

## Portfolio Resilience: Using Scenarios to Understand Risks, Opportunities

**Climate change presents significant risks and opportunities for the global economy.**

At Chesapeake, we recognize the need to prepare for the social, economic and environmental uncertainties inherent in how climate change will affect our planet in the future. We study and plan for potential climate change impacts, including conducting a robust scenario analysis to assist in quantifying climate-related risks and opportunities. This analysis also provides additional perspective on how a lower carbon future may affect the company's long-range business plans and portfolio optimization.

For our long-term planning, Chesapeake considers a variety of energy and policy forecasts and analyses from public and private institutions. However, for purposes of this climate-related report, we used scenarios from the International Energy Agency (IEA)'s 2021 World Energy Outlook (WEO) to test our portfolio resilience. Recommended by the Task Force on Climate-related Financial Disclosures (TCFD) and widely used across our industry, this outlook includes climate change policies that align with the goals of the Paris Agreement (defined as a 1.5°C pathway within the WEO).

**It's important to note that the 2021 WEO is the most recent version of the outlook, however it was published prior to Russia's invasion of Ukraine in 2022. This conflict is significantly impacting the global energy landscape — and subsequent policy actions — and reiterating the importance of national energy security. As a result, the supply and demand analysis conducted in the WEO may not fully represent today's current energy environment and priorities.**

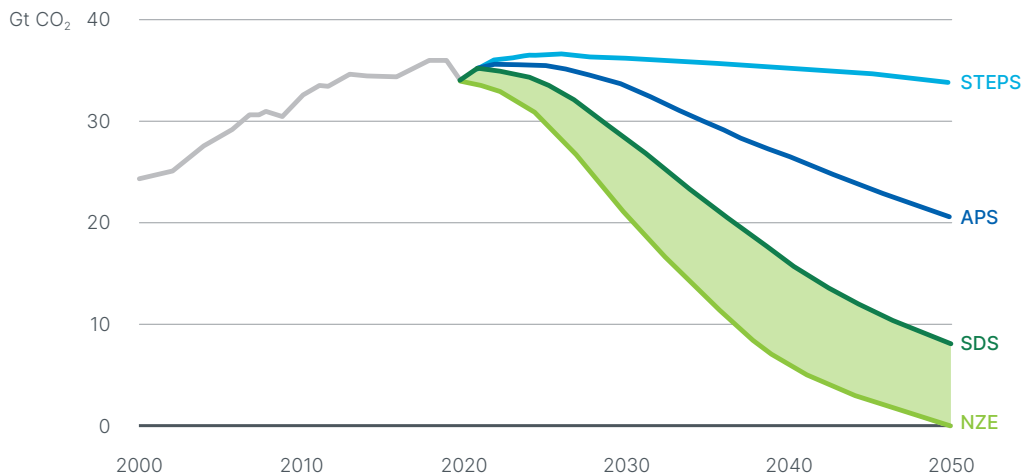
### Introducing the Scenarios

While the 2021 WEO presents three primary scenario assessments, we based our analysis on the two exploratory scenarios we believe offer the most achievable outcomes. The two referenced WEO scenarios include predicted fluctuations of product price and energy demand through 2050. Emissions impact is also analyzed, including measuring each scenario's ability to meet Paris Agreement objectives.

- The **Announced Pledges Scenario (APS)** assumes all climate commitments made by governments around the world will be met in full and on time. Appearing for the first time in the 2021 WEO, this scenario shows the cumulative expanse of global climate change goals as of mid-2021 and does not try to reach a particular outcome.
- The **Stated Policies Scenario (STEPS)** reflects current policy intentions and targets on a sector-by-sector basis without additional influence from policy makers. This scenario acts as a barometer as to the strength, impact and expected outcome of these policy settings and does not assume that governments will reach all of their announced goals.

We also reference the Sustainable Development Scenario (SDS), introduced in the 2020 WEO and noted in the 2021 report. The SDS achieves key energy-related United Nations Sustainable Development Goals including universal energy access and greatly improved air quality. This scenario also reaches global net zero emissions by 2070, with many countries achieving net zero prior to that year, and is a “well below 2°C” pathway (projecting to keep global warming to 1.7°C around 2050) to achieve Paris Agreement outcomes.

#### CO<sub>2</sub> Emissions in the WEO-2021 Scenarios Over Time<sup>(1)</sup>



The APS pushes emissions down, but not until after 2030; the SDS goes further and faster to be aligned with the Paris Agreement; the NZE delivers net zero emissions by 2050.

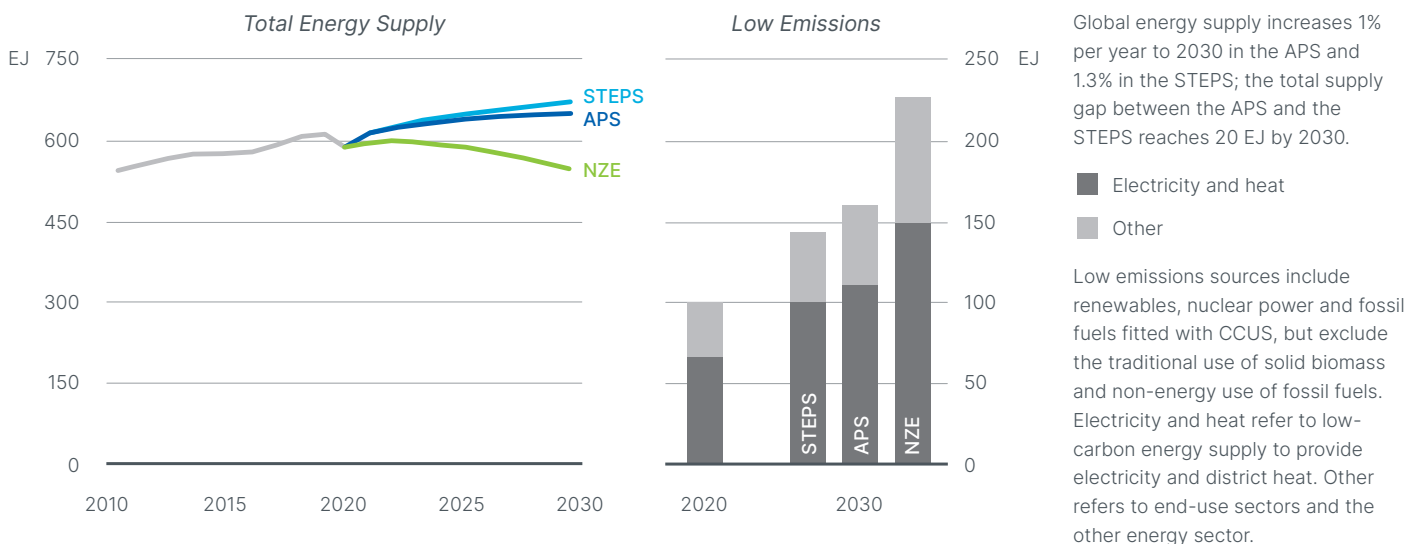
Lastly, the 2021 WEO’s third scenario, the Net Zero Emissions by 2050 (NZE), is Paris-aligned and projects to limit global warming to 1.5°C. The IEA argues that this scenario offers the greatest opportunity to reach global climate goals and projects a decline in oil and gas demand by 2030.

We have tested against this scenario — which forecasts a difficult future for many oil and gas firms — however, we believe its analysis does not realistically balance achieving environmental goals with meeting future energy demand. As noted in the WEO, “secure transitions” require careful planning to help ensure that a reduction in one energy resource is complemented by an increase in another.<sup>(2)</sup>

Should the U.S. decrease its oil and gas investments, we would need to dramatically increase spending on low emissions fuels and technologies. To replace more carbon intensive resources, lower carbon sources need to already be in place to meet today’s demands with affordability and reliability.

**Discussing energy supply and demand is critical to any conversation about climate change. As we phase out more carbon intensive resources, we must be able to sustain our current energy supply to meet growing demand both now and as it increases in the future. For this reason, we must rely on affordable and reliable forms of energy that are widely available now.**

### Global Total Energy Supply by Scenario and Low Emissions Energy Supply Sources by Sector, 2010 – 2030<sup>(1)</sup>



It's also important to note that all of the defined scenarios provide studied constructs of the future, but they're not forecasts. They represent potential futures, identifying possible trends or factors that could influence business models should a scenario's key assumptions occur. Many of the scenarios also assume the adoption of technologies that are either unproven or are in various stages of development.

### Highlighting Key Outlook Findings

According to the 2021 WEO, today's climate change pledges cover less than 20% of the emissions reduction gap needed to be closed by 2030 if we are to keep global temperature ambitions (a pathway to 1.5°C) within reach.

The 2021 WEO also presents specific solutions to close this gap, including:

- Continuing the advancement of electrification
- Relentlessly focusing on energy efficiency
- Boosting clean energy innovation
- Cutting methane emissions from fossil fuel operations

Without action, the 2021 WEO warns of the unchecked risks of climate change, particularly to the energy sector. Most notably, the physical risks to infrastructure and the resilience needed to react to extreme weather and subsequent demand.

Chesapeake is closely monitoring the risks highlighted in this outlook and taking a leadership role in many of the solutions presented, particularly related to reducing methane emissions and increasing energy efficiency.

According to the 2021 WEO, methane emissions are the second-largest cause of global warming today. While China and Russia are the two largest emitters globally, we recognize the role the U.S. energy industry must play in continuing to reduce domestic emissions.

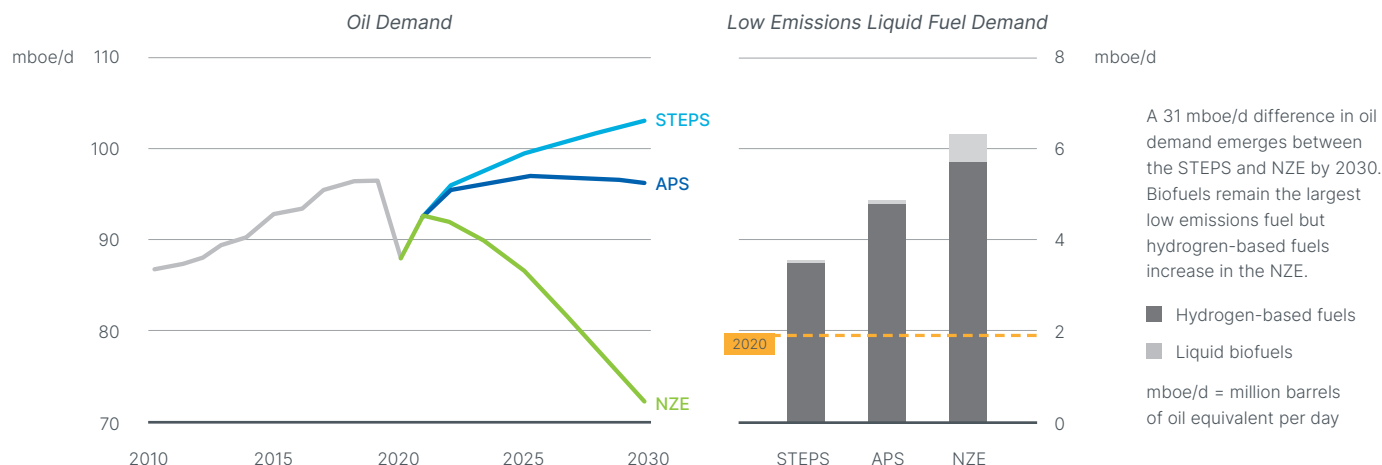
**Chesapeake is an industry leader in methane emissions reduction, having pledged — and achieved — a methane intensity of near zero (0.09% was our goal and we achieved 0.07% at year-end 2021).**

## Oil Demand and Pricing

According to the 2021 WEO, oil demand — for the first time — shows an eventual decline in all scenarios, although timing varies widely. Most of the scenarios indicate that demand may level off in the 2030s but will continue to be bolstered by the aviation, shipping and petrochemical industries according to STEPS.

Also, those countries with net zero pledges are most likely to experience decreased oil demand, however the rest of the world will offset this change in demand. The electrification of passenger vehicles is expected to play a significant role in the reduced demand for oil, as the 2021 WEO predicts that by 2030, 60% of passenger cars sold globally will be electric.

### Oil Demand Over Time and Low Emissions Fuel Demand in 2030<sup>(1)</sup>



Even with oil demand peaking and declining under the most stringent scenario, analysis suggests that companies developing high-value projects at streamlined costs will continue to remain competitive.

### Oil Price by Scenario<sup>(1)</sup> as compared to Chesapeake's 2022 breakeven price range: \$33 – \$42 (bbl)

	STEPS	APS	SDS	NZE
2030	\$77	\$67	\$56	\$36
2050	\$88	\$64	\$50	\$24

The reported 2022 breakeven price range is based on internal company estimates for our position in the Eagle Ford Shale, recognizing that pricing is likely to decrease due to industry efficiencies and innovation. Also, in August 2022, we announced that the company is taking actions to solidify our strategic focus on our core Marcellus and Haynesville positions, which offer our best rock, best operations and lowest emissions footprint.

## Natural Gas Demand and Pricing

Natural gas demand increases in all scenarios during the next five years, however demand decreases at varying levels afterwards. As the global economy shifts to clean energy, natural gas' prominence in the energy mix is not uniform across different geographies of the world. In STEPS, natural gas demand continues to grow into 2050 as natural gas remains the default option for space heating and fueling the industry and power sectors.

Similar to oil, in APS, natural gas demand is dependent on if countries have made net zero pledges. For those that have, it is expected that they will move away from the use of gas in buildings, reducing consumption by the power sector as early as 2030.

Near-term, higher natural gas demand and the rise in oil prices will put pressure on natural gas prices. This price increase will also be supported by demand growth in China, India and other areas of Southeast Asia. Those regions will likely continue to boost natural gas demand, increasing export opportunities. Natural gas will also continue its relevance in part due to its ability to produce low-carbon hydrogen and participate in carbon capture, utilization and storage (CCUS) for significant emissions reduction.

**Through our New Ventures team, Chesapeake is actively exploring enhanced resource solutions and emerging technologies, such as geothermal, CCUS and hydrogen energy development.**

Natural Gas Price by Scenario <sup>(1)</sup> as compared to Chesapeake's 2022 breakeven price range: \$1.95 – \$2.10 (mbtu)				
	STEPS	APS	SDS	NZE
2030	\$3.6	\$3.1	\$1.9	\$1.9
2050	\$4.3	\$2.0	\$2.0	\$2.0

The reported 2022 breakeven price range is based on internal company estimates for its positions in the Haynesville and Marcellus shales. If we continue to follow long-term market trends, we expect our breakeven prices to decrease due to industry efficiencies and innovation.

**Chesapeake's current breakeven prices reinforce the strength of our operational strategy and capital allocation flexibility, in addition to our formidable hedging strategy that helps ensure consistent future revenue. It is important to note that our current scenario analysis only tests against domestic U.S. prices.**

Similar to our oil price outlook, Chesapeake's cash-cost efficiency, including faster cycle times and consistent innovation, suggests a strong future for our natural gas projects. Also, we anticipate increased participation in the growing global LNG markets allowing us to diversify revenues by accessing global pricing indices.

### Identifying Successful Producers

Throughout the 2021 WEO, the most successful producers will be those that operate at scale but are nimble enough to:

- Recognize cost efficiencies
- Enhance production
- Reduce expenditures and
- Take advantage of export opportunities

Chesapeake is poised to respond to future market conditions, using our agile culture and flexible operating structure to be a market winner. Based on our 2021 scenario planning analysis, we're confident that our portfolio of assets will continue to deliver strong returns well into the future.

(1) Based on IEA data from World Energy Outlook 2020 © OECD/IEA 2020, [www.iea.org/statistics](http://www.iea.org/statistics), all rights reserved, as modified by Chesapeake Energy Corporation

(2) International Energy Agency (IEA). World Energy Outlook 2021. Revised version December 2021, p 71.