# Climate-Related Risks and Opportunities: Positioning for a Lower-Carbon Economy



# About Occidental

Occidental Petroleum Corporation (Occidental) is an international oil and gas exploration and production company with operations in the United States, Middle East and Latin America. Headquartered in Houston, Occidental is one of the largest U.S. oil and gas companies based on equity market capitalization. Occidental's midstream and marketing segment gathers, processes, transports, stores, purchases and markets hydrocarbons and other commodities. Occidental's wholly owned subsidiary, OxyChem, is a major North American chemical manufacturer.

"At Occidental, social responsibility is fundamental to our success and reputation as a respected Partner of Choice.""

Founded in 1920, Occidental's success is built on technical expertise, business acumen, strong partnerships and our proven ability to deliver results.

At Occidental, social responsibility is fundamental to our success and reputation as a respected Partner of Choice.<sup>®</sup> We are committed to conducting our business in a manner that safeguards our employees, protects the environment, benefits neighboring communities and strengthens local economies.

# About this Report

This report highlights our efforts to address climate-related risks and opportunities in our business. The report begins with a letter from our President and CEO, followed by a substantive executive summary. We then take a deeper look at carbon dioxide enhanced oil recovery (CO<sub>2</sub> EOR) and carbon capture, utilization and sequestration (CCUS), a technological and operations-oriented approach that can be used to reduce greenhouse gas emissions while growing our business. For those interested in greater detail, we include an in-depth review that is organized in the four-element framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD), which covers governance, risk, strategy and metrics and targets.<sup>1</sup> A glossary of relevant terms is provided at the end of this report.

<sup>1</sup> The TCFD — established by the Financial Stability Board in response to a request from the G20 Finance Ministers and Central Bank Governors — developed a voluntary disclosure framework for climate-related financial disclosures. The framework is organized around four themes: Governance, Strategy, Risk Management and Metrics and Targets. See https://www.fsb-tcfd.org/

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### Cautionary Statement Regarding Forward-Looking Statements

This report contains forward-looking statements based on management's current expectations relating to Occidental's operations and business prospects. Words such as "estimate," "project," "predict," "will," "would," "should," "could," "may," "might," "anticipate," "plan," "intend," "believe," "expect," "aim," "goal," "target," "objective," "likely" or similar expressions that convey the prospective nature of events or outcomes generally indicate forward-looking statements. You should not place undue reliance on these forward-looking statements, which speak only as of the date of this report. Actual results may differ from anticipated results, sometimes materially, and reported results should not be considered an indication of future performance. Factors that could cause results to differ include, but are not limited to: global commodity pricing fluctuations; changes in supply and demand for Occidental's products; higher-than-expected costs; the regulatory approval environment; not successfully completing, or any material delay of, field developments, expansion projects, capital expenditures, efficiency projects, acquisitions or dispositions; technological developments; uncertainties about the estimated quantities of oil and natural gas reserves; lower-than-expected production from operations, development projects or acquisitions; exploration risks; general economic slowdowns domestically or internationally; political conditions and events; liability under environmental regulations including remedial actions; litigation; disruption or interruption of production or manufacturing or facility damage due to accidents, chemical releases, labor unrest, weather, natural disasters, cyber attacks or insurgent activity; failures in risk management; and the factors set forth in Part I, Item 1A "Risk Factors" of the 2017 Form 10-K. Unless legally required, Occidental does not undertake any obligation to update any forward-looking statements, as a result of new information, future events or otherwise. Third-party scenarios discussed in this report reflect the modeling assumptions and outputs of their respective authors, not Occidental. Statistics and metrics included in this report are estimates and may be based on assumptions or developing standards.

# **CEO** Letter

At Occidental, we provide energy the world needs while delivering strong, sustainable returns for our shareholders through business strategies and technologies that address a lower-carbon economy and other environmental issues.

Last year, our shareholders asked for more information about the steps we're taking to prepare for the potential financial risks of a lower-carbon economy. We've analyzed our portfolio using the 2016 and 2017 climate scenarios developed by the International Energy Agency, and I'm pleased to report the results showed no significant impacts to our business.

This report also highlights our experience in carbon capture and sequestration projects (CCUS), which is built upon our industry-leading position in carbon dioxide enhanced oil recovery, and has the potential to help achieve global goals for reducing emissions. In early 2018, Congress approved legislation that could help incentivize the development of new CCUS projects, making more anthropogenic carbon dioxide available for geologic sequestration and for use in oil and gas production. This should provide additional opportunities for Occidental in a lower-carbon future.

In addition to our ongoing efforts to conserve resources and reduce emissions, we have made new commitments to:

- Regularly evaluate our strategy with Board oversight under various lower-carbon scenarios
- Model carbon prices and related financial impacts in capital spending plans for major projects
- Develop new metrics for carbon dioxide and methane emissions to better inform decision-making and enhance transparency
- End routine gas flaring by 2030
- Add an executive compensation metric related to the advancement of CCUS
- Support industry emissions-reductions efforts as part of the American Petroleum Institute-sponsored Environmental Partnership

This report was prepared with guidance from the Board of Directors, management and shareholders. Independent directors participated in a majority of our meetings with shareholders. These discussions were extremely valuable, and we plan to continue this engagement.

Our Board and management understand that climate issues, like other business concerns, are continuously evolving. Occidental is committed to transparency around our climate-risk efforts and planning. We will provide updates on our progress and look forward to continuing the dialogue.

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Vicki Hollub President and Chief Executive Officer

March 2018

# Executive Summary

Occidental's Board of Directors and management team view this climate report as a key part of our efforts to continuously improve dialogue with shareholders and other key stakeholders on climate-related risks and opportunities. The Board is committed to active and participatory shareholder engagement, as well as increasing our company's acumen about these issues.

Our goal is to provide insight into how we incorporate information on climaterelated risks and opportunities into our strategy, risk management and governance processes, including the steps we're taking to account for a lower-carbon economy. We discuss enhancements to our capital approval process and emissions metrics, and we detail the competitive advantages we believe that our carbon dioxide enhanced oil recovery ( $CO_2$  EOR) and international gas assets offer in lower-carbon scenarios. We also share the positive results of our portfolio analyses of the International Energy Agency's (IEA) global energy scenarios consistent with the goal of limiting the global increase in temperature to 2°C (the 450 and Sustainable Development Scenarios), and remain committed to regular assessments as new scenarios are developed.

### Sustainable, Flexible Business Positioned for Success in a Lower-carbon Economy

Occidental is focused on continuing to build and improve a sustainable business through asset quality, organizational capability and a unique value-based development approach. Our oil and gas assets are located in some of the world's highest-margin basins and are characterized by an advantaged mix of short- and long-cycle, returns-focused development opportunities. In the United States, we continue to hold a dominant position in the Permian Basin. Our other core operations are in the Middle East (Oman, Qatar and UAE) and Latin America (Colombia). We also operate a world-class chemical business that generates high financial returns. Occidental's midstream and marketing segment strives to maximize the realized value of production from the oil and gas and chemicals businesses.

Our global strategy includes active investment in  $CO_2$  EOR and carbon capture, utilization and sequestration (CCUS), as well as other emissions-reducing technologies, positioning Occidental with a competitive advantage in lower-carbon scenarios. We have included a standalone section following this executive summary to further define these technologies and our business approach, explain their significance and provide context around their potential.

In addition, our Middle East assets are in emerging gas markets where there is a drive for cleaner power generation. As part of a 30-year joint venture, we participate in Al Hosn Gas, one of the largest natural gas developments in the Middle East. We also operate gas developments in Qatar and Oman. External market data indicates a significant increase in future demand for natural gas as a cleaner energy source in the Middle East, which provides support for a regional commodity price premium. Our history and strategic position in the region, along with our major project capability and strong relationships, position us for significant value potential in a lower-carbon economy.

Occidental is committed to environmental stewardship, and we have been recognized by the U.S. Environmental Protection Agency (EPA), as well as other government and third-party groups, for our practices and innovation. For decades, we have conducted our business in accord with the highest standards, not only with respect to the technical aspects of our industry, but also with regard to protection of the environment and the health and safety of our employees and contractors and the communities where we operate. Looking ahead, our high-quality assets and our track record of technical and operational excellence, in combination with our unique  $CO_2$  EOR and international gas assets, position us to be successful — even if widespread carbon constraints are adopted in the regions where we operate. Occidental is built for sustainability, with the capacity to be nimble and responsive and to stay focused on our competitive advantages.

### Climate-risk Assessment and Management with Board Oversight

Our Board of Directors has made it a priority to include consideration of greenhouse gas (GHG) emissions and a lower-carbon economy in our strategic planning. Environmental, social and governance (ESG) issues are the responsibility of two of our Board committees: the Environmental, Health and Safety Committee and the Corporate Governance, Nominating and Social Responsibility Committee. Combined, these committees include all of our independent directors. One of the responsibilities of the Environmental Committee outlined in its charter is to review and discuss climate-related risks and opportunities with management.

Occidental's capital planning and business strategies incorporate analyses of the short- and long-term financial risks of a lower-carbon economy. Our oil and gas capital projects typically return capital deployed in three years or less, minimizing the risk that proved reserves and capital could be stranded in the event of rapid disruptive market or regulatory changes, including those related to climate.

Currently, no carbon tax applies to any of Occidental's oil and gas operations or products. However, our leadership is taking proactive steps to understand potential impacts should such carbon pricing regimes emerge. Starting this year, Occidental is modeling carbon prices and related financial impacts for all major projects, regardless of whether the projects are in areas with current or proposed carbon prices. Our capital approval process assumes a \$40/metric ton price on carbon for sensitivity modeling. This modeling will be supplemented by a field-by-field  $CO_2$  emission-intensity information initiative. We are taking this proactive step to enhance our capital planning process and preparedness.

We are a hands-on, application-oriented company, and manage GHG emissions at the field level by using innovative technologies to reduce flaring and methane emissions. Our asset teams employ increasingly sophisticated technology to identify and mitigate methane and other hydrocarbon leaks, and upgrade plants and facilities by retrofitting them with vapor recovery units and low-emitting equipment. In 2017, more than 1,500 leak surveys were performed in Occidental's U.S. oil and gas operations as part of our efforts to reduce emissions. We also minimize flaring of natural gas by bringing it to market or putting it to use, making substantial reductions in flaring emissions in Qatar and Oman.

> "Our Board of Directors has made it a priority to include consideration of greenhouse gas (GHG) emissions and a lower-carbon economy in our strategic planning."

### Scenario Analysis

As part of our efforts to better understand the potential long-term impacts of a lower-carbon economy, we reviewed the three main scenarios from the IEA's 2016 World Energy Outlook and tested our proved reserves against the most rigorous of the three — the 450 Scenario, which aims to reduce emissions with the goal of limiting the global increase in temperature to 2°C.

The 450 Scenario included escalating carbon prices of \$20-\$140 per metric ton for our U.S. assets. Our analysis then went a step further by applying  $CO_2$  prices to our international assets, even though the 450 Scenario had assumed  $CO_2$  prices of \$0 for those locations.

In late 2017, the IEA published its annual update to its World Energy Outlook. This update included a new Sustainable Development Scenario that embedded many of the same assumptions used in the 450 Scenario, but changed certain others, such as lower oil and gas pricing and an accelerated increase in carbon prices.

Our modeling of both the 450 and the Sustainable Development Scenarios showed no significant impact to proved reserves.

We believe that regular assessment and testing are useful tools to ensure that our company properly understands and is prepared for climate-related challenges, and view the IEA scenarios as important guideposts in performing tests of our portfolio. Our Board and management are committed to regularly evaluating our asset base and reserves under various lower-carbon scenarios.

#### Metrics, Targets and Next Steps

Occidental's projects have reduced cumulative estimated methane emissions by more than 17.2 billion cubic feet the equivalent of almost 1 million metric tons of  $CO_2$  — from 1990 through year-end 2016. We are committed to ending routine gas flaring by 2030, and are developing CO<sub>2</sub> and methane emission-intensity metrics to help focus our efforts and to provide transparent indicators of our performance.

We voluntarily report estimated GHG emissions and have participated in the CDP (formerly the Climate Disclosure Project) survey since its inception in 2003. In our 2017 CDP submittal,

Occidental provided increased disclosure on initiatives for mitigating CO<sub>2</sub> and methane emissions, as well as our direct and indirect estimated emissions by business divisions for both CO<sub>2</sub> and methane, among other GHGs. Our CDP responses are available on our company website.<sup>2</sup>

We also participate in the recently announced API-sponsored Environmental Partnership to reduce methane emissions and plan to share our progress on these efforts.

We recognize that planning for a lower-carbon economy is a continuing and evolving process. Going forward, we will monitor and adjust our metrics and targets. Occidental is committed to maintaining an ongoing and transparent dialogue between management, shareholders and other key stakeholders on climate-related risks and opportunities.

Learn more about Occidental's climate-related performance, progress and outlook, starting with an overview of CO<sub>2</sub> EOR and CCUS on page 9. An in-depth review, organized in the framework recommended by the Task Force on Climate-related Financial Disclosures (TCFD), follows on pages 14-30.

Figure 1. Summary of Climate Change Report Themes	
<b>Strategy for Sustainability</b> High quality, diverse assets are economic in a lower-carbon economy. A unique position and capability in $CO_2$ EOR and international gas is a differentiator.	<ul> <li>Safe and low-cost production provides sustainability in a low-price lower-carbon economy.</li> <li>Our expertise in CO<sub>2</sub> EOR and CCUS technologies are a competitive differentiator.</li> <li>In the Middle East, premium prices and a drive for cleaner power generation provide additional opportunities.</li> </ul>
Managing Climate Risk Occidental's planning and business strategies address the short- and long-term financial risks of a lower-carbon economy.	<ul> <li>There is no significant impact to Occidental's proved reserves under the 450 Scenario or the Sustainable Development Scenario. We are committed to regular re-evaluation.</li> <li>Occidental's capital approval process assumes a \$40/ton price for carbon for the purpose of sensitivity modeling.</li> <li>Our advanced field-based technologies and processes contribute to the decline of methane emissions.</li> </ul>
Metrics and Targets: Improving Reporting Transparency Committed to responsible environmental performance and emissions reductions.	<ul> <li>Occidental is developing indicators for CO<sub>2</sub> emissions intensity per barrel of oil equivalent (BOE) and methane emitted relative to natural gas production.</li> <li>We are committed to the elimination of routine flaring in all fields where we operate by 2030.</li> </ul>
Governance: Oversight on Climate Risks & Opportunities The Board oversees Occidental's strategic planning process, including active consideration of GHG emissions and climate matters.	<ul> <li>Future strategy reviews will include increasing focus on climate risks and opportunities that will be overseen by the Board and Management.</li> <li>Oversight of ESG and sustainability matters is analyzed by two Board committees that include all the independent directors.</li> <li>Occidental's Board has several directors who bring unique expertise to the analysis of ESG and sustainability issues affecting the company.</li> </ul>
www.oxy.com/SocialResponsibility	

# Carbon Capture and Enhanced Oil Recovery Technologies

The important role of carbon capture, utilization and sequestration (CCUS) technology to help reduce greenhouse gas (GHG) emissions on a global scale is recognized by respected energy and climate organizations and authorities. Occidental is a leader in the technology and its application in the oil and gas industry. In this section, we distill the terms and concepts of CCUS, detail our business approach and the significance of our effort, and provide context for its potential to reduce global GHG emissions while expanding Occidental's business opportunities.

## Essential Concepts

#### What is CCUS?

CCUS is a process that captures anthropogenic (man-made) carbon dioxide ( $CO_2$ ) emissions from sources such as coal-fired power plants, ethanol plants and cement production. The  $CO_2$  is then used in a manner that prevents it from entering the atmosphere, usually by sequestering (permanently entrapping) the  $CO_2$  deep underground. Carbon dioxide sequestration in geologic formations includes injection into oil and gas reservoirs, un-mineable coal seams and deep saline reservoirs structures that have stored crude oil, natural gas, brine and  $CO_2$  for millions of years. One of the most commercially viable forms of CCUS is carbon dioxide enhanced oil recovery ( $CO_2$  EOR).

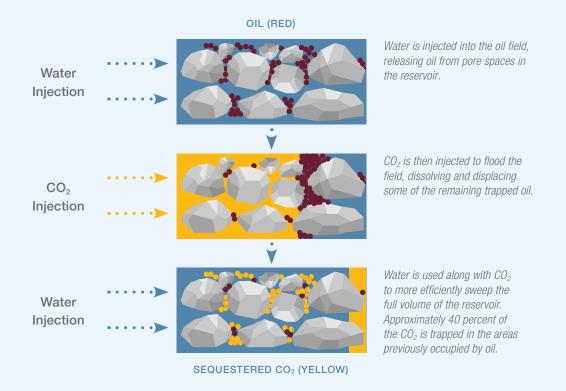
#### What is CO<sub>2</sub> EOR?

Primary oil and gas recovery is driven mostly by native pressures in the subsurface hydrocarbon formation. As hydrocarbons and other fluids are produced from the formation, the natural pressures are reduced. Once that pressure drops to a level that renders primary production methods uneconomic, various methods can be used to re-pressurize the formation and/or increase hydrocarbon mobility to enhance recovery of the remaining oil and gas. Enhanced oil recovery using CO<sub>2</sub> is a well-established EOR technique used in mature oil fields.

Using  $CO_2$  EOR to produce more oil from mature fields can be less environmentally intrusive than exploration and development of new fields.  $CO_2$  EOR avoids new habitat disturbance and leverages existing infrastructure, thereby reducing lifecycle environmental impacts of equivalent production volumes. Injection of  $CO_2$  typically allows an additional 10-20 percent recovery of original oil in place in the fields where it is employed.

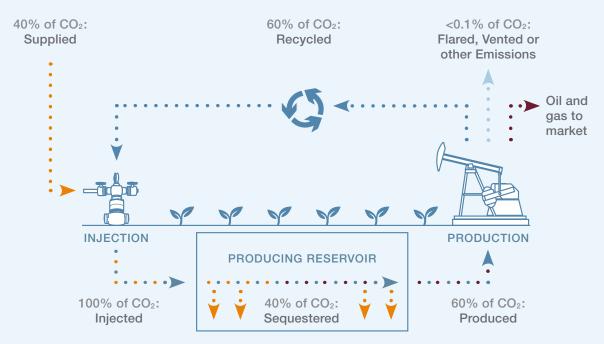
In the most common type of  $CO_2$  EOR, carbon dioxide is injected into reservoirs at sufficient pressures to cause the  $CO_2$  and oil to become a homogeneous mixture, similar to carbonated beverages. The resulting  $CO_2$  and oil mixture has lower viscosity, enhanced mobility and lower interfacial tension than reservoir oil without dissolved  $CO_2$ . This facilitates the recovery of more oil from the reservoir.

A significant portion of the  $CO_2$  injected in the reservoir becomes permanently trapped within geologic pore spaces and through dissolution in residual oil and water that remain locked in the hydrocarbon formation (see figure 2). The remaining injected  $CO_2$  is produced (pumped to the surface) along with hydrocarbon-bearing fluids, then separated and reinjected as part of the continuous injection/production process.



#### Figure 2. How CO<sub>2</sub> EOR Works In the Reservoir

 $CO_2$  EOR operations employ "closed loop" systems for managing the produced fluids — which includes  $CO_2$  — so that recaptured  $CO_2$  is injected back into the oil reservoir (see figure 3). As a result, virtually all of the supplied  $CO_2$  that is injected ultimately becomes permanently trapped in the reservoir.

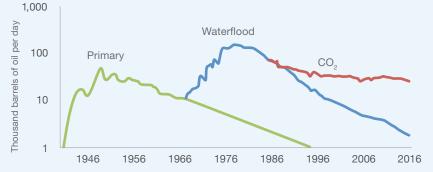


Occidental's  $CO_2$  EOR operations employ a "closed loop" so that more than 99.9 percent of the supplied  $CO_2$  that is injected ultimately becomes permanently trapped in the reservoir. This graphic illustrates a representative snapshot of the process. It shows that the  $CO_2$  injected into the reservoir at a point in time consists of newly supplied  $CO_2$  plus  $CO_2$  that is recycled in the process. During each pass through the reservoir, approximately 40 percent of the injected volume is sequestered (equivalent to the volume of new  $CO_2$  supplied); the remaining 60 percent is produced, separated from the oil and gas products, and reused.

#### Occidental's CO<sub>2</sub> EOR Business Approach and Significance

Occidental is the world leader in  $CO_2$  EOR. It is a core business and critical to our returns-based value proposition. Our strategy includes active investment in projects that extend the life of mature oil and gas reservoirs and allow for lower capital intensity and investments that are therefore profitable at lower commodity prices.

The scale and position of Occidental's  $CO_2$  EOR operations in the Permian Basin over the last 40 years are unmatched. Occidental currently operates 34  $CO_2$  EOR projects in the Permian Basin. The  $CO_2$  supplied to these projects consists primarily of natural  $CO_2$  sourced from Occidental's  $CO_2$  fields or third-party supply pipelines, as well as anthropogenic  $CO_2$  captured at some Occidental gas plants. Virtually all of this supplied  $CO_2$  (averaging approximately 18 million metric tons per year) is ultimately sequestered — equivalent to the annual emissions from more than three million vehicles.



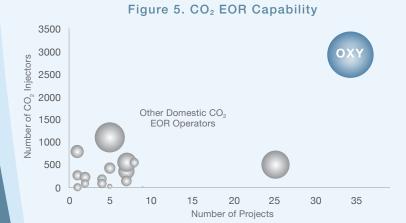
#### Figure 4. Denver Unit Oil Production

Our Denver unit in the Permian Basin of West Texas is an example of the benefits that EOR can have on oil production. After initially drilling and producing the field, waterflooding and then  $CO_2$  EOR have kept the field producing for 80 years. Historically, water has been used as a secondary oil recovery mechanism, but today  $CO_2$  is increasingly used in both secondary and tertiary recovery.

### Public Policy Engagement on CO<sub>2</sub> EOR & CCUS

Occidental's ongoing engagement with key government stakeholders and policy groups, along with our track record as an operator of world-scale  $CO_2$  EOR floods, positions us as a leader on the economic and environmental benefits of  $CO_2$  EOR and CCUS.

- Occidental engages the U.S. EPA, Department of Energy and other agencies, to advocate for the development of programs and infrastructure to increase the utilization of CCUS.
- Occidental worked with a bipartisan coalition that successfully sought enactment of the FUTURE Act, which extends a federal tax credit for CO<sub>2</sub> capture and sequestration and incentivizes the use of anthropogenic CO<sub>2</sub> in EOR operations.
- Occidental worked with the EPA and other stakeholders to develop procedures to transparently measure, report and verify CO<sub>2</sub> sequestration through CCUS, which were subsequently codified into regulations.
- We work with the Carbon Capture Coalition (formerly the National Enhanced Oil Recovery Initiative) to support CCUS incentive legislation and fiscal policies to spur commercial deployment of technologies to enable the capture of anthropogenic CO<sub>2</sub> and the permanent and safe geologic storing of CO<sub>2</sub> underground.





While much of the  $CO_2$  for our EOR operations originates from natural sources, Occidental is actively looking for opportunities to capture and use anthropogenic sources of  $CO_2$ . We have designed and developed facilities that can separate the  $CO_2$  from certain of our own production processes, and participate in research and development of other anthropogenic capture opportunities. Occidental also has a dedicated  $CO_2$  strategy team tasked with identifying business opportunities related to third-party  $CO_2$ capture and transportation for use in our operations. Beyond the Permian Basin, other Occidental-operated projects around the world may be suitable for  $CO_2$  EOR. With a reliable  $CO_2$ supply, we could have the opportunity to enhance these assets and the associated financial returns.

> As the technological leader in this application, we have partnered with regulators to help the overall CCUS industry advance, and we invest in research and development to stay at the forefront of this technology.

Occidental has received EPA approval of two Monitoring, Reporting and Verification (MRV) plans for CO<sub>2</sub> EOR fields in our Permian Basin operations. These plans, which were the first-ever approved by EPA for simultaneous CO<sub>2</sub> EOR and sequestration, provide an EPA-approved framework for assessing the reservoir and the potential pathways of CO<sub>2</sub> leakage and reporting the amount of CO<sub>2</sub> sequestered throughout the process. The first plan, for our Denver Unit in the Permian Basin of Texas and New Mexico, was approved by the EPA in late 2015, and the second (for Hobbs Field, also in the Permian Basin) in 2017. Together, these plans demonstrate the safe and secure storage of CO<sub>2</sub> through EOR. These plans are published on the EPA website at https://www.epa.gov/ghgreporting/ subpart-rr-geologic-sequestration-carbon-dioxide. In the first year of the Denver Unit plan, more than 3.1 million metric tons of  $CO_2$  was sequestered. Of this amount, more than 25 percent was captured from government-recognized anthropogenic sources (specifically, waste  $CO_2$  captured from Occidental's Century gas plant). It is noteworthy that the total anthropogenic  $CO_2$  sequestered in this one project alone represents more than 7 percent of Occidental's 2016 direct GHG emissions globally.

Occidental is making a significant investment to advance  $CO_2$  EOR as a form of CCUS. We believe these technologies offer meaningful tools to address GHG emissions and grow our business. Moreover, because Occidental currently purchases much of the  $CO_2$  we use in EOR, we have insight into market-driven  $CO_2$  supply pricing. Though we have yet to model this in our scenarios and stress tests, we can foresee a time when we may be paid to take and sequester  $CO_2$  from third parties incentivized to capture it from their own operations.

### The Role of CCUS in Mitigating Global GHG Emissions

Climate and energy authorities, including the International Energy Agency (IEA) and the UN Intergovernmental Panel on Climate Change, recognize the important role that CCUS must play if atmospheric carbon concentrations are to be limited to levels targeted in international climate accords. Based on research by the IEA, it has been shown that CCUS in the form of EOR with anthropogenic  $CO_2$  can provide a significant reduction in life-cycle per barrel  $CO_2$  emissions compared to oil produced using non-EOR techniques.

We are encouraged by the efforts of others, including global competitors, to study and seek to apply this promising technology. We will continue to build on and maintain our leadership position in these technologies while advocating their global potential.



# Governance

Occidental's senior management team and Board of Directors share a commitment to effective and ethical corporate governance, which we believe ultimately enhances stockholder value. Good governance also requires stakeholder engagement. Below is information about our Board oversight process and stakeholder engagement practices.

### Board Oversight of Climate Risks & Opportunities

Pursuant to its charter, the Board's longstanding Environmental, Health and Safety Committee (Environmental Committee) reviews climate-related risks and opportunities as part of our strategic planning and risk management processes.

Currently comprised of six independent directors, the Environmental Committee has held several joint meetings with the Corporate Governance, Nominating and Social Responsibility Committee (Governance Committee) to discuss key environmental, social, governance (ESG) and sustainability matters. Issues discussed have included climate-related matters, including the development and review of this report. Based on the current membership of these committees, these joint meetings have included all of the company's independent directors. In addition, the Environmental Committee typically has held meetings when no other committee meeting was scheduled, so that all directors had the opportunity to attend and participate. This oversight structure and meeting schedule has been intended to ensure that important ESG and sustainability matters, including analysis of climate-related risks and opportunities, receive the attention of the full Board.

#### Figure 6. Board Oversight of Climate Risk

Audit Committee Corporate Governance, The Environmental and Nominating and Governance committees Social Responsibility provide oversight of ESG and Committee sustainability matters Together these two committees include all of our independent Environmental. directors, some of whom have Health and Safety unique expertise on ESG and Committee sustainability issues Executive Compensation Committee

Occidental's Board recognizes the multifaceted nature of risk management and has empowered its committees with risk oversight responsibilities, including climate risk.

Occidental's Board includes a number of directors who have decades of industry experience, as well as several directors who bring unique expertise and perspective to the analysis of ESG and sustainability issues affecting the company. They include:



JOHN FEICK, executive chairman of an environmental services provider with broad experience in the environmental, health and safety areas, who chairs Occidental's Environmental Committee and is a member of our Governance and Compensation Committees;



ELISSE WALTER, a former Chairman of the U.S. Securities and Exchange Commission (SEC), current director of the SASB Foundation and noted speaker on sustainability and disclosure issues, who serves on our Environmental and Audit Committees;



MARGARET FORAN, a recognized expert in corporate governance, who has had a leading role in strengthening corporate ESG principles and practices at several U.S.-based global companies, who chairs our Compensation Committee and is a member of our Governance Committee; and



SPENCER ABRAHAM, a former Secretary of the U.S. Department of Energy who spearheaded the department's research and development efforts in the areas of hydrogen fuel cells and clean coal technology, who serves on our Environmental and Compensation Committees.

Finally, the Board is led by an independent chairman who, among other responsibilities, coordinates and approves all meeting agendas and serves as liaison between the Board and Occidental's stockholders.

In addition to oversight exercised through its strategy review, project approval and committee processes, the Board, through the Executive Compensation Committee, also influences management priorities by establishing the parameters and goals that determine executive compensation.

For many years, Occidental's executive compensation program has included elements related to sustainability, focused primarily on safety and environmental performance. For 2018, the sustainability portion of the program was broadened to include a climate-related element associated with the advancement of CCUS.

### Board Engagement and Oversight

To support the Board's oversight of strategy and risk management, senior management regularly reports to the Board on environmental and sustainability matters, including climate-related risks and opportunities. This interaction takes place informally during regular business, scheduled meetings and during annual strategy sessions.

During 2017 strategy discussions, the Board heard from a noted expert in oil markets and energy demand. The expert discussed alternate scenarios, including one in which the market rapidly transitions away from fossil fuels, as well as the potential impacts of electric vehicle market penetration on oil demand.

The Board also received an update from Occidental's  $CO_2$  EOR strategy team on anthropogenic  $CO_2$  sources, commercial partnerships and technology developments in CCUS. Additionally, the Board discussed international gas project opportunities that could provide business growth and support a cleaner energy supply.

These agenda items reflect the Board's engagement and efforts to enhance its understanding of how a lower-carbon economy might affect the company – while supporting and strengthening Occidental's shareholder value proposition. Future Board strategy sessions will continue to refine and enhance our consideration of climate-related risks and opportunities.

### Stakeholder Engagement

Occidental is focused on building trust through regular and transparent communication and engagement. By actively engaging with our stakeholders, we strive to understand and proactively address issues and concerns to develop beneficial outcomes.

Occidental's integration of issues relating to climate risks and opportunities into our business strategy helps inform our active stakeholder engagement. For example:

- Occidental is a member of IPIECA (formerly International Petroleum Industry Environmental Conservation Association), the global oil and gas industry association for environmental and social issues. Our collaborative work with IPIECA supports efforts to develop industry guidelines on GHG management and reporting and mitigation technologies and to convene climate-related workshops to inform stakeholders like the United Nations Framework Convention on Climate Change (UNFCCC).
- Occidental has reported water and climate-related information through the CDP (formerly the Climate Disclosure Project) since its inception in 2003, and looks for guidance on reporting principles from organizations including the TCFD, SASB and the Global Reporting Initiative.
- We discussed the company's approach to climaterelated risks and opportunities with more than 30 investors and other ESG-focused stakeholders as part of preparations for this report. A majority of the discussions included one or more independent directors. These discussions played a role in the decision that the report structure would reflect the framework developed by the TCFD.

Going forward, Occidental will continue this dialogue on emissions and climate-related risks and opportunities with our shareholders and other key stakeholders through engagement and established reporting requirements, as well as evolving reporting/disclosure frameworks.

# Risk Management: Integrating Climate-related Risks & Opportunities

Occidental has long recognized that robust risk assessment and proactive risk management is essential to assure safe and reliable operations and consistent returns for investors. Climate-related risks are integrated into our routine risk assessments and strategic planning to support readiness for emerging challenges and opportunities.

Our capital planning process is grounded in a returnsfocused approach that is intended to maximize the value of our portfolio and execute on our strategic priorities. As part of our investment decision process, we evaluate a wide range of opportunities and consider the associated risks, such as technical subsurface challenges and technical progress, regulatory and environmental developments, geopolitics, macro commodity-price outlooks and localized risks. We consider the effects that a lower-carbon economy could have on our business and returns on capital by:

- Assessing the potential impacts of various climaterelated energy price/demand scenarios on our existing assets; and
- Starting this year, testing all new projects of greater than \$5 million for carbon price sensitivity.

We are also developing a process for field-by-field greenhouse gas (GHG) emissions intensity estimation. Understanding the GHG emissions intensity of each field will provide additional information for future capital allocation decisions that might be affected by a price on carbon. This information could also help identify opportunities for additional monitoring or better emissions management. In this section we discuss our carbon pricing assumptions and portfolio review process, including how our assets and reserves performed under modeling based on the International Energy Agency's 2016 "450 Scenario" and 2017 "Sustainable Development Scenario."

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#### Carbon Price Assumptions

Currently, no carbon tax applies to any of Occidental's oil and gas operations or products. However, as part of our commitment to informed capital planning and risk management, in 2018 we added an assumed price on carbon to our capital approval process for the purpose of sensitivity modeling.

This modeling allows our capital planners and senior management to analyze the long-term risks of exposure to carbon prices when extending the operating life or reserves of existing fields or entering new projects, while simultaneously instilling a culture of carbon-price sensitivity in our capital planning. The carbon price used for this sensitivity modeling was determined by considering the average project "cycle" (the time expected for the project to return the original capital investment, typically three years for shorter cycles and five or more years for longer cycles) and the risk of a price on carbon in each operating region. In general, Occidental's domestic projects are shorter cycle but have higher risk of a future carbon price, while our international projects have longer cycles and, for Middle East locations, a lower-carbon price risk. Accordingly, for 2018, Occidental has determined that a \$40 price on  $CO_2$  emissions (which translates to a cost of about \$1.50 per BOE) will be used to perform sensitivity modeling for all larger projects.

Our sensitivity modeling approach is informed by policybased carbon price risk assumptions derived primarily from scenarios considered in the IEA's World Energy Outlook (WEO). Additionally, as the largest commercial purchaser and injector of  $CO_2$  for EOR in the Permian Basin and a global leader in this technology, Occidental has insight into market-driven  $CO_2$  supply pricing and routinely utilizes this information in our business and strategic planning.

### Portfolio Review Process & Results

To supplement the strategic planning discussions that occur at the senior management and Board levels, Occidental considers various scenarios to assess potential future climate-related impacts on the company's existing assets. For scenarios, Occidental relies on independent third parties, such as the IEA, to develop the narratives and associated assumptions (including demographic, government policy, technological change and energy supply/demand data), and to run the large-scale simulation models that generate equilibrium prices for energy and CO<sub>2</sub> emissions. Although Occidental does not have the resources needed to develop such scenarios internally, we believe sound, externallydeveloped scenarios benefit stakeholders seeking to compare companies across industries. The IEA is recognized for its work in examining future energy trends. The IEA's *World Energy Outlook 2016* included three main scenarios that Occidental reviewed: the Current Policies Scenario, which includes only those policies enacted as of mid-2016; the New Policies Scenario, which assumes global compliance under the Paris Agreement and certain announced governmental climate targets and intentions; and the 450 Scenario, which envisions a more stringent global policy framework that aims to cap the atmospheric concentration of  $CO_2$  at 450 parts per million — a level intended to limit global temperature increase to 2 degrees Celsius.

We modeled the 2016 WEO 450 Scenario, the most rigorous of the three.

A few months prior to the publication of this report, the IEA published its *World Energy Outlook 2017*. The IEA updated the Current Policies and New Policies scenarios, and replaced the 450 Scenario with the Sustainable Development Scenario. We modeled the most rigorous of the new main IEA scenarios, the Sustainable Development Scenario.

A discussion of our modeling of the 450 and Sustainable Development Scenarios follows.

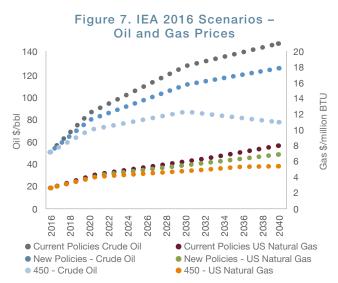


### The 2016 IEA 450 Scenario

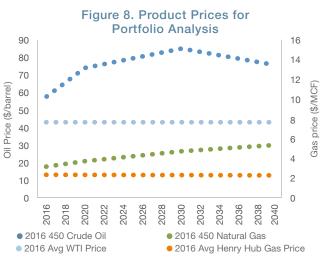
For our assessment of potential negative impacts of the 450 Scenario on our existing proved reserves, Occidental used a reference case model to represent our asset base at year-end 2016. The assessment was based on a representative portfolio of assets that contained more than 50 percent of proved reserves from our U.S. and non-U.S. oil and gas locations as reported in our 2016 Form 10-K. Planned capital spending and expected operating costs from the approved development plans that support the reserves were embedded in the model. The reference case model used the oil, natural gas liquids (NGL) and natural gas prices calculated in accordance with U.S. Securities and Exchange Commission (SEC) rules for determining year-end 2016 proved reserves and computing the Standardized Measure of Discounted Future Net Cash Flows ("Standardized Measure") reported in Occidental's 2016 Form 10-K. For estimating reserves, SEC rules require the use of the unweighted arithmetic average of the first-day-of-the-month price for each month within the year, unless prices were defined by contractual arrangements. Oil, NGL and natural gas prices used for this purpose were based on posted benchmark prices and adjusted for price differentials including gravity, quality and transportation costs. For 2016, the calculated average West Texas Intermediate (WTI) oil price was \$42.75; the calculated average Brent oil price was \$44.49; and the calculated average Henry Hub gas price was \$2.55. We also used a \$0 price on CO<sub>2</sub> emissions for the reference case model, since none of Occidental's oil and gas operations or products are currently subject to regulations that impose a carbon pricing structure.

Portfolio impacts were assessed by applying the outcomes for the 450 Scenario for oil and natural gas prices and  $CO_2$ prices in the regions where we operate. We also performed a more rigorous sensitivity analysis that added a carbon price on our international assets, none of which would have been subject to carbon prices under the 450 Scenario. In the test cases, capital expenditures and operating expenses were escalated in a manner consistent with the escalation of the product prices in the 450 Scenario.

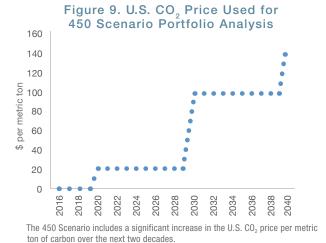
The results from this analysis showed no significant impact to our proved reserves. Domestic proved reserves decreased less than 1 percent, while international proved reserves declined approximately 6 percent due to provisions of operating contracts that adjust Occidental's production share relative to price. The net present



Occidental considered three scenarios from the *World Energy Outlook 2016*: the Current Policies, New Policies and 450 Scenarios. We chose to model the 450 Scenario because its forecast for relatively lower oil and gas prices, pictured in this chart, and relatively higher carbon prices presented a more rigorous test.



The 450 Scenario prices for oil and gas are well above 2016 calculated average WTI and Henry Hub prices.



value applying a 10 percent discount factor (NPV10) of Occidental's proved reserves showed no negative impact under the 450 Scenario. In fact, the analyses showed an increase in NPV10. This outcome is not surprising since, under the 450 Scenario, the cost burden imposed by  $CO_2$  emissions prices is more than offset by oil and gas product prices under the scenario that are higher than our reference case model prices calculated in accordance with SEC rules as described above. For example, even at a  $CO_2$  price of \$100 per metric ton applied on our domestic oil and gas operations, we estimate a cost burden for our oil and gas operations to be equivalent to approximately \$2 per BOE (based on Occidental's current  $CO_2$  emissions intensity.) The difference between our reference case oil and gas prices and the scenario prices is more than \$2.

The results of the scenario analysis further demonstrate the strength of Occidental's assets and strategy, including in a lower-carbon economy. Occidental has a robust resource base with a focus on short-cycle projects and disciplined cost management. Our  $CO_2$  EOR business, which has a low decline rate and a depreciated asset base, acts as a hedge against longer-cycle risks.

Occidental's ability to operate economically and the strength of our internal capital planning supports a sustainable dividend payout even when oil prices are low. Our business is currently implementing a plan for sustainability at oil prices as low as \$40 per barrel (see sidebar). Furthermore, Occidental's oil price assumptions are flat over the modeled period and significantly lower than that of the IEA models, which — even in the 450 Scenario — assume an upward trend over most of the modeled period. In addition, our 450 Scenario analysis did not model for the potential upside of the additional proved reserves (and associated reserve valuation) that would have resulted from the higher future oil and gas prices used by both the New Policies and 450 Scenarios relative to Occidental's reference case.

Occidental also did not use these scenarios to develop models of the potential upside for Occidental's  $CO_2$  EOR business, though we plan to do so in the future. Occidental currently incurs a cost to source  $CO_2$  for its EOR business. Under a scenario where  $CO_2$  emissions carry a price, there would be a potential benefit to Occidental — one that is proportional to the  $CO_2$  emissions price — as emitters look to reduce their  $CO_2$  emissions costs.

## Scenario Analysis and \$40/\$50 Business Plan

The relatively recent drop in oil prices from over \$100 per barrel in 2014 to below \$30 per barrel in 2016 presented a significant challenge to Occidental's investment premise of sustained dividend and production growth. In response, our Board and management implemented a near-team business plan to achieve "sustainability at \$40 oil price" and "growth at \$50 oil price." At \$40 WTI, the plan supports the dividend and provides sufficient operating cash flow and capital to sustain production. At \$50 WTI, the plan provides enough additional capital to grow production 5-8 percent annually while continuing to fulfill Occidental's dividend growth goal.

To accomplish this business plan, Occidental set a 24-month timeline with milestones for operating cash flow and production improvements, starting in the first quarter of 2017. As of the publication of this report, we are ahead of schedule and expect to achieve our plan before the end of 2018.

Occidental's ability to execute this business plan demonstrates our resilience to lower-price scenarios. The strategic process used to develop these plans will continue to be refined with climate-related inputs to support our readiness for associated risks and opportunities.

### The 2017 IEA Sustainable Development Scenario

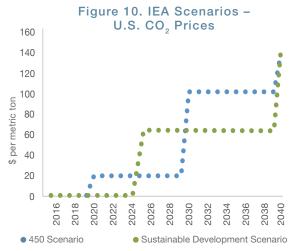
In late 2017, the IEA released its *World Energy Outlook 2017*. It describes four large-scale shifts in the global energy system:

- The rapid deployment and falling costs of clean energy technologies;
- The growing electrification of energy;
- The shift to a more services-oriented economy and a cleaner energy mix in China; and
- The resilience of shale gas and tight oil<sup>3</sup> in the United States.

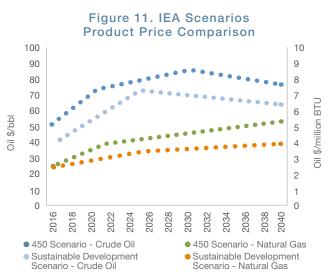
The *World Energy Outlook 2017* assumes lower oil prices than the 2016 version, reflecting higher estimates for recoverable tight oil and natural gas liquids in the United States, a reduction in the cost outlook for a variety of upstream projects, and a greater share of shorter-cycle investments on the supply side. The lower product prices and the modified carbon price profile create a more conservative (i.e., stringent) basis for modeling reserves versus the 450 Scenario. The *World Energy Outlook 2017* includes three main scenarios: the Current Policies and New Policies Scenarios, which are similar to those in the World Energy Outlook 2016, and the Sustainable Development Scenario, which is described below.

For 2017, IEA replaced its 450 Scenario, which was focused on a single goal (reducing carbon emissions), with its new Sustainable Development Scenario, which models the least-cost pathway to achieving the three energy-related goals in the 2030 Agenda for Sustainable Development adopted by the United Nations in 2015. These goals are: universal access to modern energy by 2030, stringent control of GHG emissions consistent with the objectives of the Paris Agreement (and generally consistent with the 450 Scenario), and a steep reduction in conventional air pollutant emissions.

Under the Sustainable Development Scenario, carbon prices varied somewhat from those modeled in the 450 Scenario, but continued to reach \$140/metric ton in 2040. Also, the Sustainable Development Scenario anticipated carbon emission pricing in more countries than the 450 Scenario, but this pricing still only applies to Occidental's U.S. oil and gas assets.



The U.S.  $\mbox{CO}_2$  price trajectory for the Sustainable Development Scenario compared to the 450 Scenario.

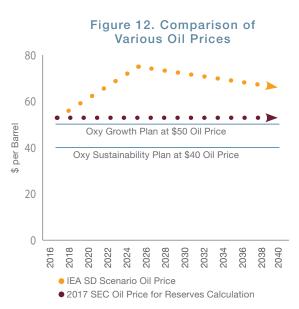


The product prices for oil and gas in the Sustainable Development Scenario are lower than in the 450 Scenario.

Occidental used the Sustainable Development Scenario to assess our year-end 2017 proved reserves, using the same methodology (updated with 2017 SEC prices) as we had used in our assessment of the 450 Scenario on our year-end 2016 proved reserves, as described on page 18. Even with the Sustainable Development Scenario's lower oil prices and accelerated  $CO_2$  cost burden relative to the 450 Scenario, there is still no significant impact to Occidental's proved reserves or NPV10 valuation. Proved reserves decreased less than 1 percent and the NPV10 valuation of Occidental's proved reserves showed no negative impact. As with the 450 Scenario analysis, the cost burden imposed by  $CO_2$  emissions prices is more than offset by oil and gas

product prices under the Sustainable Development Scenario that are higher than our reference case model prices calculated in accordance with SEC rules for reserves calculations. At CO<sub>2</sub> prices of \$63 and \$140 per metric ton for the U.S., as used in years 2025 and 2040 of the Sustainable Development Scenario, we estimate Occidental's cost burden to be equivalent to approximately \$1 and \$3 per BOE, respectively, while the differences between our reference case oil and gas prices and the scenario prices are more than those amounts. Figure 12 compares the oil prices used in our 2017 scenario analysis (the Sustainable Development Scenario oil prices and the 2017 SEC oil prices used for our reserve calculations) with the oil prices we are using in our near-term \$40/\$50 business plan as described in the sidebar on page 19.

Occidental recognizes that other climate scenarios are being developed using a spectrum of price and supply/ demand assumptions. We will continue to evaluate new scenarios, and reassess our asset portfolio based on material changes in leading market forecasts or carbon pricing regimes or significant changes to our asset mix.



Oil prices used for estimating year-end 2017 proved reserves were calculated in accordance with SEC rules, based on posted benchmark prices and adjusted for price differentials including gravity, quality and transportation costs. For 2017, the calculated average WTI oil price was \$51.34 and the calculated average Brent oil price was \$54.93.



# Our Strategy for Resilience and Opportunity

Following a comprehensive portfolio review in 2013, Occidental took action on a strategy to become a more focused and betterintegrated company, positioned to be an industry leader in financial, operational and environmental performance. The attributes of this strategy include our short-cycle investment portfolio, low base-production declines, strong financial position and focus on shareholder return through value-based development. This portfolio optimization commenced as oil commodity prices began a significant drop, but the strength of our remaining portfolio and conservative balance sheet provided time and capital to rebuild profits through higher-margin and better-returning projects. As a result, we are better positioned to execute our long-term strategy, operate more efficiently and enhance value for shareholders.

> "Occidental is a world leader in the use of CO<sub>2</sub> EOR and CCUS. These capabilities provide our company with the opportunity to grow CO<sub>2</sub> EOR and sequestration in a lowercarbon economy."

Occidental's assets and business segments are regularly reviewed by our Board and management to enhance strategic alignment and positioning for future opportunities and risks. Within our strategic improvement framework, we are focused on social responsibility, including the environment and climate. Occidental's unique expertise in  $CO_2$  EOR technologies differentiates us from our peers, and represents a compelling business opportunity with potential to reduce global GHG emissions. We will continue to refine our strategic improvement framework – enhancing asset quality, organizational capability and innovative technical applications – while remaining focused on environmental conservation, climate-related risks and opportunities, and other social responsibility commitments.

### Occidental Oil & Gas: Flexible, Low-cost Assets with Unique Technical Capabilities

Through our portfolio optimization efforts, we exited several higher-risk, lower-returning assets representing approximately 40 percent of our production. Today, Permian Basin unconventional development projects provide a short-cycle investment timeframe, replacing the lower-return production that was exited during the portfolio optimization. This provides better cash flow while growing long-term value through stronger returns on capital employed, a key metric for Occidental.



Today, we are focused on core domestic and international assets that are competitively advantaged through geography and scale, and provide long-term business opportunities and risk management under a wide range of scenarios. Located in the U.S. Permian Basin, Colombia, Oman, Qatar and the UAE, our core operating and development areas are in mature hydrocarbon basins with pre-existing production and infrastructure. These assets provide current production and a portfolio with decades of future projects that are flexible, have short-cycle investment paybacks and low base-production declines.

In each core operating area, we benefit from scale, technical expertise, environmental and safety leadership, and commercial and governmental collaboration. We can bring additional production quickly to market by the development of new assets and by extending the life of older fields at lower development and operational costs. Our asset positioning and innovative approach provides full-cycle value and differentiated future opportunities. Occidental is a world leader in the use of  $CO_2$  EOR and CCUS. These capabilities (discussed elsewhere in this report and on Occidental's website) provide our company with the opportunity to grow  $CO_2$  EOR and sequestration in a lower-carbon economy. International gas projects, which supply cleaner energy in rapidly growing markets, also highlight Occidental's leadership in business and environmental stewardship, including climate-related matters.

#### Middle East Depth and Opportunity

Occidental has been an active investor in the Middle East for more than four decades. We are well regarded in this key region for our strong performance record, technical expertise and effective working relationships with strategic partners. Occidental has a history of developing and delivering major gas projects on time and within budget with our national oil company partners.

Our focus areas — Oman, Qatar and the UAE — represent approximately 45 percent of Occidental's total worldwide production and approximately 1 billion BOE of proved reserves, of which approximately 65 percent is in the form of natural gas and NGLs. This large position in gas and gas liquids allows Occidental to invest capital opportunistically in a region where gas demand for power generation is growing. Should global market signals indicate a longterm demand shift away from higher emitting fuels, these gas-rich Middle East assets represent a strong element of Occidental's lower-carbon economy resiliency strategy.

#### Low-Cost Inventory – Permian Resources

Occidental is the largest operator and oil producer in the Permian Basin, where our unique portfolio of unconventional and conventional acreage differentiates us from competitors. Together these business units provide Occidental with a short- and long-term advantage with scale, position and capability as a leading low-cost operator.

Our Permian Resources development projects provide short investment-payback time horizons, averaging less than three years, while also providing some of the highest margins and returns of any oil and gas projects in the world.

Occidental currently has 17 years of undeveloped Permian Resources inventory that are profitable at oil prices less than \$50 per barrel. The 17 years of undeveloped inventory assumes current activity levels and provides an estimated annual production growth of 20 to 30 percent for our Permian Resources assets over the next several years. Occidental's large and well-positioned Permian assets allow for a continued and significant build of low oil price break-even inventory as our unconventional position is fully delineated and improved through technological advancements.

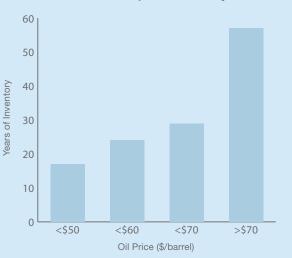


Figure 13. Permian Resources – Undeveloped Inventory

Occidental currently has 17 years of undeveloped Permian Resources inventory that is profitable at oil prices less than \$50 per barrel.

Our successes in the Middle East include:

Occidental has a 24.5 percent interest in the Dolphin Energy project in Qatar's North Field, one of the world's largest gas reservoirs. Approximately 2.5 billion cubic feet of natural gas and liquids per day produced from wells offshore are processed at the onshore plant in Ras Laffan, Qatar, among the biggest gas plants ever built. Processed gas is transported through a 230-mile-long subsea pipeline — one of the longest long-bore subsea pipelines in the world — to markets in the United Arab Emirates and Oman. The project, which became operational in 2007, has had a significant economic impact in the region.

#### Figure 14. Qatar North Field Gas Transport Lines



- In the UAE, Occidental partnered with the Abu Dhabi National Oil Company (ADNOC) in Al Hosn Gas, one of the largest natural gas developments in the Middle East. Occidental holds a 40 percent interest in the development, which is located in the Shah Field, about 200 kilometers southwest of Abu Dhabi city. The project, which is important to the Abu Dhabi "Economic Vision 2030," became operational in 2015. The plant processes about 1 billion standard cubic feet per day of well fluids and provides approximately 500 million cubic feet per day of clean natural gas, along with other products. It has established a benchmark for high-sulfur gas processing and plans are underway to expand capacity to meet growing demand for gas in the region.
- In Oman, Occidental's major operations are located in two blocks in northern Oman and at the Mukhaizna Field in the south. Occidental holds an 80 percent interest in Block 62 — also known as Habiba Block — with its partner, the Oman Oil Company. Two new gas fields — Fushaigah and Maradi Huraymah — have been brought online in Block 62. Recently, Occidental commissioned a new gas plant in the Maradi Huraymah Field, culminating a collaborative effort with the national oil company to accelerate additional gas production to meet the near-term needs of Oman.

As these Middle Eastern regions shift power generation from higher-emitting fuels like coal, diesel and oil, to lower-emitting natural gas, Occidental is well positioned with its national oil and gas company partners to solidify and expand its significant natural gas production opportunities.

Additionally, our flexible, short-cycle, low base-decline U.S. portfolio carries low future capital commitments and allows the ability to adjust to emerging alternative investments. Future carbon price impacts could be managed by shifting capital to lower  $\rm CO_2$ -intensity areas and projects, while also maintaining a competitive advantage against higher-cost operators that require more capital to sustain or grow.

# Oil & Gas Competitive Differentiators:

- Low Base Decline: Our combined oil and gas assets provide an industrydifferentiated, low base production decline, which lowers long-term risk against price volatility and timing of investments.
- Short Payback Period: The average payback timeframe for all projects that develop our proved reserves is approximately three years.
- Decades of Low-Cost Inventory: Occidental currently has 17 years of undeveloped Permian Resources inventory that is profitable at oil prices less than \$50 per barrel. See figure 13 and associated discussion.
- Flexibility with Low-Capital Commitments: Since 2013, Occidental has strategically reduced investments in projects with longer time-frame capital commitments.

### Chemicals

Occidental Chemical (OxyChem), our wholly owned subsidiary, is a leading North American manufacturer of polyvinyl chloride (PVC) resins, chlorine and caustic soda key building blocks for a variety of indispensable products such as plastics, pharmaceuticals and water treatment chemicals. Through a well-established asset base, our margin-focused management team has built a business that continues to provide significant free-cash flow and competitive returns while delivering peer-leading financial performance. Beyond our historic core business, our team continues to explore opportunities in emerging markets to support Occidental's value proposition and long-term sustainability.

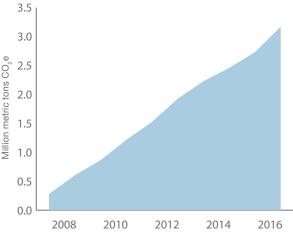
OxyChem is currently completing a period of expansion that leverages our innovative technology capabilities and collaborative business approach. These include a new chlor-alkali facility in New Johnsonville, Tennessee, and an ethylene plant in Ingleside, Texas, a joint venture with Mexichem that is already contributing cash flow.

OxyChem is the world's second-largest merchant marketer of chlorine and the largest marketer of its co-product, caustic soda. Another significant co-product of the production process is hydrogen gas, some of which is sold to customers and another portion of which is used

## Developing New Products to Reduce GHG Emissions

In December 2017, OxyChem began production of 4CPe at its facility in Geismar, Louisiana. 4CPe is a raw material used in making next-generation automobile refrigerants with low globalwarming and zero ozone-depletion potential. The 4CPe manufacturing process was developed and patented by OxyChem scientists, and the project to build the manufacturing facility to produce it was completed on budget and on time. as a fuel to generate electricity and heat/steam for OxyChem manufacturing facilities. When used as a fuel, the combustion of hydrogen with oxygen produces no GHG emissions — water is the only combustion product. Over the past 10 years, OxyChem's production and use of hydrogen as a fuel source has resulted in substantial cumulative GHG emissions avoidance.

#### Figure 15. OxyChem Hydrogen Fuel Emissions Reductions Benefit



Cumulative  $CO_2$  equivalent emissions benefit since 2007 due to 0xyChem's use of hydrogen fuel to generate electricity and heat.

#### Midstream

Occidental's midstream and marketing segment strives to maximize the realized value of production from the oil and gas and chemicals businesses. Domestically, we operate assets that gather, process, transport and store hydrocarbons and other commodities. We also utilize owned and leased assets, including transportation and storage capacity, to market Occidental and third-party production of oil, NGLs and natural gas and other commodities.

Our new domestic export facility in Ingleside, Texas is uniquely positioned to take advantage of international price differentials in the commodities markets, giving Occidental a competitive advantage in marketing its domestic production. In 2017, we delivered Permian crude to new markets in Europe, India, China and East Asia. We were the first Gulf Coast terminal to dock a 2-million-barrel-capacity Very Large Crude Carrier, and we are currently upgrading our terminal facilities to increase loading efficiency for such vessels. Our midstream infrastructure also reduces environmental impact. We have worked to expand oil pipeline capacity, thereby reducing the number of trucks used for transport, improving gas processing capability and reliability to reduce gas flaring, supported by strong mechanical integrity and maintenance programs. This approach allows us to reduce the environmental impacts from our operations while also increasing margins for the business.

Occidental's midstream and marketing segment produces power and steam required for certain OxyChem plants. The midstream and marketing assets include Occidental's Ingleside Cogeneration Limited Partnership (ICLP) near Ingleside, Texas, and the Taft Cogeneration facility located near Hahnville, Louisiana. These facilities are highly efficient combined-cycle cogeneration plants that provide steam and electricity to adjacent OxyChem facilities and have the capability to sell excess electricity into local markets. ICLP is a natural-gas-fired cogeneration power plant with the capacity to produce approximately 440 megawatts (MW) of electricity. The facility provides all of the electricity and steam for Occidental's adjacent Ingleside chemical complex. The Taft Cogeneration facility, operated by Occidental, is a natural-gas-fired cogeneration power plant with the capacity to produce approximately 800 MW of electricity. The facility provides all of the electricity and steam for Occidental's adjacent Taft chemical complex. Cogeneration facilities offer substantial GHG emission reductions relative to separate facilities for generating electricity and steam.

#### Actions to Mitigate Other Climaterelated Risks

Occidental's longstanding policy is to seek continuous improvement in resource recovery, conservation, pollution prevention and energy efficiency, including ongoing efforts to recycle and reuse water, and manage and capture methane and other GHG emissions. Our business decision-making process integrates these principles to further the company's commitment to low-cost production of oil, natural gas and commodity chemicals.

We take a hands-on approach to improve the efficiency and reliability of the equipment and facilities used in our oil and gas activities. We perform health, environment and safety (HES) assessments to identify any compliance gaps, potential HES risks and opportunities to enhance operational efficiency. The results, which are reported to operations, management and the Environmental Committee, are turned into action plans that the operations teams then implement.

## Reducing Emissions and Taking Captured Methane to Markets

Occidental strives to minimize flaring of natural gas and is committed to the elimination of routine flaring by 2030. Our goal is to bring natural gas to markets, which generates returns for shareholders, rather than flaring or emitting it into the atmosphere. We devote significant resources to capturing emissions of methane and other organic compounds by retrofitting existing facilities and designing and constructing new facilities.

Occidental has implemented a broad spectrum of projects that have reduced cumulative estimated methane emissions by more than 17.2 billion cubic feet from 1990 through year-end 2016. This corresponds to almost 1 million metric tons of carbon dioxide equivalents ( $CO_2e$ ). Occidental's ongoing efforts to prevent or capture methane emissions under the EPA's voluntary Natural Gas STAR Program have also reduced GHG emissions from our oil and gas operations. Among the technologies that Occidental employs to help reduce methane emissions are:

- Adopting lower emission thresholds to identify and minimize leaks and initiate repairs across a variety of components (e.g., valves, flanges, pump seals).
- Adopting "green completion" practices to capture gas at the wellhead during well completion and prevent its release to the atmosphere. For example, Occidental's U.S. oil and gas operations began performing reduced emissions completions for all hydraulically fractured wells, prior to any regulatory requirement, and in 2016 performed more than 1,000 leak surveys. In 2017, more than 1,500 surveys were conducted.
- Replacing diesel generators and engines with electric drives, where feasible.
- Transitioning to compressed air systems for pneumatic control and instrumentation, rather than using natural gas.
- Installing Vapor Recovery Units (VRUs) to capture and recover gas from certain equipment, rather than venting to the atmosphere.
- Adopting better control devices (e.g., low-bleed or nobleed pneumatic valves) to reduce methane emissions.
- Using Infrared (IR) cameras to help identify and eliminate leaks.



### The Power of FLIR Cameras

Occidental uses forward-looking infrared (FLIR) cameras to identify possible emissions leaks on equipment and components such as pneumatic valves, plunger lift systems, storage tanks, compressors and glycol dehydrators.

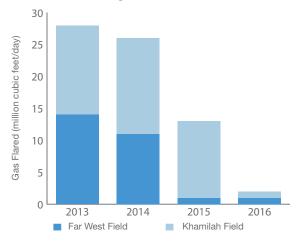
Equipment exhibiting possible leaks is further inspected and components are repaired or replaced, as appropriate.

The FLIR camera approach is especially helpful when equipment or components are geographically dispersed or difficult to access.

#### Significant Results in the Field

The national oil and gas company Qatar Petroleum, our partner in Occidental's Qatar operations and owner of the natural gas resource, is a member of the World Bank Global Gas Flaring Reduction Partnership. In collaboration with Qatar Petroleum, our operations have reduced flaring emissions in Qatar by more than 98 percent since 2005 and we continue to pursue further reductions. Flaring reduction projects include the capturing of flared gas for reinjection into the reservoir for EOR and for the generation of electricity. Prior to the implementation of gas capture projects, baseline  $CO_2e$  emissions were more than 6 million metric tons. Through 2016, a cumulative total of more than 63 million metric tons of  $CO_2e$  emissions have been avoided.

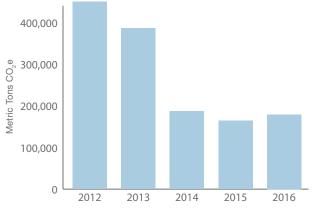
In Oman, gas capture and methane utilization projects have contributed to a significant reduction in gas flared at the Far West and Khamilah fields. From 2013 to 2016, we reduced the amount of gas flared from more than 9 billion cubic feet per year (BCF/yr) to 1 BCF/yr, a decrease of more than 90 percent - cumulatively equivalent to almost 800,000 metric tons of CO<sub>2</sub>. In Block 9 of the Safah Field, Occidental installed gas compression systems to reduce flaring. With the support of the Oman government, the project was the first in the country to qualify under the United Nations Clean Development Mechanism (CDM) to create tradeable, saleable, certified emissions-reduction credits. Original flare volumes at Safah were approximately 20 BCF/yr. Over the initial CDM project period (2013-2019), cumulative gas reductions of more than 75 BCF are expected (equivalent to 775,000 metric tons of  $CO_2$  per year).



#### Figure 16. Far West and Khamilah Flaring Reduction in Oman

Occidental has implemented projects to significantly reduce gas flaring in Oman.

In our domestic EOR operations, from 2012 to 2016, Occidental achieved an approximately 60 percent reduction in emissions from gas flaring. Typically, flaring results from non-routine operations, maintenance and weather-related upsets. Better coordination of plants and field operations, enhanced controls and a more rigorous maintenance program contributed to a cumulative CO<sub>2</sub> reduction of approximately 889,000 metric tons over this period.



#### Figure 17. Permian EOR Operations - CO<sub>2</sub> Emitted

 $\mathrm{CO}_2$  emissions (based on equity ownership) of Occidental Permian EOR operations.

#### Industry Partnership

In December 2017, Occidental joined more than 20 other oil and gas operators in launching the API-sponsored Environmental Partnership program aimed at reducing methane emissions from production operations. The voluntary program encompasses three initiatives.

- Leak Detection and Repair: Implement monitoring and timely repair of fugitive emissions at selected sites. Occidental has committed to performing more than 900 leak surveys in 2018.
- Equipment Upgrade: Replace, remove or retrofit high-bleed pneumatic controllers. Over the next 5 years, Occidental expects to replace over 900 of such controllers.
- Operating Practices: Minimize emissions associated with the removal of liquids from gas wells. Since Occidental does not have shale gas wells, we will not be participating in this initiative.

To reinforce our commitment to transparency beyond the terms of the Partnership, we will report our progress in implementing these initiatives annually on our website.

#### Physical Risk Resilience

Occidental's business and risk assessments include analyses of potential physical impacts such as flooding or natural resource stresses.

The Company has several facilities located near the U.S. Gulf Coast or other regions prone to weather events capable of producing life-threatening conditions, facility damage or the interruption of operations. Effective planning and mitigation improve access to, and the safe and efficient operation of, these or other dependent facilities, as well as our workers' communities.

In addition to holding third-party insurance with respect to certain weather-related losses, Occidental's Health, Environment and Safety Management System integrates such issues — ranging from those that are event-driven to those that are the result of a systemic change — into our risk and operations management structure. Facilities exposed to tropical storm risks are hardened against severe weather events and routinely inspected, and have historically weathered such events without casualties or major damage. These facilities have emergency preparedness and response plans that are initiated in advance of identified storms.

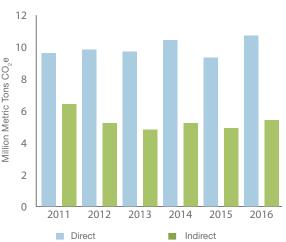
Following severe weather events, our facilities undergo detailed inspection and recovery protocols to support a safe and timely return to full production. Various channels of communication are maintained during and after events, and extensive resources to speed both facility and employee recovery are inventoried, pre-positioned and quickly distributed to impacted facilities and workers.

# Metrics, Targets & Next Steps

We have reported our GHG emissions publicly for 15 years and will continue to report our overall GHG emissions management and environmental stewardship programs. We have participated in the CDP questionnaire since its inception in 2003 and post our responses on our company website. In our 2016 CDP response, Occidental enhanced the transparency of our disclosure in several meaningful ways:

- Defined our identification and management processes using company-wide and asset-level examples to provide more context for climate-related risk management
- Increased details about strategy and alignment with recognized scenario models
- Increased disclosure on initiatives for mitigating CO<sub>2</sub> and methane emissions
- Increased disclosure on the opportunities for revenues utilizing CCUS and the capital planning process
- Disclosed direct and indirect estimated emissions by business segments for both CO<sub>2</sub> and methane
- Estimated CO<sub>2</sub> and methane emissions, by business segment and emissions category
- Disclosed stored CO<sub>2</sub> from the Denver Unit MRV Plan (2016 data)

Occidental voluntarily reports estimated GHG emissions using several protocols and reporting guidelines. For our worldwide operations, Occidental uses the Greenhouse Gas Protocol,<sup>4</sup> supplemented by industry-specific protocols (American Petroleum Institute, American Chemistry Council and IPIECA). In 2016, Occidental's estimated global direct and indirect GHG emissions on an equity-share basis increased by approximately seven percent, net of the disposition of certain oil and gas assets. The increase reflects higher output in both our chemicals and oil and gas business segments, as well as the expanded inclusion of emissions from oil and gas source categories recently added to EPA GHG reporting requirements.



#### Figure 18. Occidental GHG Emissions

In addition to determining direct (Scope 1) and indirect (Scope 2) GHG emissions for oil and gas and chemicals operations, Occidental's oil and gas business is developing emission intensities, as tonne  $CO_2e$  emitted per thousand barrels of oil equivalent (MBOE) produced, on a field-by-field basis. We believe these intensity data will help inform capital planning, emission reduction opportunities and targets. Until these data are developed, we will measure our performance by tracking Scope 1 emissions intensity for all oil and gas operations.

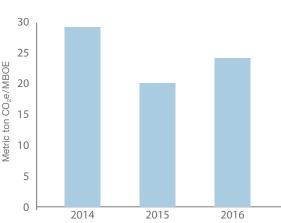


Figure 19. Occidental Oil and Gas CO<sub>2</sub> Emissions Intensity

Direct and indirect emissions for Occidental's operations (equity ownership basis).

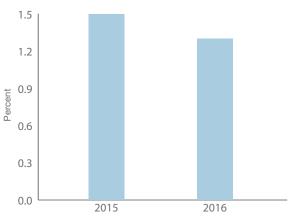
Direct emissions (equity ownership basis) for Occidental's oil and gas operations normalized on barrels of oil equivalent produced.

Also, for our U.S. oil and gas operations, Occidental is piloting an indicator of estimated methane emissions relative to our natural gas production and anticipates establishing a target once protocols for performing such estimates have matured.

In addition to disclosing our  $CO_2$  emissions-intensity and methane emissions-intensity indicators, Occidental is committing to end routine gas flaring by 2030.

Finally, we are implementing a more streamlined approach to reporting and providing a more accessible and comprehensive resource for our stakeholders. As a first step, we have reorganized the data presented in the Social Responsibility portion of our website (http://www. oxy.com/SocialResponsibility) to make tracking of our ESG performance more convenient.

#### Figure 20. Occidental Oil and Gas Methane Emissions Intensity



Direct emissions of methane (equity ownership basis) for Occidental's oil and gas operations as a percentage of natural gas produced.





# Conclusion

Occidental is pleased to share this first report on climate-related risks and opportunities, especially as it is a product of much discussion and collaboration among the management team, our Board and many investors and other stakeholders.

We are confident that we have increased our insight into climaterelated risks and opportunities and are proud to share our strategy, risk management and governance processes, including the steps we're taking to account for a lower-carbon economy. We are also encouraged by results of our portfolio analyses of the IEA global energy scenarios consistent with the goal of limiting the global increase in temperature to 2°C (the 450 and Sustainable Development Scenarios), and remain committed to regular assessments.

Occidental recognizes that climate-related risk management and business planning are continuing and evolving processes. We are dedicated to maintaining a dialogue between the Board, management, shareholders and other key stakeholders on climate-related risks and opportunities. We welcome your feedback on this report.

# Glossary

**450 Scenario** A modeled energy supply/demand scenario developed by the International Energy Agency in its *World Energy Outlook 2016*. The scenario is based on an energy pathway consistent with the goal of limiting the global increase in temperature to  $2^{\circ}$ C by limiting concentration of GHGs in the atmosphere to around 450 parts per million of CO<sub>2</sub>

BBL Barrel (typically oil) - 42 gallons

BCF Billion cubic feet

**BOE** Barrel of oil equivalent is the energy released by burning one barrel of oil, and is used to express the energy contained in other hydrocarbon streams in barrels – for example, Occidental uses a conversion of 6,000 cubic feet of natural gas = 1 BOE

CO<sub>2</sub> Carbon dioxide

CO<sub>2</sub> EOR Carbon dioxide enhanced oil recovery

**CO**<sub>2</sub>**e** Carbon dioxide equivalent – obtained by converting a mixture of GHGs to a single number based on the global warming potential of each individual gas

CCUS Carbon capture, utilization and sequestration

**CDP** A non-profit organization that manages a system for disclosing environmental impacts. Formerly known as the Carbon Disclosure Project (www.cdp.net)

CH<sub>4</sub> Methane

EPA U.S. Environmental Protection Agency (www.epa.gov)

ESG Environmental, Social and Governance

**GHG** Greenhouse gases – primarily comprised of carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride

**Henry Hub** Henry Hub is a natural gas pipeline located in Erath, Louisiana that serves as the official delivery location for futures contracts on the New York Mercantile Exchange **HES** Health, Environment and Safety

IEA International Energy Agency (www.iea.org)

**IPIECA** Originally, the International Petroleum Industry Environmental Conservation Association, but since 2002: "IPIECA, the global oil and gas industry association for environmental and social issues" (www.ipieca.org)

MCF Thousand cubic feet

**Metric Ton** 1,000 kilograms (approximately 2,205 pounds)

MRV Monitoring, Reporting and Verification

**NPV** Net Present Value of revenues minus expenses using an annual discount rate of 10%

**Permian Basin** The Permian Basin is a hydrocarbonbearing sedimentary basin largely contained in the western part of Texas and the southeastern part of New Mexico

**SASB** Sustainability Accounting Standards Board (www.sasb.org)

#### Sustainable Development Scenario

IEA scenario that integrates the objectives of three Sustainable Development Goals (SDGs): universal access to modern energy by 2030, stringent control of GHG emissions consistent with the objectives of the Paris Agreement (and generally consistent with the 450 Scenario), and a steep reduction in conventional air pollutant emissions

**SEC** U.S. Securities and Exchange Commission (www.sec.gov)

**TCFD** Task Force on Climate-related Financial Disclosures (www.fsb-tcfd.org)

WTI West Texas Intermediate – a type of crude oil that is the underlying commodity of the New York Mercantile Exchange's oil futures contracts and a common benchmark for pricing crude oil



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