



**Canadian Natural**



# 2021

**STEWARDSHIP REPORT  
TO STAKEHOLDERS**

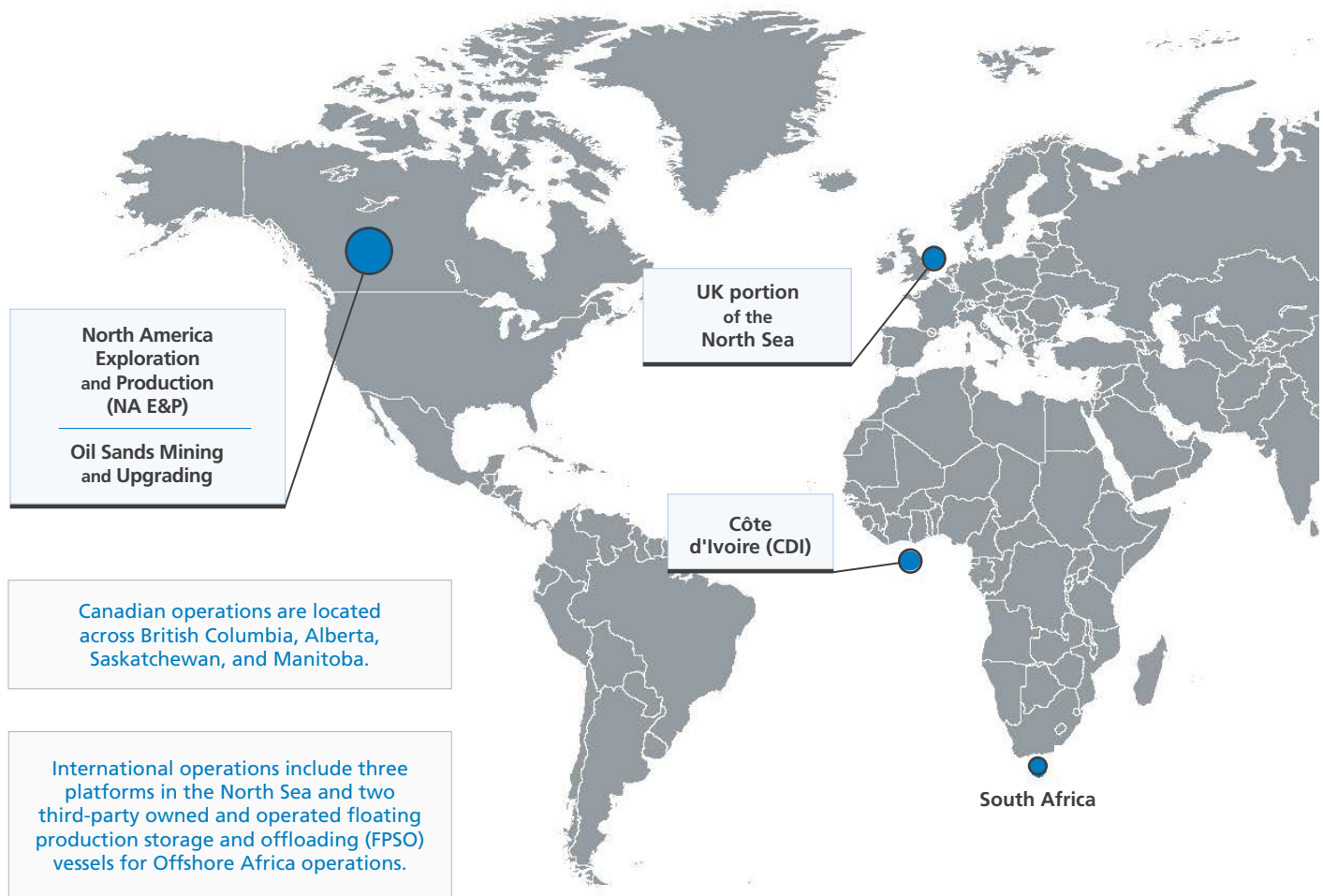
Canadian Natural's Sustainability Report

## WE LIVE OUR MISSION STATEMENT

“To develop people to work together to create value for the Company’s shareholders by doing it right with fun and integrity.”

Canadian Natural Resources Limited (Canadian Natural) is a senior independent crude oil and natural gas exploration, development and production company based in Calgary, Alberta, Canada. Our strong, diversified asset base is comprised of a balanced portfolio of light, synthetic, and heavy crude oil and natural gas. Canadian Natural operates in Canada, the United Kingdom and Offshore Africa.

We are committed to a long-term presence in the communities where we operate. Our activities create value by providing employment, business development opportunities, revenues to governments that contribute to spending on goods and services, and essential resources for public services, including health, safety, education and training. We are proud to produce a valuable resource that is used across the world to power people’s lives.



**Cover Photo**  
Arctic Grayling habitat monitoring near our Horizon Operations.

Many of the photographs in this report were provided by Canadian Natural staff. We would like to thank those who contributed pictures to this edition of the Sustainability Report.

# About This Report

This Stewardship Report to Stakeholders, Canadian Natural's Sustainability Report, covers topics determined material by an internal assessment process where disclosures were rated for relevancy to our external stakeholders and relevance to our operations. Material topics highlighted in this report reflect the following categories:

- Climate (Governance, Strategy, GHG reduction)
- Workplace and Process Safety
- Community and Indigenous Relations
- Environment (spill prevention, water stewardship, biodiversity)
- Tailings Management

We also engage with investors and stakeholders to help us understand relevant factors viewed as important. As a result, our reporting levels for sustainability performance are assessed on an ongoing basis for potential enhancement and to ensure value for all stakeholders.

Our Board of Directors also provides expertise and oversight on Environment, Social and Governance (ESG) factors through the Health, Safety, Asset Integrity and Environmental (HSAI&E) Committee, and the Nominating, Governance and Risk Committee. Performance results are reported internally through a management review process.

This annual sustainability report covers performance and activities from January 1 to December 31, 2021. It may include ongoing projects (started before 2021), cumulative data and projects we anticipate to work on beyond 2021. Unless otherwise stated, the following information and data is presented on an operational control basis.

## Reporting Frameworks

Our external reporting integrates financial and sustainability metrics to align with recommendations from the:

- Task Force on Climate-Related Financial Disclosures (TCFD)
- Sustainability Accounting Standards Board (SASB)
- Global Reporting Initiative (GRI)

Canadian Natural's sustainability reporting is captured in this report, the CDP Climate Change and Water Questionnaires, our Sustainability Reporting Content Indexes, and financial disclosures, such as our Annual Information Form, Management Information Circular, Annual Report, and [www.cnrl.com](http://www.cnrl.com).

## United Nations' Sustainable Development Goals

The United Nations (UN) relates general social and health outcomes to increased access to affordable energy and improved energy efficiency. Canadian Natural's activities also contribute to the UN Sustainable Development Goals (SDGs). The most relevant SDGs we align with are:

- Goal 4: Quality Education
- Goal 5: Gender Equality
- Goal 6: Clean Water and Sanitation
- Goal 7: Affordable and Clean Energy
- Goal 8: Decent Work and Economic Growth
- Goal 9: Industry, Innovation and Infrastructure
- Goal 12: Responsible Consumption and Production
- Goal 13: Climate Action
- Goal 15: Life on Land

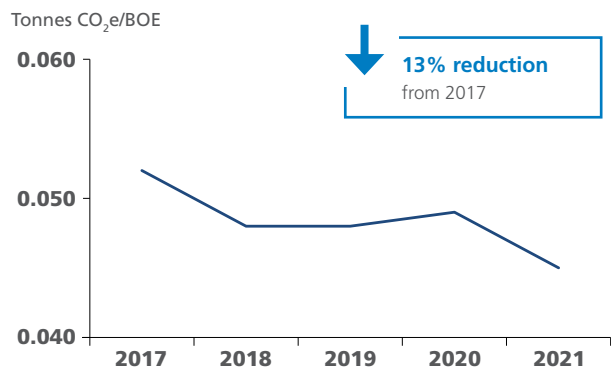
For more information on our specific alignment with the SDGs, see our [Sustainability Reporting Content Indices](#).



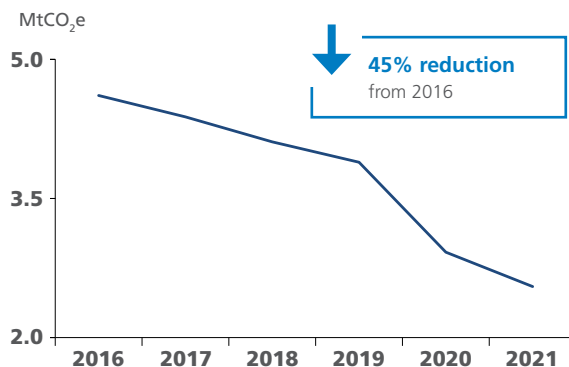
# Canadian Natural's ESG Highlights

## GHG Emissions

### Corporate Scope 1 (Direct) GHG Emissions Intensity



### North America E&P Methane Emissions



**11.4 million tonnes of CO<sub>2</sub>e conserved**

in primary heavy crude oil and in situ operations since 2017

## Governance



### ESG performance

is linked to executive compensation

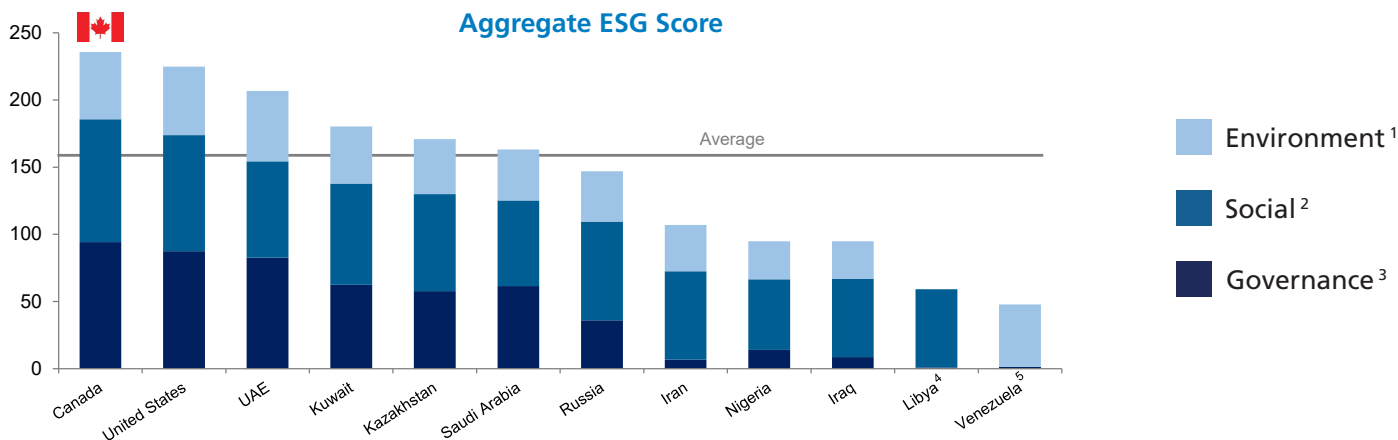
**4 of 9 independent directors are women**



### Board members with relevant experience

- 7 in Climate Change/Carbon Policy and Emissions
- 9 in Health, Safety and Environment
- 11 in Risk Management

## ESG Performance Among Top Oil Exporting Nations



1. 2022 Yale Environment Performance Index (EPI).

2. 2021 Social Progress Index (SPI) prepared by Social Progress Imperative.

3. 2020 World Governance Indicators (WGI), Regulatory Quality Score percentile rank.

4. Libya Environmental score not shown due to insufficient data and Governance score is negligible.

5. Venezuela Social score not shown due to insufficient data and Governance score is negligible.

# Environmental Targets

## NA E&P methane emissions

50% reduction by 2030 from 2016 baseline

## In situ fresh water use intensity

40% reduction in fresh water use by 2026 from 2017 baseline

## Oil sands mining fresh river water use intensity

40% reduction in fresh river water use by 2026 from 2017 baseline

# Innovation and Technology

Recognize the need to reduce GHG emissions

Leverage technology and Canadian ingenuity

Opportunities to reduce emissions further



## R&D Investment Leader

### \$450 million invested

in technology development and deployment in 2021<sup>1</sup>

### \$84 million invested

in technology development and implementation to reduce GHG emissions in 2021

1. Technology Development includes R&D with academic institutions, eligible Scientific Research and Experimental Development claims for Canadian income tax purposes, and other activities that create or deploy new technology, or improve existing technology.



## Leadership in CCUS Projects

### Largest owner of carbon capture capacity

in the Canadian crude oil and natural gas sector (based on data from the Global Carbon Capture Institute)

### 2.7 million tonnes CO<sub>2</sub>e/year total capture capacity

the same as taking ~576,000 passenger vehicles off the road per year

### 6 million tonnes CO<sub>2</sub>e captured and safely stored at Quest

since 2015, where CO<sub>2</sub> is captured from the Scotford Upgrader. Quest and the upgrader are part of the Athabasca Oil Sands Project, of which Canadian Natural has a 70% ownership interest



## Investing in Innovation and Technology

- ✓ Reduce environmental footprint
- ✓ Unlock reserves
- ✓ Increase production
- ✓ Effective and efficient operations — lower costs

# Reclamation



**3,000+ wells abandoned**

in NA E&P in 2021

**10,850 hectares reclaimed**

in NA E&P since 2016

**7.3 million trees planted**

across operations to date

**1.4 million trees planted**

across operations in 2021



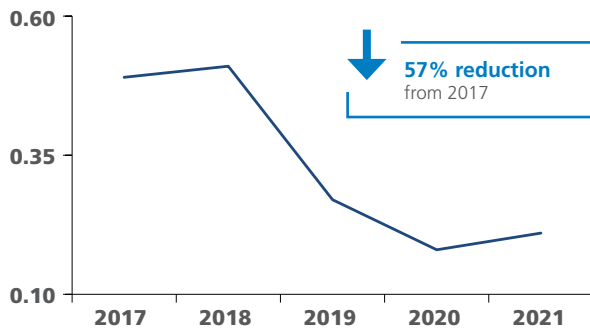
Reclaimed wheat field. In our conventional and thermal operations, we use an area-based approach to strategically reclaim large contiguous areas.

In this way, we are taking sites out of service in a safe and environmentally sound manner, while reducing reclamation, abandonment, and decommissioning timelines and costs.

# Water Use

## In Situ Fresh Water Use Intensity

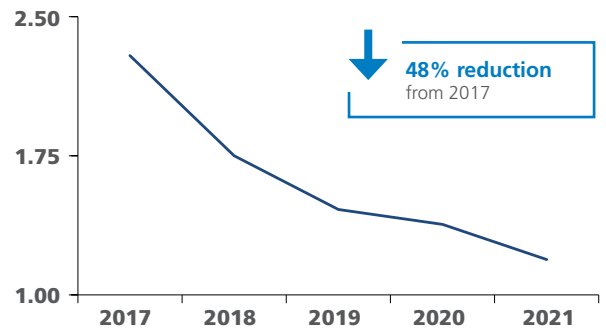
m<sup>3</sup> water/m<sup>3</sup> bitumen



Includes Alberta thermal in situ facilities. In situ water use intensity has decreased due to optimization of water use and increased bitumen production with no associated freshwater requirements.

## Oil Sands Mining Fresh River Water Use Intensity

m<sup>3</sup> water/m<sup>3</sup> bitumen



Includes river water and tributaries. 2021 precipitation was higher than expected, reducing the withdrawal requirement of fresh river water.



**85% recycle rate**

of produced water in thermal operations



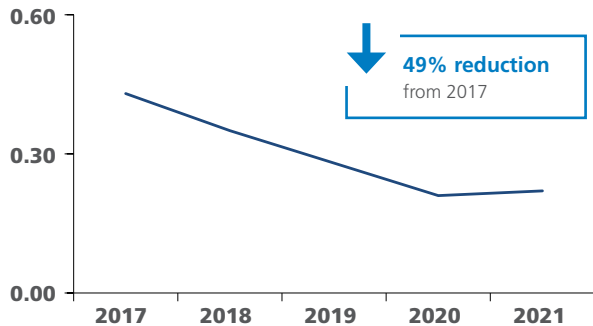
**86% recycle rate**

of surface water in oil sands mining

# Workplace Safety and Process Safety

## Corporate Total Recordable Injury Frequency (TRIF) (Employees and Contractors)

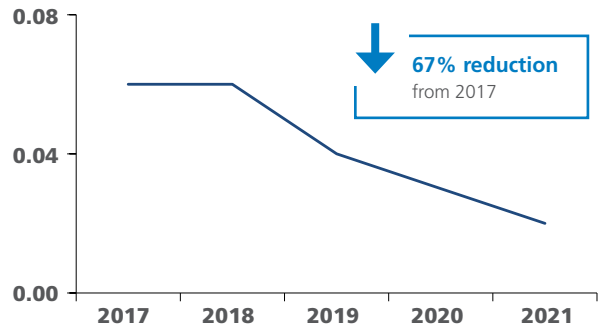
Incidents per 200,000 exposure hours



**43% decrease**  
in Tier 1 and Tier 2 process safety events versus 2017

## Corporate Lost Time Incident (LTI) Frequency (Employees and Contractors)

Incidents per 200,000 exposure hours



**AAA rating for tailings management**  
for Horizon and Albian, the highest rating that can be achieved in the Towards Sustainable Mining Framework

# Economic and Community Contributions



## 80,728 full-time equivalent jobs supported

by operational and capital spending

### Jobs breakdown:

- Direct **18,591 jobs**
- Indirect (suppliers) **42,662 jobs**
- Induced (economy at large) **19,475 jobs**



## \$11.1 billion of capital and operational spending

providing significant economic contribution and support for jobs across our operations in 2021



## \$6.8 billion

total supply chain spending with 9,000+ suppliers worldwide

## \$572 million in contracts

17% increase from 2020, with 144 Indigenous businesses



## \$5.3 billion in contributions to governments and local communities in 2021

### Including:

- Royalties **\$2.8 billion**
- Corporate taxes **\$1.9 billion**
- Property taxes **\$339 million**
- Surface and mineral land leases **\$202 million**

# Message to Stakeholders

For more than three decades, Canadian Natural has been a safe, effective and efficient producer of crude oil and natural gas, meeting and exceeding regulatory standards. Recent global events and concerns about energy security have further underscored the need and importance of affordable, secure, and responsibly produced energy to meet global demand. In this context, Canadian Natural is well positioned to support Canada in being a preferred supplier of crude oil and natural gas.

## Canada's Opportunity

Canada's crude oil and natural gas industry has world-leading environmental, social, governance (ESG) performance amongst top crude oil exporting countries, while leading in innovation and clean technology investment. With the third largest crude oil reserves globally, and the vast majority of these reserves located in the oil sands, Canada's oil sands are an important and sustainable energy source for the country and the world.

The long life low decline nature of Canada's oil sands resource and production is a significant competitive advantage for the sector and positions the country well for global competitiveness as the world shifts to net zero emissions. Canadian ingenuity enabled oil sands development decades ago and through continued innovation and collaboration, the sector can deliver an ESG-leading barrel to meet long-term global energy demand.

## Working Together

In 2021, teams from Canadian Natural along with Canada's oil sands producers in the Oil Sands Pathways to Net Zero Initiative (now called Pathways Alliance) continued to advance our plan, working together with governments, to achieve net zero in the oil sands by 2050 and help Canada meet its climate and economic goals. Our actionable plan can help us collectively be more effective and efficient from a time and cost perspective for Carbon Capture Utilization and Storage (CCUS) and technology projects.



**N. MURRAY EDWARDS**  
Executive Chairman



**TIM S. MCKAY**  
President



**DEAN W. HALEWICH**  
Senior Vice-President, Safety,  
Risk Management & Innovation

## In This Report

Canadian Natural has been producing this sustainability report since 2004 to highlight our ongoing commitment to environmental performance, social responsibility and continuous improvement.

We outline many examples of our commitment to operational excellence and continuous improvement, while maintaining focus on our mission statement: To develop people to work together to create value for the Company's shareholders by doing it right with fun and integrity.

The following are some highlights of our 2021 performance:

- 49% reduction since 2017 in Total Recordable Injury Frequency
- \$450 million invested in research, and technology development and deployment, with \$84 million in GHG technology and implementation projects
- 13% reduction since 2017 in Scope 1 GHG emissions intensity
- 3,079 inactive wells abandoned and 1,644 hectares of land reclaimed (about the size of 2,017 Canadian football fields)
- \$572 million awarded in contracts with 144 Indigenous businesses
- \$32 million invested in creating shared value for local communities near our operations

Canadian Natural is very proud of our workforce and their resilience. Thank you to everyone for supporting continuous improvement, environmental excellence and shareholder value in 2021.

With our dedicated workforce, culture of continuous improvement and the strength of our assets, we are poised to further our position as an ESG-leading producer of energy the world will need in a lower carbon emissions future.



## Producing an ESG-leading Barrel: Canadian Natural's Advantages

### Mission Statement

*"To develop people to work together to create value for the Company's shareholders by doing it right with fun and integrity."*

Canadian Natural's mission statement provides the foundation for our integrated ESG approach that reflects a long-term commitment to sustainable development and creating value for stakeholders. Our development strategy is aligned with developing the globally leading ESG barrel. To get there, we're focusing on:

### CREATING SHARED VALUE

We work together with a broad group of stakeholders in proximity to our operations, to support local communities and their priorities. We establish meaningful dialogue and work together to find solutions. Our economic contributions and community investment help us make a true impact in the lives of many Canadians.

### INVESTING IN TECHNOLOGY AND INNOVATION FOR CONTINUOUS IMPROVEMENT

Our defined pathway drives long-term GHG emissions reductions with an integrated management strategy that includes investment in research and technology. We are also industry leaders for abandonment, decommissioning and reclamation projects in Canada and UK offshore operations.

### COLLABORATING WITH INDUSTRY AND GOVERNMENT FOR NET ZERO IN THE OIL SANDS

We are participating in the Pathways Alliance, with Canada's largest oil sands producers working to achieve net zero GHG emissions. The goal of this unique alliance, working collectively with the federal and Alberta governments, is to achieve net zero GHG emissions from oil sands operations by 2050 to help Canada meet its net zero aspirations.

### DEVELOPING NATURAL GAS TO SUPPORT A LOW CARBON ECONOMY

Natural gas is a reliable and affordable energy source for power generation, with less than half the carbon footprint of coal. Electricity from natural gas is agile, it can be started and stopped according to demand – adding to its list of benefits as a reliable, base energy source. Canadian Liquefied Natural Gas (LNG) projects are projected to provide leading GHG performance and a preferred source of energy as we transition to a lower carbon emissions economy.

## Economic Contributions in 2021

**80,728** FULL-TIME  
EQUIVALENT JOBS  
supported by operational and  
capital spending

**\$11.1** BILLION  
of capital and  
operational spending

**\$6.8** BILLION  
total supply chain  
spending with 9,000+  
suppliers worldwide

**\$5.3** BILLION  
in contributions to  
governments and for  
local communities

**\$2.8** BILLION  
in royalties

**\$1.9** BILLION  
in corporate taxes

**\$339** MILLION  
in property taxes

**\$202** MILLION  
in surface and mineral  
land leases

# Governance

## Governance and Risk Management

Canadian Natural remains committed to managing sustainability matters and continuing our track record of creating value for our shareholders.

Environmental stewardship is integrated into our operations with our Board of Directors in key governance roles. The Board is responsible for overseeing and ensuring Canadian Natural has appropriate and effective measures in place to create and execute our strategies, including management of climate-related issues.

## Board Members with Relevant Experience



**7 MEMBERS**

in Climate Change/Carbon  
Policy & Emissions



**9 MEMBERS**

in Health, Safety  
& Environment



**11 MEMBERS**

in Risk Management

## Risk Management from the Top Down

Canadian Natural uses a multidisciplinary Enterprise Risk Management (ERM) framework to identify, assess, and mitigate risks that may affect the company and our operations.

The ERM framework incorporates a matrix approach to risk assessment that categorizes and aligns risks across operational areas, allowing teams to better understand the identified risks, their impacts on our operations and the mitigation being undertaken to address these risks.

## Board Diversity

Canadian Natural believes that having a Board of Directors whose members are diverse in background and experience can bring a broad perspective to enhance decision making for good governance, guidance, and leadership.

The Board supports diversity in all its forms and in sufficient numbers, and is committed to a diversity target where 30% of its independent directors are women, when all other factors relevant to Board effectiveness are considered. Currently, four of the nine independent directors are women (44.4%).

**4 OF 9**

independent directors  
are women

## Aligning Sustainability Metrics to Compensation

In 2021, Canadian Natural reinforced the significance of environmental performance on the overall performance of the company, increasing the Safety, Asset Integrity and Environmental performance measure weighting by 50% (from 10% in 2020 to 15% in 2021). The increase in the weighting includes the addition of targets for North America E&P absolute methane emissions as well as abandonment and reclamation activity.

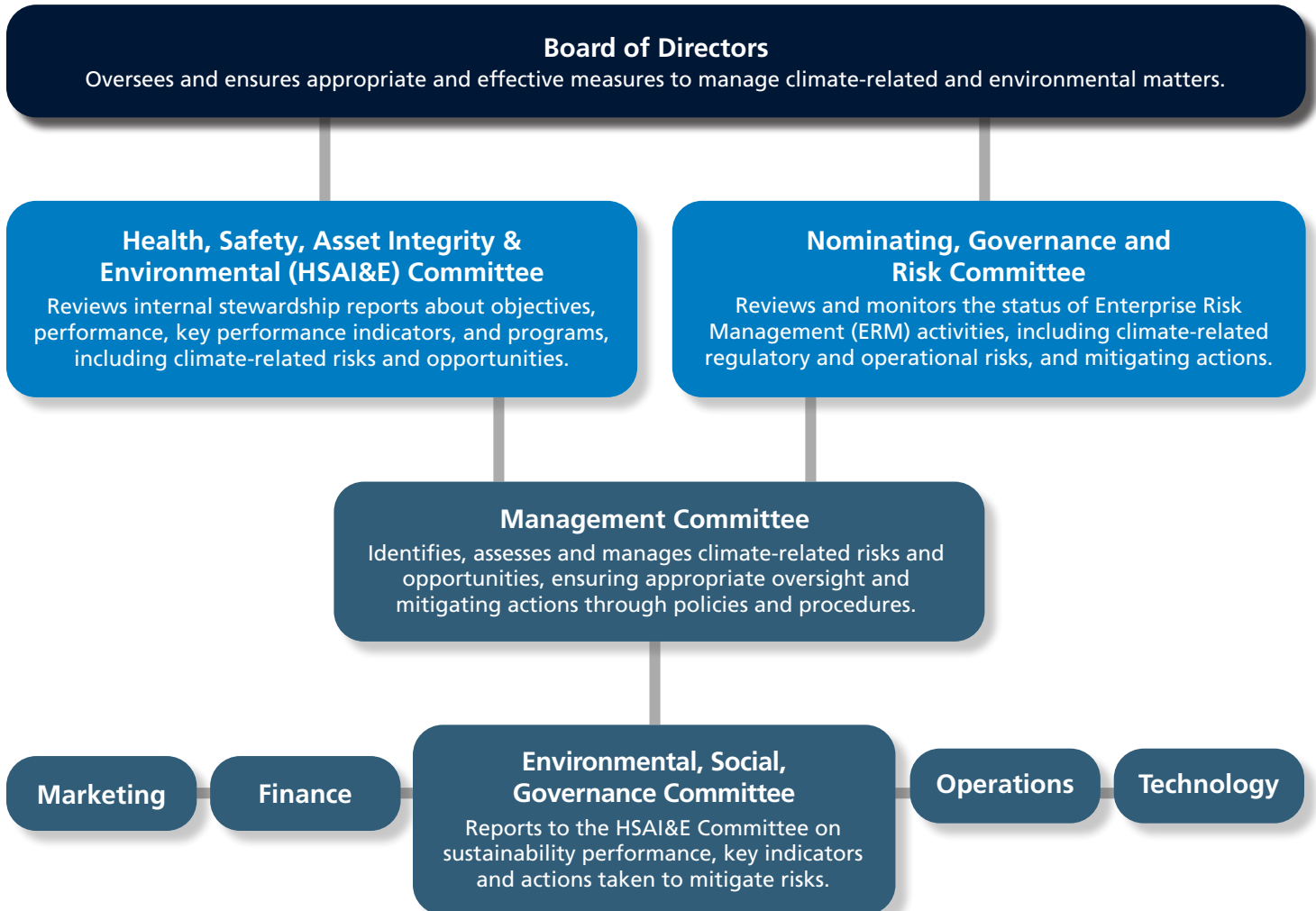
These changes further align executive compensation with Canadian Natural's performance when measured against sustainability metrics for safety, asset integrity and environmental targets.

Performance is evaluated based on improvement from prior period results (e.g. corporate GHG intensity and methane emissions) and/or against target ranges determined by prior period performance.

## Board Oversight of Climate Change and Environmental Risks and Opportunities

Canadian Natural's Board of Directors provides expertise and oversight on ESG factors, through the Health, Safety, Asset Integrity and Environmental (HSAI&E) Committee, and the Nominating, Governance and Risk Committee. This consists of environmental matters, including climate change related risk.

For more information on our governance model for sustainability matters, our Performance Scorecard and our approach to risk management, visit our website for our [annual financial disclosure documents](#) and our most recent [CDP Climate submission](#).



## Canada's Sustainable, Secure Energy Leadership

Canada's natural resources are safely and responsibly developed with world-leading standards. The country has the world's third-largest oil reserves, some of the most stringent regulations and standards anywhere in the world, a strong track record for technology development and an established reputation of industry working together with Indigenous communities and municipalities. Canada's crude oil and natural gas industry continues to deliver leading Environmental, Social and Governance (ESG) performance amongst the top crude oil exporting countries.

Canada's significant long life, no decline oil sands mining resources with manufacturing-like operations represent one of the clearest routes to net zero emissions of any global crude oil asset. Our assets also provide the opportunity for investments in innovation to achieve net zero from oil sands operations, making them valuable for sustainable long-term energy security and global GHG reductions.

With a well-established track record of safe and responsible development, our industry is showing resilience and continually adapting to challenges through entrepreneurship and ingenuity to deliver impressive results, supported by technology pathways to net zero. We believe a strong crude oil and natural gas industry is essential to helping Canada meet its emissions targets and all its future energy and economic needs.

“ Oil sands producers have led the pace of improvement in numerous ESG trends over the past decade including emissions intensity, fresh water and tailings, as well as social/governance progress in Indigenous engagement, health & safety and executive alignment. ”

*BMO Capital Markets, "Building a Sustainable Future: ESG in Canadian Oil and Gas", November 2021*

“ Canada has a strong social and governance record, consistently ranking in the top decile of all six dimensions of governance according to the World Bank's Worldwide Governance Indicators report that includes more than 200 countries and territories... Canada ranked in Tier 1 of the 2021 Social Progress Index (sixth overall). ”

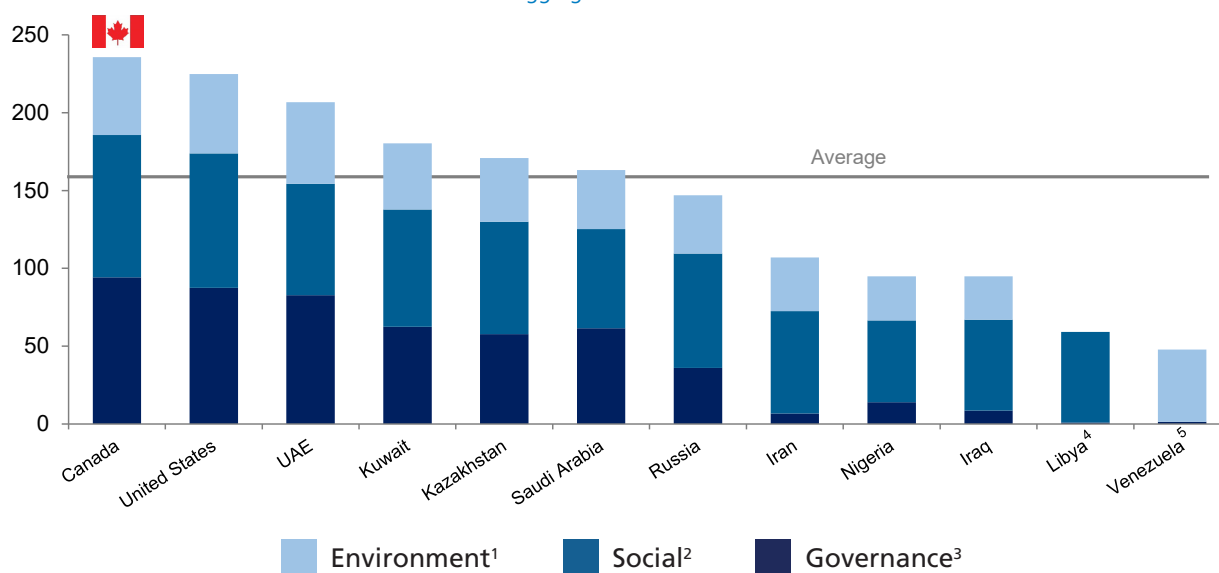
*RBC Capital Markets, "Introducing our Canadian Oil and Gas ESG Scorecard," May 24, 2022*

“ Canadian oil and gas producers have rapidly improved the quality of ESG disclosure in recent years, with the Canadian energy sector now outperforming all other industries [based on Bloomberg ESG disclosure score]. ”

*RBC Capital Markets, "Introducing our Canadian Oil and Gas ESG Scorecard," May 24, 2022*

### ESG Performance Among Top Oil Exporting Nations

Aggregate ESG Score

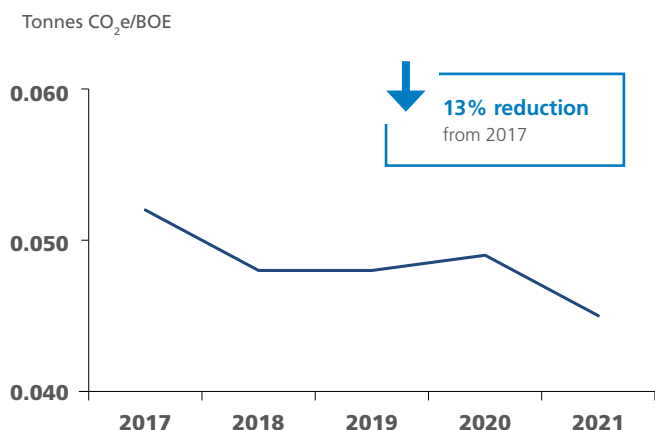


- 2022 Yale Environment Performance Index (EPI).
- 2021 Social Progress Index (SPI) prepared by Social Progress Imperative.
- 2020 World Governance Indicators (WGI), Regulatory Quality Score percentile rank.
- Libya Environmental score not shown due to insufficient data and Governance score is negligible.
- Venezuela Social score not shown due to insufficient data and Governance score is negligible.

# Climate and GHG Emissions Management

## 2021 Performance Highlights

Corporate Scope 1 (Direct) GHG Emissions Intensity

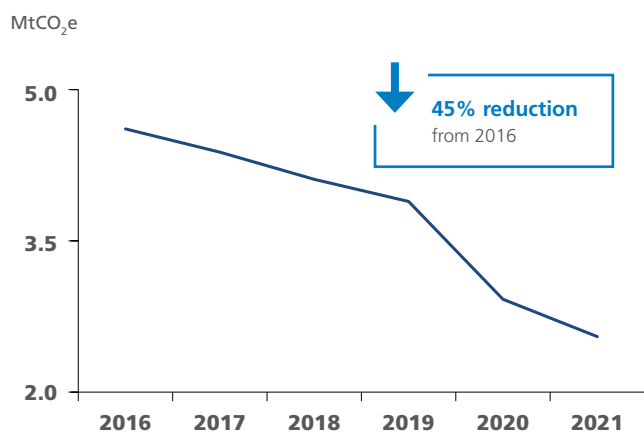


**11.4** MILLION TONNES OF CO<sub>2</sub>e CONSERVED since 2017 in primary heavy crude oil and in situ oil sands operations

**6** MILLION TONNES OF CO<sub>2</sub>e AT QUEST CAPTURED and safely stored since 2015

**640** THOUSAND TONNES OF CO<sub>2</sub>e REDUCED since 2018 from pneumatic retrofits and removals

North America E&P Methane Emissions



**LARGEST OWNER** of carbon capture capacity in the Canadian crude oil and natural gas sector; 6th largest globally

**LEADING PRODUCER** of blue hydrogen in Canada

**THIRD-PARTY INDEPENDENT REASONABLE ASSURANCE** on our 2021 Scope 1 and 2 emissions, including methane emissions

**THIRD-PARTY INDEPENDENT LIMITED ASSURANCE** on our 2021 Scope 3 emissions

**NA E&P Methane Target:** 50% reduction by 2030 from the 2016 baseline.

## Canadian Natural delivers long-term value and sustainability through strategic climate and environmental management.

### Canadian Leadership

The Government of Canada's commitments to reducing GHG emissions, along with climate frameworks in Canadian jurisdictions, place our country among the most responsible crude oil and natural gas producing jurisdictions globally. Our stable, secure energy supply further strengthens Canada's position as a leader in sustainability.

Canadian Natural supports Canada's leadership in the Paris Agreement to hold the increase of global average temperature to below 2°C and pursuing efforts to limit the temperature increase to 1.5°C by reducing emissions and driving innovation. We also support the federal and provincial governments' commitments to reduce methane emissions.

Canadian Natural and the Canadian crude oil and natural gas sector are delivering game-changing environmental performance. We recognize the need to reduce GHG emissions across our operations. By leveraging technology and Canadian ingenuity, we will build on the progress we have made and will continue to deliver results.

### Reducing Our GHG Emissions

Canadian Natural's continuous improvement culture delivered reductions in GHG emissions intensity from 2020 levels, including reductions of absolute methane emissions of approximately 13% in NA E&P.

In 2021, we remained steadfast in our GHG emissions reduction commitments and announced a new NA E&P methane reduction target of 50% by 2030 from a 2016 baseline.

This progress is a testament to the hard work of our employees and contractors and the commitment to continuous improvement, implementing innovative technologies and challenging the status quo.

Our Management Committee considers GHG emissions when making capital investment decisions. In 2021, Canadian Natural invested \$83.8 million in GHG emissions reduction technology development and implementation.

Our GHG emissions reduction initiatives include:

- Participation in the Pathways Alliance
- Solution gas conservation
- Compressor optimization to improve fuel gas efficiency
- Pneumatic device retrofits and removals
- CO<sub>2</sub> addition to oil sands tailings
- CO<sub>2</sub> capture and storage at Quest

Our oil sands mining operations have also incorporated advancements in technology to further reduce GHG emissions through:

- Maximizing heat integration
- The use of cogeneration to meet steam and electricity demands
- The design of the hydrogen production facility that incorporates the CO<sub>2</sub> capture of up to 400,000 tonnes/year for injection of CO<sub>2</sub> in oil sands tailings
- The capturing of off-gas (natural gas liquids and olefins) from the Horizon upgrader

### Leadership in CCUS Projects

#### THE LARGEST OWNER OF CARBON CAPTURE CAPACITY

in the Canadian crude oil and natural gas sector (based on data from the Global Carbon Capture Institute)

#### 2.7 MILLION TONNES CO<sub>2</sub>e/YEAR TOTAL CAPTURE CAPACITY

the same as taking ~576,000 passenger vehicles off the road per year

#### 6 MILLION TONNES OF CO<sub>2</sub>e CAPTURED AND SAFELY STORED AT QUEST

since 2015, where CO<sub>2</sub> is captured from the Scotford Upgrader. Quest and the upgrader are part of the Athabasca Oil Sands Project, of which Canadian Natural has a 70% ownership interest

## Pathways Alliance

Significant collaboration across industry and governments will be essential to accelerate the path to net zero. This is why Canadian Natural, along with Canada’s largest oil sands producers, formed the Oil Sands Pathways to Net Zero initiative (now called the Pathways Alliance) in 2021. The goal of this unique alliance, working with the federal and Alberta governments, is to achieve net zero GHG emissions from oil sands operations by 2050 to help Canada meet its climate goals, including its Paris Agreement commitments and 2050 net zero aspirations.

In the 2022 federal budget released in April 2022, an investment tax credit for CCUS projects for industries across Canada was announced. It is encouraging to see support for developing and deploying carbon capture technologies and that it has a role in helping Canada meet its climate goals, including the need to make long-term, large-scale investments in infrastructure.

By working together, we have developed an executable plan that can help us collectively be more effective and efficient from a time and cost perspective for CCUS projects. As a group, we are leveraging our R&D investments, knowledge and experience towards our work in the Pathways initiative.

To learn more about the Pathways Alliance please visit [pathwaysalliance.ca](https://pathwaysalliance.ca).



## Pathways Alliance

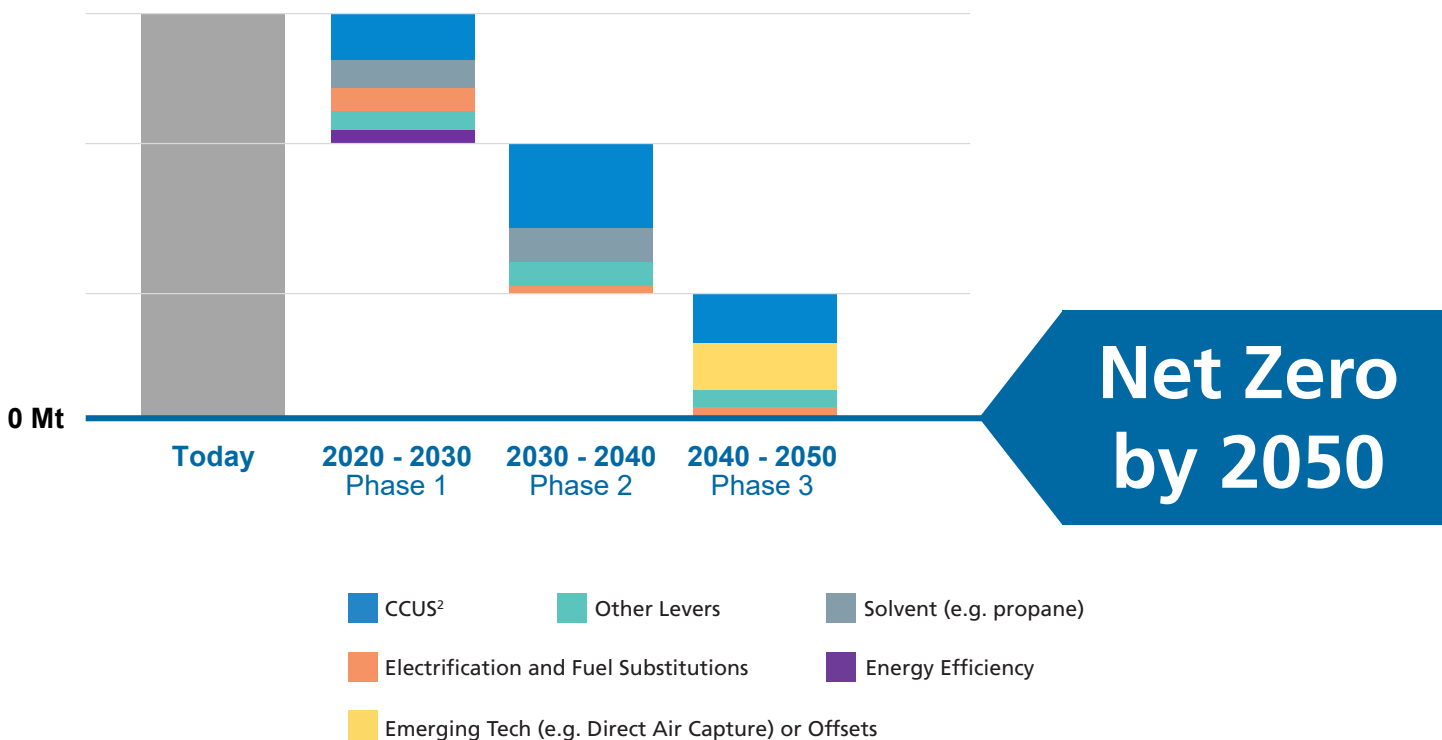
“ We are focused on being strategic and intentional in our decisions. We are prioritizing where we can make the biggest difference in moving the needle on GHG emissions reductions. ”

Canadian Natural is committed to working with industry partners and governments to help meet Canada’s climate and economic objectives.

Dean Halewich,  
Senior Vice-President,  
Safety, Risk Management and Innovation

### Pathways to Net Zero Plan

Proposed emissions reductions by phase<sup>1</sup>



**Net Zero by 2050**

1. Magnitude of reductions in each decade can be adjusted based on chosen investment level.  
2. Carbon capture in Phase 1. Phases 2 or 3 could include carbon capture technology, small modular reactors and/or hydrogen.

## Canadian Natural's Strategy for the Future

### Resiliency of Canadian Natural's Strategy

As part of evaluating climate change related risk and opportunities, Canadian Natural reviews independent external scenario analyses developed by energy firms and agencies representing a range of global oil and natural gas demand levels through 2050. We have reviewed scenarios that model assumptions, which are aligned with the commitment of the Paris Agreement, including the International Energy Agency's Net Zero Emissions by 2050 scenario.

These external scenario analyses are a tool used to support business planning and identification of risks and opportunities. As part of this process, Canadian Natural considers a number of variables and assumptions related to markets (e.g., economic and social events), commodity prices, carbon prices, policy, regulation, technology development and adoption, energy efficiency and reputation.

The scenarios reviewed show that crude oil and natural gas remains an important part of the global energy mix for the foreseeable future along with providing an outlook on global GHG emissions reduction. As the world evolves

toward a lower carbon emissions energy system, we are proud to be one of the leading companies producing oil and natural gas while reducing our GHG emissions.

Canadian Natural is focused on reducing our GHG emissions through our investments in CCUS projects, co-founding the Pathways Alliance, employing significant resources to reduce our methane emissions, and investing in natural gas production, a clean burning hydrocarbon.

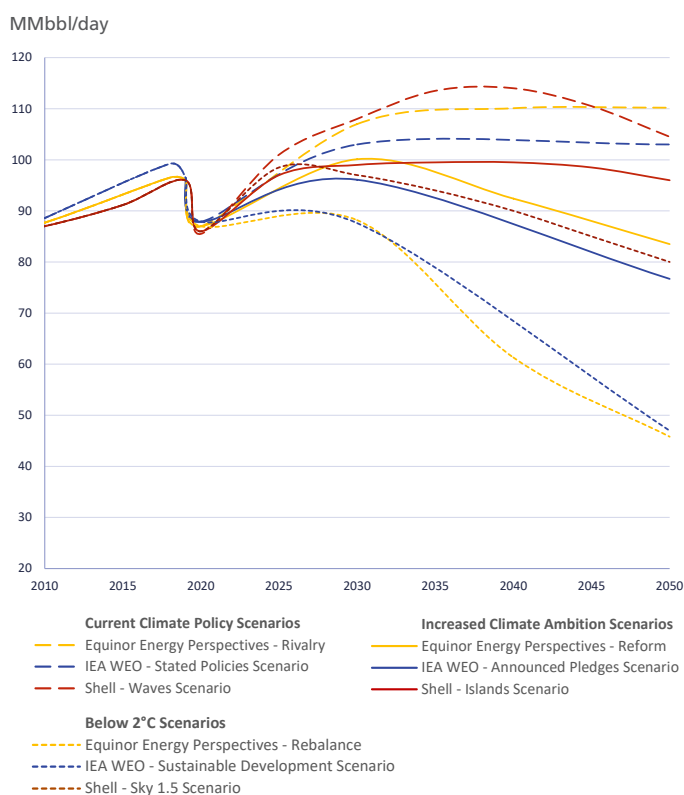
Natural gas is an integral part of our business strategy and a pathway to a lower carbon emissions future. As one of the largest producers of natural gas in Canada, Canadian Natural's natural gas assets deliver strong environmental performance. As the energy system integrates more renewable energy sources, natural gas will provide a reliable baseload energy supply.

Canadian Natural's balanced portfolio of light, synthetic, and heavy crude oil and natural gas represents one of the strongest and most diverse, long life low decline asset portfolios of any energy producer in the world. The strength of our assets, along with our integrated GHG Emissions Management Strategy, helps to mitigate climate change risks to our reserves and will position us for success in a low carbon future.

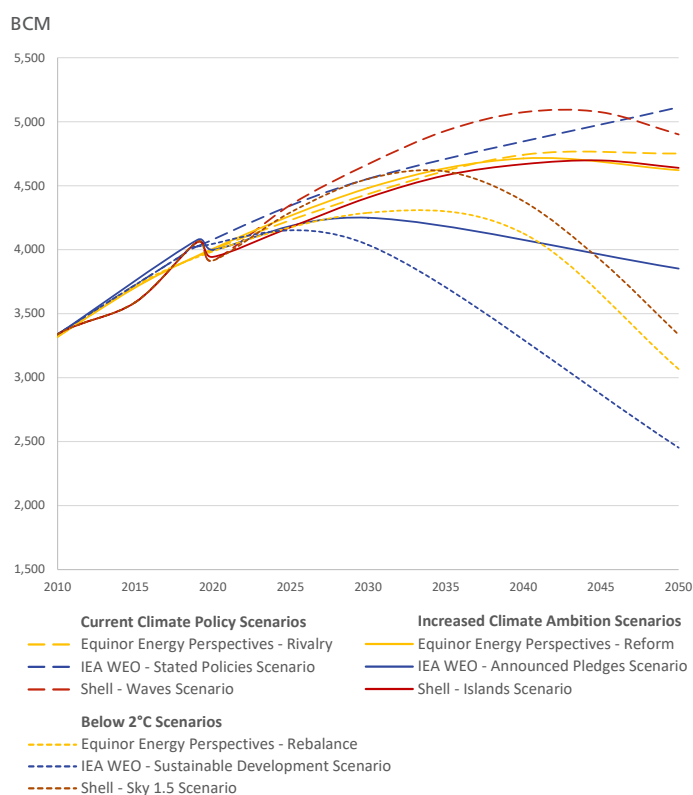
“ Canada has made a series of international and domestic commitments towards a balanced approach to resource development to promote economic growth and strengthen environmental performance to set Canada on a path to achieve a net zero emissions future by 2050. ”

International Energy Agency Canada Energy Policy Review 2022

### Global Crude Oil Demand Scenarios



### Global Natural Gas Demand Scenarios





## Our GHG Emissions Management Approach

Canadian Natural has a core technical team that identifies projects and initiatives that support our overall GHG emissions reduction strategy. This multidisciplinary team looks to leverage technology and evaluate opportunities for further development.

### Our integrated GHG emissions management strategy includes:

- Integrating emissions reduction in project planning and operations
- Leveraging technology to create value, enhance performance and reduce emissions
- Investing in research and development (R&D) and supporting collaboration
- Focusing on continuous improvement to drive long-term emissions reductions through energy and process efficiencies
- Leading in carbon capture, sequestration and storage
- Engaging proactively in policy and regulation to effectively manage climate risks and opportunities, including trading capacity and offsetting emissions
- Reviewing and developing new business opportunities and trends that present further opportunities to reduce our environmental footprint

For more information on our GHG emissions management approach, read our [2021 CDP Climate Submission](#).

### Reducing GHGs Through Continuous Improvement

Our teams at the Wembley Oil Battery in Grande Prairie, Alberta, identified an opportunity to reduce the percentage of produced water in the inlet emulsion. Reducing the produced water in the inlet emulsion reduces the energy needed in the oil treatment process and increases facility-treating capacity.

The team installed a sales-gas/inlet-emulsion exchanger to capture and use waste heat – something that is not normally done in this type of system. This design improvement resulted in less heat loss, while increasing the oil treatment capacity of the facility.

The success of the project resulted in an energy reduction of 62,000 GJ/year and a GHG emissions reduction of 4,300 tCO<sub>2</sub>e/year.

### Methane Reduction Programs

Solution gas conservation projects reduce venting by optimizing compressor units and the tie-in of wells and multi-well pads in our primary heavy oil operations.

In our conventional operations, we have completed over 6,400 pneumatic retrofits and removals since 2018, resulting in a cumulative CO<sub>2</sub>e reduction of approximately 640,000 tonnes.

 **140,000 TONNES OF CO<sub>2</sub>e/YR REDUCED**  
in 2021 from 1,400 retrofits and removals

Check out our [Technology and Innovation case studies](#) on our website for more information on how Canadian Natural manages methane emissions.

### Fugitive Emissions Management Program for Leak Detection and Repair (LDAR)

Canadian Natural, with the support of Emissions Reduction Alberta (ERA), implemented Alternative Fugitive Emissions Management Program pilots in 2021 while working with the Alberta Energy Regulator (AER). These pilots are deploying emerging technologies across 1,500 facilities in our NA E&P operations to evaluate technology performance and validate forecasted emission and cost reductions.

As part of continuous improvement, we also conducted over 3,000 comprehensive fugitive emission surveys using optical gas imaging cameras, and conducted fugitive emission screenings at over 21,000 wells across our NA E&P operations. This enhanced technology is helping us reduce our methane emissions through faster leak detection.

**Canadian Natural has reduced our methane emissions by 45% in our NA E&P operations from 2016 levels.**



Solution gas conservation compressor unit at our Bonnyville facilities.

## Investing in Technology and Innovation

At Canadian Natural, we know technology and innovation are keys to success in a lower carbon emissions future. We evaluate and invest in a range of technology projects, such as CCUS, molten carbonate fuel cells, solvent enhanced steam assisted gravity drainage (SAGD), and expanding on uses for bitumen.

We understand that helping to address the challenge of climate change requires significant collaboration between industry and governments, including investing together in the research, development and scaling of new and emerging technologies. As we advance innovation, oil and natural gas production provides a foundation to incorporate many valuable opportunities for lower carbon emission products and to support renewable energy.



### \$450 MILLION INVESTED

in technology development and deployment in 2021<sup>1</sup>



### \$84 MILLION INVESTED

in technology development and implementation to reduce GHG emissions in 2021



### R&D INVESTMENT LEADER

in the Canadian oil and natural gas industry<sup>2</sup>

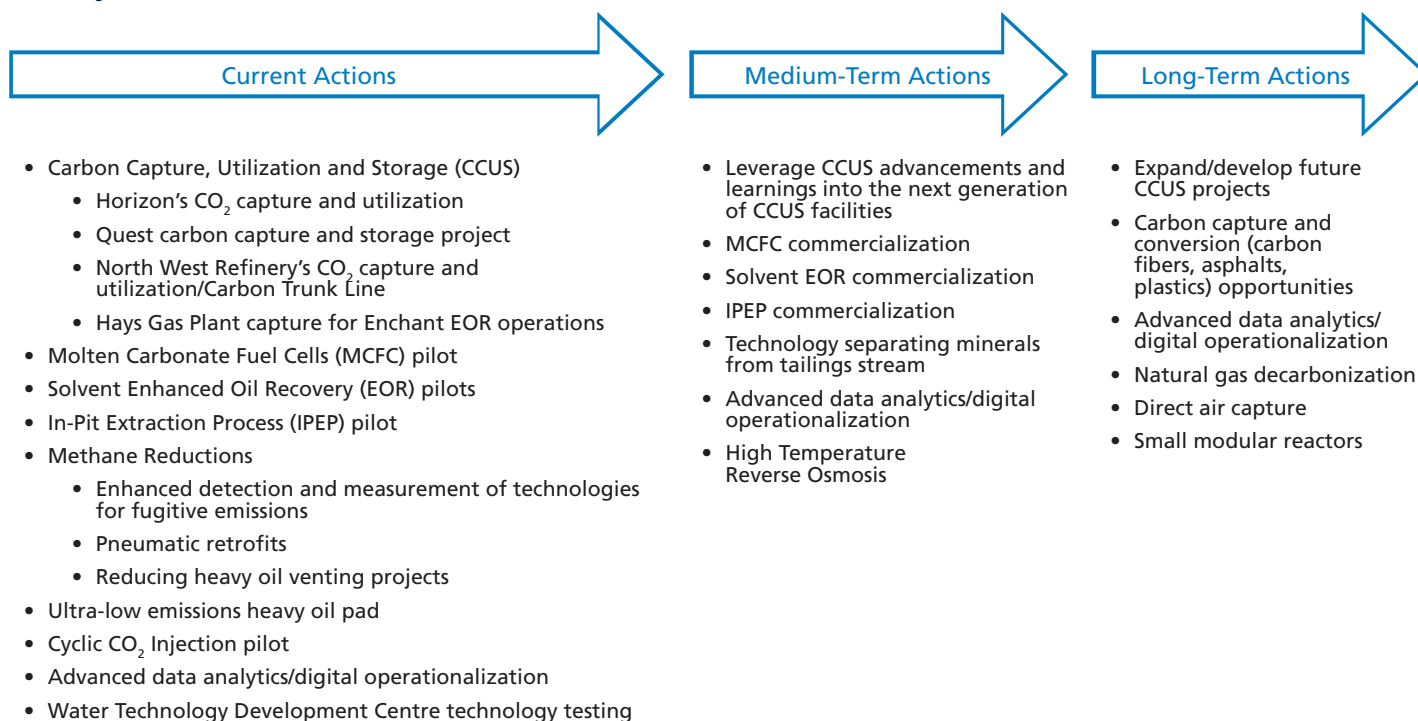
## Solvent Enhanced Oil Recovery

Solvent technologies will have a significant role in creating value across all of our thermal operations on our journey to net zero oil sands emissions. Our ongoing pilot at Kirby South tested solvent effectiveness to help improve oil recovery in a SAGD process.

Results were positive, showing Steam to Oil Ratio (SOR) and GHG intensity reductions of 45% through the pilot process, as well as solvent recoveries of approximately 85%, confirming the viability of this technology.

At Primrose, in the steam flood area, a solvent injection pilot is targeting SOR and GHG intensity reductions of 40 to 45% and solvent recoveries of greater than 70%.

## Pathways to Net Zero in the Oil Sands



1. Technology Development includes R&D with academic institutions, eligible Scientific Research and Experimental Development claims for Canadian income tax purposes, and other activities that create or deploy new technology, or improve existing technology.

2. Research InfoSource, Canada's top 100 Corporate R&D Spenders 2021.

## Disrupting the Status Quo: Non-Combustion Products

Canadian Natural and industry continue to look for opportunities and solutions to find new markets for products that avoid downstream emissions. These investments will accelerate the clean tech sector across the country, reduce our scope 3 emissions and position Canada as producing the preferred ESG barrel.

Most bitumen produced from Alberta's oil sands, like other types of petroleum, is primarily used for making combustion products like fuels such as gasoline, diesel and heating oil. We are currently exploring converting bitumen into valuable products that do not require combustion, like activated carbon, graphene and graphite.

Products like these have the potential to be a game-changer with many different applications. For example, graphene is 200 times stronger than steel and the world's most conductive material. When used in batteries, graphene has the potential to increase capacity and reduce charging times while being lightweight and flexible.

## Potential Value-Added Products

### CARBON FIBERS AND COMBINATION PRODUCTS, INCLUDING GRAPHENE

used in steel, cement and wood

### HIGH QUALITY ASPHALTS AND ASPHALTENES

used for roads, roofing shingles and waterproof coating on building foundations

### PLASTICS OR POLYMERS

that are compostable and biodegradable, as well as vanadium flow batteries

## Potential Benefits

### REDUCE GHG EMISSIONS INTENSITY

by producing products derived from oil sands not combusted as fuel

### CREATE NEW AND/OR EXPANDED MARKETS

for oil sands components and their derived products

### EXTEND LONG-TERM VALUE OF RESERVES

## Harnessing Renewable Energy Sources

At our Septimus and Noel natural gas processing plants in BC, we have invested in power infrastructure to use the province's hydroelectricity to drive electric compressor motors instead of using natural gas.

Septimus has avoided approximately 624,000 tonnes CO<sub>2</sub>e since 2011 when it started operating, while Noel has avoided approximately 112,000 tonnes CO<sub>2</sub>e since we gained ownership of the plant in 2014. We are now looking at other opportunities to leverage hydroelectrical power.

Canadian Natural is also actively evaluating opportunities to add solar and wind power generators to supplement the electrical needs of our existing and new facilities.

In 2022, Canadian Natural launched a multi-year project to convert approximately 3,000 pneumatic injection pumps in our Alberta and British Columbia conventional areas to solar configurations. This project is targeting reductions of methane emissions by up to 270,000 tonnes CO<sub>2</sub>e/yr when completed.

In our International operations, we are working with the Net Zero Technology Centre in the UK to explore the potential of installing a floating wind turbine generator to supply power to our offshore platforms. A 10-megawatt wind turbine could reduce GHG emissions by approximately 35,000 tonnes CO<sub>2</sub>e/yr on one platform.



**~624,000 TONNES OF CO<sub>2</sub>e AVOIDED**  
at Septimus since 2011



Our Septimus natural gas processing plant in BC uses the province's hydroelectricity to drive electric compressor motors instead of using natural gas.

## Working Collaboratively

Supporting innovation and leveraging technology are key to reducing risk and advancing projects. By working together, coordinating efforts and collaborating, we are helping our projects achieve commercialization faster.

The development of new technology takes time and capital to test and commercialize, making collaboration essential when evaluating and leveraging research and development investments. We work with entrepreneurs, industry, academia, and technology companies, sharing knowledge and accelerating research and technology implementation to find innovative solutions to industry's environmental challenges. Industry also works with government and regulators to develop policies and guidelines that enable continuous improvement and investment in environmental performance.

### Our Partners



## Pathways Alliance

Canadian Natural participates in the Pathways Alliance, consisting of Canada's largest oil sands producers who operate facilities representing about 95 per cent of Canada's oil sands production.

More than 120 engineers and technical experts from Pathways Alliance companies are developing applications for underground storage space, refining carbon capture technology, developing state-of-the-art emissions reducing technology, and engaging Indigenous and local communities along the proposed pipeline route.

### Molten Carbonate Fuel Cells (MCFCs)

Canadian Natural, together with partners from Canada's Oil Sands Innovation Alliance and Emissions Reduction Alberta, is leading a Joint Industry Project to pilot a 1.4 megawatt MCFC at the Scotford Upgrader, part of the Athabasca Oil Sands Project (AOSP).

The MCFC pilot will capture CO<sub>2</sub> and generate low GHG-intensity electricity that could be used on-site or sold back to the power grid.

If successful, this has the potential to:

- Reduce GHG emissions
- Provide electricity for on-site use or export to the Alberta grid
- Provide water for use at oil sands facilities and displace other make-up water sources

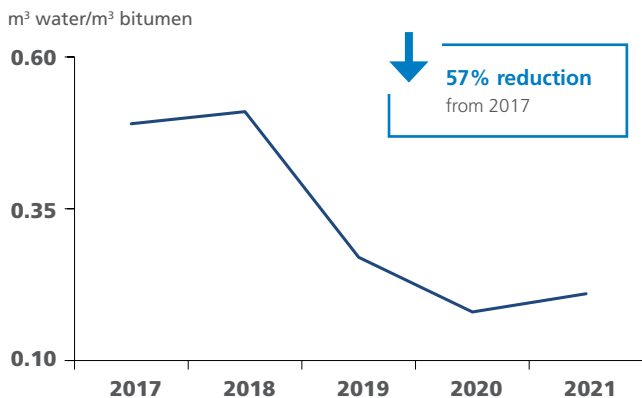


Technology and operational efficiency projects are profiled in our [Technology and Innovation 2021 Case Studies](#) on our website.

# Environment

## 2021 Performance Highlights

### In Situ Fresh Water Use Intensity

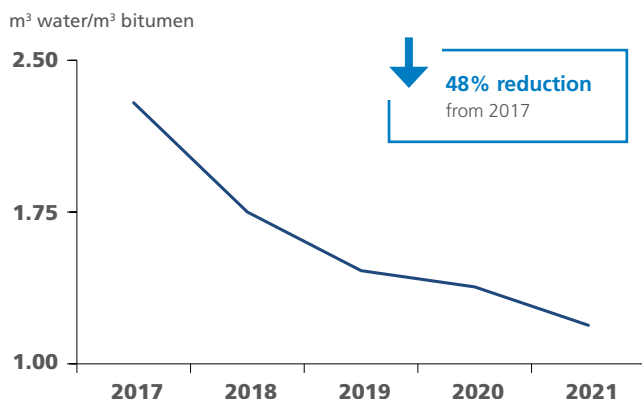


In situ water use intensity has decreased due to optimization of water use and increased bitumen production with no associated freshwater requirements.

**2026 Target:**

40% reduction from the 2017 baseline.  
Includes Alberta thermal in situ facilities.

### Oil Sands Mining Fresh River Water Use Intensity



2021 precipitation was higher than expected, reducing the withdrawal requirement of fresh river water.

**2026 Target:**

40% reduction from the 2017 baseline.  
Includes river water and tributaries.

### Reclamation Highlights

**~3.9 MILLION TREES** planted at Albian since 2002 and Horizon since 2009

**~3.4 MILLION TREES** planted in our NA E&P operations to date

**3,079 ABANDONED** inactive wells in 2021

**2,053 HECTARES RECLAIMED** in oil sands mining to date

**889 RECLAMATION CERTIFICATES** received in NA E&P in 2021; equivalent to ~2,017 Canadian football fields

**86% RECYCLE RATE** of surface water in oil sands mining

**85% RECYCLE RATE** of produced water in thermal operations

**26% DECREASE** in total number of reportable spills since 2018

## Land Management with a Vision

We begin every project with a vision and plan to manage our impact on the land. Across our operations, land management practices are designed to reduce disturbance and progressively reclaim land.

In our conventional and thermal operations, we have been using an area-based approach since our first pilot in 2013 to strategically reclaim large contiguous areas. This program geographically groups well and pipeline abandonments, remediation and reclamation activities into projects. Project efficiencies are safely and strategically obtained through the coordination of people, equipment and technologies while minimizing land disturbance associated with reclamation.

Oil sands mining operations are subject to some of the strictest reclamation standards in the world. Reclaimed sites are monitored continuously for years afterwards to ensure a sustainable ecosystem is integrating successfully with the surrounding natural habitat.

We have worked with local communities and industry to advance monitoring and research programs, incorporate traditional knowledge and improve reforestation practices.

Our mining operations have reclaimed 2,053 ha of upland forests, wetlands and shrubland to date. A rigorous process of mapping soils for salvage, storing the soil for replacement and monitoring revegetation of the reclaimed sites is in place to meet the planned outcomes.



**3,000+ INACTIVE  
WELLS ABANDONED**

in NA E&P in 2021



**10,850 HECTARES RECLAIMED**

in NA E&P since 2016

## Integrated Environmental Stewardship

Our Environmental Management System (EMS) provides the structure to identify and assess environmental risks and minimize impacts in all phases of our projects, from planning through to design, operation and final reclamation. We identify opportunities for improvement through regular environmental inspections, audits and monitoring, developing action plans and setting key indicators to measure our performance across our operations.

For example, we have enhanced our wetland and wildlife monitoring programs by standardizing procedures and reporting to align with provincial programs while we improve our understanding of the effects of our operations.

## North Sea Decommissioning

Offshore decommissioning projects are complex, requiring multi-year planning cycles to execute them safely and efficiently. Canadian Natural removed the topside of Ninian North using the world's largest construction vessel — the Allseas Pioneering Spirit — in a single lift. It took years of planning and preparation work, minimizing land disturbance during decommissioning, resulting in the actual lift being completed in just seven seconds, and the entire operation from vessel mobilization to full offload of the topsides onshore completed in seven days.

The single lift operation at Ninian North significantly reduced safety exposure and risk of incidents and performed cost-effectively, with 98% of the topside materials being recycled.

## Safety Statistics:

**7 SECONDS**

to complete the topside lift

**7 DAYS**

from lift to shore

**98% TOPSIDE MATERIAL**

recycled



Reclaimed wheat field. In our conventional and thermal operations, we use an area-based approach to strategically reclaim large contiguous areas.

In this way, we are taking sites out of service in a safe and environmentally sound manner, while reducing reclamation, abandonment, and decommissioning timelines and costs.

## Biodiversity and Wildlife

We assess our impact and incorporate long-term biodiversity and reclamation planning into our programs to maintain regional characteristics and reduce impacts on wildlife. We apply a mitigation hierarchy to avoid, minimize, and restore habitat disturbances in project design, field operations, and closure. Continued monitoring of wildlife, biodiversity, aquatic ecosystems and reclamation provide us with data to improve mitigation programs.

We continuously improve by conducting research and monitoring programs of reclamation practices. The re-establishment of important soil functions and vegetation species is crucial to restoring habitat for wildlife, including species at risk such as caribou. It is also important for restoring natural ecosystems, such as wetlands. With record numbers of projects completed, Canadian Natural is an industry leader for abandonment, reclamation and facility decommissioning in Canada and offshore UK.



Monitoring and relocating Canadian Toads at Horizon.



**~3.9 MILLION TREES**

planted at Albian since 2002 and Horizon since 2009



**~3.4 MILLION TREES**

planted in our NA E&P operations to date



**~1.5 MILLION TREES  
PLANTED ACROSS  
OPERATIONS IN 2021**

## Monitoring and Reducing Air Emissions

Canadian Natural measures and monitors air emissions from our larger sources and supports and participates in regional airsheds to monitor ambient air quality. In the oil sands, we are an active participant in the [Wood Buffalo Environmental Association](#) (WBEA), Lakeland Industry Community Association and the Peace River Air Monitoring Program, collaborations of communities, environmental groups, industry, government and Indigenous stakeholders.

All airshed management programs include monitoring air emissions based on human health guidelines. The WBEA network operates the most extensive ambient air monitoring network in Alberta inclusive of acid deposition to soils, lakes and vegetation, passive monitors, lichens, snow and odours.

Site specific, real-time data collection gathered through direct sampling of stack emissions allows us to minimize SO<sub>2</sub> emissions at Horizon and Primrose/Wolf Lake operations and to optimize efficiency of processes. At Horizon, an industry leading sulphur recovery system captures over 99% of the sulphur from the upgrading of bitumen.

Regionally, airshed monitoring programs assess the ambient air quality by also collecting real-time data and reporting their findings publicly. Alberta's ambient air quality objectives and guidelines are developed under the *Alberta Environmental Protection and Enhancement Act* (EPEA).

### Bird Management

To enhance our robust bird detection and deterrent systems at Horizon, we are working with Environment and Climate Change Canada to identify the target signal of specific bird species. We installed a long range radar unit in 2019 designed to track birds up to 20 km away from our site. This allows us to detect bird flights near incoming aircraft and large bodied birds when they get close to our operations using data filtering. Work is ongoing to develop real-time data displays that will be used to prevent birds from landing near our operations.



## Tailings Treatment and Reclamation

The continuous improvement of tailings management is an integral component of successful oil sands mining operations. Reducing the size and need for tailings ponds, and increasing the speed at which very fine particles settle is important to our commitment to reclaim our tailings facilities as safely and quickly as possible.

Canadian Natural has taken significant steps to minimize the footprint of tailings. Our comprehensive planning considers the end of mine life so that we can manage our environmental closure programs and obligations, and advance reclamation. We have reclaimed the first tailings facility in the oil sands under new decommissioning and closure requirements in Alberta.

Our tailings management strategies align with regulatory requirements based on two key principles:

1. Creating landforms that fit within the local landscape, and
2. Supporting productive wetlands and boreal forest habitats.

Our processes focus on preventing fluid tailings through optimizations and continuous improvements.

In 2021, Canadian Natural's mining operations were audited under the Mining Association of Canada's Towards Sustainable Mining (TSM) program. The operations received the highest rating of "AAA" for tailings management in 2020 and completed the external verification in 2021.

The audit highlighted the value of Canadian Natural's management systems to deliver tailings reduction programs to accelerate final reclamation. The TSM standard is a globally recognized sustainability program that supports mining companies in managing key environmental and social risks.

Canadian Natural has continuously invested in tailings research, technologies and project construction. Our technologies are increasing water recycling and improving tailings consolidation over time, to ultimately accelerate the reclamation process. Read more about these technologies in our [Technology Case Study booklet](#).



Wāpan Sākahikan (Horizon Lake), fisheries compensation lake. Canadian Natural constructs and rigorously manages compensation lakes, creating self-sustaining bodies of water that support thriving aquatic ecosystems. Horizon Lake, constructed in 2008, now covers 80 hectares and is home to thousands of fish that is capable of sustaining up to twice the fisheries habitat that will be impacted during the life of the mining operation.

## Tailings Reclamation at the South Expansion Area

The South Expansion Area (SEA) at our Muskeg River Mine, part of our Albian operations, was the first tailings facility in the oil sands mining region to be reclaimed through the new requirements under Alberta's Dam and Canal Safety Directive (2018).

The Directive requires a plan and authorization from the AER for the decommissioning and closure of the facility that ensures the stability and safety of the landform.

Canadian Natural transformed the site to include natural landscape features, such as streams, wetlands and upland forest areas with hummocks. A mixed forest was also planted using trees and shrubs grown from seeds collected locally. Final reclamation of this ~295 hectares was achieved in 2021.





## Water Management

Canadian Natural's water management strategies focus on reducing fresh water use and improving water reuse. Our efforts focus on maximizing produced water recycling and using saline water for steam generation whenever possible. We engage with local communities on our water use and employ a comprehensive monitoring program that meets or exceeds regulatory requirements.

Canadian crude oil and natural gas are produced under some of the highest standards in the world, including strict water use regulations for fresh water withdrawals, wastewater disposal and hydraulic fracturing. In collaboration with industry, we continue to improve water use through best practices, innovation and shared results.

For example, members of Canada's Oil Sands Innovation Alliance (COSIA) have reduced the net water use intensity from the Athabasca River and its tributaries by 36% compared to 2012. We also work with other operators to share water allocations and infrastructure, which helps to conserve water while reducing costs.

For more information on our water management strategies, read our most recent [CDP Water](#) submission.



### 57% REDUCTION

from 2017 for in situ fresh water use intensity



### 48% REDUCTION

from 2017 for oil sands mining fresh river water use intensity

## Improving Water Recycling in Oil Sands Mining

CO<sub>2</sub> addition to tailings and other technologies help maintain a high water recycling rate at our oil sands mining operations, reducing the need for fresh water withdrawals from the Athabasca River to 42% of our annual licensed allocation.

At our oil sands mining operations, fresh river water use intensity has decreased by 48% since 2017 (from 2.29 to 1.19 barrels of water per barrel of synthetic crude oil) due to improved recycle water quality and availability of water from sources such as collected storm water.



### 86% RECYCLE RATE

of surface water in oil sands mining



### 85% RECYCLE RATE

of produced water in thermal operations



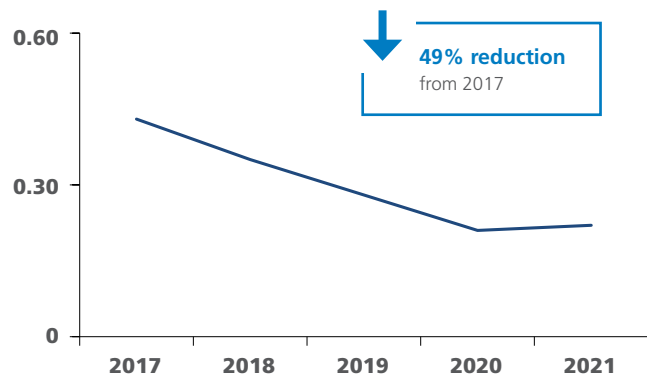
Athabasca River.

# Workplace and Process Safety

## 2021 Performance Highlights

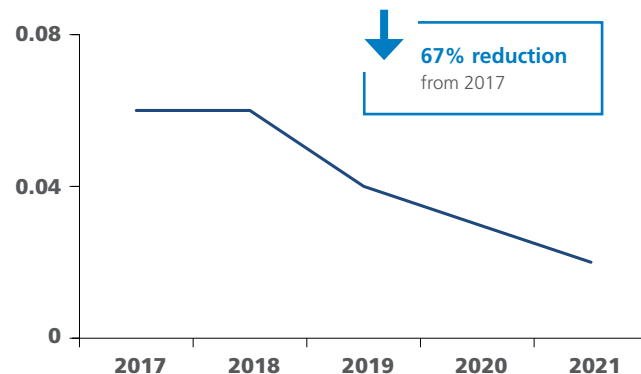
### Corporate Total Recordable Injury Frequency (TRIF) (Employees and Contractors)

Incidents per 200,000  
exposure hours



### Corporate Lost Time Incident (LTI) Frequency (Employees and Contractors)

Incidents per 200,000  
exposure hours



## Workplace Safety

**49%** TRIF REDUCTION  
from 2017

**43%** REDUCTION  
in recordable injuries company-  
wide from 2017

**67%** REDUCTION  
in LTI frequency from 2017

**187,179** HOURS  
of safety and competency  
training completed in 2021

## Process Safety

**21%** DECREASE  
in number of leaks/1,000km  
of pipelines since 2017.  
Lowest level to date achieved  
in 2021

**43%** DECREASE  
in Tier 1 and Tier 2 process  
safety events versus 2017

**100%** COMPLETED  
planned geohazard  
inspections in 2021

**ZERO** TIER 1 PROCESS  
SAFETY EVENTS  
at Horizon upgrader in 2021

## Aiming for Safety Excellence

Safety Excellence across our operations is a shared goal throughout our company, our contractors and our service providers. The cornerstone of our commitment to safety is ensuring employees and contractors at all levels are trained and engaged in our robust Safety Management System (SMS).

Our SMS program targets Total Recordable Injury Frequency (TRIF) reduction across our operations by engaging employees and contractors through processes such as Worksite Safety Observations, root cause analysis and safety meetings. Our year-over-year safety performance, as measured by industry standards, demonstrates our continuous improvement.

## Frontline-driven Incident Prevention

At Canadian Natural, safety is frontline-driven. This means that management and supervisors work together with field workers and reinforce everyone's role in contributing to a safe workplace. The direct involvement of our frontline staff is as important as management commitment. Employees, contractors and service providers deliver valuable insights about how they can perform their jobs safely and efficiently. Our safety teams work with leadership, employees and contractors to identify hazards and develop safe work procedures to achieve an incident-free workplace.

In 2021, two contractors passed away as a result of an incident on-board a third-party operated Floating Production Storage and Offloading vessel in our Offshore Africa operations. This was a terrible tragedy. A joint review of the incident was conducted, resulting in ways that we are reinforcing our commitment to safety across the company through:

- **Cross-divisional Working Group** – This working group was formed with representation from frontline employees and management across our operations. Their goal was to identify improvement opportunities to enhance our safety performance to prevent incidents. No significant gaps in our management system were identified; however, we found an opportunity to share best practices and ensure consistency in the implementation of our management system across the company. Key learnings and shared practices have been applied across the organization.
- **Safety Excellence/Mission Statement Meetings** – Senior management meets with employees throughout the year to reinforce safety expectations and keep safety commitment top-of-mind, from leadership to frontline worker.
- **Contractor Safety Excellence Meetings** – Management from contracting companies and Canadian Natural work together to identify action items and establish plans to improve worker safety.

## A Foundational Safety Management System (SMS)

Our comprehensive Safety Management System applies to all our employees and contractors in all our operations. Routine inspections and audits, as well as compliance and safety meetings integrate personal health and safety, process safety and asset integrity. Risk assessment tools built into our SMS allow us to identify potential hazards and effectively implement controls to prevent and reduce exposure to risks in the workplace.

Hazard identification, near-miss reporting, incident investigations, emergency response training, and management actions are all cornerstones of this program. Each aspect of the SMS is audited regularly to ensure opportunities for continuous improvement are leveraged and employees and contractors are fluent in the system.

Field employees and contractors are trained in the Site Supervisor Safety Training (SSST) as part of onboarding. SSST covers regulatory compliance, explains our SMS and explains site supervisor responsibilities. As part of our Safety Orientation and Competency Training, workers are provided the safety information they need for their roles and responsibilities, including their expected performance and required procedural knowledge. Management is involved in ensuring requirements are customized, while reporting tools are utilized to measure completion and compliance.

## 42 EMPLOYEE SAFETY EXCELLENCE/MISSION STATEMENT MEETINGS



with Senior Leadership across the Company

## OVER 72,500 WORKSITE SAFETY OBSERVATIONS



proactively identifying improvement opportunities

**At Canadian Natural, safety is a core value that underlies all our activities to reach our ultimate goal of 'No harm to people; No safety incidents'.**

## Using Immersive Virtual Reality for Safety Training

Major Canadian Natural facilities have been designed for a number of years with a series of 3-D models. Teams can perform ‘virtual walkthroughs’ of the models on their computers to identify potential hazards and optimize project planning.

The models are used by approximately 1,800 employees to gain efficiencies and lower operational costs in plant planning activities, including for maintenance periods, facility design changes and orientation/training.

For example, virtual reality is being used by employees to train on equipment, operational procedures, and emergency response in the exact plant location. This allows a level of training that would otherwise be impossible in an operating plant.



Canadian Natural Board Member, Annette Verschuren, tests a VR headset and digitally walks around the Horizon Oil Sands plant.

## Workforce Health and Wellness

The proactive management of workforce health and wellness is a key part of Canadian Natural’s strategy to keep workers engaged and supported on the job.

Workplace health is managed throughout our operations, whether it be our health and emergency response teams at our remote sites or our ergonomic assessments in our corporate offices. Our Strive wellness program, established in 2011, provides resources, tools and support for employees across our operations.

By participating in Strive, including completing Health Risk Assessments, employees are eligible for financial rewards for use toward additional healthcare or wellness expenses not fully covered by the company’s benefits plan.

In 2021, we launched the Strive wellness app, a personal portal to our Strive wellness program’s resources, tools and support for employees across our operations. High-level data provided by the program is used to develop employee engagement programs that target specific health or wellness issues.

### Canadian Natural Indigenous Contractor Reaches Safety Milestone

Canadian Natural congratulates Bouchier, an Indigenous service provider in Fort McKay, AB, for recording a 12-month TRIF of 0.00, the first in their 20-year history.

Bouchier worked more than 12 consecutive months and over 1.75 million hours without a recordable injury and are proud that not one employee required any medical treatment beyond first aid during that period. This is a true accomplishment and a testament to their Safety-First Culture and passionate 1,000 employees who come to work and put safety first every day.

Bouchier has been working with us since day one at Horizon. We are proud to work with such a dedicated team and look forward to continuing our safety-first partnership in the years to come.

### A Focus on Mental Health

In 2021, Canadian Natural expanded our support for the mental health of our employees by launching the Canadian Mental Health Association’s program, Not Myself Today, with pilots involving teams in our Calgary office and field locations. This program is based on a shared insight — the feeling of not being oneself — that connects people to the topic of mental health and helps build empathy through online resources, webinars and in person check-ins. It is employee-driven with management’s support, leading to an even bigger impact.

“ The Not Myself Today program has helped me to strengthen my mental resiliency. It has taught me to identify and correct unhealthy thoughts and patterns. This has improved my work performance, my personal life and my community involvement. ”

Nathan Taylor,  
Operator, East Field

## Focused on Process Safety Performance

The integrity of our process equipment and structures is an essential part of ensuring safety company-wide. Our established, robust Process Safety Management (PSM) system is designed to prevent and control serious incidents that have the potential to release hazardous materials.

Our process safety management systems and our commitment to incident prevention help us ensure the safety, compliance and reliability of our infrastructure. We continually improve our processes and performance through process safety metric tracking, training and monitoring. As a result of this focus, our PSM program has resulted in the reduction of our Tier 1 and 2 process safety events in 2021 from 2020 levels.

Here are a few key ways we ensure our PSM is making a difference throughout the company:

### WELL ESTABLISHED PSM PROCESSES

In our Oil Sands Mining operations, for example, our mature PSM processes include the tracking of process safety events that are then reported to a PSM Review Panel of senior technical specialists, providing corporate-level process safety oversight to strategically implement improvements and further strengthen our process safety culture.

### CULTURE OF CONTINUOUS IMPROVEMENT

Our PSM performance is monitored by using recognized industry metrics to drive continuous improvement. During 2021, we successfully completed a Risk Based Inspection (RBI) continuous improvement project in our Oil Sands Mining operations that identified opportunities for increased efficiency and management oversight of the RBI process.

### PROACTIVE RISK MANAGEMENT

In 2021, we enhanced a Field Risk Review program in our NA E&P operations as an additional way to proactively identify potential process safety concerns and increase understanding of these risks across groups.

Our Asset Integrity Management Systems are another foundational pillar of our PSM system and provide the framework to identify, assess and manage risk to prevent leaks due to corrosion or other types of material degradation.

We use this system to coordinate compliance with regulations and drive continuous improvement through goal setting, tracking and results measurement. Asset Integrity, Operations, Engineering, and Safety teams receive training and support so that risks are proactively assessed, understood, communicated and mitigated.

### Achieving Zero Tier 1 Events in 2021 at Horizon Upgrader

Strong leadership and a culture of continuous improvement are two key elements that help distinguish Canadian Natural from other producers. Process Safety Management (PSM) is always a key focus throughout our operations, and in 2017, the team at the Horizon Upgrader identified the need to enhance their PSM approach when process safety events began to increase. The team launched an investigation of historically significant process safety incidents to review and collate trends in root causes in order to identify improvement areas and then they ensured that all actions were effectively implemented.

As part of enhancing continuous education throughout all levels of workers, the team worked together with Canadian Natural's senior management to drive support for process safety with the frontline leadership. Analyzing past events, educating the team and reinforcing our safety culture at every level resulted in zero Tier 1 events at the Upgrader in 2021.



A view of Horizon's process plant.

## Tailings Management

Canadian Natural's tailings management strategies focus on the objectives of dam integrity, environmental performance, and reclamation to achieve physically and chemically stable landforms. We align with regulatory requirements based on two key principles:

1. Creating landforms that are integrated within the local landscape, and
2. Supporting productive wetlands and boreal forest ecosystems.

Our processes focus on reducing accumulation of fluid tailings through optimizations and continuous improvements.

“ Tailings management, including dam safety, is a strong focus for Canadian Natural. We collaborate with our peers to ensure everyone's success when it comes to dam safety. ”

Scott Martens,  
Manager, Geotechnical/Geology, Albian

We follow the leading practices of the Canadian Dam Association for dam safety management, the Alberta Dam and Canal Safety Directive, the Alberta Environment and Parks' Tailings Management Framework, and the Alberta Energy Regulator's Directive 085: Fluid Tailings Management for Oil Sands Mining Projects.

Our program is subject to multiple external audits, internal reviews and continuous monitoring. The design, construction and performance of the tailings dams are reviewed twice annually by an Independent Review Board of internationally recognized experts in tailings dam safety. A comprehensive dam safety review is performed every five years by an independent consulting firm.

As a member of the Mining Association of Canada (MAC), Canadian Natural's mining operations have been audited under MAC's Towards Sustainable Mining (TSM) program. Both Albian and Horizon operations received the highest rating of "AAA" for tailings management in 2020 and completed the external verification in 2021. Visit the [MAC website](#) for our latest TSM audit report.



### AAA RATING

for Horizon and Albian, the highest rating that can be achieved in the Towards Sustainable Mining Framework



Canadian Natural invests in research and technologies to improve environmental performance. The In-Pit Extraction Process (IPEP) (above) is a relocatable, modular extraction plant that processes ore and separates bitumen right in the mine pit. It has many benefits, including producing stackable dry tailings, potentially eliminating the need for future fluid tailings ponds.

## Emergency Response Planning

Canadian Natural has a comprehensive approach to emergency management that extends throughout our operations to ensure we are properly prepared to protect personnel, the public, the environment and our assets in the event of an incident.

Our approach to emergency response management includes an Incident Command System, detailed procedures, trained personnel, and emergency response plans (ERPs) for immediate response with equipment access for safe and well-coordinated action. Our programs and ERPs meet or exceed the regulatory requirements in each jurisdiction where we operate.

We conduct regular planned training exercises at all of our operating sites to help ensure our employees are ready to respond should an incident occur. These exercises test the fitness of emergency preparedness and response arrangements, and highlight areas of good practice and opportunities for improvements. Tabletop and major ERP exercises are also conducted with regulators and contractors.

## Cyber Security Management

Canadian Natural takes a proactive management approach to mitigating cyber security threats. We have implemented a robust training and awareness program that engages employees in identifying potential threats, as well as robust infrastructure, protocols, and procedures to further enhance our security. Canadian Natural's Cyber Security team works with teams across the company to ensure threats are identified and mitigated. The program is audited internally for continuous improvement.

### Emergency Management Successfully Adapts to Virtual Exercises

In 2021, the emergency management and operations teams lived our mission statement by working together to develop a plan for conducting virtual emergency response exercises, testing our emergency response capabilities. Twenty-five major exercises were successfully completed in 2021 that included topics like tailings dam breaches, forest fires and operational upsets.

Regulators, municipalities and internal and external stakeholders were complimentary of Canadian Natural's ability to respond to the simulated emergency events and meet the key objectives of protecting workers, the public and the environment. Thank you to everyone who adapted effectively to make this possible.



**99% PASS RATE ON  
TEST PHISHING EMAILS**

to 15,421 users over nine campaigns in 2021



**17,724 CYBER SECURITY  
TRAINING ASSIGNMENTS**

completed in 2021



Members of Horizon's Emergency Services team.

# People, Community & Partnerships

## 2021 Performance Highlights

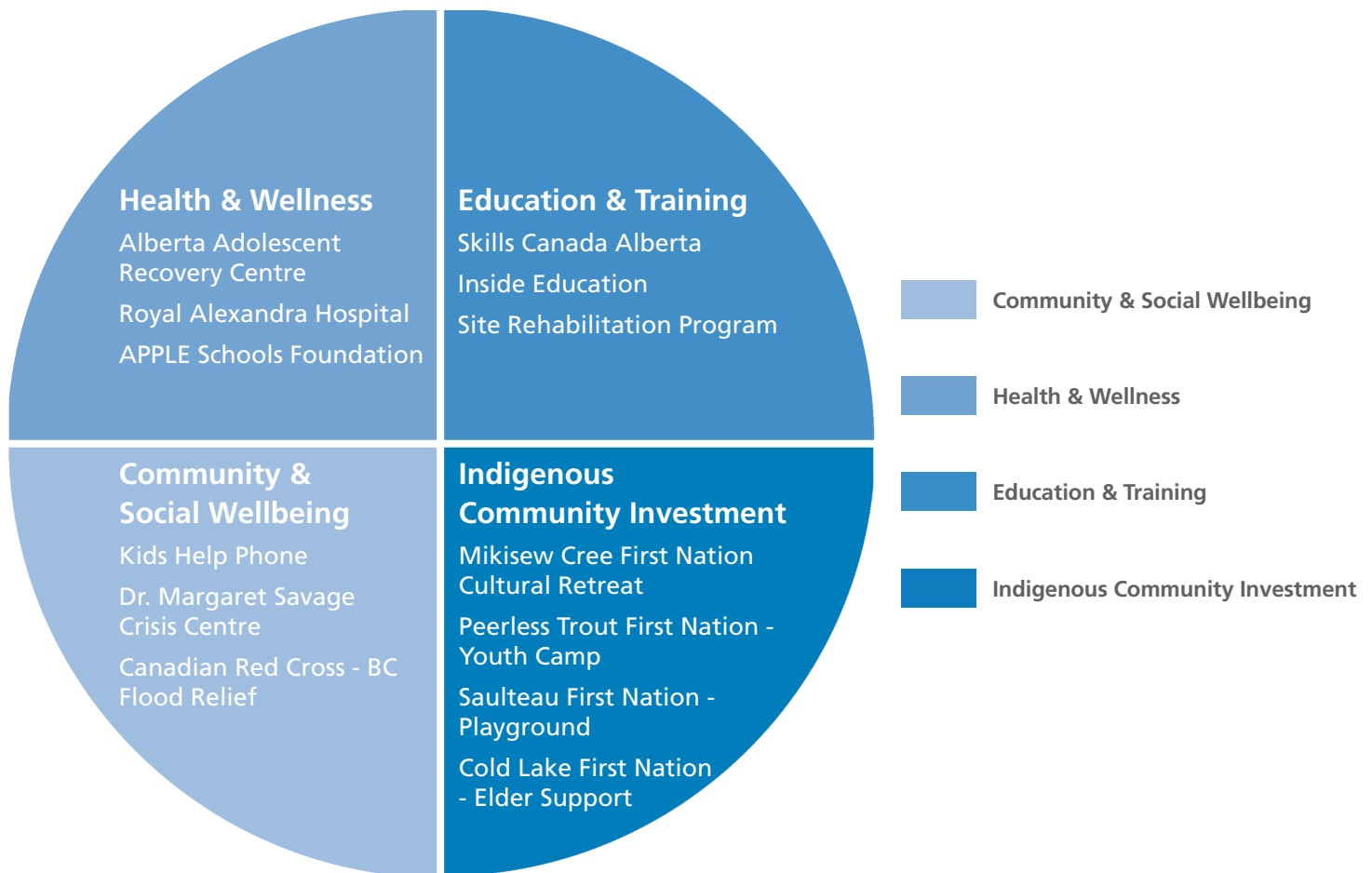
**\$572** MILLION IN CONTRACTS,  
a 17% increase from 2020, with 144  
Indigenous businesses

**\$8** MILLION  
in employee and  
contractor training

**600+** COMMUNITY ACTIVITIES  
supported and celebrated

**139** SCHOLARSHIPS  
awarded across operations

**\$31.9 MILLION** invested in local communities in 2021, including:





## Stakeholder Engagement

Through meaningful engagement efforts, Canadian Natural focuses on building and maintaining relationships throughout the project lifecycle. Relationships are built through open and meaningful discussions, so community members are well positioned to openly raise and discuss their concerns, or ideas for improvement, through our many interactions.

Our ConfidenceLine, managed by a third-party, provides another avenue for stakeholders to provide feedback. For more information on ConfidenceLine, see the Ethics and Integrity section on page 34.

In 2021, we continued to connect and work with many stakeholders on local area opportunities and challenges:

- Engaged with communities on more than 100 projects and development plans.
- Worked with local governments, rural counties and municipalities, chambers of commerce, landowners, regulators, industry and non-governmental groups to identify and address community concerns. These included engagement on:
  - Operational activities
  - Business opportunities
  - Environmental stewardship
  - Public safety
  - Services to improve quality of life
  - Appropriate property tax levels
  - Infrastructure and road use
- Participated in collective dialogues at local stakeholder and synergy groups.

## Stakeholder Engagement Throughout the Project Lifecycle

### 1. PROJECT PLANNING

Engagement on areas of project placement considering ecologically sensitive species and habitat, traditional land use, cultural importance, construction feasibility, reservoir access, etc. as well as mitigation measure discussions

### 2. CONSTRUCTION

Facilitate opportunities to encourage local businesses for construction work

### 3. ONGOING ENVIRONMENTAL OPERATIONS

Ongoing monitoring and community engagement, with annual engagement plans to respond to community priorities and commitment tracking

### 4. RECLAMATION

Engagement to acknowledge traditional knowledge and involve local businesses in reclamation work

## Engaging with Indigenous Communities

We engage with Indigenous communities from a place of respect for the traditional values and cultures of the many different communities where we do business. Our responsibilities and commitments when working with Indigenous communities are outlined in our [Indigenous Relations Policy](#) available on our website. Before a project begins, we consult with communities to explain the project and acquire information about traditional land use and culturally important areas.

To ensure ongoing communication, we connect regularly with community leadership, Elders, members and advisory committees to identify and discuss community interests and concerns.

For example, in our oil sands mining operations, Canadian Natural organizes Annual Stakeholder Tailings Forums in Alberta with representatives from seven local Indigenous communities to share operational updates and discuss environmental programs.

Our engagement efforts are steered by our commitment to our [Code of Conduct and Human Rights](#), guiding employees and contractors in maintaining the highest level of business ethics and principles.

In areas where we have extensive operations near communities, we have established working relationship agreements to formalize our engagement efforts with Indigenous communities. These agreements promote relationship building and mutual benefit through economic and community development opportunities.

### Bringing Our Communities Together, One Skateboard at a Time

Canadian Natural proudly supported Let's Try Skateboarding, an Indigenous skateboard camp that included kids from Fort St. John and Blueberry River First Nation in British Columbia. The goal was to bring these communities together for physical fun in a safe, outdoor setting. It was the perfect summer getaway that helped bridge gaps and build lasting friendships.



## Promoting Local Business Development

Canadian Natural promotes local and regional business development opportunities through the procurement of goods and services for our operations. Hiring local workers and suppliers is mutually beneficial, leading to long-lasting partnerships and economic development.

Canadian Natural has developed an Indigenous Contractor Directory, where local Indigenous capacity information is maintained in support of our procurement objectives. We have also hosted business development meetings with community representatives to identify and provide shared value through business opportunities for Indigenous-based businesses, as well as capacity building opportunities with Canadian Natural and contractors.



**\$572 MILLION, A 17%  
INCREASE FROM 2020,**  
in contracts with 144 Indigenous businesses

## Ethics and Integrity

Canadian Natural is committed to maintaining the highest level of business ethics and principles. To ensure all employees know and understand what is expected of them in the performance of their duties, the company has in place a Code of Integrity, Business Ethics and Conduct (the “Code”).

All directors, officers, employees (permanent and part-time), contractors and consultants are required to acknowledge and sign the Code when joining the company and review it annually. Our employees are also required to apply the Code to sustainability matters, specifically in working with regulatory bodies, sustainability reporting, and third-party industry associations. Our full Code is available on our [website](#).

### ConfidenceLine: Canadian Natural’s Integrity Hotline

ConfidenceLine, our third-party managed integrity hotline, is one of the ways community members, employees, contractors and service providers are able to share workplace concerns or questions in a confidential and anonymous way. The hotline is available by phone or via the ConfidenceLine website 24 hours a day, 365 days a year.

## Reclamation Work with Indigenous Companies

Canadian Natural works with local Indigenous-owned companies to build abandonment and reclamation project capacity. Most recently, Canadian Natural has been working with many First Nations and Métis communities in Alberta, Saskatchewan and British Columbia to abandon inactive wells, pipelines and facilities and to reclaim sites and access roads in these communities.

In 2021 and 2022, we are targeting to invest more than \$50 million working with Indigenous companies on site closure projects supported by a federal government funding program. The program has built abandonment and reclamation capacity that will benefit these communities for years to come.



Canadian Natural continues to monitor and learn from the piloting of new reclamation techniques for restoration of native biodiversity. Working with consultants, we engaged local Indigenous community members from Conklin, Alberta to advise us on the specific qualities of the vegetative species and participate in the planting of seedlings for a constructed wetland in 2018.

Today, this wetland is thriving and the Indigenous knowledge, combined with novel planting and reclamation techniques, is leading to improved wetland reclamation and potentially decreased costs.

## Diversity & Inclusion

At Canadian Natural, we believe promoting diversity allows us to nurture different perspectives and thoughts, mitigates against group bias and ensures we have the opportunity to benefit from all available talent and ideas. A culture of inclusion strengthens innovation and creativity by fostering and including a diverse number of perspectives in our planning.

Our strong commitment is outlined in our Code of Integrity, Business Ethics and Conduct. Staff at all levels are encouraged and required to respect fellow staff members, business associates and public officials, regardless of race, gender, sexual orientation, age, religion, disability, colour, national or ethnic origin, or any other basis.

Our staff recruitment and development decisions are determined by skill set and experience, and are governed by the principles of equality, equity, and reasonable accommodation. By creating an atmosphere where all people are welcomed, Canadian Natural is a place where everyone can grow and contribute to the success of the organization.

### E3 Inspires Collaboration at all Levels

Employees from across the company are profiled for the unique work they do, including Al Chan, Manager, Control Systems, Horizon Upgrading & Utilities, a leader in artificial intelligence and virtual reality technology at Canadian Natural. E3 is a grassroots employee-led initiative, with a goal to engage, educate and empower employees throughout their career by connecting processes and projects to the people that work on them through informal Q&As and presentations.

With a 15% increase in attendance since last year, employees turn to E3 to understand how their diverse roles contribute to the success of Canadian Natural and how collaboration is essential towards growing our world-class company.

Al is one of many employees who has volunteered his time and expertise through E3 to share how working together to find innovative solutions can drive incredible results not only for the company, but for individuals and teams as well.



Our strategies to enhance our diversity and inclusion in the Company include:

### LEADERSHIP

Our Diversity Policy Statement applies from the top down and to all Company levels, starting with our Board of Directors for Board diversity and renewal, as well as to employees and contractors

### PROCESS AND POLICIES IN PLACE

To provide a respectful and safe environment that supports equality and diversity, our 'Workplace Harassment and Violence Prevention' Policy is the basis of our 'Respect in the Workplace' training program, which was completed by all employees and contractors in 2020. We also have an Employment Equity Policy, Parental Leave Policy and a confidential and anonymous ethics hotline, ConfidenceLine

### RECRUITMENT AND TALENT ATTRACTION

Canadian Natural offers a safe and inclusive work environment where everyone feels part of a team. All employees have equal access to continuing education and career development opportunities, and we work to develop local talent

### PROGRAMS FOR EMPLOYEE ENGAGEMENT/INVOLVEMENT

Programs include our Gen Next young professional network, E3 (Engage, Educate, Empower) focusing on enhancing and creating opportunities for interaction, collaboration and knowledge sharing, and the Equality, Diversity and Inclusion (EDI) program in our International operations that promotes an inclusive culture based on mutual respect

### PROGRAMS TO PROMOTE FROM WITHIN THE COMPANY

We develop people through internal training and mentorship, which are essential to our culture

Canadian Natural values and respects what makes us unique, and we know that having equality, diversity and inclusion at the heart of our culture fosters value creation. We are all diverse and unique. An inclusive approach strengthens innovation and creativity, and supports a resilient and dynamic company.

## Talent Attraction, Training & Development

Canadian Natural's recruitment process is consistent with our commitment to Human Rights as detailed in our Code of Integrity, Business Ethics, and Conduct. Our recruitment process considers equality, diversity and inclusion.

We believe that when people feel included and connected with their differences being valued, they are enabled to achieve their full potential. When identifying candidates, both employees and contractors, for different roles, we take into account experience, qualifications, expertise, skills and knowledge.

Canadian Natural's Campus Recruitment program is one of the largest in the country. Our program is designed with the students in mind and allows them to be part of the team from day one, gaining experience and knowledge, and receiving training and mentorship under the guidance of skilled staff. Many of our students are hired for permanent positions upon graduation.

At our International operations, we support local employment — for example, at our Côte d'Ivoire operations, 90% of our staff is Ivorian. We also facilitate training programs and work together with communities and the education system to identify and develop local talent.

Once hired, we offer mentorships, apprenticeships, cross-company placements and cooperative student opportunities — all in service of promoting internal talent to fill positions. For example, our Engineer-in-Training (EIT) program provides mentorship with senior engineers and hands-on experience.

## Developing Our People

Much like our approach to safety in our operations, Canadian Natural encourages our employees to regularly upgrade their skills, achieve and maintain their certifications and professionally develop.

For example, we support employees with their professional designations by providing the time and resources to complete their professional development hours that help them meet their designation requirements. Leadership training, conflict resolution training and skills development are also available, with coordination and support provided by our Human Resources team.

### Scholarships Support Local Students

Canadian Natural awarded scholarships to 139 students in 2021, including 19 of Indigenous descent, for a total of \$159,450.



Canadian Natural students participating in a United Way plane pull fundraiser.

## Investing in Communities

As members of the communities where we operate, our teams work together with local stakeholders to understand and prioritize projects that promote quality of life and long-term local economic growth and development — we call this shared value. In this way, we can help local grassroots efforts that get right to the heart of the issues the communities care about.

Our community investment program includes corporate sponsorships and cash donations, in-kind donations, support for employee giving and volunteering (e.g. corporate matching), and funding for community-based economic development projects, including Indigenous programs. Funding priority areas include health and wellness (from hospitals to local sports and recreation), education and training, and social/cultural events.

### Canadian Natural Wins United Way Quantum Leap Award

United Way of Calgary and Area awarded Canadian Natural the Quantum Leap award for achieving significant growth in 2021 over 2020, including an increase in both funds raised and the number of donors.

Employees from across our operations were able to participate in our employee-led campaign virtually in 2021, raising over \$1.6 MM through activities like a virtual fun run and walk, 50/50 draws and direct employee donations — rising above the COVID-19 pandemic challenges and giving back to the communities we live and work in.

These contributions helped over 5,000 local people in the areas of poverty, kids and community in 2021.



United Way Calgary & Area President and CEO, Karen Young (left) and Canadian Natural's United Way volunteers Rebecca Akinde and David Wilms.



**\$30+ MILLION DONATED**

to United Way over 30+ years



**\$1.9 MILLION DONATED**

to United Way through employee giving and corporate matching in 2021



**\$1+ MILLION DONATED**

by employees to charitable organizations in 2021



**977 UNITS OF BLOOD**

donated to Canadian Blood Services, helping to save up to 3,000 lives in 2021

### In-Kind Donations Support Local Communities

In 2021, Canadian Natural donated a variety of important items to the areas around our operations, worth over \$1.2 MM. These donations included a pumpjack for the Rocky Mountain House Museum, tubing joints to local communities for fencing and office furniture for the Horse Lake First Nation. Thank you to all of the employees involved that made these donations possible.



Canadian Natural pumpjack on display at the Rocky Mountain House Museum in Rocky Mountain House.

# Performance Data

The Company's performance data is based on the operational control approach and reflects operations acquired by the Company and new capital projects started during the periods presented in this report. From Q2 2017 onward, North America Exploration and Production (NA E&P) operations include the Peace River Complex, and Oil Sands Mining and Upgrading operations include the Albian mines (bitumen production). From Q2 2019 onward, NA E&P operations include Kirby North, Jackfish and additional primary heavy oil assets. Where adjustments of historical data have occurred, explanatory footnotes are provided.

## PRODUCTION

As part of our efforts to continually improve and provide meaningful data to stakeholders, we have standardized our methodology for reporting intensity metrics to use gross operated production values unless otherwise noted.

Production values are presented here for the purposes of calculating greenhouse gas (GHG) and spill intensities, and represent the Company's gross operated production before royalties. These values are not reflected within our financial reports, which represents the Company's working interest share of production, before royalties.

Gross operated production, before royalties (MMboe)	2017	2018	2019	2020	2021
North America Exploration and Production	262.1	249.7	262.8	285.1	299.0
Oil Sands Mining and Upgrading	117.1	185.2	173.0	180.6	197.7
International Exploration and Production	26.9	26.1	28.2	21.4	16.2
<b>CORPORATE TOTAL</b>	<b>406.1</b>	<b>461.4</b>	<b>464.4</b>	<b>487.1</b>	<b>513.0</b>

## EMPLOYMENT

Number of employees	2017	2018	2019	2020	2021
North America Exploration and Production	4,496	4,395	4,857	4,736	4,603
Oil Sands Mining and Upgrading	5,097	4,948	4,979	4,918	4,807
International Exploration and Production	380	366	344	339	325
<b>CORPORATE TOTAL</b>	<b>9,973</b>	<b>9,709</b>	<b>10,180</b>	<b>9,993</b>	<b>9,735</b>

Exposure hours (millions) — based on a 12-hour shift	2017	2018	2019	2020	2021
North America Exploration and Production	42.18	44.71	42.88	38.10	46.53
Oil Sands Mining and Upgrading	34.05	37.94	38.23	39.55	39.84
International Exploration and Production	3.90	4.98	5.22	3.59	3.15
<b>CORPORATE TOTAL</b>	<b>80.13</b>	<b>87.63</b>	<b>86.33</b>	<b>81.24</b>	<b>89.52</b>

## ECONOMIC CONTRIBUTIONS

Contributions to economies (\$ millions)	2017	2018	2019	2020	2021
Community investment	12	15	25	25	31
Contracts with Indigenous businesses and services	370	500	550	490	572
Payments to suppliers	7,457	8,275	8,090	6,832	6,829

## SAFETY

Recordable injury frequency (TRIF) (employees and contractors) per 200,000 hours worked	2017	2018	2019	2020	2021
North America Exploration and Production	0.38	0.34	0.22	0.20	0.19
Oil Sands Mining and Upgrading	0.38	0.31	0.31	0.22	0.22
International Exploration and Production	1.33	0.72	0.61	0.22	0.57
<b>CORPORATE TOTAL</b>	<b>0.43</b>	<b>0.35</b>	<b>0.28</b>	<b>0.21</b>	<b>0.22</b>

Lost time incident frequency (LTI) <sup>1</sup> (employees and contractors) per 200,000 exposure hours	2017	2018	2019	2020	2021
<b>CORPORATE TOTAL</b>	<b>0.07</b>	<b>0.06</b>	<b>0.04</b>	<b>0.03</b>	<b>0.02</b>

1. LTI is an injury incident where a worker is unable to return to work the next scheduled day.

Fatalities - Employees	2017	2018	2019	2020	2021
North America Exploration and Production	0	0	0	0	0
Oil Sands Mining and Upgrading	0	0	0	0	0
International Exploration and Production	0	0	0	0	0
<b>CORPORATE TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Fatalities - Contractors	2017	2018	2019	2020	2021
North America Exploration and Production	0	0	0	2	0
Oil Sands Mining and Upgrading	0	0	0	0	0
International Exploration and Production	0	0	0	0	2
<b>CORPORATE TOTAL</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>2</b>

Regulatory inspections compliance (% satisfactory) North America Exploration and Production	2017	2018	2019	2020	2021
Alberta	84.2	84.5	83.6	89.1	83.2
British Columbia	86.0	73.0	79.2	82.4	83.1

## PROCESS SAFETY MANAGEMENT (PSM) EVENTS

Corporate Tier 1 and Tier 2 process safety incidents are defined by the American Petroleum Institute Recommended Practice 754 and the International Association of Oil and Gas Producers Report 456 as major releases or losses of primary containment of greater consequence.

PSM events	2017	2018	2019	2020	2021
Operational Process Safety Events (Tier 1 and Tier 2)	148	120	111	84	85

Tier 1 events	2017	2018	2019	2020	2021
North America Exploration and Production	23	32	26	11	15
Oil Sands Mining and Upgrading	4	4	3	1	1
International Exploration and Production	1	1	0	0	0
<b>TIER 1 TOTAL</b>	<b>28</b>	<b>37</b>	<b>29</b>	<b>12</b>	<b>16</b>

Tier 2 events	2017	2018	2019	2020	2021
North America Exploration and Production	113	78	81	70	65
Oil Sands Mining and Upgrading	6	5	1	1	3
International Exploration and Production	1	0	0	1	1
<b>TIER 2 TOTAL</b>	<b>120</b>	<b>83</b>	<b>82</b>	<b>72</b>	<b>69</b>

## GHG EMISSIONS

As part of Canadian Natural's commitment to sustainability reporting, we have engaged an independent third party to provide assurance on the reported GHG emissions. They provided reasonable assurance for reported 2021 Scope 1 (which includes methane emissions) and Scope 2 emissions along with limited assurance for 2021 Scope 3 emissions. The independent assurance report is provided at the end of this report.

The Company's Scope 1 and 2 GHG emissions are reported based on the operational control approach. Scope 3 emissions are reported on a net working interest basis after royalties and self-consumption of natural gas. As we continue to improve our reporting processes, we have updated and standardized our methodology to ensure consistency across business divisions. Specifically, we have improved the accuracy of our calculations for site-specific fuel gas emissions for 2020 and 2021 and standardized the calculation of intensity to use gross operated emissions and gross operated production. These updates have resulted in adjustments to NA E&P emissions for 2020 and emissions intensities for 2017-2020.

The Company's GHG emission estimates are prepared following the GHG Protocol Corporate Accounting and Reporting Standard, Alberta Greenhouse Gas Quantification Methodologies (AQM) for individually regulated projects, Western Climate Initiative Essential Requirements for Mandatory Reporting and internal calculation guidance based on the AQM and supplemented with internal engineering estimates for methane emissions from unmetered sources.

**Scope 1** GHG emissions include direct emissions from combustion, flaring, formation CO<sub>2</sub>, venting and fugitive leaks from equipment. For a breakdown of our GHG emissions by greenhouse gas type (CO<sub>2</sub>, CH<sub>4</sub>, N<sub>2</sub>O, HFC, PFC and SF<sub>6</sub>) please see our CDP Climate Change questionnaire on our website at [www.cnrl.com](http://www.cnrl.com).

**Scope 2** GHG emissions are indirect emissions that occur from the generation of purchased electricity and steam consumed by the company and that physically occur at the facility where electricity and/or steam is generated. Offshore platforms in the UK and offshore Africa do not purchase any electricity, therefore do not have associated Scope 2 emissions.

**Scope 3** GHG emissions are indirect emissions (not included in Scope 2) that occur upstream and downstream of a company's operations. Scope 3 emissions are a function of the demand for energy products and consumer choices on how and when to consume energy. These emissions are indirect and occur outside of our control, therefore the reporting of Scope 3 emissions is less certain.

We have estimated Scope 3 emissions arising from the end use of our sold products (Category 11 in the GHG Protocol) on a net working interest basis after royalties and self-consumption of natural gas, which is the category most material to the Company. The remaining categories of Scope 3 emissions were not included due to lack of reliable third-party data.

Scope 3 emissions are calculated following the GHG Protocol. Additionally, the CDP Technical Note: Guidance methodology for estimation of Scope 3 category 11 emissions for oil and gas companies is used to determine emission factors that are applied to annual volumes of our sold products: crude oil, natural gas and natural gas liquids. Following the Production Method, Higher Tier, emission factors include non-energy use and storage factors to account for a portion of our products that do not emit carbon in their final consumption phase.

Scope 3 emissions should be read with caution as the potential for duplication, inaccuracies and inconsistencies exists when looking at emissions within the overall energy system. For example, when looking at reported emissions from overlapping industries such as oil and gas producers, fuel distribution companies, vehicle manufacturers and vehicle insurance providers, there is a high likelihood of significant duplication as one company's Scope 3 emissions will be another's Scope 1 or 2.



<b>GHG emissions intensity – gross operated (tonnes CO<sub>2</sub>e/BOE)<sup>1</sup></b>					
<b>Scope 1 GHG emissions intensity</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
North America Exploration and Production	0.051	0.052	0.052	0.054	0.051
Oil Sands Mining and Upgrading <sup>2</sup>	0.051	0.040	0.040	0.039	0.036
International Exploration and Production	0.067	0.059	0.051	0.056	0.054
<b>CORPORATE TOTAL</b>	<b>0.052</b>	<b>0.048</b>	<b>0.048</b>	<b>0.049</b>	<b>0.045</b>

- Adjusted to account for standardized calculation methodology to use gross operated emissions and production.
- Combined emissions intensity of Horizon's synthetic crude oil and Albian's bitumen production (as of June 1, 2017).

<b>Scope 1+2 GHG emissions intensity (tonnes CO<sub>2</sub>e/BOE)<sup>1</sup></b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
North America Exploration and Production	0.057	0.058	0.058	0.060	0.056
Oil Sands Mining and Upgrading <sup>2</sup>	0.059	0.049	0.049	0.048	0.045
International Exploration and Production	0.067	0.059	0.051	0.056	0.054
<b>CORPORATE TOTAL</b>	<b>0.058</b>	<b>0.054</b>	<b>0.054</b>	<b>0.056</b>	<b>0.051</b>

- Adjusted to account for standardized calculation methodology to use gross operated emissions and production.
- Combined emissions intensity of Horizon's synthetic crude oil and Albian's bitumen production (as of June 1, 2017).

<b>Scope 1 direct GHG emissions (million tonnes CO<sub>2</sub>e)</b>					
<b>Total</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
North America Exploration and Production	13.30	12.99	13.76	15.53 <sup>1</sup>	15.13
Oil Sands Mining and Upgrading	5.94	7.45	6.91	7.09	7.14
International Exploration and Production	1.79	1.53	1.45	1.19	0.88
<b>CORPORATE TOTAL</b>	<b>21.03</b>	<b>21.97</b>	<b>22.12</b>	<b>23.81</b>	<b>23.15</b>

- Adjusted to account for standardized calculation methodology.

<b>GHG emissions from fuel consumption (million tonnes CO<sub>2</sub>e)</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
North America Exploration and Production	9.43	9.40	10.48	12.69 <sup>1</sup>	12.95
Oil Sands Mining and Upgrading	3.38	4.35	4.21	4.39	4.43
International Exploration and Production	1.04	1.03	0.93	0.81	0.66
<b>CORPORATE TOTAL</b>	<b>13.85</b>	<b>14.78</b>	<b>15.62</b>	<b>17.89</b>	<b>18.04</b>

- Adjusted to account for standardized calculation methodology.

<b>Methane emissions (million tonnes CO<sub>2</sub>e)</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
North America Exploration and Production	4.38	4.11	3.89	2.92 <sup>1</sup>	2.55

- Adjusted to account for standardized calculation methodology.

<b>Volume natural gas flared (10<sup>3</sup>m<sup>3</sup>)</b>	<b>2017</b>	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>
North America Exploration and Production	100,504	96,209	97,742	110,067 <sup>1,2</sup>	131,323 <sup>3</sup>
Oil Sands Mining and Upgrading <sup>4</sup>	24,536	20,422	14,357	19,319	20,032
International Exploration and Production	292,458	195,233	210,702	152,935	86,605
<b>CORPORATE TOTAL</b>	<b>417,498</b>	<b>311,864</b>	<b>322,801</b>	<b>282,321</b>	<b>238,160</b>

- Regulatory change in flare gas definition - fuel gas volumes that are used to assist the flare operation are reported as flared volumes as of January 1, 2020.
- Adjusted to account for standardized calculation methodology.
- Flared gas volume increase is primarily due to shut-downs, start-ups and acquisition activities.
- Flaring at Oil Sands Mining and Upgrading operations is associated with turnaround activity.

Volume natural gas vented (10 <sup>3</sup> m <sup>3</sup> )	2017	2018	2019	2020	2021
North America Exploration and Production	109,093	102,467	98,760	100,253	88,674

Scope 2 indirect GHG emissions					
North America Exploration and Production	2017	2018	2019	2020	2021
Electricity consumption (TWh)	2.63	2.79	2.85	2.90	2.87
Electricity consumption (TWh) from renewable sources	0.19	0.21	0.18	0.18	0.18
<b>Scope 2 GHG emissions (million tonnes CO<sub>2</sub>e)</b>	<b>1.69</b>	<b>1.47</b>	<b>1.54</b>	<b>1.58</b>	<b>1.54</b>

Oil Sands Mining and Upgrading <sup>1</sup>	2017	2018	2019	2020	2021
Electricity consumption (TWh)	1.07	1.86	1.65	1.88	1.95
Electricity indirect GHG emissions	0.30	0.46	0.36	0.49	0.57
Steam imports (PJ)	11.06	19.02	18.47	17.71	18.25
Steam indirect GHG emissions	0.70	1.20	1.19	1.15	1.15
<b>Scope 2 GHG emissions (million tonnes CO<sub>2</sub>e)</b>	<b>1.00</b>	<b>1.66</b>	<b>1.55</b>	<b>1.64</b>	<b>1.72</b>

1. Includes Albion's electricity and steam from third-party cogeneration plant.

Scope 2 indirect GHG emissions (million tonnes CO <sub>2</sub> e)					
CORPORATE TOTAL	2.69	3.13	3.09	3.22	3.26

Scope 3 indirect GHG emissions (million tonnes CO <sub>2</sub> e)	2017	2018	2019	2020	2021
Emissions arising from the end use of sold products <sup>1</sup>	Not reported	Not reported	Not reported	Not reported	132

1. Calculation based on net working interest production less royalties and self-consumption of natural gas. Emission factors from derived from American Petroleum Institute, International Energy Agency and United Nations Framework Convention on Climate Change and assume a portion of sold products are used in a non-energy application in final consumption.

## AIR EMISSIONS

NO <sub>x</sub> emissions (tonnes)	2017	2018	2019	2020	2021
North America Exploration and Production	54,086	55,310	49,191	47,507	53,191 <sup>1</sup>
Oil Sands Mining and Upgrading	12,189	15,141	15,866	15,979	15,197
International Exploration and Production	2,118	1,663	1,576	1,473	1,274
<b>CORPORATE TOTAL</b>	<b>68,393</b>	<b>72,114</b>	<b>66,633</b>	<b>64,959</b>	<b>69,662</b>

1. Emissions increased compared to 2020 due to increased production.

SO <sub>x</sub> emissions (tonnes)	2017	2018	2019	2020	2021
North America Exploration and Production	6,639	6,863	9,364 <sup>1</sup>	12,851	11,400
Oil Sands Mining and Upgrading	2,419	2,693	2,737	2,395	2,514
International Exploration and Production <sup>2</sup>	149	105	179	180	150
<b>CORPORATE TOTAL</b>	<b>9,207</b>	<b>9,661</b>	<b>12,280</b>	<b>15,426</b>	<b>14,064</b>

1. Emissions increased compared to 2018 due to acquisitions.

2. UK only.

## LAND

Abandonment and reclamation projects					
North America Exploration and Production (area-based closure)	2017	2018	2019	2020	2021
Number of active operated wells	53,013	52,643	49,986	48,093	46,454
Number of inactive operated wells <sup>1</sup>	23,292	23,638	28,946	30,188	29,323
Number of wells abandoned	771	1,293	2,035	1,065	3,079
Number of pipelines abandoned <sup>2</sup>	728	1,149	1,086	866	2,245
Number of reclamation certificates submitted	604	1,012	912	1,050	898
Number of reclamation certificates received	596	717	893	854	889
Hectares reclaimed (area reclamation certified)	1,273	1,383	2,160	2,065	1,644
Trees/seedlings planted	301,410	144,417	394,773	503,345	974,917

1. Based on Alberta Energy Regulator definition for inactive well sites.
2. Adjusted due to amended methodology for the accounting of line segment abandonment and discontinuation.

Oil Sands Mining and Upgrading	2017	2018	2019	2020	2021
Hectares reclaimed	769 <sup>1</sup>	176	276	352	72 <sup>2</sup>
Trees/seedlings planted	353,790	582,144	571,193	874,214	506,265

1. Includes Albian's cumulative total, reflecting a consistent and integrated approach across oil sands mining and upgrading operations.
2. Total hectares reclaimed in 2021 was less than 2020 due to availability of areas for reclamation.

Facility decommissioning					
North America Exploration and Production	2017	2018	2019	2020	2021
Number of facilities and well equipment removed <sup>1</sup>	58	84	287	502	661
Number of site remediation projects completed and ready for reclamation	4	53	20 <sup>2</sup>	28 <sup>2</sup>	26
Number of ongoing remediation projects	217	348	351	387	406

1. 2017-2018 figures represent facilities removed only. Starting 2019, we include facilities and well equipment removed.
2. Adjusted to standardized methodology.

## SPILLS

Reportable spills are reported to regulatory agencies, according to jurisdictional requirements, including oil, produced water and refined products.

Spills and leaks					
Number of reportable spills	2017	2018	2019	2020	2021
North America Exploration and Production <sup>1</sup>	257	280	265	172	201
Oil Sands Mining and Upgrading	102	128	93	86	87
International Exploration and Production	10	11	2	6	2
<b>CORPORATE TOTAL</b>	<b>382</b>	<b>420</b>	<b>371</b>	<b>306</b>	<b>312</b>

1. Adjusted to exclude fresh water.

Volume spilled (m <sup>3</sup> )	2017	2018	2019	2020	2021
North America Exploration and Production	2,122	1,572	1,824	1,074	1,939 <sup>1</sup>
Oil Sands Mining and Upgrading <sup>2</sup>	9,239	20,613	8,100	8,458	9,694
International Exploration and Production	1.29	1.04	0.02	0.72	0.56
<b>CORPORATE TOTAL</b>	<b>11,362</b>	<b>22,186</b>	<b>9,924</b>	<b>9,533</b>	<b>11,634</b>

1. Increase due to a single produced water event at a pipeline. All fluids were recovered.
2. Majority of spills are from tailings lines (low risk spills, consisting of water, sand, silt and trace oil). All spills were contained on lease. 2018 spill volumes were from Horizon's Bitumen Production area pump box that was modified to reduce spills.

Number of spills/production (MMboe) <sup>1</sup>	2017	2018	2019	2020	2021
North America Exploration and Production	1.13	1.12	1.01	0.60	0.67
Oil Sands Mining and Upgrading	0.87	0.69	0.54	0.48	0.44
International Exploration and Production	0.37	0.42	0.07	0.28	0.12
<b>CORPORATE TOTAL</b>	<b>0.91</b>	<b>0.91</b>	<b>0.78</b>	<b>0.54</b>	<b>0.57</b>

1. 2017-2020 values adjusted to account for standardized calculation methodology to use gross operated production and exclude fresh water.

Volume spilled or leaked/production (m3/MMboe) <sup>1</sup>	2017	2018	2019	2020	2021
North America Exploration and Production	8.1	6.3	6.9	3.8	6.5
Oil Sands Mining and Upgrading	78.9	111.3	46.8	46.8	49.0
International Exploration and Production	0.05	0.04	0.00	0.03	0.03
<b>CORPORATE TOTAL</b>	<b>28.0</b>	<b>48.1</b>	<b>21.4</b>	<b>19.6</b>	<b>22.7</b>

1. 2017-2020 values adjusted to account for standardized calculation methodology to use gross operated production.

Number of leaks/1,000 km pipeline	2017	2018	2019	2020	2021
North America Exploration and Production	1.49	1.25	1.20	1.23	1.17

## WATER

Source water for oil and natural gas operations in Western Canada typically involves a combination of recycled produced water, saline and non-saline (fresh) water. Saline water is defined in Alberta as having greater than 4,000 mg/L total dissolved solids (TDS) and is not suitable for drinking or agricultural use without treatment. Fresh water has less than 4,000 mg/L total TDS concentration.

Fresh water resources are effectively managed by provincial regulators to ensure there are no significant regional effects on water. Canadian crude oil and natural gas are produced under some of the highest standards in the world, including strict water use regulations for fresh water withdrawals, wastewater disposal and hydraulic fracturing.

Water that is returned to the environment is tested to ensure the required water quality objectives are met prior to release, complying with relevant provincial and federal regulations pertaining to the disposal and release of water and surface water run-off. These regulations are designed to protect receiving waters. For the purposes of this report, water discharge refers to water that is returned to the surface environment and deep underground disposal is reported separately.

North America Exploration and Production					
Water withdrawal (million m <sup>3</sup> )	2017	2018	2019	2020	2021
Fresh surface water <sup>1</sup>	3.5	4.3	3.6	2.6	4.1 <sup>2</sup>
Fresh groundwater	4.6	6.8	6.5	6.5	7.3
Saline groundwater <sup>3</sup>	7.0	8.9	6.9	5.3	5.2
Produced water <sup>4</sup> and flowback <sup>5</sup> generated	46.9	48.1	58.5	66.6	73.7

1. All fresh water withdrawn for our NA E&P operations is consumed and therefore not returned to the environment.
2. Increase in fresh surface water withdrawal due to increased boiler feed water demand at Peace River Complex and increased drilling and completions activities.
3. Includes thermal in situ projects (Kirby, Primrose and Wolf Lake and Jackfish) and conventional water flood projects (Pelican, Brintnell, Pierson and various Saskatchewan).
4. All produced water in NA E&P is either recycled or disposed.
5. Flowback is the recovered hydraulic fracturing fluid that returns to the surface during a hydraulic fracturing operation.

North America Exploration and Production					
Water recycling	2017	2018	2019	2020	2021
Produced water recycled <sup>1</sup> (million m <sup>3</sup> )	38.8	39.7	48.6	58.6	62.3
Produced water recycled (%)	82 <sup>2</sup>	82 <sup>2</sup>	83	88	85

1. Includes thermal in situ projects (Kirby, Primrose and Wolf Lake, Peace River Complex, Jackfish, Senlac and North Tangleflags) and the following conventional projects, Pelican, Brintnell, Nipisi, Wembley, Sweeny, Pierson, Cliffdale and Septimus.
2. Adjusted for rounding.

North America Exploration and Production					
Water disposal	2017	2018	2019	2020	2021
Produced water deep disposal <sup>1</sup> (million m <sup>3</sup> )	8.4	8.5	10.0	8.4	11.4
Produced water deep disposal (%)	18	18	17	12 <sup>2</sup>	15

1. Includes thermal in situ projects (Kirby, Primrose and Wolf Lake, Peace River Complex, Jackfish, Senlac and North Tangleflags) and the following conventional projects, Pelican, Brintnell, Nipisi, Wembley, Sweeny, Pierson, Cliffdale and Septimus.
2. Adjusted for rounding.

Oil Sands Mining and Upgrading					
Water withdrawal (million m <sup>3</sup> )	2017	2018	2019	2020	2021
Fresh surface water <sup>1</sup>	66.2	68.7	59.4	79.4	59.6
Fresh groundwater	5.5	7.4	6.4	6.7	8.2
Saline groundwater <sup>2</sup>	0.3	0.6	0.4	0.4	0.3

1. Includes water withdrawal from the Athabasca River and all other surface water sources for Horizon and Albion, as well as runoff water. Fresh water withdrawals remain well below authorized withdrawal limits.
2. Includes water used in Albion's production process and Horizon's saline water from depressurization in the mine that is not used in our production process.

Oil Sands Mining and Upgrading					
Water recycling	2017	2018	2019	2020	2021
Water recycled (million m <sup>3</sup> ) <sup>1</sup>	210	231	239	237	250
Water recycled (%)	79	81	85	84	86

1. Volumes of water recycled are greater than water withdrawn because water is used more than once through the process.

Oil Sands Mining and Upgrading					
Water discharge <sup>1</sup>	2017	2018	2019	2020	2021
Water discharge (million m <sup>3</sup> )	1.4	2.6	6.7	10.6	10.3
Water discharge (%)	2	3	10	12	15

1. Includes industrial runoff directed to settling ponds.

Oil Sands Mining and Upgrading					
Water consumption (million m <sup>3</sup> )	2017	2018	2019	2020	2021
Fresh water consumption	70.3	73.6	59.1	75.5	57.5

International Exploration and Production					
Water discharge (million m <sup>3</sup> )	2017	2018	2019	2020	2021
North Sea	19	15	18	19	16
Offshore Africa	1.6	1.8	1.6	1.6	1.2

International Exploration and Production					
Water consumption (million m <sup>3</sup> )	2017	2018	2019	2020	2021
Total water consumption <sup>1</sup>	16.4	16.8	23.7	22.4	18.1

1. Sea water injection (lifted and treated sea water injected downhole to improve production of the fields).

International Exploration and Production					
Oil in water content (mg/l)	2017	2018	2019	2020	2021
North Sea <sup>1</sup>	16.7	16.4	16.6	18.5	17.0
Offshore Africa	11.0	11.7	19.5	13.9	16.9

1. Oil in water content remains well below regulatory requirement of <30 mg/l.

## WASTE MANAGEMENT

Canadian Natural manages waste in accordance with jurisdictional regulations, directives and best practices. We minimize, reduce, and monitor site-generated waste using technology and optimizing processes, including recycling, re-use and recovery whenever possible.

Waste information focuses on oilfield waste, including fluid and solid waste based on a conversion of all volumes to tonnes. Waste quantities fluctuates year to year with production levels, drilling, reclamation and turnaround activities. Hazardous waste includes streams such as tank clean out fluids and sludge, workover fluids, filter media and other substances. Non-hazardous waste includes hydrocarbon and salt impacted soils, spent lubricating oil, drilling waste and produced sand.

Waste sent to recycling facilities includes empty containers, lube oil, batteries, filters, tires, scrap metal and other miscellaneous recyclables.

Weight of waste (thousand tonnes)					
North America Exploration and Production	2017	2018	2019	2020	2021
Hazardous waste (off-site disposal, third-party)	55	78	81	79	120 <sup>1</sup>
Non-hazardous waste disposal <sup>2</sup>	1,403	1,378	1,233	943	1,243 <sup>1</sup>
On-site disposal (owned) <sup>2</sup>	680	506	592	509	645
Off-site disposal (third-party)	723	872	642	433	600

1. Increased operational activity levels and the completion of three turnaround periods at thermal operations contributed to higher levels of waste disposal.
2. 2017-2020 values adjusted due to reclassification of non-hazardous waste materials.

Oil Sands Mining and Upgrading (thousand tonnes)	2017	2018	2019	2020	2021
Hazardous waste (off-site disposal, third-party)	0.15	0.49	0.31	0.24	0.17
Hazardous waste recycled <sup>1</sup>	6	8	0.32	0.27	0.45
Non-hazardous waste disposal	14	18	16	20	19
Off-site disposal (owned)	13	13	15	19	17
Off-site disposal (third-party)	1	4	0.44 <sup>2</sup>	1	1
Non-hazardous waste recycled	22	40	39	36	26

1. Hazardous waste recycled in Oil Sands Mining and Upgrading operations decreased due to a reclassification of used lube oil in 2019.
2. Non-hazardous waste off-site disposal in Oil Sands Mining and Upgrading decreased, with majority of waste being recycled.

International Exploration and Production <sup>1</sup> (thousand tonnes)	2017	2018	2019	2020	2021
Hazardous waste disposal	0.09	0.17	0.05	0.04	0.41
Hazardous waste recycled	0.03	0.04	0.07	0.11	0.07
Non-hazardous waste disposal	0.44	0.30	0.11	0.07	0.01
Scrap metal recycled <sup>2</sup>	16	15	0.42	0.27	11.57
Other non-hazardous waste recycled	0.67	0.37	0.53	0.39	0.32

1. All international operations waste is disposed of or treated at third-party facilities. Ninian South has a dedicated drill cuttings re-injection well, therefore no drilling waste is sent to shore.
2. Includes Murchison decommissioning project in 2017, Murchison and Ninian North decommissioning projects in 2018, Ninian North topsides decommissioning onshore in 2021.

Corporate totals (thousand tonnes)	2017	2018	2019	2020	2021
Hazardous waste disposal	55	79	81	79	121
Hazardous waste recycled	6	8	0.4	0.4	0.5
Non-hazardous waste disposal	1,417	1,396	1,249	963	1,262
Non-hazardous waste recycled	39	56	40	36	38



**Independent practitioner’s reasonable and limited assurance report on Canadian Natural Resources Limited’s selected performance indicators for the year ended December 31, 2021.**

**To the Directors of Canadian Natural Resources Limited (the Company).**

We have undertaken a reasonable assurance engagement over the following performance indicators (the reasonable assurance subject matter) as presented in the Company’s 2021 Stewardship Report to Stakeholders (the 2021 sustainability report), hosted on the Company’s website<sup>1</sup>, for the year ended December 31, 2021.

Level of Assurance	#	Performance Indicator	2021 Value	Units
Reasonable	1	Scope 1 (Direct) Emissions - North America Exploration and Production	15.13	million tonnes CO <sub>2</sub> e
	2	Scope 1 (Direct) Emissions - Oil Sands Mining and Upgrading	7.14	million tonnes CO <sub>2</sub> e
	3	Scope 1 (Direct) Emissions - International Exploration and Production	0.88	million tonnes CO <sub>2</sub> e
	4	Scope 2 (Indirect Emissions) - North America Exploration and Production	1.54	million tonnes CO <sub>2</sub> e
	5	Scope 2 (Indirect Emissions) - Oil Sands Mining and Upgrading	1.72	million tonnes CO <sub>2</sub> e

We have also undertaken a limited assurance engagement over the following performance indicator (the limited assurance subject matter) as presented in the 2021 sustainability report, for the year ended December 31, 2021.

<sup>1</sup> The maintenance and integrity of the Company’s website is the responsibility of the Company; the work carried out by PricewaterhouseCoopers LLP does not involve consideration of these matters and, accordingly, PricewaterhouseCoopers LLP accepts no responsibility for any changes that may have occurred to the reported information or criteria since they were posted on the website.



Level of Assurance	#	Performance Indicator	2021 Value	Units
Limited	6	Scope 3 (indirect) GHG Emissions - Emissions arising from the end use of sold products (Category 11)	132	million tonnes CO <sub>2</sub> e

### Management's responsibility

Management is responsible for the preparation of the reasonable assurance subject matter and limited assurance subject matter in accordance with the GHG Protocol Corporate Accounting and Reporting Standard, and the corporate boundaries and policies as outlined in the 2021 sustainability report (together, the applicable criteria).

Management is also responsible for such internal control as management determines necessary to enable the preparation of the reasonable assurance subject matter that is free from material misstatement, whether due to fraud or error.

### Our responsibility for Reasonable Assurance

Our responsibility is to express a reasonable assurance opinion on the reasonable assurance subject matter based on the evidence we have obtained. We conducted our reasonable assurance engagement in accordance with the Canadian Standard on Assurance Engagements (CSAE) 3410, *Assurance Engagements on Greenhouse Gas Statements*.

This standard requires that we plan and perform this engagement to obtain reasonable assurance about whether the reasonable assurance subject matter is free from material misstatement.

Reasonable assurance is a high level of assurance, but is not a guarantee that an engagement conducted in accordance with this standard will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of users of our report. The nature, timing and extent of procedures selected depends on our professional judgment, including an assessment of the risks of material misstatement, whether due to fraud or error, and involves obtaining evidence about the preparation of the reasonable assurance subject matter in accordance with the applicable criteria. A reasonable assurance engagement also includes:

- Making enquiries of management to obtain an understanding of the overall governance and internal control environment, risk management processes relevant to the data metrics in the reasonable assurance subject matter;
- Evaluating the appropriateness of quantification methodology and reporting policies used, and the reasonableness of estimates made by the Company;
- Analytical reviews and trend analysis of the reasonable assurance subject matter;
- Recalculation of the scope 1 and scope 2 reported emissions;





- Sample testing the underlying source data to supportive evidence; and
- Evaluating the overall presentation of the reasonable assurance subject matter and limited assurance subject matter included in their performance table.

We believe the evidence we obtained is sufficient and appropriate to provide a basis for our reasonable assurance opinion.

#### **Our responsibility for Limited Assurance**

Our responsibility is to express a limited assurance conclusion on the limited assurance subject matter's based on the evidence we have obtained. We conducted our limited assurance engagement in accordance with CSAE 3410, *Assurance Engagements on Greenhouse Gas Statements*. This standard requires that we plan and perform this engagement to obtain limited assurance about whether the limited assurance subject matter is free from material misstatement.

A limited assurance engagement involves performing procedures (primarily consisting of making inquiries of management and others within the entity, as appropriate, and applying analytical procedures) and evaluating the evidence obtained. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the decisions of users of our report. The procedures are selected based on our professional judgment, which includes identifying areas where the risks of material misstatement, whether due to fraud or error, in preparing the limited assurance subject matter in accordance with the applicable criteria are likely to arise.

Our limited assurance procedures included, but were not limited to the following:

- Enquiries of management to obtain an understanding of the overall governance and internal control environment, risk management processes relevant to the data metrics in the limited assurance subject matter;
- Analytical reviews and trend analysis of the reported limited assurance subject matter;
- Reconciled underlying data to reported data and performed limited sample testing of the underlying data referenced in the limited assurance subject matter.

The procedures performed in a limited assurance engagement vary in nature and timing from, and are less in extent than for, a reasonable assurance engagement and, consequently, the level of assurance obtained is substantially lower than the assurance that would have been obtained had a reasonable assurance engagement been performed.

#### **Inherent uncertainty**

Non-financial data is subject to more inherent limitations than financial data, given both the nature and the methods used for the determining, calculating, sampling or estimating such data. Qualitative interpretations of relevance, materiality and the accuracy of data are subject to individual assumptions and judgments. Greenhouse gas quantification is subject to inherent uncertainty because of incomplete scientific knowledge used to determine emissions factors and the values needed to combine emissions of different gases.

**Our independence and quality control**

We have complied with the relevant rules of professional conduct/code of ethics applicable to the practice of public accounting and related to assurance engagements, issued by various professional accounting bodies, which are founded on fundamental principles of integrity, objectivity, professional competence and due care, confidentiality and professional behaviour.

The firm applies Canadian Standard on Quality Control 1, *Quality Control for Firms that Perform Audits and Reviews of Financial Statements, and Other Assurance Engagements*, and, accordingly, maintains a comprehensive system of quality control, including documented policies and procedures regarding compliance with ethical requirements, professional standards and applicable legal and regulatory requirements.

**Opinion - Reasonable Assurance**

In our opinion, the reasonable assurance subject matter for the year ended December 31, 2021 is prepared, in all material respects, in accordance with the applicable criteria.

**Conclusion - Limited Assurance**

Based on the procedures we have performed and the evidence we have obtained, nothing has come to our attention that causes us to believe that the limited assurance subject matter for the year ended December 31, 2021 is not prepared, in all material respects, in accordance with the applicable criteria.

**Purpose of statement and restriction on use of our report**

The selected information has been prepared in accordance with the applicable criteria to assist the Company's management to report to the Board of Directors on the performance indicators. As a result, the reasonable assurance subject matter and limited assurance subject matter may not be suitable for another purpose. Our report is intended solely for the Company. We neither assume nor accept any responsibility or liability to any third party in respect of this assurance report.

*PricewaterhouseCoopers LLP*

**Chartered Professional Accountants**

Vancouver, British Columbia  
August 3, 2022

# Forward Looking Statements

Certain statements relating to Canadian Natural Resources Limited (the “Company”) in this document or documents incorporated herein by reference constitute forward-looking statements or information (collectively referred to herein as “forward-looking statements”) within the meaning of applicable securities legislation. Forward-looking statements can be identified by the words “believe”, “anticipate”, “expect”, “plan”, “estimate”, “target”, “continue”, “could”, “intend”, “may”, “potential”, “predict”, “should”, “will”, “objective”, “project”, “forecast”, “goal”, “guidance”, “outlook”, “effort”, “seeks”, “schedule”, “proposed”, “aspiration” or expressions of a similar nature suggesting future outcome or statements regarding an outlook. Disclosure related to expected future commodity pricing, forecast or anticipated production volumes, royalties, production expenses, capital expenditures, income tax expenses and other targets provided throughout this Management’s Discussion and Analysis (“MD&A”) of the financial condition and results of operations of the Company, constitute forward-looking statements. Disclosure of plans relating to and expected results of existing and future developments, including, without limitation, those in relation to: the Company’s assets at Horizon, AOSP, the Primrose thermal oil projects, the Pelican Lake water and polymer flood projects, the Kirby Thermal Oil Sands Project, the Jackfish Thermal Oil Sands Project and the North West Redwater bitumen upgrader and refinery; construction by third parties of new, or expansion of existing, pipeline capacity or other means of transportation of bitumen, crude oil, natural gas, NGLs or SCO that the Company may be reliant upon to transport its products to market, the development and deployment of technology and technological innovations; the financial capacity of the Company to complete its growth projects and responsibly and sustainably grow in the long-term; and the “Outlook” section of this MD&A, particularly in reference to the 2022 targets provided with respect to budgeted capital expenditures, and the timing and impact of the Oil Sands Pathways to Net Zero (“Pathways”) initiative, government support for Pathways and the ability to achieve net zero emissions from oil production, also constitute forward-looking statements. These forward-looking statements are based on annual budgets and multi-year forecasts, and are reviewed and revised throughout the year as necessary in the context of targeted financial ratios, project returns, product pricing expectations and balance in project risk and time horizons. These statements are not guarantees of future performance and are subject to certain risks. The reader should not place undue reliance on these forward-looking statements as there can be no assurances that the plans, initiatives or expectations upon which they are based will occur.

In addition, statements relating to “reserves” are deemed to be forward-looking statements as they involve the implied assessment based on certain estimates and assumptions that the reserves described can be profitably produced in the future. There are numerous uncertainties inherent in estimating quantities of proved and proved plus probable crude oil, natural gas and NGLs reserves and in projecting future rates of production and the timing of development expenditures. The total amount or timing of actual future production may vary significantly from reserves and production estimates.

The forward-looking statements are based on current expectations, estimates and projections about the Company and the industry in which the Company operates, which speak only as of the earlier of the date such statements were made or as of the date of the report or document in which they are contained, and are subject to known and unknown risks and uncertainties that could cause the actual results, performance or achievements of the Company to be materially different from any future results, performance or achievements expressed or implied by such forward-looking statements. Such risks and uncertainties include, among others: general economic and business conditions (including as a result of effects of the novel coronavirus (“COVID-19”) pandemic and the actions of OPEC+) which may impact, among other things, demand and supply for and market prices of the Company’s products, and the availability and cost of resources required by the Company’s operations; volatility of and assumptions regarding crude oil and natural gas and NGLs prices including due to actions of OPEC+ taken in response to COVID-19 or otherwise; fluctuations in currency and interest rates; assumptions on which the Company’s current targets are based; economic conditions in the countries and regions in which the Company conducts business; political uncertainty, including actions of or against terrorists, insurgent groups or other conflict including conflict between states; industry capacity; ability of the Company to implement its business strategy, including exploration and development activities; impact of competition; the Company’s defense of lawsuits; availability and cost of seismic, drilling and other equipment; ability of the Company and its subsidiaries to complete capital programs; the Company’s and its subsidiaries’ ability to secure adequate transportation for its products; unexpected disruptions or delays in the mining, extracting or upgrading of the Company’s bitumen products; potential delays or changes in plans with respect to exploration or development projects or capital expenditures; ability of the Company to attract the necessary labour required to build, maintain, and operate its thermal and oil sands mining projects; operating hazards and other difficulties inherent in the exploration for and production and sale of crude oil and natural gas and in mining, extracting or upgrading the Company’s bitumen products; availability and cost of financing; the Company’s and its subsidiaries’ success of exploration and development activities and its ability to replace and expand crude oil and natural gas reserves; the Company’s ability to meet its targeted production levels; timing and success of integrating the business and operations of acquired companies and assets; production levels; imprecision of reserves estimates and estimates of recoverable quantities of crude oil, natural gas and NGLs not currently classified as proved; actions by governmental authorities (including any production curtailments mandated by the Government of Alberta); government regulations and the expenditures required to comply with them (especially safety and environmental laws and regulations and the impact of climate change initiatives on capital expenditures and production expenses); asset retirement obligations; the sufficiency of the Company’s liquidity to support its growth strategy and to sustain its operations in the short, medium, and Canadian Natural 2021 Annual Report 12 long-term; the strength of the Company’s balance sheet; the flexibility of the Company’s capital structure; the adequacy of the Company’s provision for taxes; and other circumstances affecting revenues and expenses.

The Company’s operations have been, and in the future may be, affected by political developments and by national, federal, provincial, state and local laws and regulations such as restrictions on production, changes in taxes, royalties and other amounts payable to governments or governmental agencies, price or gathering rate controls and environmental protection regulations. Should one or more of these risks or uncertainties materialize, or should any of the Company’s assumptions prove incorrect, actual results may vary in material respects from those projected in the forward-looking statements. The impact of any one factor on a particular forward-looking statement is not determinable with certainty as such factors are dependent upon other factors, and the Company’s course of action would depend upon its assessment of the future considering all information then available.

Readers are cautioned that the foregoing list of factors is not exhaustive. Unpredictable or unknown factors not discussed in this MD&A could also have adverse effects on forward-looking statements. Although the Company believes that the expectations conveyed by the forward-looking statements are reasonable based on information available to it on the date such forward-looking statements are made, no assurances can be given as to future results, levels of activity and achievements. All subsequent forward-looking statements, whether written or oral, attributable to the Company or persons acting on its behalf are expressly qualified in their entirety by these cautionary statements. Except as required by applicable law, the Company assumes no obligation to update forward-looking statements in this MD&A, whether as a result of new information, future events or other factors, or the foregoing factors affecting this information, should circumstances or the Company’s estimates or opinions change.

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Our 2021 Stewardship Report to Stakeholders aligns with recommendations from the Financial Stability Board Task Force on Climate-Related Financial Disclosures (TCFD) and the Sustainability Accounting Standards Board (SASB). The Report includes consolidated ESG and economic disclosures from the Global Reporting Initiative (GRI) Sustainability Reporting Standards and the Oil and Gas Sector Supplement. Our activities also contribute towards the United Nations Sustainable Development Goals (SDGs). Our disclosures and sustainability content are summarized in the [TCFD disclosures index](#) and [GRI, SASB and SDG disclosures index](#) as well as the [Corporate Responsibility](#) section of our website.

We welcome your comments and suggestions on this report.

Canadian Natural produces a separate Annual Report, which is also available online.



**Canadian Natural**

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