executive summary

At Chevron, we believe the future of energy is lower carbon, and we support the global net zero ambitions of the Paris Agreement. This report builds on our previous four reports and has updates throughout, including key updates to pages 32–44 to reflect our response to stockholders on net zero and our contributions to support our customers in addressing their emissions (Scope 3).

reliable and disciplined oversight

Our governance structure calls for Chevron's full Board of Directors and executive leadership to exercise their oversight responsibilities with respect to potential climate change–related risks and energy-transition opportunities. This oversight is executed through regular engagement by the full Board of Directors and also through deeper, focused engagement by all Board committees. This occurs primarily through the Board's Public Policy and Sustainability Committee, as well as the Board's Management Compensation, Audit, and Nominating and Governance Committees. At the executive level, we manage potential climate change–related risks and energy-transition opportunities through the Enterprise Leadership Team and the Global Issues Committee, each of which meets regularly throughout the year. We periodically reassess our governance structure to enable Chevron to maintain a Board composition and governance framework that is effective for managing the Company's performance and risks as we deliver value to our investors.

risk assessment and management

We face a broad array of risks, including physical, legal, policy, technology, market, and reputational risks. We utilize an enterprisewide process to assess major risks to the Company and seek to apply appropriate mitigations and safeguards. As part of this process, we conduct an annual risk review with executive leadership and the Board of Directors and assess our risks, safeguards, and mitigations.

higher returns, lower carbon

Our primary objective is to deliver higher returns, lower carbon, and superior shareholder value in any business environment. Chevron's strategic and business planning processes bring together the Company's views on long-term energy market fundamentals to guide decision making by executives and to facilitate oversight by the Board of Directors. The world's energy demands are greater now than at any time in human history. Chevron has a long and celebrated history of producing oil, gas, and other products that enable human progress, which it proudly continues today, as it pursues the energy future. Most published outlooks conclude that fossil fuels will remain an important part of the energy system for years to come, and that the energy mix will include increasingly lower carbon sources. As part of our strategic planning process, we use models and internal analysis to forecast demand, energy mix, supply, commodity pricing, and carbon prices—all of which include assumptions about future policy, such as those that may be implemented in support of the Paris Agreement's goal of "holding the increase in the global average temperature to well below 2° C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5° C above pre-industrial levels."

In 2020, more than 60 percent of our total Scope 1 and 2 equity greenhouse gas (GHG) emissions (i.e., participating share of emissions both from facilities that Chevron operates and from our nonoperated joint ventures) were in regions with existing or developing carbon-pricing policies.* In this environment, and into a future likely to include additional lower carbon policies, we seek to find solutions that are good for society and good for investors.

We use carbon prices and derived carbon costs in business planning, investment decisions, impairment reviews, reserves calculations, and assessment of carbon-reduction and new energy opportunities. We believe that our asset mix and actions in new energies enable us to be flexible in response to potential changes in supply and demand, even in lower carbon scenarios like the International Energy Agency's (IEA) *Net Zero by 2050* (NZE 2050) scenario or under higher-emissions scenarios like the Intergovernmental Panel on Climate Change AR5 Representative Concentration Pathway 8.5 that models a hypothetical upper bound of physical risks. We believe the likelihood of either scenario is remote and do not rely on either scenario in our current business planning.

success in a lower carbon future

Affordable, reliable, ever-cleaner energy is essential to achieving a more prosperous world. We have a strategy that combines a high-return, low-growth, lower carbon–intensity† traditional business together with faster-growing, profitable, lower carbon new energy businesses that leverage our strengths.

in summary

Chevron has world-class capabilities and people—and we intend to apply them to advance Chevron's growth to a lower carbon future. Higher returns, lower carbon: We believe we must deliver both to earn a higher valuation for our stockholders and benefit all stakeholders.

* Scope 1 includes direct emissions. Scope 2 includes indirect emissions from imported electricity and steam. Scope 3 includes all other indirect emissions, such as the use of products by customers.
† Carbon intensity refers to a measure of CO_2e per unit of production. For more information, see page 61.

Q&A

with the honorable jon m. huntsman jr., former ambassador and member of the PPSC

"If Chevron is to lead responsibly on climate, then ambitions are required. We support the Paris Agreement, which calls for achieving net zero GHG emissions in the second half of this century."

As you return to the Chevron Board, including serving on the Public Policy and Sustainability Committee, what do you see as the greatest policy issue facing the Company today?

Huntsman: Chevron is a world-class company with a significant global reach. Of all the policy issues facing the Company, the one that transcends all others is climate change. We must lead and be solution oriented, which gladly is recognized by Chevron leadership, starting with the Board. We are well-positioned to confront the post-COVID environment, which will carry both social and economic challenges. But at the same time, we will expect that Chevron helps advance a lower carbon economy. With 140 years of navigating difficult circumstances and policy issues, Chevron is better prepared than ever to lead as a responsible and respected global energy company.

Some are calling for Chevron to establish an ambition for net zero by 2050. What is your view on the issue?

Huntsman: If Chevron is to lead responsibly on climate, then ambitions are required. We support the Paris Agreement, which calls for achieving net zero GHG emissions in the second half of this century. Chevron is already a leader in producing energy at a carbon intensity well below the average of the global system and is in the best-performing quartile of all oil and gas producers. Addressing the world's need for affordable, reliable, and lower carbon energy is a priority that must be tailored to our broader goals around sustainability while generating a competitive return for investors. Our Board is deeply engaged on this issue and has aligned the Company's ambitions to advance these opportunities.

With your background as a diplomat, policymaker, and businessperson, how do you think Chevron can best support the global effort to reach the goals of the Paris Agreement?

Huntsman: The best way a company can support this effort is to report on the carbon efficiency of the products they sell, along with making continuous carbon efficiency improvements and advancing new technologies that expedite all of the above. Companies like Chevron that are global leaders must play a role in informing good policy, driving innovative solutions, and working with others to lower the carbon intensity of the global economy. None of this will happen without strong and unprecedented global collaboration around Paris Agreement goals while maintaining economic growth and enhancing the standard of living for all. As I return to the Board, I've never been more optimistic or impressed about what Chevron is doing to support the global energy transition.

3.1.2 Policy: Trends, framework, and impact analysis

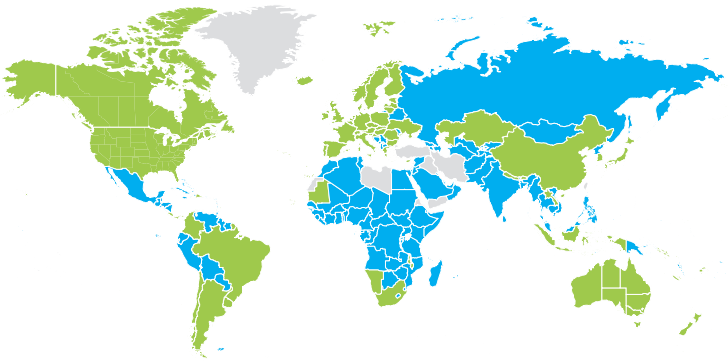
Policies, like those that support the Paris Agreement, can change the amount of energy consumed, the rate of energy-demand growth, the energy mix, and the relative economics of one fuel versus another. Tracking and anticipating policy trends helps us identify potential changes in energy mix and supply/demand scenarios and adjust our outlooks accordingly.

Policy trends: The Paris Agreement, which went into effect in 2016, aims to hold "the increase in the global average temperature to well below 2° C above pre-industrial levels and [to pursue] efforts to limit the temperature increase to 1.5° C above pre-industrial levels."* Under the agreement, each country may pursue its own strategies for achieving its Nationally Determined Contributions (NDCs). According to the IEA, the current NDCs do not appear to enable achieving the goals of the Agreement,[7] although new, updated, or reconfirmed NDCs are intended to be submitted.

According to the IPCC, achieving the Paris Agreement's goals will require peaking emissions as soon as possible and global net zero emissions by "around 2070" (2065–2080). The IPCC finds that achieving a 1.5° C scenario with high confidence and without any temporary overshoot would require net zero by "around 2050" (2045–2055). Other IPCC scenarios reach net zero later this century, but they achieve 1.5° C outcomes through greater adoption of carbon dioxide removal opportunities. Achieving a 1.5° C goal will require nations to reduce emissions across all sectors of the economy. It will also require increasing removals by sinks, such as nature-based solutions (e.g., forestry), and through technology solutions (e.g., CCUS).

The IPCC finds there are numerous potential pathways to achieving the goals of the Paris Agreement. All pathways include the continued use of oil and gas, even in rapid decarbonization scenarios. To achieve net zero emissions by 2050, direct air carbon dioxide capture and storage and carbon capture and storage (CCS) are required to be scaled up and globally deployed. Without this technology, the IPCC climate models cannot achieve theoretical solutions to reach net zero in the desired time frame.

Exhibit 4. Nearly all countries have endorsed the Paris Agreement and some are supporting net zero ambitions



Endorsed Paris Agreement

Endorsed Paris Agreement and government support for net zero

As of October 2021.

Sources: United Nations Treaty Collection, treaties.un.org/Pages/ViewDetails.aspx?src=TREATY&mtdsg_no=XXVII-7-d&chapter=27&clang=_en; United Nations Framework Convention on Climate Change, unfccc.int.

to achieve global net zero, markets should be empowered to incentivize the most carbon-efficient producers

We support the Paris Agreement and its goal of "holding the increase in the global average temperature to well below 2° C above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5° C above pre-industrial levels," which per the IPCC implies reaching global net zero in the second half of this century. We believe that the optimal approach is to drive the most efficient and cost-effective reductions economywide, paired with natural and technological emissions removals. Narrow sectoral or geographic metrics are less efficient than broad economywide solutions, which are uniquely able to incentivize the most efficient and cost-effective reductions. Chevron supports a price on carbon, applied as widely and broadly as possible, as the best approach to reduce emissions. We work to encourage national policies to support international linkages (for example, through Article 6 of the Paris Agreement), with the goal of ultimately building up to a liquid and integrated global carbon market.

Individual companies contribute to achieving the goals of the Paris Agreement through their participation in policies that may be included in the NDCs of the countries in which the companies operate. We work with governments to encourage well-designed policies that can strengthen the NDCs, such as carbon pricing and rewarding the most efficient and least carbon-intensive producers. Most energy forecasts agree that oil and gas will continue to be a significant source of energy—even in a net zero scenario for years to come. We believe the transparent reporting of performance will enable the market to reward the most carbon-efficient producers.

*UN Intergovernmental Panel on Climate Change (IPCC), *Special Report: Global Warming of 1.5 °C*, 2018, ipcc.ch/sr15/.

Policy organizational framework: Given the sheer scale of the global challenge to address climate change, allocation of limited resources as efficiently and effectively as possible is critical to creating the greatest opportunity for success. Prioritizing efforts that curtail emissions at the lowest cost per tonne, irrespective of where or in which sectors those abatements occur, is the most economically efficient approach. These efforts, grouped by category, can be ordered by cost of the reduction on a per-tonne basis in a graphical representation (Exhibit 5), often called a marginal abatement cost curve (MACC).*

Each bar represents one type of mitigation opportunity. The height of each bar represents the cost of abatement, generally expressed in a breakeven cost per tonne of carbon dioxide–equivalent (CO_2e), and the width of each bar represents the volume of abatement, usually in tonnes of CO_2e. Generally, efficiency and some renewable-power applications are less costly than nature- and land-based reductions, which are generally less costly than CCUS and other technologies still in early development. Potential carbon-reduction costs and volumes can also vary by geography or application.[8]

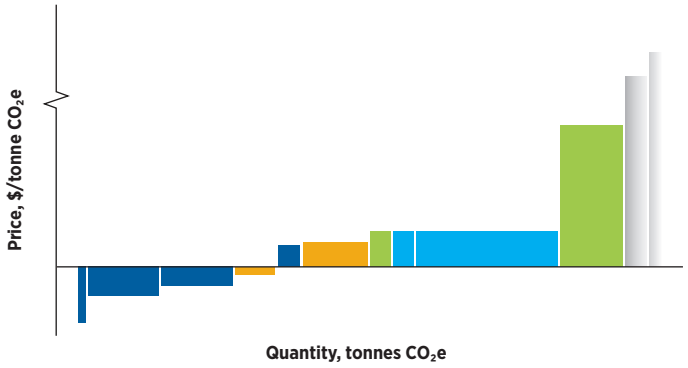
Because it is impossible to know the exact abatement cost and reduction available in order to design specific policies for targeted reduction opportunities, many economists believe the most efficient way to achieve economywide emissions reduction is through a price on carbon.[9] Carbon pricing incentivizes reductions across the economy and investment in reduction technologies for the future. A price in the form of either a tax—which sets the cost of reduction—or a cap-and-trade system—which sets the volume of reduction—can flexibly integrate additional information and solutions within a market-based framework, strengthening and compounding its comparative advantages over time (Exhibit 6). In addition, carbon prices could raise revenue that can either be invested in reduction technologies whose commercial application might otherwise be too distant to incentivize investment or returned to impacted communities and consumers.

The wider the coverage of a price, the more opportunities there are to find carbon reductions. For example, in non-OECD economies, it is often less expensive to reduce emissions because investment may not have been made in the most efficient technology. By linking OECD and non-OECD economies, financing can be mobilized to incentivize reductions from the lowest-cost area. It is estimated that with global cooperation (for example through the Paris Agreement), reductions can be made at half the cost of an inefficient and unlinked system.[10]

Policies narrowly targeted at specific geographic regions, sectors, or technologies can miss the efficiencies of a comprehensive market-based system. The impact of a targeted approach may be a reordering of the MACC-abatement opportunities—by shifting a higher-cost activity to the left on the graph (Exhibit 7).

*Construction of a MACC requires detailed understanding of a wide range of technologies and mitigation options across the various sectors of the economy. Numerous decisions are also necessary, such as the grouping of technologies and the choice of discount rate, which can affect both the volume and the cost calculations. MACCs should be taken as qualitative, rather than quantitative, representations of the costs and potential magnitudes of mitigation options unless done with facility- and project-specific information.

Exhibit 5. A MACC can be a helpful organizational framework for policy analysis and abatement-potential analysis



Note: Example of a marginal abatement cost curve; project ranking represents average prices, but specific projects within categories vary.

Exhibit 6. In markets with carbon pricing, the carbon cost often follows the cost of abatement in the market†

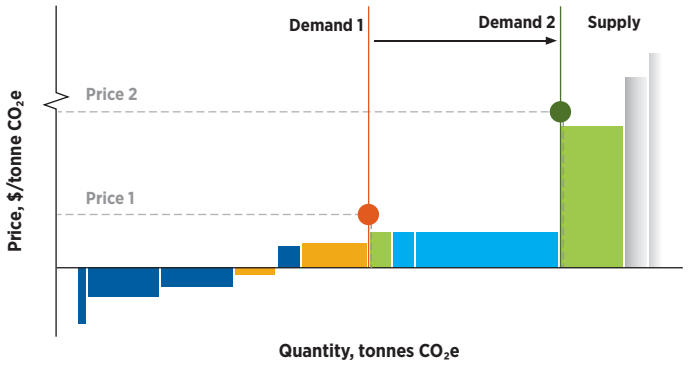
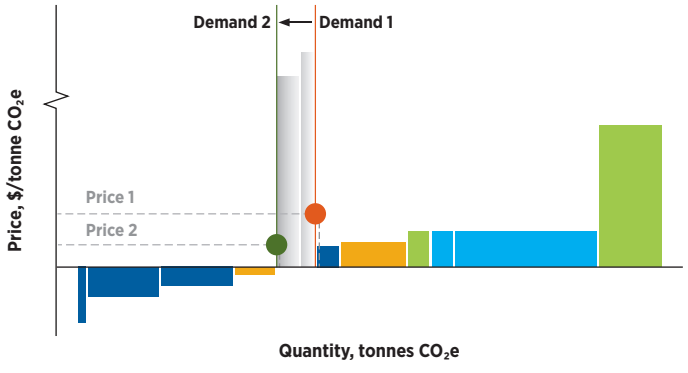


Exhibit 7. In markets with narrowly targeted policies, abatement opportunities may be reordered†



†For illustration only. Not drawn to scale.

3.6 scenario test

stress-testing our portfolio under the IEA's NZE 2050 and the IPCC's AR5 representative concentration pathway (RCP) 8.5

We use long-term energy-demand scenarios and a range of commodity prices to test our portfolio, assess investment strategies, and evaluate business risk to strive to deliver results under a range of potential futures. We analyze alternative scenarios to stress-test our portfolio and integrate learnings into our decision making to remain competitive and resilient in any environment.

For longer-term scenarios, we routinely use external views to both inform and challenge our internal views. This includes scenarios that assume a range of longer-term global warming outcomes, which may include scenarios for which the possibility of occurrence is remote. Some observers suggest the abrupt reduction in demand from the COVID-19 pandemic has presented a real-world stress test for our portfolio and the industry. The pandemic's impact on energy markets arguably illustrates the scale of changes and disruption that would accompany a reordering of the economy and behavior in order to meet the goals of the Paris Agreement.[28]

A scenario is a hypothetical construct that uses assumptions and estimates to highlight central elements of a possible future, but is not a forecast, prediction, or sensitivity analysis.

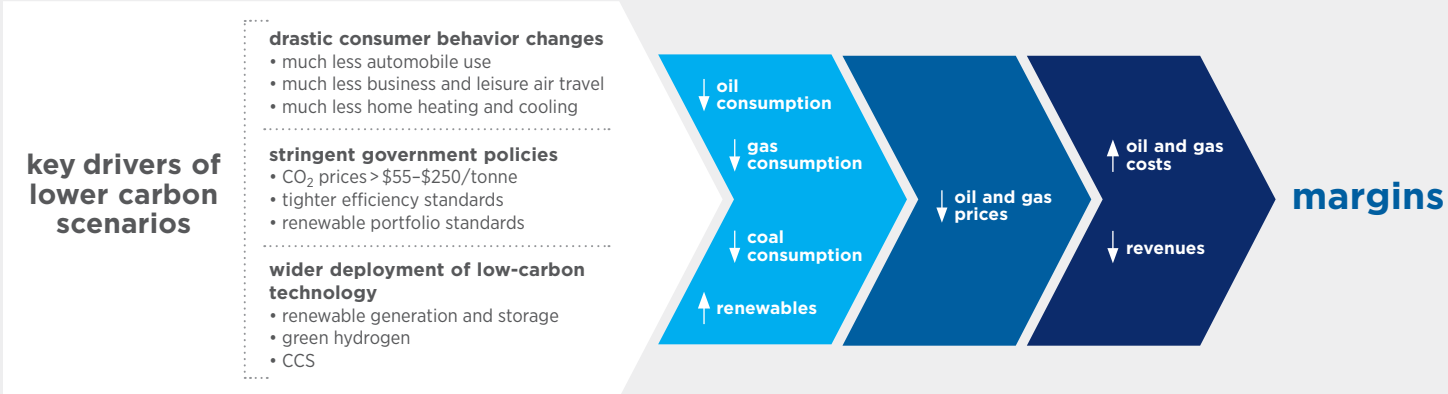
The statements included in this section represent projections and assumptions under the NZE 2050 scenario testing, not Chevron's own predictions or actual conditions or results at the present time.

3.6.1 The IEA's NZE 2050: Energy demand, oil, natural gas, refined product, new energies, and portfolio analysis

One example of a lower carbon scenario is the IEA's *Net Zero by 2050* scenario. NZE 2050 is limited to the energy sector and thus does not address natural climate solutions and impacts to land-use change that occur in non-energy sectors. The IEA states that the "*pathway remains narrow and extremely challenging, requiring all stakeholders—governments, businesses, investors, and citizens—to take action this year and every year after so that the goal does not slip out of reach.*"

NZE 2050 is a hypothetical scenario that assumes what we believe to be a highly unlikely transformation of the global energy system from one currently supplied primarily by fossil fuels to a smaller one dominated by renewable energy, with renewables and bioenergy increasing from 16 percent to 67 percent of the global energy mix by 2050. It requires immediate and unprecedented action: globally coordinated policy design, strong international cooperation, vast capital redeployment, new infrastructure build-out, accelerated technology deployment, and a threefold improvement in energy efficiency that to date has not been forthcoming. NZE 2050 also assumes carbon prices reaching as much as $250 per tonne in advanced economies by 2050.

Exhibit 30. Potential impacts to oil and gas from lower carbon scenarios



Under NZE 2050, the global economy moves away from one largely powered by fossil fuels to one powered predominantly by renewable energy. In this scenario, steep declines in medium- and long-term oil and gas demand put downward pressure on prices.

We believe the likelihood of the IEA's NZE 2050 scenario is remote.[29] It is not reflective of any realistic current projections, especially in terms of global cooperation with regard to the adoption of effective global policies that would transform the global energy mix so dramatically by 2050. For example, in its *International Energy Outlook 2021* (IEO2021), the U.S. Energy Information Administration projects in its reference case that by 2050 global energy consumption will increase substantially as a result of population and economic growth and that oil and natural-gas production will also continue to grow.[30] Moreover, the wide range of unpredictable variables and externalities affecting long-term outcomes during this period of uncertainty and energy transition makes long-term modeling of this scenario inherently speculative. Therefore, we do not rely on the NZE 2050 scenario for our business planning. Nonetheless, we have conducted a scenario test of the IEA's NZE 2050 demand projections, as well as its oil, gas, and carbon price projections, to test against our portfolio. The NZE 2050 scenario outlined is not a prediction.

The IEA does not directly provide all market detail required to run a scenario analysis (e.g., regional product consumption). Regional demand information from the IEA's Sustainable Development Scenario was used as a guide to interpolate from the available NZE 2050 information to create the regional input estimates necessary to run the scenario. Other assumptions employed in our analysis included the following:

- Chevron would have extremely aggressive growth of CCUS, offsets, hydrogen, renewable fuels, and renewable natural gas.
- Refining and petrochemicals margins were decreased by the percentage change in Brent prices relative to our 2021 Business Plan price forecast.
- Marketing volumes were based on regional gasoline and diesel demand.

Our Corporate Audit department, which performs the internal audit function at Chevron, conducted a non-rated assurance review of the IEA's *Net Zero by 2050* scenario analysis. The Corporate Audit department found that the analysis was conducted in accordance with established internal process and emerging external guidance.

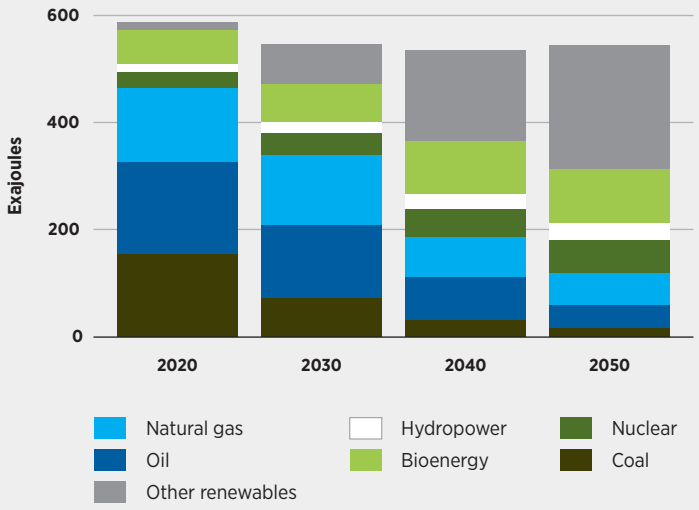
Energy demand and energy mix: The NZE 2050 scenario results in global energy demand that is approximately 7 percent lower than 2020 levels while supporting a global economy more than double the size. The NZE 2050 scenario's assumptions relevant to the oil and gas sector are as follows:

- Electricity use increases from approximately 20 percent of final energy consumption today to nearly 50 percent by 2050.
- Renewables and bioenergy account for approximately two-thirds of the global energy mix by 2050.
- The oil and gas sector's share of total primary energy demand declines from 50 percent today to approximately 20 percent by 2050.
- By 2050, CCUS accounts for 7.6 gigatonnes (Gt) of CO_2 removals.
- By 2050, crude oil prices drop to less than $25 per barrel, in real terms, and international gas prices drop to $2–$5 per mmbtu, in real terms.
- By 2050, carbon prices rise to $250 per tonne CO_2e in advanced economies, $200 in China, Russia, Brazil, and South Africa, and $55 in other emerging-market and developing economies.
- Consumer behavior drives much of the emissions reduction:
  - > 55 percent of emissions reductions in the scenario result from consumers adopting low-carbon technologies, such as electric vehicles or solar water heaters.
  - > 8 percent of the emissions reductions result from shifts in consumer behavior, including the phase-out of internal combustion engine vehicles in all cities by 2030, the capping of long-haul airline travel at 2019 levels, use of high-speed rail as a substitute for air travel, lower temperatures for heating, higher temperatures for space cooling, and higher levels of plastics recycling.
- Universal energy access is achieved globally by 2030.

Global energy investment increases from an average of $2 trillion per year today to over $4.5 trillion per year by 2030 and beyond.

mmbtu = millions of British thermal units

Exhibit 31. Total primary energy demand in the IEA's NZE 2050



Source: IEA, *Net Zero by 2050*, iea.org/reports/net-zero-by-2050.