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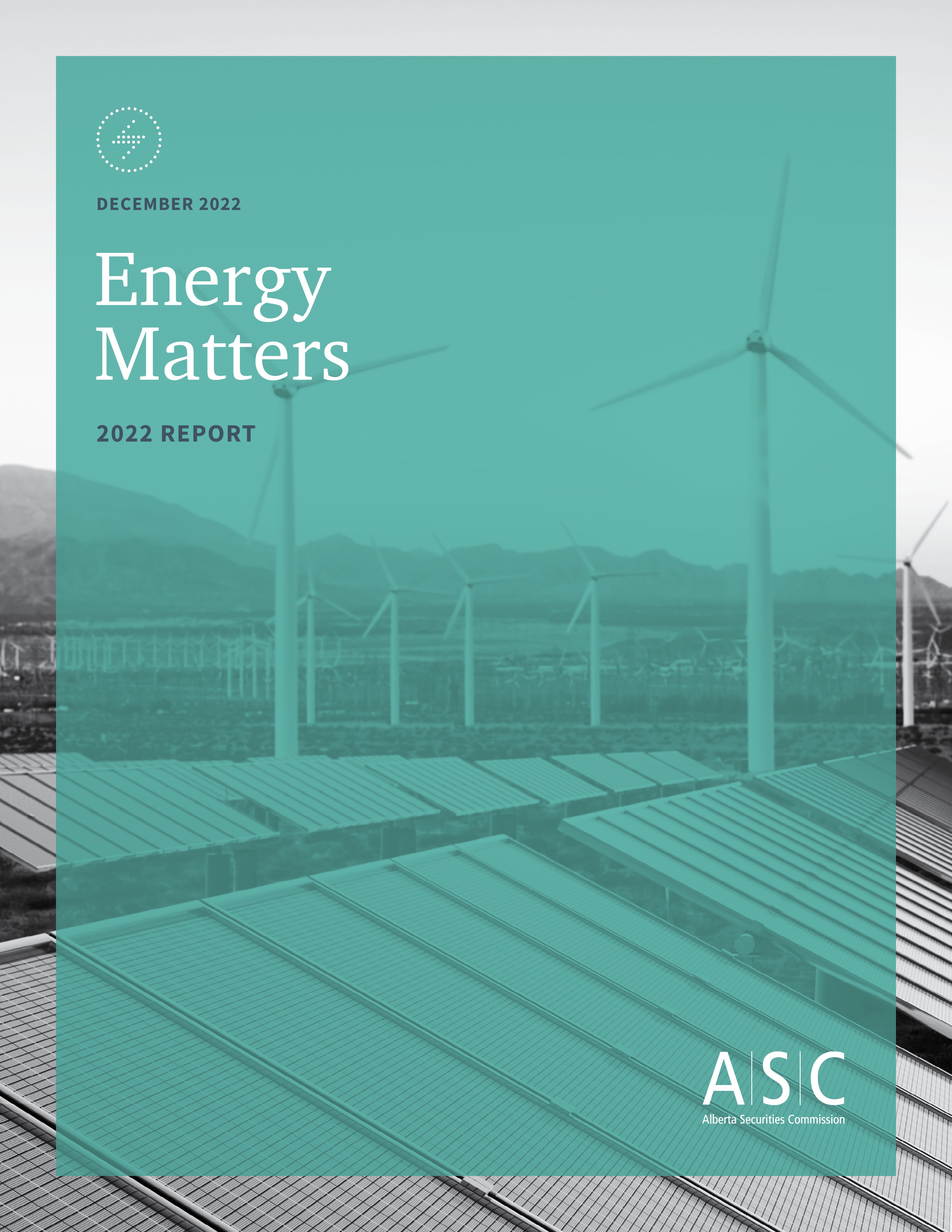
Energy Matters

2022 REPORT



Alberta Securities Commission

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As the energy industry evolves, it remains critical that investors have access to balanced, accurate and high-quality reporting to help inform their investment decisions.

One of the Alberta Securities Commission (ASC)'s strategic pillars contemplates protecting investors and market integrity including through effective compliance oversight and education. Another strategic pillar involves engagement, including with issuers and their professional advisers.

We are pleased to share with you the ASC's 2022 Energy Matters Report. This report and the related seminar planned for January 2023 are important aspects of our strategic objectives. I hope that reporting issuers and their advisers will find this report to provide useful practical guidance to help understand and comply with the obligations under National Instrument 51-101 *Standards of Disclosure for Oil and Gas Activities* (NI 51-101) and the related requirements of Alberta securities laws.

This report is based on the reviews and analysis conducted by our Energy Group, a team of geologists, engineers and energy analysts. It provides guidance in areas where we have identified that issuers may be experiencing challenges. It clarifies requirements relating to *independent* and *qualified* reserves evaluators and auditors, and certain areas of confusion between NI 51-101 and the Canadian Oil and Gas Evaluation Handbook. In addition, it provides guidance on reserves reconciliations and oil and gas reserves estimates.

Building on the broader energy focus introduced in last year's Energy Matters Report, this year's report responds to questions raised in relation to the disclosure of helium production, renewable hydrocarbons and geothermal energy. It also provides insight into the extent of emissions and environmental disclosure being made by energy issuers, and provides an overview of financing activity by issuers engaged in oil and gas activities or the broader energy sector.

To further assist issuers, we held a webinar in June 2022 entitled *Beginner's Guide to National Instrument 51-101 Standards of Disclosure for Oil and Gas Activities*. A recording of it is available on the ASC website. We hope to offer similar sessions in the coming year, as well as sessions on more advanced topics. We welcome your suggestions on areas of particular interest.

Please feel free to reach out to our team with any questions.

Yours truly,

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Introduction

1.1 GENERAL

The Alberta Securities Commission (**ASC**) administers Alberta's securities laws and is the lead regulator for oil and gas and other energy-related disclosure within the Canadian Securities Administrators (**CSA**), the umbrella group of Canada's securities regulators. Alberta securities laws are comprised of the *Securities Act* (Alberta) (**Act**) and the rules, regulations and decisions made under the Act. Alberta securities laws are intended to protect investors and foster a fair and efficient capital market. ASC staff endeavour to ensure investors have access to the disclosure necessary to make informed investment decisions and that it is balanced, authentic, relevant and reliable.

The ASC's Energy Group, staffed with technical experts, is part of the Corporate Finance division. It is responsible for overseeing disclosure from reporting issuers (**RIs**) for which the ASC is the principal regulator (**AB RIs**). While the review of oil and gas-related disclosure remains a core responsibility, the Energy Group's responsibilities have adjusted to accommodate Alberta's continuously evolving capital market and energy industry. This market includes a multitude of issuers in various energy-related sub-industries, increasingly focused on sustainable energy development, including greenhouse gas (**GHG**) emissions reduction. Adapting to this, the Energy Group now applies its specialized technical expertise to the broader energy industry, reviewing oil and gas and other energy-related disclosure from AB RIs. It also provides assistance to other securities regulators within the CSA concerning certain energy matters.

The Energy Group's specific responsibilities include:

- Review of oil and gas disclosure, including reserves and resources other than reserves and other oil and gas information, from issuers that report under National Instrument 51-101 *Standards of Disclosure For Oil and Gas Activities* (**NI 51-101**);
- Development and maintenance of guidance related to NI 51-101 and recommending amendments to NI 51-101;
- Review of other energy-related disclosure from RIs for which the ASC is the principal regulator;
- Monitoring of energy-related trends, technologies and developments, including those related to GHG emissions, and their relationship to Alberta's capital market;
- Review of disclosure concerning energy-related environmental liabilities;
- Monitoring and review of disclosure concerning GHG emissions and other environmental sustainability matters;
- Engagement with other ASC Corporate Finance division staff to develop disclosure requirements and guidance related to GHG emissions; and
- Engagement with Alberta capital market participants through our advisory committees, publications, webinars, presentations, inquiries and other outreach.

As stated above, the Energy Group's mandate includes energy disclosure from energy-related RI's for which the ASC is the principal regulator. The following subject matter is included in this mandate:

- Oil and gas activities as defined in NI 51-101;
- Oil and gas midstream (including pipelines) and oil and gas services;
- Petrochemicals;
- Renewable energy via wind, solar, hydro and geothermal;

- Nuclear energy;
- Exploration and development of helium;
- Hydrogen;
- Renewable hydrocarbons, also referred to as "green hydrocarbons" and "biofuels;"
- Carbon capture, utilization, storage (**CCUS**) and related technologies;
- Lithium recovered from oilfield brines (battery usage);
- Electrical generation, transmission and storage;
- Energy-related environmental liabilities;
- GHG emissions, monitoring and reporting;
- Green or transition financing initiatives; and
- Energy-related services.

This 2022 Energy Matters Report (**Report**) provides information about oil and gas, in addition to other energy-related subjects. The information addresses:

- Oil and gas disclosure from RIs engaged in oil and gas activities;
- Disclosure from other energy-related RIs for which the ASC is the principal regulator, including those involved in the exploration and development of helium, renewable hydrocarbons and geothermal energy;
- Results of reviews of disclosure concerning GHG emissions and other environmental sustainability matters in respect of energy-related RIs;
- Energy and the Alberta capital market; and
- Energy Group activities.

Please note that a glossary of selected terms related to oil and gas activities is located in section 8 of this Report.

1.2 OVERVIEW

Energy is of critical importance to the world, ensuring basic human needs are met, while providing employment opportunities and tax revenues that improve and maintain standards of living. Canada's energy industry continues to have a major economic impact at home and abroad, demonstrating exceptional technical expertise, innovation and leadership. This is particularly important as the industry responds to significant challenges attributed to energy diversification and increasing scrutiny and accountability with respect to GHG emissions and other sustainability concerns.

In 2022, the Energy Group continued to review general and required annual oil and gas disclosure to assess its compliance with securities law disclosure requirements, including NI 51-101 and its related forms. NI 51-101 sets out the general disclosure standards and specific annual disclosure requirements for RIs engaged in oil and gas activities. Under section 2.1 of NI 51-101, RIs engaged in oil and gas activities are required to file the following with the securities regulatory authority on an annual basis:

- Form 51-101F1 *Statement of Reserves Data and Other Oil and Gas Information* (**Form 51-101F1**);
- Form 51-101F2 *Report on [Reserves Data][,] [Contingent Resources Data] [and] [Prospective Resources Data] by Independent Qualified Reserves Evaluator or Auditor* (**Form 51-101F2**); and
- Form 51-101F3 *Report of Management and Directors on Oil and Gas Disclosure* (**Form 51-101F3**).

In addition, specific circumstances may necessitate the filing of:

- Form 51-101F4 *Notice of Filing of 51-101F1 Information*, or
- Form 51-101F5 *Notice of Ceasing to Engage in Oil and Gas Activities*.

Per NI 51-101, specified disclosure must be prepared in accordance with the Canadian Oil and Gas Evaluation Handbook (**COGE Handbook**), which is maintained and distributed by the Society of Petroleum Evaluation Engineers (**SPEE**) (Calgary Chapter) (www.speecanada.org). The COGE Handbook is amended from time to time and oil and gas RIs must ensure that their disclosure complies with amendments upon their publication.

The disclosure reviewed by staff subsequent to the 2021 Energy Matters Report (**2021 Report**) was generally compliant with securities law disclosure requirements, including NI 51-101 and its related forms, and its technical standard, the COGE Handbook. This Report contains observations and analyses concerning key areas identified by staff for improvement. These include the following:

- **Form 51-101F3**
  - Errors and prohibited modifications to reports concerning Form 51-101F3.
- **Qualified reserves evaluators and qualified reserves auditors**
  - Specified disclosure not having been prepared or audited by a qualified reserves evaluator or qualified reserves auditor, as required.
- **Independence pertaining to qualified reserves evaluators and qualified reserves auditors**
  - Specified disclosure not having been prepared or audited by an independent qualified reserves evaluator or qualified reserves auditor, as required.
- **Conflicts between NI 51-101 and the COGE Handbook**
  - Errors and deficiencies in disclosure resulting from conflicts between NI 51-101 and the COGE Handbook, its technical standard.
- **Reserves reconciliations**
  - Errors and deficiencies in reserves reconciliations required by Form 51-101F1.

Also included are data and discussion concerning the quality of oil and gas reserves estimates that are required to be disclosed under section 2.1 of NI 51-101.

In addition to the NI 51-101 matters, the Report contains information concerning disclosure of the following emerging energy-related subjects:

- Helium
- Renewable hydrocarbons
- Geothermal energy

Finally, the Report contains data and commentary concerning environmental sustainability disclosure and commentary regarding Alberta's capital market as it pertains to energy-related matters.

1.3 ENERGY GROUP YEAR IN REVIEW

The Energy Group's principal activities to the end of September 2022 included the completion of 130 screening reviews of the required annual oil and gas filings for RIs engaged in oil and gas activities. This included filings for 105 RIs for which the ASC was the principal regulator and 25 for issuers where another Canadian jurisdiction was the principal regulator.

Staff also completed 196 screening reviews concerning disclosure of GHG emissions and other sustainability matters – one review for each energy-related RI for which the ASC was the principal regulator. These reviews focused on the assessment of basic information, such as the presence of specific disclosure, the timing and frequency of the disclosure, its preparation and the method of disclosure. These reviews are discussed in detail in section 4 of this Report.

To the end of September 2022, staff reviewed 20 prospectuses from energy-related RIs, including 13 for RIs for which the ASC was the principal regulator, five for which the British Columbia Securities Commission was the principal regulator, one for which the Financial and Consumer Affairs Authority of Saskatchewan was the principal regulator and one for which the Ontario Securities Commission was the principal regulator.

Staff conducted approximately 1,222 press release screening reviews and 11 full press release reviews, six of which were for RIs for which the ASC was the principal regulator.

In addition, staff completed 15 other disclosure reviews to the end of September 2022. Further information on review types is contained in section 2.1.1 of this Report.

Figure 1: Number of completed disclosure reviews

REVIEW TYPE	JURISDICTION	2022 YTD	2021	2020	2019	2018
Prospectus – Oil & gas	AB	8	21	3	5	12
	Other	4	3	0	1	2
Prospectus – Other energy	AB	5	8	–	–	–
	Other	3	4	–	–	–
Annual oil & gas filing screening	AB	105	113	129	132	138
	Other	25	29	41	45	57
Press release screening	All	1,222	1,766	–	–	–
Press release	AB	6	38	21	26	15
	Other	5	3	2	5	0
Other	AB	11	29	12	20	37
	Other	4	9	0	3	1
Sustainability technical screening	AB	164	190	–	–	–
	Other	52	0	–	–	–

As part of its ongoing commitment to engage with capital market participants, the ASC published the 2021 Energy Matters Report in December 2021. It was also emailed to approximately 860 subscribers. In January 2022, staff participated in the 2022 Corporate Finance Disclosure and Energy Matters Information Sessions webinar. The event had 370 registered participants and 298 attendees. In addition, in June 2022, staff hosted the Beginners Guide to National Instrument 51-101 *Standards of Disclosure For Oil and Gas Activities* webinar. The event had 236 registered participants and 163 attendees.

See https://asc.ca/news-and-publications/events for information concerning past and future ASC seminars and webinars.

Between October 2021 and the end of September 2022, the Energy Group responded to 49 inquiries. These comprised 18 from firms that evaluate oil and gas reserves and resources other than reserves, 14 from RIs, seven from law firms, seven from other Canadian regulators, and three from other sources.

The Energy Group can be reached at your convenience through the contact information in section 7 of this Report. Please let us know how we can help.

Oil and gas disclosure commentary

2.1 INTRODUCTION

This section discusses key areas of oil and gas disclosure by RIs engaged in oil and gas activities identified by staff for improvement. It also includes data, analysis and discussion concerning the quality of oil and gas reserves estimates. The content is based primarily on reviews of 2022 disclosure attributed to oil and gas activities that were mostly conducted in 2020 (accounting for variability in financial year end dates).

In its role as the lead regulator on oil and gas-related matters within the CSA, the Energy Group applies a rigorous review process to assess compliance with oil and gas securities law disclosure requirements. While this process primarily focuses on RIs for which the ASC is the principal regulator, staff routinely review disclosure from RIs engaged in oil and gas activities for which other Canadian jurisdictions are the principal regulator. This is done in an effort to assist these jurisdictions, while also ensuring the ASC's broader awareness of oil and gas-related matters.

The type of review conducted by staff will often determine specifically what will be reviewed during the review itself. Reviews may incorporate disclosure required by section 2.1 of NI 51-101 (including the statement of the reserves data and other information specified in Form 51-101F1 and related reports), management discussion and analyses, press releases, prospectuses, investor presentations, and websites, along with material used to prepare disclosure, such as evaluations of oil and gas reserves and resources other than reserves.

2.1.1 Types of reviews

The Energy Group conducts and participates in the following types of reviews:

- **Screening**
  - **Oil and gas**
    - Includes the required annual oil and gas filings, which comprise the statement of the reserves data and other information specified in Form 51-101F1 and reports in accordance with Form 51-101F2 and Form 51-101F3.
    - Depending on findings, these may result in the initiation of a compliance, technical or continuous disclosure review (see below).
  - **Press release**
    - Includes the press release under review and other disclosure, as needed.
    - Depending on findings, these may result in the initiation of a press release review (see below).
  - **Environmental sustainability technical**
    - Includes disclosure concerning GHG emissions and other environmental sustainability matters.
    - These focus on the assessment of certain baseline information, such as:
      - Whether certain sustainability disclosure has occurred.
      - The timing and frequency of such disclosure.
      - How the disclosure was prepared.
      - The method of disclosure.
      - Whether specific information has been disclosed.

  - Depending on findings, these may result in the initiation of a continuous disclosure review (see below).

- **Cease trade order revocation**
  - Includes oil and gas, energy-related and other disclosure contained in required and voluntary filings, as needed.
- **Compliance**
  - These are initiated as a result of a specific issue identified during another review that was not pursued in the initial review due to it exceeding the scope of that review, or via files referred from elsewhere in the ASC or another CSA jurisdiction.
  - Includes oil and gas, energy-related and other disclosure, as needed.
  - Depending on findings, these may result in the initiation of a technical or continuous disclosure review.
- **Continuous disclosure**
  - Includes all oil and gas, energy-related and other disclosure contained in regulatory and voluntary filings, as needed.
  - Depending on findings, these may result in the initiation of a compliance review.
- **Notice of intent to be qualified to file a short form prospectus**
  - Includes oil and gas, energy-related and other disclosure, as needed.
- **Press release**
  - More in-depth than a press release screening review.
  - Includes other disclosure, as needed.
  - Typically results in a letter sent to the RI.
  - Depending on findings, these may result in the initiation of a compliance, technical or continuous disclosure review.
- **Prospectus (short-form, long-form and shelf)**
  - Includes evaluations of oil and gas reserves and resources other than reserves and associated disclosure for long-form prospectuses (e.g. initial public offerings), and as needed for short-form and shelf prospectuses.
  - Includes other disclosure, as needed.
  - Depending on findings, it may result in the initiation of a compliance review.
- **Technical**
  - Includes evaluations of oil and gas reserves and resources other than reserves and associated disclosure associated with the evaluations.
  - Depending on findings, these may result in the initiation of a continuous disclosure review.

Outcomes of reviews will vary depending on the specific circumstances. Possible outcomes include:

- no action necessary
- advisory comment(s) intended to improve future disclosure
- identification of deficiencies, including errors and omissions that may be misleading, with results that include one or more of the following:
  - requirement to correct and refile
  - issuer placed in default
  - management cease trade order
  - cease trade order
  - referral to the ASC Enforcement division

2.1.2 Disclosure expectations

RIs are required to ensure that their disclosure is not misleading and does not omit a required fact or a fact necessary to make a statement not misleading,[1] focuses on material information, i.e. information that would be likely to influence a decision by a reasonable investor to buy, hold or sell a security of a RI,[2] and otherwise complies with securities law disclosure requirements.

RIs that are uncertain whether their disclosure is compliant with securities law, including NI 51-101 and its technical standard, the COGE Handbook, should seek the advice of an appropriate professional advisor.

General guidance and examples of misrepresentations and misleading statements are provided in section 2(a)(i)(A) of CSA Staff Notice 51-327 *Revised Guidance on Oil and Gas Disclosure* (**CSA SN 51-327**).

2.2 FORM 51-101F3

Concern: Form 51-101F3 reports filed per section 2.1.3 of NI 51-101 do not meet NI 51-101 requirements. Reasons include the presence of errors and material modifications, their filing in situations where they should not have been or their absence in situations where they should have been filed.

Staff have observed a variety of issues in recent years with reports filed in accordance with Form 51-101F3, including the following:

- Execution errors
  - Signatures are:
    - Absent where they are required, or
    - Replaced with those of individuals that are not qualified to execute the reports.
  - Dates are absent or incorrect

[1] No person or company shall make a statement that the person or company knows or reasonably ought to know:

(a) in any material respect and at the time and in the light of the circumstances in which it is made,
(i) is misleading or untrue, or
(ii) does not state a fact that is required to be stated or that is necessary to make the statement not misleading,

and

(b) would reasonably be expected to have a significant effect on the market price or value of a security, a derivative or an underlying interest of a derivative. (Section 92(4.1) *Securities Act* (Alberta))

[2] Section 1.4(2) of NI 51-101

- Incorrect alternatives are used to prepare the reports
  - Alternative A is to be used if there is reserves data, contingent resources data or prospective resources data to report.
  - Alternative B is to be used if there is no reserves or resources other than reserves to report.
- Reports have been materially modified, which is not permitted
- Reports are filed in situations where they should not be
  - Reports should only be identified as a Form 51-101F1, Form 51-101F2 or Form 51-101F3 if filed to meet annual filing requirements per section 2.1 of NI 51-101. Reference to those forms for other purposes could be confusing and potentially misleading.
- Reports have not been amended and restated, as they are required to be, to reflect amended and restated statements of the reserves data and other information specified in Form 51-101F1
- Reports are absent in situations where they are required to be filed
  - The reports must be filed if the statement of the reserves data and other information specified in Form 51-101F1 are filed.

An RI engaged in oil and gas activities must file[3] the following with the securities regulatory authority no later than the date on which it is required by securities legislation to file audited financial statements for its most recent financial year:

1. A statement of the reserves data and other information specified in Form 51-101F1, as at the last day of the RI's most recently completed financial year;
2. A report in <u>accordance</u> (underlining in this Report is to emphasize importance) with Form 51-101F2 included in, or filed concurrently with, the statement described in 1; and
3. A report in <u>accordance</u> with Form 51-101F3 contained in, or filed concurrently with, the statement described in 1.

One of two available alternatives is to be used when preparing the report in accordance with Form 51-101F3:

- Alternative A: Reserves Data to Report or Contingent Resources Data or Prospective Resources Data to Report
  - Use when there is reserves data, contingent resources data or prospective resources data to report
- Alternative B: No Reserves to Report and No Resources Other than Reserves to Report
  - Use when there is no reserves data and no contingent resources data or prospective resources data

The report required under Form 51-101F3 must[4] be executed by two officers of the RI, one of whom is the chief executive officer, and on behalf of the board of directors, by any two directors other than those referred to previously. If the RI only has three directors, two of whom are those referred to previously, all of the RI's directors must execute the report.

Further, the report must in all material respects be in the required form. This means that the report is not to be modified in any material way. Although flexibility[5] is permitted with respect to what information is disclosed and how it is presented in the statement of the reserves data and other information specified in Form 51-101F1,

[3] Section 2.1 of NI 51-101
[4] Section 2.1.3(e) of NI 51-101
[5] General instructions 3,4,5 of the statement of the reserves data and other information specified in Form 51-101F1

this is not the case with the report in accordance with Form 51-101F3. The representations specified by Form 51-101F3 are not to be modified or removed. Further, additional representations are not to be provided.

Execution and filing of the report required by Form 51-101F3 acknowledges that the board of directors has approved the:

- Content and filing of the statement of the reserves data and other information specified in Form 51-101F1,
- Filing of the report required by Form 51-101F2, and
- Content and filing of the report required by Form 51-101F3.

Despite this, the report required by Form 51-101F3 is sometimes executed and filed with errors or material modifications. Staff also observe errors and material modifications to the report required by Form 51-101F2 (discussed in the 2021 Report), and various material deficiencies in the statement of the reserves data and other information specified in Form 51-101F1.

2.3 QUALIFIED RESERVES EVALUATORS AND QUALIFIED RESERVES AUDITORS

Concern: Disclosure is not prepared or audited by a qualified reserves evaluator or qualified reserves auditor, as required by NI 51-101.

Staff continue to identify disclosure prepared and audited by individuals who do not meet the requirements of qualified reserves evaluators (**QREs**) or qualified reserves auditors (**QRAs**). NI 51-101 requires specified disclosure to be prepared or audited by QREs or QRAs as defined in NI 51-101, and that those who perform the responsibilities of QREs and QRAs must be qualified per NI 51-101.

Experience in the practice of engineering, geology, geophysics, or other discipline of physical science, by itself, is generally not sufficient to meet NI 51-101 requirements. QREs and QRAs are considered specialists within their respective fields.

Being qualified under other regulatory instruments to perform similar tasks does not mean an individual meets the requirements pertaining to QREs and QRAs under NI 51-101. Terms such as qualified person, competent person and technical person are not recognized by nor used in NI 51-101, and are not synonymous nor substitutable with the terms QRE and QRA under NI 51-101.

RIs must ensure that any individual they appoint to perform the tasks of a QRE or QRA for the purposes of NI 51-101, satisfies the requirements. To assist RIs in complying with their disclosure obligations, we discuss the roles of QREs and QRAs with respect to NI 51-101 in this section and provide further information regarding their respective qualifications.

QREs and QRAs are fundamental to compliance with NI 51-101:

- If an RI discloses reserves or other information of a type specified in Form 51-101F1, the estimates of reserves and future net revenue must be prepared or audited in accordance with the COGE Handbook (section 5.2 of NI 51-101). The COGE Handbook extensively addresses the qualifications, experience and use of QREs and QRAs.
- Disclosure of anticipated results from resources not currently classified as reserves, which includes an estimate of a quantity in which the RI has an interest or intends to acquire an interest, or an estimated value attributable to an estimated quantity, must be prepared by a QRE or QRA (section 5.9 of NI 51-101).
- Disclosed analogous information must indicate if it was not prepared by a QRE or QRA (section 5.10 of NI 51-101).

- An RI must appoint one or more independent QREs or QRAs and direct each to report to the board of directors, a committee of the board of directors, or those individuals whose authority and duties in respect of that RI are similar to those of a board of directors, on the reserves data, contingent resources data and prospective resources data disclosed in Form 51-101F1 (section 3.2 of NI 51-101).
- An RI must have the independent QRE or QRA execute the report that the RI files in accordance with Form 51-101F2 (section 2.1 of NI 51-101).

An individual that represents themselves as a QRE or QRA under NI 51-101 must fully comply with the respective requirements and as necessary, demonstrate this compliance.

QRE and QRA are defined in NI 51-101.[6] A QRE is an individual who:

> (a) in respect of particular *reserves* data, resources or related information, possesses professional qualifications and experience appropriate for the estimation, *evaluation* and *review* of the *reserves data, resources* and related information; and
>
> (b) is a member in good standing of a *professional organization*; [Emphasis added]

A QRA is an individual who:

> (a) in respect of particular *reserves* data, *resources* or related information, possesses professional qualifications and experience appropriate for the estimation, *evaluation, review* and *audit* of the *reserves data, resources* and related information; and
>
> (b) is a member in good standing of a *professional organization*; [Emphasis added]

An important element of both definitions is that qualifications and experience in the estimation, evaluation and review of reserves data, resources and related information is required. The COGE Handbook provides additional information regarding these.[7] A QRE must have a minimum of five years of practical petroleum experience, with at least three recent years of evaluation experience.

A QRA must have a minimum of 10 years of practical petroleum experience, with at least five recent years of evaluation experience. The evaluation experience needs to occupy the majority of the practical petroleum experience during the three and five years respectively or the required evaluation experience will have not accrued. Very few petroleum professionals will satisfy the QRE qualifications. Fewer will satisfy the QRA qualifications that permit them to perform audits.[8]

An evaluation[9] is:

> [T]he process whereby an economic analysis is made of a *property* to arrive at an estimate of a range of net present values of the estimated *future net revenue* resulting from the *production* of the *reserves* or *resources other than reserves* associated with the *property*. [*COGE Handbook*]

[6] Section 1.1 of NI 51-101
[7] Section 5.4.3.1 of the COGE Handbook
[8] Section 5.4.3.1 of the COGE Handbook
[9] CSA Staff Notice *Revised Glossary to NI 51-101 Standards of Disclosure for Oil and Gas Activities* (**CSA SN 51-324**)

An audit[10] is:

> [T]he process whereby an *independent qualified reserves auditor* carries out procedures designed to allow the *independent qualified reserves auditor* to provide reasonable assurance, in the form of an opinion that the *reporting issuer's reserves data* (or specific parts thereof) have in all *material* respects, been determined and presented in accordance with the *COGE Handbook* and are, therefore, free of *material* misstatement. […] [*COGE Handbook*]

The COGE Handbook[11] requires evaluation reports to be prepared by or under the direct supervision of a QRE. The QRE must possess appropriate professional qualifications and experience for the tasks contemplated in NI 51-101 and be a member in good standing of a professional organization.[12]

The main evaluation steps[13] include:

- Determining volumes and values
- Classifying the volumes and values according to the COGE Handbook
- Reporting on the results of the evaluation in accordance with regulatory requirements

The main objective of an audit is to give an opinion on the reasonableness of an evaluation. An audit does not replicate the original evaluation in whole or in part, but instead addresses the quality of the evaluation. An audit can only be performed by a QRA.[14]

In addition to professional qualifications and appropriate experience, a QRE or QRA must be a member in good standing of a professional organization at the time the evaluation or audit is performed.[15] Assurances that membership in a professional organization would be granted if it were applied for is not sufficient.

NI 51-101[16] defines a professional organization as a self-regulating organization of engineers, geologists, other geoscientists or other professionals, whose professional practice includes reserves evaluations or reserves audits that meets certain criteria. The CSA recognizes a number of such organizations, including the Association of Professional Engineers and Geoscientists of Alberta (**APEGA**) and SPEE, in respect of Members, Honorary Life Members and Life Members.

RIs must satisfy themselves that any person they appoint as a QRE or QRA is qualified with respect to the reserves data to be reported on.[17] Executing a report prepared in accordance with Form 51-101F2 without the required qualifications and experience could be misleading. Additionally, an individual who is a member of a professional organization will have certain professional obligations to only undertake work that they are competent to perform by virtue of their qualifications and experience.[18]

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10 CSA SN 51-324
11 Section 5.6 of the COGE Handbook
12 Section 1.1(6) of Companion Policy 51-101CP *Standards of Disclosure for Oil and Gas Activities* (**51-101CP**)
13 Section 1.1.4 of the COGE Handbook
14 Section 5.3.3 of the COGE Handbook
15 Section 1.1(5) of 51-101CP
16 Section 1.1 of NI 51-101
17 Section 1.1(6) of 51-101CP and section 5.4.3 of the COGE Handbook
18 CSA SN 51-327 Section 2(b)

KEY POINTS

- A QRE or QRA must have professional qualifications and experience in the estimation, evaluation and review of reserves data, resources and related information.
  - The qualifications and experience must relate to NI 51-101 and by extension, its technical standard, the COGE Handbook.
- A QRE or QRA must be a member in good standing of a professional organization whose practise includes reserves evaluations and reserves audits, as well as the evaluation and audit of reserves data.
- The preparation of an evaluation involves the determination and classification of volumes and associated values and the reporting of these results.
- A QRA meets the qualifications of a QRE, while a QRE is not necessarily a QRA; a QRA can conduct audits, while a QRE cannot.
- RIs are responsible for ensuring that the QREs and QRAs that they appoint are qualified.
- QREs and QRAs are specialists within their respective fields; they are qualified for their roles.

The ASC will continue to pay particular attention to concerns regarding QREs and QRAs in its reviews and will continue to address these concerns with RIs and their professional advisors.

2.4 INDEPENDENCE PERTAINING TO QUALIFIED RESERVES EVALUATORS AND QUALIFIED RESERVES AUDITORS

Concern: Disclosure is not prepared or audited by a qualified reserves evaluator or qualified reserves auditor that is independent of the RI and therefore does not meet NI 51-101 requirements.

Staff have encountered situations where disclosure that is required to be prepared or audited by one or more QREs or QRAs independent of the RI was not prepared by one or more QREs or QRAs that was independent, resulting in the amending and restating of disclosure. Independence has also been the subject of several inquiries received by the Energy Group.

Under section 2.1 of NI 51-101, RIs are required to annually file a report with the securities regulatory authority that is in accordance with Form 51-101F2 *Report on [Reserves Data][,] [Contingent Resources Data] [and] [Prospective Resources Data] by Independent Qualified Reserves Evaluator or Auditor.* This report is to be executed by one or more QREs or QRAs, each of whom is independent of the RI.

Section 3.2 of NI 51-101 addresses the appointment of independent QREs and QRAs by an RI and the requirement that they be directed to report to the board of directors, a committee of the board of directors, or those individuals whose authority and duties in respect of that RI are similar to those of a board of directors, on the reserves data, contingent resources data and prospective resources data disclosed in the RI's statement of the reserves data and other information specified in Form 51-101F1.[19]

The filing of the executed report prepared in accordance with Form 51-101F3 acknowledges that the management and directors of an RI have accepted their responsibilities concerning the annual filings outlined in section 2.1 of NI 51-101.

[19] Section 2.1.1 of NI 51-101

NI 51-101[20] defines independent in respect of the relationship between an RI and a person or company, to mean a relationship between the RI and that person or company in which there is no circumstance that could, in the opinion of a reasonable person aware of all relevant facts, interfere with that person's or company's exercise of judgment regarding the preparation of information which is used by the RI.

Staff would generally[21] consider the requirement for independence to not be met if a QRE or QRA doesn't satisfy a number of criteria. These include not:

- Being an employee, insider or director of the RI or a related party, or a partner of an individual or company who is;
- Holding or expecting to hold securities of the RI or a related party, or in an RI that has an interest in the property that is the subject of the technical report or an adjacent property;
- Having or expecting to have ownership, royalty, or other interest in the property that is the subject of the technical report or an adjacent property; or
- Receiving the majority of income in the three years preceding the date of the technical report from the RI or a related party.

In addition to the circumstances in the last bullet, staff will also consider whether a QRE or QRA expects to receive the majority of their income, either directly or indirectly, from an RI or a related party of the RI, subsequent to them preparing or auditing an evaluation (technical report) on behalf of the RI.

An RI may be asked to provide information concerning the independence of a QRE or QRA that it has appointed under section 3.2 of NI 51-101. There may be situations where a reasonable person would consider an appointed QRE or QRA to be independent of an RI, even though they hold an interest in securities of the RI. However, it is the RI's responsibility to make this determination and explain and support this determination as necessary. Important factors to consider may include the type of security or securities, the interest(s) held and when and how the security or securities were acquired.

2.5 NAVIGATING CONFLICTS BETWEEN NI 51-101 AND THE COGE HANDBOOK

Concern: Errors and deficiencies in disclosure that result from conflicts between NI 51-101 and the COGE Handbook.

There are circumstances where the requirements of NI 51-101 and the COGE Handbook conflict, which can create difficulties for RIs and their professional advisors. An awareness of where these conflicts occur and an understanding of how to navigate and resolve them, can reduce errors and deficiencies in disclosure.

The COGE Handbook is required to be used to prepare or audit specific NI 51-101 disclosure, but not all NI 51-101 disclosure. Examples of disclosure that must be prepared or audited in accordance with the COGE Handbook are listed below, along with additional information, including the reference to each requirement within NI 51-101:

- Reserves or other information of a type specified in Form 51-101F1
  - Estimates of reserves and future net revenue must be prepared or audited in accordance with the COGE Handbook (section 5.2 of NI 51-101).

[20] Section 1.1 of NI 51-101
[21] Section 1.1(3) of 51-101CP

- Terminology and category of reserves and resources other than reserves
  - Applicable terminology and category set out in the COGE Handbook must be used and classification must be in the most specific category (section 5.3 of NI 51-101).
- Anticipated results
  - If attributed to resources not currently classified as reserves, it must be prepared in accordance with the COGE Handbook (section 5.9 of NI 51-101).
- Analogous information
  - Must indicate if it was not prepared or audited in accordance with the COGE Handbook (section 5.10 of NI 51-101).

In addition, by executing the report filed in accordance with Form 51-101F2 a QRE or QRA accepts several responsibilities with respect to the COGE Handbook, including:

- That the audit, evaluation and review, as applicable, was carried out in accordance with COGE Handbook standards;
- That an assessment has been conducted to determine whether the reserves data, contingent resources data and prospective resources data are in accordance with the COGE Handbook's principles and definitions; and
- There is assurance that the reserves data, contingent resources data and prospective resources data have in all material respects been determined and are in accordance with the COGE Handbook.

The following considerations are intended to help navigate conflict between NI 51-101 and the COGE Handbook.

- **Flexibility in the COGE Handbook** — There are situations where NI 51-101 directs RIs to prepare or audit their disclosure in a manner that differs from what is indicated in the COGE Handbook. This is necessary to ensure that disclosure meets the requirements of NI 51-101 and Canadian securities legislation. However, this can be accommodated, as section 5.1 of the COGE Handbook addresses flexibility in its application and the necessity to ensure that evaluations prepared using the COGE Handbook are fit for purpose and meet the regulatory requirements of the jurisdiction for which it is being prepared.

- **Disclosure for securities law purposes** — There are instances where the COGE Handbook discusses expectations and requirements regarding Canadian disclosure that are not necessarily aligned with NI 51-101. Where differences occur between NI 51-101 and the COGE Handbook, NI 51-101 takes precedence in respect of disclosure required under Canadian securities legislation.

  When using the COGE Handbook in the preparation and review of disclosure required by securities legislation, RIs must interpret it in a manner that is consistent with applicable Canadian securities legislation including, but not limited to, the principles and specific requirements and restrictions of NI 51-101.[22]

[22] Section 2.(a)(ii) of CSA SN 51-327

The following are areas of disclosure where conflict exists between NI 51-101 and the COGE Handbook, accompanied by information concerning how to navigate the specified conflict.

- **Abandonment and reclamation costs** — We discussed the differences between NI 51-101 and the COGE Handbook regarding abandonment and reclamation costs in the 2020 Oil and Gas Review Report. The accounting of oil and gas restoration costs/decommissioning liabilities as abandonment and reclamation costs in situations where they are not abandonment and reclamation costs under NI 51-101, was discussed. Misattribution of these costs can result in the disclosure of erroneous abandonment and reclamation costs.

- **Reserves reconciliations** — RIs are required to disclose an annual reconciliation of reserves per item 4.1 of Form 51-101F1 (see Section 2.6 of this Report). RIs must use the reserve change categories specified in item 4.1.2(c) of Form 51-101F1 and instruction (4) of item 4.1. Section 4.6.2.2 of the COGE Handbook discusses "change categories," which has the same meaning as reserve change categories in NI 51-101. There are two change categories that do not have equivalent reserve change categories: product type transfers and resource transfers. The disclosed reconciliation must not use these, as they are not reserve change categories.

- **Independence** — The COGE Handbook provides information regarding the independence of QREs and QRAs that conflicts in certain respects with NI 51-101. Section 5.5.6.2 of the COGE Handbook states that QREs, QRAs and their associated organizations, would normally be considered independent if they adhere to specified criteria six months before, during and after their professional engagement. They must not have:

  > Owned, acquired investments or had options to own or acquire, or have been committed to acquire, directly or indirectly, any material financial interest of the company or any enterprise or affiliated person, or any property being evaluated or audited.

  As discussed in section 2.4 of this Report, we would not consider the requirement for independence to be met for the purposes of NI 51-101 disclosure if a QRE or QRA holds or expects to hold securities, either directly or indirectly, of the RI or a related party of the RI. In addition to other differences, no time period is specified in information in 51-101CP, unlike in section 5.5.6.2 of the COGE Handbook. There are other important differences between section 5.5.6.2 of the COGE Handbook and 51-101CP concerning independence. Readers are encouraged to review and understand these.

- **Terminology** — Section 1.2 of NI 51-101 states:

  > 1) Terms used in this Instrument but not defined in this *Instrument, NI 14-101* or the securities statute in the *jurisdiction*, and defined or interpreted in the *COGE Handbook*, have the meaning or interpretation ascribed to those terms in the *COGE Handbook*.
  >
  > 2) <u>In the event of a conflict or inconsistency between the definition of a term in this *Instrument, NI 14-101* or the securities statute in the *jurisdiction* and the meaning ascribed to the term in the *COGE Handbook*, the definition in this *Instrument, NI 14-101* or the securities statute in the *jurisdiction*, as the case may be, applies</u>. [Emphasis added]

Section 1.1 of NI 51-101 defines a limited number of terms used in NI 51-101, while these terms and additional ones are defined in CSA SN 51-324. The meanings in CSA SN 51-324 are accompanied with the source, which includes NI 51-101, National Instrument 14-101 *Definitions* (NI 14-101) and the COGE Handbook.

2.6 RESERVES RECONCILIATIONS

Concern: Incorrect disclosure regarding item 4.1 of Form 51-101F1, which requires disclosure of an annual reserves reconciliation.

Staff have identified the following:

- Opening balances not matching closing balances from the previous financial year
- Negative volumes where they should not occur
- Erroneous and potentially misleading uses of reserve change categories, particularly “technical revisions”
- Erroneous reserves additions and reductions due to the use of incorrect dates for acquisitions and dispositions
- Incorrect production volumes
- Incorrect reserve change categories
- Absence of explanations regarding disclosure in each reserve change category
- Closing balances not matching the results of the summation of volumes attributed to the individual reserve change categories for each product type for each reserves category
- Missing or inconsistent units of measure
- Optional BOE disclosure for a given reserve change category not matching the results of the summation of volumes attributed to each product type

Incorrect reserves reconciliation disclosure is a recurring concern, with deficiencies attributed to RIs of all sizes. Some deficiencies are readily identifiable, while others are only identified through detailed analyses of disclosure and scrutiny of the associated reserves evaluations. In some cases, incorrect disclosure may be misleading, such as the erroneous use of reserve change categories, particularly “technical revisions.”

Item 4.1 of Form 51-101F1 requires disclosure of an annual reconciliation of changes in estimates of gross proved reserves (in total), gross probable reserves (in total) and gross proved plus probable reserves (in total). This disclosure is required by country, product type specified in item 4.1.2(b) and reserve change category specified in item 4.1.2(c). In addition, item 4.1.2(c) requires an explanation concerning disclosure that occurs in each reserve change category.

Product types are specified in item 4.1.2(b), as follows:

> (i) *bitumen;*
> (ii) *coal bed methane;*
> (iii) *conventional natural gas;*
> (iv) *gas hydrates;*
> (v) *heavy crude oil;*
> (vi) *light crude oil* and *medium crude oil* combined;
> (vii) *natural gas liquids;*
> (viii) *shale gas;*
> (ix) *synthetic crude oil;*
> (x) *synthetic gas;*
> (xi) *tight oil.*

Substances such as oil, condensate, liquids, gas, solution gas, associated gas, non-associated gas, sulphur and helium are not product types.

Reserve change categories specified in item 4.1.2(c) are:

> (i) *extensions and improved recovery;*
> *(ii) technical revisions;*
> *(iii) discoveries;*
> *(iv) acquisitions;*
> *(v) dispositions;*
> *(vi) economic factors;*
> (vii) *production.*

Instruction (4) of item 4.1 requires reserves changes attributed to infill drilling to either be included in "extensions and improved recovery" or in a separate reserve change category labelled "infill drilling."

The reconciliation per item 4.1 compares reserves data at the effective date for the most recent financial year (the financial year for which the disclosure is being prepared), with the corresponding estimates at the last day of the preceding financial year, which is the reconciliation's "opening balance." The "closing balance" is the result of this comparison.

Effective date is defined in section 1.1 of NI 51-101 as:

> [T]he date as at which, or for the period ended on which, the information is provided;

Additional information concerning terminology and preparation of reserves reconciliations is contained in section 2.7(6) of 51-101CP and section 4.6.2 of the COGE Handbook. Please note that where discrepancies occur between the COGE Handbook and NI 51-101, NI 51-101 takes precedence.

Staff note the following common disclosure deficiencies with respect to the reserves reconciliation required by item 4.1 of Form 51-101F1, along with corrective information, for each of the reserve change categories, as well as other important aspects of the reconciliation.

- **Reserve change categories extensions and improved recovery, infill drilling and discoveries** — The erroneous recording of negative volumes. Once a volume has been assigned to these reserve change categories, subsequent changes to the estimate should be identified as technical revisions or economic factors and accounted for in their respective reserve change categories, except as noted in section 4.6.2.4 of the COGE Handbook.

- **Reserve change category technical revisions** — The recording of negative volumes that exceed 100 per cent of the opening balance and the attribution of reserve changes to the reserve change category "technical revisions" that should be attributed to a different category that is appropriate under the circumstances. Both of these will result in incorrectly prepared reserves reconciliations.

  Technical revisions show changes in existing reserves estimates, in respect of carried-forward properties, over the period of the reconciliation and are the result of new technical information, not the result of capital expenditure.[23]

  It is technically impossible to remove a volume in excess of the opening balance through a technical revision. Therefore, a negative technical revision that exceeds 100 per cent of the opening balance is erroneous.

  It is not appropriate to account for changes in reserves estimates that result from capital expenditures as technical revisions. Doing so may result in misleading disclosure. Disclosure by an RI that acknowledges that technical revisions have been done in this incorrect manner does not absolve an RI of its responsibility to ensure that the disclosure is done appropriately and is not misleading. The ASC will continue its efforts to identify misattributed technical revisions.

- **Reserve change category acquisitions** — The use of incorrect dates to account for reserves additions through acquisitions. The date to use to reconcile changes in reserves acquired during the most recent financial year is the effective date of the RI's most recent financial year.

  The reserves estimate to be used in the reconciliation is the estimate of reserves at the effective date, not at the acquisition date, plus any production since the acquisition date. This production must be included as production in the reconciliation. If there has been a change in the reserves estimate between the acquisition date and the effective date other than that due to production, the RI should explain this as part of the reconciliation in a footnote to the reconciliation table.[24]

  a) **Acquisition date** — The term "acquisition date" is not defined nor clarified in NI 51-101 and its related forms, 51-101CP or staff notices. Staff consider it to mean the date at which the RI has attained a direct or indirect ownership, working or royalty interest in reserves. Ownership is discussed in section 1.4.4.2 of the COGE Handbook.

  b) **Activities after the acquisition date** — Reserves estimates attributed to activities that occur on an acquired property subsequent to the acquisition date of the property and prior to the effective date of the RI's most recent financial year, other than those due to production, are to be accounted for in the appropriate reserve change category.

[23] Section 2.7(6)(c) of 51-101CP
[24] Section 2.7(6)(c) of 51-101CP

Such activities would typically involve the drilling or recompletion of a well and related pursuits. The results would be reflected in reserve change categories "extensions and improved recovery," "discoveries" or "infill drilling," not reserve change category "acquisitions," as they occurred subsequent to the acquisition date. Provide the reasons for disclosure in these categories. Staff suggest that these explanations occur in conjunction with the previously noted explanations required by item 4.1(2)(c) of Form 51-101F1, which are discussed below under "Explanations."

In summary, the estimates to be used in the reserve change category "acquisitions" are the sum of:

- The estimates of the reserves data by product type attributed to the acquisition at the effective date of the most recent financial year (the financial year for which the disclosure is being prepared); and
- The production by product type that has occurred from the acquisition, accrued from the date ownership was attained, to the effective date for the most recent financial year.

Although reserves estimates may be determined at any point during a particular financial year, reserves are only reconciled for the purposes of item 4.1 at the last day of the most recent financial year.

Reconciliation steps regarding acquisitions are:

1. **Evaluate** all of the RI's reserves at the effective date of the RI's most recent financial year. This evaluation will include properties, wells, etc. owned at the beginning of the most recent financial year and those acquired during the most recent financial year.
2. **Determine** the RI's share of the gross production volume, by product type, derived from the acquisition. This includes production that has occurred from the date that ownership was attained to the effective date of the most recent financial year.
3. **Add** the results from step 2 to the acquired properties, wells, etc. identified and evaluated in step 1. This exercise is mechanical and is not impacted by estimates from any evaluation of the acquisition that may have occurred at or around the date that ownership was attained.
4. **Enter** the results from step 3 into the reconciliation table adjacent to the reserve change category "acquisitions," associated with the appropriate product type and reserves category.
5. **Assign** to the appropriate reserve change category, reserves estimates originating from activity occurring on the acquired property, wells, etc. (typically the drilling or recompletion of a well or related activities) subsequent to attainment of ownership and prior to the effective date of the most recent financial year. It is incorrect to account for these reserves estimates under reserve change category "acquisitions."

- **Reserve change category dispositions** — The use of incorrect dates to account for reserves reductions through dispositions. As discussed in section 4.6.2 of the COGE Handbook, disposed reserves are recorded at the disposition date, which is the date at which ownership by the RI has ceased. Production that has occurred subsequent to the last day of the preceding financial year, to the disposition date, is accounted for under reserve change category "production."

- **Reserve change category production** — Volumes not matching those disclosed under item 6.9.1(a) of Form 51-101F1 for the same country and product type. These volumes should match, unless production from entities that do not have reserves assigned is included. If they do not match, an explanation must be provided.

- **Opening balance** — Volumes for the current year not matching the closing balance from the previous financial year for the same country, product type and reserves category. These should match.

- **Closing balance** — Volumes not matching those disclosed for the same country, product type and reserves category under item 2.1.1 of Form 51-101F1. These should match.

- **Units of measure** — Missing or inconsistent units of measure for disclosure in the reconciliation. Although no particular unit of measure is specified in Form 51-101F1, consistency of units is addressed in general instruction (8), which advises against switching between Imperial units and Système International (SI) units without a compelling reason. If switching does occur, we expect disclosure of the reason.

- **Reserve change category usage** — The inappropriate use of categories that are not specified in item 4.1.2(c) or instruction (4) of item 4.1. It is incorrect to do this. An RI must use the categories specified in item 4.1.2(c) or instruction (4) of item 4.1, and if necessary, explain unusual circumstances. Please note that although section 4.6.2.2 of the COGE Handbook provides recommended “change categories” (equivalent to “reserve change categories”), not all change categories have equivalent reserve change categories.

- **Volume summation** — Volumes that do not correctly sum. The closing balance for each product type for each reserves category must equal the sum of the volumes disclosed in each associated reserve change category. Additionally, the gross proved plus probable reserves (in total) for each product type, must equal the sum of the gross proved reserves (in total) and the gross probable reserves (in total). This is true for disclosure in each reserve change category, as well as the opening balance and closing balance.

  Incorrect summation, both vertically and horizontally in the reserves reconciliation may result from mathematical error or incorrect preparation of the reconciliation. The latter is frequently seen with respect to technical revisions and the re-categorization of reserves. RIs that optionally disclose BOEs as part of their reconciliation must ensure that the conversion is done appropriately and that the constituent values sum correctly.

- **Explanations** — The absence of required explanations that are to accompany disclosure in individual reserve change categories. We expect RIs to provide detailed explanations of changes in individual reserve change categories. Item 4.1.2(c) of Form 51-101F1 requires separate identification and explanation of disclosure in each reserve change category.

  Without an explanation, a change may occur that cannot be easily understood. For example, a large technical revision, an acquisition, or a re-categorization of reserves from probable reserves to proved reserves may have occurred. In the absence of an explanation for the latter, the re-categorization could go unnoticed if the proved plus probable reserves (in total) remains unchanged.

EXAMPLE OF DISCLOSURE THAT *DID* MEET OUR EXPECTATIONS

	HEAVY OIL		
	Total Proved (Mbbl)	Total Probable (Mbbl)	Total Proved + Probable (Mbbl)
FACTORS			
Opening balance	0	125	**125**
Discoveries	0	0	**0**
Extensions	75	(75)	**0**
Infill drilling	0	0	**0**
Improved recovery	0	0	**0**
Technical revisions	0	0	**0**
Acquisitions	0	0	**0**
Dispositions	0	0	**0**
Economic factors	0	0	**0**
Production	(10)	0	**(10)**
Closing balance	**65**	**50**	**115**

Explanation: The Company assigned probable heavy oil reserves of 125 Mstb to a location on its ABC Property in 2020. In the first quarter of 2021, the probable location was drilled, tested and put on production and 75 Mstb of proved heavy oil reserves were subsequently assigned. The probable reserves assignment remains unchanged. The production in the reconciliation is attributed to this new well.

Staff's comments on this disclosure:

- *This reserves reconciliation correctly portrays how a re-categorization of reserves from probable to proved is to be prepared and disclosed.*
- *It would be inappropriate for the RI to reconcile the proved reserves as a positive technical revision and the probable reserves as a negative technical revision.*
- *Instead, the proved reserves should be entered as an addition in the reserve change category that the reserves for the probable location were initially attributed, which in this example is reserve change category "Extensions."*
- *The probable reserves component will be entered as a negative change in the original reserve change category that the reserves for the probable location were initially attributed, which in this example is reserve change category "Extensions."*
- *All subsequent changes to the reserves associated with this drilled location will be attributed to reserves change category "Technical Revisions."*
- *The reserves reconciliation correctly adds up both vertically and horizontally.*
- *An explanation accompanies the reserves reconciliation that explains the disclosure in the individual reserve change categories.*

- *The correct reserve change categories are used.*
- *The units of measure are consistent.*

Instruction (5) of item 4.1 of Form 51-101F1 notes that a reconciliation is not required for RIs that have become engaged in oil and gas activities after the last day of their preceding financial year. Remember, the opening balance of the reserves reconciliation is equivalent to the associated estimates at the last day of the preceding financial year (the closing balance). In this situation, the opening balance would be zero. As discussed in this instruction, if an RI had reserves at the effective date of the preceding financial year, but an evaluation of these reserves is unavailable, reserves estimates will not be available for the opening balance and a reconciliation cannot practicably be undertaken. A zero opening balance is not appropriate in such a situation. Instead, the RI must disclose the reason for the absence of the reconciliation.

Additional information concerning preparation of the reserves reconciliation is provided in 51-101CP. For example, section 2.7(6)(a) discusses a scenario in which an RI has reserves at the effective date for its most recent financial year, but had no reserves at the start of that year (at which time the RI was presumably engaged in oil and gas activities). If the added reserves are material to the RI, a reconciliation must be disclosed. The opening balance will be zero, reflecting the lack of reserves at the start of the financial year. Section 5.10(4) of 51-101CP discusses reserves reconciliations with respect to initial public offerings.

2.7 INSIGHT INTO OIL AND GAS RESERVES ESTIMATES

Analysis of an RI's reserves estimates and their variability over time can provide insight into activities undertaken by the RI and the quality of its reserves estimates. The annual reserves reconciliation that item 4.1 of Form 51-101F1 requires is instrumental in this analysis. For example, an RI's pursuit of new reservoirs, its efforts to expand existing reservoirs or its efforts to increase recoveries from existing reservoirs, can be assessed through disclosure in the reserve change categories "discoveries" and "extensions and improved recovery" respectively. The quality of reserves estimates can be judged using disclosure in reserve change category "technical revisions." This can help determine whether reserves estimates have been meeting the certainty levels for the associated categories and have therefore been assigned in accordance with the COGE Handbook, as required. This process of "reserves validation" is described in section 4.6.1 of the COGE Handbook.

With appropriate sampling and analysis, insight into activities and reserves quality can also be determined for groups of issuers that report under NI 51-101. Figure 2 presents a series of aggregated reserves reconciliations for AB RIs. These demonstrate changes in grouped and summed gross proved plus probable reserves (in total), disclosed by reserve change category. The information is attributed to disclosure from AB RIs and reflects oil and gas activities disclosed in 2022, but mostly conducted in 2021 (accounting for variability in financial year-end dates). An RI's contribution to its group reconciliation is based solely on the reserves volumes it has disclosed in each reserve change category. While generalized, a review of the changes that have occurred to volumes between the opening and closing balances for each group of RIs can help assess the quality of reserves data disclosed by AB RIs.

The following steps were taken to generate the reconciliations in Figure 2:

1. Quarterly average gross daily production volumes were obtained for each AB RI engaged in oil and gas activities at the end of 2021. Item 6.9 of Form 51-101F1 requires these volumes to be disclosed by quarter, country and product type, for the most recent financial year. The volumes were summed for each RI and an annual average gross daily production volume was determined for each RI.

2. The RIs were ranked by their annual average gross daily production volume.

3. The AB RIs were then categorized into production groups based on gross daily production volumes as follows:
   a. "seniors" being those RIs with >100,000 BOE per day of production (based on a conversion ratio of six thousand cubic feet of gas for one barrel of oil);
   b. "intermediates" being those RIs with 10,000 to 100,000 BOE per day of production; and
   c. "juniors" being those RIs with <10,000 BOE per day of production.

4. The AB RIs ranked highest by production were chosen from each group, with 10 senior, 20 intermediate and 50 junior RIs selected in each previous year. However, only nine seniors met the selection criteria at the end of 2021.

5. Within each group of selected RIs, volumes disclosed by each RI in each applicable reserve change category specified in item 4.1.2(c) of Form 51-101F1 for gross proved plus probable reserves (in total) were summed. These were neither weighted nor adjusted in any way.

6. The per cent change between the opening balance of 2021 (the closing balance of 2020) and the closing balance of 2021 was calculated. Figure 2 illustrates these results, by production group. Positive and negative changes fall to the right and left of the opening balance (denoted as 0 per cent), respectively.

Figure 2: 2021 reconciliations of summed gross proved plus probable reserves (in total) for AB RIs, by production group

Figure 2a: Seniors

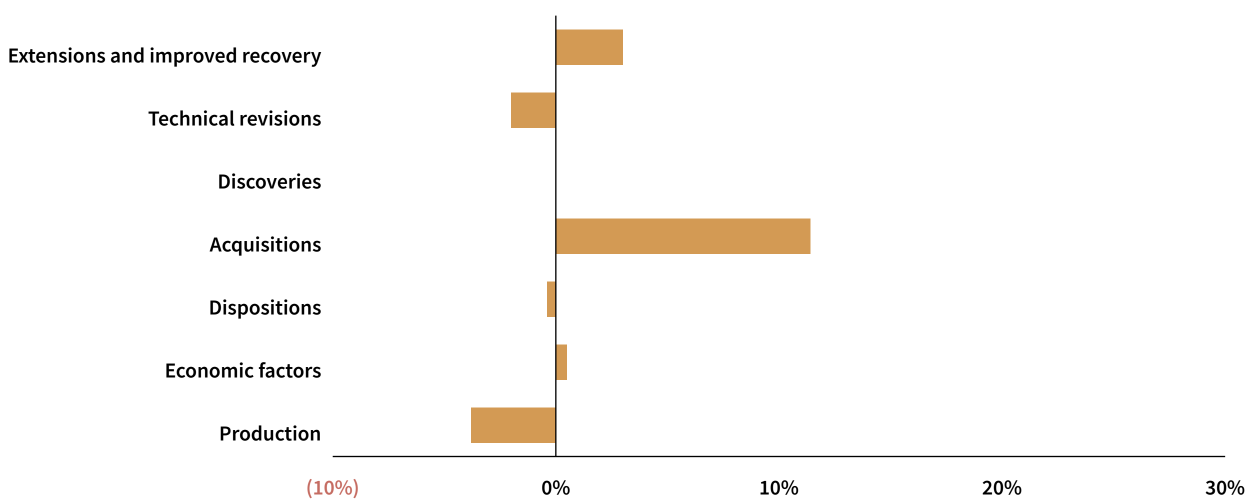


Figure 2b: Intermediates

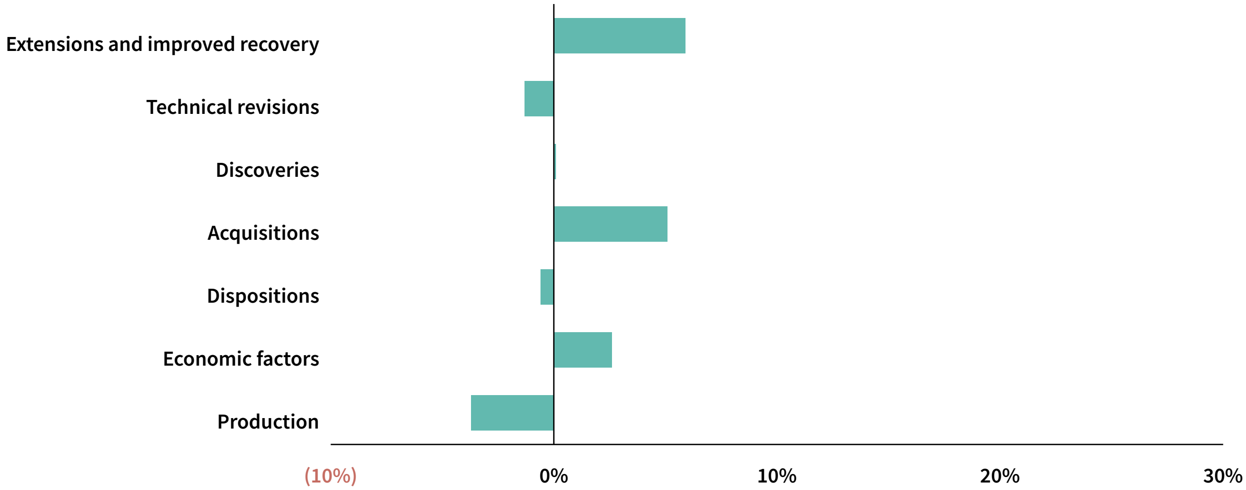
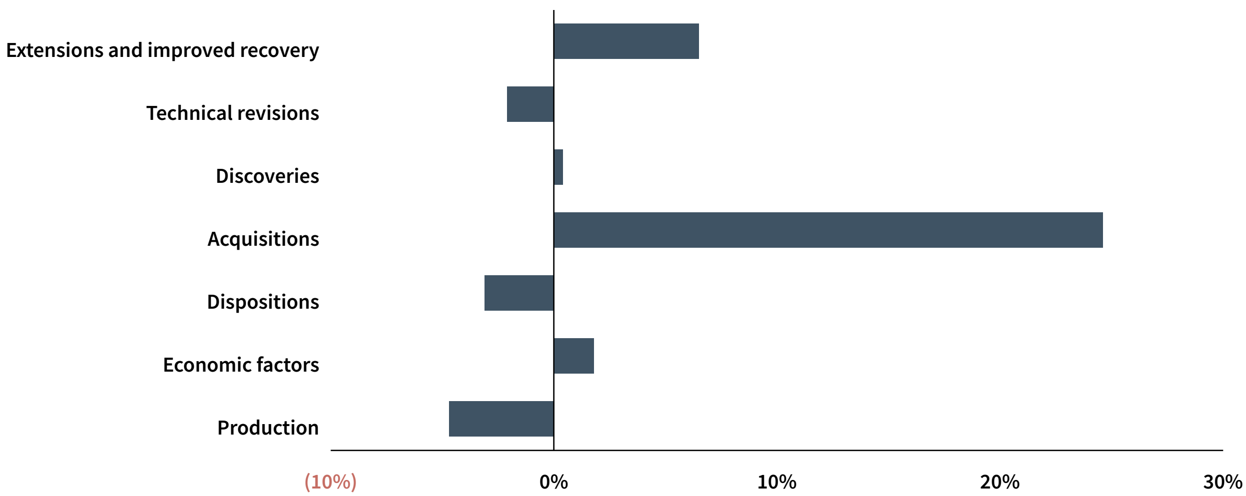


Figure 2c: Juniors



As illustrated in Figure 2, changes in extensions and improved recovery, which result from capital expenditures for step-out drilling in previously discovered reservoirs, and those associated with the installation of improved recovery schemes, are three per cent for the seniors, six per cent for the intermediates and seven per cent for the juniors. All seniors recorded extensions and improved recovery, with two of them accounting for 67 per cent of the group change. All but three of the intermediates recorded extensions and improved recovery, with five accounting for 54 per cent of the total for the group. Only 24 of the juniors recorded extensions and improved recovery, with 10 accounting for less than one per cent and four accounting for 63 per cent of the group total.

Regarding technical revisions, positive and negative revisions are generally attributed to better or poorer reservoir performance respectively, than initially forecast. For a given entity, proved reserves should be adjusted positively over time, while proved plus probable reserves should remain relatively constant. Technical revisions in Figure 2 concern proved plus probable reserves (in total), which are negative two per cent for the seniors, negative one per cent for the intermediates and negative two per cent for the juniors. Six of the seniors recorded negative technical revisions, with three of these accounting for 85 per cent of the group total. Thirteen intermediates recorded negative technical revisions, while 22 juniors did.

Discoveries were recorded by only one of the seniors and one of the intermediates. Three RIs account for all of the junior group's discoveries, including one that accounts for 96 per cent of the group change.

Changes in acquisitions are 11 per cent for the seniors, five per cent for the intermediates and 25 per cent for the juniors. Eight seniors, 11 intermediates and 10 juniors recorded acquisitions.

Changes in dispositions are zero per cent for the seniors, negative one per cent for the intermediates and negative three per cent for the juniors. Eight seniors, eight intermediates and 10 juniors recorded dispositions.

All three groups show adjustments for economic factors, with one per cent for the seniors, three per cent for the intermediates and two per cent for the juniors.

Figures 3 through 5 illustrate changes in summed extensions and improved recovery, discoveries and technical revisions respectively for gross proved plus probable reserves (in total), for each group of RIs in Figure 2, from 2014 to 2021. While generalized, the purpose is to illustrate the multi-year changes in each reserve change category by production group. This can assist in the identification of disclosure trends and issues.

Figure 3: Summed extensions and improved recovery for gross proved plus probable reserves (in total) for AB RIs, by production group

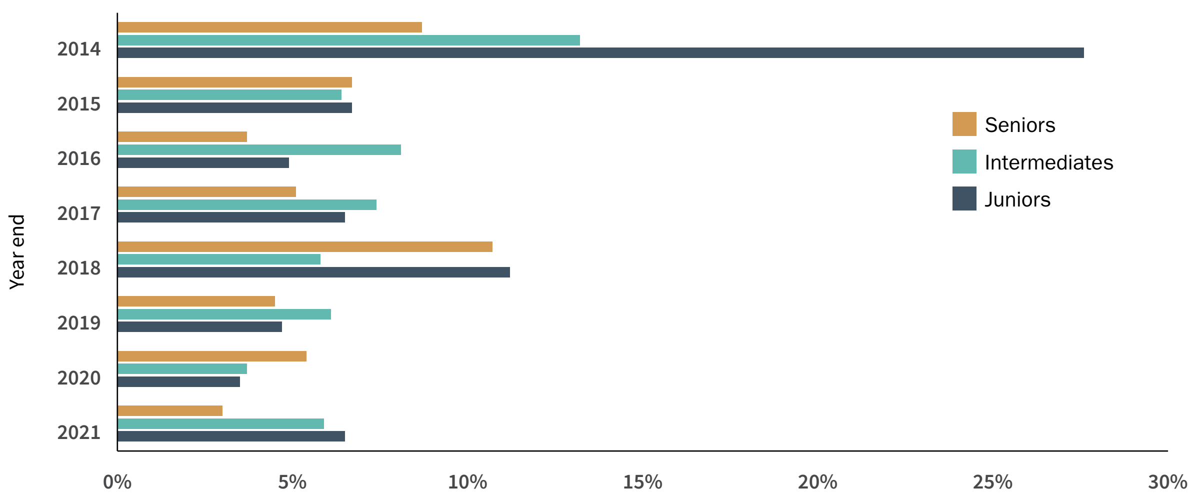


Figure 4 illustrates the average percentage change in aggregated discoveries for each group of AB RIs. The percentage change for the juniors increased sharply in 2020 and then decreased sharply, returning to historical levels in 2021. The percentage change for the intermediates also decreased, following three consecutive years of consistent results, while no percentage change was recorded for the seniors for the third consecutive year.

Figure 4: Summed discoveries for gross proved plus probable reserves (in total) for AB RIs, by production group

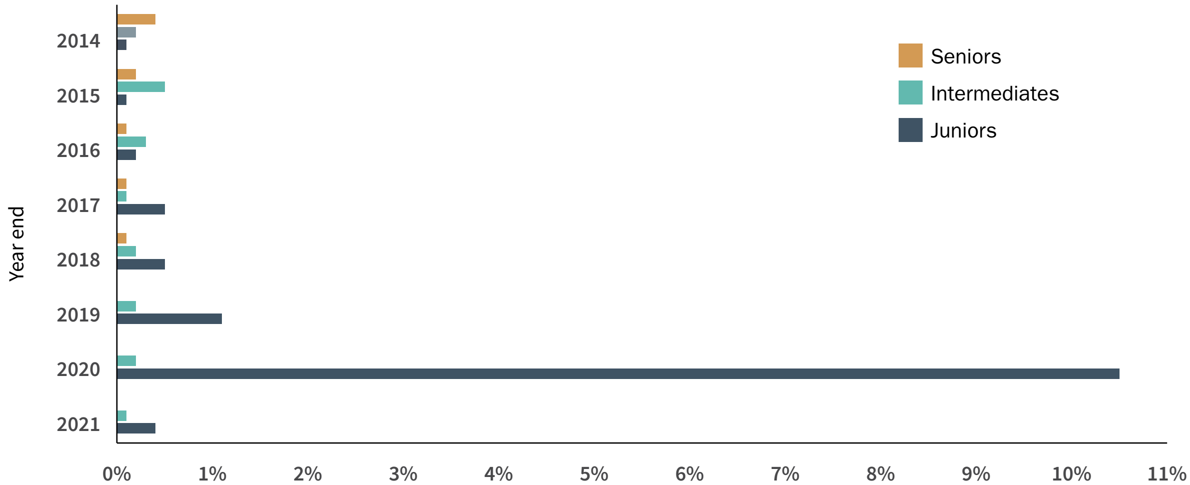
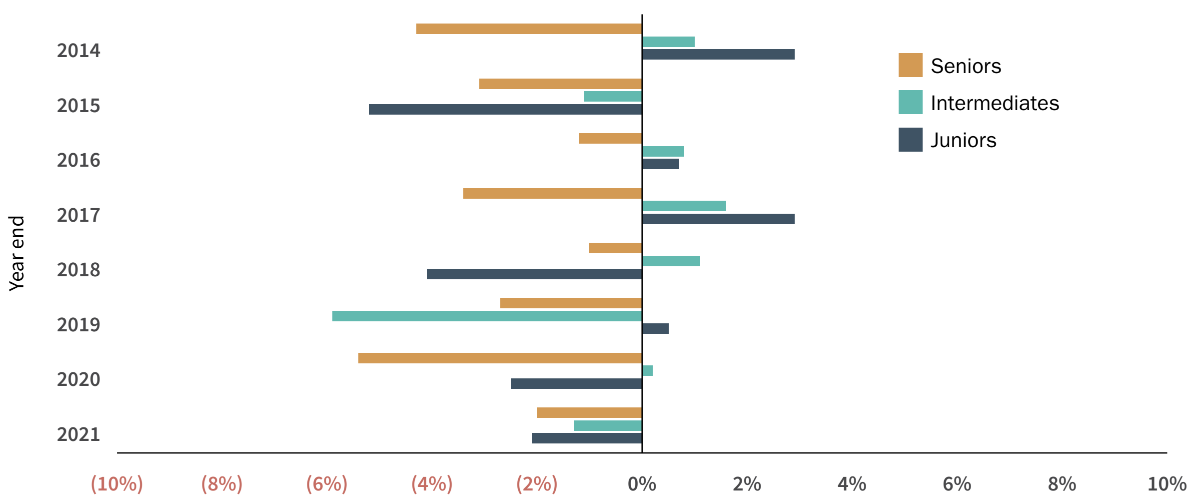


Figure 5 illustrates the multi-year average percentage change in aggregated technical revisions for each group of RIs. Although the reserves quality varies for individual RIs within each group, the changes in gross proved plus probable reserves (in total) have remained relatively constant for the juniors and intermediates and appear to approximate the associated certainty levels described in the COGE Handbook. The changes for the seniors have been negative for each of the years, with the percentage change in 2021 moderating noticeably over 2020. This suggests that the certainty levels for proved plus probable reserves continue to not be met. The ASC will continue to pay particular attention to negative technical revisions in its reviews of disclosure and will continue to address these concerns with RIs.

Figure 5: Summed technical revisions for gross proved plus probable reserves (in total) for AB RIs, by production group



Emerging energy-related disclosure commentary

3.1 INTRODUCTION

This section discusses disclosure regarding emerging energy-related matters. It includes the exploration, development, removal and sale of helium (**He**), the manufacture and sale of renewable hydrocarbons, also referred to as "green hydrocarbons" and "biofuels," and the development of geothermal energy.

As discussed further below, NI 51-101 will typically apply to the production of He as a by-product as defined in NI 51-101. Further, National Instrument 43-101 *Standards of Disclosure for Mineral Projects* (**NI 43-101**) will typically apply to the production of lithium, including from brines. However, in other cases, as the subject matter is emerging, there will not always be specific disclosure standards like NI 51-101 or NI 43-101 that address these subjects in a similar, dedicated manner. However, general provisions of securities legislation relating to balanced, accurate and reliable disclosure, with a focus on materiality, will apply. The information is meant to assist RIs and issuers that are not yet RIs, as well as their professional advisors, that intend to file a prospectus or other disclosure documents that incorporate prospectus requirements.

Both Canadian and Alberta capital markets continue to experience increasing activity in emerging energy-related matters. New RIs are appearing, while existing RIs, including those involved in legacy energy areas such as oil and gas activities, oil and gas midstream and oil and gas services, and those involved in electrical generation and transmission, are increasingly active in non-traditional energy-related areas. In addition to the subjects discussed in this section, these include hydrogen, recovery of lithium from oilfield brines (used in batteries), GHG emissions reduction, including CCUS and related technologies, co-generation, and renewables, such as wind and solar.

Similar to its approach concerning RIs engaged in oil and gas activities, the ASC has developed a rigorous review process regarding emerging energy-related subjects, which assesses compliance with securities law regulatory requirements. While this process primarily focuses on RIs for which the ASC is the principal regulator, staff also review select disclosure from RIs for which other Canadian jurisdictions are the principal regulator. These reviews have also been instrumental in assisting the Energy Group to determine individual RI involvement in emerging energy areas.

3.2 HELIUM

Interest in the exploration and development of subsurface reservoirs containing He, its removal and its sale, has grown in recent years, owing to increased prices and supply concerns. Helium is typically found in relatively small quantities alongside other substances, including nitrogen, carbon dioxide, water, and hydrocarbons like natural gas. Following recovery, specialized processing is used to separate these substances from He, which is then subjected to additional purification prior to sale. Recovered hydrocarbons are generally sold, consumed in facility operations or reinjected. Due to their natural association, oil and gas activities leads some RIs to inadvertently become involved with He, while others set out to be involved solely with He and inadvertently encounter hydrocarbons. Furthermore, He and hydrocarbons share similar exploration and development techniques, equipment and infrastructure.

As described in more detail below, an RI engaged in "oil and gas activities" that produces He from a "property" as a "by-product" of a "product type" will be expected to provide the disclosure required by NI 51-101 in respect of He. Issuers otherwise producing He will not generally be required to comply with NI 51-101. However, we strongly encourage these RIs to consider the requirements and principles of NI 51-101, appropriately adapted for He, to help prepare their disclosure. They provide a useful framework for identifying information that would typically be material to investors and therefore required to be disclosed in order to provide investors with the information necessary to make informed investment decisions.

At the end of September 2022, there were seven RIs involved in the exploration and development of subsurface reservoirs containing He, its removal and its sale. Alberta was the principal regulator for two of these RIs. This is the same number as at the end of September 2021 (it was incorrectly recorded as six in the 2021 Report). For each of these RIs, He is their main focus or only focus.

Section 1.3 of NI 51-101 states that NI 51-101 applies only to RIs engaged directly or indirectly in oil and gas activities. The use of NI 51-101 for other purposes, beyond consideration of its broader principles and requirements, could result in misleading disclosure and is strongly discouraged.

What constitutes engaging in “oil and gas activities?” Section 1.1 of NI 51-101 indicates it includes the following:

> a) searching for a *product type* in its natural location;
> b) acquiring *property* rights or a *property* for the purpose of exploring for or removing *product types* from their natural locations;
> c) any activity necessary to remove *product types* from their natural locations, including construction, drilling, mining and production, and the acquisition, construction, installation and maintenance of *field* gathering and storage systems including treating, *field* processing and *field* storage;
> d) producing or manufacturing of *synthetic crude oil* or *synthetic gas*;
>
> but does not include any of the following:
>
> e) any activity that occurs after the *first point of sale*;
> f) any activity relating to the extraction of a substance other than a *product type* and their *by-products*; […]

“Product types” is defined to comprise bitumen, coal bed methane, conventional natural gas, gas hydrates, heavy crude oil, light crude oil and medium crude oil combined, natural gas liquids, shale gas, synthetic crude oil, synthetic gas and tight oil. He is not a product type.

Section 1.1 defines by-product as:

> A substance that is recovered as a consequence of producing a *product type*.

Therefore, if He is recovered as a consequence of producing a product type, it is a by-product and NI 51-101 applies.

In NI 51-101 disclosure, only product types can have reserves and resources other than reserves attributed (volumes and associated values). Outside of NI 51-101 disclosure, reserves and resources other than reserves (volumes and associated values) can be disclosed for He.

Under NI 51-101, product types and by-products are associated with properties. The term “property” is defined[25] to include:

- Fee ownership or a lease, concession, agreement, permit, licence or other interest representing the right to extract oil or gas;
- Royalty interests, production payments and other non-operating interests in properties operated by others; and

[25] Section 1.1 of NI 51-101

- An agreement with a foreign government or authority under which an RI participates in the operation of properties or otherwise serves as "producer" of the underlying reserves.

A property is where an RI has the right to conduct oil and gas activities, including the extraction of product types and their by-products from their natural locations before the first point of sale, or where they have a royalty or other non-operating interest where others have the right to do so.

The first point of sale[26] is the first point after initial production at which there is a transfer of ownership of a product type.

Staff consider the concept of first point of sale to also apply to He disclosure. In other words, in this section, we are focused on disclosure involving activities related to He that occur prior to the first point of sale, regardless of whether they are associated with oil and gas activities.

NI 51-101 mandates the COGE Handbook for the preparation of specified disclosure. The COGE Handbook contains information concerning the evaluation of oil and gas and other substances, including He, and identifies the following main evaluation steps:

- Determination of estimates of volumes and associated values;
- Classification of these estimates according to their commerciality and uncertainty; and
- Reporting of evaluation results in accordance with regulatory requirements.

New information concerning the evaluation of He was included in an update to the COGE Handbook published in January 2022. This development necessitated the updating of the He information contained in the 2021 Report to reflect the changes made to the COGE Handbook.

Disclosure regarding the exploration and development of subsurface reservoirs containing He, its removal and its sale, depends on circumstances specific to each RI. An RI and its professional advisors must carefully consider these circumstances on an ongoing basis to ensure that the RI's disclosure satisfies Canadian securities law requirements.

Concerning the disclosure of He where the He is associated with:

1. **An RI engaged in oil and gas activities, and the He is a by-product of such activities per NI 51-101**

    - NI 51-101 applies. Disclose the He under NI 51-101.
        - Sections 5.4 and 5.5 and item 2.1.3(c) of Form 51-101F1 address specific by-product requirements.
    - He reserves and resources other than reserves (volumes and associated values) cannot be disclosed under NI 51-101; disclose elsewhere. Staff encourage the issuer to use the principles and requirements of NI 51-101, appropriately adapted for He, to help prepare the disclosure.
        - For convenience, RIs in this situation can consider including this disclosure in a clearly demarcated, labelled and described section within the body of their NI 51-101 disclosure if it is clear from its positioning, prominence, labelling and description that it is additional information separate and distinct from their oil and gas disclosure.
    - Specified He disclosure must be prepared or audited in accordance with the COGE Handbook.

> Example: He recovered alongside hydrocarbons from the same subsurface reservoir, by an RI engaged in oil and gas activities.

[26] Ibid

2. **An RI engaged in oil and gas activities, but the He is not a by-product of such activities per NI 51-101**
   - NI 51-101 does not apply to the He. Do not disclose the He as if it is required under NI 51-101. Disclose it elsewhere if material but do not do so as if it is provided under NI 51-101 as this could be misleading.
   - We encourage the RI to use the requirements and principles of NI 51-101, appropriately adapted for He, to help prepare their disclosure. The disclosure format can be similar to that used for NI 51-101 if it is clear that the disclosure is not NI 51-101-related and does not misleadingly suggest that NI 51-101 applies.
     – He reserves and resources other than reserves (volumes and associated values) can be disclosed and may need to be if required as a material fact. Failure to do so would be misleading.
   - RIs will find useful information in the COGE Handbook regarding preparing and auditing the He disclosure.

Example: He recovered from a subsurface reservoir, in the absence of hydrocarbons, by an RI engaged in oil and gas activities.

3. **An RI that is not engaged in oil and gas activities**
   - NI 51-101 does not apply. Do not disclose the He under NI 51-101. Disclose it elsewhere but do not do so as if it is provided under NI 51-101.
   - We encourage the RI to use the requirements and principles of NI 51-101, appropriately adapted for He, to help prepare their disclosure. The disclosure format can be similar to that used for NI 51-101 if it is clear that the disclosure is not NI 51-101 and does not misleadingly suggest that the same standards apply.
     – He reserves and resources other than reserves (volumes and associated values) can be disclosed and may need to be if required as a material fact. Failure to do so would be misleading.
   - RIs will find useful information in the COGE Handbook regarding preparing and auditing the He disclosure.

Example: He recovered from a subsurface reservoir, in the absence of hydrocarbons, by an RI not engaged in oil and gas activities.

In addition, for all He disclosure, it will generally be necessary for the RI to ensure:

- Technical terminology is defined and explained;
- The disclosure is in accordance with all applicable requirements; and
- Material information is disclosed.

In assessing whether He-related disclosure is material to an RI, staff will generally assume that disclosure featured prominently in investor presentations, promotional materials or news releases is material.

Please contact staff with questions concerning disclosure of He.

3.3 RENEWABLE HYDROCARBONS

Renewable hydrocarbons, also referred to as “green hydrocarbons” and “biofuels,” are substances manufactured by applying various biological, chemical and thermal processes or combinations of these, to biological material. Source materials include vegetable and animal oils, algae, cellulosic substances such as crops, crop residues, trees and forestry waste products, food waste, livestock manure, wastewater and solid waste. The manufactured hydrocarbons include diesel, gasoline, aviation fuel and methane, which are chemically equivalent to those manufactured through refinement of naturally occurring hydrocarbons. As a result, they can be substituted for or blended with them. Facilities that manufacture renewable hydrocarbons are either stand-alone or incorporated into larger facilities, including petroleum refineries.

The manufacture, sale and use of renewable hydrocarbons has been growing in prominence in recent years, encouraged by sustainability goals, government incentives and new fuel regulations. The latter includes the Government of Canada’s Canadian Renewable Fuels Regulations (**Federal Regulation**) and the Government of Alberta’s Alberta Renewable Fuels Standard Regulation. These require fuel suppliers to meet a minimum renewable fuel content of five per cent for gasoline and two per cent for diesel. On September 30, 2024, the Federal Regulation will be replaced by the Canadian Clean Fuel Regulations, which sets lifecycle GHG emissions intensity reductions annually instead of mandating minimum renewable content.

At the end of September 2022, there were six RIs involved in the manufacture and sale of renewable hydrocarbons for which Alberta was the principal regulator. For three of these RIs, renewable hydrocarbons are a significant, if not primary focus. For the other RIs, renewable hydrocarbons are a component of their business. Five additional RIs are involved in other aspects of renewable hydrocarbons, such as transportation, storage, services or as a purchaser. None of these RIs are engaged in oil and gas activities.

NI 51-101 does not apply to the disclosure of renewable hydrocarbons, as they are not associated with oil and gas activities. RIs are instructed to not include disclosure related to renewable hydrocarbons under NI 51-101. In simple terms, oil and gas activities involves the search for, acquisition of, or removal of product types and their by-products from their natural locations before the first point of sale, or the production or manufacturing of the product types synthetic crude oil or synthetic gas.

Per section 1.1 of NI 51-101, product types comprise bitumen, coal bed methane, conventional natural gas, gas hydrates, heavy crude oil, light crude oil and medium crude oil combined, natural gas liquids, shale gas, synthetic crude oil, synthetic gas and tight oil. Each of these is directly or indirectly defined as being naturally occurring. Synthetic crude oil and synthetic gas should not be misconstrued as being associated with renewable hydrocarbons, although they are manufactured. The former is derived from upgrading substances such as bitumen, kerogen or coal or from gas to liquid conversion, while synthetic gas is generated via the application of a transformation process to coal or other hydrocarbon-bearing rock in situ.

Therefore, since renewable hydrocarbons are not product types and only product types and their by-products are addressed in NI 51-101, renewable hydrocarbons are not addressed in NI 51-101 and it would not be appropriate to disclose them under NI 51-101.

Concerning the preparation of disclosure involving the manufacture and sale of renewable hydrocarbons, in order to ensure disclosure of material information required by securities legislation, staff would typically expect an RI to address the following for each project:

- The RI’s interest in the project;
- The project’s location;
- Whether it is a stand-alone project or associated with a larger project or existing facility;

- The substances expected to be manufactured and their respective quantities;
- Project value, if available, along with the:
  - Basis for the value determination;
  - Methodology used;
  - Input data used, including costs, commodity price assumptions and credits, grants and other financial incentives and considerations;
  - Source of the input data and value determination; and
  - Effective date of the determination.
- The estimated total undiscounted cost of the project;
- The general timeline of the project, including the estimated date of first production;
- The technology to be used, whether it is experimental or if it has been used previously and if so, whether it was used in a pilot or commercial application, the results, and if the proposed use is different than its previous use, how;
- The significant factors or uncertainties relevant to the project; and
- Project risks, including, but not limited to, regulations, and risks associated with feedstock source, availability, quality and logistics.

In addition, for all renewable hydrocarbon disclosure, it will generally be necessary for the RI to ensure:

- Technical terminology is defined and explained;
- The disclosure is in accordance with all applicable requirements; and
- Material information is disclosed.

In assessing whether renewable hydrocarbon-related disclosure is material to an RI, staff will generally assume that disclosure featured prominently in investor presentations, promotional materials or news releases is material.

Please contact staff with questions concerning disclosure of renewable hydrocarbons.

3.4 GEOTHERMAL ENERGY

Geothermal energy harnesses and utilizes clean energy derived from heated fluids circulating in the earth's crust. These fluids are passively heated via radioactive decay and heat dissipation attributed to post formation cooling of the earth. Wellbores are used to access these fluids, which are then used to generate electricity and provide heat, while these wellbores are also used to dispose of waste fluids following energy extraction. Additional benefits of geothermal energy include low ground surface disturbance for wellbores and related infrastructure, their long service life, and the baseload qualities of electricity generated from it. The benefits of geothermal energy have resulted in it receiving increased attention in recent years, alongside growing interest in clean, renewable energy sources.

In general, geothermal energy potential increases with subsurface depth, but various geological factors can affect this. Potential also varies geographically due to regional geological characteristics. For example, whether a particular location is underlain by a sedimentary basin or a volcanic system will greatly influence its potential, as will the presence, quantity and quality of fluids and fracture networks in the host rock.

Canada hosts a number of geothermal energy resource types. These include:

- High and high-intermediate temperature steam and fluids from deep geothermal resources
  - Used for electrical generation and direct use in district (residential and commercial) and industrial heating, following heat extraction via exchangers and pumps.
- Low-intermediate and low temperature fluids associated with shallow geothermal resources
  - Used for direct heating and cooling.

The assessment of geothermal energy potential in Western Canada has been assisted by the region's long history of oil and gas development, which includes the drilling of hundreds of thousands of exploration and development wells and the related infrastructure. Relevant geological, geotechnical and other data has been collected and analyzed from many of these wells, and while most efforts have not specifically focused on geothermal energy, some inadvertent rock and fluid characterization has occurred. There is also the potential to utilize and potentially repurpose existing oil and gas infrastructure and access technical expertise.

In December 2021, the *Geothermal Resource Development Act* (**GRDA**) was proclaimed by the Government of Alberta, providing a regulatory framework for the development of Alberta's geothermal resources. The GRDA applies to facilities and pipelines used solely for geothermal energy production.

The GRDA establishes the Alberta Energy Regulator (**AER**) as the primary regulator for geothermal developments. Published in August 2022, Directive 089: Geothermal Resource Development, sets out the AER's requirements and processes for geothermal resource development. It includes references to existing oil and gas regulatory instruments that apply to geothermal development.

As of the end of September 2022, two Canadian RIs disclosed active efforts involving geothermal energy development, with Alberta being the principal regulator for both of them. Both of these RIs are also engaged in oil and gas activities. A number of other RIs have disclosed interest in geothermal energy, including some that are engaged in oil and gas activities. Some of these RIs have indicated an interest in geothermal energy development associated with existing oil and gas projects.

The definition of oil and gas activities per section 1.1 of NI 51-101 does not include geothermal energy. The extraction of hydrocarbons as a consequence of the extraction of geothermal steam is specifically excluded from the meaning of oil and gas activities. Consequently, it would not be appropriate for RIs who are not engaged in oil and gas activities to include disclosure related to geothermal energy development in a manner that suggested it was subject to NI 51-101.

An RI engaged in oil and gas activities and subject to NI 51-101 can include disclosure related to geothermal energy development in a separate, clearly demarcated, labelled and described section within their NI 51-101 disclosure, if the information is related to their oil and gas activities.

Concerning the preparation of disclosure involving geothermal energy development, in order to ensure disclosure of material information required by securities legislation, staff would typically expect an RI engaged in geothermal energy development to address each of the following for each project:

- The RI's interest in the project;
- The project's location;
- Whether it is a stand-alone project or associated with a larger project or existing facility;
- The types of energy expected to be generated and their respective quantities;

- Project value, if available, along with the:
  - Basis for the value determination;
  - Methodology used;
  - Input data used, including costs and commodity price assumptions, and credits, grants and other financial incentives and considerations;
  - Source of the input data and value determination; and
  - Effective date of the determination.
- The estimated total undiscounted cost of the project;
- The general timeline of the project, including the estimated date it is expected to be operational;
- The technology to be used, whether it is experimental or if it has been used previously and if so, whether it was in a pilot or commercial application, the results, and if the proposed use is different than its previous use, how;
- The significant factors or uncertainties relevant to the project; and
- Project risks, including, but not limited to, those associated with regulations and geology.

In addition, for all geothermal energy development project disclosure, it will generally be necessary for the RI to ensure:

- Technical terminology is defined and explained;
- The disclosure is in accordance with all applicable requirements; and
- Material information is disclosed.

In assessing whether geothermal energy disclosure is material to an RI, staff will generally assume that disclosure featured prominently in investor presentations, promotional materials or news releases is material.

Please contact staff with questions concerning disclosure of geothermal energy.

Sustainability disclosure

There is growing interest in sustainability disclosure among many capital market stakeholders. RIs are responding with increased disclosure concerning GHG emissions, climate risks, emissions reduction and other sustainability matters. In consideration of preparation of such disclosure, RIs are reminded of the broader Canadian securities disclosure framework and its various requirements, guidance and prohibitions.

As discussed in section 2 of this Report, the Energy Group has a rigorous review process used to assess compliance with oil and gas and other energy-related securities regulatory requirements. This process was expanded in 2021 to include the review of certain aspects of sustainability disclosure from energy-related RIs. These reviews are referred to as "Sustainability Technical Screening Reviews" and focus on the assessment of basic information attributed to an RI, such as:

- Whether certain environmental sustainability disclosure has been provided concerning:
  - GHG emissions
  - Other air emissions
  - Energy usage
  - Water usage
  - Abandonment and reclamation activities
- The timing and frequency of such disclosure
- How the disclosure was prepared
- The method of disclosure
- Whether specific information has been disclosed.

These reviews do not assess whether specific social or governance information has been disclosed.

The 2021 Report, for the first time, included information concerning environmental sustainability disclosure attributed to RIs engaged in oil and gas activities for which the ASC is the principal regulator. This Report has expanded to include updated information for these RIs, and to include this information for RIs involved in oil and gas midstream (including pipelines) and oil and gas services for which the ASC is the principal regulator.
It is intended to inform the ASC and others regarding the current status of sustainability disclosure from these RIs. As there are currently no specific securities requirements respecting sustainability disclosure, the quality of such disclosure is not addressed in this Report.

The timing of sustainability disclosure is often irregular and does not typically conform to an RI's financial year. The information in this section incorporates disclosure from current RIs that has occurred from the end of September 2021 to the end of September 2022. This corresponds to the 12 months following the period covered in the 2021 Report.

As shown in Figure 6a, 54 per cent of current RIs engaged in oil and gas activities, for which the ASC is principal regulator, provided sustainability disclosure in the past year, up from 41 per cent in the previous period (see the 2021 Report). Forty-two per cent provided this disclosure through a stand-alone report, while 12 per cent provided this information only on their website, up from 33 and nine per cent respectively. As illustrated in Figure 6b, all current RIs involved in oil and gas midstream provided sustainability disclosure in the past year, with all providing it in a stand-alone report. Per Figure 6c, 53 per cent of current RIs involved in oil and gas services provided sustainability information, with 33 per cent providing this information in a stand-alone report.

Figure 6: Sustainability disclosure occurrences and methodology by AB RIs

Figure 6a: RIs engaged in oil and gas activities

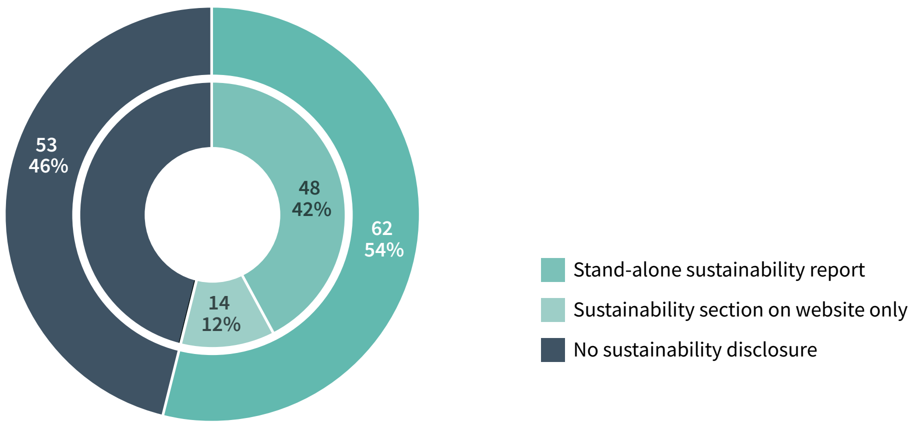


Figure 6b: RIs involved in oil and gas midstream

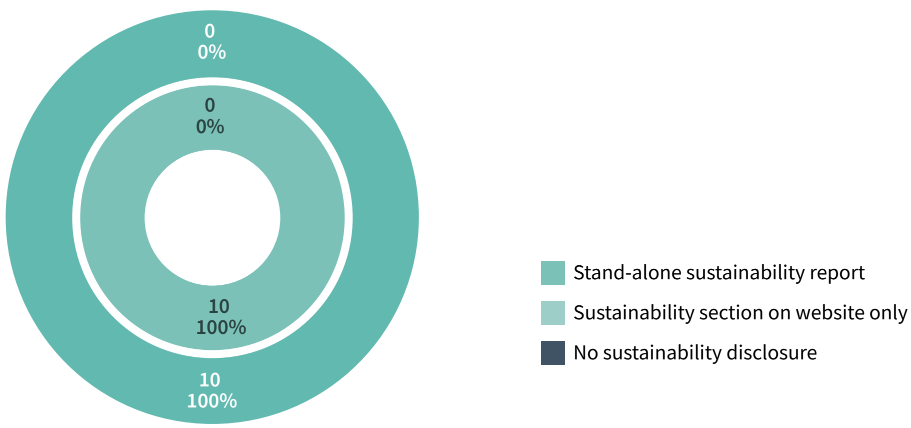
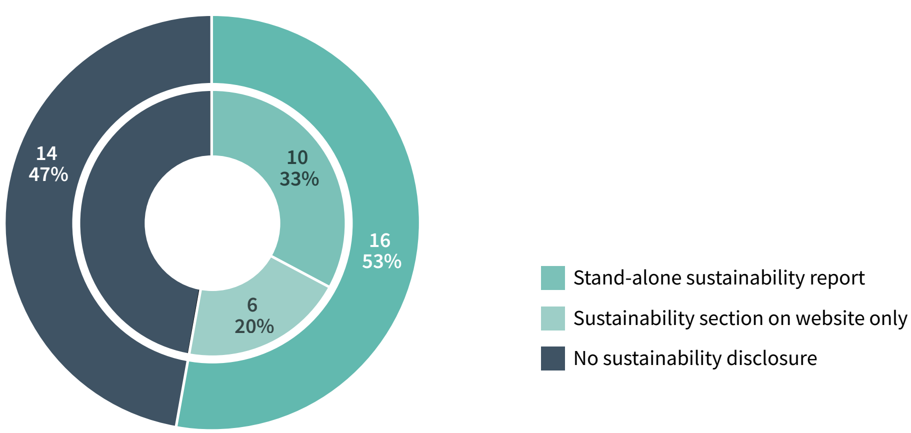


Figure 6c: RIs involved in oil and gas services



The disclosure methodology is important. Sustainability information disclosed on websites is typically less informative than that disclosed in stand-alone reports. Furthermore, sustainability information found on the websites of RIs that do not publish stand-alone reports is typically not quantified, so changes over time are difficult to ascertain and it tends to be more aspirational, with a focus typically on corporate philosophy concerning such matters.

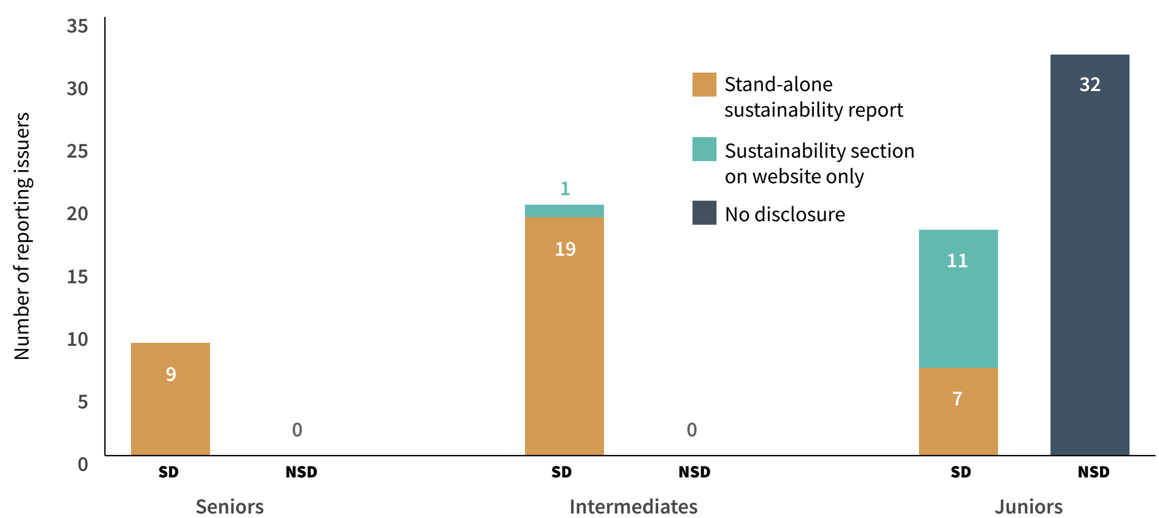
Figure 7 illustrates the information presented in Figure 6a by production group. The RIs engaged in oil and gas activities were grouped using production disclosed per item 6.9 of Form 51-101F1, as follows:

- “seniors” being those RIs with >100,000 BOE per day of production (based on a conversion ratio of six thousand cubic feet of gas for one barrel of oil);
- “intermediates” being those RIs with 10,000 to 100,000 BOE per day of production; and
- “juniors” being those RIs with <10,000 BOE per day of production.

The RIs ranked highest by production were selected from each group, incorporating nine senior, 20 intermediate and 50 junior RIs.

As shown in Figure 7, all of the seniors published a stand-alone report containing sustainability information. Nineteen of the 20 intermediates did the same, with one RI providing this information only on its website. Of the juniors, 18 of the 50 disclosed sustainability information, with seven of these RIs having published a stand-alone report and the other 11 providing this information only on their website. This is very similar to our findings in the 2021 Report in which we noted that all of the seniors, 17 of the intermediates and three of the juniors published a stand-alone report.

Figure 7: Sustainability disclosure occurrences and methodology by AB RIs engaged in oil and gas activities, by production group



SD - Sustainability disclosure occurrences **NSD** - No sustainability disclosure occurrences

Figure 8 indicates the reporting frameworks identified by the RIs as being used to prepare their sustainability disclosure.

Although an RI may be noted as using a particular reporting framework, they may not have used it appropriately or in its entirety.

The frameworks used are:

- Task Force on Climate-related Financial Disclosure's (**TCFD**) Recommendations of the Task Force on Climate-related Financial Disclosures
- Global Reporting Initiative's (**GRI**) GRI Standards
- Sustainability Accounting Standards Board's (**SASB**) SASB Standards

Many RIs use more than one framework. None of the RIs that only provided sustainability information on their website disclosed a reporting framework. Concerning the RIs engaged in oil and gas activities, seven of the seniors, 11 of the intermediates and one of the juniors used all three frameworks to prepare their disclosure. For RIs involved in oil and gas midstream and oil and gas services, four and five did so, respectively.

Figure 8: Reporting frameworks used by AB RIs to prepare sustainability disclosure

Figure 8a: RIs engaged in oil and gas activities, by production group

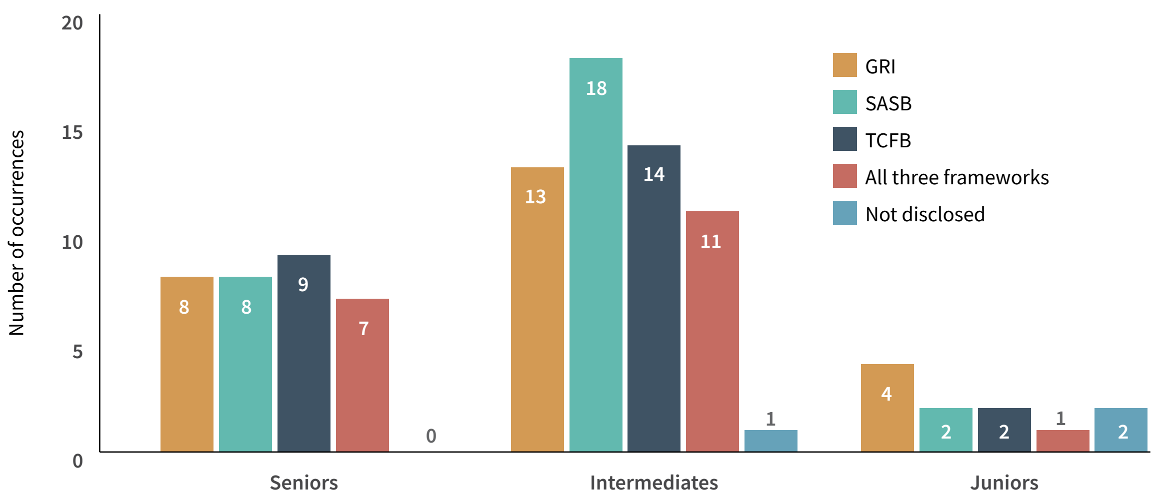


Figure 8b: RIs engaged in oil and gas activities, those involved in oil and gas midstream and those involved in oil and gas services

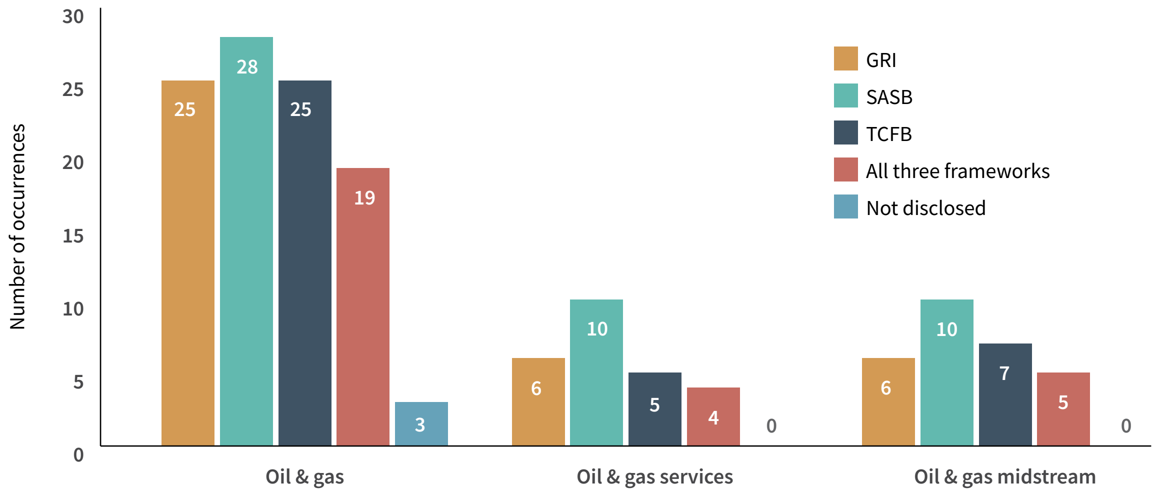


Figure 9 illustrates emissions disclosure occurrences by the RIs. "Scope 1," "Scope 2" and "Scope 3" refer to carbon dioxide equivalent emissions, which includes carbon dioxide, methane and nitrous oxide. The terms are defined within each framework, but broadly mean:

- **Scope 1**: all direct emissions owned or otherwise controlled by the RI
- **Scope 2**: all indirect emissions attributed to energy acquired by the RI (electricity, heat or steam)
- **Scope 3**: all other indirect emissions attributed to the value chain of the RI

As shown in Figure 9a for the RIs engaged in oil and gas activities, all of the seniors, 19 of the intermediates and six of the juniors disclosed Scope 1 emissions. All of the seniors, 19 of the intermediates and four of the juniors disclosed Scope 2, while four of the seniors, three of the intermediates and none of the juniors disclosed Scope 3 emissions. Similar to what was noted in the 2021 Report, all of the seniors, 18 of the intermediates and two of the juniors disclosed Scope 1, all of the seniors, 18 of the intermediates and one of the juniors disclosed Scope 2 and two of the seniors, five of the intermediates and none of the juniors disclosed Scope 3 emissions.

As shown in Figure 9b, 10 of the RIs involved in oil and gas midstream and six involved in oil and gas services disclosed Scope 1, nine involved in oil and gas midstream and six involved in oil and gas services disclosed Scope 2, while four involved in oil and gas midstream and six involved in oil and gas services disclosed Scope 3 emissions.

Please note that there is wide variation in adherence to the various methodologies for preparing Scope 3 emissions disclosure. Some RIs note that they only include material quantities of emissions and some indicate that they exclude certain data due to concerns with its completeness or reliability.

"Other Air Emissions" in Figure 9 includes nitrogen oxides, sulphur dioxide, volatile organic compounds and particulate matter.

Figure 9: Emissions disclosure occurrences by AB RIs

Figure 9a: Emissions disclosure occurrences by AB RIs engaged in oil and gas activities, by production group

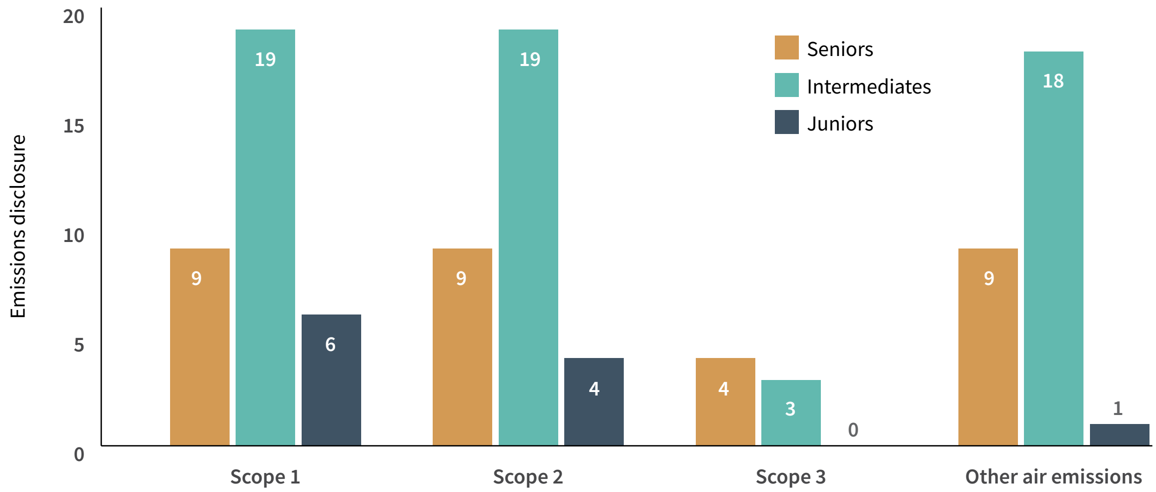


Figure 9b: Emissions disclosure occurrences by AB RIs engaged in oil and gas activities, those involved in oil and gas midstream and those involved in oil and gas services

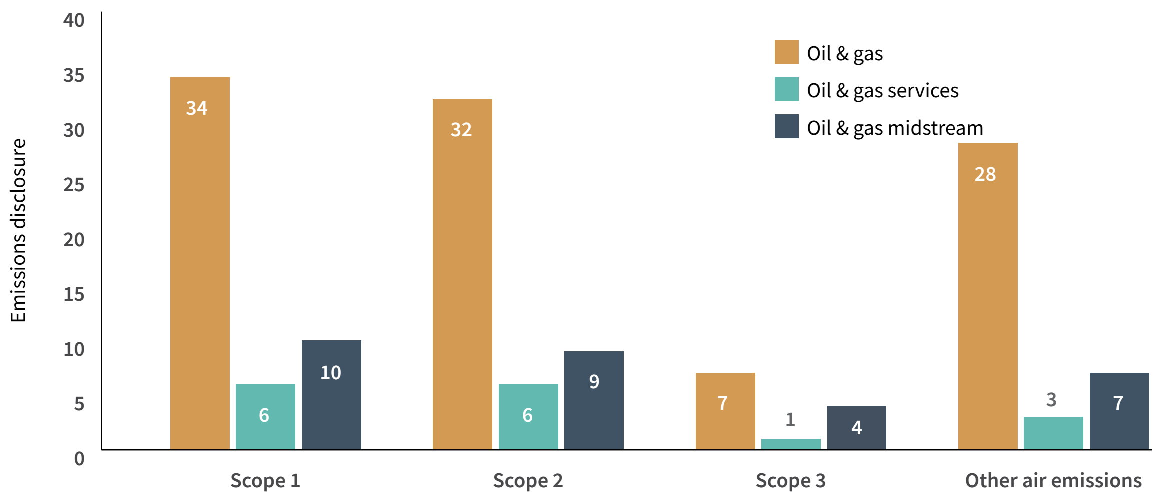
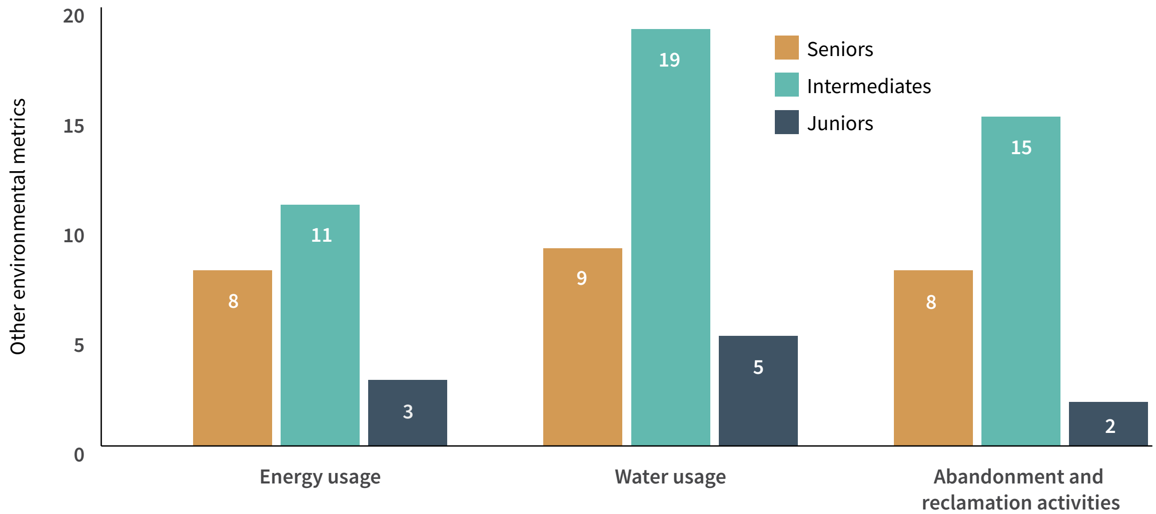


Figure 10 illustrates other environmental disclosure occurrences by RIs engaged in oil and gas activities, by production group. Of the three categories, abandonment and reclamation disclosure may be of most interest to readers of this Report, due to related disclosure requirements in NI 51-101. Eight of the seniors, 15 of the intermediates and two of the juniors provided this information, compared to six, 15 and one in the 2021 Report, respectively.

Figure 10: Other environmental disclosure occurrences by AB RIs engaged in oil and gas activities, by production group

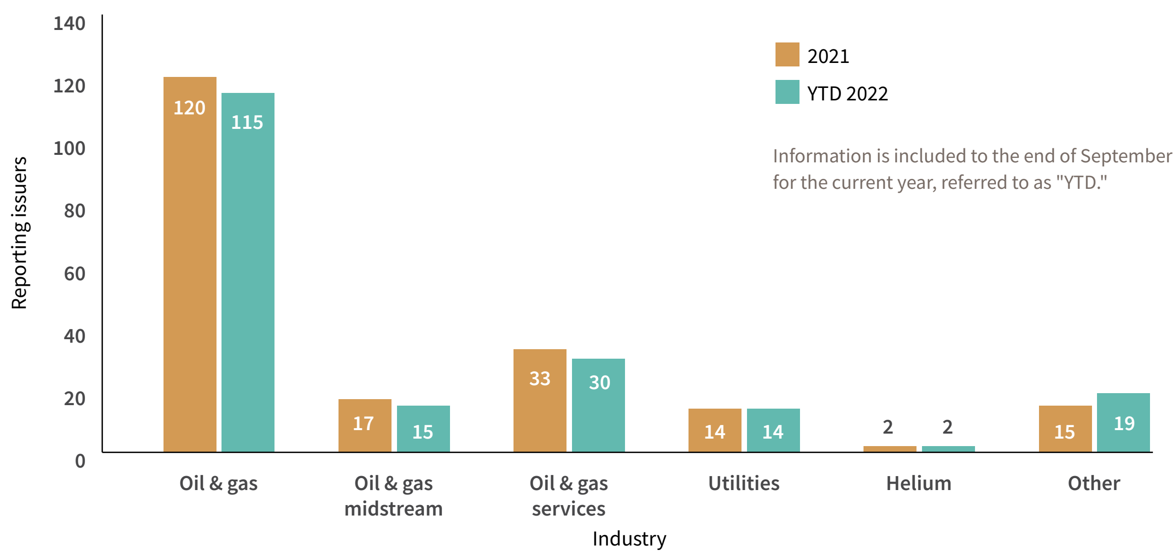


Energy and the Alberta capital market

This section explores the relationship between energy and the Alberta capital market and makes some comparisons to other jurisdictions, both within and outside Canada. It incorporates a number of the energy industry's various sub-industries, both established and emerging, and provides details concerning some of their important characteristics. These include the number of RIs attributed to each, the market capitalization of each, details concerning their capital raising activities and changes to these over time. Additional information concerning disclosure of contingent resources data and prospective resources data by RIs engaged in oil and gas activities is also provided.

Figure 11 presents a snapshot of the number of energy-related RIs for which the ASC is the principal regulator, by their respective sub-industry, for 2021 and to the end of September 2022. Regarding the individual sub-industries, "Oil & Gas" includes RIs engaged in oil and gas activities, "Oil & Gas Midstream" includes RIs involved with oil and gas pipelines, "Utilities" includes RIs that are involved in electrical generation (traditional and renewable means), transmission or distribution, while "Other" includes RIs involved in other energy-related sub-industries, including energy minerals (includes uranium and lithium), energy services, clean technology and renewable hydrocarbons.

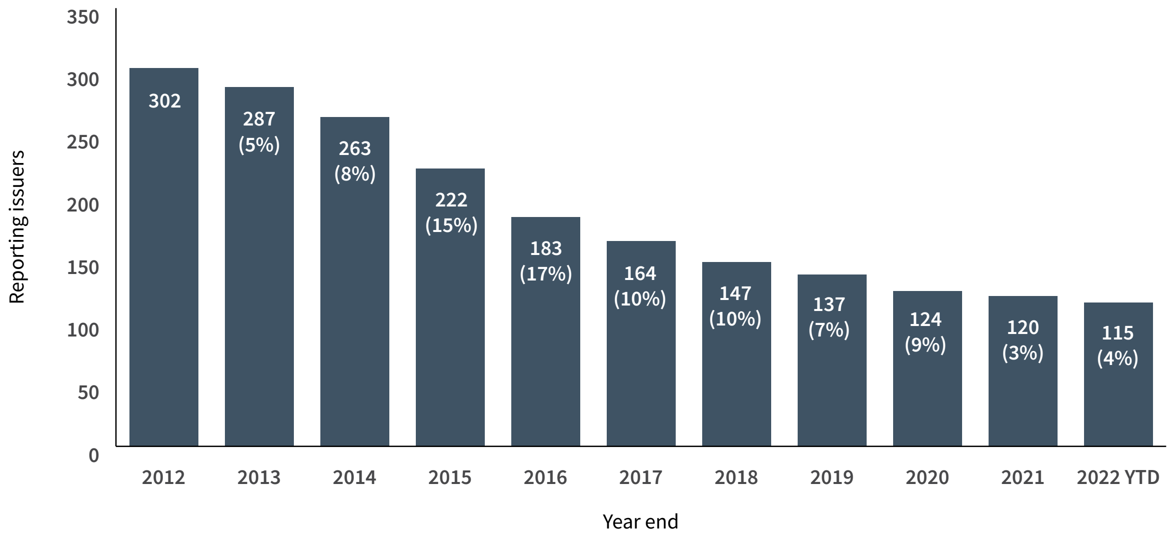
Figure 11: Number of energy-related AB RIs, by sub-industry



Many RIs included in "Oil & gas" and "Oil & gas midstream" are increasingly pursuing projects beyond their traditional businesses. For example, many RIs in "Oil & Gas" are pursuing non-traditional projects that involve CCUS as well as their related technologies, renewable hydrocarbons, co-generation, wind energy, and various clean technologies, while some RIs in "Oil & Gas Midstream" are developing renewable electrical generation projects that are typically the domain of RIs in "Utilities."

Figure 12 shows the number of RIs engaged in oil and gas activities for which the ASC was the principal regulator, from 2012 to the end of September 2022. There has been a steady decrease in the number of RIs engaged in oil and gas activities over this period. As illustrated, there were 120 at the end of 2021, down from 124 at the end of 2020 (three per cent decrease) and down from 302 at the end of 2012 (60 per cent decrease). At the end of September 2022, there were 115, representing a 62 per cent decrease since 2012.

Figure 12: Number of AB RIs engaged in oil and gas activities



As shown in Figure 13, the reduction in RIs is disproportionately reflected in the number of junior RIs, although intermediate RIs have notably declined. To construct this figure, RIs were grouped as follows, using production disclosed per item 6.9 of Form 51-101F1:

- "seniors" being those RIs with >100,000 BOE per day of production (based on a conversion ratio of six thousand cubic feet of gas for one barrel of oil);
- "intermediates" being those RIs with 10,000 to 100,000 BOE per day of production; and
- "juniors" being those RIs with <10,000 BOE per day of production.

Figure 13: Number of AB RIs engaged in oil and gas activities, by production group

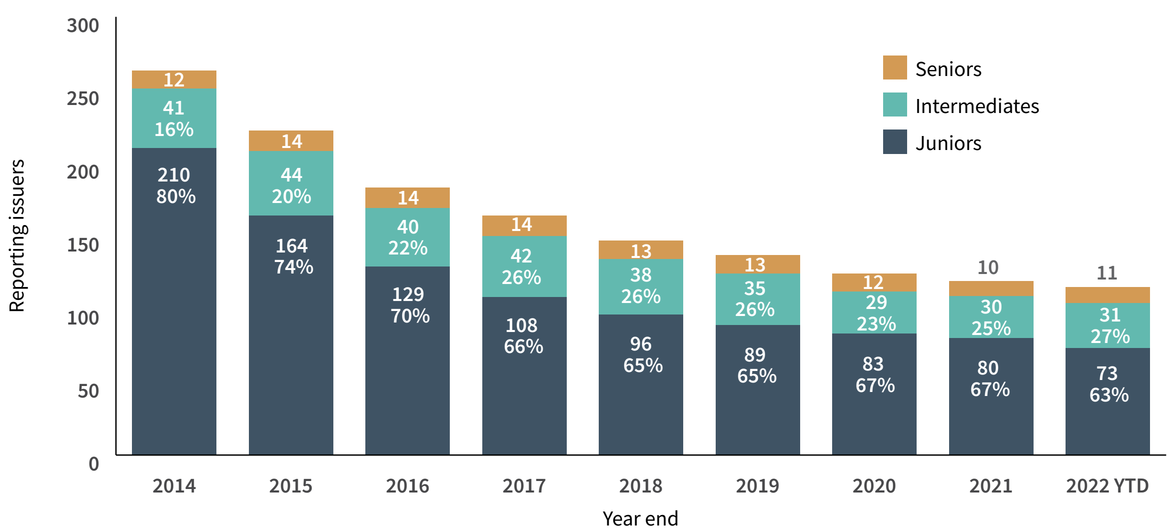


Figure 14 illustrates the reasons that account for the changes that occurred in the number of RIs from the end of 2021 to the end of September 2022, for each production group.

Figure 14: Net change in AB RIs engaged in oil and gas activities, by production group

	NUMBER OF REPORTING ISSUERS[1]				REASON(S) FOR CHANGE
	Seniors	Intermediates	Juniors	**TOTAL**	
	–	–	–	**0**	receivership/bankruptcy
	–	–	(4)	**(4)**	change in industry/acquired by a company in another industry
	(1)	–	–	**(1)**	privatized/acquired by a company not principally regulated by the ASC/ceased to be RI principally regulated by the ASC
	–	(1)	(2)	**(3)**	acquired by an RI princiupally regulated by the ASC
	–	–	(1)	**(1)**	Cease Trade Order
	–	–	4	**4**	new RI[3]
TOTAL	(1)	(1)	(3)	**(5)**	

[1] Does not capture changes due to movement between production groups.
[2] "–" = no occurences
[3] New RI includes Cease Trade Order revocations.

Figure 15 shows the number of RIs engaged in oil and gas activities from Canadian jurisdictions for which the ASC was not the principal regulator, from 2017 to the end of September 2022. The number of RIs has decreased even more sharply than the decrease in the number of RIs for which the ASC was the principal regulator over the same time period (44 per cent decrease versus 30 per cent decrease).

Figure 15: Number of non-AB RIs engaged in oil and gas activities

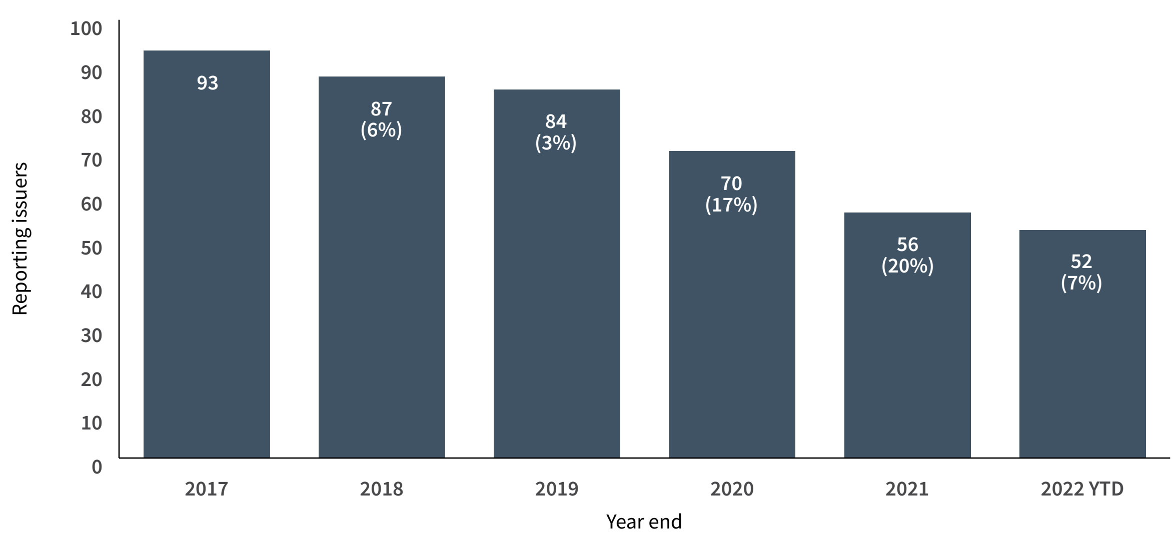


Figure 16 shows the RIs from Figure 15 grouped by production using the methodology employed to construct Figure 13.

Figure 16: Number of non-AB RIs engaged in oil and gas activities, by production group

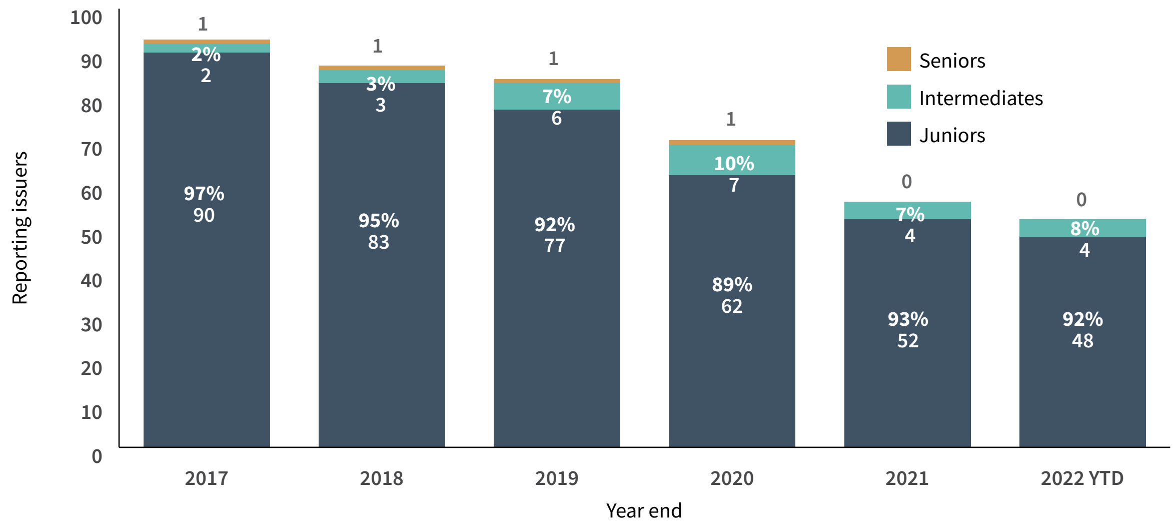


Figure 17 illustrates the market capitalizations of the energy-related sub-industries presented in Figure 11 at the end of September 2021 and 2022. These are based on closing prices attributed to the most active marketplace for the shares of each constituent RI in each sub-industry. For most of the RIs, this is the Toronto Stock Exchange (TSX) or the TSX Venture Exchange (TSX-V). Pricing data for this and all other figures in this Report is in Canadian dollars.

Figure 17: Market capitalization of energy-related AB RIs, by sub-industry

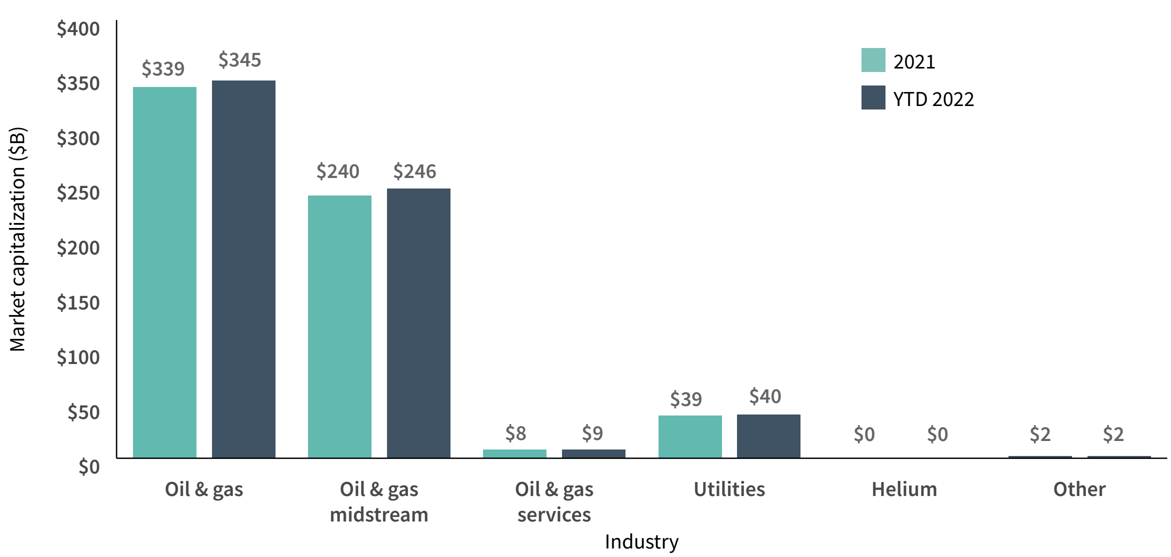


Figure 18 shows the amount of capital raised through prospectus offerings by RIs engaged in oil and gas activities for which the ASC was the principal regulator, from 2016 to the end of September 2022, and the number of these offerings. The offerings include various types of equity and debt securities, such as common shares, units, debentures, convertible debentures, rights, subscription receipts and notes. As long as Alberta is the principal regulator and the prospectus is filed in Alberta, the offering is included in Figure 18. The amount raised includes capital raised in Alberta and jurisdictions outside Alberta, as applicable under a prospectus. The 2022 year-to-date activity consists of eight offerings by seven different RIs.

Figure 18: Capital raised through prospectus offerings and the number of such offerings, by AB RIs engaged in oil and gas activities

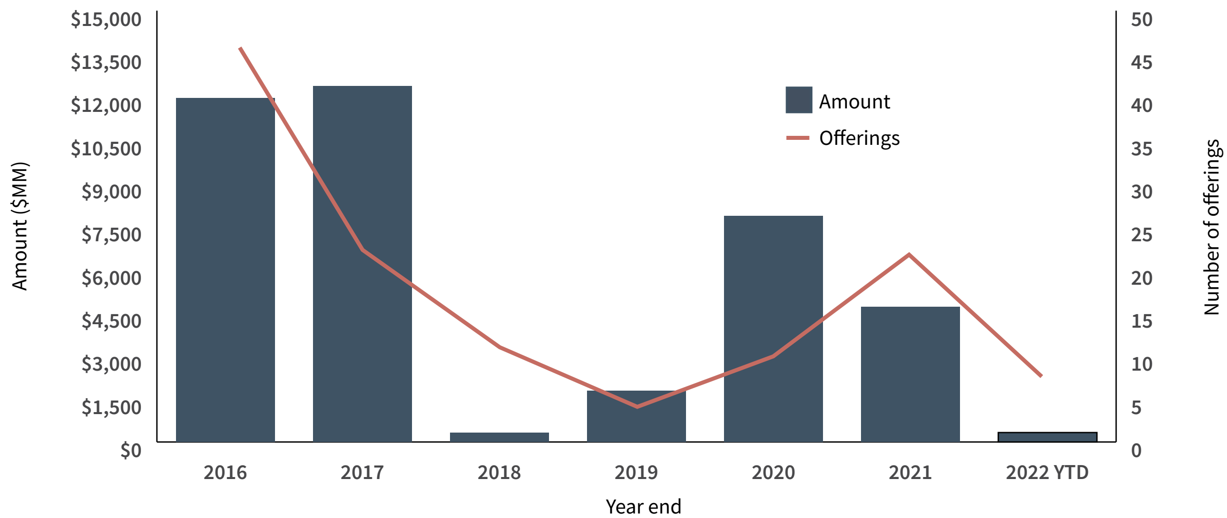


Figure 19 attributes the amounts raised in Figure 18 to production group.

Figure 19: Capital raised through prospectus offerings and the number of such offerings, by AB RIs engaged in oil and gas activities, by production group

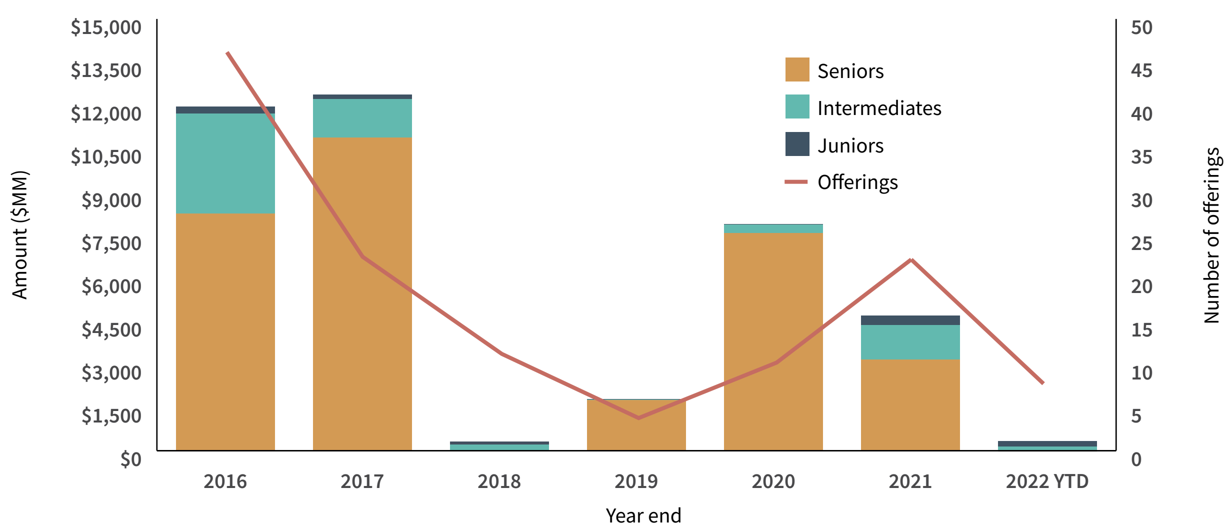


Figure 20 attributes the amounts raised in Figure 18 to securities category, be it equity, debt or both.

Figure 20: Capital raised through prospectus offerings and the number of such offerings, by AB RIs engaged in oil and gas activities, by securities category

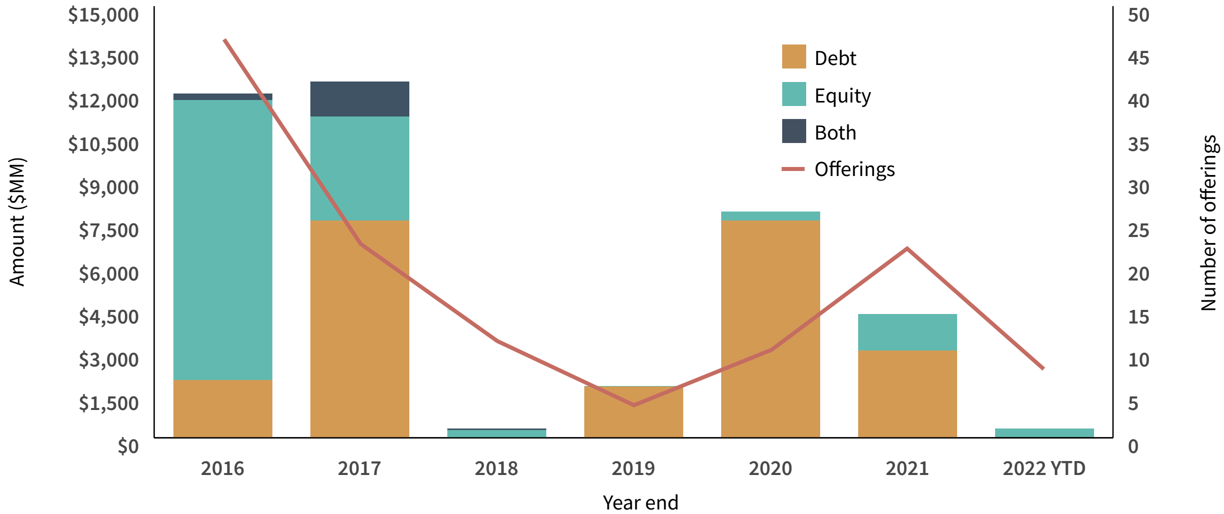
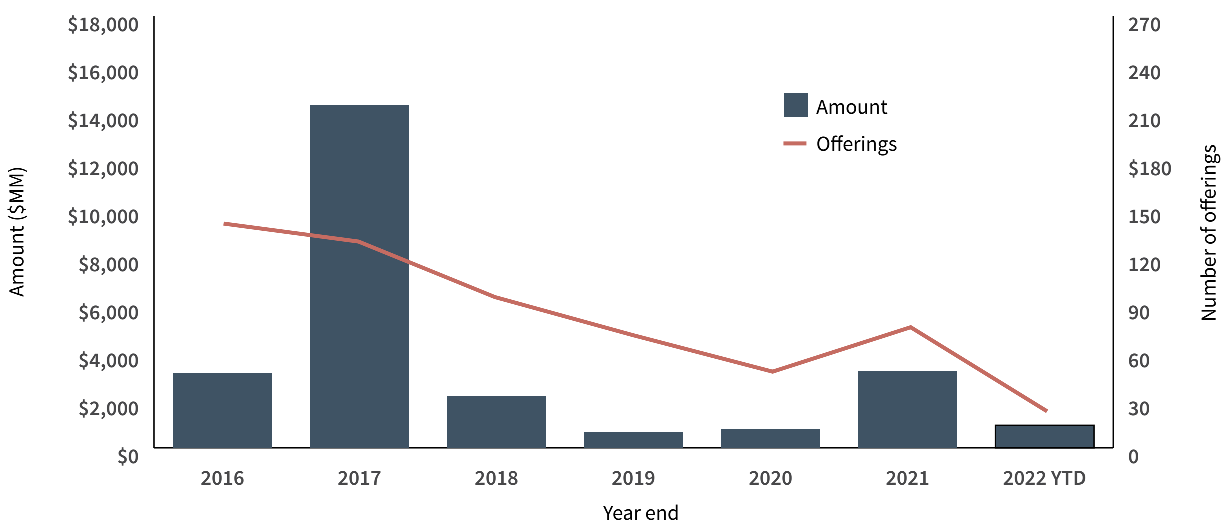


Figure 21 shows the amount of capital raised under exemptions from the prospectus requirement (capital not raised via prospectus) by RIs engaged in oil and gas activities for which the ASC was the principal regulator, from 2016 to the end of September 2022, and the number of these offerings. The offerings include various types of equity and debt securities. The amount raised includes capital raised in Alberta and jurisdictions outside Alberta, as applicable and as reported. The 2022 year-to-date activity consists of 26 offerings by 19 different RIs.

Figure 21: Capital raised in the exempt market and the number of such offerings, by AB RIs engaged in oil and gas activities



There are a number of prospectus exemptions available, most of which are set out in National Instrument 45-106 *Prospectus Exemptions*. Both RIs and non-RIs rely on prospectus exemptions to raise capital. Most prospectus exemptions used for capital raising purposes are required to be reported to applicable securities regulators using Form 45-106F1 *Report of Exempt Distribution*. Reports filed with the ASC are required to report on the distributions made in Alberta and may not report sales to investors in other jurisdictions.

Figure 22 attributes the amounts raised from Figure 21 to production group.

Figure 22: Capital raised in the exempt market and the number of such offerings, by AB RIs engaged in oil and gas activities, by production group

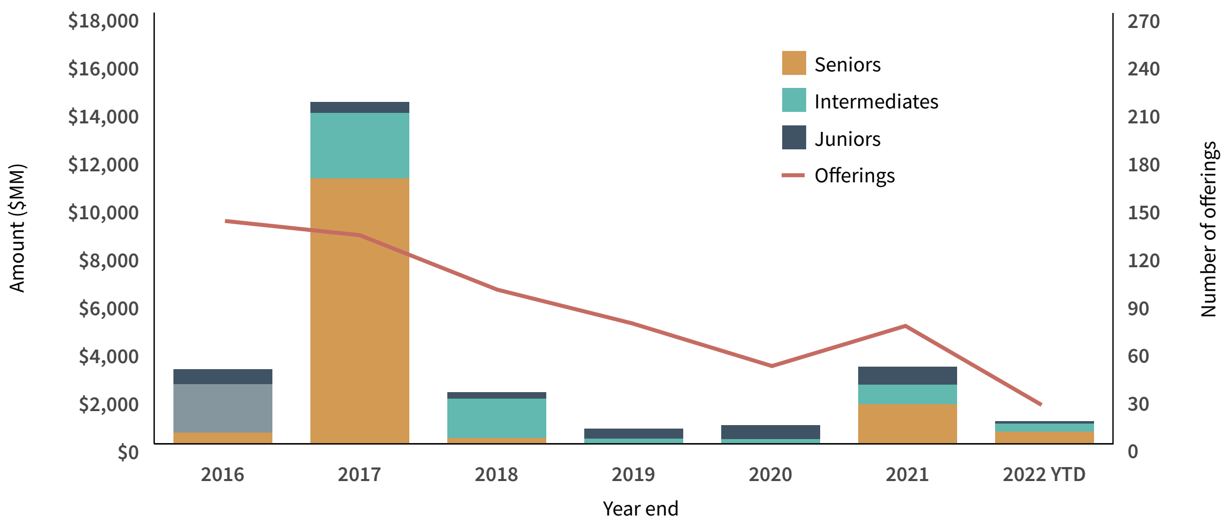


Figure 23 includes information presented in Figure 18 and Figure 21, for comparison. At the end of September 2022, the amount raised and the number of offerings is higher in the exempt market.

Figure 23: Capital raised through prospectus offerings and in the exempt market and the number of such offerings from each, by AB RIs engaged in oil and gas activities

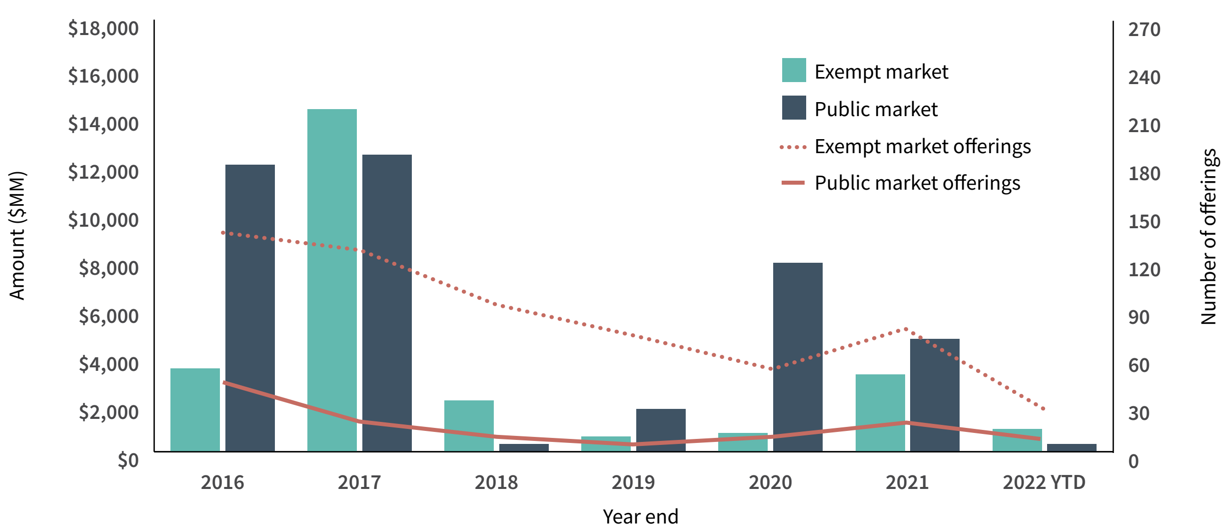


Figure 24 illustrates the amount of capital raised in Alberta by oil and gas issuers based in Alberta that are not RIs, from 2016 to the end of September 2022, and the number of these offerings. This is based on information reported to the ASC and is incomplete, as some offerings are not required to be reported (e.g. issuers relying on the private issuer prospectus exemption). The amount raised includes capital raised in Alberta and jurisdictions outside Alberta, as applicable. The 2022 year-to-date activity consists of 16 offerings by 12 different RIs.

Figure 24: Capital raised in the exempt market and the number of such offerings, by oil and gas issuers based in Alberta that are not RIs

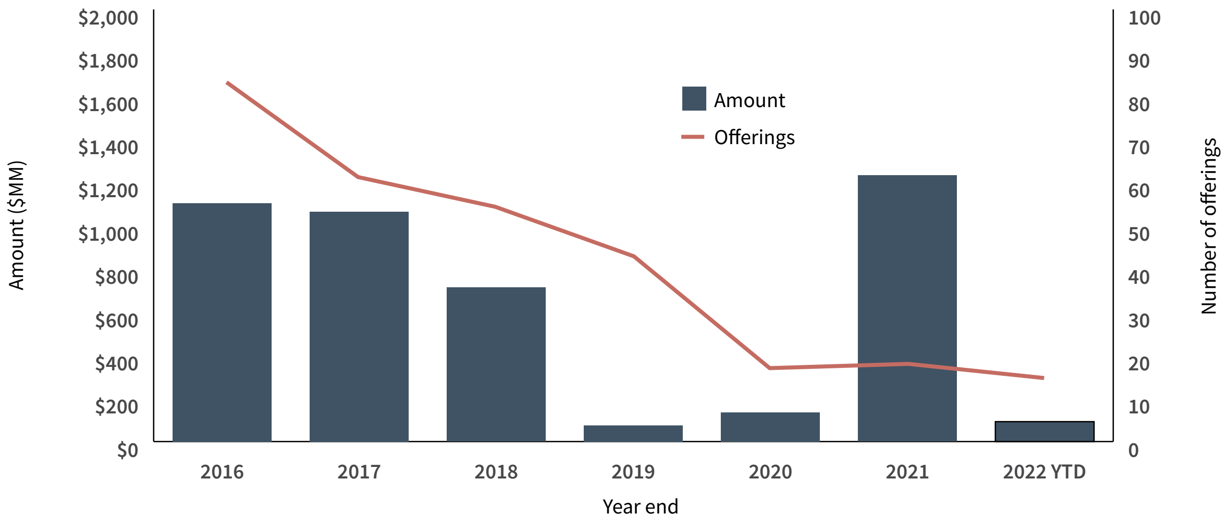


Figure 25 shows the amount of capital raised through prospectus offerings by RIs involved in oil and gas midstream and oil and gas services for which the ASC was the principal regulator, from 2016 to the end of September 2022, and the number of these offerings. The offerings include various types of equity and debt securities, such as common shares, units, debentures, convertible debentures, rights, subscription receipts and notes. As long as Alberta is the principal regulator and the prospectus is filed in Alberta, the offering is included in Figure 25. The amount raised includes capital raised in Alberta and jurisdictions outside Alberta, as applicable. The 2022 year-to-date activity consists of two offerings by two different RIs involved in oil and gas midstream and three offerings by three different RIs involved in oil and gas services. In the absence of a prospectus exemption, capital would be raised through securities issuance via prospectus.

Figure 25: Capital raised through prospectus offerings and the number of such offerings, by AB RIs involved in oil and gas midstream and oil and gas services

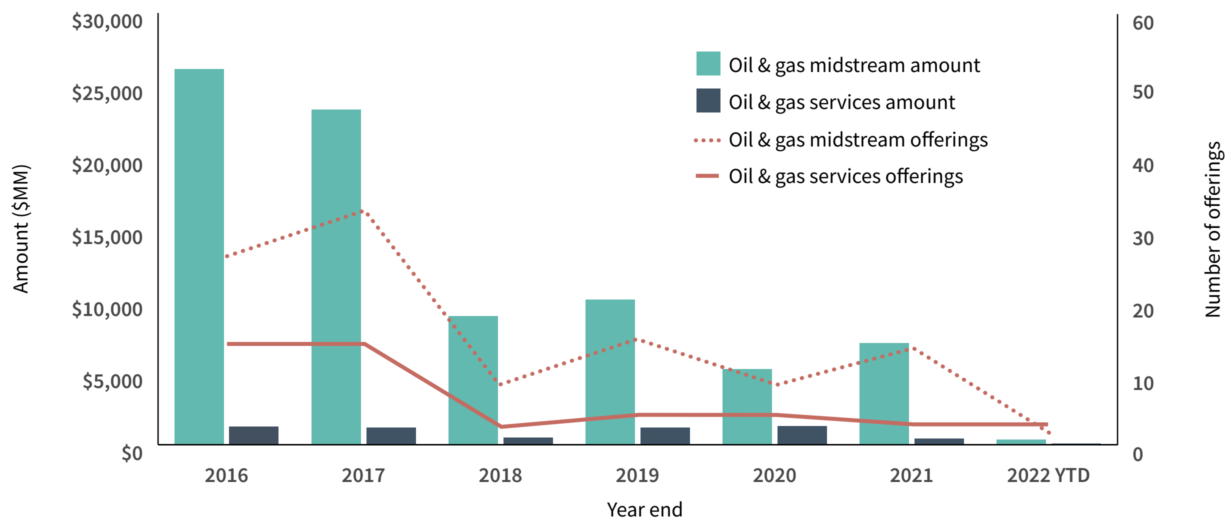


Figure 26 attributes the amounts raised in Figure 25 to securities category, be it equity, debt or both.

Figure 26: Capital raised through prospectus offerings by AB RIs involved in oil and gas midstream and oil and gas services, by securities category

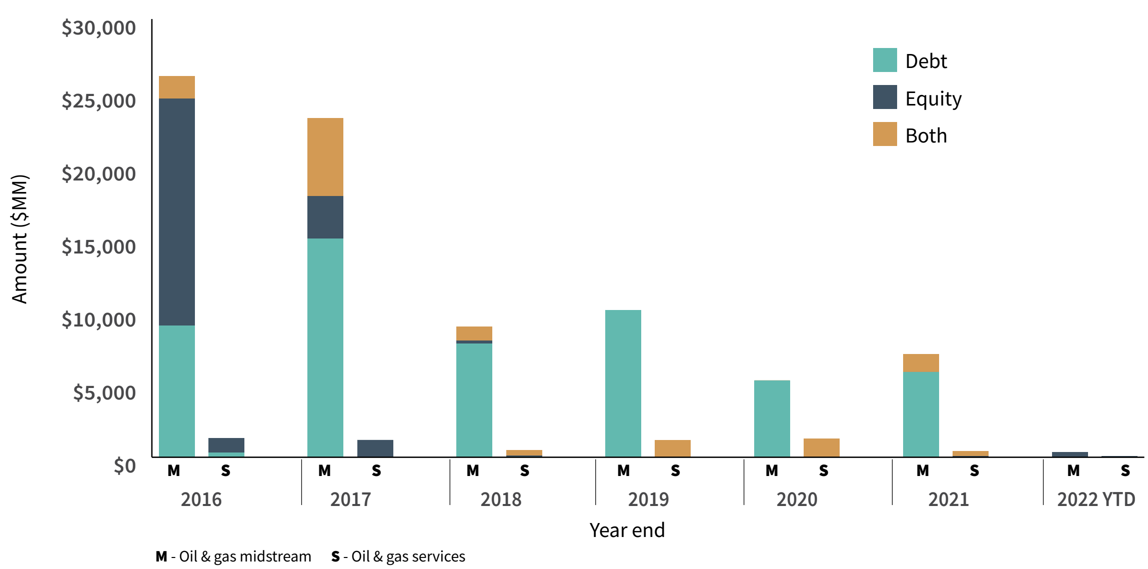


Figure 27 includes information presented in Figure 18 and Figure 25, for comparison.

Figure 27: Capital raised through prospectus offerings and the number of such offerings, by AB RIs engaged in oil and gas activities and those involved in oil and gas midstream and oil and gas services

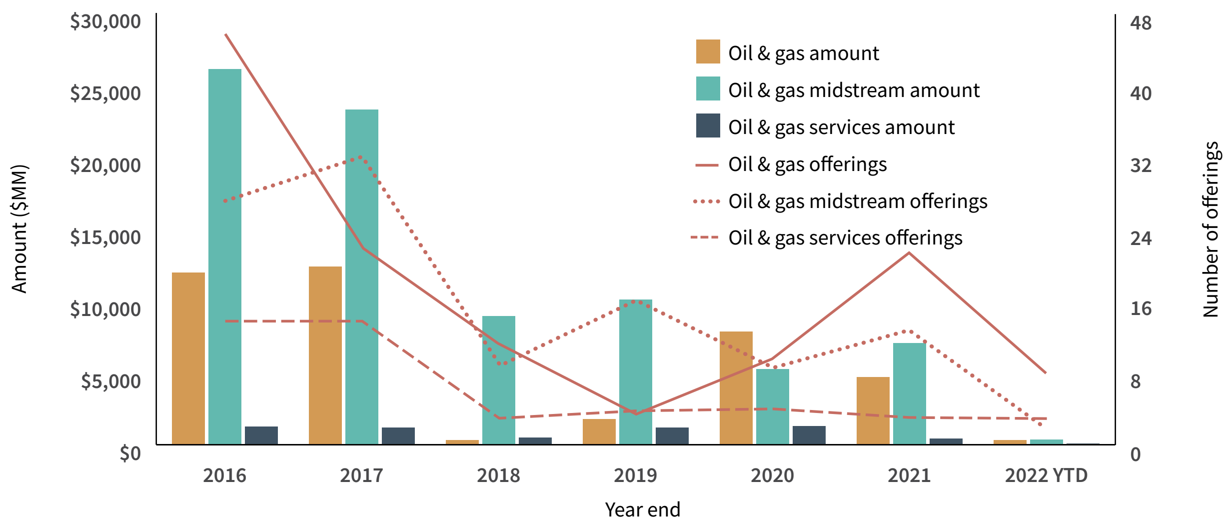


Figure 28 includes information presented in Figure 20 and Figure 26, for comparison.

Figure 28: Capital raised through prospectus offerings by AB RIs engaged in oil and gas activities and those involved in oil and gas midstream and oil and gas services, by securities category

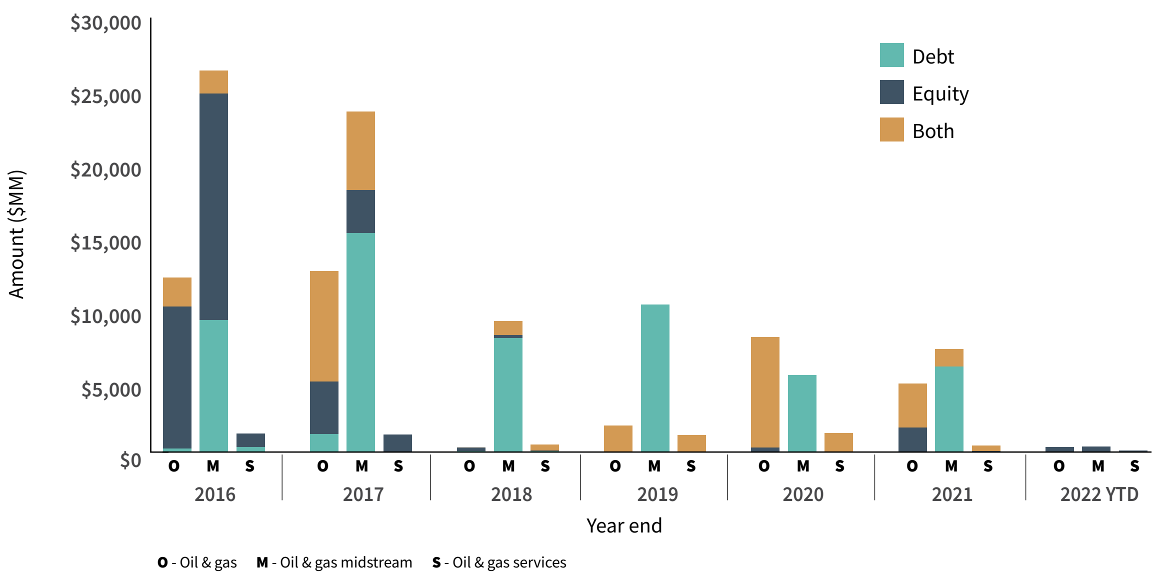


Figure 29 shows the amount of capital raised through prospectus offerings by RIs involved in utilities, helium and other energy-related sub-industries for which the ASC was the principal regulator, from 2016 to the end of September 2022, and the number of these offerings. The offerings include various types of equity and debt securities, such as common shares, units, debentures, convertible debentures, rights, subscription receipts and notes. As long as Alberta is the principal regulator and the prospectus is filed in Alberta, the offering is included in Figure 29. The amount raised includes capital raised in Alberta and jurisdictions outside Alberta, as applicable. The 2022 year-to-date activity consists of two offerings by two different RIs involved in other energy-related sub-industries.

Figure 29: Capital raised through prospectus offerings and the number of such offerings, by AB RIs involved in utilities, helium and other energy-related sub-industries

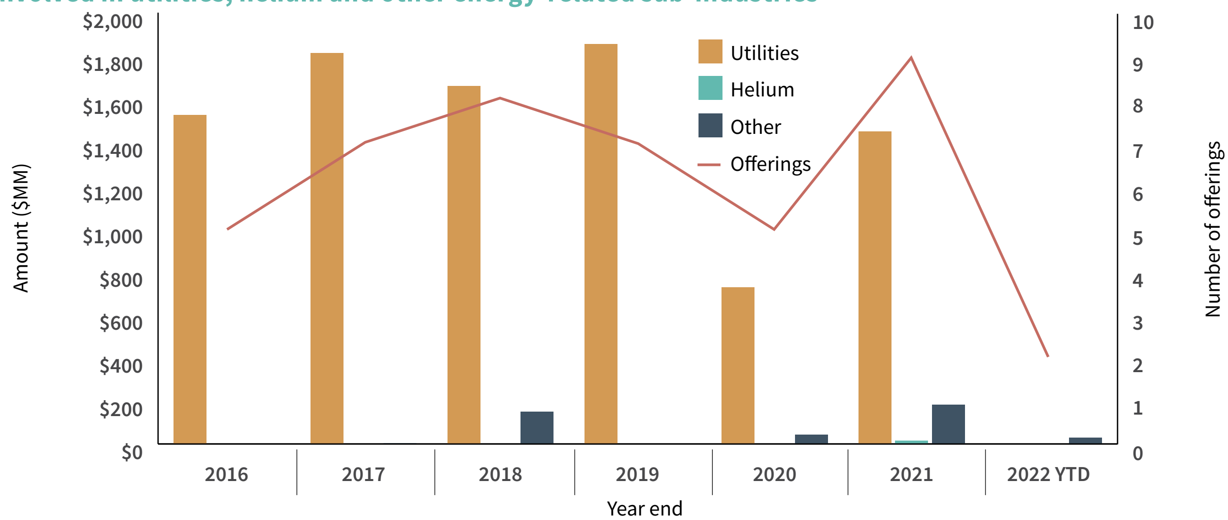


Figure 30 attributes the amounts raised in Figure 29 to securities category, be it equity, debt or both.

Figure 30: Capital raised through prospectus offerings by AB RIs involved in utilities, helium and other energy-related sub-industries, by securities category

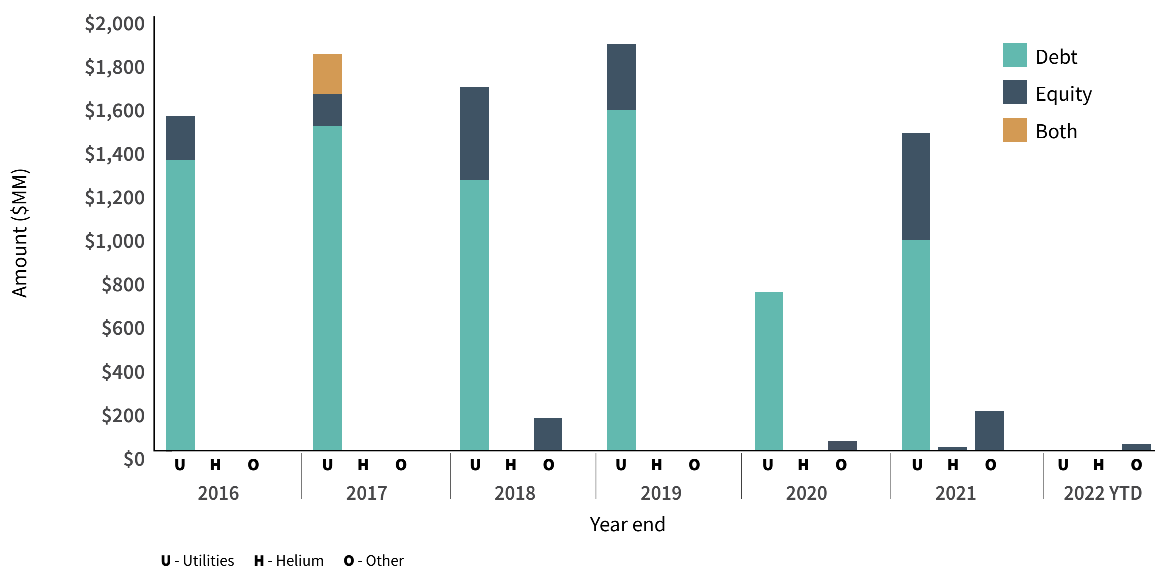
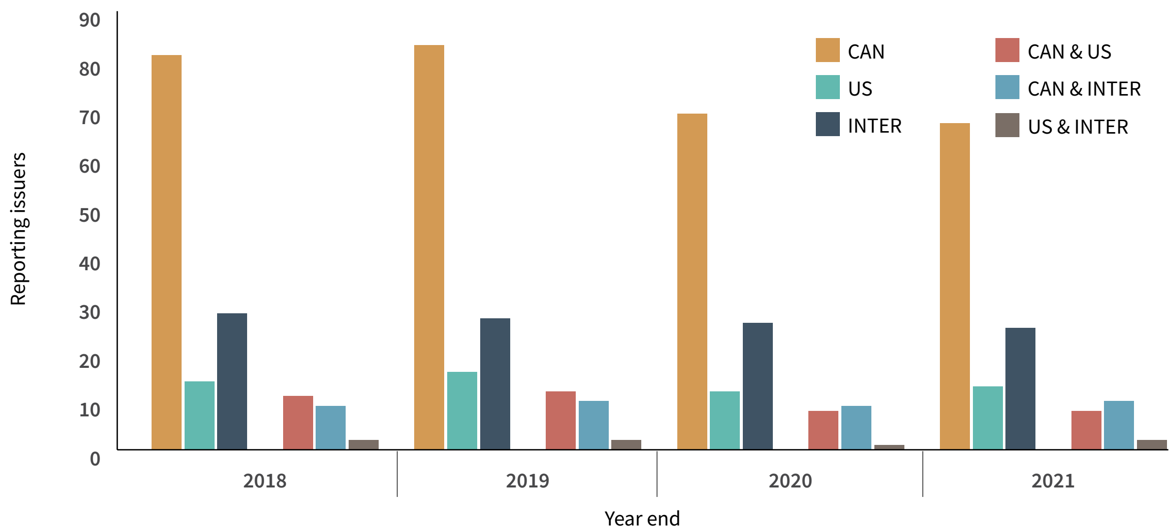


Figure 31 indicates the locations where RIs engaged in oil and gas activities for which the ASC was the principal regulator, from 2018 to the end of September 2022, have one or a combination of reserves data, contingent resources data or prospective resources data attributed.

Figure 31: Locations where AB RIs engaged in oil and gas activities have reserves data, contingent resources data or prospective resources data attributed



It is understood by staff that investors have been more interested in the financial performance of RIs in recent years than the respective amount of resources or production attributed to these RIs. In response, RIs have been less inclined to optionally disclose contingent resources data and prospective resources data, which is typically done in an effort to project growth opportunities.

Figure 32 illustrates the number of occurrences of disclosure of contingent resources data, prospective resources data or both, in the statement of reserves data and other information specified in Form 51-101F1, from 2014 to 2021. Disclosure occurrences for both decreased slightly in 2021 over 2020, continuing an overall downward trend.

Figure 32: Disclosure occurrences of contingent resources data, prospective resources data or both, by AB RIs engaged in oil and gas activities

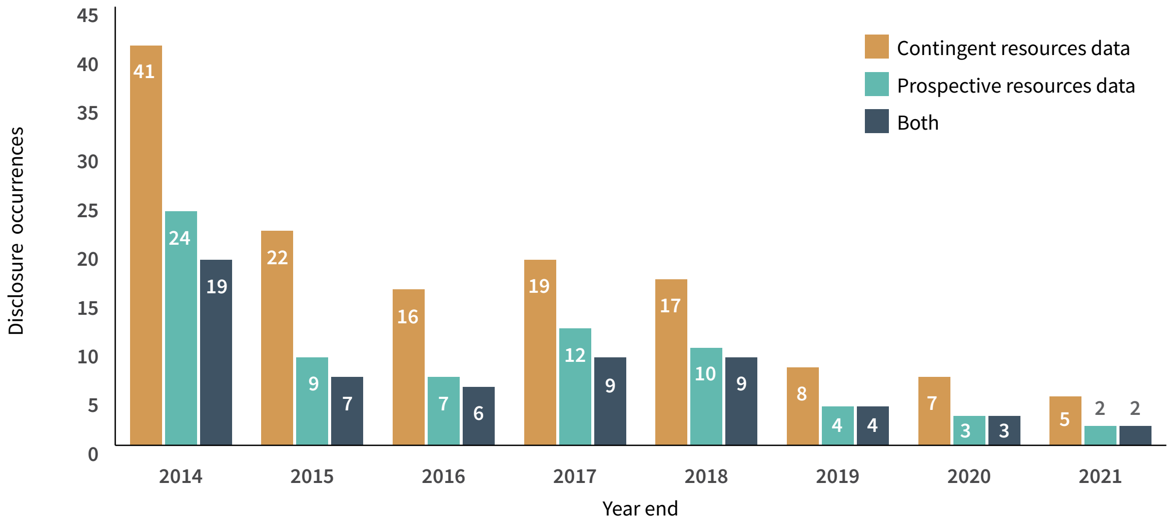


Figure 33 illustrates the information shown in Figure 32 by production group.

Figure 33: Disclosure occurrences of contingent resources data, prospective resources data or both, by AB RIs engaged in oil and gas activities, by production group

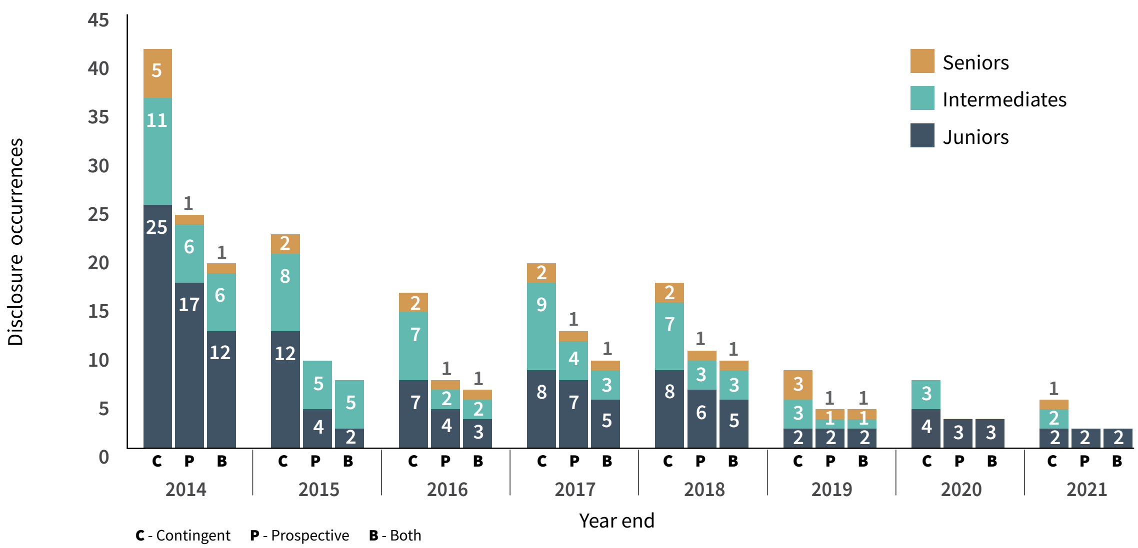
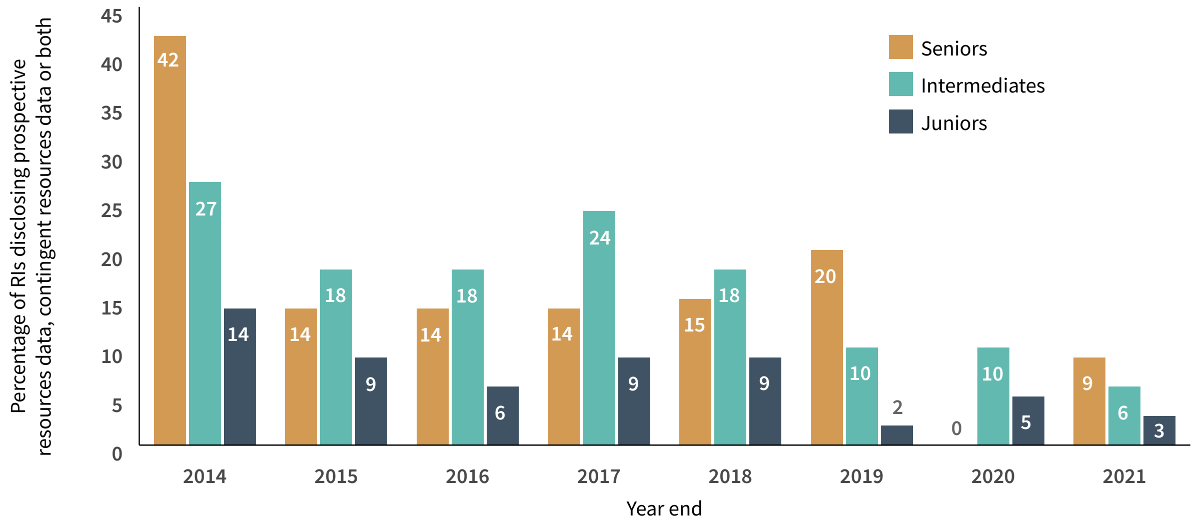


Figure 34 shows the percentage of RIs engaged in oil and gas activities, for which the ASC was the principal regulator, that disclosed contingent resources data, prospective resources data or both, in the statement of reserves data and other information specified in Form 51-101F1, from 2014 to the end of 2021. As shown, the disclosure percentage has typically been highest for the intermediates and lowest for the juniors. However, there has been continued downward trend due to reduced investor interest in this information.

Figure 34: Percentage of AB RIs engaged in oil and gas activities that disclosed contingent resources data, prospective resources data or both, by production group



Petroleum Advisory Committee

The Petroleum Advisory Committee (**PAC**) is an important source of information and advice for the ASC on oil and gas and other energy-related matters. The PAC is comprised of volunteer members (**Members**) with energy-related backgrounds that are appointed to three-year terms. Meetings are normally held three times per year and attended by Members, observers and select ASC staff.

PAC's mandate is to:

- Review and provide feedback on issues and current developments regarding the:
  - Evaluation of oil and gas reserves and resources other than reserves.
  - Disclosure concerning oil and gas activities.
  - Evaluation and disclosure regarding other energy-related matters.
- Comment on related current and proposed Alberta securities laws and regulatory policies.
- Provide informal advice to staff.

The ASC thanks the Members for their contributions and acknowledges the contributions of those who have previously served.

Current Members:

Caralyn P. Bennett, P.Eng.
GLJ Ltd.

Steven J. Golko, P.Eng.
Sproule

Nicole Labrecque, P.Eng.
Cenovus Energy Inc.

Dr. John Lacey, P.Eng.
Enjay Holdings Alberta Ltd.

Ian McDonald, P.Eng.
CNOOC International

Rob Morgan, P.Eng.
Strathcona Resources Ltd.

James Surbey, B.Eng., LLB
Birchcliff Energy Ltd.

Michael Verney, P.Eng.
McDaniel & Associates Consultants Ltd.

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Glossary of terms

The following terms and respective definitions concern oil and gas activities, as defined in NI 51-101 *Standards of Disclosure For Oil and Gas Activities*. They are sourced from section 1.1 of NI 51-101 and CSA Staff Notice 51-324 *Revised Glossary to NI 51-101 Standards of Disclosure for Oil and Gas Activities*.

"**anticipated results**" means information that may, in the opinion of a reasonable person, indicate the potential value or quantities of resources in respect of the reporting issuer's resources or a portion of its resources and includes:

(a) estimates of volume;

(b) estimates of value;

(c) areal extent;

(d) pay thickness;

(e) flow rates; or

(f) hydrocarbon content.

"**COGE Handbook**" means the "Canadian Oil and Gas Evaluation Handbook" maintained by the Society of Petroleum Evaluation Engineers (Calgary Chapter), as amended from time to time.

"**commercial**" means when a project is commercial this implies that the essential social, environmental, and economic conditions are met, including political, legal, regulatory, and contractual conditions.

Considerations with regard to determining commerciality include:

- economic viability of the related development project;
- a reasonable expectation that there will be a market for the expected sales quantities of production required to justify development;
- evidence that the necessary production and transportation facilities are available or can be made available;
- evidence that legal, contractual, environmental, governmental, and other social and economic concerns will allow for the actual implementation of the recovery project being evaluated;
- a reasonable expectation that all required internal and external approvals will be forthcoming. Evidence of this may include items such as signed contracts, budget approvals, and approvals for expenditures, etc.
- evidence to support a reasonable timetable for development. A reasonable time frame for the initiation of development depends on the specific circumstances and varies according to the scope of the project. Although five years is recommended as a maximum time frame for classification of a project as commercial, a longer time frame could be applied, where, for example, development of economic projects are deferred at the option of the producer for, among other things, market-related reasons or to meet contractual or strategic objectives.

"**contingent resources data**" means:

(a) an estimate of the volume of contingent resources, and

(b) the risked net present value of future net revenue of contingent resources.

"**effective date**" in respect of information, means the date as at which, or for the period ended on which, the information is provided.

"**evaluation**" means, in relation to reserves data or resources other than reserves, the process whereby an economic analysis is made of a property to arrive at an estimate of a range of net present values of the estimated future net revenue resulting from the production of the reserves or resources other than reserves associated with the property.

"**forecast prices and costs**" means future prices and costs that are:

(a) generally accepted as being a reasonable outlook of the future;

(b) if, and only to the extent that, there are fixed or presently determinable future prices or costs to which the reporting issuer is legally bound by a contractual or other obligation to supply a physical product, including those for an extension period of a contract that is likely to be extended, those prices or costs rather than the prices and costs referred to in subparagraph (a).

"**future net revenue**" means a forecast of revenue, estimated using forecast prices and costs or constant prices and costs, arising from the anticipated development and production of resources, net of the associated royalties, operating costs, development costs, and abandonment and reclamation costs.

"**gas**" includes natural gas, conventional natural gas, coal bed methane, gas hydrates, shale gas, and synthetic gas.

"**gross**"

(a) In relation to a reporting issuer's interest in production or reserves, its "company gross reserves", which are the reporting issuer's working interest (operating or non-operating) share before deduction of royalties and without including any royalty interests of the reporting issuer.

(b) In relation to wells, the total number of wells in which a reporting issuer has an interest.

(c) In relation to properties, the total area of properties in which a reporting issuer has an interest.

"**net**"

(a) In relation to a reporting issuer's interest in production or reserves, the reporting issuer's working interest (operating or non-operating) share after deduction of royalty obligations, plus the reporting issuer's royalty interests in production or reserves.

(b) In relation to a reporting issuer's interest in wells, the number of wells obtained by aggregating the reporting issuer's working interest in each of its gross wells.

(c) In relation to a reporting issuer's interest in a property, the total area in which the reporting issuer has an interest multiplied by the working interest owned by the reporting issuer.

"**oil**" includes crude oil, bitumen, tight oil and synthetic crude oil.

"**oil and gas activities**" includes the following:

(a) searching for a product type in its natural location;

(b) acquiring property rights or a property for the purpose of exploring for or removing product types from their natural locations;

(c) any activity necessary to remove product types from their natural locations, including construction, drilling, mining and production, and the acquisition, construction, installation and maintenance of field gathering and storage systems including treating, field processing and field storage;

(d) producing or manufacturing of synthetic crude oil or synthetic gas;

but does not include any of the following:

(e) any activity that occurs after the first point of sale;

(f) any activity relating to the extraction of a substance other than a product type and their by-products;

(g) extracting hydrocarbons as a consequence of the extraction of geothermal steam.

"**property**" includes:

(a) fee ownership or a lease, concession, agreement, permit, licence or other interest representing the right to extract oil or gas subject to such terms as may be imposed by the conveyance of that interest;

(b) royalty interests, production payments payable in oil or gas, and other non-operating interests in properties operated by others; and

(c) an agreement with a foreign government or authority under which a reporting issuer participates in the operation of properties or otherwise serves as "producer" of the underlying reserves (in contrast to being an independent purchaser, broker, dealer or importer).

A property does not include supply agreements, or contracts that represent a right to purchase, rather than extract, oil or gas.

"**prospective resources data**" means:

(a) an estimate of the volume of prospective resources, and

(b) the risked net present value of future net revenue of prospective resources.

"**qualified reserves auditor**" means an individual who:

(a) in respect of particular reserves data, resources or related information, possesses professional qualifications and experience appropriate for the estimation, evaluation, review and audit of the reserves data, resources and related information; and

(b) is a member in good standing of a professional organization.

"**qualified reserves evaluator**" means an individual who:

(a) in respect of particular reserves data, resources or related information, possesses professional qualifications and experience appropriate for the estimation, evaluation and review of the reserves data, resources and related information; and

(b) is a member in good standing of a professional organization.

"**qualified reserves evaluator or auditor**" means a qualified reserves auditor or a qualified reserves evaluator.

"**reserves**" means proved, probable or possible reserves.

"**reserves data**" means an estimate of proved reserves and probable reserves and related future net revenue, estimated using forecast prices and costs.

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