



# 2021 TCFD Report and Scenario Analysis

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# 2021 TCFD Report and Scenario Analysis

Please visit [www.valero.com](http://www.valero.com) to learn more about our company.

**Cover:** By planting trees in wetlands and restoring swamps in front of levees, employees at the Valero St. Charles Refinery help protect the area from hurricanes.

**Inside Cover:** In partnership with the Texas Coastal Exchange, Valero invested in the capture of carbon dioxide in marsh, prairie and woodland habitats in the wetlands of the Texas Gulf Coast near its refinery in Port Arthur.

# A Letter from Joe Gorder

Valero is the world's largest independent refiner and also a leader in the production of renewable fuels. We have invested more than \$3 billion to date in low-carbon transportation fuels and we expect to invest almost \$2 billion more through 2023. In addition, we are evaluating, advancing and developing low-carbon projects, such as sustainable aviation fuel, renewable naphtha, renewable hydrogen, carbon capture and storage and more. We are on track to achieve our plan to reduce and offset 63% of global refining Scope 1 and 2 greenhouse gas emissions (GHG) by 2025 through existing board-approved projects. We also recently announced that we plan to increase that percentage to 100% by 2035.

We recognize low-carbon fuels will be part of the energy mix going forward. Demand growth for renewable fuels will be driven primarily by low-carbon fuel policies and stricter fuel efficiency standards. We plan to leverage our low-cost liquid-fuels platform and operational expertise to diversify into high-growth, high-return, lower-carbon projects as we seek to continue returning value to our shareholders and contributing to our 2025 and 2035 GHG emissions reduction and offset targets.

Following the Task Force on Climate-related Financial Disclosures (TCFD) recommendations, this report provides an updated analysis on the company's governance, strategy, risk management, and metrics and targets. This

report also discusses the results of the analysis of the resilience of our business under a scenario provided by the International Energy Agency and conducted with refining benchmarking data provided by HSB Solomon Associates LLC.

Our board of directors and senior management recognize the opportunities that a low-carbon economy provides. With the resilience of our assets and strategy, we believe we will be well positioned to tackle the challenges of the future.

We welcome continued engagement and dialogue with shareholders and other stakeholders on these matters.

Thank you for your support and trust.



**Joe Gorder**  
CHAIRMAN AND  
CHIEF EXECUTIVE OFFICER

**"Our board of directors and senior management recognize the opportunities that a low-carbon economy provides. With the resilience of our assets and strategy, we believe we will be well positioned to tackle the challenges of the future."**

Cooling towers at Valero's Corpus Christi West Refinery.

# Introduction

The terms “Valero,” “we,” “our,” and “us,” as used in this report, may refer to Valero Energy Corporation, to one or more of its consolidated subsidiaries, or to all of them taken as a whole.

Valero is a Fortune 500 company based in San Antonio, Texas. Our corporate offices are located at One Valero Way, San Antonio, Texas, 78249. Our common stock trades on the New York Stock Exchange under the trading symbol “VLO.”

Valero owns 15 petroleum refineries that produce conventional gasolines, premium gasolines, reformulated gasoline, gasoline meeting the specifications of the California Air Resources Board (CARB), diesel, low-sulfur diesel, ultra-low-sulfur diesel, CARB diesel, other distillates, jet fuel, asphalt, petrochemicals, lubricants and other refined petroleum products. Valero, through our consolidated joint venture, Diamond Green Diesel

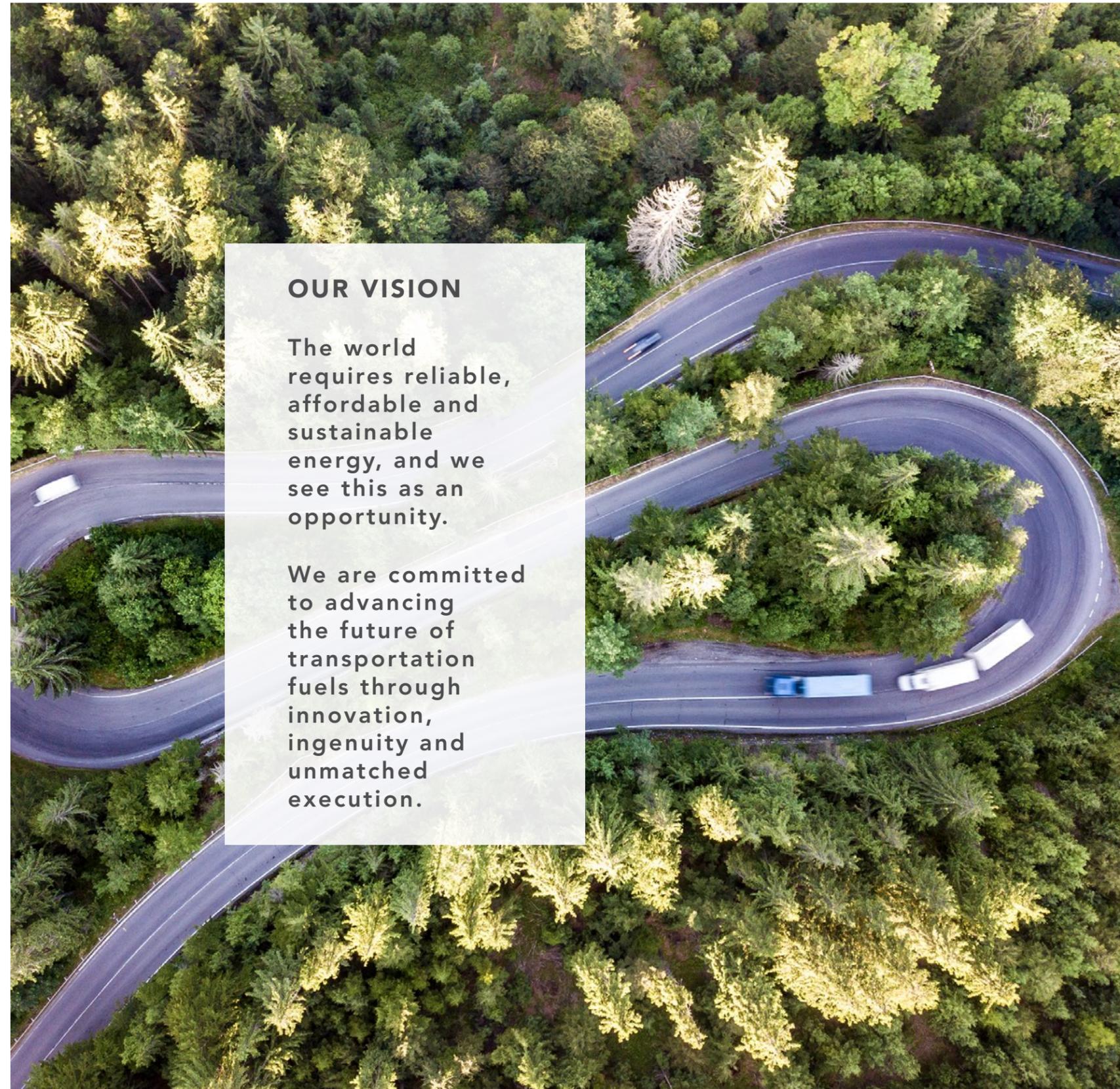
Holdings LLC (DGD), is the largest renewable diesel producer in North America. In addition, we own 13 ethanol plants that produce ethanol and various co-products. Renewable diesel and ethanol are both low-carbon transportation fuels.

We sell our products primarily in the United States, Canada, the United Kingdom, Ireland and Latin America.

In September 2018, we published the Review of Climate-related Risks and Opportunities, which was developed generally in line with the Task Force on Climate-related Financial Disclosures (TCFD) recommendations. At that time, we engaged HSB Solomon Associates LLC (Solomon) to examine our business and review the resilience of our strategy under multiple demand scenarios, including the potential transition to a lower-carbon economy consistent with the 450 PPM scenario, a 2°C scenario developed by the

International Energy Agency (IEA).

**The following report was developed in line with the recommendations of the TCFD and provides updated disclosures from 2018 on certain climate-related aspects of our governance, strategy, risk management and performance metrics and targets. We also engaged Solomon to conduct a scenario analysis based on the assumptions developed by the IEA in the Sustainable Development Scenario (SDS), also known as a well-below 2°C scenario.**



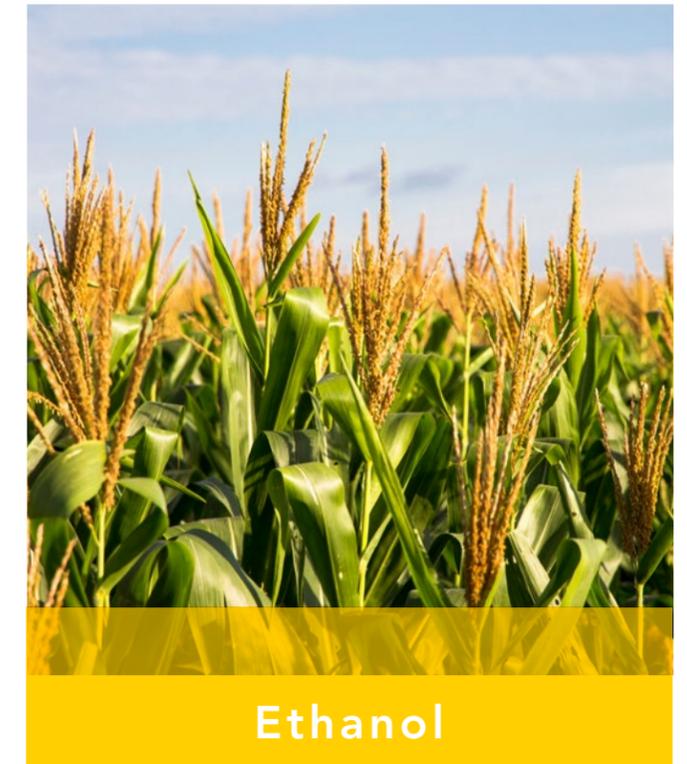
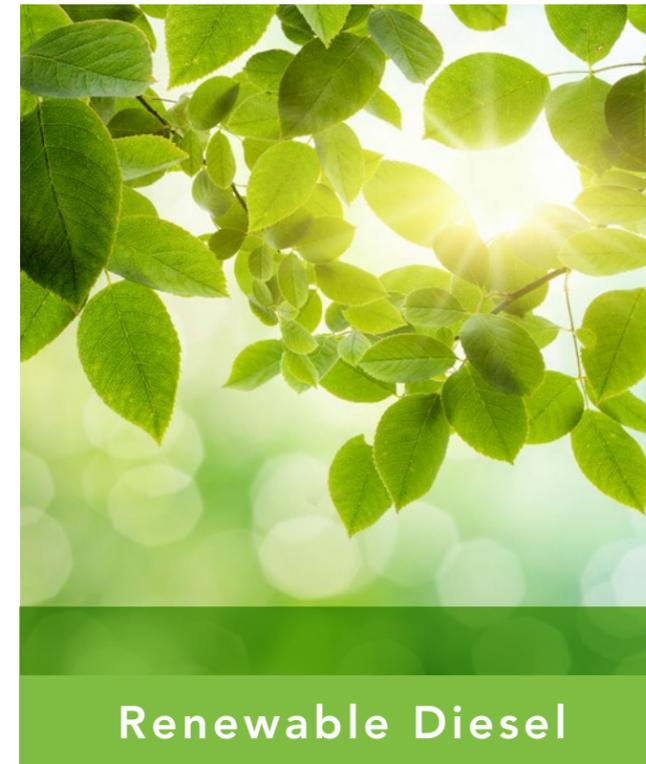
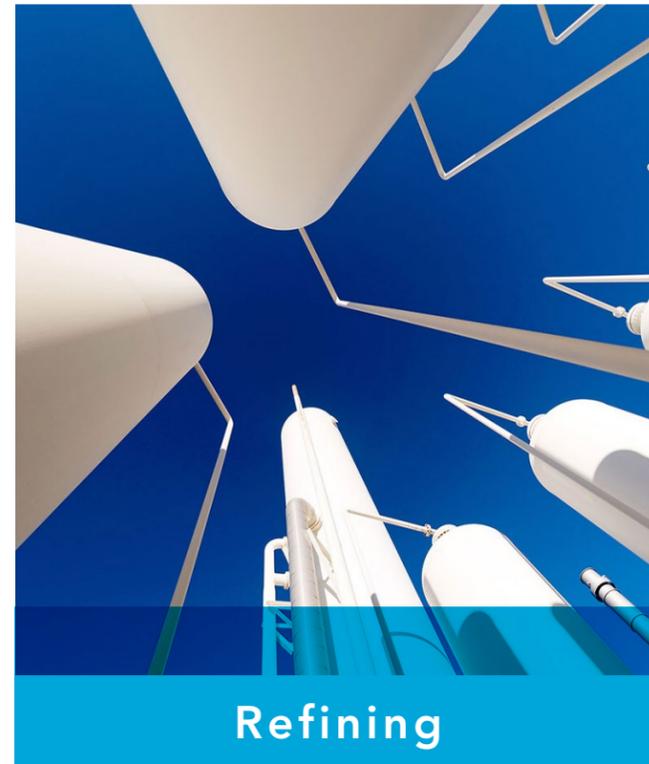
## OUR VISION

The world requires reliable, affordable and sustainable energy, and we see this as an opportunity.

We are committed to advancing the future of transportation fuels through innovation, ingenuity and unmatched execution.

# Who We Are

Valero Energy Corporation (NYSE: VLO), through its subsidiaries (collectively, "Valero"), is an international manufacturer and marketer of transportation fuels and petrochemical products.



**FORTUNE  
500**  
COMPANY

**WORLD'S LARGEST**  
INDEPENDENT REFINER



**WORLD'S 2<sup>ND</sup> LARGEST**  
RENEWABLE DIESEL PRODUCER



**WORLD'S 2<sup>ND</sup> LARGEST**  
CORN ETHANOL PRODUCER



**3.2 MILLION BARRELS** PER DAY OF HIGH-COMPLEXITY THROUGHPUT CAPACITY

CURRENT PRODUCTION CAPACITY OF <b>290 MILLION GALLONS</b>	EXPANDING TO <b>690 MILLION GALLONS</b> PER YEAR IN 2021	AND <b>1.2 BILLION GALLONS</b> PER YEAR IN 2023
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**1.7 BILLION GALLONS** PER YEAR OF PRODUCTION CAPACITY



HEADQUARTERED IN  
**SAN ANTONIO, TEXAS**

MANUFACTURER AND MARKETER OF **TRANSPORTATION FUELS AND PRODUCTS** THAT ARE **ESSENTIAL TO MODERN LIFE**



UP TO **80% REDUCTION** IN LIFE CYCLE GHG EMISSIONS

**100% COMPATIBLE** WITH EXISTING ENGINES AND INFRASTRUCTURE

HIGH-OCTANE RENEWABLE FUEL OFFERS AT LEAST **30% REDUCTION** IN LIFE CYCLE GHG EMISSIONS



**~10,000**  
GLOBAL EMPLOYEES

ADVANTAGED REFINING AND LOGISTICS ASSETS WELL POSITIONED FOR **FEEDSTOCK AND PRODUCT OPTIMIZATION**

**SAFETY** IS OUR FOUNDATION FOR SUCCESS

**LOWEST-COST** PRODUCER

PRODUCED FROM WASTES SUCH AS **RECYCLED ANIMAL FATS, USED COOKING OIL AND INEDIBLE CORN OIL**

**LOW-CARBON FUEL**  
SOLD IN NORTH AMERICA AND EUROPE

EXISTING LOGISTICS ASSETS WELL POSITIONED TO **SUPPORT EXPORT GROWTH**

DEVELOPING **CARBON CAPTURE AND STORAGE PROJECTS** TO FURTHER REDUCE CARBON INTENSITY

# Map of Operations

## REFINING

**Assets:**  15 petroleum refineries in the U.S., Canada and the U.K.

**Products:**  Gasoline, diesel, jet fuel and other specialty products, including asphalt and petrochemicals, that fuel modern life

**Throughput Capacity:**  3.2 million barrels per day of crude oil and other feedstocks

## RENEWABLE DIESEL

**Assets:**  Diamond Green Diesel (joint venture), Norco, Louisiana

**Products:**  Renewable diesel fuel

**Capacity:**  290 million gallons per year

## ETHANOL

**Assets:**  13 plants in the Midwest U.S.

**Products:**  Ethanol, distillers grains and fuel-grade corn oil

**Capacity:**  1.7 billion gallons per year of ethanol; 4.5 million tons of distillers grains



## LOGISTICS ASSETS

 3,000+ miles of active pipelines  
 130+ million barrels of active shell capacity for crude oil and products  
 200+ truck rack bays

 ~5,200 railcars  
 50+ docks  
 2 Panamax-class vessels

Includes assets that have other joint venture or minority interests. Does not include ethanol assets, except for railcars.

## ALTERNATIVE ENERGY GENERATION

 Adjacent to the McKee refinery in the Texas Panhandle, 33 wind turbines with 50 megawatts of electricity capacity

 4 cogeneration plants in the U.S. and the U.K.

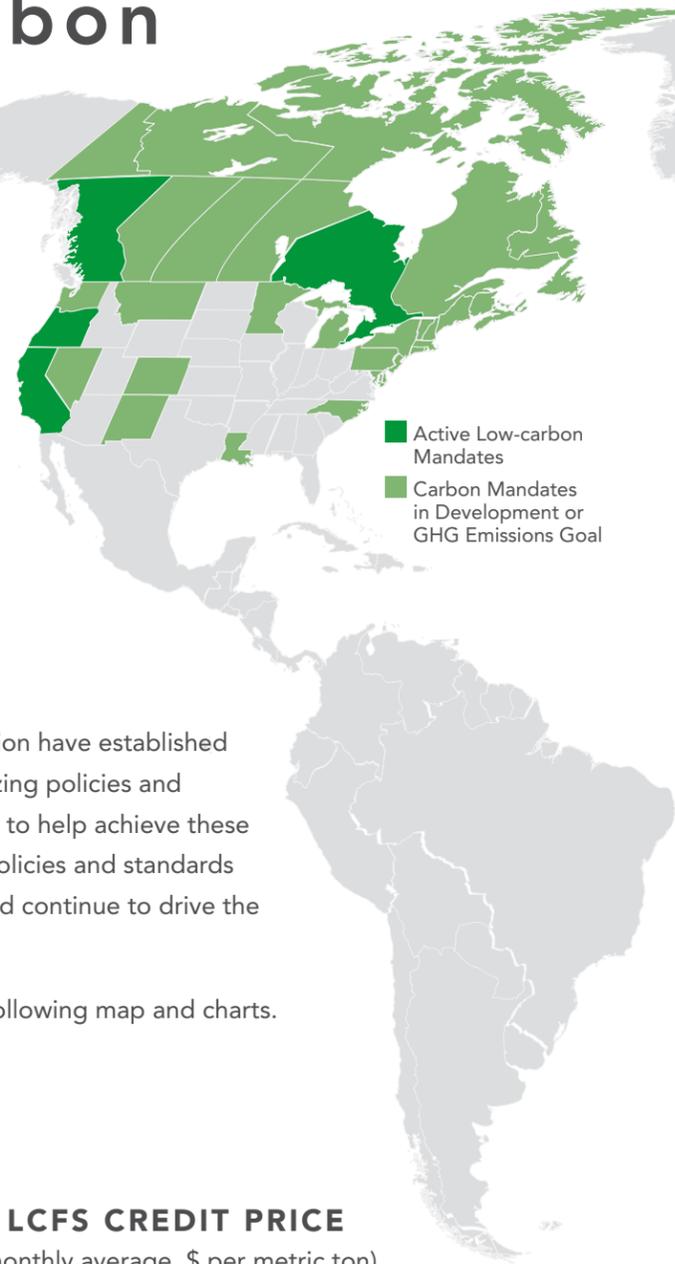
 Expanders at 6 of our refineries

# Global Low-Carbon Fuel Policies

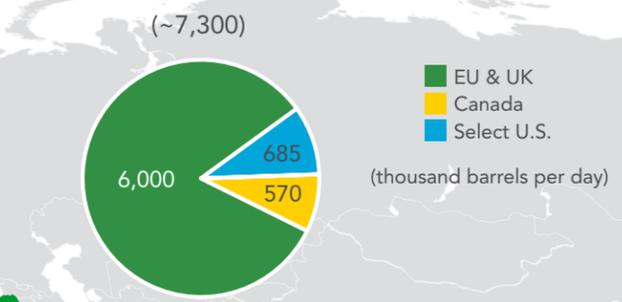
Many state, provincial and national governments across the world have implemented, or are considering implementing, low-carbon fuel policies and stricter fuel efficiency standards to help reach greenhouse gas (GHG) emissions reduction targets.

Markets such as California, Canada and the European Union have established ambitious GHG emissions reduction targets, and are utilizing policies and standards with respect to low-carbon transportation fuels to help achieve these targets. Some of these policies and other lower-carbon policies and standards aimed at reducing GHG emissions have driven, and should continue to drive the demand for both renewable diesel and ethanol.

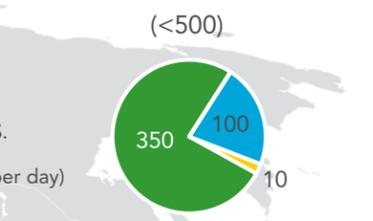
For a list of many such low-carbon fuel policies, see the following map and charts.



## DIESEL DEMAND IN SELECT MARKETS<sup>1</sup>

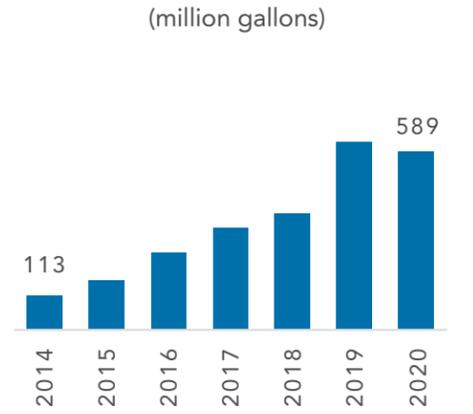


## CURRENT RD AND BD CONSUMPTION<sup>1</sup>

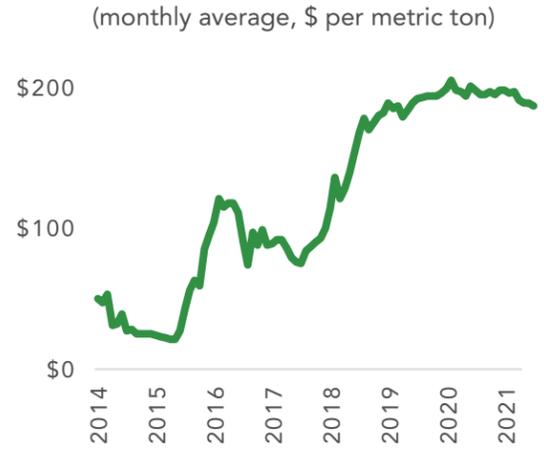


We believe that our ability to supply renewable fuels could play an important role in helping achieve GHG emissions reduction targets.

## CALIFORNIA RENEWABLE DIESEL CONSUMPTION



## LCFS CREDIT PRICE



Source: California Air Resources Board. LCFS credit price through July 2021.

	2030 GHG Emissions Reduction Target	Net-Zero GHG Emissions Target	Primary Transportation Fuel Policy Mechanism	2030 Liquid Fuels Goal
<b>California</b>	40%	Net-zero by 2045	Low Carbon Fuel Standard (LCFS)	Reduce the carbon intensity of transportation fuels by at least 20%
<b>Canada</b>	30%	Net-zero by 2050	Clean Fuel Standard (CFS) - enforcement expected 2022	Reduce the carbon intensity of transportation fuels by ~13%
<b>EU</b>	40%	Net-zero by 2050	Renewable Energy Directive II (RED II)	Replace 14% of transportation fuels with renewable energy
<b>Other Policies in Place</b>	<ul style="list-style-type: none"> <li>Oregon's Clean Fuels Program requires a 10% carbon intensity reduction by 2025; has proposed a 25% reduction by 2035</li> <li>Washington State's legislature has passed an LCFS that requires a 20% carbon intensity reduction by 2038</li> <li>British Columbia and Ontario have existing low-carbon fuels policies</li> <li>Sweden currently has a 21% GHG reduction requirement for diesel in 2020, increasing to 66% in 2030</li> <li>Finland aims for 30% of transportation fuels to be biofuels by 2030</li> <li>UK requires that 9.6% of transportation fuel meets prescribed sustainability criteria and has proposed an increase to 14.6% by 2032</li> </ul>			
<b>Potential Policies</b>	<ul style="list-style-type: none"> <li>New York continues to evaluate LCFS in order to meet its goal of reducing emissions 85% by 2050</li> <li>New Mexico and Minnesota are exploring renewables mandates</li> </ul>			

<sup>1</sup>2019 diesel demand, inclusive of biofuels, and current Renewable Diesel (RD) and Biodiesel (BD) consumption in Canada, EU, UK, and U.S. states with mandates in place or in consideration (CA, OR, WA, NY, NM, & MN only). Data from DOE, California Air Resources Board, Oregon DEQ and industry consultants.

# Electric Vehicles (EVs)

## A better understanding of electrification.

- EVs will be part of the energy mix to achieve low-carbon goals but they are not the only technology solution.
- Before an EV leaves the showroom, it has already emitted twice the CO<sub>2</sub> emissions of a car fueled by gasoline.<sup>2</sup>
- The mining/extraction and processing of the rare earth minerals and metals needed to produce an EV battery result in significant GHG emissions, and often occur in countries with less-stringent environmental and reclamation regulations than North America or Europe.
- Once in operation, an EV is still not “zero emissions” as the electricity that powers an EV often is generated by fossil fuels.
- The infrastructure build-out necessary to support an increase in EVs will be costly, time-intensive and fossil-fuel dependent, thus emitting a large amount of CO<sub>2</sub> itself.
- According to the IEA’s *The Role of Critical Minerals in Clean Energy Transitions*,<sup>3</sup> it is questionable whether the world has the mineral resource capacity to meet the demand increase of renewable technologies, such as EV batteries.

**ELECTRIC VEHICLES ARE NOT ZERO EMISSIONS**

Southwest Research Institute Ted Talk, Presented by Graham Conway

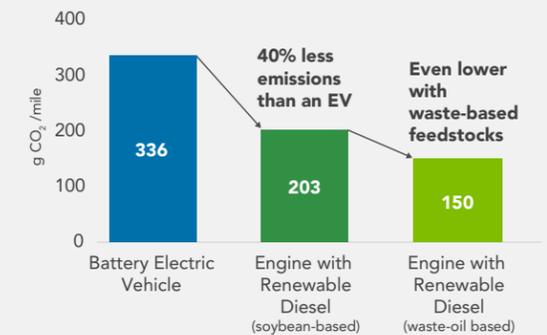
# Renewable Diesel

An affordable solution to immediately reduce transportation GHG emissions.

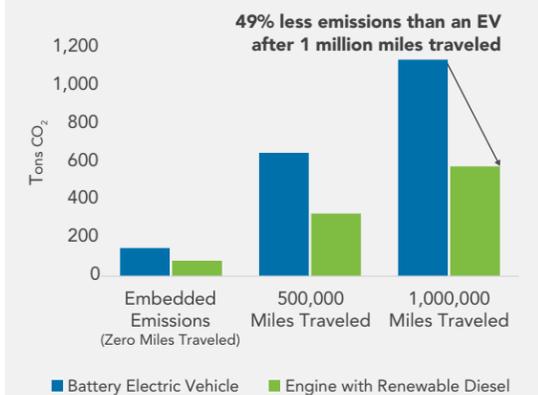
## BENEFITS OF RENEWABLE DIESEL COMPARED TO EVs

- Renewable diesel is a drop-in fuel, which means that it is 100% compatible with existing infrastructure and diesel engines, from light- to heavy-duty long-haul vehicles. This helps make renewable diesel a viable solution to immediately reduce transportation GHG emissions without requiring a costly, time-intensive and CO<sub>2</sub>-emitting infrastructure build-out as with EVs.
- Our renewable diesel is typically made of waste materials and manufactured in jurisdictions with strict environmental, labor and governance regulations.
- Unlike with EVs, owners of vehicles running on renewable diesel do not incur a high up-front cost to replace their current vehicles, nor the expenses related to charging and other new infrastructure needed to support an EV.
- As detailed on the right, because of the feedstocks used to produce renewable diesel, a vehicle running on renewable diesel can significantly cut life cycle GHG emissions compared with an EV.<sup>4</sup>

### U.S. LIGHT-DUTY VEHICLE LIFE CYCLE EMISSIONS



### U.S. HEAVY-DUTY LONG-HAUL VEHICLE LIFE CYCLE EMISSIONS



<sup>4</sup>Argonne National Laboratory (DOE) and Southwest Research Institute. See page 43 for notes regarding this chart.

## SIGNIFICANT ISSUES AND EMISSIONS FROM EV LIFE CYCLE

**MINING/  
EXTRACTION**

**COBALT & RARE  
EARTH PROCESSING**

**MANUFACTURING  
EVs**

**POWER  
GENERATION**

A single **light-duty vehicle** running on renewable diesel emits **29 tons less CO<sub>2</sub> than an electric vehicle<sup>4</sup>**, an amount equal to the benefit of planting **435 trees<sup>5</sup>**

A single **heavy-duty long-haul vehicle** running on renewable diesel emits **561 tons less CO<sub>2</sub> than an electric vehicle<sup>4</sup>**, an amount equal to the benefit of planting **8,482 trees<sup>5</sup>**



<sup>2</sup>Southwest Research Institute Ted Talk, Presented by Graham Conway.

<sup>3</sup>International Energy Agency (2021), *The Role of Critical Minerals in Clean Energy Transitions*, IEA, Paris. All rights reserved.

<sup>5</sup>Estimated based on the U.S. Environmental Protection Agency (EPA) GHG Equivalencies calculator for urban tree seedlings grown for ten years.

# IEA Scenarios and Global Mineral Capacity in Energy Transition

## International Energy Agency (IEA) Scenarios

As part of this report, we are assessing our business strategy by focusing on a hypothetical transition to a lower-carbon economy under a scenario created by the IEA. A description of relevant IEA scenarios are set forth in the following paragraphs.

In creating such hypothetical scenarios for assessment purposes, the IEA considers energy market data and dynamic representations of energy technologies, and acknowledges that there is not a single storyline about the future and that all scenarios are possible.

### STATED POLICIES SCENARIO (STEPS)

The aim of the **STEPS** scenario is to provide a detailed sense of the direction in which existing policies and recently announced commitments and plans would take the energy sector out to 2040.<sup>6</sup>

### SUSTAINABLE DEVELOPMENT SCENARIO (SDS)

Aligned with the Paris Agreement and described as a well-below 2°C scenario, the **SDS** scenario has many advanced economies reaching net-zero emissions by 2050, and puts the world on track for net-zero emissions by 2070.<sup>6</sup>

## NET-ZERO EMISSIONS BY 2050 SCENARIO (NZE2050)

The **NZE2050** scenario supplements the SDS scenario and reflects what the IEA believes is needed for the global energy sector to achieve net-zero emissions by 2050. NZE2050 includes rapid deployment of available technologies as well as widespread use of technologies that are not on the market yet.<sup>7</sup>

In this report, we are assessing our business strategy by focusing on a hypothetical transition to a lower-carbon economy under IEA's SDS scenario. Although the IEA released the NZE2050 scenario in 2021, certain data sheets and benchmarking data were not readily available to include this scenario in this report.

In this report, we refer to STEPS, SDS and NZE2050 as the IEA Scenarios.

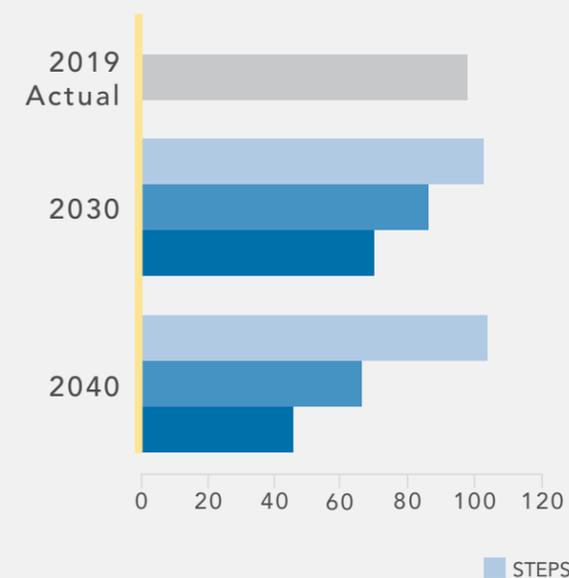
The STEPS scenario forecasts that global oil demand would increase to 104.1 million bpd by 2040, from 97.9 million bpd in 2019. The SDS scenario forecasts that global oil demand would decline to 86.5 million bpd in 2030 and 66.2 million bpd in 2040. In a more accelerated timeframe, the NZE2050 scenario forecasts that global oil demand would be 71.7 million bpd in 2030, 42.6 million bpd in 2040 and 24.1 million bpd in 2050.

The STEPS scenario forecasts that global demand for low-carbon fuels would increase to 5.1 million bpd in 2040. The SDS scenario forecasts that global demand of low-carbon fuels would increase to 7.4 million bpd in 2040. And the NZE2050 scenario forecasts that global low-carbon fuels demand would increase to 7 million bpd by 2050.



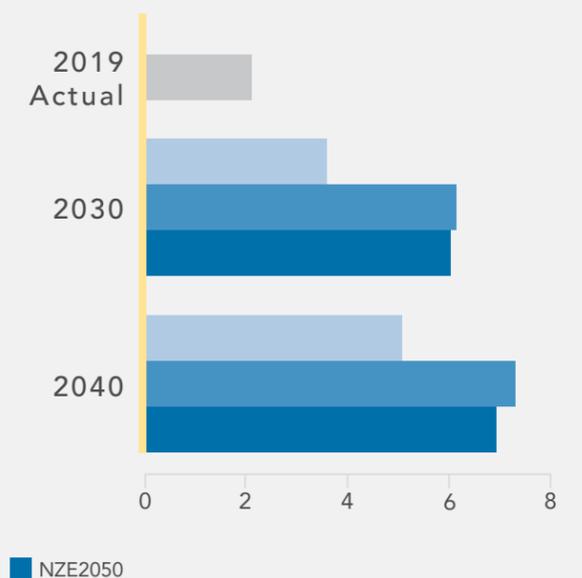
### GLOBAL OIL DEMAND BY SCENARIO

(million bpd)



### GLOBAL RENEWABLE FUELS DEMAND BY SCENARIO

(million bpd)



Sources: International Energy Agency (2020), *World Energy Outlook 2020*, IEA, Paris. All rights reserved; and International Energy Agency (2021), *Net Zero by 2050*, IEA, Paris. All rights reserved; as modified by Valero.

<sup>6</sup>International Energy Agency (2020), *World Energy Model Documentation: 2020 version*, IEA, Paris, last Updated May 7, 2021. All rights reserved.

<sup>7</sup>International Energy Agency (2021), *Net Zero by 2050*, IEA, Paris. All rights reserved.

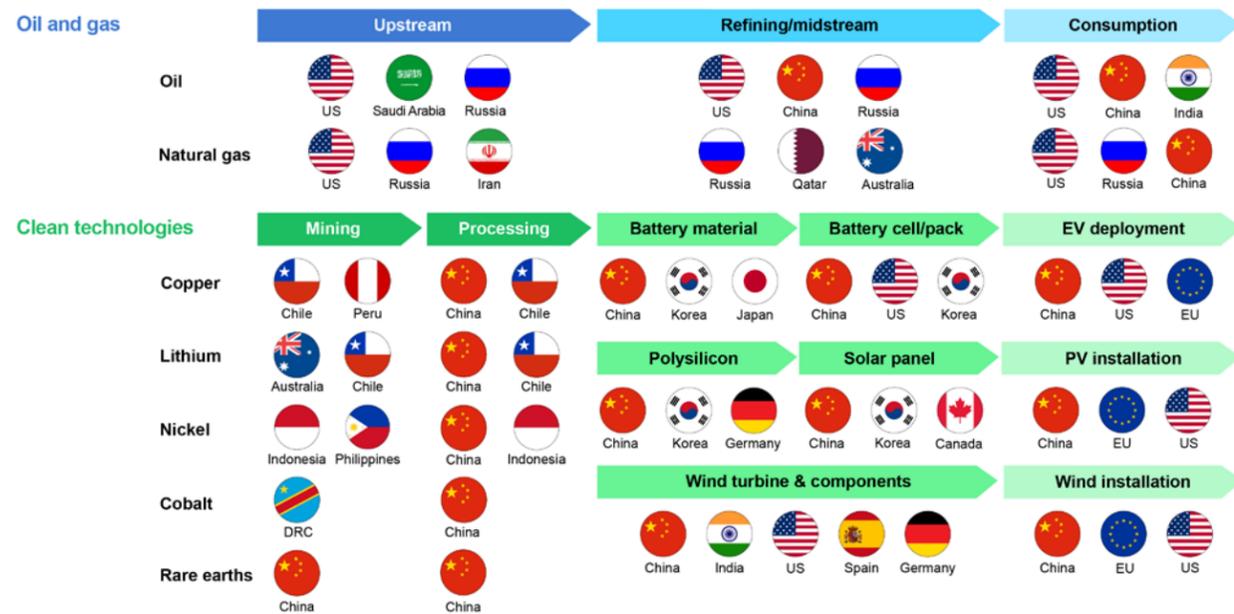
## Mineral Resources in the Energy Transition

Reaching net-zero emissions globally by 2050 would demand an accelerated deployment of various alternative energy initiatives. To this end, the IEA recently published **The Role of Critical Minerals in Clean Energy Transitions** to provide an assessment of the mineral resource requirements for a wide variety of alternative energy initiatives such as renewable power, nuclear power, EVs, battery storage and hydrogen. These technologies require metals and alloys, which are produced by processing mineral-containing ores. It is questionable whether the world has available mineral resource supply and adequate investment plans to meet the demand increase necessary to support such energy transitions in a sustainable and responsible manner.

The mining, processing and development of these metals and alloys bring new and rapidly changing energy trade and geopolitical considerations as well as less transparent supply chains in terms of human rights, environmental concerns and higher GHG emissions intensities.



## SUPPLY CHAINS OF OIL AND GAS AND ALTERNATIVE ENERGY TECHNOLOGIES

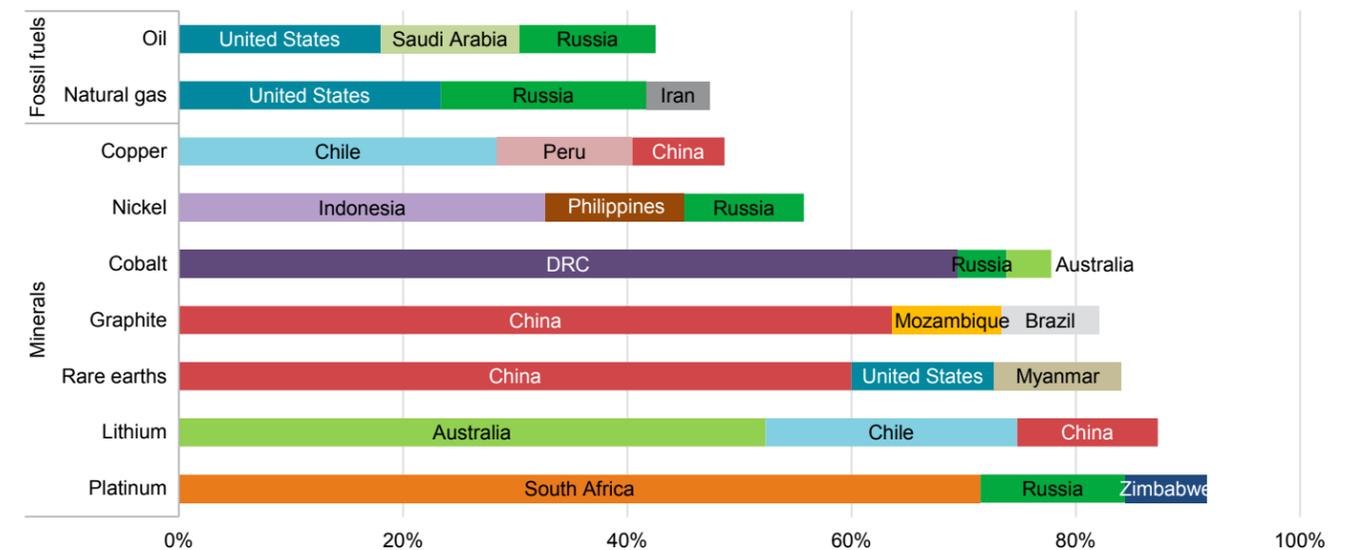


Notes: DRC = Democratic Republic of Congo; EU = European Union; US = United States; Russia = Russian Federation; China = People's Republic of China. Largest producers and consumers are noted in each case to provide an indication, rather than a complete account.

Source: International Energy Agency (2021), *The Role of Critical Minerals in Clean Energy Transitions*, IEA, Paris. All rights reserved.

## SHARE OF TOP THREE PRODUCING COUNTRIES IN TOTAL PRODUCTION FOR SELECTED MINERALS AND FOSSIL FUELS

(2019)



Source: International Energy Agency (2021), *The Role of Critical Minerals in Clean Energy Transitions*, IEA, Paris. All rights reserved.

# GLOBAL MINERAL CAPACITY

## EXPLOITATION OF MINERAL RESOURCES GIVES RISE TO A VARIETY OF ENVIRONMENTAL AND SOCIAL IMPLICATIONS THAT MUST BE CAREFULLY MANAGED TO ENSURE RELIABLE SUPPLIES

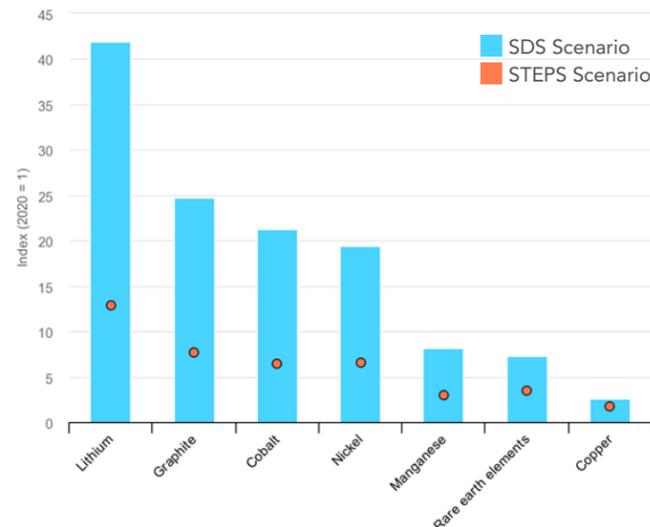
The following table includes selected environmental and social challenges related to energy transition minerals, as described by the IEA in *The Role of Critical Minerals in Clean Energy Transitions*:

Areas of risks	Description
Environment	<b>Climate change</b> <ul style="list-style-type: none"> <li>With higher greenhouse gas emission intensities than bulk metals, production of energy transition minerals can be a significant source of emissions as demand rises</li> <li>Changing patterns of demand and types of resource targeted for development pose upward pressure</li> </ul>
	<b>Land use</b> <ul style="list-style-type: none"> <li>Mining brings major changes in land cover that can have adverse impacts on biodiversity</li> <li>Changes in land use can result in the displacement of communities and the loss of habitats that are home to endangered species</li> </ul>
	<b>Water management</b> <ul style="list-style-type: none"> <li>Mining and mineral processing require large volumes of water for their operations and pose contamination risks through acid mine drainage, wastewater discharge and the disposal of tailings</li> <li>Water scarcity is a major barrier to the development of mineral resources: around half of global lithium and copper production are concentrated in areas of high water stress</li> </ul>
	<b>Waste</b> <ul style="list-style-type: none"> <li>Declining ore quality can lead to a major increase in mining waste (e.g. tailings, waste rocks); tailings dam failure can cause large-scale environmental disasters (e.g. Brumadinho dam collapse in Brazil)</li> <li>Mining and mineral processing generate hazardous waste (e.g. heavy metals, radioactive material)</li> </ul>
Social	<b>Governance</b> <ul style="list-style-type: none"> <li>Mineral revenues in resource-rich countries have not always been used to support economic and industrial growth and are often diverted to finance armed conflict or for private gain</li> <li>Corruption and bribery pose major liability risks for companies</li> </ul>
	<b>Health and safety</b> <ul style="list-style-type: none"> <li>Workers face poor working conditions and workplace hazards (e.g. accidents, exposure to toxic chemicals)</li> <li>Workers at artisanal and small-scale mine (ASM) sites often work in unstable underground mines without access to safety equipment</li> </ul>
	<b>Human rights</b> <ul style="list-style-type: none"> <li>Mineral exploitation may lead to adverse impacts on the local population such as child or forced labor (e.g. children have been found to be present at about 30% of cobalt ASM sites in the DRC)</li> <li>Changes in the community associated with mining may also have an unequal impact on women</li> </ul>

Source: International Energy Agency (2021), *The Role of Critical Minerals in Clean Energy Transitions*, IEA, Paris. All rights reserved.

A significant increase in demand for minerals would be required to reach the goals of the Paris Agreement. To reach a temperature rise at well below 2°C, as in the SDS scenario, or at 1.5°C, as in the NZE2050, mineral requirements for alternative energy technologies would need to quadruple (SDS) or grow six times more (NZE2050) by 2040. Moreover, under such scenarios, the mineral demand for use in EVs and battery storage is expected to grow at least 30 times by 2040, with lithium expected to grow by more than 40 times, and graphite, cobalt and nickel expected to grow at 20 to 25 times.

### GROWTH IN DEMAND FOR MINERALS BY SCENARIO IN 2040 RELATIVE TO 2020



## COVID-19, A STRESS TEST TO THE ENERGY SECTOR

“The COVID-19 pandemic has caused more disruption to the energy sector than any other event in history, leaving impacts that will be felt for years to come.”

- International Energy Agency (IEA), *World Energy Outlook 2020*, IEA, Paris.

At Valero, we experienced unprecedented demand contraction for our products as the outbreak of COVID-19 developed into a pandemic. For instance, in April 2020 relative to the same period in 2019, demand for gasoline was at 50%, 70% for diesel and 30% for jet fuel. In addition, stay-at-home orders and other social distancing measures to slow the spread of COVID-19 restricted travel and the overall level of individual movement, and helped drive record high levels of crude oil and product inventories. Throughout the COVID-19 pandemic, our team has been thorough, decisive and swift in our operational, financial and community support response, while maintaining focus on safety, environmental performance and reliability. In fact, we set several refining operational records in 2020, recording our best year ever in employee and contractor safety performance, our best year ever for process safety and record-low environmental events. In applying our refining expertise to optimize our renewable diesel segment, we also set records for sales volumes and margin.

As the pandemic stressed the energy sector, we witnessed many refineries around the world announce shutdowns or potential conversions. Our focus on reliable, low-cost operations coupled with a disciplined approach to capital investment will ensure that our facilities remain competitive through lower demand environments.

Valero St. Charles Refinery employee



# Governance and Risk Management

## Valero Energy Corporation's board of directors ("Board") considers oversight of Valero's risk management to be a responsibility of the full Board.

The Board exercises its oversight responsibility for risk assessment and risk management directly and through its committees. The Board's oversight role includes receiving reports from its committees, members of senior management and third parties on areas of material risk to Valero, and/or relating to the success of a particular project or initiative under consideration.

The full Board regularly receives from management, and discusses at Board meetings, updates on operational, financial, market, legal, regulatory, strategic, human capital, political, reputational, environmental, health and safety, cybersecurity, policy and climate-related risks facing Valero. From time to time, the Board also requests reports on areas of special or current relevance. For example, in the last year, the full Board has conducted reviews with management of:

- (i) operational, financial and health risks arising from the COVID-19 pandemic,
- (ii) Valero's cybersecurity initiatives,
- (iii) Valero's assessment of health, safety and environmental performance, as well as climate-related risks and opportunities,
- (iv) human capital issues, including the recruiting and retention of a diverse and talented workforce,
- (v) Valero's policies and procedures concerning issues of workplace safety, sexual harassment and discrimination,
- (vi) political spending and lobbying,
- (vii) global compliance, and
- (viii) the status of Valero's pension and retirement plans.

The Board also discusses significant risks at its annual strategic planning meeting. The Board regularly discusses the strategic priorities of Valero and the risks to Valero's successful execution of its strategy, including global economic and other significant trends, as well as changes in the energy industry and regulatory initiatives. In addition to receiving and discussing reports from management in strategic planning sessions, Valero invites, and the Board is able to interact with, third-party experts who make presentations to the Board on short- and long-term risks facing Valero and its businesses.

The oversight of risk is shared between the full Board and its committees. The full Board (or appropriate Board committee) regularly receives reports from management to enable the Board (or committee) to assess Valero's risk identification, risk

management and risk mitigation strategies. When a report is vetted at the committee level, the chair of that committee thereafter, as appropriate, reports on the matter to the full Board. This enables the Board and its committees to coordinate the Board's risk oversight role.

The Nominating/Governance and Public Policy Committee is composed of five independent directors with an effective mix of backgrounds, knowledge and skills. The committee is positioned to effectively assist the Board in its oversight responsibilities with respect to corporate governance, Board membership and environmental, social and governance (ESG) matters. Those ESG matters include, but are not limited to, climate-related risks and opportunities; health, safety and environmental performance; public policy; political contributions; and corporate responsibility.

As detailed above, the Nominating/Governance and Public Policy Committee regularly reports to the full Board regarding climate issues under the committee's purview. We believe that this is an effective structure to provide Board oversight of climate-related risks

and opportunities. At the Valero Energy Corporation level, at least once per year, our senior management team has a formal strategic planning meeting with our full Board. This meeting covers key aspects of Valero's businesses, including the impact of global climate policies on our outlook. In 2021, our Board and senior management team agreed to update our analysis of Valero's business strategy resilience and to issue this report. Our Board is also active in reviewing, and retains final authority regarding, major capital projects and significant acquisitions or divestitures. The current and potential impact of climate-related risks and opportunities is considered as part of this oversight.

Valero's senior management team assesses and manages climate-related risks and opportunities through an interdisciplinary approach that coordinates the views of our commercial, operational, regulatory, policy, legal and government affairs groups into long-term strategic planning. This effort is overseen by our Senior Vice President, General Counsel and Secretary who reports to our Chief Executive Officer and has direct reporting

duties to the Nominating/Governance and Public Policy Committee. Our Senior Vice President, General Counsel and Secretary has direct management oversight of Health, Safety and Environmental; ESG; Compliance; Risk Management; Government Relations and Legal matters. Each of those areas is actively involved in climate-related management issues.

Valero Corpus Christi West Refinery

In addition, we have well-developed management structures central to decision-making and risk management, including:

- We use long-term product supply and demand assessments and forecasts as part of our capital allocation process. These assessments and forecasts incorporate our estimates on potential impacts of climate-related risks and policy changes, among many other factors, and are distinct from the hypothetical IEA scenarios.
- We use a four-stage “phase-gate” process for project development and execution that considers regulatory risks and opportunities before a capital project can move forward. This process also applies higher return on investment thresholds for projects with greater financial and regulatory uncertainty. Major capital projects must be approved by the Board after going through this process.
- We continually engage with shareholders and other stakeholders and monitor current and proposed climate and environmental-related policies, laws and regulations to help us shape effective business strategies.
- We have robust operational and environmental management systems following three programs:

## 1

**Our Commitment to Excellence Management System (CTEMS)** is a proprietary systematic approach to planning, executing, checking and acting to improve everyday work activities across all of our operations. CTEMS has 10 elements:

1. Leadership accountability
2. Protecting people and the environment
3. People and skills development
4. Operations reliability and mechanical integrity
5. Technical excellence and knowledge management
6. Change management
7. Business competitiveness
8. Stakeholder relationships
9. Assurance and review
10. Continual improvement

Risks related to regulatory issues and physical threats to our facilities are among those assessed as we implement CTEMS at Valero.

## 2

**Environmental Excellence and Risk Assessment (EERA):** Created in 2020, EERA elevated the environmental audit and compliance functions to an environmental excellence vision. Its main goal is to assess the design and effectiveness of environmental management systems regarding specific excellence objectives, and to facilitate continuous improvement across the company. EERA defines more than 100 expectations and involves a five-step process using a combination of external assessors and internal subject matter experts. EERA follows a five-step process that includes:

1. Self-assessment is conducted by refinery leadership. Each refinery compares itself to rating criteria.
2. Third-party and in-house subject matter experts conduct an extensive deep-dive review of refinery environmental data and report in a due-diligence-style process.
3. Technical field assessment is conducted using industry standards and advanced technology to evaluate effectiveness in controlling emissions.
4. Results from the technology review and due-diligence process are used by a team of experts in a substantive on-site inspection and cultural assessment.
5. Experts and leadership team produce a final gap assessment report with mitigation pathway and scoring improvement actions.

## 3

**Our Fuels Compliance program** provides operational safeguards, software, auditing, training and protocols for uniformity across our labs to reinforce our compliance with applicable fuels regulations across the globe. Our fuels compliance efforts also include evaluating low-carbon-intensity value generation opportunities by finding carbon intensity optimization investments and strategies.

With the continuing global demand for the energy products we produce, even in carbon-constrained scenarios, we believe Valero is well positioned to remain a thriving company. We believe our governance and risk-management processes allow us to maintain resilient business strategies for various business and regulatory environments over time.



### DID YOU KNOW?

**FLARE-GAS RECOVERY SYSTEMS RESULTED IN MORE THAN 97% FLARING-FREE OPERATIONS IN 2020**

Approximately 80% of Valero’s large process flares are equipped with flare-gas recovery systems. These systems reduce flaring and recover fuel gases, which are used to fire heaters and boilers, reducing natural gas consumption and reducing GHG emissions.



Employees with protective equipment at Valero’s Corpus Christi refineries

# Strategy

**Global energy supply must increase to meet the demand created by a growing world population that desires access to the standard of living enjoyed by developed countries. Liquid transportation fuels are reliable, affordable and scalable, and we believe they will continue to be an essential source of transportation fuels well into the future.**

Our strategic actions have enabled Valero to be a low-cost, efficient and reliable supplier of liquid transportation fuels to the world. Our refineries operate in locations with significant operating cost advantages and the ability to export fuel to meet demand in developing countries, or in niche markets that enjoy raw-material cost or product-margin advantages. During the last decade we have been growing our low-carbon fuel business. Our ethanol plants are located near abundant raw material, have some of the lowest operating costs in the industry and have the ability to export to meet world demand. Our renewable diesel segment produces a low-carbon, high-margin product that represents an affordable and immediate solution to reduce transportation GHG emissions.

Throughout Valero's history, we have proactively managed our business portfolio through acquisitions and divestitures and have made selective investments to build a portfolio of assets that we expect to thrive under most energy demand forecasts, and we intend to continue to optimize as conditions demand.

We closely follow existing and proposed climate-related policies such as vehicle mileage standards, EV mandates, low-carbon fuel standards and carbon taxes. When appropriate, we act in a strategic fashion to capture opportunities related to these policies. For example, our investments in production capacity expansion projects for our renewable diesel segment help capitalize on the growing demand for low-carbon liquid fuels such as renewable diesel in low-carbon fuel standard markets.



**ETHANOL CARBON INTENSITY REDUCTION**

**DID YOU KNOW?** In order to continue reducing the carbon intensity of ethanol, we have implemented additional processes using enzymes to further break down the corn kernel fiber to produce cellulosic ethanol.

Valero St. Charles Refinery



## PRODUCTS AND OPERATIONS

We believe that our strategy to be a low-cost, efficient and reliable supplier of transportation fuels to the world is durable, even in IEA's lower-carbon scenarios.

Two of our three business segments are focused on low-carbon fuels: renewable diesel and ethanol. These products will continue contributing to meet the world's demand for low-carbon fuel alternatives as well as GHG emissions reduction targets.

We believe that our refining strategy will provide an advantage over refineries operating in other regions of the world, and that our primary refining opportunity is to export gasoline, diesel and jet fuel to meet continuing stronger demand for these products in developing countries, including in Latin America. We have built a system of assets that we expect to thrive under most reasonable energy demand forecasts, and we intend to continue to optimize our portfolio as conditions demand.



## SUPPLY CHAIN

Our long-term product supply and demand assessments and forecasts incorporate our estimates of the potential impacts of climate-related risks and opportunities, and policy changes, among many other factors, and are distinct from the hypothetical IEA scenarios. We have been executing, and plan to continue to execute, refining as well as low-carbon projects and initiatives that take advantage of today's market opportunities and that we believe will retain their value in the future.



## CAPITAL ALLOCATION

Valero's capital allocation supports the development of high-return projects with products placed into high-growth markets, including markets with low-carbon standards. Valero currently allocates approximately 60% of growth capital to low-carbon projects in 2021.

## Resiliency of North America Refining

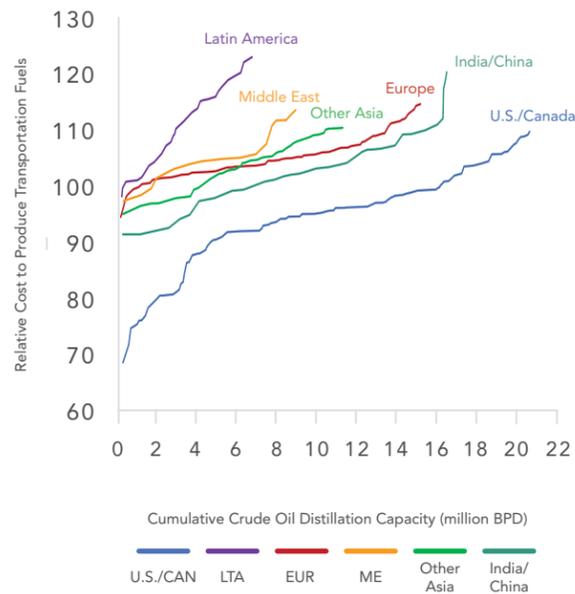
We view the cost to produce transportation fuels as a key indicator of the competitiveness of a refinery. Cost to produce is largely driven by operating expenses and raw material costs. Refinery operating expenses can be influenced by a number of factors, including energy costs and access to feedstocks. In terms of energy costs, natural gas is the primary energy used in North America to power refinery processes. The North American refining sector benefits from lower natural gas costs compared with most global competitors. Regarding feedstocks, crude oil is the primary raw material used in refineries. The North American refining sector benefits from oil produced in the U.S. and Canada that often trades at location-related discounts compared with the price of similar-quality crude oil traded on international markets.

Lower energy costs and advantaged North American crude oil result in a lower cost to produce transportation fuel in North America as reflected in the chart below. These cost advantages exceed the cost to transport gasoline, diesel and jet fuel to other key regions in the world, thereby allowing North American refineries to operate and export fuel even when refineries in the destination regions face closure because of reduced demand in the IEA scenarios.

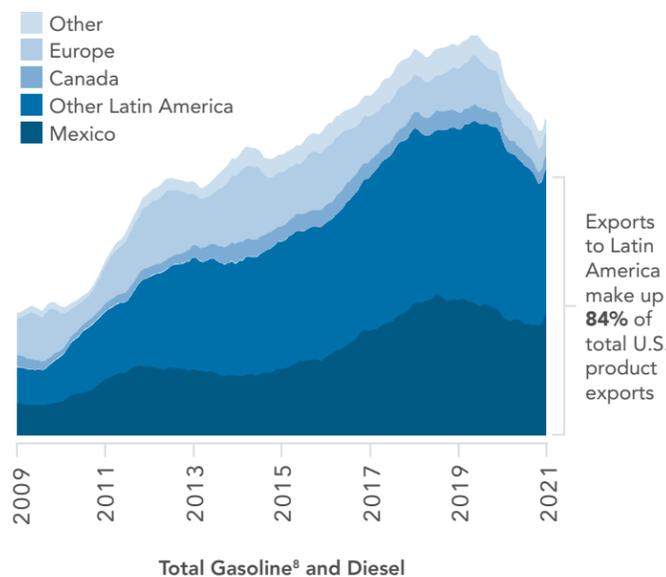
We see evidence of this trend in trade-flow data regarding U.S. transportation fuel exports. The volume of U.S. exports has grown significantly, with the majority of exports originating along the U.S. Gulf Coast to supply markets in Mexico and other parts of Latin America.

For all of these reasons, we expect the North American refining sector to maintain its cost advantages and continue to export transportation fuels to the rest of the world for many years into the future, even in the SDS or NZE2050 scenarios.

### U.S. REFINING COST ADVANTAGE (2018)



### U.S. PRODUCT EXPORTS (12-month moving average, mbpd)



Source: DOE Petroleum Supply Monthly data through May 2021.  
<sup>8</sup>Gasoline represents all finished gasoline plus all blendstocks (including ethanol, MTBE and other oxygenates).

## Resiliency of Valero's Refining Strategy

We engaged Solomon to assist us in evaluating the resiliency of our global refining strategy under the hypothetical conditions of the SDS scenario. Solomon is a leading benchmarking and advisory firm serving the refining industry and compiles high-quality data through its biennial Fuels Study that allows Solomon to compare the competitiveness of refineries around the world. For purposes of our analysis, we asked Solomon to assist us in assessing how our global refining assets would compare to our global competition against the assumptions of the SDS scenario. The cost to produce transportation fuel was a critical aspect of this analysis.

The scenario analysis contained several base assumptions:

- Solomon made assumptions regarding regional product demand in 2030 and 2040 based on the SDS scenario regional oil demand projections.
- The SDS scenario contains global and regional oil demand projections and global demand for oil products, including gasoline, diesel, naphtha and other products.
- Refineries with the highest cost to produce transportation fuel would close as demand fell.
- Regional refined product trade flows would adjust primarily based on regional differences in feedstock cost, operating costs and inter-regional transportation costs.
- Solomon examined data from the 2018 worldwide Fuels Study (which was the latest data available at the time of this analysis) for cost of transportation fuels.
- Solomon included known closures and probable refining projects based on public data to estimate refining capacity at risk in 2030.

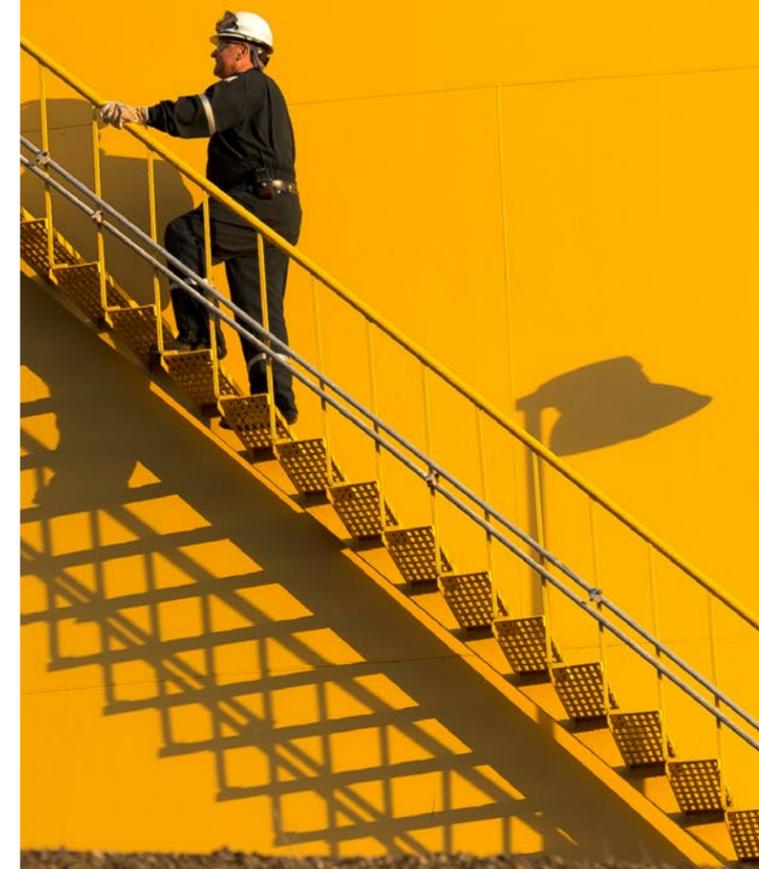
Valero Benicia Refinery employee



**DID YOU KNOW?**

### RECYCLING OF MATERIAL RECOVERED FROM TANK CLEANING

Recovered material is inserted back into the refining process to create fuels and other products. Alternatively, the recovered material is also used to fuel third-party facilities, avoiding landfill waste.



# STRATEGY

After conducting the SDS scenario analysis, independent of Valero, Solomon concluded that Valero’s overall refining portfolio would be resilient in a low-carbon marketplace.

Solomon concluded that our refinery in Pembroke, U.K., as well as all but one of our North American refineries, would be resilient under the market assumptions of the SDS scenario. Solomon’s analysis identified that market conditions could be challenging for only one of our assets, a refinery located along the U.S. Gulf Coast. That single refinery was very close to resilient and some strategic actions could be needed for that refinery to remain competitive. For context, the operating income from that refinery constituted less than 2% of Valero’s overall refining operating income in 2019.

In the TCFD report we published in September 2018, the Review of Climate-related Risks and Opportunities, Solomon concluded that, using the assumptions of the IEA’s 450 scenario, the market conditions of two of our refineries in the U.S. West Coast would be challenging. However, under the market assumptions of the SDS scenario, Solomon concluded that, after recent closures and peer refinery rationalization, our two refineries in the U.S. West Coast would be competitive in the transition to a lower-carbon economy as estimated in the SDS scenario.



### MARINE VAPOR RECOVERY UNITS

At certain refineries, captured vapors generated when loading ships with gasoline and other light products are routed back into the refinery’s gasoline pool.

**DID YOU KNOW?**

We have been executing and plan to continue to execute refining projects and initiatives that take advantage of today’s market opportunities, and that we expect will retain their value in the future, even in the SDS scenario, including:

- Construction of alkylation units at our Houston and St. Charles refineries that produce a high-octane gasoline blend stock, a product we believe will be necessary to help meet increased fuel efficiency standards.
- The addition of light crude distillation units at our Houston and Corpus Christi refineries that allow us to process increased volumes of light crude from U.S. shale oil resources.
- Reduction of refinery operating costs through cogeneration plants at our Wilmington and Pembroke refineries that reduce costs and improve reliability of power supplies.

- Investments to improve margins and light-product yields with the construction of a new Port Arthur coker unit, creating two independent coker trains that will improve turnaround efficiency and reduce maintenance-related emissions and lost margins.
- Investments to grow wholesale fuel volumes and exports to regions where demand for refined products is expected to outpace supply, such as in Mexico where our wholesale business is supported by a growing and flexible logistics supply system.

In summary, we believe that our strategy to be a low-cost, efficient and reliable producer of transportation fuels is durable, even in the SDS scenario.

## INCREASED REFINERY AVAILABILITY HAS DRIVEN VALERO TO BE THE LOWEST-COST PRODUCER

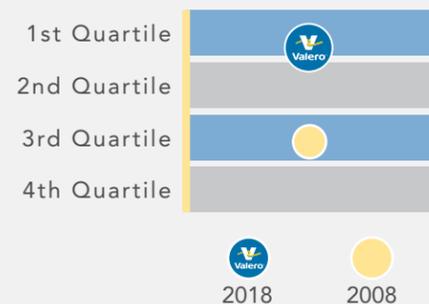
### REFINING CASH OPERATING EXPENSES PER BARREL OF THROUGHPUT

(excludes turnaround and D&A expenses)



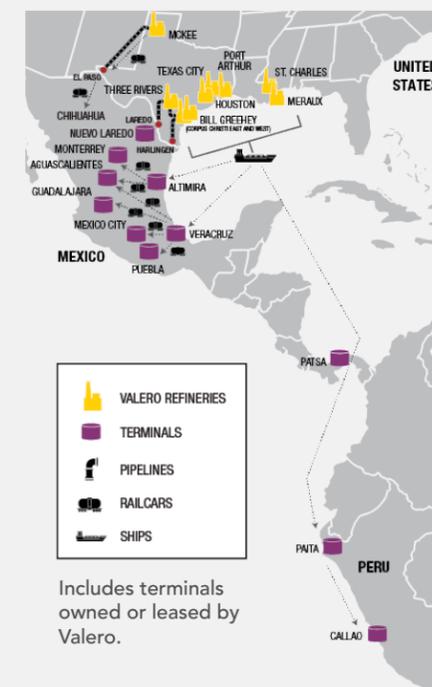
<sup>9</sup>Peer group includes PSX, MPC, HFC and PBF

### IMPROVEMENT IN MECHANICAL AVAILABILITY VERSUS INDUSTRY BENCHMARKS



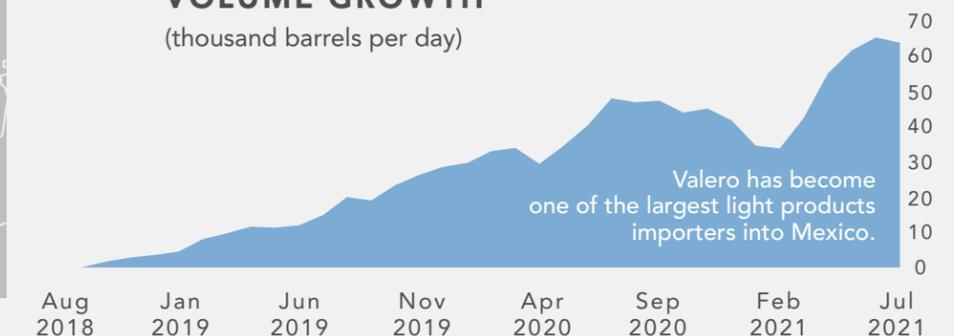
## INVESTING TO GROW PRODUCT EXPORTS INTO HIGHER NETBACK MARKETS

### ADVANTAGED REFINERIES AND LOGISTICS



### VALERO'S MEXICO WHOLESALE VOLUME GROWTH

(thousand barrels per day)



Valero has become one of the largest light products importers into Mexico.

See page 43 for notes regarding this page.

## Resiliency of Valero’s Low-Carbon Fuels Strategy: Renewable Diesel and Ethanol

Valero is the world’s second-largest producer of both renewable diesel and ethanol. We have invested more than \$3 billion to date in our renewable fuels and we expect to invest almost \$2 billion more through 2023 to complete the expansion of our renewable diesel production capacity.<sup>10</sup>

### RENEWABLE DIESEL

A drop-in fuel, our renewable diesel uses a combination of used cooking oil, recycled animal fats and inedible corn oil to produce low-carbon-intensity renewable diesel that reduces life cycle GHG emissions up to 80%, compared with traditional diesel.

Through DGD, our consolidated joint venture that started operations in 2013 at a plant adjacent to our St. Charles refinery, we have capacity to produce 290 million gallons per year with a planned expansion to 690 million gallons by late 2021. Another renewable diesel plant was approved by our Board to start operations in the first half of 2023, and will be located adjacent to our refinery in Port Arthur, Texas. This will result in a combined annual capacity of about 1.2 billion gallons of renewable diesel (the equivalent of more than 75,000 bpd).

### ETHANOL

Valero was the first traditional refiner to enter large-scale ethanol production. Today, we own 13 ethanol plants across the Midwest with a combined capacity of 1.7 billion gallons per year. A clean-burning, high-octane renewable fuel, ethanol has at least 30% lower life cycle GHG emissions, compared with petroleum gasoline. In order to continue reducing the carbon intensity of ethanol, we have implemented additional processes using enzymes to further break down the corn kernel to produce cellulosic ethanol. This type of ethanol offers lower life cycle GHG emissions compared with corn ethanol.

### GROWTH CAPITAL

Last year, more than 40% of growth capital was invested in low-carbon projects. In 2021, we are allocating approximately 60% of growth capital expenditures to low-carbon projects. Many state, provincial and national governments across the world have implemented, or are considering implementing, low-carbon fuel policies and stricter fuel-efficiency standards to help reach GHG emissions reduction targets. Some of these and other low-carbon policies and standards aimed at reducing GHG emissions should drive the demand for both renewable diesel and ethanol.

The growth of our renewable fuels business not only contributes to lower carbon emissions but also provides, and should continue to provide, a high financial return to our shareholders.

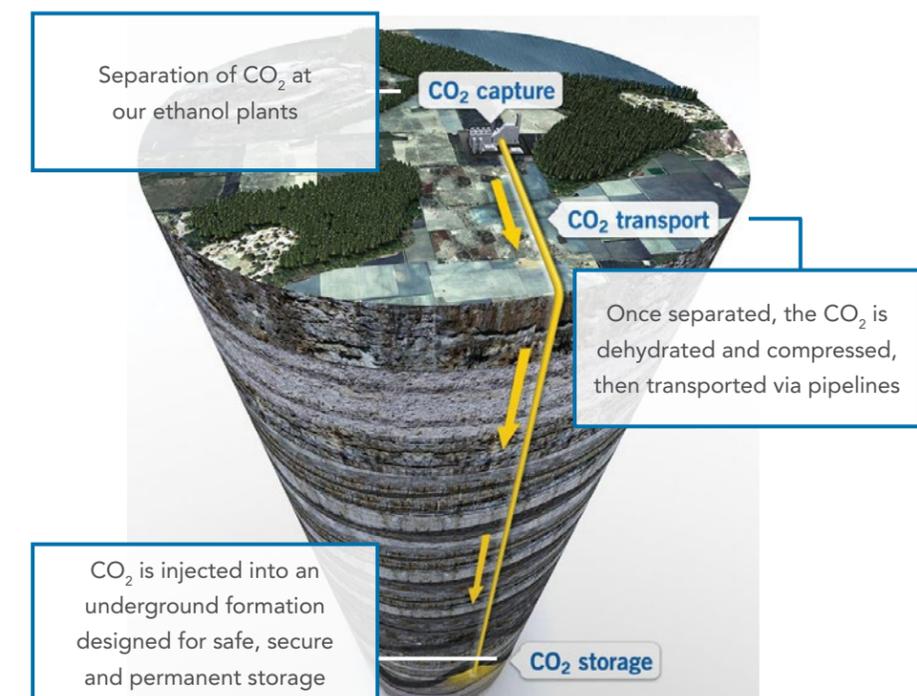
The IEA projects significantly increased demand for renewable fuels in the SDS scenario to 7.4 million barrels per day by 2040.<sup>11</sup> Our renewable fuels production facilities are well positioned to meet increasing demand as projected in this scenario.



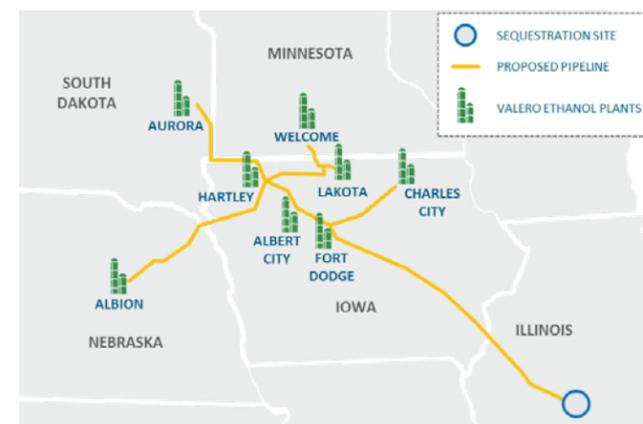
## LARGE-SCALE CARBON CAPTURE AND STORAGE TO FURTHER REDUCE THE CARBON INTENSITY OF ETHANOL

This project<sup>12</sup> involves capturing high-concentration CO<sub>2</sub> streams produced in the fermentation process at our ethanol plants.

The removal of CO<sub>2</sub> from our ethanol plants has the potential to further **reduce the carbon intensity** of this low-carbon fuel by **more than 40%** and significantly contribute to our GHG emissions reduction/offset targets.



<sup>12</sup>Working with BlackRock Global Energy & Power Infrastructure Fund III and Navigator Energy Services expected to be completed in 2024.



Valero is expected to be the anchor shipper with eight of its ethanol plants connected to the 1,200-mile carbon capture pipeline across five Midwest states.

Map is indicative only. Exact pipeline route subject to change following the conclusion of open season.

<sup>10</sup>Includes 100 percent of the capital investments of our consolidated joint venture, DGD.  
<sup>11</sup>International Energy Agency (2020), *World Energy Model Documentation: 2020 version*, IEA, Paris, last Updated May 7, 2021. All rights reserved.

# Summary of Risks and Opportunities

Potential Risks <sup>13</sup>	Explanation
<b>Current regulation</b>	Volatility in the market price of biofuel credits (primarily RINs needed to comply with the RFS) and GHG emission credits needed to comply with the requirements of various GHG emission programs can affect our results.
<b>Emerging regulation</b>	Policies that seek to address climate risks, such as a carbon tax, cap and trade, and low-carbon fuel standards, could increase the cost of our products in affected regions.
<b>Technology</b>	Increasingly stringent fuel efficiency standards and increased adoption of EVs could reduce consumer demand for liquid transportation fuels.
<b>Legal</b>	Potential climate-related litigation from governments, non-governmental climate organizations, and other third-parties could increase our costs.
<b>Market</b>	The price, availability and acceptance of alternative fuels and alternative-fuel vehicles, as well as sentiment and perceptions with respect to GHG emissions more generally, can affect our results.
<b>Reputation</b>	Investor sentiment towards climate change, fossil fuels and other ESG matters could adversely affect our business, cost of capital and the price of our stock and other securities.
Potential Opportunities	Explanation
<b>Market expansion for low-cost reliable fuels</b>	A growing global economy may result in increased demand for transportation fuels by middle-class families in developing countries. We believe that our strategy to be a low-cost, efficient and reliable supplier of transportation fuels to the world is durable in both strong future demand conditions and in a lower-carbon scenario. We believe that our strategy will provide an advantage over less competitive domestic refineries and refineries operating in other regions of the world, and that our primary refining opportunity is to export gasoline, diesel and jet fuel to meet continuing stronger demand for these products in developing countries, including Mexico and others in Latin America.
<b>Market expansion of renewable fuels</b>	A growing global economy, emerging regulatory policies and demand for low-carbon transportation fuels may result in increased demand for our renewable fuels. We strive to manage our business to responsibly meet the world's demand for reliable and affordable energy and have made multibillion-dollar investments to develop and grow our low-carbon renewable diesel and ethanol businesses. These renewable fuels businesses have made us one of the world's largest renewable fuels producers. We have invested more than \$3 billion to date in our renewable fuels businesses, and we expect additional growth opportunities in this area. For example, we expect to invest almost \$2 billion through 2023 to complete the expansion of our existing renewable diesel plant located next to our St. Charles refinery in Louisiana, and to build another plant adjacent to our refinery in Port Arthur, Texas. <sup>14</sup>
<b>Technology</b>	A transition to a low-carbon economy could spur the development and deployment of new efficiency measures and technologies for our facilities. Valero recently announced its intention to participate in a large-scale carbon capture and storage project with Navigator and BlackRock, which will capture carbon from eight of our ethanol plants, reducing the carbon intensity of this low-carbon fuel by an estimated 40% and significantly contributing to our GHG emissions reduction targets.
<b>Consumer preferences</b>	Our complex refining system is capable and well positioned to adapt to growing demand for feedstocks as well as a potential shift to high-octane fuels that improve fuel efficiency.

<sup>13</sup>The description of these risks include those facing the company that we think, at the time of the relevant disclosure, there is a substantial likelihood that a reasonable investor would consider important in making an investment decision, taking into account a variety of factors and considerations depending on the specific circumstance and its content, which could include items such as how speculative/uncertain the risk may be, the potential effect of the risk, its significance relative to the total mix of information made available, our business strategy and many other considerations that could be appropriate based on the specific facts.

<sup>14</sup>Includes 100 percent of the capital investments of our consolidated joint venture, DGD.

## PHYSICAL RISKS

According to the UN Intergovernmental Panel on Climate Change (IPCC), the physical risks of climate change are widespread and varied in terms of level of confidence and magnitude.

With refineries along coastlines and ethanol plants in the U.S. Midwest, Valero evaluates and prepares for physical risks to its facilities from natural disasters, including hurricanes and tornadoes, to other threats, and works to mitigate risks to its people, assets, surrounding communities and the environment.



### Securing our Facilities

We analyze historical data and trends to identify best practices that we can implement to mitigate and reduce physical risks to our operations and our people. Our sustaining capital is invested in securing our facilities:

- We construct new infrastructure at raised elevation to reduce the effects of flooding.
- We designed our Ardmore and McKee refinery control rooms to withstand EF3 tornadoes, and designed employee shelters to withstand EF5 tornadoes.
- We have upgraded critical buildings at our refineries, including control rooms, to be resilient to multiple physical risks, including severe weather.
- Our Gulf Coast refining facilities were designed to withstand severe hurricane forces. However, operating in such conditions could potentially expose employees to flying debris and flooding; as such, for more severe hurricanes that pose such a danger, we initiate safe shutdowns and evacuate our employees in accordance with our hurricane preparedness plan discussed on the following pages.



### Emergency Preparedness and Response

Valero has developed a consistent emergency management process, designed to identify and address the risks posed to our operations and our people from external threats. Our facility and corporate leadership teams meet regularly to identify risks to our facilities and implement long-term solutions. Our emergency preparedness and response program actively engages facility and corporate employees and leadership, including:

- Developing emergency response plans at each facility to be compliant with all local, state and federal regulations.
- Staffing qualified emergency response teams at each of our facilities.
- Executing a routine drill and assessment schedule to promote response readiness and identify opportunities for improvement.
- Ensuring that emergency planning and response is appropriately considered in the strategic planning and capital budget process.
- Identifying and utilizing emerging technologies to promote efficient emergency planning and decision-making.



Our post-hurricane assistance team provides much-needed employee help after the storms by removing debris and doing urgent home repairs and other essential tasks.

Valero's U.S. Gulf Coast facilities are periodically exposed to hurricanes and their associated weather events, including strong winds, storm surges and flooding. Our management and refinery leadership teams use a sophisticated hurricane preparedness program to promote the safety and reliability of our assets and the safety of our people, which includes the following pre-hurricane season measures:

#### Facilities and Equipment Management

- Site inspection, pre-season maintenance.
- Structural evaluations, securing portable structures.

#### Planning and Execution

- Shutdown/evacuation timelines.
- Port closures and other operating contingencies.
- Coordination with applicable agencies.

#### Personnel Readiness

- Employee contact information updates.
- Shutdown/startup and ride-out-crew teams.
- Employee home emergency preparedness and evacuation planning.

During the hurricane season, our five-phase process is designed to monitor evolving conditions across the Atlantic and provide adequate time and resources for our facilities and employees to safely and responsibly prepare for any incoming storms.

# 1

#### Phase 1 – Start of Season

- Daily monitoring and tracking of disturbances in the Atlantic basin.

# 2

#### Phase 2 – Predicted Storm Impact to Gulf

- Conference call with affected sites.
- Shutdown and evacuation timelines verified.

# 3

#### Phase 3 – Significant Impact to Site(s) Likely

- Corporate Emergency Operations Center (EOC) activated to support site(s).
- Operating strategies and contingencies reviewed.
- Call center activation reviewed and timeline set.
- Equipment and service providers put on standby.

# 4

#### Phase 4 – Shutdown/Ride-out

- Ride-out, shutdown and/or evacuation plans executed.
- Equipment and service providers mobilized.
- Support teams prepared for deployment, EOC staffed.
- Post-impact communication strategy established.

# 5

#### Phase 5 – Post-hurricane

- Assess impacts to operations, employees and environment.
- Develop plans for care and recovery of people and processes.
- Deploy support teams.
- Startup safely.
- Critique response for improvement at appropriate time.

## HOW VALERO REBOUNDED FROM TWO OF THE NATION'S MOST POWERFUL STORMS



“Valero personnel worked around-the-clock to get much-needed fuel to stranded motorists, Houston hospitals and emergency response crews. Valero’s efforts were truly extraordinary during Texas’ time of need.”

- Victoria Ford, Texas Gov. Rick Perry’s Deputy Legislative Director, March 2006

While writing this report, we were in the midst of assessing the impact of Hurricane Ida on two of our refineries, St. Charles and Meraux. In advance of the hurricane landfall, both refineries were shut down in a safe, controlled manner. The safety of our employees, their families and neighboring communities has always been our primary focus. We stood ready to help our employees in Louisiana affected by this storm and deployed teams and supplies to support recovery efforts.

On August 29, 2005, Hurricane Katrina slammed ashore in Louisiana and passed just to the east of Valero’s St. Charles Refinery. It wreaked havoc on the community. Valero pledged to do whatever was necessary to help its employees and the community recover. It delivered truckloads of supplies; sent cooks to prepare three meals a day, every day; and established a town of

47 residential trailers – dubbed “Valeroville” – to house workers who returned to help restart the plant. Less than 24 hours after Katrina struck, crews from Valero’s other refineries hit the road to help restore power and function in St. Charles. Bolstered by the outpouring of support, the St. Charles employees worked night and day to restart their refinery in record time. In just nine days, Valero’s St. Charles refinery was up and producing much-needed fuels. An accomplishment that drew the attention of the U.S. Federal Emergency Management Agency (FEMA) to Valero’s Hurricane Preparedness Program, including pre- and post-storm responses.

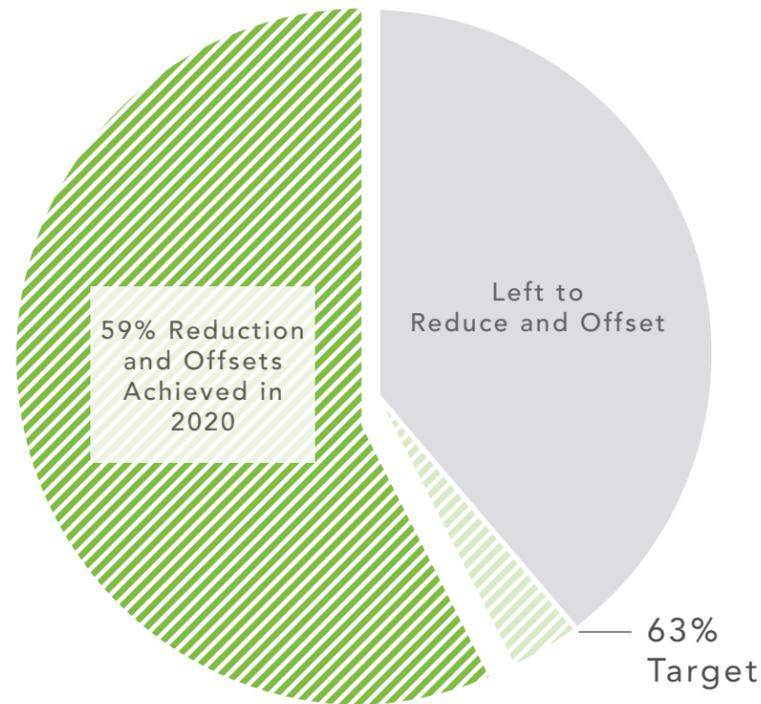
Less than a month later, Hurricane Rita churned over the city of Port Arthur. The Valero Port Arthur Refinery suffered flooding across much of its 5,000 acres, a toppled flare stack and wind-damaged

cooling towers. But as they had with Katrina, workers responded immediately. Supplies, food, water and 69 residential trailers made their way to Port Arthur even before the rain stopped falling. Fuel and hot meals were offered to anyone in need. Valero’s employees followed emergency response protocols and worked around the clock to restore electricity to the plant before many areas of the city even had power. Then, they repaired and restarted the plant safely and quickly. Months later, Valero was still providing relief, nearly \$1.2 million was given to employees who suffered damage. Inspired by Valero’s \$1 million donation to the American Red Cross, employees donated nearly \$300,000 and 9,000 volunteer hours to hurricane relief efforts. The unprecedented hurricane response is the embodiment of Valero’s caring and sharing culture.

# Targets

## 2025 TARGET:

To reduce and offset 63% of our global refining Scope 1 and 2 GHG emissions by 2025 through Board-approved projects.



On track to achieve 63% refining GHG emissions reduction/offset target by 2025.

In addition to absolute refining GHG emissions reductions, our production of renewable diesel and ethanol offers meaningful reductions in life cycle GHG emissions, compared with traditional diesel and gasoline. Blending and credits with respect to renewable fuels also provide a displacement of GHG emissions. Many state, provincial and national governments across the world have implemented, or are considering implementing, low-carbon fuel policies and stricter fuel efficiency standards to help reach GHG emissions

reduction targets. This has driven the demand for both renewable diesel and ethanol. Valero believes that the ability to supply these renewable fuels plays an important role in achieving such GHG emissions reduction targets.

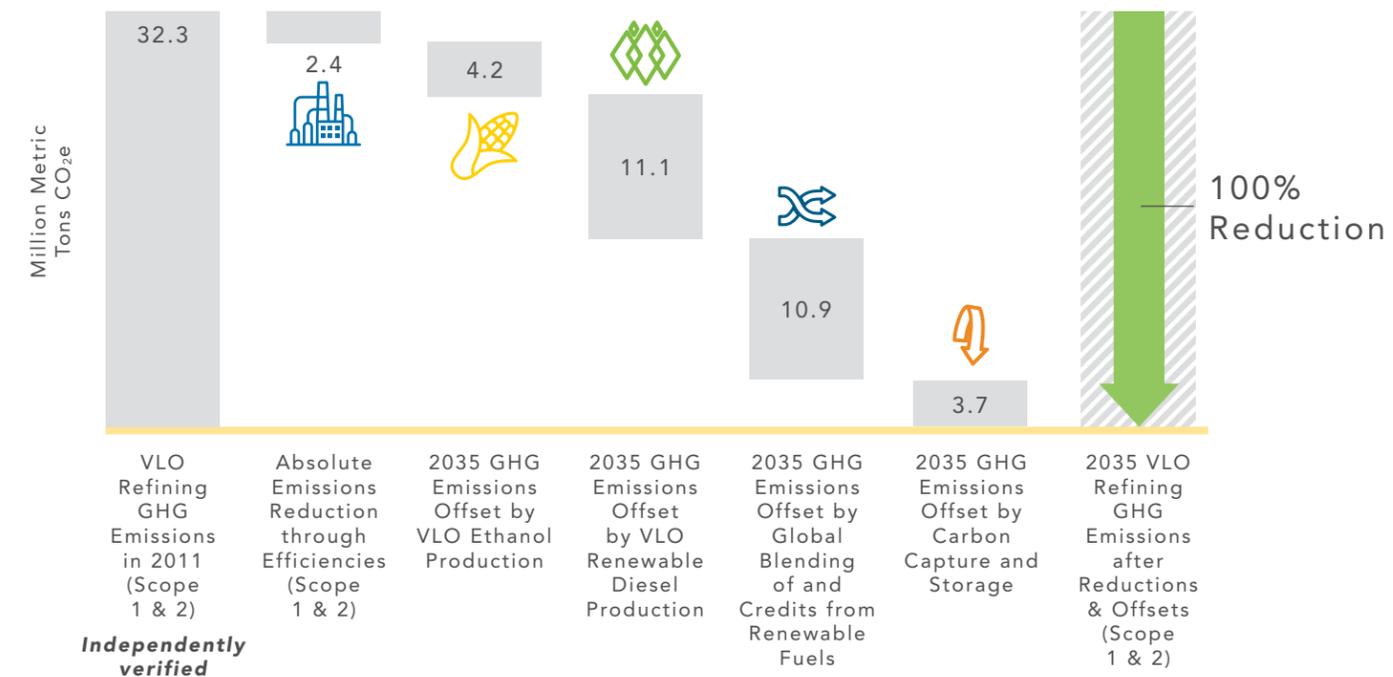
We have invested more than \$3 billion to date in our renewable fuels, and we have allocated almost \$2 billion over the next three years expanding our Board-approved renewable projects.<sup>15</sup>

<sup>15</sup>Includes 100 percent of the capital investments of our consolidated joint venture, DGD.

For more information regarding this page, see pages 106 and 107 of the Stewardship and Responsibility Report, which includes the SASB report.

## NEW 2035 TARGET:

We plan to further reduce and offset 100% of our global refining Scope 1 and 2 GHG emissions by 2035 through Board-approved projects and carbon capture and storage projects under development.



**TARGETING TO REDUCE AND OFFSET 100% OF GLOBAL REFINING SCOPE 1 AND 2 GHG EMISSIONS BY 2035**

For more information regarding this page, see pages 106 and 107 of the Stewardship and Responsibility Report, which includes the SASB report.

# Performance Metrics

Valero uses third parties to conduct environmental, emissions and fuel compliance verifications.

State, provincial and national governments across the world with cap-and-trade and low-carbon fuel policies require independent assurance of our GHG emissions and the carbon intensity of our low-carbon fuels. In addition, we engaged Lloyd's Register Quality Assurance Inc., an affiliate of Lloyd's Register North America Inc., to evaluate and issue an assurance statement on the accuracy and reliability of our global refining Scope 1 and 2 GHG emissions. We intend to continue attaining assurance statements on our global refining GHG emissions each year.

Details on independent verifications and assurance statements can be found on our website at [www.valero.com](http://www.valero.com) > Investors > ESG.

For more information on performance metrics, please see our **SASB report** on pages 106 and 107 of the Stewardship and Responsibility Report.

ENVIRONMENTAL METRICS				
GLOBAL REFINING <sup>16</sup>	2017	2018	2019	2020
GHG Emissions Scope 1 <sup>16</sup>	25.2	25.4	24.8	23.0
GHG Emissions Scope 2 <sup>16</sup>	5.2	5.0	4.7	4.5
NO <sub>x</sub> <sup>17</sup>	9,300	9,000	8,700	7,900
SO <sub>x</sub> <sup>17</sup>	8,800	7,700	8,800	7,600
PM <sub>10</sub> <sup>17</sup>	2,400	2,300	2,200	2,200
VOCs <sup>17</sup>	9,500	10,300	7,700	7,500
Fresh Water withdrawn <sup>18</sup>	181.2	165.8	164.1	164.6

<sup>16</sup>Million metric tons CO<sub>2</sub>e. Scope 1 is defined as the direct GHG emissions from global refinery operations. Scope 2 (market-based) is the indirect GHG emissions from purchased electricity and steam calculated using EPA-derived steam emissions factors and energy supplier-specific emissions factors.

<sup>17</sup>Metric Tons

<sup>18</sup>Million m<sup>3</sup>

# Conclusions

We believe that demand for our products will continue to increase, together with the growing economies of the developing world.

We believe that our assets and strategies for our refining and low-carbon fuels are well positioned to make Valero a resilient company in a lower-carbon economy. Our executive management team, with the ongoing oversight of our Board, expects to continue to address climate-related risks and opportunities through the governance and risk management framework described in this report. When appropriate, we plan to act strategically to capture these opportunities and mitigate risks. Our strategy to invest in flexible and efficient manufacturing, renewable fuels and other low-carbon projects, and the infrastructure critical to our operations help us to meet today's energy needs and prepare for future market demands. Valero remains committed to seeking to be the lowest-cost, safest operator in our industry as we provide reliable and affordable transportation fuels for the modern world, while serving the needs of our employees, communities and other stakeholders.

Valero Meraux Refinery



# Disclaimers and Notes

## About this Report - Policies and Procedures

### Policies and Procedures

This report includes statements regarding various policies, values, standards, approaches, procedures, processes, systems, programs, initiatives, assessments, technologies, practices and similar measures related to our operations and ESG and compliance systems ("Policies and Procedures"). References to Policies and Procedures in this report do not represent guarantees or promises about their efficacy or continued implementation, or any assurance that such Policies and Procedures will apply in every case. Such Policies and Procedures are subject to risks, uncertainties and other factors, some of which are beyond the control of Valero and are difficult to predict, and there may be exigent circumstances, factors or considerations that may cause implementation of other measures or exceptions in specific instances. Please see Forward-Looking Statements below.

### Forward-Looking Statements

This report contains forward-looking statements within the meaning of Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934. You can identify forward-looking statements by words such as "should," "strive," "pursue," "intend," "anticipate," "forecast," "track," "would," "continue," "poised," "focused," "opportunity," "scheduled," "believe," "estimate," "expect," "seek," "could," "may," "will," "targeting," "goal," "plan" or other similar expressions that convey the uncertainty of future events or outcomes. Forward-looking statements in this report include, among others, those relating to our policies and procedures, the resiliency of our business strategy and assets against potential constrained demand scenarios as detailed by the IEA, our 2025 and 2035 GHG emissions reduction/offset targets, expected timing of completion of projects, future safety performance, future business plans and strategies, future investments and growth capital spending plans, potential risks and opportunities, future operating performance and management of future risks. These forward-looking statements are not guarantees of future performance or actions and are subject to risks, uncertainties and other factors, some of which are beyond the control of Valero and are difficult to predict, including, but not limited to, the effect, impact, potential duration or other implications of the COVID-19 pandemic and various events arising therefrom. These statements are often based upon various assumptions, many of which are based, in turn, upon further assumptions, including examination of historical operating trends and market conditions made by the management of Valero. Although Valero believes that the assumptions were reasonable when made, because assumptions are inherently subject to significant uncertainties and contingencies, which are difficult or impossible to predict and are beyond its control, Valero cannot give assurance that it will achieve or accomplish its expectations, beliefs or intentions, or that any forward-looking statements will ultimately prove to be accurate.

When considering these forward-looking statements, you should keep in mind the risk factors and other cautionary statements contained in Valero's filings with the Securities and Exchange Commission, including Valero's annual report on Form 10-K, quarterly reports on Form 10-Q, and other reports available on Valero's website at [www.valero.com](http://www.valero.com). These risks could cause the actual results, actions and Policies and Procedures of Valero to differ materially from those contained in any forward-looking statement. We do not intend to update these statements unless we are required by applicable securities laws to do so.

Results or metrics in this report as of any date, or for any period, ending on or prior to the date of this report are not necessarily indicative of the results that may be expected as of any date, or for any period, ending after the date of this report.

### Page 15

U.S. Light-Duty Vehicle Life Cycle Emissions study conducted by Argonne National Laboratory (DOE) – "Cradle-to-Grave Lifecycle Analysis of U.S. Light-Duty Vehicle-Fuel Pathways: A Greenhouse Gas Emissions and Economic Assessment of Current (2015) and Future (2025-2030) Technologies." Study focused on the midsize sedan, assumed 15-year vehicle life of vehicle, renewable diesel emissions are based on 100% renewable diesel blend, electricity based on 2014 EIA average mix, no battery replacement for 210-mile range electric vehicle, DGD waste oil feedstock CI's have at least 40% less emissions than soybean-based renewable diesel.

U.S. Heavy-Duty Long-Haul Vehicle Life Cycle Emissions study conducted by Southwest Research Institute – "Class 8 Truck Life Cycle Analysis" (2020). Class 8 heavy-duty truck with a 1 million-mile (~15 years) lifetime; electric truck with a 500-mile battery range, electricity based on GREET Distributed U.S. Mix Variable 2020-2035, no battery replacement; 15L diesel engine running on 100% renewable diesel, renewable diesel carbon intensity based on CARB's 2019 LCFS Quarterly Data Summary.

### Page 30

Industry benchmarking and Valero's performance statistics from Solomon Associates and Valero. Valero's refining operations typically consume approximately 905,000 MMBtu/day of natural gas, of which 66% is operating expense and the balance is cost of goods sold.

Valero Corpus Christi Refineries employees



For the fifth consecutive year, volunteers from our Quebec refinery planted trees and shrubs in the lands adjacent to Parc de la Rivière-Etchemin to enhance the natural landscape.



# DRIVEN

TO MAKE A DIFFERENCE



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