The Canadian Association of Petroleum Producers’ (CAPP) Responsible Canadian Energy Program is an opportunity for industry to demonstrate environmental and social progress and to be candid about challenges and opportunities. It represents a unified approach by CAPP’s membership, focusing efforts on continual industry improvement and achievement of the high standards of performance that our members and stakeholders expect of our industry.

The 2014 Responsible Canadian Energy progress report articulates industry’s contribution to Canada’s economic prosperity in Section I, and performance in four areas—people, air, water and land—covering key environmental and social metrics, in Section II. The analysis in this report is based on 2013 data collected from all of CAPP’s more than 70 upstream oil and gas producing member companies with Canadian operations. Wherever possible, the latest contextual information has been included to explain performance trends.

Additional data sources for this report include federal and provincial governments and regulators. CAPP has taken this approach to provide as complete a picture of industry contribution and performance as possible. These sources are clearly identified throughout the report.

This summary report provides performance information from a national perspective, combining Western Canada (conventional oil and gas operations), oil sands and Atlantic Canada offshore. For more detailed information on industry performance by issue and industry segment and region, visit www.capp.ca/rce. A supplemental report for Atlantic offshore will be published to this site in early 2015.
ABOUT THE RESPONSIBLE CANADIAN ENERGY PROGRAM

The RCE Program formerly had its own Vision, Mission and Objectives. In the course of reviewing and revising CAPP’s Vision and Mission in 2014, it was decided to directly align the Vision and Mission for the RCE Program with the overarching Vision, Mission and Objectives of CAPP. This enables a clear line of sight between the RCE Program and the broader strategic objectives for CAPP, as endorsed by its members. The program remains a vehicle for providing industry with performance tools, such as operating practices and guidelines, and for communicating performance and industry contribution information.

Vision Statement
CAPP’s Vision is to enhance Canada’s prosperity by enabling responsible growth of Canada’s upstream oil and gas industry.

Mission Statement
CAPP’s Mission, on behalf of the Canadian upstream oil and gas industry, is to advocate for and enable economic competitiveness and safe, environmentally and socially responsible performance.

This means achieving the following outcomes for our industry:

- **Competitiveness**, in North America and globally, so as to attract the capital necessary to grow production and expand markets and to deliver value to the Canadian public and to our investors; and
- **Public confidence** from governments, Aboriginal peoples, the public, stakeholders and the communities in which we operate, which will be determined by:
  - Our collective performance, as measured by continual improvement and comparison to world-class benchmarks; and
  - The effectiveness of our communications and outreach.

CASE STUDIES
Throughout this report, we feature case studies to illustrate the types of projects, technologies and innovation that are driving industry performance forward. These represent some of the 34 project nominations for this year’s CAPP Responsible Canadian Energy Awards. The case studies represent industry-leading practices. Members look to their peers for learnings on how to apply these leading practices to their own operations.

Visit [www.capp.ca](http://www.capp.ca) to download a copy of the 2014 Responsible Canadian Energy Awards booklet.

Photograph: Courtesy Statoil; Helge Hansen
ABOUT THE RESPONSIBLE CANADIAN ENERGY PROGRAM

RCE PROGRAM ECONOMIC PROSPERITY INDICATORS
Contributing to a balanced overall perspective on the upstream oil and gas industry, CAPP has included a section on Economic Prosperity. This section provides an overview of the industry’s contribution to economic prosperity and is intended to be complementary to the section of the report on performance which follows.

RCE PROGRAM PERFORMANCE OBJECTIVES
With feedback from members, CAPP revised and streamlined its performance objectives in 2014 to better align with industry direction and evolving stakeholder expectations.

The three stated objectives for the RCE Program are:

1. **Social**: CAPP members will continually improve industry’s social performance.
2. **Health and Safety**: CAPP members will continually improve operational safety.
3. **Environment**: CAPP members will continually improve environmental performance.

The annual RCE progress report remains an integral vehicle for communicating with our stakeholders the impact that our industry has on Canadians and the economy, and our social, health and safety and environmental performance. To this end, the report has been reformatted into two clear sections:

I. **Economic prosperity**;
II. **Responsible development**.
GOVERNANCE

Governance of the RCE Program evolved in 2014 with the creation of an RCE committee of the CAPP Board of Governors. This committee champions and provides guidance to the direction of the program. CAPP’s President and CEO has ultimate responsibility for the program. Operational oversight of the program remains with the Policy and Performance group and is overseen on a daily basis by the Manager, Corporate Responsibility.

CAPP continues to rely on the independent RCE Advisory Group to provide feedback on the RCE Program, performance report process, and progress the industry is making as demonstrated in the RCE progress report.

This report is a key annual performance reporting outcome of the RCE Program. To ensure consistent performance reporting on behalf of its members, CAPP has developed a reporting and data submission guideline. The guideline outlines how data and information for more than 20 key metrics and indicators are to be submitted to our association on a regular basis. The structure of the report has been modified this year to clearly differentiate between the important social-economic contributions CAPP members make to Canada and the equally important health and safety and environmental performance areas.

RESPONDING TO FEEDBACK: CHANGES IN THIS YEAR’S REPORT

CAPP and its member companies have made changes in this year’s report in response to feedback provided last year by the RCE Advisory Group. These included the use of clear, non-technical language in the report, ensuring that it can be more easily understood by the public. Where technical language is unavoidable, we have included explanations and definitions within the text or as call-outs and sidebars.

The RCE Advisory Group also commented that “CAPP members should pay more attention to their products transported by various modes such as rail, pipelines and marine tankers, and within their sphere of influence, work closely with carriers to assure the safe and environmentally sustainable movement of these products.” Within the Emerging Issues segment of this report, we outline some substantive initiatives that CAPP and our members have undertaken, working closely with governments and carriers in ensuring the safe delivery of our products.

The RCE Advisory Group challenged members to be specific in their performance goals. CAPP acknowledges this challenge and industry is taking initial steps in this direction under the umbrella of Canada’s Oil Sands Innovation Alliance (COSIA). CAPP is examining more specific performance goals as part of the evolving RCE Program design.

Finally, the RCE Advisory Group noted that in last year’s report, metrics did not always line up well with our program objectives—specifically noting that more work is needed in areas such as Aboriginal and community engagement. We have added a new section called Economic Prosperity outlining the contribution industry makes to Canadians and the Canadian economy. In the Social Performance section, we include a survey overview of several communities that are home to oil and gas activity, and the latest findings of a study describing industry’s engagement with Aboriginal groups that was performed by the Oil Sands Community Alliance (OSCA).

Throughout the report, we endeavour to provide additional context to the performance data. This includes the addition of more case studies which describe specific programs and technologies that address many of the challenges highlighted within the RCE data. These case studies are examples of leading practices to be shared among industry to help drive performance improvement.

CONTINUAL IMPROVEMENT

Improvement over the long term in the areas of health and safety, environment and social-economic performance is the objective of Canada’s oil and gas industry. Industry acknowledges that performance in any given area may vary from one year to the next, and it will continue to build on existing leading practices. Industry’s committed focus remains on performance improvement.
RESPONSIBLE CANADIAN ENERGY ADVISORY GROUP

Prior to publication, the RCE progress report is reviewed by the independent RCE Advisory Group, which is made up of senior experts and stakeholders whose backgrounds include safety, environment, Aboriginal and non-Aboriginal communities, labour, academia, private business, finance and investment.

The Advisory Group’s role is to advise and challenge industry to manage its risks effectively and continually improve its performance. Members of the group review and provide feedback on the RCE Program, performance report process, and the progress industry is making as demonstrated in the RCE progress report. They also select the recipients of the annual RCE Awards that recognize leading practices in industry.

The Advisory Group has reviewed the 2014 RCE progress report and their statement reflects the group’s perspective on the progress CAPP members have made over the past year.
The RCE Advisory Group is pleased to comment on the 2014 Progress Report. Our goal is to encourage and to challenge CAPP members to improve reporting and performance in ways that are credible and meaningful to the public. Our comments should be read in the context of previous years’ statements, as we wish to avoid unnecessary duplication.

Our main concerns this year relate to the oil and gas sector’s greenhouse gas (GHG) emissions, both absolute and intensity based, as well as to water use. Both continue to rise, due at least in some part, to increased production and the development of lower-quality resources. This is overshadowing near-term efforts to improve the performance of the industry. There is no defined end for these trends, although the industry is developing new technologies that could mitigate or reverse them eventually. We strongly reiterate the need for CAPP to set achievable goals to reduce GHG emissions and water use, either for the entire oil and gas sector, or at least by setting goals for specific geographic regions or for different lines of business. CAPP should be straightforward in reporting to the public how long it might take to turn these trends around, but it should show that progress is anticipated, at least in some areas.

We believe that CAPP should report more fully on the new technologies and control measures that could be implemented to accomplish overall reductions in the future.

On a positive note, we appreciate CAPP’s comments in this year’s report on emerging issues that we highlighted last year; in particular: the safe and environmentally sustainable transportation of products; a commitment to consider more specific performance ambitions and increased efforts to align performance metrics to RCE Program objectives. We look forward to ongoing progress in these areas over the coming year.

We also comment favourably on the “big data” approach to worker health and safety that has been initiated by CAPP and which will provide greater insight into problem areas requiring attention. However, we note with sadness, and concern, the eight worker fatalities that occurred in 2013, despite the general trend of a declining frequency of injuries. We expect that CAPP and its members do whatever is necessary to understand the root causes of these fatalities and take whatever steps are required to prevent such events in the future.

Our final comment is that future RCE reports need to distinguish clearly when communicating about oil sands in contrast to the broader industry. We also urge CAPP to focus on telling a more complete story of the industry’s actions and impacts under the Responsible Canadian Energy Program.

In closing, panel members give a special thanks to CEO Dave Collyer for his leadership on the RCE Program and his support for the work of the Advisory Group. Dave has devoted considerable time during his tenure to meeting with the group and responding, with good grace, to the many questions and comments we raised.

A more detailed statement that includes specific areas of focus may be found online at www.capp.ca/rce/report-overview/rce-advisory-group/
WHAT ARE THE KEY PARTS OF THIS REPORT?
The Responsible Canadian Energy progress report provides the oil and gas industry with an opportunity to collectively assess how we are doing in terms of performance, to be candid about our challenges, and to identify and act upon opportunities for performance improvement in each of these key areas. It also provides a transparent and objective platform for our work in the areas of policy and regulatory advocacy, communications and education.

The report is not an end in itself but rather an annual consolidation and reporting of effort that is ongoing throughout the year under the auspices of CAPP’s industry level Responsible Canadian Energy Program. Public confidence requires that industry both demonstrate continual performance improvement in key areas and effectively communicate and engage with communities, stakeholders, the public and Aboriginal peoples. Both are essential. The Responsible Canadian Energy Program provides the framework for the former—continual industry performance improvement. This program is a comprehensive effort among CAPP and our members to align and drive performance improvement, by developing and sharing guidelines and best practices and by measuring, assessing and reporting on industry performance.

In the past year CAPP’s Vision and Mission statements were updated and the RCE Program has been fully aligned with CAPP’s broader strategic framework (see page 3).

HOW IS THE INDUSTRY MAKING PROGRESS ON ITS RCE PROGRAM OBJECTIVES?
This latest report demonstrates improvement in performance in a number of key performance areas and relative to other jurisdictions, reflecting industry’s ongoing focus on technology and innovation to reduce the intensity of our impact on the environment and to improve social performance. It also highlights performance issues in some areas and particularly the challenge to reduce absolute environmental impacts in a growing resource-based industry. This growth is reflected in increasing jobs, increasing capital investment and the supply of secure, affordable energy for all Canadians. As well, through tax revenues and supply chain impacts, our industry’s growth is enabling economic and social enhancements in all parts of the country.

The growth we are experiencing is accompanied with a significant challenge when it comes to mitigating impacts on land, on water use and on air emissions. The latest data highlights some areas of clear progress, such as a steady decline in the amount of water used per barrel of oil produced for in situ oil sands operations. This is vitally important in light of in situ production also being the fastest area of energy production growth in our industry.

Industry growth, however, is also driving increases in our absolute greenhouse gas emissions and water withdrawals. These absolute impacts are likely to continue increasing over the next several years as our industry continues to grow to meet domestic and global energy demand. While our industry and others are devoting very significant resources to technology and innovation, and making demonstrable improvements in performance through the application of new technologies, it may take some time before we are able “bend the curve” appreciably in some performance areas.
WAS THERE A YEAR’S HIGHLIGHT FOR YOU?
There are three highlights I would mention.

The first is the program itself. It acts as an important ongoing reminder of the need to focus on our performance as an industry. We are gaining a better understanding of industry performance and the factors that drive performance, and demonstrating a greater sense of urgency when it comes to performance. We’re also not depending solely on technological advances, but rather looking at best practices, industry guidelines and improved reporting to take things up a level. RCE is clearly an important part of that conversation.

The second is the improvements we have made in the RCE Program. While these never happen as quickly as I would like and the RCE Advisory Group continues to prompt us to move faster, the program is improving in substance and in relevance. A notable change we’ve begun in this report, and that we will expand in future reports, is to highlight our industry’s performance and economic contributions within a broader context—looking at how we fare relative to regional, provincial, national and global frames of reference. This provides more relevant benchmarks and more clearly articulates the necessary balance between benefits and impacts that are a part of any industrial development.

Third, there are a number of areas where industry performance is on a positive trajectory and we should recognize this result, as well as the very innovative measures being taken by many of our member companies.

WHERE DOES THE INDUSTRY NEED TO FOCUS TO DELIVER RCE PERFORMANCE IMPROVEMENTS? WHAT ARE SOME KEY CHALLENGES?
There are three areas in which there is an opportunity for improvement, on some of which the RCE Advisory Group has also offered suggestions.

The first is an opportunity for us to drive a step-change in safety performance. We are very concerned over the increase in industry fatalities in 2013, and TRIF (total recordable injury frequency) improvement appears to have plateaued in recent years. Opportunities for further improvement lie in the areas of guidelines and best practices (safety culture, process safety) and in measurement and reporting (leading indicators, process safety metrics), some of which will be reflected in next year’s report.

The second is ongoing improvement in objectives and metrics in the report, so as to ensure they are both comprehensive and relevant. Key performance areas for further improvement in metrics are community, Aboriginal and land.

Finally, there is a need for industry to ensure the necessary focus on performance improvement, particularly as it relates to GHG emissions and water (use and quality). From a data perspective, it can be challenging to identify these opportunities against a backdrop of overall growth and variable resource quality, while recognizing that technological advances can only be implemented so quickly in a capital intensive industry like ours, with deeply embedded in-place infrastructure. We are heading away from a one-size-fits-all approach, to one where we set more focused and concrete performance objectives that take into account the specific opportunities and challenges for a given production method and / or region (e.g., in situ oil sands or Atlantic Canada offshore).

HOW HAVE YOU RESPONDED TO FEEDBACK FROM THE RCE ADVISORY GROUP?
The RCE Advisory Group (RCEAG) has made a number of suggestions, some of which we have addressed and some of which are being given further consideration.

We are considering more focused and specific performance objectives, which the Advisory Group has called for in past reports as a means to stimulate broader commitment and focus on performance improvement. In regard to goal-setting, as a first step CAPP is assessing the goal-setting process for oil sands environmental performance via COSIA as a pilot for potential broader application of environmental performance goals for the upstream sector on a sector-specific or regional basis.

We also certainly acknowledge the Advisory Group’s request for improved metrics in several performance areas such as community investment, and water and land impacts, and are working with this group and others to define metrics that are meaningful and relevant to Canadians. Progress has been made in this regard and it is a key element of the ongoing effort to improve the program. We are also considering the RCEAG’s suggestion that we articulate a broader perspective with this report, one that takes in the full Canadian context as well as where we fit in compared with other energy producing nations. This provides a useful perspective to the public and we’ve taken a first step with this report with the inclusion of an economic prosperity section. We will be assessing opportunities to incorporate more of this context in future reports.

For a summary of how we’ve addressed the RCEAG’s challenges and concerns expressed in their statement in last year’s report, see Responding to Feedback, Changes in This Year’s Report on page 5.
I. ECONOMIC PROSPERITY

INDUSTRY’S CONTRIBUTION TO CANADA’S ECONOMIC PROSPERITY

INVESTMENT
The upstream oil and gas industry provides economic benefits to Canadians in all regions of the country. In 2013, the industry was the single largest private sector investor in the country, investing about $74 billion in the Canadian economy. Capital spending by the oil and gas industry accounts for 20 per cent of total private sector capital investment in Canada.

EMPLOYMENT
Industry investment and growth creates jobs for Canadians. Currently, our industry contributes to the employment of more than 780,000 workers across Canada (with more than 180,000 direct, more than 370,000 indirect and more than 230,000 induced jobs) and that number continues to grow. Many of the jobs are indirect, with thousands of people working in secondary industries associated with the energy sector, such as engineering, manufacturing, trade and technical work, and financial services.

GOVERNMENT REVENUES
Governments receive about $18 billion per year (based on a three-year average) from our industry in the form of royalties, income taxes and lease sales. These payments enable governments to fund education, health care and other essential public services across Canada.

INDIRECT BENEFITS
The economic impact of oil and gas activity is shared across Canada, with many areas of the country providing goods, materials and services to the oil and gas sector. It is estimated that the oil sands industry will purchase about $440 billion in supplies and services from Canadian provinces outside Alberta over the next 25 years (Source: Canadian Energy Research Institute). From outside Alberta almost 2,400 companies provide goods and services to the oil sands sector (Source: CAPP).

AFFORDABLE ENERGY
The technological advances of hydraulic fracturing and horizontal drilling have unlocked significant natural gas deposits in Canada and the United States, lowering prices. Companies in the natural gas value chain are seeking to diversify their markets beyond North America. This should not materially affect energy affordability for Canadians going forward. The National Energy Board has forecast end-use prices for natural gas in residential, commercial, and industrial sectors to grow by just over two per cent per year over the 2013-2035 period. Canada is expected to produce more natural gas than its end-use demand over the same period, indicating export availability.

Wholesale Natural Gas Price by Top 10 Consuming Countries

$3.9 trillion
Estimated contribution to Canadian economy from new oil sands development over the next 25 years
(Source: Canadian Energy Research Institute).

20%
EMPLOYMENT for more than 780,000 Canadians (direct, indirect and induced jobs).

$18 billion
UPSTREAM OIL AND GAS PAYMENTS to municipal, provincial and federal governments in royalties, income taxes and lease sales are $18 billion a year (based on a three-year average).

20%
CAPITAL SPENDING by the oil and gas industry accounts for 20 per cent of total private sector capital investment in Canada.
II. RESPONSIBLE DEVELOPMENT

PERFORMANCE OVERVIEW

The common theme across CAPP member performance objectives is continual improvement. Performance improvement is a long-term objective and there will be fluctuations in performance in any given area year to year. The intent of this report is to explain the context in which performance has occurred, highlighting where improvements have been seen and where indicators may suggest performance has slipped.

Overall, the 2014 RCE report, based on 2013 data and information, shows industry’s continuing focus on supporting the communities in which it operates; addressing the challenge of an increase in fatalities; and continual reductions in emissions of nitrogen oxides (NO\textsubscript{x}) and sulphur dioxide (SO\textsubscript{2}). In a growing industry, we observe a continual decline in overall GHG intensity in the oil sands over the past five years. We also see water intensity decreasing in the area of most rapid growth, in situ oil sands.

SAFETY

Industry experienced eight fatalities in 2013, four more than 2012, in spite of the overall decline in injury frequency of 11 per cent since 2009. The reduction in total recordable injury frequency (TRIF) was achieved at a time of significant industry growth and a 49 per cent overall increase in the hours employees and contractors worked over the last five years. Any fatality is not acceptable and industry is focused on understanding this past year’s fatalities, and implementing appropriate actions.

AIR

Industry’s absolute greenhouse gas (GHG) emissions increased 15 per cent over the last five years, mostly as a result of growing production from more energy-intensive production processes such as used in the oil sands. Our total emissions from the oil and gas sector represent 19.9 per cent of Canada’s GHG emissions and 0.3 per cent of the world’s total (Sources: Environment Canada’s 2014 National Inventory Report; World Resources Institute).

Over the last five years, the intensity of industry’s GHG emissions (emissions per unit of production) also rose 16 per cent, again reflecting a shift toward more energy-intensive production processes. In response, oil and gas operators are working to apply new recovery technologies that offer lower GHG emissions intensities.

From 2009 to 2013, industry’s national NO\textsubscript{x} and SO\textsubscript{2} emissions performance (both absolute emissions and emissions per unit of production) continued to improve, due to shifts in production mix and implementation of new technologies. NO\textsubscript{x} emissions per unit of production declined 24 per cent and SO\textsubscript{2} emissions per unit of production declined 32 per cent.

“From 2009 to 2013, industry’s national NO\textsubscript{x} and SO\textsubscript{2} emissions performance (both absolute emissions and emissions per unit of production) continued to improve, due to shifts in production mix and implementation of new technologies.”
Here are some highlights:

SOCIAL PERFORMANCE

Industry growth is driving employment opportunities, with total direct employment increasing by an average of more than two per cent a year over the past five years. To address expected continued growth in workforce needs, CAPP is facilitating a workforce strategy in collaboration with key stakeholders.

CAPP member companies continue to provide social benefits through substantial investments in communities. These totaled more than $144 million across Canada in 2013. These monies were invested in capacity building of local non-profit groups, education and skills building programs, infrastructure development and local environmental and social initiatives.

Industry continues to actively engage local communities on project plans as it pursues development opportunities across Canada. CAPP conducted a survey of key communities where industry has active operations and found that the majority of residents feel that industry is responsive and a valuable member of the community.

Industry also continues to work with Aboriginal communities to mitigate impacts of oil and gas development while providing positive economic and business opportunities. As an example, a 2013 survey by the Oil Sands Community Alliance (OSCA) found that oil sands developers continue to bring opportunities to Aboriginal communities, with $2 billion in contracts awarded to local Aboriginal businesses, and $6.2 million in community investment in the Wood Buffalo and Lac La Biche areas. Nearly $12 million was paid to First Nations and Métis communities in the Athabasca area for regulatory consultation services including environmental impact assessments.

WATER

The total volume of fresh water consumed by industry in the oil sands rose 12 per cent above 2009 levels, driven by growth in production. Oil sands mining water withdrawal continues to be highly variable year over year as new projects come on stream or large maintenance projects occur. The 2013 intensity was 3.2 barrels per barrel of bitumen. In situ water use intensity continues to decline and now stands at 0.31 barrels per barrel of bitumen production. In the Western Canada Sedimentary Basin, we are seeing an increase in intensity as more water is used for enhanced oil recovery and pre-production use for hydraulic fracturing. Water use stands at 0.2 barrels per barrel of production.

“Oil sands mining has disturbed 0.02 per cent of Canada’s boreal forests.”

LAND

The total active footprint (land cleared, disturbed and being reclaimed for oil sands mining) was 89,500 hectares at the end of 2013, an increase of 33 per cent from 2009. About 91 per cent of the total active footprint is cleared and disturbed land, and nine per cent is being reclaimed. Oil sands mining has disturbed 0.02 per cent of Canada’s boreal forests.

Industry is minimizing land impacts through decisions on where to place roads and other infrastructure to support development. The use of multi-well pads is also reducing surface footprint, compared to using single well pads.

In this report, industry performance is discussed from a national perspective, combining Western Canada, Oil Sands and Atlantic Canada offshore. Performance reported regionally in more detail can be found in addition to this report online at www.capp.ca/rce.
PERFORMANCE OVERVIEW

PEOPLE

$2 billion
The value of contracts awarded to local Aboriginal businesses in the oil sands.

11%
The reduction in the total recordable injury frequency (TRIF) for employees and contractors since 2009.

> $144 million
The amount that CAPP members contributed through community investment across Canada.

AIR

15%
The increase in the industry’s total GHG emissions over the last five years, as a result of growing production driven by the oil sands.

0.3%
The percentage of overall global GHG emissions represented by Canada’s oil and gas industry. The industry accounts for 19.9 per cent of Canada’s GHG emissions.

-32% & -24%
The respective reductions in the industry’s SO₂ and NOₓ emissions intensity over the past five years.

16%
The increase in GHG emissions intensity (emissions per unit of production) for the overall industry from 2009 to 2013. This reflected a shift toward more energy-intensive production processes. In response, oil and gas operators are applying new recovery technologies that offer lower GHG emissions intensities. Oil sands producers have reduced their GHG intensity per barrel of oil produced by 28 per cent since 1990.

Sources: 1 World Resources Institute; 2 Government of Canada’s 2014 National Inventory Report.
**WATER**

94%

The percentage of water used in oil sands in situ production that is recycled.

27%

The decrease in fresh water withdrawal per barrel of production for oil sands in situ operations from 2009 to 2013, as a result of improved water re-use and the application of new technology.

12%

The increase in total fresh water volume consumed by the oil sands industry since 2009. This increase was driven largely by the growth in production.

**LAND**

9.4%

The percentage of the total active footprint that has been or is being reclaimed since oil sands mining operations began in the 1960s. As mine operations mature and the sites become older, mined-out areas close down and are reclaimed, in accordance with well-planned procedures. Over time all of the area that is currently being mined will be reclaimed as required by law.

0.02%

The proportion of Canada’s boreal forests that has been disturbed by oil sands mining operations since the 1960s.

33%

The increase in the total active footprint (land cleared, disturbed and being reclaimed) from 2009 to 2013 for the oil sands mining sector. At the end of 2013, the sector’s total land footprint was 89,500 hectares.

22,500

The number of wells in Western Canada in the active process of land reclamation (active reclamation/remediation; monitoring/assessment or application)—this is 75 per cent of all abandoned wells.

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The barrels of fresh water required by oil sands mining projects to produce one barrel of oil. This is compared to 3.4 barrels of fresh water five years ago.

The barrels of fresh water required by oil sands in situ projects to produce one barrel of oil. This is compared to 0.4 barrels of fresh water five years ago.
Fatalities increased from 4 in 2012 to 8 in 2013.

The reduction in the worker total recordable injury frequency (TRIF) over the past five years is 11%.

A gap between employee and contractor safety performance remains. The 2013 employee TRIF was 0.45, nearly half the contractor TRIF of 0.84.

Hours worked are up over the last five years—16% for employees and 62% for contractors—reflecting increased development activity.

Fatalities increased from 4 in 2012 to 8 in 2013.
PEOPLE

SOCIAL PERFORMANCE

THIS SECTION OF THE REPORT ADDRESSES RESPONSIBLE DEVELOPMENT AS IT RELATES TO SOCIAL PERFORMANCE.

#1 RCE OBJECTIVE – SOCIAL PERFORMANCE: CAPP members will continually improve industry’s social performance.

Social performance is addressed in the context of employment, community investment, community engagement and Aboriginal relations.

GROWING WORKFORCE NEEDS – CHALLENGES AND OPPORTUNITIES

Over the 2008 to 2012 period, for when data is available, total direct employment in the industry grew by an average of more than two per cent a year, with annual employment growth in 2012, the latest year for which we have data, amounting to more than nine per cent. As industry continues to grow, there will be opportunities for further increases to employment.

Attracting and retaining new workers remains crucial for Canada’s oil and gas industry, which must hire between 125,000 and 150,000 new workers—both professionals and skilled trades—in the next decade simply to replace losses due to turnover and retirement-related attrition (Source: Petroleum Human Resources Council, 2013).

Through CAPP, industry is facilitating the development of a workforce strategy for the upstream oil and gas industry, and working with other stakeholders to address training needs. CAPP works with union and non-union labour groups on initiatives to improve labour availability, including workforce mobility, skilled trades training and apprenticeship opportunities, and immigration.

Industry also continues to invest in training and education for local Aboriginal communities to ensure they are well positioned to benefit from the economic opportunities associated with resource development. Many companies have employment policies to recruit local Aboriginal workers. Today, for example, more than 1,700 Aboriginal employees have permanent operations jobs in the oil sands. About 10 per cent of the oil sands workforce is Aboriginal (Source: Government of Alberta).

Nearly 13,800 new apprentices entered core trades in the industry in Alberta in 2013.

Source: Petroleum Human Resources Council.

TOTAL DIRECT EMPLOYMENT - NATIONAL
(annual percentage growth)

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Sources: Petroleum Human Resources Council, Statistics Canada.

Direct employment in Canada’s oil and gas industry grew 2.2 per cent on average from 2008 to 2012.
COMMUNITY INVESTMENT
Our member companies provide local social benefits by making substantial investments in the communities where they operate, supporting many local initiatives with valuable contributions. These corporate contributions play a key role in funding many non-profit organizations that provide needed services and enrich local quality of life. In 2013, CAPP member companies committed a total of more than $144 million to community investment programs across Canada.

COMMUNITY ENGAGEMENT
As the oil and gas industry pursues development opportunities across Canada, it is important that it actively engage local communities on its project plans. Landowners and communities have questions about the impacts of oil and gas activities on the environment, health and quality of life, and our industry has a desire and responsibility to respond to these concerns in an open, honest and timely manner. This aligns with industry’s mission of achieving public confidence among stakeholders and communities through effective communication, outreach and performance.

Industry understands the value of ensuring that communities are consulted at the earliest stages of project development to identify opportunities and concerns and mitigate potential adverse impacts in a proactive manner. Our member companies gather feedback through different mechanisms—for example, through public consultation such as open houses, individual meetings and surveys—and consider community input carefully before making project decisions.

CASE STUDY
SOCIAL PROSPERITY WOOD BUFFALO STRENGTHENS NON-PROFIT AGENCIES
Social Prosperity Wood Buffalo (SPWB) is a five-year community-driven collaboration project between stakeholders in the Regional Municipality of Wood Buffalo (RMWB), the University of Waterloo and Suncor Energy Foundation to build capacity in the non-profit sector in this region of northeast Alberta.

The project emerged from Suncor’s vision to further build quality of life in Wood Buffalo by developing and sustaining innovation and social change.

Established in 2011, SPWB has brought together stakeholders from the energy industry, the private sector, the non-profit sector, government and higher education. Suncor and the different participants are working together to develop processes and tools to help the community become more socially prosperous, resilient and sustainable.

SPWB reflects Suncor’s community investment strategy and commitment to collaboration for long-term sustainability. The project’s goal is to strengthen the non-profit sector, allowing groups to be more proactive, better equipped to deal with change and able to support vibrant communities.

For more case studies, see the RCE Awards at www.capp.ca/.

WHAT COMMUNITIES NEAR OPERATIONS SAY ABOUT OUR INDUSTRY:
IPSOs REID SURVEY
In support of CAPP’s vision of responsible growth of Canada’s upstream oil and natural gas industry and the objective of continual improvement in the area of social performance, CAPP commissioned a pilot community survey in 2014. The objective of the survey was to test the impressions of the oil and natural gas industry in select operating communities and to create a baseline to understand community priorities and how to best engage with communities going forward.

Ipsos Reid conducted a total of 1,541 telephone interviews with Canadian adults aged 18 and older between August 18 and September 5, 2014. The following communities were selected where industry has active operations:

- Bonnyville/Cold Lake, Alberta
- Dawson Creek, British Columbia
- Estevan, Saskatchewan
- Fort Saskatchewan, Alberta
- Fort St. John, British Columbia
- Mountain View County, Alberta

Overall, we heard the communities’ top three priorities were: public health and safety, environmental protection, and industry communications and responsiveness.

The overall majority of residents who were in contact with a production company felt that industry is responsive, and a majority also agreed that the oil and gas industry is a valuable member of the community.

Two key findings arose from the survey indicating the importance of communities in being familiar with the industry. The more familiar residents are with the oil and gas industry the more likely they are to trust the industry. Additionally, the more familiar residents are with the industry the more likely they are to feel the overall quality of life in their community is ‘much better’ as a result of industry involvement.

The survey provided valuable baseline information and direction, which will inform future actions to address industry’s operational and social performance in the communities in which we operate, and build sustainable public trust in our industry.
ABORIGINAL RELATIONS
As Canada’s oil and gas industry enters new areas for production, increasingly oil and gas development is taking place near Aboriginal communities and on or near traditional lands.

CAPP member companies work with Aboriginal communities to seek ways to mitigate the impacts of oil and gas development in their traditional territory and provide positive economic and business opportunities. Depending on the scope of the development, this consultation may occur throughout the life of the project from initial project planning through to final reclamation. Oil and gas producers consult directly with chiefs, counselors, Elders and community members and gather information through meetings, studies and workshops.

For Aboriginal communities, improved communication can help identify communities' interests, concerns and priorities. It can also result in business opportunities for local service providers, employment opportunities, funding for community initiatives, and industry agreements to avoid culturally or ecologically significant areas.

One organization that works to bring industry and Aboriginal communities together is the Oil Sands Community Alliance (OSCA). OSCA works in the Athabasca oil sands area to help build thriving communities and shared value with industry’s neighbours. Each year OSCA surveys its members to gather information on financial contributions to Aboriginal communities. In 2013, OSCA member companies, including most oil sands developers in the area, contributed $6.2 million to Aboriginal communities in the Wood Buffalo and Lac La Biche areas. This funding supported the communities in hosting cultural events, delivering youth and educational programs, and building resources and services to enhance the well-being and quality of life for community members.

OSCA members also demonstrated their commitment to enhancing Aboriginal economic participation in the oil sands industry by sourcing close to $2 billion in contracts with local Aboriginal companies in 2013. Over the past 14 years, this spending has amounted to more than $8 billion. Some of these contracts included civil work, site reclamation, environmental monitoring and management, consultation services, and support services such as worker accommodation, safety and water services.

In 2013, OSCA members paid nearly $12 million to First Nation and Métis communities in the Athabasca oil sands area for regulatory consultation services. These services include reviews of project applications and consultation with community leaders and members.

For more information on OSCA and its activities, visit www.oscaalberta.ca/.

WHAT IS OSCA?
The Oil Sands Community Alliance (OSCA) was recently formed from the Oil Sands Developers Group (OSDG). OSCA was created to renew industry’s focus on socio-economic issues and proactively address changes in the communities where oil sands developers operate. It has four focus areas: Aboriginal; community well-being; infrastructure; and workforce. OSCA emphasizes a collaborative approach of engagement, building relationships and creating measurable socio-economic benefits.

For more information, visit www.oscaalberta.ca/.
ACHIEVING OUR OBJECTIVE OF CONTINUAL IMPROVEMENT

Contributing positively to the social fabric of the communities in which our members work is a way to demonstrate improvement in our social performance. The continuing growth of our industry means more local jobs. In 2012 (the most current year we have data for), employment grew by nine per cent. The oil sands employs 1,700 Aboriginal workers as permanent employees and Aboriginal workers make up about 10 per cent of the oil sands workforce. Industry contributed more than $144 million in community investment, monies which were used by communities to operate not-for-profit organizations, fund social infrastructure projects and generally enrich the quality of life of residents. We have also learned through our first community survey that familiarity with the industry leads to higher levels of trust, a key aspect of achieving public confidence in industry.

PEOPLE

SOCIAL PERFORMANCE

Information sharing and funding for community initiatives—two of the many ways our industry is striving to build stronger relationships with Aboriginal communities.

CASE STUDY 1

TOUR OF HYDRAULIC FRACTURING OPERATION BUILDS AWARENESS IN SAHTU COMMUNITIES

In support of its proposed exploration program in the Central Mackenzie Valley in the Northwest Territories (N.W.T.), ConocoPhillips Canada conducted a workshop and tour of a ConocoPhillips hydraulic fracturing site near Red Deer, Alberta, in November 2012. The program included 15 delegates from communities in the N.W.T.’s Sahtu region and was carried out in collaboration with Husky Energy, Schlumberger, the Canadian Society for Unconventional Resources (CSUR) and the N.W.T. government.

Multi-stage hydraulic fracturing has never been conducted in the N.W.T., and ConocoPhillips Canada wanted to prepare communities for the type of activity that could potentially be expected. Representatives were flown to Alberta to participate in information-sharing sessions, which included presentations, visual aids and extensive dialogue with industry experts, and a guided tour of a hydraulic fracturing site. The collaborative model proved very successful, with tour participants recognizing the project’s potential and the need for continued collaboration.

CASE STUDY 2

CHILDREN’S BOOK RECORDS STORIES FROM ABORIGINAL COMMUNITIES NEAR KEARL

Imperial Oil announced the start-up of the Kearl oil sands project on April 27, 2013. As part of celebrating first oil at Kearl, the company produced a children’s book to create a record of the stories told across generations in Kearl’s surrounding communities.

The book, Our Stories Help the Northern Lights Dance, features stories collected from Fort Chipewyan and Fort McKay Elders and was written by N.W.T. author Richard Van Camp, with illustrations by local children and assistance from Alberta First Nation artist George Littlechild. The book provides the reader with an understanding of local First Nations and Métis history that is passed down through generations of storytelling.

Copies of the book were presented to local First Nations and Métis Elders, as well as community schools and libraries.

For more case studies, see the RCE Awards at www.capp.ca/.
People

Health and Safety

This section of the report addresses responsible development as it relates to health and safety.

#2 RCE Objective – Health and Safety: CAPP members will continually improve operational safety (“Operational Safety” refers to the safety of people as well as the integrity of the equipment and processes used by industry).

Overview

The primary focus of health and safety as it pertains to Canada’s oil and gas industry has, over the years, been on workers. While this remains the focus of this year’s report, we are expanding our focus to process safety as well as safety of the public. We have not previously discussed actions industry takes to keep the public safe. For instance, members regularly engage with communities during the development of emergency preparedness and response plans. This informs the community of any potential hazards and the responses to those hazards. Going forward, CAPP is expanding its understanding and actions toward public safety.

For workers in the oil and gas industry, there is a degree of risk often involving the operation of heavy, moving equipment in a continually changing environment. To mitigate this risk, industry requires that all employees and contractors have the training and competency they need to remain safe on the job and support the safety of those with whom they work. Aligned with the RCE health and safety objective, industry is committed to ensuring a safe work environment for every worker.

CAPP is often asked how our industry’s worker safety record compares to other industries and internationally. CAPP staff is working to normalize the disparate data sources, data collection methodologies and injury definitions so that we may fairly represent our member performance in relation to other industries and peers internationally in the near future.

Industry’s safety record shows that across Canada, we are making steady progress toward our objective, with safety performance continuing to improve in 2013, contributing to an 11 per cent decline in the total recordable injury frequency (TRIF) over the last five years during a time of growth in industry.

Our continual focus on keeping workers safe was insufficient as industry experienced eight fatalities in 2013, compared with four in 2012. Of these fatalities, two were member employees and six were contractors. While the frequency of injuries continues to slowly decline, the most severe result in fatality. While no company had multiple fatalities in 2013, we need to understand as an industry if there is a fundamental reason for this increase because we consider all fatalities unacceptable. In support of this, CAPP along with its members and Enform are working on improved contractor management processes and training that continue to be implemented to reduce the frequency and severity of injury in the future, especially fatalities.

We continue to enhance the RCE Program’s health and safety reporting. In the next RCE progress report, we will expand our performance to include job-related illnesses. CAPP is also investigating how we can incorporate process safety metrics into the reporting and what benefit that may have to explaining industry’s overall safety performance.
In 2013, industry reported a combined worker TRIF of 0.75, down from 0.77 in 2012 and 0.85 in 2009.

Since 2009, hours worked in the oil and gas industry have increased by 16 per cent for employees and 62 per cent for contractors. There has also been a shift in the distribution of work hours, from 28 per cent employee and 72 per cent contractor in 2009, to 22 per cent employee and 78 per cent contractor in 2013.

DEFINITIONS

Total recordable injury frequency (TRIF) – measured widely and used by many industries to evaluate the frequency of injuries that occur in their operations. The total number of fatalities, permanent total disabilities, lost work day cases, and cases involving restricted activity and/or medical treatment are combined for every 200,000 hours worked, providing a ratio that is used to benchmark performance.

Fatal Accident Rate – measure used internationally as a frequency rate. The total number of employee and contractor fatalities is combined for every 200,000 hours worked, providing a ratio to benchmark industry performance. This rate is more useful than absolute numbers for preventative purposes and international comparisons as it accounts for differences in employment sizes (number of workers and hours worked).

After three years of declining numbers, total fatalities in the industry increased from four in 2012 to eight in 2013, and the fatality injury rate increased to 0.0031 per 200,000 hours worked in 2013, from 0.0017 in 2012. The Atlantic Canada fatalities in 2009 were due to a helicopter accident which resulted in 17 fatalities.
ENABLING A CULTURE OF SAFETY IMPROVEMENT – CHALLENGES AND OPPORTUNITIES

To enable additional safety improvement, CAPP is facilitating a step change from current performance by focusing on a broader safety scope including people, process and product stewardship. The protection of people, including workers and the public, and responsible development of oil and gas resources, begins with safe operations.

Process safety management ensures reliable operations, and the prevention of major accidents, which mitigates risk to workers, the public, and the environment. Our members have long been focused on measures to prevent an incident from occurring (reducing the likelihood of a major accident), and are now adding enhanced controls to minimize the severity if an event was to occur (reducing the consequences). Process safety is a subset of operational excellence and asset integrity. By focusing on effective design and engineering of facilities, maintenance of equipment, and procedures and training, our industry is taking the appropriate steps to prevent major incidents that can lead to spills, fires and explosions and cause serious injuries or fatalities.

Product stewardship focuses on applied risk management principles across the product supply chain and life cycle, including crude by rail, marine transport and pipeline safety and integrity. CAPP’s pipeline safety and integrity initiative is one example of this shift and will result in enhanced product stewardship as well as environmental outcomes.

Our members are focused on identifying and reducing hazards on the work site, improving response and recovery capabilities, and advancing process safety management in their health and safety management systems, while building a positive safety culture. Members are promoting the development of a positive safety culture, through initiatives such as safety planning, mentoring and teamwork—where everyone is encouraged, and enabled to make the right on-the-job decisions contributing to improved safety performance. In the effort to promote industry-wide safety improvements, a positive safety culture supports innovation and constant change in operating practices, environments and technology.

Consistent with these changes, CAPP is evolving RCE performance measures to include process safety and product stewardship metrics in future reporting years.

SAFETY STANDARDS AND TRAINING

Working with Enform, other industry trade associations and committees, Canada’s oil and gas industry follows defined safety standards and guidelines, shares health and safety best practices and uses comprehensive integrated training resources.

Enform is the health and safety association of the upstream onshore oil and gas industry. Operating primarily in Western Canada, Enform’s mission is to assist companies in achieving their health and safety goals by providing leading practices, assessment, training, support metrics and communication. In 2013, more than 255,000 oil and gas workers participated in Enform’s leading health and safety training, programs and services.

In Atlantic Canada, industry participates in the Atlantic Canada Offshore Petroleum Training and Qualifications Committee. Members of this committee, which include drilling contractors, regulators and other stakeholders, work together to manage training standards for the Atlantic Canada offshore industry.

For more information, visit www.enform.ca/.
CASE STUDY
PLANNING AND TEAMWORK RESULT IN ZERO INCIDENTS FOR OFFSHORE WELL

In 2013, Chevron Canada operated the Margaree A-49 exploration well in the Orphan Basin 415 kilometres offshore from St. John’s, Newfoundland and Labrador. The Margaree well was drilled without any recordable injuries or environmental incidents, despite 306,176 person hours worked in one of the most difficult operating environments in the world.

This strong safety and environmental performance was a direct result of high-level teamwork among Chevron Canada, Stena Drilling and other contractors to achieving incident-free operations.

The team proved that with proper planning and with a “do it right—once, the first time” execution philosophy that Zero is Attainable, even on a complex drilling operation in the harsh North Atlantic operating environment.

For more case studies, see the RCE Awards at www.capp.ca/.

KEEPING WORKERS SAFE
Historically, swings in the demand for oil and gas workers have had a direct impact on injury rates in our industry. Increasing demand for workers, including new and inexperienced workers, requires a clear focus on keeping this population of workers safe. The data indicates that while the number of contractors, many of whom are new and inexperienced, continues to increase, the frequency of injuries is declining. One unacceptable change in 2013 was a doubling in the most severe of incidents, fatalities. Our members recognize they must continue working to understand what safety protocols failed, resulting in these fatalities, and take steps to prevent these incidents in the future.

By focusing on and improving management systems and their implementation, our member companies can effectively manage health and safety risks. Management systems provide for standardized safety training and equipment, on-site supervision, and identification and control of work hazards. The combination of these practices, among others, in turn helps to mitigate the risk of new and inexperienced workers to injury.

ACHIEVING OUR OBJECTIVE OF CONTINUAL IMPROVEMENT
Continually improving operational safety is a commitment that CAPP members have made individually and collectively. While our recordable injury frequency continues to decline, indicating that progress has been made, an increase in fatalities would suggest otherwise. Individual members hold themselves accountable for their safety performance. CAPP brings members together to discuss the issues and opportunities of safety performance. From these discussions come new or enhanced programs, practices and procedures that members can implement within their organizations and at their work sites. It is this collective work that is expected to influence positive improvement over time. Statistics show that in some areas safety performance may have plateaued; therefore, there is an opportunity for a renewed emphasis on safety culture and process safety that is expected to improve operational safety performance and mitigate potential public health and environmental impacts.
ENVIRONMENT
AIR, WATER AND LAND

THE FOLLOWING SECTIONS OF THE REPORT ADDRESS RESPONSIBLE DEVELOPMENT AS IT RELATES TO THE ENVIRONMENT – AIR, WATER AND LAND.

#3 RCE OBJECTIVE – ENVIRONMENT:
CAPP members will continually improve environmental performance.
Absolute emissions of NOx and SO2 (which contribute to smog and acid rain) have fallen 24% and 31% respectively over the last five years.

Air

GHG Emissions intensity has risen 16% over the past five years due to a shift to more energy-intensive forms of production. Technology and innovation remain critical for reducing emissions intensity as production grows.

Industry’s share of Canadian GHG emissions in 2012 was 19.9%, up from 17.2% in 2008 (or about 0.3% of the world’s total).

Oil sands’ share of Canadian GHG emissions in 2012 was 8.7%, up from 5.7% in 2008 (or about 0.1% of the world’s total).

Absolute emissions of NOx and SO2 (which contribute to smog and acid rain) have fallen 24% and 31% respectively over the last five years.
FOCUSING ON GREENHOUSE GASES AND AIR EMISSIONS.

ENVIRONMENT OBJECTIVE –
CAPP members will continually improve environmental performance.

Air quality matters to Canadians—both in terms of the global impact of greenhouse gas (GHG) emissions on climate change and the potential for air contaminants such as nitrogen oxides (NOx) and sulphur dioxide (SO2) to affect regional air quality and acid deposition.

Our industry emits GHGs through fuel combustion and other operational processes such as flaring. CAPP members are working on developing and implementing new technologies to reduce GHG and air emissions per unit of production, leading to improvement in environmental performance.

NOx emissions are by-products of fuel combustion emitted during activities such as firing of engines for gas compression and power generation, and flaring. SO2 is emitted from operations that produce and process raw natural gas, oil and bitumen containing hydrogen sulphide (H2S).

OVERVIEW: GHG EMISSIONS

GHG emissions continue to be a critical challenge for industry. The oil and gas industry requires energy to recover and produce oil and gas resources. It is required to operate mines and upgraders and to create steam for in situ operations in the oil sands. Energy is also needed to compress and process natural gas and pump both oil and natural gas to market. All of these processes produce GHG emissions such as carbon dioxide (CO2)—a contributing factor to climate change.

According to the International Energy Agency (2013), world energy demand is forecast to increase 33 per cent over the next two decades. While Canada, with its reserves, is well positioned to deliver its share of oil and gas supply, the challenge remains doing so with a clear focus on reducing emissions intensity over time.

As seen in the following graph, new technologies in both oil sands in situ and mining development have the ability of contributing to lowering GHG intensity, while delivering Canadian oil sands production GHG emissions comparable to competing sources on a wells-to-wheels basis.

New oil sands extraction technologies (noted in green) are improving full-cycle GHG emissions from in situ and mining extraction processes. This is delivering Canadian oil sands production GHG emissions that are comparable to competing sources on a wells-to-wheels basis.

According to the International Energy Agency (2013), world energy demand is forecast to increase 33 per cent over the next two decades.
Shifting production to more energy-intensive sources, such as oil sands, has resulted in total oil and gas industry GHG emissions rising 15 per cent over the past five years. Emissions intensity (emissions per unit of production) has also risen, for the same reason.

Decreases in emissions from other sectors of the economy and increasing emissions from the oil sands contribute to our increasing share of total Canadian GHG emissions. For example, the electricity sector’s emissions dropped from 113 megatonnes in 2008 to 86 megatonnes in 2012 as plants switched to natural gas, with a lower GHG footprint, from coal.

As production, specifically oil sands production grows in Canada, the industry’s total emissions of GHGs are expected to increase in the near and medium term. We are also looking to this segment of our industry for the greatest opportunities to reduce emissions intensity. Industry is exploring globally, for instance, emission and production technologies to provide both continual improvement and a step change in performance. In this mix, industry is relying on technologies, with long development-to-commercialization life cycles, to reduce the GHG intensity of its oil products.

Industry is exploring globally emission and production technologies to provide both continual improvement and a step change in performance.

WHAT IS COSIA?
In March 2012, Canada’s Oil Sands Innovation Alliance (COSIA) was formed by oil sands producers, who agreed to work together to accelerate the pace of improvement in environmental performance through collaborative action and innovation. COSIA represents a major breakthrough in that member companies have all agreed to share innovations. This leverages the monies being invested into innovation, and significantly accelerates how quickly a given innovation can be turned into an industry standard. To date, member companies have shared 560 technologies that cost more than $900 million to develop and are now working on 185 joint industry projects across four environmental priority areas: GHGs; water; land; and tailings. For more information, visit www.cosia.ca/.

COSIA is also an enabler of technology development in industry’s pursuit of continually improving its environmental performance over time. COSIA has been able to bring oil sands industry players together for the first time to collaborate on addressing the challenges of GHG emissions. Notwithstanding this critical focus, as existing sunk technology continues to be used and poorer quality reservoirs are exploited, industry expects over the next several years to be challenged in reducing GHG intensity further. As older production shuts down and new technologies are employed over time, the intensity is expected to decrease.
As production of oil and gas is increasingly coming from more energy-intensive reservoirs and existing in-place technologies continue to be used, we are seeing upward pressure on GHG emissions intensity. From 2009 to 2013, GHG emissions intensity has risen 16 per cent. Note: GHG emissions intensity numbers for 2009 to 2012 for national and oil sands categories have been restated to reflect updated data from CAPP members. The restated data does not materially alter trends discussed in previous reports.

Total GHGs emitted by CAPP member companies continue to increase as production from more GHG intensive sources increases. GHGs have increased 15 per cent over the last five years, from 100 million tonnes in 2009 to 115 million tonnes in 2013. Note: absolute GHG emissions for 2009 to 2012 have been restated to reflect updated data from CAPP members. The restated data does not materially alter trends discussed in previous reports.

How we report emissions

We present air emissions data in two distinct ways:

- **Absolute emissions (total emissions):** This provides information regarding overall trends in total emissions. However, it is impacted by many factors and does not provide a perspective on efficiency of operations.

- **Emissions intensity (emissions per unit of production):** This measure helps us to understand how efficient an operation is in terms of the emissions associated with delivering each unit of oil-equivalent production.

While both absolute and intensity measures provide important information to the oil and gas industry, intensity is the more relevant measure of operational performance. It normalizes or accounts for changes in product, production volumes and mix, and it allows oil and gas companies to evaluate their own operations and against their peers—both domestic and international.
IMPROVING GHG EMISSIONS INTENSITY – CHALLENGES AND OPPORTUNITIES
The industry’s overall GHG emissions intensity has continued to rise, reflecting a shift toward growing production of relatively more energy-intensive resources such as oil sands. In addition, as conventional oil and gas reservoirs become depleted, the industry is applying more energy-intensive technologies to maximize extraction of depleting reservoirs.

Technology and innovation are critical tools for reducing emissions intensity as production of oil sands resources continues to grow. The focus for industry is to accelerate the pace of development and implementation of technologies that will drive down GHG emissions intensity from oil and gas production over time.

For example, producers are exploring alternative methods of extracting bitumen using solvents instead of steam. Through the injection of solvents to reduce the viscosity of bitumen deposits and enhance recovery, oil sands operators can reduce or replace the need for steam, not only reducing water needed to produce steam, but also reducing total GHG emissions. While these technologies and innovations, and others, are expected to have a positive impact on reducing GHG intensity, the long development and commercialization cycle means we are expecting to see a relatively flat GHG intensity profile in the near term. Adding to the challenge is declining reservoir quality and existing technology already in place.

Through Canada’s Oil Sands Innovation Alliance (COSIA), companies are investigating solutions to drive long-term improvement in performance. Oil sands companies have joined together to collaborate with universities, government, industry and research institutes to develop innovative technologies to reduce energy use and associated GHG emissions for oil sands operations. Some of the key areas COSIA is looking at include recovering waste heat for reuse, improving energy efficiency and producing alternative energy.

CASE STUDY
ENGAGING EMPLOYEES IN NEW IDEAS TO REDUCE GHG EMISSIONS
Devon Canada has a GHG reduction budget that awards funding to initiatives proposed by Devon employees. This program directly engages employees in environmental stewardship and creates awareness around why energy efficiency and GHG mitigation are important to Devon’s business.

To qualify for funding, the initiatives must provide a suitable rate of return, result in measurable emission and energy reductions and go beyond regulatory compliance. All submitted projects go through a vetting process by Devon’s employee-led GHG Working Group.

In its first year in 2013, the budget totaled $2.5 million. Thirty-three employees came forward with more than 75 proposed projects; 11 proposals were selected for implementation. Together these projects are anticipated to:

- reduce emissions by about 30,000 tonnes of CO₂ equivalent a year — the equivalent of removing 6,300 vehicles from Canada’s roads;
- provide estimated cost savings of more than $1.5 million a year; and
- result in a rate of return of more than 40 per cent.

For more case studies, see the RCE Awards at www.capp.ca/.

ACHIEVING OUR OBJECTIVE OF CONTINUAL IMPROVEMENT
Continual improvement in environmental performance as it relates to the challenges of both improving GHG intensity and reducing absolute GHG emissions is a long-term prospect. We will drive for continual improvements in the needed technologies, some of which have been noted here, such as low steam-to-oil ratio SAGD technologies. As world demand for energy continues to increase, Canada is positioned to deliver crude oil and natural gas to customers at a lower GHG intensity in the market than competing supplies of oil.
NO\textsubscript{x} – OVERVIEW

NO\textsubscript{x} is a by-product of combustion and is released from engines and boilers used in oil and gas production. Our industry’s total NO\textsubscript{x} emissions have continued to fall, decreasing 24 per cent since 2009, as a result of the use of more efficient engines and boilers, declining natural gas production and shifts in the oil production mix. Similarly, industry’s NO\textsubscript{x} emissions intensity has improved.

Industry’s NO\textsubscript{x} emissions declined to 229,106 tonnes in 2013 from 299,852 tonnes in 2009, a decrease of 24 per cent.

The intensity of industry’s national NO\textsubscript{x} emissions shows a downward trend. In 2013, it was 0.71 tonnes per thousand cubic metres of oil-equivalent production, down 24 per cent from 2009 levels.
SO₂ – OVERVIEW

Industry has continued to lower its total SO₂ emissions. Since 2009, emissions have improved 31 per cent, primarily as a result of more efficient sulphur recovery equipment at facilities that process sour crude oils. Industry’s SO₂ emissions intensity also decreased, despite a gradual shift to more sour crude and bitumen production. This downward trend in emissions intensity was due in part to reduced production of sour gas, improvements in sulphur recovery, and regulations requiring a reduction in flaring and venting in Canada.

Industry’s total SO₂ emissions decreased by 31 per cent over the last five years, dropping to 157,699 tonnes in 2013 from 228,448 tonnes in 2009. The Atlantic Canada offshore industry’s SO₂ emissions were negligible with respect to the national total.

Industry’s national SO₂ emissions intensity has steadily improved. In 2013, it was 0.49 tonnes per thousand cubic metres of oil-equivalent production, down 32 per cent from 2009. However, SO₂ emissions intensity in the Atlantic Canada offshore increased significantly during the year, due to start-up of a new offshore project, which produces some sour gas.
# AIR

## NO\textsubscript{x} AND SO\textsubscript{2} EMISSIONS

**CASE STUDY**

**CAPTURING VENT GAS turns EMISSIONS INTO FUEL**

In 2012, with funding from its Environmental Innovation Fund and the Climate Change and Emissions Management Corporation (CCEMC), Encana initiated a three-year program to install vent gas capture systems at 57 natural gas compressors in southern Alberta.

Each system captures fuel gas vented to the atmosphere as part of normal operations and redirects it into the compressor engine’s air intake to help fuel the engine. The technology was developed by REM Technology Inc., a division of Spartan Controls, based in Calgary.

The project was successfully wrapped up in September of 2014 with all vent gas capture systems operational. By redirecting the gas to fuel the engines, the project is designed to recover about 175 million standard cubic feet of sales gas per year, reduce emissions by more than 69,000 tonnes of CO\textsubscript{2} equivalent annually and generate $1 million per year in carbon offsets.

For more case studies, see the RCE Awards at [www.capp.ca/](http://www.capp.ca/).

**COLLABORATING ON AIR QUALITY – OPPORTUNITIES AND CHALLENGES**

Our industry expects to further improve its air emissions intensity as the federal Air Quality Management System (AQMS) continues to be developed. This system involves a comprehensive approach for improving atmospheric air quality in Canada and is the product of collaboration by the federal, provincial and territorial governments, industry and non-governmental organizations. CAPP has been actively engaged in the AQMS design and implementation process.

AQMS will help to lower levels of criteria air contaminants—industrial emissions such as SO\textsubscript{2} and NO\textsubscript{x} that contribute to smog, acid rain and health hazards.

Implementation of AQMS began in 2013. One component of the system will be emissions requirements that set equipment specific limits for performance for all major industries in Canada. These are encompassed within base-level industrial emissions requirements (BLIERS) that will apply across a broad spectrum of the upstream oil and gas industry, facilitating further industry emission performance.

## ACHIEVING OUR OBJECTIVE OF CONTINUAL IMPROVEMENT

In our growing industry we are seeing a continual improvement in absolute emissions and intensity of both NO\textsubscript{x} and SO\textsubscript{2}. These performance improvements over the past five years are the result of shifts in production mix and the implementation of new technologies.
Fresh water withdrawal in the oil sands was up 12% from 2009 levels due mainly to increased production.

94% of water used in oil sands in situ production was recycled.

Conventional operations in Western Canada required 0.2 barrels of fresh water to produce one barrel of oil-equivalent.

Oil sands in situ production required 0.31 barrels of fresh water to produce one barrel of bitumen, compared to 0.4 barrels five years ago.

Oil sands mining production required 3.2 barrels of fresh water to produce one barrel of bitumen, compared to 3.4 barrels five years ago.

Source: 1 Government data
REDUCING FRESH WATER USE AND SAFEGUARDING WATER QUALITY.

ENVIRONMENT OBJECTIVE – CAPP members will continually improve environmental performance.

Canadians place a high value on the country’s fresh water resources. They want to know that our industry is using water responsibly, without undue negative impact on water quality or availability.

Depending on the location and nature of the operation, our industry uses many different types of water that include:

- Fresh water from surface water bodies or underground aquifers;
- Saline groundwater that is high in dissolved salt and is not suitable for domestic or agricultural uses;
- Recycled water that comes from municipal waste water treatment facilities or other poor quality sources; and
- Reuse of waste water from other oil and gas activities.

Industrial use of fresh water is strictly regulated in Canada, and the use of poor quality alternative sources is encouraged. A licence or permit is required to access surface water or fresh groundwater from Crown land, and the operator is responsible for monitoring the volume used. Each provincial government closely regulates the amount of water that is licensed for use, and must be satisfied that the amount being withdrawn each year is sustainable.

CAPP members are committed to safeguarding water resources through efficient use and ensuring appropriate systems are in place to minimize risk of contaminating natural water systems. Implementing technologies to maximize water recycling. One example is the use of evaporator technology by in situ developers to treat and produce cleaner feed water for steam generation. In 2013, in situ operators used 94 per cent recycled water for the generation of steam for injection.

In addition, our industry is working with provincial and federal government agencies to increase data collection and monitoring activities. These activities improve knowledge and management of regional surface and groundwater resources. In northeast British Columbia, for example, industry is working with the provincial government and others on a project to develop a regional groundwater monitoring network. With this data, analysis and knowledge, we will be better positioned to understand our environmental impact and where the greatest opportunities lie for improvement.

HOW OUR INDUSTRY USES WATER

- In oil sands mining, heated water is used to separate the sticky bitumen from sand and clay.
- In oil sands in situ operations, steam is generated to heat the bitumen underground, allowing it to flow to the surface.
- In older, conventional fields involving enhanced oil recovery, water is pumped down the well to force the oil out of the cracks and pores so it can be pumped to the surface.
- In hydraulic fracturing, water is pumped at high pressure into tight formations with low permeability to open fractures in the rock, allowing natural gas and crude oil to become mobile and flow to a well for recovery.
**FRESH WATER USE**

In 2013, Canada’s oil and gas industry withdrew a total of 264 million cubic metres of fresh water. Comparing the number of barrels of water used to the barrels of oil or oil equivalent produced per year is a useful means of evaluating performance. Overall, the fresh water used by industry each year represents a small fraction of the total volume used in the production process, as the majority of water can be stored and reused multiple times.

Industry’s fresh water use intensity (amount of fresh water withdrawn per barrel of production) has steadily improved in the oil sands in situ sector. From 2009 to 2013, in situ oil sands developers decreased the fresh water required to produce one barrel of oil by 27 per cent. This was done in part by enhancing water reuse capacity and by improving efficiency through the application of new technologies.

Total water withdrawal and fresh water use intensity for oil sands mining continue to be the highest among the key segments of the industry. This is due to the nature of the extraction and processing operations which require large volumes of water to remove bitumen from the sand deposits. Like the in situ operations, oil sands mines reuse a large proportion of the water needed for the process again and again, therefore, reducing the annual demand for fresh water from natural sources.

“Industry’s fresh water use intensity (amount of fresh water withdrawn per barrel of production) has steadily improved in the oil sands in situ sector.”

In 2013, there was a reported increase in fresh water use and intensity that was due in part to the start-up of new operations. As well, the total fresh water withdrawn and water use intensity for the Western Canada Sedimentary Basin (WCSB) has been reported differently in 2013 than in previous years. Prior to 2013, the Alberta government reported water volumes used for enhanced oil recovery, in situ and mining operations, but only reported on the volume allocated to industry for drilling and completions activities, as opposed to the volume of water actually withdrawn from water bodies and used for production. In early 2012, an improved reporting structure was introduced in the province under Directive 059, which requires hydraulic fracturing operators to report actual water use. As a consequence, starting in 2013, the fresh water use reported in the WCSB includes all water that was actually used for enhanced oil recovery, drilling and hydraulic fracturing activities. For earlier years (2009 to 2012), the fresh water reported includes a proportion that was used for enhanced oil recovery and a proportion that was allocated for hydraulic fracturing. Another shift in the reporting methodology that was implemented in 2013 was the inclusion of natural gas production volume in the calculation for fresh water intensity in the WCSB. Natural gas development accounts for a significant proportion of water use and production volume in Western Canada; by including barrels of oil equivalent in the calculation, the intensity metric is much more accurately reflected. For this reason, it is not appropriate to compare fresh water use or fresh water use intensity in 2013 to previous years.
In 2013, industry withdrew a total of 264 million cubic metres of fresh water. Oil sands mining continued to be the industry’s most water-intensive activity. In 2013, it accounted for 68 per cent of industry’s total fresh water withdrawal, while Western Canadian conventional oil and gas production accounted for 24 per cent. The remaining eight per cent was used for in situ oil sands production. These volumes do not include water that is recycled and reused.

In 2013, 3.2 barrels of fresh water were required to produce one barrel of oil from oil sands mining projects, and 0.3 barrels were used to produce one barrel of oil from oil sands in situ projects. A methodology change has resulted in a restatement of fresh water intensity use numbers for Western Canadian conventional oil and gas operations. In 2013, 0.2 barrels of fresh water were required to produce one barrel of oil or oil equivalent in Western Canada conventional and unconventional operations.
REDDUCING WATER WITHDRAWAL – CHALLENGES AND OPPORTUNITIES
A challenge facing the oil and gas industry is to reduce fresh water use per barrel of production while continuing to develop oil and gas resources. Research and development of technologies to improve water reuse and recycling rates remains a priority for our members in support of our objective to continually improve environmental performance.

In Western Canadian oil and gas operations, the increase in multi-stage hydraulic fracturing to access and develop shale gas has led to increased demand for water. Industry is addressing this demand by reducing reliance on fresh water sources through the use of these alternative water sources including:

- Brackish or saline groundwater (water from salty aquifers);
- Reuse of poor quality waste water (i.e., municipal waste water);
- Flowback (water injected during fracturing that flows back to the wellbore); and
- Produced water (water naturally present in the reservoir that is recovered during oil and gas production).

Within in situ development, CAPP member companies are continually improving water use intensity. As new recovery technologies evolve and are applied, producers continue to look for ways to improve the steam to oil ratio (the amount of steam needed to produce a barrel of oil). Some of the options they are exploring involve additives to steam, improved water treatment and boiler technologies that allow more water to be recycled when creating steam for injection.

Oil sands mining operators are also taking action to reduce fresh water requirements. These include increased use of water from mine tailings, developing a non-aqueous bitumen extraction process, and exploring ways to work cooperatively to coordinate water withdrawals from the Athabasca River, the water source for mining projects.

PROTECTING WATER RESOURCES – CHALLENGES AND OPPORTUNITIES
The oil and gas industry adheres to regulations and takes strict measures to protect surface water and groundwater quality and quantity.

As part of regulations, oil and gas companies design and construct wells to protect groundwater resources from being contaminated through the drilling and operational phases of the well. For example, both conventional and tight oil and gas wells are engineered with a steel surface casing that is cemented externally to prevent any fluids from migrating from the wellbore to drinking water aquifers.

Baseline data collection is required in many of the jurisdictions where CAPP members operate. For example, domestic water wells in close proximity to well pads must be sampled before drilling activity is to commence in Alberta and the results made available to residents. In British Columbia, operators are often required to install surface water quality monitoring equipment in the vicinity of hydraulic fracturing operations as a condition of licence approval. Oil sands producers and unconventional operators applying for water licences are required to conduct extensive water studies as part of the regulatory approval process, and must perform ongoing monitoring of surface and groundwater resources.

In addition, water quality and quantity are carefully monitored through industry and government initiatives.

CASE STUDY
NEW INFRASTRUCTURE SUPPORTS USE OF ALTERNATIVE WATER SOURCES
To effectively use alternative water sources, significant infrastructure such as water storage facilities, pipelines and deep saline wells are required. In Alberta and northeastern British Columbia, the industry is entering many new natural gas and tight oil fields. As these production areas are developed and begin to mature, economies of scale will support increased construction of infrastructure to enable more reuse and recycling of water. Infrastructure to access saline water, often deep underground and requiring special containment and handling for environmental and public safety, requires a detailed understanding of source reservoirs and that operators undergo lengthy approval and construction timelines. One example of the infrastructure under development is Encana’s creation of an innovative water resource hub, located near Dawson Creek, British Columbia. Here, Encana has installed a central facility to house and distribute produced water from existing energy wells, as well as saline water accessed from reservoirs deep underground. Additionally the facility enables the recycling of flowback water from well stimulations. These alternative sources of water, transported by pipeline from the hub to new well sites, will both significantly reduce area truck traffic and ultimately reduce the company’s surface water use in the region by up to 75 per cent.
The industry is making a significant investment (up to $50 million per year) in the Alberta and federal governments’ Joint Oil Sands Monitoring (JOSM) program, created to enhance environmental monitoring in the region and provide data-based assurance of environmental health. The program integrates and enhances environmental monitoring systems to assess the cumulative impacts of oil sands activity on water, biodiversity and air quality. The environmental monitoring data from Alberta’s oil sands region is available online at jointoilsandsmonitoring.ca/.

JOSM monitoring of water quality in the Athabasca basin is ongoing and builds upon the historic data collected by Environment Canada and the Regional Aquatics Monitoring Program (RAMP). As the program matures, the number of sites and availability of timely information will increase. For available information as of June 2012, no measured substances in the Athabasca River exceeded Canadian Council of Ministers of the Environment (CCME) guidelines (http://ceqg-rcqe.ccme.ca/). Industry has begun to review the findings as they emerge, and will use this information to plan for mitigation and minimization of future impacts.

A similar program is under development in British Columbia as part of the Northeast Water Strategy. Still in the early stages of development, industry is working with the government, regulator, local communities, First Nations and other industry sectors to develop a comprehensive plan for water management in the region that includes both surface and groundwater quantity and quality monitoring. Existing monitoring infrastructure in the area will continue to be maintained and reported on through the BC Oil and Gas Commission’s NorthEast Water Tool (NEWT) and Water Portal (https://www.bcogc.ca/public-zone/water-information).

ACHIEVING OUR OBJECTIVE OF CONTINUAL IMPROVEMENT

The best way to achieve continuous improvement in environmental performance is to fully understand the extent of our industry’s impact on water resources and to invest in technologies and best practices to reduce those impacts. Oil and gas operators in Canada support sound scientific data collection and are collaborating with each other, with government, communities and scientists to achieve this objective. Valuable data on the quality and quantity of water in the Athabasca region is being collected through various agencies, including Environment Canada, JOSM and the Alberta Environmental Monitoring, Evaluation and Reporting Agency (AEMERA). This data will help industry to understand and mitigate potential impacts to the system. Coordinated efforts to manage water withdrawals for mining operations have improved flows in the river during critical winter low flow periods. In addition, improvements in fresh water efficiency in oil sands in situ operations illustrate in real terms how collaboration and innovation can reduce the need for fresh water inputs.

In recent years, much attention has focused on the potential effects of hydraulic fracturing on groundwater and drinking water wells, potential spills and disposal of waste fluids. Regulations in British Columbia, Alberta and New Brunswick require disclosure of the specific chemical ingredients used during the hydraulic fracturing process. To further address public concerns, CAPP developed a set of guiding principles and operating practices for hydraulic fracturing. These guiding principles and practices support water management and encourage improvements in shale gas, tight gas and tight oil operations across Canada.

CAPP OPERATING PRACTICES FOR HYDRAULIC FRACTURING

Building on the laws that regulate hydraulic fracturing operations, use and water protection, oil and gas producers are encouraged to carry out CAPP’s operating practices for hydraulic fracturing.

These cover:
- Disclosure of fracturing fluid additives;
- Risk-based assessment and management of fracturing fluid additives;
- Baseline testing of fresh groundwater;
- Wellbore construction and quality assurance;
- Assessment and measurement of water sources;
- Fluid transport, handling, storage and disposal; and
- Assessment, monitoring, mitigation and response to the potential for anomalous induced seismicity in development areas.

Visit www.capp.ca/.
LAND

Photograph: Courtesy Syncrude Canada Ltd.; Roth & Ramberg Photography

Syncrude reclaimed mine site: trees and shrubs indigenous to the region and climate are planted as part of the reclamation process.

KEY FACTS (2013)

0.02% of Canada’s boreal forests has been disturbed by oil sands mining since development began almost five decades ago.

Active footprint of oil sands mines increased 22,100 hectares over the last five years and the area of land ready for reclamation or in some stage of reclamation increased by 800 hectares.

Number of wells in Western Canada in the final phases of land reclamation (active reclamation/remediation; monitoring/assessment or application for certification) is 22,500.

Number of wells abandoned each year (2010 to 2013) has ranged from approximately 2,100 to 2,700.

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ENVIRONMENT OBJECTIVE – CAPP members will continually improve environmental performance.

OVERVIEW

MANAGING IMPACTS
Industry knows oil and gas exploration and production have an impact on the land. The challenge—and the policy and regulatory requirement of governments—is to return the land to a productive self-sustaining landscape once operations have been completed. This is done most effectively by managing impact in three key areas: avoidance, mitigation and restoration of habitat.

Avoidance
The industry’s action in minimizing impacts is through early decisions on where to place infrastructure, such as well pads, and the routing of seismic lines, roads and pipelines. Using pre-development assessments, companies look for opportunities to avoid sensitive habitats, minimize the area needed for well sites and work with other users to reduce land footprint. This includes locating roads in such a manner that they can be shared by multiple operators. In addition, the use of multi-well pads in unconventional and in situ operations greatly reduces surface footprint relative to individual well sites.

Mitigation
As a project proceeds, industry designs and implements mitigation programs to reduce the extent of land disturbance at each phase of activity, from site preparation through exploration and production to final reclamation. Some of the ways industry mitigates impacts to land during operations involve planting vegetation to manage erosion, re-contouring and reclaiming smaller areas within the project footprint to speed up the eventual reclamation process, and building storage basins to contain surface runoff water. Throughout a project, oil and gas companies work with numerous stakeholders, including Aboriginal peoples, local communities, governments and landowners, to understand and address concerns about the project and its potential impact on the community, the land and biodiversity.

Reclamation
Industry is required to return the land to a productive self-sustaining landscape prior to receiving a reclamation certificate and handing the land back to government. The reclamation process involves:

- **Planning**: developing reclamation plans as part of project approvals;
- **Material handling**: salvaging top soil during project construction; replacing top soil on site, once the shape of the land has been formed and re-contoured;
- **Re-vegetation or reforestation**: collecting native seeds; fertilizing and seeding the land; planting trees and shrubs in the case of reforestation; and
- **Monitoring**: assessing the health of vegetation, trees and soil after reclamation.

A government reclamation certificate is only issued when the work meets all regulatory requirements and the approval writer is satisfied that the site will continue to function as a natural part of the landscape.

In some cases it is not possible to return an area back to its pre-development state (for example, lands which are predominantly low-lying wetlands before oil sands mining development are often reclaimed to upland areas due to hydrological, hydrogeological and geotechnical constraints). In these cases, it is the responsibility of the operator and the regulatory agency to work together to ensure that there is an equivalency of ecological function across the landscape once the project is complete.
Biodiversity

Oil and gas operations occur in very diverse landscapes. These landscapes are living breathing entities, also known as ecosystems. These ecosystems are home to many species of plants and animals existing in balance. The variability of species and balance are known as biological diversity or biodiversity. Industry must explore for, develop and operate oil and gas activities while minimizing impact on the land and biodiversity. With the vast variability of biodiversity from one area to the next, even in close proximity to one another, it is extremely difficult to quantify biodiversity.

Monitoring systems have been built to measure aspects of biodiversity, albeit not consistently. Global and national performance metrics (for example, Environmental Performance Index and Social Progress Index) rely on surrogates for biodiversity, such as total terrestrial and marine protected area. To date, this has been the most globally consistent means for reporting on biodiversity conservation. While this approach may offer some assurance that biodiversity is managed, it is often insufficient to address dynamic processes that help to maintain biodiversity.

Oil and gas companies, like other land users, have a sense of whether the design of projects and land use serves to increase, maintain, or diminish different species or ecosystem types. Our members survey and measure the abundance of individual species of interest or concern in their operating areas. They implement specific management actions to address impacts to those species. As an industry, it is not presently possible to articulate any one or two metrics that can adequately speak to biodiversity across our members’ operations, or even in a business area as large as oil sands or the Western Canada Sedimentary Basin. We continue to follow the science and look for appropriate ways of reflecting our industry’s performance on the land.

In view of this challenge, CAPP members are considering options to meaningfully contribute to and report out on biodiversity management. In the coming year, we plan to shift our approach to better understand the global context for performance expectations about biodiversity, and Canada’s performance in order to define a meaningful and relevant role for the upstream oil and gas industry. This more strategic approach will allow the oil and gas industry to consider our role in a shared land base so that industry can meaningfully contribute to biological diversity in a way that is valued by Canadians and the world.
ACTIVE, INACTIVE AND ABANDONED WELLS IN WESTERN CANADA

Active wells are defined as those that have reported production at some point during the previous calendar year. In 2013, there were 213,736 active conventional and unconventional wells in Western Canada.

A well may be considered inactive when it is capable of producing but has no reported production during the previous calendar year. Inactive well status depends on a number of factors, including the age of the reservoir, future potential, location, ease of re-entry and economic viability of the well. When, for instance, operating costs for a well exceed the price received for gas, the operator may shut in and monitor the inactive well until such time as it again becomes economic for production. This approach allows the opportunity to avoid drilling new wells (with the associated cost and disturbance) when existing reservoir potential remains to be accessed. Inactive wells contribute to environmental liability so industry and regulators carefully manage and monitor these wells. Balancing inactive and abandoned wells is critical to both industry and government.

Regulations require permanent abandonment (cutting, cementing and capping the well below the surface), within two years of a well having reached the end of its productive life. Once an abandonment certificate has been received, the site proceeds through the stages of active reclamation (material handling and re-contouring, re-vegetation and monitoring).

In 2013, Western Canada saw a one percent reduction in the number of active wells and a 0.1 per cent increase in the number of inactive wells compared to 2012. The number of abandonment certificates issued in 2013 increased by 14 per cent compared to 2012. The data suggests that while the number of active and inactive wells are not changing significantly year over year, the number of sites entering into the reclamation process are increasing. When numbers are compared to 2009 data, active wells increased by 10 per cent, inactive wells increased by 21 per cent and well abandonments increased by 39 per cent. The number of inactive wells is responsive to market uncertainty and natural gas prices.

Status of Abandoned Wells in 2013 - Western Canada

- Temporarily Deferred Abandoned Wells: 23%
- Abandoned Wells in Active Reclamation/Remediation: 52%
- Abandoned Wells in Monitoring/Assessment or Application: 25%

A total of 2,477 wells were abandoned in 2013 in Western Canadian oil and gas operations, compared with 2,164 in 2012.

In Western Canada, industry has reported a cumulative total of 30,000 abandoned wells to date. Of this total, 75 per cent are in the final two phases of reclamation: active reclamation/remediation and monitoring/assessment or application for regulatory certification.
LIABILITY MANAGEMENT

Industry and regulators want to ensure that abandonment and reclamation liabilities are estimated appropriately and that adequate funding is in place to reclaim oil and gas sites at the end of their life. The Alberta Energy Regulator, formerly the Alberta Energy Resources Conservation Board, implemented changes to the Licensee Liability Rating (LLR) Program in 2013. The LLR program compares a licensee’s assets with its liabilities, and requires companies to post security if liabilities exceed the licensee’s assets. This program provides risk mitigation for remediation work should an operator be financially unable to meet its remediation liability obligation.

Also in existence is the Orphan Well Fund. The fund pays for the abandonment and reclamation of upstream oil and gas orphaned wells, facilities and pipelines. An orphan is a well, pipeline, facility or associated site which has been investigated and confirmed as not having any legally responsible or financially able party to deal with its abandonment and reclamation. The fund is paid for entirely by the industry.

OIL SANDS MINES AND IN SITU

Reclamation planning begins during the first phase of project design. A reclamation plan covering the life of the project is required prior to project approval. Oil sands producers perform reclamation on an ongoing basis on land no longer being used for oil production. This practice is called progressive reclamation.

Since operations began in the 1960s, about nine per cent of our industry’s active oil sands mining footprint has been or is being reclaimed. Since 2009, the total active footprint of oil sands mines increased by 33 per cent. Of that area, the land ready for reclamation or in some stage of reclamation increased by 11 per cent.

In 2013, 91 per cent of the total active footprint for oil sands mining operations was cleared or disturbed land and nine per cent was ready for reclamation or being reclaimed. This is a slight change from 89 per cent and 11 per cent respectively in 2009.

Given the long life cycle of oil sand operations (a typical oil sands mine has a 25 to 50 year lifespan and an in situ operation runs for 10 to 15 years), much of the industry’s reclamation activity is still in the early stages. Companies are evolving their operations and the technologies used to reduce their footprints, and continue to pursue ways to manage impact on the land.
LAND USE PLANNING
CAPP and the industry are active participants in regional land use planning. On behalf of members, CAPP has provided input to the following initiatives:

**British Columbia:**

**Alberta:**
Lower Athabasca Regional Plan (completed), South Saskatchewan Regional Plan (in progress), Southeast Alberta Conservation Offset Pilot Project (in progress), Biodiversity Management Frameworks (planned).

**Saskatchewan:**
South of the Divide Multi-species Action Plan (in progress).

Through the various plans, governments are expected to introduce a suite of planning tools that will guide industry in developing projects in different regions.

RECLAIMING TAILINGS PONDS – CHALLENGES AND OPPORTUNITIES
Settling ponds—also known as “tailings” ponds—are found at all oil sands mining sites. These large, engineered dam and dyke systems are designed to contain the water, sand, fine clays, silts, and residual bitumen that are by-products of the oil sands mining and extraction process. The combination of these by-products is called tailings.

Tailings ponds are settling basins that enable process water to be separated and continuously recycled. Tailings are managed within a closed-circuit drainage system that helps maintain the structural integrity of the ponds and ensures that no tailings or process-affected water (i.e., water use in the bitumen extraction process) are allowed off-site. Clarified water from tailings ponds is reused in the mining operations and now is also being used for in situ production. At the end of their useful life, tailings ponds are required to be reclaimed into self-sustaining landscapes.

Under CAPP’s guiding principles for oil sands development, industry is committed to progressively reclaiming all lands disturbed by oil sands operations, returning them to self-sustaining landscapes. Technology development is the key performance area to achieve tailings reduction. This is a multi-year (multi-decade) program to research and develop tailings technology. Currently, there is not one technology (including end pit lakes) that is considered a proven technology. It will take many years to prove which of the many technologies being pursued provide optimal performance while being cost effective. This effort is being co-ordinated by Canada’s Oil Sands Innovation Alliance (COSIA), www.cosia.ca.

Moreover, the Alberta government requires all oil sands operators to have plans in place to convert fine tailings to reclaimable landscapes. The total footprint of all oil sands tailing ponds, including associated structures such as ditches and dykes, occupies an area of 182 square kilometres. The total area within those ponds that is covered by fluids is 77 square kilometres.

Reclamation of tailings and meeting our environmental performance objective in this area will be achieved through:

1. Eliminating fluid containment dams in the closure landscape.
2. Establishing a stable closure landscape, with sustainable and diverse ecosystems, within a reasonable time after cessation of mining.
3. Developing sustainable surface drainage including a functional lake system.
4. Facilitating progressive reclamation (i.e., the reclamation of mine areas, to the extent practical during mine life, to reduce post-closure liability).
5. Optimizing full life-cycle costs and minimizing life-cycle environmental impacts without compromising reclamation and closure objectives.
6. Understanding technical uncertainties and appropriately managing their associated residual risks.
LAND IMPACTS AND BIODIVERSITY

Oil and gas development can affect plants and wildlife in numerous ways. Impacts occur when operations disrupt the habitat of a species—for example, by clearing land for well sites or mining. Linear developments such as roads, seismic lines and pipeline rights-of-way can affect wildlife by creating travel corridors for predators such as wolves. Aerial deposition of contaminants or surface runoff can also impact aquatic species.

Producers are pursuing a variety of approaches to protect biodiversity across the industry’s working landscape. In planning their projects, they look for opportunities to avoid sensitive habitats, optimize the area needed for well sites and work with other users to reduce the disturbance footprint by sharing roads and pipelines and employ technologies to minimize emissions. They also maintain site hygiene to deter animals, and use deterrence tools and programs to keep wildlife from harm.

Oil and gas companies share the land base with many land users. For this reason, the maintenance of biodiversity is the shared responsibility of all land users.

Many oil and gas companies recognize these challenges and have chosen to invest and participate in a range of biodiversity enhancement programs outside their operating footprint, including:

- Conservation easements on private lands;
- Conservation offset projects that enhance wildlife habitat;
- Industry research to better understand interactions with wildlife and their habitat, and to enable continued improvement in operating practices; and
- Breeding programs that support population recruitment and enhancement for species at risk.

As part of COSIA’s Algar Habitat Restoration Project, techniques are being developed to help restore past linear land disturbance within 56,000 hectares of critical woodland caribou habitat in northern Alberta.
BIODIVERSITY – CHALLENGES AND OPPORTUNITIES

Protecting sensitive land and aquatic features and biodiversity is a shared responsibility for all users on any landscape. There is an increasing need for government to provide clarity on priority land values in different regions where oil and gas development is taking place. At the same time, industry recognizes that, working with government and others, it can play a constructive leadership role. Industry is taking action through:

- **Participation in multi-stakeholder land use strategies** such as Saskatchewan’s South of the Divide Multi-species Action Plan. CAPP and industry members have participated in the development of the plan to protect multiple species and the establishment of a land users committee. The committee’s goal is to support more coordinated and integrated land use to make room for species and their habitat.

- **Funding environmental monitoring programs.** These include the Alberta and federal governments’ Joint Oil Sands Monitoring program, which is expected to strengthen environmental monitoring programs for air, water, land and biodiversity in the oil sands region.

- **Investing in industry research.** The industry is developing different tools to reduce industry’s footprint, accelerate land reclamation and preserve biodiversity through organizations such as Canada’s Oil Sands Innovation Alliance (COSIA).

Measuring species and habitat health is relatively new as it relates to oil and gas development. While certain species have been measured and monitored individually, how their health relates to an overall ecosystem has not been assessed.

Today, the leading source of information for industry on species health is the Joint Oil Sands Monitoring Program. While this program is unique to the Athabasca region, the Alberta government is moving to establish monitoring across the province. And while the information we have today is limited to the lower Athabasca region, we continue to work with governments in all our operating areas to enhance species monitoring and understanding.

> Today, the leading source of information for industry on species health is the Joint Oil Sands Monitoring Program.

Monitoring in the oil sands (lower Athabasca region) has provided us with the following ecosystem health information to date:

- Invertebrates (Hyalella) artificially exposed to three sites on the Ells, Steepbank and Firebag rivers for two weeks in 2010, 2012, and 2013 showed no effects on survival or growth of these organisms.

- A significant amount of bird surveying has been undertaken since 2010 and the results are currently being studied to determine why bird populations may or may not be increasing or decreasing; to predict population sizes within the oil sands region; and to assess cumulative effects of development on bird populations. Industry is looking to this data and analysis to help in the responsible development of the oil sands region, and in other geographical regions in the future.
CASE STUDY
ENHANCING HABITAT FOR ARCTIC GRAYLING

Canadian Natural Resources Limited’s Horizon Oil Sands mining project contains bitumen resources that underlay the Tar and Calumet river watersheds. Avoidance of the local watersheds was impossible for development to proceed, so to mitigate the planned disturbance Canadian Natural chose to construct the first fisheries compensation lake in Alberta’s oil sands region in May 2008.

Horizon Lake, also known by its Cree name Wapah Sakahikan, represents a unique alternative to addressing environmental impacts to fish habitat. Developed in close consultation with local people and incorporating Aboriginal traditional knowledge in its design, the lake is a self-sustaining ecosystem with a growing population of native fish species.

Canadian Natural has continued to enhance fish habitat near the lake by improving summer feeding and overwintering habitat for Arctic Grayling, a regionally sensitive fish. This project involved applying innovative measures to increase species population such as installing a rock weir and scour pools in an inlet river to create deeper water habitat.

The company is monitoring the project’s success, using fish fences, hydroacoustic technology and implanted tags to track fish movement and measure species abundance and habitat use. Canadian Natural is sharing the learnings and data from its Horizon Lake experience with stakeholders and other operators.

For more case studies, see the RCE Awards at www.capp.ca/.

ACHEIVING OUR OBJECTIVE OF CONTINUAL IMPROVEMENT

Understanding the environment in which we operate is critical to improving our environmental performance. We continue to promote and work with governments and others on broad-based environmental monitoring to assist ourselves and stakeholders in understanding our impact on the environment and to inform mitigating actions. JOSM and the Wood Buffalo Environmental Association are two such monitoring organizations; others, in British Columbia, for instance, are in their formative stages.

Remediation of our leases is key to ensuring we meet expected environmental performance of returning well sites and closed operating sites to a sustainable landscape. We saw progressively more wells move toward this goal as 313 more wells were abandoned in 2013 than 2012 and only 56 more wells were moved to inactive status. Abandonment reduces liability. Liability is also addressed through the revised Licensee Liability Rating Program and the Orphan Well Fund, both fully funded by industry. These programs support industry in ensuring remediation of all well sites back to a sustainable landscape prior to return to the Crown.
EMERGING ISSUES

TIGHT OIL AND GAS
CAPP adopted guiding principles for hydraulic fracturing in 2011 and several operating practices for hydraulic fracturing in natural gas development in 2012. The practices address sound wellbore construction, alternatives to fresh water use and the recycling of water, disclosure of fluid additives, and management of induced seismicity. CAPP has since applied those practices to all hydraulic fracturing operations including tight oil development. Since their adoption, CAPP has used the practices to inform conversations with governments and regulators. As an example, the provinces of British Columbia and Alberta have since mandated fluid additive disclosure through regulation. CAPP has also embarked upon a community engagement program to inform and engage community members in operating areas on issues regarding hydraulic fracturing and development more generally.

SAFE AND RESPONSIBLE TRANSPORTATION TO MARKETS
With the oil and gas industry’s growth, Canada’s upstream producers continue to support industry initiatives directed at safe transportation of oil and natural gas products across the value chain and are focusing efforts on the review of safety standards and regulations.

Transportation of oil and natural gas extends the full length of the value chain: from the production to the pipelines, rail and marine industries and from the East Coast, West Coast and U.S. Gulf Coast. This necessitates a much broader engagement by the upstream oil and gas industry, not only with the suppliers of transportation directly, but efforts to seek alignment with industry associations such as the Canadian Energy Pipeline Association, the Railway Association of Canada and the marine shipping agencies such as the Chamber of Shipping of British Columbia, to name a few.

PIPES
Pipelines remain the safest way to transport large volumes of energy over long distances for long periods of time. Pipeline companies take active steps to ensure that health, safety, security and environmental concerns are addressed through the planning, construction and operational phases of pipeline operations. Pipeline companies also have in-house integrity management programs that are employed to prevent releases by evaluating, inspecting and maintaining their pipelines. CAPP member companies have supported the pipeline companies’ efforts to achieve best practices regarding integrity management programs.

In addition to supporting the safety of interprovincial transmission pipelines, CAPP is exploring opportunities to directly improve the safety and integrity of producer-owned pipelines. In March 2014, CAPP established a High Consequence Area Task Group to identify and evaluate options that can help strengthen existing pipeline integrity management programs for all upstream producing companies, and reduce the frequency and consequence of pipeline incidents in Alberta. A focus for the group will be to identify options to reduce incidents in areas where the impact of the incident can lead to significant social and environmental consequences.

In the transportation of oil and natural gas, the focus is on safety. For example, the Canadian Energy Pipeline Association’s (CEPA’s) Integrity First Program requires member companies to commit to the Integrity First policy statement and principles on pipeline safety, environmental protection, socio-economic benefits and community involvement around pipeline projects. In this regard, CAPP seeks to align our industry’s actions and programs with those of CEPA to ensure consistency and quality across the value chain.

An oil containment boom is deployed during Synergy, an annual on-water spill response exercise organized by offshore operators in Newfoundland and Labrador.

Photograph: Courtesy Hibernia Management and Development Company Ltd.
RAIL SAFETY

Rail has always been a transportation option for fuels, such as diesel and gasoline, especially to connect remote markets to refineries. The recent growth in crude transport by rail is the result of a significant increase in Canadian crude oil production, and U.S. oil production from the Bakken formation in conjunction with near-term pipeline infrastructure limitations. Producers are working with government and rail operators on new measures to enhance the safety of rail transport of dangerous goods.

Our industry broadly supports the measures announced and will continue to work with service providers and Transport Canada to ensure the safe delivery of our products.

In April 2014, the federal government announced new safety measures for rail transportation to be enforced by Transport Canada. These measures include, for example, upgrading the safety of rail cars transporting dangerous goods, enhancing emergency preparedness and response capability and improving liability provisions related to rail transportation of certain dangerous goods.

Our industry broadly supports the measures announced and will continue to work with service providers and Transport Canada to ensure the safe delivery of our products.

In a collaborative effort to enhance rail safety, CAPP, the Railway Association of Canada and the Canadian Fuels Association formed an industry task force. The task force developed an emergency response assistance plan framework and identified the Liquid Petroleum Gas Emergency Response Corporation (LPGERC) to design and implement the framework. LPGERC will create an enhanced national spill and fire emergency response capability through a single entity to meet the needs of shippers, first responders and government agencies in the event of an incident involving flammable liquids on rail.

MARINE OIL TRANSPORT

Canada has decades of experience in the safe marine transportation of oil along the East and West coasts. Today about 580 million barrels of oil are shipped safely each year along Canada’s coasts.

Our industry works closely with governments and the marine tanker industry to support a world-class marine tanker safety system that ensures oil and natural gas products continue to be transported safely in Canadian waters.

In May 2014, in response to an anticipated increase in marine traffic, Transport Canada announced measures to enhance Canada’s world-class marine tanker safety system. Among the measures are:

- Modernization of Canada’s marine navigation system, including taking a leadership role in implementing “e-navigation,” a system that provides accurate, real-time information on navigation hazards, weather and ocean conditions;
- Establishment of area response planning partnerships for regions that have current or projected high levels of tanker traffic;
- Amending legislation to provide use of alternate response measures such as chemical dispersants;
- Conducting additional research into the behaviour of different formulations of heavy oil products when spilled in marine environments; and
- Strengthening the polluter-pay principle by significantly increasing industry compensation funding available in the event of a single incident.

CAPP was a participant in the expert panel process which provided recommendations on which many of the measures are based.

DEFINITION

Dispersants – chemical agents designed for use in marine environments to speed up natural oil dispersion. They can be rapidly sprayed onto an oil spill by a specially equipped aircraft or vessel, or injected directly into a subsea spill. For more information, visit www.capp.ca to read new fact sheet on dispersants.
### NATIONAL DATA TABLE
Five Year Trend Responsible Canadian Energy Aggregated Data - National

<table>
<thead>
<tr>
<th>Key Metric</th>
<th>Metric</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PEOPLE</strong></td>
<td></td>
</tr>
<tr>
<td>Fatalities</td>
<td>Worker fatalities (Number/yr)</td>
</tr>
<tr>
<td></td>
<td>2009</td>
</tr>
<tr>
<td>Employee Total Recordable Injury Frequency (TRIF)</td>
<td>0.60</td>
</tr>
<tr>
<td>Contractor Total Recordable Injury Frequency (TRIF)</td>
<td>0.94</td>
</tr>
<tr>
<td>Combined Total Recordable Injury Frequency (TRIF)</td>
<td>0.85</td>
</tr>
<tr>
<td><strong>AIR AND ENERGY MANAGEMENT</strong></td>
<td></td>
</tr>
<tr>
<td>Air emissions</td>
<td></td>
</tr>
<tr>
<td>SO₂ emissions (tonnes/yr)</td>
<td>228,448</td>
</tr>
<tr>
<td>SO₂ intensity (tonnes per 10³m³ OE of production)</td>
<td>0.72</td>
</tr>
<tr>
<td>NO₂ emissions (tonnes/yr)</td>
<td>299,852</td>
</tr>
<tr>
<td>NO₂ intensity (tonnes per 10³m³ OE of production)</td>
<td>0.93</td>
</tr>
<tr>
<td>Greenhouse gas (GHG) emissions</td>
<td></td>
</tr>
<tr>
<td>Total CO₂ equivalent emissions (tonnes/yr)</td>
<td>100,635,352</td>
</tr>
<tr>
<td>Tonnes GHG emitted per 10³ OE of production</td>
<td>0.31</td>
</tr>
<tr>
<td><strong>WATER MANAGEMENT</strong></td>
<td></td>
</tr>
<tr>
<td>Fresh water withdrawal</td>
<td></td>
</tr>
<tr>
<td>Fresh water withdrawal for Western Canada Sedimentary Basin operations (millions m³/yr)</td>
<td>46.7</td>
</tr>
<tr>
<td>Fresh water withdrawal for in situ operations (millions m³/yr)</td>
<td>16.6</td>
</tr>
<tr>
<td>Fresh water withdrawal for mining operations (millions m³/yr)</td>
<td>162.4</td>
</tr>
<tr>
<td>Fresh water as a percentage of total water withdrawal</td>
<td></td>
</tr>
<tr>
<td>Fresh water as a percentage of total water withdrawal for Western Canada Sedimentary Basin operations (%)</td>
<td>64%</td>
</tr>
<tr>
<td>Fresh water as a percentage of total water withdrawal for oil sands in situ operations (%)</td>
<td>50%</td>
</tr>
<tr>
<td>Fresh water withdrawal per barrel of production</td>
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<tr>
<td>Fresh water withdrawal per barrel of production for Western Canada Sedimentary Basin operations (bbl/bbl)</td>
<td>0.14</td>
</tr>
<tr>
<td>Fresh water withdrawal per barrel of production for oil sands in situ operations (bbl/bbl)</td>
<td>0.43</td>
</tr>
<tr>
<td>Fresh water withdrawal per barrel of production for oil sands mining operations (bbl/bbl)</td>
<td>3.4</td>
</tr>
<tr>
<td><strong>LAND MANAGEMENT</strong></td>
<td></td>
</tr>
<tr>
<td>Active and inactive wells</td>
<td></td>
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<tr>
<td>Active wells</td>
<td>194,793</td>
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<tr>
<td>Inactive wells</td>
<td>82,182</td>
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<tr>
<td>Annual well abandonments</td>
<td>1,779</td>
</tr>
<tr>
<td>Status of abandoned wells in reclamation</td>
<td>First reported in 2011</td>
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<tr>
<td>Temporarily deferred abandoned wells</td>
<td>8,975</td>
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<tr>
<td>Abandoned wells in active reclamation/remediation</td>
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<tr>
<td>Abandoned wells in monitoring/assessment or application</td>
<td>5,866</td>
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<tr>
<td>Annual reclamation certifications or releases received</td>
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<tr>
<td>Oil sands in situ</td>
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<tr>
<td>Wells in operation</td>
<td>17,268</td>
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<tr>
<td>Annual well abandonments</td>
<td>135</td>
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<tr>
<td>Annual reclamation certifications or releases received</td>
<td>53</td>
</tr>
<tr>
<td>Oil sands mining</td>
<td></td>
</tr>
<tr>
<td>Total active footprint (ha)</td>
<td>67,419</td>
</tr>
<tr>
<td>Total area cleared or disturbed (ha)</td>
<td>59,810</td>
</tr>
<tr>
<td>Total area in reclamation or reclaimed and not certified (ha)</td>
<td>7,609</td>
</tr>
</tbody>
</table>

*Combined* includes both employees and contractors in TRIF calculation

1 Absolute GHG emissions and GHG emissions intensity for 2009 to 2012 have been restated from prior reports to reflect updated data from CAPP members. The restated data does not substantively alter trends discussed in previous reports.

2 A reporting methodology change has resulted in a restatement of fresh water withdrawal and fresh water intensity use numbers for Western Canada Sedimentary Basin operations. The restated data does not substantively alter trends discussed in previous reports.

3 A reporting methodology change has resulted in a restatement of active and inactive well numbers, and well abandonment and reclamation numbers. Oil sands in situ wells are now reported separately from non-oil sands wells. The restated data does not substantively alter trends discussed in previous reports.

4 Calculated based on water actually used for production, i.e., not including water used for camps, field offices, refining and upgrading.

N/A - Not available
ABOUT THE CANADIAN ASSOCIATION OF PETROLEUM PRODUCERS

The Canadian Association of Petroleum Producers (CAPP) represents companies, large and small, that explore for, develop and produce natural gas and crude oil throughout Canada. CAPP’s member companies produce about 90 per cent of Canada’s natural gas and crude oil production. CAPP’s associate members provide a wide range of services that support the upstream crude oil and natural gas industry. Together, CAPP’s members and associate members are an important part of a national industry with revenues of about $120 billion a year. CAPP’s mission, on behalf of the Canadian upstream oil and gas industry, is to advocate for and enable economic competitiveness and safe, environmentally and socially responsible performance.

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ENVIRONMENTAL BENEFITS STATEMENT

The savings below are achieved when post-consumer recycled fiber is used in place of virgin fiber. This report uses 790 lb(s) of Rolland Enviro Satin paper which has a post-consumer recycled content of 100 per cent. By using the environmentally friendly paper, in a print run of 1,000 copies, CAPP is contributing to saving the following resources:

7 TREES

24,521 L OF WATER

870 days of water consumption

301 KG OF WASTE

6 waste containers

986 KG CO₂

6,596 km driven

6 GJ

27,250 60W light bulbs for one hour

1 KG NOx

emissions of one truck during four days