PORE SPACE AS A RESOURCE: A DISCUSSION OF THE POLICY AND REGULATORY FRAMEWORK FOR CARBON CAPTURE, UTILIZATION, AND STORAGE

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Reinforced by the International Energy Agency (IEA), carbon capture, utilization, and storage (CCUS) is currently the only available group of technologies that reduce emissions in key hard to abate sectors and capture CO_2 emissions that enable low carbon value chains such as hydrogen. Further, CCUS and carbon management play a critical role in achieving future global climate and energy goals. In fact, the Intergovernmental Panel on Climate Change and the IEA state that there is no viable path to net zero emissions without CCUS and other carbon management technologies.

Due to concerns regarding energy security and an increase in energy demand, generation of energy from conventional hydrocarbon resources continues to be vital. In Alberta, CCUS is a necessary tool to align provincial climate change goals with the responsible and competitive market of energy production.

Canada's oil and gas sector has been an early innovator and adopter of CCUS. Given the petroleum and natural gas resources available in the Western Canadian Sedimentary Basin, and the decades-long energy industry expertise established in connection therewith, there is significant potential to further utilize CCUS to create a CCUS-based value chain.

This article provides an overview of the current Canadian regulatory frameworks enabling CCUS, with a focus on the regulatory framework and development in Alberta. Specific topics include: (1) an overview of the regulatory frameworks governing CCUS in key jurisdictions in Canada, including Alberta; (2) an overview of the frameworks for the generation of offset credits from environmental attributes associated with a given project or activity, including both federal and provincial carbon credits and clean fuel credits; (3) a discussion of gaps in policy and legislation; (4) options for regulating "open access" CCUS hubs and CO_2 pipelines; and (5) an overview of the various governmental incentives for CCUS projects, including federal and provincial tax credits.

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I. INTRODUCTION

A. WHAT IS CCUS?[1]

As described in the *Carbon Storage Atlas*, "[c]arbon capture and storage (CCS) is the separation and capture of carbon dioxide (CO_2) from the emissions of industrial processes prior to release into the atmosphere and storage of the CO_2 in deep underground geologic

[1] International Energy Agency, Press Release, "The World Needs to Build on the Growing Momentum Behind Carbon Capture" (24 September 2020), online: [perma.cc/6Z3D-SVR7]; Natural Resources Canada, "Carbon Management Strategy (Formerly Known as the Carbon Capture, Utilization and Storage Strategy)" (24 February 2023), online: [perma.cc/H5GL- 9JCZ].

formations."[2] "Examples of capture sources include electricity generators, upgraders, cement plants, ethanol plants, fertilizer plants and oil refineries."[3]

In Canada, oil and gas reservoirs could provide storage capacity for up to 16 gigatonnes (GT) of CO_2, unmineable coal could provide 4 GT to 8 GT of capacity, and deep saline formations could provide capacity for 28 GT to 296 GT.[4] Both deep saline aquifers, and mature oil and gas reservoirs provide significant CO_2 storage opportunities for Canada. In fact, Canada has an estimated 220 to 1,500 years of available CO_2 storage.[5]

The literature generally identifies four components of any CCUS project: (1) the capture of CO_2 (from an anthropogenic or industrial source); (2) the transportation of CO_2 (typically by pipeline to an injection well); (3) the injection of CO_2 into the storage reservoir; and (4) post-closure.[6] However, this article adds the ongoing measurement, monitoring, and verification (MMV) of the sequestered CO_2 during the life cycle of the CCUS project prior to closure as a fifth component of any CCUS project.

1. CCUS VERSUS CCS

The terms CCUS and CCS are often used interchangeably. The "utilization" in CCUS refers to the use of captured CO_2 in other industrial activities, such as the production of technical fluid for feedstock for carbon-containing chemicals (for example, permanent sequestration in cement) or its use for enhanced oil recovery (EOR) where captured CO_2 is re-injected into a well to augment hydrocarbon recovery.[7] For the purposes of this article, we will use the term CCUS, consistent with Alberta's *Regulatory Framework Assessment*, and our discussion will focus on permanent subsurface sequestration and not utilization of captured CO_2.[8]

2. CCUS VERSUS EOR

EOR is viewed as a means of non-permanent sequestration of CO_2.[9] There are numerous EOR and acid gas disposal schemes currently operating in Alberta and Saskatchewan. While a detailed review of the EOR regulatory framework is outside the scope of this article,

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2 United States of America, Department of Energy, *Carbon Storage Atlas*, 5th ed (Albany, Or: National Energy Technology Laboratory, 20 August 2015) at 6, online (pdf): [perma.cc/J6BV-AET3].

3 Alberta Energy, *Carbon Capture & Storage: Summary Report of the Regulatory Framework Assessment*, (Edmonton: AE, January 2013) at 33 [Alberta Energy, *Regulatory Framework Assessment*].

4 Robert Wright et al, "The First North American Carbon Storage Atlas" (2013) 37 Energy Procedia 5280 at 5287. See also Nigel Bankes & Elizabeth Brennan, "Enhanced Oil Recovery and the Geological Sequestration of Carbon Dioxide: Regulation and Carbon Crediting" (2013) [unpublished].

5 Wright et al, *ibid* at 5287.

6 Nigel Bankes, Jenette Poschwatta & E Mitchell Shier, "The Legal Framework for Carbon Capture and Storage in Alberta" (2008) 45:3 Alta L Rev 585 at 587.

7 Christophe McGlade, "Can CO2-EOR Really Provide Carbon-Negative Oil?" (11 April 2019), online: *International Energy Agency* [perma.cc/B659-XLWW]; Bruce Robertson & Milad Mousavian, "Carbon Capture to Serve Enhanced Oil Recovery: Overpromise and Underperformance: Shute Creek, the World's Largest CCUS Facility, Consistently Fails to Meet Its Targets" (March 2022) at 7, online (pdf): *Institute for Energy Economics and Financial Analysis* [perma.cc/UA8G-MGYQ].

8 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3.

9 Sarah Hannis et al, "CO_2 Storage in Depleted or Depleting Oil and Gas Fields: What can We Learn from Existing Projects?" (2017) 114 Energy Procedia 5680.

it is important to highlight certain key differences between EOR and CCUS, including without limitation, the following:

- While both CCUS and EOR inject captured CO_2, the objective of EOR is to enhance hydrocarbon recovery by injecting CO_2 to increase reservoir pressure.[10] With EOR, the injected CO_2 is not permanently sequestered and is released along with the hydrocarbon recovery process.[11]

- Given the associated hydrocarbon recovery with EOR, EOR schemes are not often viewed as a decarbonization process. EOR stakeholders can be criticized regarding the permanency of the sequestration and for using CO_2 to produce more fossil fuels for combustion, which still results in the emission of CO_2.[12] However, proponents of EOR schemes would point out that extracting otherwise un-producible volumes of hydrocarbons from existing reserves creates value for Alberta, and enables future CO_2 permanent sequestration in depleted fields.[13]

- In Alberta, while EOR schemes are regulated under existing frameworks for mineral extraction,[14] pore space tenure for CCUS project development is subject to a separate regulatory framework and, more recently, a hub model development program.[15]

- Long-term liability for EOR schemes rests with the licensee or operator and other working interest participants under the applicable regulatory authorizations.[16] Whereas long-term liability for CCUS schemes is transferred to the Crown upon closure, thereby relieving the owners or operators from post-closure liability exposure.[17]

- Current investment tax credit schemes promoting development of CCUS projects in Canada are not available for the development and operation of EOR schemes.[18]

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10 "Enhanced Oil Recovery," online: *Alberta Energy Regulator* [perma.cc/E3BR-W3AS]; Alberta Energy Regulator, *Directive 065: Resources Applications for Oil and Gas Reservoirs* (AER, 27 July 2023), s 4.1.7(10), online: [perma.cc/Y944-FZLZ] [AER, *Directive 065*].

11 "Carbon Capture, Utilization, and Storage," online: *Alberta Energy Regulator* [perma.cc/V4LW-6B2K].

12 McGlade, *supra* note 7; Robertson & Mousavian, *supra* note 7.

13 Sarah Hannis et al, *supra* note 9 at 5689.

14 *Mines and Minerals Act*, RSA 2000, c M-17 [*MMA*]; *Oil and Gas Conservation Act,* RSA 2000, c O-6 [*OGCA*].

15 See Part III.B, below.

16 *OGCA*, *supra* note 14, ss 27–31.1.

17 *MMA*, *supra* note 14, s 121.

18 *Income Tax Act*, RSC 1985, c 1 (5th Supp), s 127.44(1)(b) of the definition of "ineligible use" (as proposed to be amended by the *Fall Economic Statement Implementation Act, 2023*, tabled in Parliament on 28 November 2023: *House of Commons Debates*, 44-1, Vol 151, No 257 (28 November 2023) (Hon Chrystia Freeland)). The Government of Canada first announced that the CCUS ITC would not be available in respect of EOR when it announced the CCUS ITC in the 2021 Budget: Canada, Department of Finance, *Budget 2021: A Recovery Plan for Jobs, Growth, and* Resilience, Catalogue No F1-23/3E-PDF (Department of Finance, 2021) at 168, online: [perma.cc/KAX8-MWJW] [Department of Finance, *Budget 2021*].

B. SCOPE OF ARTICLE

This article is comprised of nine parts. Following the abstract above and the introduction within this part, Part II provides a high-level overview of CCUS frameworks across certain jurisdictions in Canada. Part III provides a detailed overview of the regulatory framework for CCUS in Alberta, including the acquisition of pore space tenure, the entering into of evaluation permits and sequestration lease agreements, and other key considerations for the development of CCUS in Alberta. Part IV outlines the applicable frameworks, regulations, and protocols — both provincially and federally — for the generation of carbon and clean fuel credits associated with CCUS. Part V highlights certain policy or legislative gaps that currently exist. Part VI of this article provides an overview of various options for the regulation of open access CCUS hubs and pipelines as required by Alberta's updated regulatory framework. Part VII highlights existing government incentives for the development and construction of CCUS projects. Finally, Part VIII is the conclusion of this article.

II. FRAMEWORKS ACROSS CANADA

A. OVERVIEW ACROSS CANADA

Below is a brief overview of the regulatory framework for CCUS development in some key Canadian provinces. Where available, we identify for each province examined: (1) pore space ownership; and (2) the regulatory process for a CCUS proponent receiving the necessary pore space tenure. Not every province in Canada has developed a regulatory scheme for CCUS, as seen below.

1. BRITISH COLUMBIA

British Columbia has developed a comprehensive CCUS regulatory framework. Northeastern British Columbia may have significant CCUS potential due to its depleted gas pools and deep saline formations.[19] The British Columbia government has codified its CCUS regulatory regime under the Part 14 of the *Petroleum and Natural Gas Act*[20] administered by the British Columbia Energy Regulator (formerly the BC Oil and Gas Commission).

a. Pore Space Ownership

In the Fall of 2022, the British Columbia government amended the *PNGA* to introduce a vesting provision for underground storage reservoirs. Under section 125.4 of the *PNGA*:

> (1) The government has a right to explore for, access, develop and use storage reservoirs for the purpose of storing or disposing of
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> (a) carbon dioxide,

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[19] British Columbia Ministry of Energy, Mines and Petroleum Resources, *Carbon Capture and Storage in British Columbia*, by Alf Hartling in *Geoscience Reports 2008* (Victoria: BCMEMPR, 2008) at 27.

[20] RSBC 1996, c 361 [*PNGA*].

(b) a substance referred to in section 50 (2) (b), or

(c) a prescribed substance.[21]

Notably, the entirety of Part 14 of the *PNGA*, including section 125.4, does not apply in relation to treaty lands of a treaty First Nation, Nisga'a lands including Nisga'a Fee Simple Lands within the meaning of the *Nisga'a Final Agreement*,[22] the lands over which the Supreme Court of Canada granted a declaration of Aboriginal title,[23] and the lands found by the British Columbia Supreme Court[24] to be proven title area outside the claim area.[25]

Under section 129.1 of the *PNGA*, a person must not use a storage reservoir to store or dispose of substances described in section 125.4(1), except for in accordance with either a lease under Part 6, or a licence under section 130.[26]

b. Receiving Pore Space Tenure

The *PNGA* provides three mechanisms by which a party may undertake CCUS activities in the province: (1) under an existing petroleum and natural gas lease (PNG Lease) granted under section 50;[27] (2) through a storage reservoir licence granted under section 130;[28] or (3) through an exploration licence granted under section 126.[29]

Under section 50 of the *PNGA*, a PNG Lease holder may utilize its tenure to store and dispose of natural gas and substances associated with petroleum and natural gas (PNG) exploration, production, or processing.[30] Specifically, the holder of a PNG Lease has "the right to store or dispose of natural gas, water produced in relation to the production of PNG, or *other substances associated with PNG exploration, production or processing*" into a storage reservoir in the location of the lease.[31] Such other substances include CO_2 produced from a well or captured at a PNG facility.[32]

Broader storage rights are provided to holders of storage reservoir licences under section 130 of the *PNGA*. A storage reservoir licence permits a person to store or dispose of CO_2 from *any* source.[33] However, the class of persons who may apply for a storage reservoir licence is limited.[34] Applications under section 130 are limited to holders of a PNG permit, a drilling licence, a lease, another storage reservoir licence, or an exploration licence.[35]

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21 *Ibid*, s 125.4(1).
22 *Nisga'a Final Agreement*, 27 April 1999, online: *Nisga'a Lisims Government* [perma.cc/QTK2-MCPL].
23 *Tsilhqot'in Nation v British Columbia*, 2014 SCC 44.
24 *Tsilhqot'in Nation v British Columbia*, 2007 BCSC 1700.
25 *PNGA*, *supra* note 20, ss 125.3, 125.4.
26 *Ibid*, ss 50–64, 125.4(1), 130.
27 *Ibid*, s 50(2)(b).
28 *Ibid*, s 130.
29 *Ibid*, s 126.
30 *Ibid*, s 50(2)(b).
31 *Ibid* [emphasis added].
32 British Columbia Ministry of Energy, Mines and Low Carbon Innovation, *Guidance for Obtaining and Utilizing Subsurface Tenure for Carbon Dioxide Storage* (Victoria: BCMEMLCI, 2022) at 4, online: [perma.cc/Q63H-RYCE].
33 *PNGA*, *supra* note 20, ss 125.4, 130(3).
34 *Ibid*, s 130(1).
35 *Ibid*.

Finally, under section 126 of the *PNGA*, if a CCUS project proponent does not yet hold the requisite tenure to apply for a storage reservoir licence, or if more information on the geology and engineering properties of a potential underground storage reservoir is needed to support an application, a proponent may apply to the Ministry of Energy, Mines and Petroleum Resources for an exploration licence.[36] Similar to Alberta's framework governing evaluation permits, the information gathered under an exploration licence will be used in the next steps of applying for a storage reservoir licence.[37]

2. SASKATCHEWAN

In July 2000, the Weyburn-Midale CO_2 Monitoring and Storage Project launched in Saskatchewan and remains one of the largest CCUS (EOR) initiatives in the world.[38] Saskatchewan reported that "over the last 25 years, [its] EOR projects have sequestered more than 40 million tonnes of CO_2."[39]

a. Pore Space Ownership

Currently, there is no legislative statement regarding the ownership of pore spaces in Saskatchewan. However, given proponents of CCUS should apply for ministerial authorization for a CCUS project, the Government of Saskatchewan appears to view pore space resources as property of the provincial Crown.[40] This position is consistent with *The Crown Minerals Act*,[41] which confirms that ownership of spaces occupied or formerly occupied by Crown minerals vests with the province.

b. Receiving Pore Space Tenure

Despite Saskatchewan's historical and continued promotion of CCUS projects, the legislative framework regulating such projects in the province remains minimal. CCUS project approval in Saskatchewan is governed by a discretionary ministerial approval process under *The Oil and Gas Conservation Act*.[42] The following provisions of the *Sask OGCA* grant the responsible minister discretionary power to permit CCUS projects:

> **Powers of minister**
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> **17(1)** Without limiting the generality of section 6, the minister may make orders, on the minister's own motion or on the application of an interested person:

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36 *Ibid*, s 126(3).
37 *Ibid*, s 126(1). See Part III, below, for more on Alberta's framework governing evaluation.
38 M Wilson & M Monea, eds, *IEA GHG Weyburn CO_2 Monitoring & Storage Project Summary Report 2000–2004: From the Proceedings of the 7th International Conference on Greenhouse Gas Control Technologies, September 5–9, 2004, Vancouver, Canada* (Regina: Petroleum Technology Research Centre, 2004) at 1.
39 Saskatchewan, Ministry of Trade and Export Development, "Saskatchewan Announces Carbon Capture Utilization and Storage Priorities" (7 September 2021), online: [perma.cc/QM5H-3CGM] [Saskatchewan, "CCUS Priorities"].
40 Saskatchewan, "Storage Project Application," online: [perma.cc/BX4Y-5HXT].
41 SS 1984-85-86, c C-50.2, s 27.2(2).
42 RSS 1978, c O-2 [Sask *OGCA*].

…

(k) respecting the containment, storage, handling, transportation, treatment, processing, recovery, reuse, recycling, destruction and disposal of oil and gas waste anywhere in Saskatchewan and non-oil-and-gas substances at a licensed facility or well or associated site;

…

(n) respecting the processing and storing of:

…

(iii) non-oil-and-gas substances at a licensed facility or well or associated site.[43]

Accordingly, a CCUS proponent (non-EOR) must complete a storage project application for a CO_2 storage project and receive authorization from Saskatchewan's Ministry of Energy and Resources through the Integrated Resource Information System before licensing, recompleting, or reclassifying a well associated with a storage project.[44] This approval process applies to both pilot and full-scale storage projects, as well as modifications and expansions.[45]

To apply for a storage project authorization, proponents must already have the right to construct, operate, and modify the proposed project wells within a storage project area, and obtain any other approvals necessary for construction, if applicable.[46] Furthermore, applicants must provide notice in accordance with *Public Notice Requirements*, where it is the responsibility of the applicant to identify and notify any potentially or directly affected parties outside of the minimum notification area.[47]

Further requirements for CCUS projects in Saskatchewan are provided by *Disposal and Injection Well Requirements*, which contains stipulations for completion, operation and monitoring requirements, as well as other logging, measurement, and reporting requirements.[48]

In September 2021, the Government of Saskatchewan announced its renewed key CCUS priorities,[49] including:

- Expanding the province's Oil Infrastructure Investment Program[50] (OIIP) to include CO_2 pipeline projects.[51] In November 2021, the Government of Saskatchewan

43 *Ibid*, s 17(k), (n).
44 Saskatchewan, "Storage Project Application," *supra* note 40.
45 *Ibid*.
46 *Ibid*, s 2.
47 Saskatchewan, *Public Notice Requirements*, Revision 2.0, Order 41/20 (March 2020) (*The Oil and Gas Conservation Act*).
48 Saskatchewan, *Disposal and Injection Well Requirements,* Revision 2.0, Order 102/23 (June 2023) (*The Oil and Gas Conservation Act*).
49 Saskatchewan, "CCUS Priorities," *supra* note 39.
50 *The Oil Infrastructure Investment Program Regulations*, RRS c F-13.4 Reg 42, s 4 [*OIIP Regulation*].
51 Saskatchewan, "CCUS Priorities," *supra* note 39.

further announced that "pipelines transporting [CO_2], whether for [CCUS] or [EOR], are … eligible" for the OIIP tax credit, a transferable production tax credit at a rate of 20 percent of eligible project costs.[52]

- Working with industry stakeholders to evaluate the current EOR royalty regime to ensure that CO_2 injection projects remain highly competitive.[53]

- "Amend[ing] and clarify[ing] regulations to support investment and provide certainty around pore space ownership, access, unitization of high-potential EOR plays, and long-term obligations and accountability for CO_2 storage."[54]

- "Explor[ing] opportunities for CCUS infrastructure hubs and distribution models, including for the Regina-Moose Jaw Industrial Corridor to Southeast Saskatchewan and Greater Lloydminster areas;"[55] and

- "Advanc[ing] the development of a CCUS [greenhouse gas] credit generation program, recognized under Saskatchewan's emissions management framework, focused on … [minimizing] administrative burden for industry prior to investment and [maximizing] credit generation for captured and sequestered CO_2."[56]

3. ONTARIO

Ontario is in the process of developing its CCUS regulatory regime. Previously, geologic injection and sequestration of CO_2 was expressly prohibited by section 11(1.1) of the *Oil, Gas and Salt Resources Act*.[57] However, policy in Ontario has shifted and this prohibition was repealed in March 2023.[58] The province now plans to create a framework to regulate and enable the permanent geologic storage of carbon through a phased approach that supports the industry and encourages sector innovation, while maintaining public safety and safeguarding the environment.[59]

a. Pore Space Ownership

In Ontario, pore space storage rights coincide with mineral ownership of the land, and therefore involve a combination of Crown and privately-owned spaces.[60] Private ownership of pore space is more prevalent given that most storage capabilities are located in southern

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52 Saskatchewan, Ministry of Energy and Resources, "Oil Infrastructure Program Expanded to Support Carbon Capture" (4 November 2021), online: [perma.cc/7C3Q-Q9HY].

53 Saskatchewan, "CCUS Priorities," *supra* note 39.

54 *Ibid*.

55 *Ibid*.

56 *Ibid*.

57 RSO 1990, c P.12, s 11(1.1) as it appeared on 21 March 2023 (the prohibition read: "[N]o person engaged in a project, activity or undertaking described in that subsection shall inject carbon dioxide for the purposes of carbon sequestration into an area, including an underground geological formation, and no permit shall be issued under this Act for such a purpose") [*OGSRA*].

58 *Ibid*, as amended by *Less Red Tape, Stronger Ontario Act, 2023*, SO 2023, c 2, Schedule 5.

59 Ministry of Natural Resources and Forestry, *Geologic Carbon Storage in Ontario*, Policy Notice, ERO 019-4470, online: [perma.cc/F5GK-V65H] [Ontario, *Geologic Carbon Storage*].

60 *Re an Application by Union Gas Limited for Natural Gas Storage – Heritage Pool Development* (29 May 2009), EB-2008-0405, online: *Ontario Energy Board* [perma.cc/F3H6-AX34].

Ontario.[61] The private ownership regime for pore space has historically been used for natural gas storage.[62] Thus, using pore space for CO_2 storage would likely fall under this existing mineral ownership regime.

b. Development of a Pore Space Tenure Regime

The Government of Ontario first considered the development of a CCUS regulatory framework in early 2022.[63] The Ministry of Northern Development, Mining, Natural Resources and Forestry issued a discussion paper in January 2022, identifying possible sedimentary rock formations around the province where test projects could evaluate CCUS suitability.[64]

On 23 November 2022, the Ontario government announced Bill 46, *Less Red Tape, Stronger Ontario Act, 2023*,[65] which received royal assent on 22 March 2023. Bill 46 repeals the prohibition on underground carbon sequestration contained within the *OGSRA*.[66]

The Ontario government has continued to pursue the development of a carbon sequestration regime.[67] Additionally, the Ontario government released its "[r]oadmap towards regulating geologic carbon storage," which contemplates that throughout 2023, legislative and regulatory changes will be introduced to allow projects to test and demonstrate new activities.[68] Such activities include geological storage.[69] Initially, these tests will occur on private land only, with commercial-scale geological carbon storage projects on Crown and private land expected to be permitted in summer or fall of 2023.[70] It is expected that for 2025 and beyond, the government will refine and adapt the framework for emerging technologies and activities.[71]

4. NEWFOUNDLAND AND LABRADOR

The development of a CCUS regulatory framework in Newfoundland and Labrador is still in its infancy. Though the onshore geology of Newfoundland and Labrador does not allow for suitable storage of CO_2 as done by traditional injection, certain offshore sedimentary basins have the potential for CCUS.[72]

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61 Nigel Bankes & Julia Gaunce, "Natural Gas Storage Regimes in Canada: A Survey" (2009) University of Calgary, Institute for Sustainable Energy, Environment and Economy Working Paper at 68, online: [perma.cc/8W2K-CAX5]. In Ontario, mineral rights ownership generally passes with land patented to private landowners, see *Public Lands Act*, RSO 1990, c P.43, s 61.

62 Bankes & Gaunce, *ibid*.

63 Ontario, *Geologic Carbon Storage*, *supra* note 59.

64 *Discussion Paper: Geologic Carbon Storage in Ontario*, (Peterborough: Ministry of Natural Resources and Forestry, January 2022) at 2, online: [perma.cc/ MY5Y-UXZQ].

65 *Less Red Tape, Stronger Ontario Act*, *supra* note 58, Schedule 5.

66 *Ibid*.

67 Ontario, "Geologic Carbon Storage" (23 November 2022), online: [perma.cc/45MT-LA32].

68 *Ibid.*

69 *Ibid*.

70 *Ibid*.

71 *Ibid*.

72 "Carbon Capture, Utilization and Storage Offshore Newfoundland and Labrador: A Net Zero Project White Paper" (February 2023) at 32–33, online (pdf): *Energy NL* [perma.cc/7HWZ-ADB6] ["Net Zero White Paper"].

The *2022 Annual Emissions Reduction Initiatives Report*[73] of the Canadian-Newfoundland & Labrador Offshore Petroleum Board (C-NLOPB) highlighted the work that The Net Zero Project has done to study the potential for the province to implement offshore CCUS technology.[74] In the report, C-NLOPB stated that "Newfoundland and Labrador has an opportunity to be an early front-runner in offshore CCUS technology with proper planning and collaboration amongst stakeholders."[75]

a. Pore Space Ownership

As storage of CO_2 in ocean basins would occur on federal lands, CO_2 storage would fall under section 8 of the federal *Oceans Act*,[76] which clarifies that seabed and sub-seabed ownership is vested in the federal Crown:

> **8 (1)** For greater certainty, in any area of the sea not within a province, the seabed and subsoil below the internal waters of Canada and the territorial sea of Canada are vested in Her Majesty in right of Canada.[77]

However, provincially, Newfoundland and Labrador regulates offshore emissions under the *Management of Greenhouse Gas Act*.[78]

b. Developing a Pore Space Tenure Regime

Developing a regulatory framework for offshore CCUS would involve the unique interplay between both provincial and federal law, as well as a component of international law. A collaborative white paper, "Carbon Capture, Utilization and Storage Offshore Newfoundland and Labrador: A Net Zero Project White Paper," which was supported by funding from Natural Resources Canada's Emissions Reduction Fund and the Government of Newfoundland and Labrador, proposes that developing a regulatory framework for offshore CCUS projects should fall under the scope of the existing C-NLOPB.[79] The C-NLOPB is a joint provincial-federal regulatory body that manages the exploration, development, and exploitation of petroleum resources offshore Newfoundland and Labrador.[80]

The "Net Zero White Paper" highlights that because Canada is a party to the *1996 Protocol to the Convention on the Prevention of Marine Pollution by Dumping of Wastes and Other Matter, 1972*,[81] Canada has enacted measures within the *Canadian Environmental*

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73 Canada-Newfoundland & Labrador Offshore Petroleum Board, *2022 Annual Emissions Reduction Initiatives Report*, by Roger Grimes (C-NLOPB, 31 January 2023), online: [perma.cc/9SSY-VTVF] [C-NLOPB].

74 "Net Zero White Paper," *supra* note 72 (The Net Zero Project is a collaborative partnership of EnergyNL, econext, and OilCo Newfoundland and Labrador).

75 *Supra* note 73 at 25.

76 SC 1996, c 31.

77 *Ibid*, s 8(1).

78 SNL 2016, c M-1.001.

79 "Net Zero White Paper," *supra* note 72 at 42.

80 *Ibid* at 42–43.

81 7 November 1996, Can TS 2006 No 5 (entered into force 24 March 2006) [*London Protocol*] (the *London Protocol* is one of two global ocean treaties prohibiting the dumping of wastes into the sea, including the storage of wastes or other matters in the seabed).

Protection Act[82] that prohibit sub-seabed CO_2 storage. However, the *London Protocol* was amended in 2006 to allow sub-seabed CO_2 storage and the amendments has come into force, which Canada has adopted.[83] Thus, Canada could now amend the provisions in *CEPA* to allow for offshore CCUS, and remain compliant with international obligations.

5. QUEBEC

The province of Quebec has not developed a CCUS regulatory framework and its current position on such projects is unclear. In 2013, the Government of Quebec financed a preliminary evaluation of the geologic storage potential of its five sedimentary basins in the southern portion of the province.[84] However, recent legislative developments in Quebec have restricted exploration and development of underground reservoirs and PNG resources.[85] Furthermore, we have not identified any pilot projects that have been approved by the Government of Quebec to explore geological CCUS in the province as of the date of this publication.

a. Pore Space Ownership

In April 2022, the Government of Quebec enacted the *Act Ending Exploration* to end the "exploration for petroleum and underground reservoirs and production of petroleum and brine" within the province.[86] Section 4 of the *Act Ending Exploration* vests underground reservoirs as "part of the domain of the State."[87]

b. Pore Space Tenure Regime

However, section 10 of the *Act Ending Exploration* provides that "wells used under a storage licence within the meaning of the Act respecting natural gas storage and natural gas and oil pipelines" are not subject to the overarching licence revocations.[88] Furthermore, section 43 of the *Act Ending Exploration* still makes it possible for a CCUS study project to be approved:

> **43.** The Minister may, after consulting with the Minister of Sustainable Development, Environment and Parks, authorize by order published in the *Gazette officielle du Québec* the implementation of a pilot project that involves the use of a well subject to the obligation provided for in section 10.
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> In a case where an authorization is required under the Environment Quality Act (chapter Q-2), the pilot project may not be authorized before that authorization is issued.

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82 SC 1999, c 33 [*CEPA*].

83 International Maritime Organization, "Status of IMO Treaties: Comprehensive Information on the Status of Multilateral Conventions and Instruments in Respect of Which the International Maritime Organization or its Secretary-General Performs Depositary or Other Functions" (19 April 2023) at 577, online (pdf): [perma.cc/S3D5-E8H3].

84 Karine Bédard, Michel Malo & Félix-Antoine Comeau, "CO_2 Geological Storage in the Province of Québec, Canada: Capacity Evaluation of the St. Lawrence Lowlands Basin" (2013) 37 Energy Procedia 5093.

85 *Act Ending Exploration for Petroleum and Underground Reservoirs and Production of Petroleum and Brine*, CQLR, c R-1.01 [*Act Ending Exploration*].

86 *Ibid*, s 1.

87 *Ibid*, s 4.

88 *Ibid*, s 10, citing CQLR c S-34.1, Division 4.

> A pilot project must allow the acquiring of geoscientific knowledge related to
>
> (1) carbon dioxide sequestration potential;
>
> …
>
> The Minister determines the standards and obligations applicable within the framework of a pilot project, in particular to ensure the safety of persons and property and the protection of the environment, and to foster the involvement of local communities, which may differ from the standards and obligations provided for by this Act or the regulations. The Minister may also determine the provisions of a pilot project whose contravention constitutes an offence.[89]

In September 2021, Questerre Energy Corporation filed an application with the Quebec Ministry of Energy and Natural Resources to test a reservoir for its potential to store CO_2.[90] This pilot project would be the first of its kind in Quebec. However, at the time of writing, no new developments have been announced on the status of this application.

III. ALBERTA'S CCUS REGULATORY FRAMEWORK

A. OVERVIEW

Alberta is a national leader in developing and advancing regulatory framework for CCUS projects. With deep oil and gas industry expertise and an abundance of suitable subsurface reservoirs, CCUS in Alberta is seen as a viable and critical tool in Canada's efforts to decarbonize.[91] The following subsections will provide an overview of the CCUS regulatory framework in Alberta, from the acquisition of pore space tenure, evaluation and sequestration phase licences and agreements, environmental impact assessments, and other regulatory permitting considerations, through to closure obligations and long-term liability matters.

There are three main components to the CCUS value chain: (1) "the capture and compression of CO_2 emissions"; (2) the transportation of CO_2 to a sequestration site; and (3) "the permanent sequestration of CO_2."[92] With respect to the third component, the permanent sequestration of CO_2 can be achieved in a depleted reservoir,[93] a deep saline aquifer,[94] an un-minable coal seam,[95] ocean storage,[96] a salt cavern,[97] mineral carbonation, or for use in industrial processes.[98] Alberta recently prioritized the regulation and development of CCUS

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89 *Act Ending Exploration*, *ibid*, s 43. See also *Environment Quality Act*, CQLR c Q-2.

90 Questerre Energy Corporation, News Release, "Questerre Files Application for Carbon Storage Reservoir Test" (24 September 2021), online: [perma.cc/ZJ5S-LWLW].

91 Nigel Bankes & Rick Nilson, "Economic Regulation and the Design of a Carbon Infrastructure for Alberta" in Martha M Roggenkamp et al, eds, *Energy Networks and the Law: Innovative Solutions in Changing Markets* (Oxford: Oxford University Press, 2012) 231 at 234.

92 *Ibid* at 232 [footnotes omitted].

93 *Ibid*.

94 *Ibid*.

95 *Ibid*.

96 Ken Caldeira et al, "Ocean Storage" in Bert Metz et al, eds, *Intergovernmental Panel on Climate Change Special Report on Carbon Dioxide Capture and Storage* (New York: Cambridge University Press, 2005) 277 at 346.

97 Sally Benson et al, "Underground Geological Storage" in Metz et al, *ibid*, 319 at 330–33.

98 Marco Mazzotti et al, "Mineral Carbonization and Industrial Uses of Carbon Dioxide" in Metz et al, *ibid*, 195 at 220.

within deep saline aquifers. Thus, this article focuses on the regulatory framework applicable to CCUS in deep saline acquifers.

In 2010, to encourage CCUS projects in Alberta, the Province passed the *Carbon Capture and Storage Statutes Amendment Act, 2010*[99] and the *Carbon Sequestration Tenure Regulation*[100] to: (1) clarify issues relating to pore space ownership; (2) put in place a system whereby a CCUS operator can acquire disposal rights; (3) provide for the transfer to the Crown of liability for CCUS projects post-closure; and (4) deal with certain regulatory matters including the issuance of closure certificates.[101]

B. PORE SPACE TENURE

The *MMA* vests ownership of all pore space within Alberta with the Crown.[102] Moreover, section 54 of the *MMA* creates a prohibition on injecting any substance into a subsurface reservoir that is the property of the Crown without an authorization or by an agreement in accordance with the *MMA*.[103] The *MMA* defines a "subsurface reservoir" as "pore space within an underground formation or a subsurface cavern."[104] Pore space includes "the pores contained in, occupied by or formerly occupied by minerals or water below the surface of land"[105] and a "subsurface cavern" is the "subsurface space created as a result of operations for the recovery of a mineral."[106]

In accordance with Part 9 of the *MMA* and the *CS Tenure Regulation*, in order to inject captured CO_2 into a subsurface reservoir, proponents must apply to the Minister of Energy (the Minister) for the requisite rights and approvals, including evaluation permits and sequestration lease agreements.[107]

Pursuant to section 15.1(1) of the *MMA*, the Crown's ownership of pore space is independent of ownership of mineral or PNG storage rights.[108] As noted above, EOR schemes differ in that the rights are based on traditional PNG tenure (whether Crown mineral rights or freehold mineral rights).[109] The disposition of the rights for use of pore space falls within the administration of Alberta Energy and the Minister of Energy, who may enter into agreements with respect to the use of the pore space.[110] The storage domain contemplated for CO_2 sequestration consists of pore storage contained in, occupied by, or formerly occupied by minerals or water "within an underground formation that is deeper than 1000 metres below the surface of the [allocated] land."[111]

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99 SA 2010, c 14.
100 Alta Reg 68/2011 [*CS Tenure Regulation*].
101 Michael G Massicotte, Alan L Ross & Chidinma B Thompson, "The Changing Legislation and Regulation of Carbon Capture and Storage: Impacts on Purpose, Policy, and Projects" (2011) 49:2 Alta L Rev 305 at 306.
102 *Supra* note 14, s 15.1.
103 *Ibid*, s 54.
104 *Ibid*, s 1(1)(bb).
105 *CS Tenure Regulation*, *supra* note 100, s 1(i).
106 *MMA*, *supra* note 14, s 1(1)(aa).
107 *Ibid*, ss 114–124; *CS Tenure Regulation*, *supra* note 100, s 9(1).
108 *MMA*, *ibid*, s 15.1(1).
109 *Ibid*; *OGCA*, *supra* note 14.
110 *MMA*, *ibid*, s 15.1(3).
111 *CS Tenure Regulation*, *supra* note 100, s 1(c).

For a CCUS scheme, tenure to the pore space is obtained from the Crown pursuant to the *MMA* and the Province's competitive hub proposal process (as discussed further below).[112] Currently in Alberta, pore space tenure is only issued for deep saline aquifers and not mature, depleted oil and gas reservoirs, except as permitted by small-scale and remote carbon sequestration tenure.[113] If permitted in the future, unless otherwise subject to regulatory changes, the pore space tenure regime described below would also apply to permanent sequestration within mature, depleted oil and gas reservoirs (without EOR).

C. INITIAL PROJECT PERMITTING STAGES

The initial application and permitting period for CCUS projects in Alberta can be divided into four stages:

(1) selection through the competitive Carbon Sequestration Tenure Management Process, as explained below;

(2) initial acquisition of subsurface and surface rights (that is, evaluation permits and carbon sequestration lease agreements);

(3) discretionary activity review and potential Environmental Impact Assessment (EIA); and

(4) regulatory approvals (for example, Alberta Energy Regulator (AER) injection scheme and pipeline and injection well licences).[114]

D. SELECTION OF ELIGIBLE CCUS HUB PROPONENTS

1. CARBON SEQUESTRATION TENURE MANAGEMENT PROCESS

In the spring of 2021, the Province suspended the issuance of pore space tenure agreements under the *MMA* while it revisited how it will manage CCUS tenure going forward.[115] On 12 May 2021, the Province announced that it will issue carbon sequestration rights through a competitive process to enable the development of "carbon storage hubs."[116] A carbon storage hub is an area of pore space overseen by a company that will plan and facilitate carbon sequestration of captured CO_2 from various emissions sources as a service to multiple industrial clients.[117]

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112 See Part III.D below.

113 On 13 September 2023, the Alberta Government, Energy Operations released Mineral Rights Informational Bulletin 2023-01, "Small-Scale and Remote (SSR) Carbon Sequestration Tenure" (13 September 2023), that permitted applications for SSR carbon sequestration tenure. A review of this scheme is outside the scope of this article.

114 Alberta, *Carbon Capture, Utilization and Storage: Developing Storage Hubs to Meet Growing Demand* (Fact Sheet) (CCUS, 25 April 2023) at 2, online (pdf): [perma.cc/7A92-BQD7] [Alberta, *CCUS Growing Demand*].

115 Alberta, Energy and Minerals, Information Letter 2021-19, "Carbon Sequestration Tenure Management" (12 May 2021).

116 Alberta, Energy Operations, *Carbon Sequestration Tenure Management* (Information Letter) 2021-19 (Edmonton: Energy Operations, 12 May 2021), online: [perma.cc/E4QG-98JJ].

117 Alberta, "Carbon Capture, Utilization and Storage: Hub Development Process" (CCUS), online: [perma.cc/QCE8-Q8FD] [Alberta, "Hub Development Process"].

Using the existing CCUS regulatory framework under Part 9 of the *MMA*, Alberta ran two "Request for Full Project Proposal" (RFPP) processes as a prerequisite to obtaining the rights to evaluate and inject captured CO_2 into pore space under the *MMA*.[118] The process does not apply to EOR or injection of formation acid gas; these projects operate under mineral rights tenure pursuant to Part 4 of the *MMA* and the *OGCA*.[119]

Alberta Energy implemented the RFPP in phases based on geographical region.[120] Projects that were eligible to participate in the RFPP process must service and enable the sequestration of CO_2 from more than one facility located within Alberta.[121] Proponents must provide "open access to parties subject to fair and reasonable cost recovery in providing: … carbon sequestration services; and access by a third party to … pore space … to undertake injection."[122]

As set out by the Government of Alberta, the carbon sequestration lease agreements granted to successful proponents under the RFPP process were intended to:

> 1. Grant the successful proponent the right to drill wells, conduct evaluation and testing, establish monitoring baselines, and inject captured [CO_2] into deep subsurface formations within previously defined zones for sequestration[; and]
>
> 2. Plac[e] requirements on the agreement holder that include:
>
> - managing the development of the hub and the efficient use of the pore space
> - ensuring open access to affordable use of the hub where appropriate
> - providing just and reasonable cost recovery to the agreement holder.[123]

Within the *RFPP Guidelines*, the Province made it clear that selection as a successful proponent did not represent a guarantee or certification of the pore space location's suitability for the sequestration.[124] Successful proponents must proceed with a suitability evaluation of the pore space area identified (or area of interest) within the proponent's proposal before a sequestration lease agreement is considered.[125]

As of the date of publication, the Province has run two RFPPs and selected a total of 25 successful proponents.[126] The first RFPP was primarily for CCUS projects enabling sequestration of carbon emissions from the Alberta Industrial Heartland (Heartland) zone

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118 *Ibid*.
119 Alberta, *Request for Full Project Proposals for Carbon Sequestration Hubs* (Government of Alberta, 3 March 2023), s 1.4, online: [perma.cc/U22G-WUCE] [Alberta, *RFPP Guidelines*]; *MMA*, *supra* note 14, ss 80–86; *OGCA*, *supra* note 14.
120 Alberta, *RFPP Guidelines*, *ibid*, s 1.2.
121 *Ibid*, s 1.4.
122 *Ibid*, s 1.3.
123 Alberta, "Hub Development Process," *supra* note 117.
124 Alberta, *RFPP Guidelines*, *supra* note 119, s 1.3.
125 *Ibid*.
126 Alberta, "Hub Development Process," *supra* note 117.

near Edmonton.[127] The second RFPP was held to provide CCUS services across the balance of the Province (outside of the Heartland zone).[128] Successful proponents were invited to enter into an agreement with the Province to further evaluate the identified area of interest.[129]

The Province has communicated within the *RFPP Guidelines* that it will continue to monitor the sequestration needs of the Province and provide additional opportunities in response to future market demand, including "exploring the potential for other forms of carbon sequestration including the use of mature fields."[130] It remains to be determined if and to what extent depleted oil and gas reservoirs will be considered for permanent sequestration or if EOR will be included as part of the Province's broader framework for CCUS.

2. THE EVALUATION PERMIT AND CARBON SEQUESTRATION LEASE AGREEMENT

The Carbon Sequestration Tenure Management Process facilitates the granting of two specific types of subsurface agreements required to acquire pore space rights to develop a CCUS project: (1) evaluation permits;[131] and (2) sequestration lease agreements.[132]

a. Evaluation Permits

Evaluation permits are agreements with the Government of Alberta that grant a proponent "the right to evaluate the geological or geophysical properties of a subsurface reservoir in a [specified] location to determine its suitability for the sequestration of captured [CO_2]."[133]

An evaluation permit does not grant the permittee the right to recover any minerals found within the location of the permit.[134] It is intended only to offer the successful proponent the right to conduct diligence and does not guarantee that the proponent will be issued an agreement for sequestration.[135] Instead, proponents must approach the Province for an agreement to sequester CO_2 supported by evidence that the proposed location is suitable.[136]

The term of an evaluation permit is five years and may be renewed at the discretion of the Minister.[137] Under an evaluation permit, the permit-holder may (subject to the requirements pursuant to the *OGCA* to obtain the requisite well licences or amendments to well licences

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127 *Ibid*; Alberta, *RFPP Guidelines*, *supra* note 119, s 1.3. This area includes Sherwood Park, Fort Saskatchewan, Gibbons, Redwater, Bruderheim, and Lamont. The designated geographical region for the first RFPP was within the Heartland zone which prescribes the boundary for where the emissions must be sourced from but does not prescribe or restrict where a sequestration hub must be located. In other words, CO_2 injection can occur outside of the region designated in the RFPP.

128 Alberta, "Hub Development Process," *supra* note 117.

129 Alberta, *RFPP Guidelines*, *supra* note 119, s 1.3.

130 *Ibid*, s 1.1.

131 *MMA*, *supra* note 14, s 115.

132 *Ibid*, s 116.

133 *Ibid*, s 115(1).

134 *CS Tenure Regulation*, *supra* note 100, s 3.

135 Alberta, *RFPP Guidelines*, *supra* note 119, Appendix A.

136 *Ibid*.

137 *CS Tenure Regulation*, *supra* note 100, s 4.

from the AER)[138] drill a new well or may re-enter an existing well for the purpose of assessing the suitability of the applicable reservoir.[139]

b. Sequestration Lease Agreements

Carbon sequestration agreements (or sequestration lease agreements) are agreements with the Government of Alberta, which grant a proponent the right to inject captured CO_2 into a subsurface reservoir for sequestration and to manage carbon storage hubs in Alberta.[140]

Prior to the RFPP model, carbon sequestration agreements were issued as a Crown agreement under section 9 of the *MMA*, which provides the Minister with discretionary power to enter into a contract with any person or a provincial, territorial, or federal government regarding "the storage or sequestration of substances in subsurface reservoirs."[141]

Sequestration lease agreements will still be issued under section 9 and reflect the existing provisions within Part 9 of the *MMA*,[142] and they will also incorporate aspects of the *CS Tenure Regulation*, including:

(1) the term of a carbon sequestration lease agreement being 15 years with no automatic rights of renewal, but may be renewed for a successive 15-year term subject to conditions prescribed by the Minister at the time;[143]

(2) MMV planning and reporting, as further described below;[144] and

(3) the provision of an initial and updated closure plan.[145]

A sequestration lease agreement grants a successful proponent the right to drill wells, conduct evaluation and testing, establish monitoring baselines, and inject captured CO_2 into deep subsurface formations within previously defined zones for sequestration.[146] The agreement will also place requirements on the proponent that are consistent with the original stated intention of the RFPP, including: (1) the management of the "development of the hub and the efficient use of the pore space"; (2) "ensuring open access to affordable use of the hub where appropriate"; and (3) "providing just and reasonable cost recovery" to the proponent.[147]

Notwithstanding section 57 of the *MMA*, these agreements may be entered into and grant storage rights to mineral interest owners.[148] Storage rights are defined as "the right to inject

138 *OGCA*, *supra* note 14, ss 11–32.
139 *MMA*, *supra* note 14, ss 115(1)–(2).
140 *CS Tenure Regulation*, *supra* note 100, s 9(3).
141 *MMA*, *supra* note 14, s 9(a)(iii).
142 *Ibid*, ss 114–24.
143 *CS Tenure Regulation*, *supra* note 100, ss 10–11.
144 See Part III.D.2.b, below.
145 Alberta, *RFPP Guidelines*, *supra* note 119, Appendix A.
146 *CS Tenure Regulation*, *supra* note 100, s 3.
147 Alberta, "Hub Development Process," *supra* note 117.
148 *MMA*, *supra* note 14, s 116(1).

fluid mineral substances into a subsurface reservoir for the purpose of storage"[149] and are typically used in the oil and gas industry for natural gas storage.[150] These storage rights are distinct from the right to inject captured CO_2, which is not a substance included within the definition of a mineral under the *MMA*.[151] Sequestration lease agreements are not transferable without the written consent of the Minister and the Minister may, in his or her discretion, refuse to consent to a transfer of the agreement.[152]

c. Application for an Evaluation or Sequestration Lease Agreement

Under the *CS Tenure Regulation*, the procedure for obtaining an evaluation permit and a carbon sequestration lease agreement includes the submission of: (1) an application in a form that is satisfactory to the Minister;[153] (2) the prescribed application fee;[154] (3) the prescribed annual rental for the first year of the term of the evaluation permit;[155] and (4) an MMV plan.[156] Additional requirements in the case of carbon sequestration lease agreements are the submission of: (5) "evidence satisfactory to the Minister that the location specified in the application is suitable for … the sequestration of captured [CO_2]";[157] and (6) a closure plan.[158] While MMV and closure plans are also required to be submitted to the AER pursuant to recent updates to *Directive 065: Resources Applications for Oil and Gas Reservoirs*, these currently must be approved by Alberta Energy prior to the proponent commencing injection.[159]

In the case of evaluation permits, the MMV plan must set out:

(a) … the [MMV] activities that the permittee will undertake for the term of the permit,

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149 *Ibid*, s 1(1)(z).

150 *Ibid*, s 57(1).

151 *Ibid*, s 1(1)(p) (citing *Law of Property Act*, RSA 2000, c L-7):

> "minerals" means all naturally occurring minerals, and without restricting the generality of the foregoing, includes
> (i) gold, silver, uranium, platinum, pitchblende, radium, precious stones, copper, iron, tin, zinc, asbestos, salts, sulphur, petroleum, oil, asphalt, bituminous sands, oil sands, natural gas, coal, anhydrite, barite, bauxite, bentonite, diatomite, dolomite, epsomite, granite, gypsum, limestone, marble, mica, mirabilite, potash, quartz rock, rock phosphate, sandstone, serpentine, shale, slate, talc, thenardite, trona, volcanic ash, sand, gravel, clay and marl, but
> (ii) does not include
> (A) sand and gravel that belong to the owner of the surface of land under section 58 of the *Law of Property Act*,
> (B) clay and marl that belong to the owner of the surface of land under section 57 of the *Law of Property Act*, or
> (C) peat on the surface of land and peat obtained by stripping off the overburden, excavating from the surface, or otherwise recovered by surface operations.

152 "Minister" is defined as the Minister determined under the *Government Organization Act*, RSA 2000, c G-10, s 16 as the Minister responsible for the *MMA* (*MMA*, *supra* note 14, s 1(1)(q)). *MMA*, *ibid*, s 118(1) (under the *MMA* s 1(1)(a), "agreement" is defined to specifically exclude other arrangements with the Crown and is limited to the grant of rights in respect of a mineral or subsurface reservoir).

153 *Supra* note 100, ss 3(2)(a), 9(2)(a).

154 *Ibid*, ss 3(2)(b), 9(2)(b); *Mines and Minerals Administration Regulation*, AR 262/1997, s 17.

155 *CS Tenure Regulation*, *supra* note 100, ss 3(2)(c), 9(2)(c).

156 *Ibid*, ss 3(2)(d), 9(2)(e).

157 *Ibid*, s 9(2)(d).

158 *Ibid*, s 9(2)(f).

159 AER, *Directive 065*, *supra* note 10, s 4.1.7(10).

(b) … an analysis of the likelihood that the operations or activities … will interfere with mineral recovery, and

(c) … any other information requested by the Minister.[160]

For purposes of a carbon sequestration lease agreement, a closure plan must be submitted for approval as part of the grant of the lease and the lessee must comply with the approved closure plan.[161] "The lessee of an agreement … shall monitor all wells and facilities and perform all closure activities in accordance with the [applicable] regulations."[162] Following compliance with the closure plan obligations, "[a] lessee of an agreement may … apply to the Minister for a closure certificate."[163] The Minister has discretion to accept an application for a closure certificate if the Minister is satisfied that certain closure criteria have been met.[164] As noted above, there seems to be redundancy in the requirement that closure plans reviewed by the Minister for the purposes of a carbon sequestration lease agreement are also submitted to the AER as part of the licensing process for CO_2 sequestration schemes.[165] At present, a closure plan remains a requirement of the *CS Tenure Regulation*, though it is possible that this requirement may be removed from the sequestration lease agreement phase in order to be dealt with later by the AER. Should the review and approval of closure plans be delegated to the AER, there could be an increased risk to proponents when entering a sequestration lease agreement without confirmation of an approved closure plan. Further, while the Minister has specified the application requirements for a sequestration lease under the *CS Tenure Regulation*, the form of the agreement itself remains unclear, which places increased risk on proponents when applying for a long-term tenure agreement whose specific terms remain subject to development.

Sites deemed appropriate to secure long-term sequestration are selected based on a number of criteria. For a CO_2 geological sequestration site to be technically feasible, three major parameters are essential:

- The sequestration complex must have sufficient capacity to sequester all the volume of CO_2 requested in any application for geological sequestration
- Injection zones in the sequestration complex must have sufficient injectivity to sequester CO_2 at the required rate (i.e. at the rate supplied by the capture facility)
- The sequestration complex must have adequate seals to contain all injected and displaced fluids.[166]

The four main types of geological storage and disposal sites are: "(1) depleted oil and gas reservoirs; (2) deep saline formations; (3) … coal beds; and (4) salt caverns."[167] Each geological site has different challenges. As discussed above, under the Province's Carbon

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160 *CS Tenure Regulation*, *supra* note 100, s 7(1).
161 *Ibid*, s 18.
162 *MMA*, *supra* note 14, s 119.
163 *Ibid*, s 120(1).
164 *Ibid*, s 120(2).
165 See the text accompanying note 159.
166 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 46.
167 Bankes, Poschwatta & Shier, *supra* note 6 at 589.

Sequestration Tenure Management Process, only subsurface formations deeper than 1,000 meters with no associated hydrocarbon recovery (that is, injection into a saline aquifer) are currently eligible.[168] Within the RFPP however, the Province indicated that it will continue to engage with industry to explore the potential for other forms of sequestration including the use of mature oil and gas fields.[169]

For a carbon sequestration lease agreement, in addition to the above requirements, an applicant's MMV plan must include an analysis of the likelihood that the operations or activities will interfere with mineral recovery.[170] For hub proponents under the RFPP, detailed economic information about the proposed project and insurance details are also required by the Minister in consideration of granting a sequestration lease agreement.[171] This appears to be a new requirement in order to assess the viability of the proposed hub and creditworthiness of the project entities at the sequestration lease agreement stage.

E. ENVIRONMENTAL IMPACT ASSESSMENT

1. PROVINCIAL

Once the subsurface rights agreements (that is, the pore space tenure rights) have been obtained, a review occurs to determine whether a project requires a provincial EIA pursuant to Part 2 of Alberta's *Environmental Protection and Enhancement Act*.[172] The AER administers EIAs for energy projects, while Alberta Environment and Protected Areas (AEPA) is responsible for all other types of industrial activity.[173]

Proposed projects are either a mandatory activity designated as such by regulation, or a project for which the Director is of the opinion that the potential environmental impacts warrant further consideration.[174]

CCUS projects are not listed as a mandatory or exempted activity within the *Environmental Assessment (Mandatory and Exempted Activities) Regulation*.[175] However, an assessment may be triggered through a review of the project as a discretionary activity.[176] As a result, to determine if an EIA will be required for a CCUS project, proponents must submit a Project Summary Table and a map to the Director.[177] Following receipt of the summary of the proposed project and any additional information the Director requires to

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168 Alberta, *RFPP Guidelines*, *supra* note 119, s 1.4. For further discussion, see Part III.D.2, above.
169 *Ibid*, s 1.1.
170 *CS Tenure Regulation*, *supra* note 100, s 15(b). This is often referred to as the "no harm test."
171 Alberta, *RFPP Guidelines*, *supra* note 119 at 6.
172 RSA 2000, c E-12, ss 39–86 [*EPEA*].
173 Operations Division, *Alberta's Environmental Assessment Process* (Operations Division, 1 December 2015), online (pdf): [perma.cc/QXW3-74JH].
174 *EPEA*, *supra* note 172, ss 39(c), 41, 43 (section 39(c) defines mandatory activity; the latter provisions regard the director's opinion about potential environmental impacts). Under *EPEA*, "Director" is defined in s 1(r) as "a person designated as a Director for the purposes of [*EPEA*] by the Minister" and "Minister" is defined in s 1(mm) as "the Minister determined under section 16 of the *Government Organization Act* [*supra* note 152] as the Minister responsible for [*EPEA*]."
175 Alta Reg 111/1993.
176 *EPEA*, *supra* note 172, ss 41–45.
177 Operations Division, *supra* note 173.

determine whether an EIA is required, the Director will determine whether an EIA is required.[178]

The only existing operational CCUS project (excluding EOR) in Alberta is Shell Canada Limited's *Quest Carbon Capture and Storage Project*.[179] The *Quest Project* completed its required EIA in 2011.[180] However this does not mean that all future CCUS projects in the Province will require an EIA. The EIA for the *Quest Project* was required, in part, due to its status as a pilot project that received government funding and also to ensure a thorough review of the project.

A completed EIA does not guarantee the CCUS project will be approved; however, it provides the applicable regulator (that is, the AER) with the necessary information "to make an informed decision that is in the public interest."[181]

2. FEDERAL

Pursuant to the federal *Impact Assessment Act*,[182] the requirement of a federal impact assessment is determined by "whether a proposed project falls within the project list set out in Schedule 2 of the *Physical Activities Regulation*."[183] CCUS projects and the storage of CO_2 are not listed within the *PAR*. However, the federal Minister has discretionary power to designate physical activities that are not prescribed by the regulations, where the Minister is of the opinion that the physical activity may cause adverse effects within federal jurisdiction (such as fishery habitat or navigable waters), adverse direct or incidental effects, or concerns the general public.[184]

In the event a CCUS project triggers the Minister's discretionary power to designate it, such a project will be subject to the requirements and review process set out in the *IAA*, which includes a broader review of the impacts of such a designated project.[185]

F. AER APPROVAL OF EVALUATION WELLS, INJECTION SCHEME, AND INJECTION WELLS

1. OVERSIGHT OF CCUS PROJECTS

As indicated above, the AER and Alberta Energy have primary oversight over CCUS Projects.[186] When assessing applications for CCUS projects and injection schemes pursuant

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178 *EPEA*, *supra* note 172, s 44.

179 Alberta, "Carbon Capture, Utilization, and Storage: Development and Innovation," online: [perma.cc/CL2E-3YGZ].

180 Alberta, Environmental Assessment Program, *Quest Carbon Capture and Storage Project* (Environmental Impact Assessment and Application for Approval), by Stantec Consulting Inc for Shell Canada Limited, Catologue No 4921835 (Calgary: Alberta Environment, 2010) [*Quest Project*].

181 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 51.

182 SC 2019, c 28, s 1 [*IAA*].

183 David V Wright, "The New Federal *Impact Assessment Act*: Implications for Canadian Energy Projects" (2021) 59:1 Alta L Rev 61 at 75; SOR/2019-285, Schedule [*PAR*].

184 *IAA*, *supra* note 182, s 9.

185 *Ibid*. It is noted that at the time of writing, the *IAA* was subject to review by the Supreme Court of Canada to determine its constitutionality, and a decision had not yet been rendered.

186 See Part III.B and Part III.D.2.c, above.

to an evaluation or sequestration lease agreement issued under the *MMA* and the *CS Tenure Regulation*, the AER must consider the impacts to the recovery and conservation of PNG, including the use of underground formations for the storage of PNG.[187] In fact, the *OGCA* contains express language creating statutory paramountcy of recovery and storage of oil and gas over the sequestration of captured CO_2.[188] Specifically, section 39(1.1) states that the AER:

> [M]ay not approve a scheme … pursuant to an agreement under Part 9 of the *Mines and Minerals Act* unless the lessee of that agreement satisfies the Regulator that the injection of the captured carbon dioxide will not interfere with
>
> (a) the recovery or conservation of oil or gas, or
> (b) an existing use of the underground formation for the storage of oil or gas.[189]

2. AER WELL LICENCES

Pursuant to sections 114–116 of the *MMA*, well licences and approvals from the AER are required prior to drilling evaluation wells or using a well for injection of captured CO_2 in accordance with the *OGCA*.[190]

Under AER *Directive 056: Energy Development Applications and Schedules*, any petroleum industry development that includes wells, pipelines, or other structures requires a licence from the AER to construct and operate.[191] For a CCUS project, "an evaluation well(s) may be drilled to acquire specific information needed for approval of an injection scheme."[192] "A [CCUS] proponent must apply to [the AER] for approval of injection and monitoring wells under [AER *Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements*] which sets out the technical requirements of an injection well."[193]

"After drilling, completion, and testing of an injection well, proponents can apply [to the AER] for an injection scheme approval under … Directive 065."[194] A CCUS project must meet the requirements for CO_2 sequestration schemes and CO_2 sequestration detailed in sections 4.1.6 and 4.1.7 of *Directive 065*.[195] "Applications under this directive provide information necessary for the [AER] to determine that there will be [adequate] containment of the [disposed captured CO_2]."[196]

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187 AER, *Directive 065*, *supra* note 10, s 4.1.6.
188 *OGCA*, *supra* note 14, s 39(1.1).
189 *Ibid*.
190 *MMA*, *supra* note 14, ss 114–16.
191 Alberta Energy Regulator, *Directive 056: Energy Development Applications and Schedules* (AER, 16 March 2023), s 2.3, online: [perma.cc/6QDB-ZWPS] [AER, *Directive 056*].
192 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 51.
193 *Ibid*; Alberta Energy Regulator, *Directive 051: Injection and Disposal Wells – Well Classifications, Completions, Logging, and Testing Requirements* (AER, 28 April 2023), online: [perma.cc/M7FQ-J9H3] [AER, *Directive 051*].
194 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 51; AER, *Directive 065*, *supra* note 10.
195 AER, *Directive 065*, *ibid*, ss 4.1.6, 4.1.7.
196 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 51.

Directive 065 and *Directive 056* each contain public consultation requirements such that local stakeholders including proximate landowners and occupants, holders of Crown mineral leases, and working interest participants in proximate hydrocarbon recovery projects will have an opportunity to participate in the regulatory process by providing statements of concern.[197] The AER will convene a public hearing — either in a written or in person format — to address public concerns if such concerns are deemed to have standing cannot be resolved, and if the AER determines that a hearing process is in the best interest of the public.[198] Prior to the AER providing final approval for CO_2 sequestration schemes, the application is referred to the Minister of AEPA for review and approval.[199] As part of this review, the Minister of AEPA may impose additional conditions.[200] Once final approval is obtained from the AER, the project may commence, subject to the imposed conditions and compliance with applicable regulatory requirements.[201]

G. LONG-TERM STATUTORY LIABILITY

Arguably the most significant difference between the CCUS and EOR schemes in Alberta is the treatment of long-term liability. The EOR scheme is based on PNG lease rights and governed by the ordinary course liability rules found in the *OGCA*.[202] As such, the operator (and the working interest participants, jointly and severally in accordance with their proportionate share) of an EOR project will remain liable for the wells associated with its project and any necessary remediation work under the *OGCA*.[203] However, under the CCUS-specific regulatory regime, the Crown assumes long-term liability for projects involving the sequestration of captured CO_2, provided that such a CCUS project has obtained a closure certificate.[204] Given that the Crown assumes the liability following closure, the Minister "retains … significant discretion in deciding whether or not to issue a closure certificate."[205] A closure certificate can only be issued to a person that has a sequestration lease agreement;[206] "[p]rojects involving the storage of CO_2 for other purposes [including pursuant to an EOR scheme] do not fall within the purview of Part 9, regardless of the duration of storage."[207]

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197 *Ibid* at 17; AER, *Directive 056*, *supra* note 191, s 3. We note that Emergency Response Plans may also be required by AER, *Directive 056*, *ibid* and AER, *Directive 065*, *supra* note 10, the requirements for which are further set out under Alberta Energy Regulator, *Directive 071: Emergency Preparedness and Response* (AER, 8 February 2023), online: [perma.cc/8PZV-L8B8] and may include additional public consultations.

198 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 68–69.

199 *Ibid* at 51.

200 *Ibid*.

201 *Ibid*.

202 *Supra* note 14, s 29.

203 *Ibid*.

204 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 61.

205 Nigel Bankes, "Alberta's Approach to the Transfer of Liability for Carbon Capture and Storage Projects" (2019) 22:3/4 Intl J Risk Assessment & Management 311 at 315.

206 *MMA*, *supra* note 14, s 120.

207 Massicotte, Ross & Thompson, *supra* note 101 at 321.

As per section 120(3) of the *MMA*, the Minister may issue a closure certificate if the Minister is satisfied that:

(1) the lessee has monitored all wells and facilities and has performed all closure activities in accordance with the regulations;[208]

(2) the lessee has abandoned all wells and facilities in accordance with the requirements under the *OGCA* and the regulations under Part 9 of the *MMA*;[209]

(3) "the lessee has complied with the reclamation requirements under the *Environmental Protection and Enhancement Act*" (*EPEA*);[210]

(4) "the closure period specified in the regulations has passed";[211]

(5) "the conditions specified in the regulations have been met";[212] and

(6) "the captured [CO_2] is behaving in a stable and predictable manner, with no significant risk of future leakage."[213]

Upon issuance of a closure certificate, the Crown becomes the owner of the captured CO_2 and

> assumes all obligations of the lessee
>
> (i) as owner and licensee under the [*OGCA*] …,
>
> (ii) as the person responsible for the injected captured [CO_2] under [*EPEA*],
>
> (iii) as the operator under Part 6 of [*EPEA* with] respect [to] the land within the location of the agreement …, and
>
> (iv) under the *Surface Rights Act*.[214]

During the life of a CCUS project, operators are required under the *MMA* and its regulations to pay into the Post-Closure Stewardship Fund (the Fund).[215] Pursuant to section 122(2) of the *MMA*, the Fund may be used for a number of purposes including:

(1) to offset costs associated with the long-term monitoring and maintenance of sequestration site assessment for monitoring and closure plan;[216]

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208 *Supra* note 14, ss 120(3)(a), 119.
209 *Ibid*, ss 123(3)(b), 114–24; *OGCA*, *supra* note 14.
210 *Supra* note 172; *MMA*, *ibid*, s 120(3)(c).
211 *MMA*, *ibid*, s 120(3)(d).
212 *Ibid*, s 120(3)(e).
213 *Ibid*, s 120(3)(f).
214 *Ibid*, s 121(1)(b); *Surface Rights Act*, RSA 2000, c S-24.
215 *MMA*, *ibid*, s 122.
216 *Ibid*, s 122(2)(d).

(2) "monitoring the behaviour of captured carbon dioxide that has been injected pursuant to [a pore space tenure agreement]";[217]

(3) "fulfilling any obligations that are assumed by the Crown pursuant to section 121(1)(b)";[218] and

(4) "paying for suspension costs, abandonment costs and related reclamation or remediation costs in respect of orphan facilities" where the work is carried out by the AER, the Director in accordance with *EPEA*, or any of their authorized representatives.[219]

The amount a lessee (operator) pays into the Fund is a fee per tonne of captured CO_2 injected into the location of the carbon sequestration lease at the rate established by the Minister.[220] In accordance with section 23.1 of the *OGCA*, once the AER receives notice issued by the Minister under Part 9 of the *MMA* that the Crown has assumed liability, the AER must "amend the licence or approval to reflect that the Crown is the holder of the licence … or the approval holder for that scheme."[221] Consequently, the former holder of the licence or approval for the well, facility, or scheme is relieved from all obligations under the *OGCA* with respect to the well, facility, or scheme, except as to any outstanding debts owing to the AER.[222]

IV. GENERATION OF CARBON AND CLEAN FUEL CREDITS

Given Alberta's established regulatory framework and incentives in place to encourage CCUS project development, coupled with the abundance of suitable subsurface reservoir capacity, it is expected that CCUS will be at the forefront of emissions reduction projects within the Province. However, in order to further such development, there is still a need for technological innovation and for proponents to realize a return on investment and other benefits in connection with such projects.

Recently, both the federal and provincial governments, including Alberta, have stated that they are open to working collaboratively to further incentivize investment in CCUS.[223] Alberta has committed to enhancing the development of CCUS, as evidenced by both the allocation of evaluation permits and carbon sequestration rights to successful hub proponents and direct funding, including Emissions Reduction Alberta's (ERA) investment of $30 million from Alberta's Technology Innovation and Emissions Reduction fund to 11 projects in the province.[224]

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217 *Ibid*, s 122(2)(a).
218 *Ibid*, s 122(2)(b).
219 *Ibid*, s 122(2)(c).
220 *CS Tenure Regulation*, *supra* note 100, s 20.
221 *OGCA*, *supra* note 14, s 23.1(a).
222 *Ibid*, s 23.1(b).
223 Nia Williams "Alberta Offers to Work with Trudeau on Carbon Capture - with Conditions," *Reuters* (17 February 2023), online: [perma.cc/N7C4-G9RM].
224 "Over $40 Million Investment to Kickstart $20 Billion in Carbon Capture Projects," online: *Emissions Reduction Alberta* [perma.cc/R498-D4L5].

Investment in CO_2 capture projects is largely driven by emitter and stakeholder returns from such projects, including credits and emission offsets generated from such projects (which are generally referred to in this article as credits).[225] Credits ensure that emissions reductions targets are met, while also incentivizing renewable and emission reduction project development as well as technology and innovation in connection with such projects. Environmental attributes are the environmental benefits represented by any credit generated, being among other things a quantified reduction of greenhouse gas (GHG) emissions.

Federally, carbon emissions are governed by the *Greenhouse Gas Pollution Pricing Act*[226] which was deemed constitutional by the Supreme Court of Canada in March of 2021.[227] The federal carbon pricing scheme is implemented pursuant to the *GGPPA*, while the provincial carbon pricing scheme in Alberta is implemented pursuant to the *Technology Innovation and Emissions Reduction Regulation*.[228] The *GGPPA* acts as a backstop, either in whole or in part, when a provincial scheme does not meet the stringency requirements under the *GGPPA*.[229] The *GGPPA* consists of two components:

(1) the levy on fossil fuels (the Fuel Charge);[230] and

(2) a cap-and-trade system for output-based GHG emissions by large industrial emitters (OBPS).[231]

The purpose of the *GGPPA* is to establish minimum pricing standards on carbon prices to incentivize emissions reductions across all sectors of the economy, and to mitigate Canada's impact on climate change in furtherance of Canada's commitment to net zero emissions by 2050. This commitment is enshrined under the *Canadian Net-Zero Emissions Accountability Act*, which became law in Canada on 29 June 2021.[232] Canada's commitment to the *Paris Agreement*[233] is implemented by the 2030 Emissions Reduction Plan which aims to reduce emissions by 40 to 50 percent of the 2005 levels by 2030.[234]

In Alberta, AEPA enables the generation of carbon credits through the Alberta Emission Offset System[235] and the generation of emissions performance credits under the *Emission Management and Climate Resilience Act*.[236] The *TIER Regulation* governs the Province's carbon pricing scheme and establishes the credits and mechanisms by which emitters are able to meet their emissions reduction targets, reflective of the environmental attribute of a given project or activity.[237] The *TIER Regulation* has been found to meet or exceed the stringency

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225 *Ibid*.
226 SC 2018, c 12 [*GGPPA*].
227 *References re Greenhouse Gas Pollution Pricing Act*, 2021 SCC 11 [*Re GGPPA*].
228 Alta Reg 133/2019 [*TIER Regulation*].
229 *Re GGPPA*, *supra* note 227 at para 27.
230 *Supra* note 226, ss 3–168.
231 *Ibid*, ss 169–261. See also *Output-Based Pricing System Regulations*, SOR/2019-266 [*OBPS Regulations*].
232 SC 2021, c 22.
233 12 December 2015, UNTS 3156 (entered into force 4 November 2016).
234 Environment and Climate Change Canada, *2030 Emissions Reduction Plan: Canada's Next Steps for Clean Air and a Strong Economy*, Catalogue No En4-460/2022E-PDF (Gatineau: ECCC, 2022) at 81, online: [perma.cc/5JAX-WWTG].
235 *TIER Regulation*, *supra* note 228, s 18(1).
236 SA 2003, C E-7.8.
237 *Supra* note 228, ss 18–21.

requirements of the *GGPPA* in respect of the matters to which the *TIER Regulation* applies; therefore, the *OBPS Regulations* are not at this time applicable in Alberta.[238]

Alberta has reinforced its commitment to bolstering Alberta's position as a leading developer of CCUS projects through recent amendments to the *TIER Regulation*. In addition to Alberta emission offsets (AEOs) and emission performance credits (EPCs) already available under the *TIER Regulation*, the amendments created two new types of carbon credits: (1) Sequestration Credits; and (2) capture recognition tonnes (Recognition Tonnes), both of which are stackable with credits generated under the *Clean Fuel Regulations*.[239] Unlike AEOs, EPCs are generated from the carbon which is sequestered rather than a recognition of a reduction of emissions.[240] The following is a chart created by the Government of Alberta comparing AEOs, Sequestration Credits, and Recognition Tonnes:[241]

	Emission Offset for Sequestration	Sequestration Credit	Capture Recognition Tonne
Stackable with CFR	✗	✓	✓
Can be banked for future use	✓	✓	✗
Can be sold to other entity?	✓	✓	✗
Can be deducted from TRE	✗	✗	✓
Can be used to meet compliance obligation	✓	✓	✗

Government incentives, including both federal and provincial offsets and credits generated from CCUS projects, that can be sold and traded on the carbon credit market are one of the driving forces behind CCUS project growth in the province. However, a balance needs to be struck to not oversaturate the carbon credit market, devaluing the credits.

A. GENERATION OF ENVIRONMENTAL ATTRIBUTES AND CREDITS IN ALBERTA

The *TIER Regulation* governs Alberta's carbon pricing scheme and establishes the credits and mechanisms by which corporations and emitters are able to meet their emissions reduction targets in Alberta, and where applicable, under the federal system.[242] Pursuant to the *TIER Regulation*, facilities that produce more than 100,000 tonnes of CO_2 are deemed to regulated by the *TIER Regulation*.[243] Smaller emitters that produce over 2,000 tonnes of CO_2 are eligible to opt into the program.[244] Facilities regulated under the *TIER Regulation*

238 *GGPPA*, *supra* note 226, Schedule 1, Part 2.
239 SOR/2022-140; *TIER Regulation*, *supra* note 228, ss 20.1, 202.2;
240 Alberta, Environment and Protected Areas, *TIER Regulatory System Amendments: Overview of System Amendments* (Webinar Slides) (EPA, 23 January 2023), online: [perma.cc/G6DT-B9AL] [EPA, *TIER Amendments Webinar*].
241 *Ibid*. Permission to reproduce obtained by the authors from Alberta Environment and Protected Areas.
242 *Supra* note 228.
243 *Ibid*, s 1(1)(cc).
244 *Ibid*, s 4(4).

are exempted from the Fuel Charge under the *GGPPA*, for so long as the *TIER Regulation* continues to meet the federal *GGPPA* stringency requirements.[245]

The *TIER Regulation* is subject to periodic review, with the first review completed in December 2022 and the next review to be completed on or before 31 December 2026.[246] Following feedback from stakeholders, the Government of Alberta released the *Technology Innovation and Emissions Reduction Amendment Regulation*[247] and the *Administrative Penalty Amendment Regulation*,[248] which imposed certain amendments and changes that came into force on 1 January 2023. The amendments enacted by the *Amendment Regulation* maintain the *TIER Regulation's* compliance with the federal stringency standards, ensuring that Alberta's carbon pricing regime remains in place instead of the *OBPS Regulations*.

Among other things, the *Amendment Regulation* made certain amendments to the *TIER Regulation* as it relates to the use of EPCs, AEOs, Sequestration Credits, and Recognition Tonnes (collectively, Provincial Credits) to reflect the Government of Alberta's alignment with emissions reduction targets, and to promote emissions reduction project development within the province.[249] The amendments allow for increased use of Provincial Credits, including an increase to the use limits, permitting emitters to use EPCs, AEOs, and Sequestration Credits to comply with emissions reduction targets in increasing amounts: 60 percent in 2023; 70 percent in 2024; 80 percent in 2025; and 90 percent in 2026.[250] The expiration period for EPCs and AEOs was also reduced from a nine-year and eight-year period, respectively, to a five-year and six-year period, respectively.[251] Sequestration Credits must be used within the six-year period beginning the year the net geological sequestration of the associated emission offset occurred.[252] These changes benefit Alberta emitters and CCUS proponents alike by creating fiscal incentives for additional CO_2 capture from industrial facilities, and rewarding both emitters and hub operators more valuable credits that can be used for compliance purposes or traded on the mature credit market.

1. TYPES OF PROVINCIAL CREDITS

Emitters that are subject to the *TIER Regulation*, either because they have voluntarily opted-in or are automatically covered, are required to apply a carbon pollution price per

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245 Provincial and territorial carbon pricing systems are subject to an annual assessment to ensure that they continue to meet the stringency standards (*GGPPA*, *supra* note 226, ss 166(3), 189(2), 270). The federal government monitors the changes to provincial systems on an ongoing basis. In assessing stringency, the federal government uses national stringency standards or 'benchmark' criteria when assessing provincial and territorial carbon pricing systems. The criteria for the federal government's carbon pricing benchmark are set out in Environment and Climate Change Canada, *Pan-Canadian Framework on Clean Growth and Climate Change: Canada's Plan to Address Climate Change and Grow the Economy*, Catalogue No En4-294/2016E-PDF (Gatineau: ECCC, 2016), Annex I, online (pdf): [perma.cc/E86A-BV3Y], which set the initial carbon price trajectory up to 2022. In August of 2021, the federal government, with input from Canadian Institute for Climate Choices, released Government of Canada, "Update to the Pan-Canadian Approach to Carbon Pollution Pricing 2023–2030" (2021), online: [perma.cc/FF3X-TYBE] and updated the minimum national standards for the 2023 to 2030 period, ensuring such standards are fair, consistent and effective.

246 *TIER Regulation*, *supra* note 228, s 39(a).

247 Alta Reg 251/2022 [*Amendment Regulation*].

248 Alta Reg 250/2022.

249 *Amendment Regulation*, *supra* note 247.

250 *TIER Regulation*, *supra* note 228, s 13(9).

251 *Ibid*, ss 13(6), 13(5)(g).

252 *Ibid*, s 13(5)(g).

tonne, which increases each year in line with the OBPS until it has reached $170 per tonne in 2030, for emissions that exceed emissions intensity performance standards for the relevant type of activity.[253] The *TIER Regulation* requires regulated facilities to reduce emissions to meet their reduction targets.[254] Facilities that reduce emissions beyond their benchmark can generate EPCs.[255]

Where facilities do not specifically meet their benchmark, they are eligible to comply using the following mechanisms:

(1) submit AEOs generated from qualifying emissions reductions outside of regulated facilities;[256]

(2) submit EPCs generated from emissions reduced at a facility beyond their benchmark;[257]

(3) submit Sequestration Credits generated from converted AEOs;[258]

(4) emissions reductions achieved at the facility or use of Recognition Tonnes;[259] or

(5) obtain fund credits by paying the prescribed price into the TIER fund (which pursuant to TIER is subject to an annual increase in line with the federal requirements).[260]

Although generated from converted AEOs, the newly created Recognition Tonnes are not eligible for compliance purposes and are subtracted directly from an emitters total regulated emissions.[261]

2. ALBERTA EMISSIONS OFFSETS

AEOs are created as a result of projects and activities that have voluntarily reduced their GHG emissions.[262] Within Alberta, AEOs are quantified using Alberta-approved methodologies called quantification protocols, which are verified by a third party.[263] In order to qualify for emission offsets, projects must meet the requirements under the *TIER Regulation*, the *Standard for Greenhouse Gas Emission Offset Developers*, and a relevant

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253 The carbon price is set at $65/tonne in Alberta for 2023 and will increase by $15 each year until it reaches $170/tonne in 2030. Alberta, Environment and Protected Areas, Ministerial Order 62/2022, (21 December 2022) (*Emissions Management and Climate Resilience Act*); *GGPPA*, *supra* note 226, Schedule 4.

254 *Supra* note 228, s 19.

255 *Ibid*, s 20.

256 *Ibid*, ss 22–23.

257 *Ibid*, ss 21–22.

258 *Ibid*, s 23.

259 *Ibid*, ss 20–21.

260 Alberta, Environment and Protected Areas, *Standard for Completing Greenhouse Gas Compliance and Forecasting Reports*, version 3.3 (Edmonton: Climate Regulation and Carbon Markets Branch Policy Division, 2023), s 5.5, online: [perma.cc/K8HA-4KWH] [EPA, *Standard for Completing GHG Reporting*].

261 *TIER Regulation*, *supra* note 228, s 20.2(1); EPA, *TIER Amendments Webinar*, *supra* note 240.

262 EPA, *Standard for Completing GHG Reporting*, *supra* note 260, s 5.3.

263 *Ibid*, s 6.

Alberta-approved quantification protocol.[264] Once qualified, AEOs are registered and publicly listed on the Alberta Emission Offset Registry (AOR).[265]

a. Quantification Protocols

There are several quantification protocols in place for various types of renewable projects, including quantification protocols for certain types of CCUS projects. Quantification protocols are essential to qualifying a project for AEOs under the *TIER Regulation*. A quantification protocol establishes the methodology for quantifying the net emissions reductions associated with the specific project activity.[266]

The aim of quantification protocols is to ensure that AEOs are only claimed for reductions that otherwise would not have occurred or for those that go beyond business as usual, establishing the requisite "additionality."[267] Additionality is the basis on which activities are included in quantification protocols.[268] The established quantification protocols represent a standard approach for the calculation of emissions reduction that is associated with a given project.[269] Once a quantification protocol has been approved, all projects that are implemented pursuant to that protocol shall be considered additional until the protocol is reviewed or the credit duration elapses.[270]

The quantification protocol that enables a proponent to generate AEOs from a CCUS project is the *Quantification Protocol for CO_2 Capture and Permanent Storage in Deep Saline Aquifers* (the CO_2 Storage Protocol).[271] Quantification protocols do not exist for all possible CCUS projects and are notably missing for mature oil and gas fields and salt caverns.

An emitter can use AEOs generated from a qualified CCUS project to comply with its obligations under the *TIER Regulation* and any AEOs not used to reach emissions reduction compliance targets can be sold in the Alberta market.[272] AEOs generated in Alberta are currently not available to be used for compliance or sold in the federal market.[273] The federal OBPS permits recognized units that are generated from a recognized offset protocol that appear on the "List of Recognized Offset Programs and Protocols for the Federal OBPS."[274]

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264 Alberta, Environment and Protected Areas, *Standard for Greenhouse Gas Emission Offset Project Developers*, version 3.2 (Edmonton, Climate Implementation and Compliance Branch Policy Division, 2021), online: [perma.cc/MBC3-B5EG] [EPA, *Standard for Offset Developers*].

265 "Welcome to Alberta Carbon Registries," online: *CSA Group* [perma.cc/7LV6-JVRN] ["Alberta Carbon Registries"].

266 Bankes & Brennan, *supra* note 4 at 23.

267 *Ibid* at 60; Alberta Climate Change Office, *Technical Guidance for Offset Protocol Development and Revision*, version 2.0 (Edmonton: Alberta Climate Change Office Regulatory and Compliance Branch, 2018) at 7, online (pdf): [perma.cc/XE5Y-YZFX] [ACCO, *Guidance for Offset Protocol Development*].

268 Bankes & Brennan, *ibid*; ACCO, *Guidance for Offset Protocol Development*, *ibid* at 19.

269 Bankes & Brennan, *ibid* at 23.

270 *Ibid* at 60.

271 Alberta Environment and Parks, *Quantification Protocol for CO_2 Capture and Permanent Storage in Deep Saline Aquifers* (Edmonton: Air and Climate Change Policy Branch, 2015), online (pdf): [perma.cc/NM2C-NG2N] [AEP, *Quantification Protocol*].

272 Environment and Climate Change Canada, *Guidance on Using Eligible Alberta Emission Offsets as Recognized Units for Compensation under the Federal OBPS* (Gatineau: ECCC, 2020) at 4–7, online (pdf): [perma.cc/3MWQ-43UF] [ECCC, *Guidance on Using Eligible Alberta Emission Offsets*].

273 *Ibid* at 7.

274 Environment and Climate Change Canada, "List of Recognized Offset Programs and Protocols for the Federal OBPS" (2023), online: [perma.cc/P6XD-FBK5] [ECCC, "Recognized Offset Programs"].

The federal OBPS does not currently recognize Alberta's CO_2 Storage Protocol as a recognized offset protocol.[275] Therefore CCUS projects in Alberta are unable to generate AEOs that can be used or sold in the federal market.

b. Quantification Protocol for CO_2 Capture and Permanent Storage in Deep Saline Aquifers

The CO_2 Storage Protocol was published in June of 2015 and relates to projects that "[capture] CO_2 emissions and transfer[s] them to a permanent storage in deep saline aquifers[, which] results in a permanent reduction in CO_2 emissions."[276] There are three main components for a CCUS project to fall within the parameters of the CO_2 Storage Protocol:

- CO_2 capture infrastructure, which includes a process modification to a facility to capture [and compress] vented CO_2 emissions …;
- A CO_2 pipeline to transport CO_2 from the capture facility to the injection well(s); and
- Disposal of CO_2 through injection wells and into deep saline aquifers.[277]

The CO_2 Storage Protocol is intended to cover the "full carbon capture and storage chain from capture through compression, transport, injection and storage."[278] Under the CO_2 Storage Protocol, the offset credit generation period is set at 20 years, with the ability to apply for five-year extensions.[279] A longer length in the credit generation period acknowledges the expensive nature of the projects and that there is "no revenue stream from the activity other than the sale or use of the offset credits generated."[280]

"Baseline emissions are determined using a projection-based baseline [model] to quantify the emissions that would have otherwise been emitted [but for] the project."[281] The methodology used to quantify the emissions and projected baseline is the "metered quantity of CO_2 injected into the deep saline aquifer for the purposes of permanent storage," being the total quantity of CO_2 that has been measured directly upstream of the injection wellheads.[282] "[E]missions [that are] associated with [the] capture, compression, transport[ation] and injection are subtracted from the baseline emissions [in order] to determine the net [GHG] reduction [that is] achieved by the project."[283] The purpose of using projected methodology is to ensure "the baseline correctly accounts for the year to year variation in CO_2 that is captured and injected."[284]

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275 *Ibid*.
276 AEP, *Quantification Protocol*, *supra* note 271, s 1.0.
277 *Ibid*.
278 *Ibid*, s 1.1.
279 *Ibid*.
280 *Ibid*.
281 *Ibid*.
282 *Ibid*.
283 *Ibid*.
284 *Ibid*, s 2.0.

To qualify, project developers must demonstrate that the offset project meets the requirements of the offset system, the *TIER Regulation*, the quantification protocol, and other guidance documents.[285] Pursuant to the CO_2 Storage Protocol, the developer will need to

> provide sufficient evidence to demonstrate [the following]:
>
> 1. The project captures CO_2 directly from an industrial or non industrial facility;
>
> 2. The project is injecting into a deep saline aquifers capable of permanently storing CO_2 gases. Each injection site included in the project must have:
>
>   - [One or more] approved carbon sequestration [lease agreements] in accordance with the *Mines and Minerals Act* and Carbon Sequestration Tenure Regulation …; and
>
>   - An approval for [the] CO_2 Storage Scheme … under the [AER's] Directive 065, Unit 4, [Directive 051] and [section 39 of the] *Oil and Gas Conservation Act*.
>
> 3. The project must be in good standing with all operating permits and relevant regulations in Alberta;
>
> 4. The reductions achieved by the project are quantified based on actual measurements and monitoring as indicated in [the CO_2 Storage] Protocol; and
>
> 5. Metering of injected gas volumes to calculate injected CO_2 volumes [placed] as close to the injection point as is reasonable to address the potential for fugitive emissions at the injection site.[286]

The CO_2 Storage Protocol recognizes that "methane and nitrous oxide emissions may also be emitted as a result of combustion and upstream production emissions."[287] As a result, all such GHG emissions must be quantified in the calculation of net GHG reduction resulting from project.[288]

3. EMISSION PERFORMANCE CREDITS

EPCs are one of the ways in which regulated facilities under the *TIER Regulation* can meet their compliance options. EPCs are tracked and managed by the Alberta EPC Registry and are generated when a regulated facility reduces its GHG emissions below the reduction target specified in the *TIER Regulation*.[289] Under the *TIER Regulation*, one tonne of carbon dioxide equivalent (CO_2e) below the emitter's performance target is the equivalent of one EPC.[290] EPCs can be a major incentive for CCUS project proponents and emitters looking to capture major point source pure CO_2 emission streams. The capture will generally result in an over-reduction of facility emissions and EPCs can be used to fund the construction of the capture infrastructure, which accounts for the majority of the cost in a CCUS project.

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285 *Ibid*, s 1.2.
286 *Ibid* [footnotes omitted]. See also *MMA*, *supra* note 14; *CS Tenure Regulation*, *supra* note 100; AER, *Directive 065*, *supra* note 10; AER, *Directive 051*, *supra* note 193; *OGCA*, *supra* note 14.
287 AEP, *Quantification Protocol*, *ibid*, s 1.1.
288 *Ibid*.
289 "Alberta Carbon Registries," *supra* note 265.
290 *Ibid*.

EPCs eligible for trading and purchasing through the Alberta EPC Registry may only be used once and can only be used in the year subsequent to when they were created.[291] In order for facilities to generate EPCs, and before the EPCs can be used as a compliance option, the emitter must submit compliance reports and be issued an EPC on the Alberta EPC Registry.[292]

4. SEQUESTRATION CREDITS

Adding further support to Alberta's CCUS regime, the *Amendment Regulation* established Sequestration Credits and Recognition Tonnes in connection with CCUS projects in Alberta.[293] Sequestration Credits are stackable with credits generated under the *Clean Fuel Regulations* and must be used within the six-year period beginning in the year in which the net geological sequestration of the associated emission offset occurred.[294] Sequestration Credits can only be issued for converted AEOs that meet the following requirements:

(1) the emissions for net sequestration must meet the requirements for sequestration under the *TIER Regulation*;[295]

(2) the geological sequestration must have occurred in or after 2022;[296] and

(3) the sequestered CO_2e for the AEO must have been captured by a large emitter or at an opted-in facility.[297]

Sequestration Credits are subject to the *TIER Regulation*'s credit use limits and once an AEO has been converted to a Sequestration Credit, this conversion cannot be undone.[298] The creation of Sequestration Credits reinforces Alberta's commitment to incentivizing CCUS projects and technology by creating credits generated from, and in recognition of, permanently sequestered CO_2, rather than a recognition of emissions reduction. The addition of credits generated solely by the process of sequestering CO_2 which are stackable with credits generated under the *Clean Fuel Regulations* gives proponents of a CCUS project increased marketability to trade such Sequestration Credits on the mature market. However, as CCUS projects develop, the potential influx of credits has the potential to over-saturate the market. As proponents begin generating the newly available credits, it will be interesting to see how proponents determine which credits they will generate and whether such attributes will be converted into other attributes (that is, Recognition Tonnes).

5. RECOGNITION TONNES

Recognition Tonnes are the second additional Provincial Credit created under the *Amendment Regulation*. Sequestration Credits may be converted into Recognition Tonnes,

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291 *TIER Regulation*, *supra* note 228, s 13(6).
292 "About," online: *CSA Group* [perma.cc/S7BG-TLZP].
293 *Supra* note 247.
294 SOR/2022-140; *TIER Regulation*, *supra* note 228, s 13(5)(g).
295 *TIER Regulation*, *ibid*, s 20.1(2)(a).
296 *Ibid*, s 20.1(2)(b).
297 *Ibid*, s 20.1(2)(c).
298 EPA, *TIER Amendments Webinar*, *supra* note 240 at 13.

allowing emitters to reduce the total regulated emissions by deducting sequestered emissions.[299] A Recognition Tonne is created by further converting a Sequestration Credit and must comply with several rules when determining the total regulated emissions for the large emitter or opted-in facility, including:

(1) a Recognition Tonne may only be used for a large emitter or opted-in facility where the CO_2 sequestered for the associated emission offset was captured;[300]

(2) a Recognition Tonne may only be used once;[301] and

(3) a Recognition Tonne in recognition of a net geological sequestration that occurred in a year may only be used for that year.[302]

In order to be converted into a Recognition Tonne, the Sequestration Credit must meet the following requirements:

(1) the CO_2 that was geologically sequestered for the associated emission offset must have been captured at the large emitter or opted-in facility of the person who is applying to convert the Sequestration Credit;[303] and

(2) the geological sequestration must have occurred in 2023 or a subsequent year.[304]

Converted Recognition Tonnes cannot be converted back into a Sequestration Credit and one Recognition Tonne represents one CO_2e tonne.[305]

Unlike Sequestration Credits, Recognition Tonnes cannot be used by an emitter to meet their compliance obligations under the *TIER Regulation*. Rather, Recognition Tonnes are subtracted directly from the emitter's regulated emissions such that their target benchmark is reduced. Recognition Tonnes are ineligible to be banked for future use or to be traded on the mature market.[306]

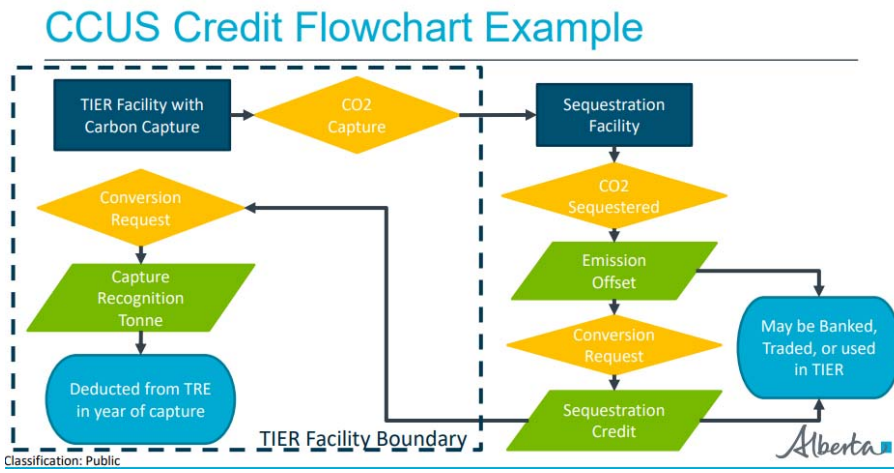
6. CONVERTING SEQUESTRATION CREDITS AND RECOGNITION TONNES

The ability to generate and use Sequestration Credits and Recognition Tonnes is a new option for emitters, which came into effect with the recent amendments to the *TIER Regulation*.[307] Some guidance related to the conversion process and use of Recognition Tonnes and Sequestration Credits has been included in the *Standard for Greenhouse Gas Emission Offset Developers* and *Standard for Completing Greenhouse Gas Compliance and*

299 *TIER Regulation*, *supra* note 228, s 20.2(1).
300 *Ibid*, s 13(3.1)(a).
301 *Ibid*, s 13(3.1)(b).
302 *Ibid*, s 13(1)(3.1)(c).
303 *Ibid*, s 20.2(2)(a).
304 *Ibid*, s 20.2(2)(b).
305 *Ibid*, ss 20.2(4)–(5).
306 EPA, *TIER Amendments Webinar*, *supra* note 240 at 13.
307 *Supra* note 228, ss 20.1– 20.2.

Forecasting Reports.[308] However, the reasoning and benefits for which an emitter may choose to use a Sequestration Credit instead of an AEO, or a Recognition Tonne instead of a Sequestration Credit, is not yet apparent.

Given the use of Sequestration Credits and Recognition Tonnes is a new option for emitters, the market involving such Provincial Credits will continue to establish and the various factors driving the use will become apparent. The path in which certain Provincial Credits may be generated and converted into others is not simple, nor is there an abundance of guidance on the process for conversion of the various Provincial Credits. The Government of Alberta has prepared the below chart summarizing the Provincial Credits that may be generated from CCUS projects:[309]



B. FEDERAL GHG SYSTEMS AND APPLICATION WITH CCUS PROJECTS IN ALBERTA

As of the date of this article, the federal *OBPS Regulations* are not in effect in Alberta, as the *TIER Regulation* currently meets the federal stringency standards, while the Fuel Charge is in effect within the province.[310] The purpose of the *OBPS Regulations* is to encourage project activities across Canada that reduce GHG emissions or remove them from the atmosphere by enabling the generation of emission offset credits.[311]

Notwithstanding that Alberta's Emission Offset Program is currently recognized by the *OBPS Regulations*, only certain activities are recognized and CCUS projects and their related activities are not recognized for the purposes of generating emission offsets for registration

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308 EPA, *Standard for Offset Developers*, *supra* note 264; EPA, *Standard for Completing GHG Reporting*, *supra* note 260.

309 EPA, *TIER Amendments Webinar*, *supra* note 240 at 15. In the flowchart, TRE refers to Total Regulated Emissions. Permission to reproduce obtained by authors from Alberta Environment and Protected Areas.

310 *OBPS Regulations*, *supra* note 231; ECCC, "Recognized Offset Programs," *supra* note 274.

311 ECCC, *Guidance on Using Eligible Alberta Emission Offsets*, *supra* note 272 at 1.

on the *OBPS Regulations* system.[312] AEOs generated by a CCUS project in Alberta under one of the applicable quantification protocols — unless converted into a Sequestration Credit or Recognition Tonne — are not currently eligible for use under the federal OBPS system.[313]

C. GENERATING ADDITIONAL FEDERAL CREDITS

1. FEDERAL *CLEAN FUEL REGULATIONS*

As part of the incentive to drive technology and innovation for clean fuels, technologies, and processes, the federal government introduced the *Clean Fuel Regulations.*[314] The *Clean Fuel Regulations* incorporate the requirements under the *Renewable Fuels Regulations*,[315] seek to decarbonize liquid transportation fuels used in Canada, and enable investment in the clean energy space as well as the adoption of technologies and processes that use clean energy.[316]

The *Clean Fuel Regulations* were adopted under the *Canadian Environmental Protection Act, 1999*[317] and require liquid fossil fuel primary suppliers to gradually reduce the carbon intensity of the gasoline and diesel produced and sold for use in Canada.[318]

The *Clean Fuel Regulations* establish a credit market and provide fuel suppliers with flexibility to meet the requirements in a way that is adaptive to suppliers' operations.[319] To meet reduction obligations and requirements under the *Clean Fuel Regulations*, producers and importers of gasoline and diesel used in Canada must create or buy credits.[320]

The *Clean Fuel Regulations* include compliance options that recognize actions that reduce a fossil fuel's carbon intensity through CO_2e emissions reduction projects at a point along the lifecycle of a liquid fossil fuel.[321] Credits under the *Clean Fuel Regulations* are governed by specific quantification method provided by ECCC.[322]

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312 *Supra* note 231.
313 *Clean Fuel Regulations*, *supra* note 294.
314 *Ibid*.
315 SOR/2010-189, ss 175, 176(2). This regulation will be repealed on 30 September 2024.
316 Environment and Climate Change Canada, "What Are the Clean Fuel Regulations?" (2022), online: [perma.cc/37A7-MBU9].
317 *CEPA*, *supra* note 82.
318 ECCC, "What Are the Clean Fuel Regulations?," *supra* note 316.
319 Environment and Climate Change Canada, "Compliance with the Clean Fuel Regulations" (2023), online: [perma.cc/9MXV-WG7Q].
320 *Ibid*.
321 Environment and Climate Change Canada, *Clean Fuel Regulations: Quantification Method Development Guidance Document*, version 1.0 (Gatineau: ECCC, July 2022) at iii, online (pdf): [perma.cc/VTZ7-DA9G] [ECCC, *Quantification Method Guidance Document*].
322 *Ibid*, s 1.0.

2. GENERATING CREDITS UNDER THE *CLEAN FUEL REGULATIONS*

In order to be eligible for credit creation under the *Clean Fuel Regulations*, a project must comply with all requirements for a given credit generation pathway.[323] A quantification method currently exists for carbon capture and storage and are quantified pursuant to the *Quantification Method for CO_2 Capture and Permanent Storage* (CO_2 Capture Quantification Method).[324]

The crediting period for credits generated under the *Clean Fuel Regulations* is ten years for all projects with the exception of CO_2 capture and permanent storage or enhanced oil recovery with CO_2 capture and permanent storage, in which case, such crediting period shall be 20 years, which may be extended for a one-time five-year extension, subject to eligibility criteria.[325]

a. Quantification Method for CO_2 Capture and Permanent Storage

In order to generate credits under the *Clean Fuel Regulations*, projects are required to meet four main components under the CO_2 Capture Quantification Method, and are subject to other additional eligibility criteria as outlined in the quantification method:

- Industrial processes or fuel combustion activities that generate CO_2;
- CO_2 capture and purification infrastructure, which can be included in a new-built facility or retrofitted to an existing facility;
- A CO_2 pipeline to transport CO_2 from the capture facility to the injection site(s); and
- Long-term geological storage at sites where CO_2 is injected for permanent storage.[326]

A CCUS project seeking to use the CO_2 Capture Quantification Method is ineligible if the project injects CO_2 for the purposes of enhanced oil recovery, and must meet the list of

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323 *Ibid*, s 3.0: in order …
to be eligible for credit creation, a project must:
- result in the reduction, sequestration or use of CO_2e emissions that are released at any point along the lifecycle of a fossil fuel in the liquid state at standard conditions… or result in the production of co-processed low-carbon-intensity fuel…;
- determine its reduction, sequestration or use of CO_2e emissions with a [quantification method] that is applicable to the project and provided by ECCC; and
- have the action specified in the [quantification method] that allows the project to begin to reduce, sequester or use CO_2e emissions [that] occur[ed] on or after July 1, 2017, unless the [quantification method] provides that the activity may be carried out before that date.

324 Environment and Climate Change Canada, *Clean Fuel Regulations: Quantification Method for CO_2 Capture and Permanent Storage*, version 1.0 (Gatineau: ECCC, July 2022), online (pdf): [perma.cc/3LAX-BW9E] [ECCC, *Quantification Method for CO_2 Capture*].

325 ECCC, *Quantification Method Guidance Document*, *supra* note 321, s 4.1.

326 ECCC, *Quantification Method for CO_2 Capture*, *supra* note 324, s 1.0.

requirements to be an eligible project outlined under section 3.0 of the CO_2 Capture Quantification Method.[327]

Under the CO_2 Capture Quantification Method, "[t]he owner or operator of a facility that injects the CO_2 into the geological formation is the default creator."[328] A different registered creator may be identified if there is an agreement between the parties, and such entity must register the project as the creator in accordance with section 21 of the *Clean Fuel Regulations*.[329] The crediting period for eligible credits under the CO_2 Capture Quantification Method is 20 years and projects may be eligible for a single five-year extension period.[330]

D. MARKETABILITY OF PROVINCIAL AND FEDERAL CREDITS

1. THE MARKET FOR CANADIAN OFFSETS

As previously noted, there are two types of markets for offset credits to be generated and traded, both federally and provincially.[331] Compliance markets are generally monitored and regulated by mandatory compliance schemes, either provincially or federally.[332] A voluntary market is that which exists outside of the mandatory scheme and permits emitters to purchase carbon offsets on a voluntary basis, which will not be used in the compliance market and can be used for furthering other initiatives.[333]

More opportunities are being developed for companies to invest and undertake renewable projects eligible for the creation of offset credits, as is evidenced by the newest creation of Sequestration Credits and Recognition Tonnes under the amendments to the *TIER Regulation*.[334] As both federal and provincial stringency requirements increase, and emitters have stricter obligations to meet emissions reductions targets, there will be an increasing demand for credits.[335] However, as more companies begin to undertake decarbonization projects with the aim of generating offset credits, there is a risk that too many companies will generate offset credits, flooding the markets and decreasing the price, thereby disincentivizing companies from pursuing and investing in renewable projects, such as CCUS. Alberta's *TIER Regulation* pricing offers some support to credit generators as it increases $15 every year from the current $65 per tonne, to a mandated maximum of $170 per tonne in 2030, as is the case in all jurisdictions across Canada.[336]

The 25 announced CCUS hubs in Alberta have been approved under the RFPPs and it is estimated that seven of the new projects have the potential to increase CCUS capacity in the province to approximately 56 million tonnes of CO_2 per year by 2030, with the remaining

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327 *Ibid*, s 3.0.
328 *Ibid*, s 4.2.
329 *Ibid*.
330 *Ibid*, s 4.1.
331 See Part IV, above.
332 Environment and Climate Change Canada, *The Essentials: Carbon Markets 101* at 2, online (pdf): [perma.cc/PDE9-BDKS] [ECCC, *Carbon Markets 101*].
333 *Ibid*.
334 See Parts IV.A.4–5, above, for further discussion.
335 ECCC, *Carbon Markets 101*, *supra* note 332 at 5.
336 Ministerial Order 62/2022, *supra* note 253; *GGPPA*, *supra* note 226, Schedule 4.

18 projects further increasing provincial carbon capacity.[337] If all the Alberta CCUS hubs go forward, there will be a large influx of AEOs that are available on the AOR. In addition, if CCUS projects can generate Recognition Tonnes or Sequestration Credits, as well as credits to satisfy obligations under the *Clean Fuel Regulations*, then an additional source of demand may be introduced.

2. STACKING OF OFFSET CREDITS

Credit stacking is one of the additional benefits offered by the various offset credit regulatory regimes and allows credits to be generated for use on different platforms under either the federal or provincial systems. Credit stacking occurs when multiple offsets are generated from the same emissions reduction project, or the same offsets are eligible for use under multiple regimes.[338] Credit stacking prohibits double counting or issuing more than one credit for the same environmental attribute.[339] Double counting refers to a situation where two parties claim the same reduction or sequestration of CO_2 and is mitigated through the carbon crediting systems themselves, for example through the use of quantification protocols and crediting registries.[340] Generally, there are three ways in which double counting can occur:

(1) Double issuance: occurs where more than one credit is issued for the same reduction of CO_2. This situation may arise where two different projects or activities claim the same reduction of CO_2.[341]

(2) Double use: occurs where more than one emitter utilizes the same offset credit, which is guarded against through the creation of registries and the serialization of offset credits that are tradeable in the crediting market.[342]

(3) Double claiming: arises where an offset credit is issued for the reduction or sequestration of CO_2 for a project or activity and another entity then uses the same reduced or sequestered CO_2 toward their own emissions reduction targets. In the context of CCUS projects, this becomes a more technical exercise as CCUS projects increasingly involve a network of transportation and storage infrastructure, which may be shared by several proponents.[343]

CCUS projects that are regulated under both *TIER Regulation* and the *Clean Fuel Regulations*, may be able to generate credits that are eligible for use under both regulations. Qualified CCUS projects may generate Sequestration Credits and Recognition Tonnes, which may be stacked with credits generated under the *Clean Fuel Regulation*, meaning the same

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337 Canada Energy Regulator, "Market Snapshot: New Projects in Alberta Could Add Significant Carbon Storage Capacity by 2030" (21 December 2022), online: [perma.cc/F2Y6-FDNG].

338 Environment and Climate Change Canada, "Carbon Pollution Pricing: Options for a Federal Greenhouse Gas Offset System, Chapter 20" (28 June 2019), online: [perma.cc/E9US-B345].

339 *Ibid*.

340 "Exclusive Claim to GHG Reductions" online: *Carbon Offset Guide* [perma.cc/VF2B-JB5P] ["Exclusive Claim"].

341 *Ibid*.

342 *Ibid*.

343 *Ibid*. See also "Global Status of CCS 2022" (2022), online (pdf): *Global CCS Institute* [perma.cc/7WQL-ZCTW].

project is eligible to generate credits under both regimes. Note, however, that projects that generate AEOs — which are not converted to Sequestration Credits — cannot also generate credits under the *Clean Fuel Regulations*.[344]

3. RISKS WITH OFFSET CREDITS AND THE CREDITING MARKET

Generating offset credits and the purchase of such credits in the market is not without risk. For offset generation, emitters are eligible to generate such credits through the use of quantification protocols.[345]

These protocols exist to quantify and recognize GHG reductions that otherwise would not have occurred — or projects that go beyond business as usual — to establish the requisite "additionality."[346] As CCUS projects become more standard or business as usual, there is the risk that the quantification protocol will be withdrawn and emitters will no longer be able to use the quantification protocol to generate offset credits.[347]

For those purchasing offset credits on the market, there is also the small risk that such credits are invalid because such credits were based on inaccurate information, or the CO_2 on which the offset credit was generated was later released due to a loss of containment.[348] This is a liability transportation sequestration providers will need to manage in connection with their services agreements. Depending on the system, the proponent or the owner of the credit will be required to replace the credit or the credit may be replaced from a pool of credits.[349] There is no guarantee that all offset credits generated and bought on the market are valid and there is some risk to the buyer purchasing such credits.

4. LEGISLATIVE GAPS

As emissions reduction and storage technology continues to develop and become more prevalent, so too will the regulatory schemes governing such projects. Notwithstanding that both the federal and provincial scheme in Alberta are well developed, there are a number of apparent gaps in the operation of a given project. One of the primary areas in which we will likely see development over the coming years is in the context of the network surrounding a CCUS project and joint ownership.

One of the greatest challenges to further developing CCUS technology and projects is the cost associated with such projects. The ability to generate credits is one of the driving factors

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344 EPA, *TIER Amendments Webinar*, *supra* note 240 at 14.

345 ECCC, *Carbon Markets 101*, *supra* note 332 at 5.

346 Bankes & Brennan, *supra* note 4 at 60; ACCO, *Guidance for Offset Protocol Development*, *supra* note 267, s 3.5.1.

347 See e.g. Climate Change Secretariat, *Notice to Termination of the Quantification Protocol for Acid Gas Injection* (Memorandum), by Bob Savage (Edmonton: Alberta Environment and Sustainable Resource Development, 2013), online: [perma.cc/K6K3-CCJB] (the Quantification Protocol for Acid Gas Injection was withdrawn from the Alberta Offset System as a stand-along GHG protocol because it no longer met the "additionality" requirements on the Offset System and became common practice. Upon the withdrawal, projects that were approved on the AOR were eligible to remain for the remainder of the crediting period but were not eligible to receive an extension).

348 ECCC, *Carbon Markets 101*, *supra* note 332 at 5.

349 *Ibid*.

legitimizing the costs associated with the development of such projects and technologies. However, not every party to a given project is able to generate credits. The existing programs recognize and enable emitters who have generated the captured CO_2 to generate credits. However, this does not enable the proponents or operators of the hubs who actually sequester the CO_2 to generate credits, due to the principles against double counting.[350] Given the costs associated with CCUS projects — including the required infrastructure and technology — without proper revenue streams that provide a fair return on investment, there is the risk that such projects become too costly to make them viable and long-term options.

V. POLICY AND LEGISLATIVE GAPS

As is typically the case when policies are announced, or new or amended legislation is enacted, there remain a number of policy and legislative gaps that will need to be addressed as CCUS projects move forward into the development phase in Alberta. Below, we have highlighted a few considerations from a policy and legislative perspective where we believe issues may arise and more clarity will be sought by interested parties.

A. OVERSIGHT BY GOVERNMENT OF ALBERTA

Despite the Province's comprehensive CCUS regulatory regime, the legislative framework of the *MMA* and *CS Tenure Regulation* provides the Minister with significant discretion in overseeing CCUS development in the province.[351] Granting an administrative decision-maker broad discretionary powers is not unusual in the context of regulatory law.[352] Discretion creates a regulatory framework with a degree of flexibility, which may be viewed as particularly important in the context of CCUS as it is an evolving area of scientific study and technological innovation. However, developers of CCUS projects in Alberta must be cognizant of the Minister's broad discretion and the resulting lack of certainty, despite the regulatory regime's detailed legislative stipulations.

The starkest example of the Minister's discretion in granting CCUS development rights in the province is provided by sections 9(a)(iii) and 9(b) of the *MMA*.[353] These sections provide:

> **9** *Notwithstanding anything in this Act or any regulation or agreement, the Minister, on behalf of the Crown in right of Alberta, may*
>
> …
>
> (a) enter into a contract with *any person* or the government of Canada or of a province or territory respecting
>
> …
>
> (iii) the storage or sequestration of substances in subsurface reservoirs;

350 "Exclusive Claim," *supra* note 340.
351 *MMA*, *supra* note 14; *CS Tenure Regulation*, *supra* note 100.
352 *Canada (Minister of Citizenship and Immigration) v Vavilov*, 2019 SCC 65 at para 108.
353 *MMA*, *supra* note 14, ss 9(a)(iii), 9(b).

…

(b) issue an *agreement*

(i) *containing* a provision that is [in] variation of a provision of this Act or the regulations that would otherwise apply to the agreement, or

(ii) making inapplicable a provision of this Act or the regulations that would otherwise apply to the agreement.[354]

Essentially, despite the clear legislative provisions on how a CCUS evaluation permit or sequestration lease agreement may be granted and the contents thereof in the *MMA* and *CS Tenure Regulation*, the Minister maintains the overarching discretion to vary from this procedure.

Reflecting this discretion, the RFPP process expressly stated that "[t]he Province reserves the right to amend, suspend, postpone, or cancel the outlined process … at its sole discretion."[355] The RFPP provided that any final CCUS lease agreements "would be issued under Section 9 of the *Mines and Minerals Act* and reflect existing provisions within Part 9."[356] Furthermore, the Province also reinforced that it had the right to amend any CCUS lease "[a]greement or [l]ocation in the [a]greement as required or determined by the Province."[357]

Despite the permissive language of Alberta's CCUS legislation, an administrative decision-maker does not have unlimited discretion. "[T]hough discretionary decisions will generally be given considerable [deference], that discretion must be exercised in accordance with the boundaries imposed in the statute, the principles of the rule of law, the principles of administrative law, the fundamental values of Canadian society, and the principles of the *Charter*."[358] However, the discretion afforded to the Minister introduces uncertainty, which proponents will contend with when proposing, financing, developing, and operating CCUS projects.

B. REGULATORY OVERLAP BETWEEN ALBERTA ENERGY AND THE AER

In addition to the broad ministerial discretion, the existing CCUS regulatory framework does not always provide a clear delineation of responsibilities as between the Minister and

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354 *Ibid* [emphasis added] (an "agreement" is defined in the *MMA* at s 1(1)(a) as "an instrument issued pursuant to this Act or the former Act that grants rights in respect of a mineral, subsurface reservoir, or geothermal resource, but does not include a notification, a transfer referred to in section 12, a unit agreement or a contract under section 9(a)"; both an evaluation permit and a carbon sequestration lease fall under the definition of "agreement").

355 Alberta, *RFPP Guidelines*, *supra* note 119, s 2.

356 *Ibid*, Appendix A.

357 *Ibid*.

358 *Baker v Canada (Minister of Citizenship and Immigration)*, [1999] 2 SCR 817 at para 56; *Canadian Charter of Rights and Freedoms*, Part I of the *Constitution Act, 1982*, being Schedule B to the *Canada Act 1982* (UK), 1982, c 11 [*Charter*].

Alberta Energy on the one hand and the AER on the other.[359] One example already discussed in Part IV is the possible duplication of review of MMV and closure plans for sequestration lease agreements and licensing applications.[360] Clarification of roles between the regulator and the government, particularly in relation to the issuance of closure certificates, was one of the recommendations of the Government of Alberta's *Regulatory Framework Assessment* in 2013 and yet it appears to remain an ongoing issue.[361] Previous commentators have also commented on the unclear allocation of responsibility between the Minister and regulator, and the lack of clarity for the departure from the typical division of powers between Alberta Energy (the policy setting body) and AER (the body responsible for technical regulation).[362] As further discussed in Part VII, below, Alberta Energy appears to be taking on a more expansive role in relation to the sequestration lease agreements for the proposed hubs, and claiming responsibility for matters that, outside the CCUS context, would be determined either by the free market or the existing regulators.[363]

C. INDUSTRY COOPERATION AND TRANSPARENCY OVER MONITORING, MEASUREMENT, AND VERIFICATION PRINCIPLES

One of the key principles underlying the CCUS regulatory framework in Alberta are the MMV requirements for projects and associated activities.[364] Proponents of CCUS are required to create an MMV plan in accordance with the guidelines established by the provincial government.[365] The MMV plan will set out the activities that a proponent is responsible for in order to identify risks and enable the completion of regulatory requirements and project approvals.[366] The MMV plan "will expire on the earlier of the [third] anniversary of its approval date or the date that the lease is renewed."[367] A lessee must submit a new MMV plan for approval no fewer than 90 days before its expiry date.[368]

In addition to the MMV Plan, CCUS proponents in Alberta must also submit a Risk Management Plan (RMP).[369] The RMP will specifically address the risks associated with CO_2 storage at a project site, expressed in terms of the combination of severity of the consequences of a hazardous event and the associated likelihood of its occurrence.[370] The

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359 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 52.
360 See Part IV, above.
361 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 52.
362 Nigel Bankes, "Alberta Makes Significant Progress in Establishing a Legal and Regulatory Regime to Accommodate Carbon Capture and Storage (CCS) Projects" (3 November 2010), online (blog): *ABlawg* [perma.cc/59YT-7LT4]. See also Massicotte, Ross & Thompson, *supra* note 101 at 325.
363 See Part VII, below.
364 Alberta Energy, *Monitoring, Measurement, and Verification Principles and Objectives for CO_2 Sequestration Projects*, version 2 (AE, 5 April 2023) at 4, online (pdf): [perma.cc/9Y2R-YTDW] [Alberta Energy, *MMV Guidelines*]. At the time of writing, the *MMV Guidelines*, as issued by Alberta Energy, provided the MMV requirements for CCUS Projects. Following the date this article was finalized, the Government of Alberta delegated to the AER the oversight of monitoring, measurement, and verification plans, closure plans, and closure certificates of CCUS projects in the province: Alberta Energy Regulator, Bulletin 2023-29, "New Edition of Directive 065" (27 July 2023), online: [perma.cc/K7QW-EXG7]. The discussion in this article as it relates to MMV requirements refers to the *MMV Guidelines* and readers are encouraged to refer to *Directive 065*.
365 *Ibid*.
366 *Ibid*.
367 *Ibid* at 8. See also *CS Tenure Regulation*, *supra* note 100, s 16(1).
368 Alberta Energy, *MMV Guidelines*, *ibid*; *CS Tenure Regulation*, *ibid*, 16(2).
369 Alberta Energy, *MMV Guidelines*, *ibid* at 4.
370 *Ibid.*

project site is suitable for CCUS if the RMP demonstrates that the "storage of the CO_2 stream at the candidate site does not pose unacceptable risks to other resources, … the environment and human health and safety, [or] to project developers, owners, operators and the Crown (post closure)."[371] Specifically, the proposed site must demonstrate suitability for CO_2 sequestration using the risk assessment process conducted using the CSA 2741-12 (Geologic Storage of Carbon Dioxide) requirements.[372]

Going forward, MMV activities will be necessary to ensure the safe and reliable operation of CCUS projects and associated activities. Verification of the data associated with an MMV plan ensures sequestration projects are operating as permitted and predicted, and compares the measured and predicted performance.[373] As CCUS projects and related activities continue to progress and increase in number in the province, one of the main areas which MMV will likely continue to survey is the potential for long term CO_2 injection and reservoir pressurization, including and up to induce seismic activity.[374] Throughout operations, a CCUS project must collect data that sufficiently provides:

(1) "suitable evidence of conformance of CO_2 stream and affected fluids within the storage complex";[375]

(2) "assurance of geological containment of CO_2 stream and affected fluids within the storage complex," including that the amount sequestered to support a permanent reduction of greenhouse gases as described in the CO_2 Storage Protocol;[376]

(3) "suitable evidence of no significantly adverse [effect] to other pore space users within hydraulically connected saline formations";[377]

(4) "suitable evidence that there are no significant adverse effects of CO_2 injection on health, the environment or other resources";[378] and

(5) "[verification and updates of] models and simulations annually … to continually inform capacity estimates and conformance verification."[379]

There is still a lot to be understood about the effects that injecting CO_2 subsurface can have on the environment, including but not limited to: (1) plume dynamics; (2) pressure waves; and (3) induced seismicity. MMV obligations are a necessary piece of the CCUS regulatory scheme, ensuring continued monitoring, mitigation of potential risks, developments and advancements to technology, as well as continued education and development of the regulatory and legislative landscape. In addition to necessary government and regulatory oversight, we expect there will also be a need for proponents to share data and

371 *Ibid*.
372 *Ibid* at 6; "CSA 2741-12: Geological Storage of Carbon Dioxide" (1 October 2012), online: *GlobalSpec* [perma.cc/Q56K-AGZT].
373 Alberta Energy, *MMV Guidelines*, *supra* note 364 at 4.
374 *Ibid* at 5.
375 *Ibid* at 8.
376 *Ibid*.
377 *Ibid*.
378 *Ibid*.
379 *Ibid*.

information underlying MMV reporting to formulate industry coalitions to address concerns regarding subsurface interactions. This exchange of information could be facilitated through the regulator to ensure information is shared in a way that respects competitively sensitive information, while creating a space for open exchange.

1. PLUME DYNAMICS

One of the unknowns related to CCUS projects and related activities is the migration of CO_2 plumes following injection. As was noted in the Government of Alberta's 2013 *Regulatory Framework Assessment*, plume migration was, and continues to be, an area that requires continued monitoring to ensure the CO_2 plume has not introduced potential leakage that was not anticipated.[380] It was noted that because many of the trapping methods used for CCUS operate over a long time scale period, complete cessation of the movement of a CO_2 plume is unlikely.[381]

Uncertainties may exist in relation to the injected CO_2 plume into neighbouring pore space, or freshwater aquifers causing potential leakage or contamination. However, there are well-documented technological mitigations such as 4-D modeling and mapping of geologic subsurface layers that act as seals to properly contain injected CO_2 such that conformance of plume migration to modeled data will be well-studied over time. Leaked CO_2 that was previously accounted for in certain credits may invalidate the use of such credits by the owner thereof.

2. SEISMIC ACTIVITY AND PRESSURE WAVES

Injection of dense phase CO_2 will inevitably generate a pressure wave that far exceeds the area of the CO_2 plume. CCUS projects located adjacent to each other could create pressure waves or pressure buildups which may interact directly with those of a neighbouring project, or may reactivate pre-existing faults, causing seismicity.[382] In order to ensure any such pressure waves do not interfere with neighbouring activities, it will be essential for proponents to share information regarding ongoing activities. Where pressure waves overlap, this could, in the future, have the potential for decreases in injectivity or an increase in pressure, which could raise CO_2 or brine to levels that impact groundwater, or reactivate pre-existing faults. It is noted that there is currently no prohibition on pressure waves exceeding the sequestration lease. In the event that pressure waves do overlap, this will favour first movers in the CCUS industry, as later proponents will have to increase injection pressure to accomplish the same levels of storage.

A report issued by Stanford University outlines that a 5.6 magnitude earthquake in the Peace River region in Alberta was triggered by oil sands water injection.[383] The report went on to consider whether long-term sequestration operations have the potential to induce

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380 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 100.

381 *Ibid* at C-5.

382 Rick Chalaturnyk, "Session 4: Regulations, Requirements and Insights" (Alberta Carbon Capture Utilization & Storage Workshop: From Policy & Technology to Deployment, Government of Alberta & Global CCS Institute, 8 March 2023).

383 Ryan Schultz et al, "Disposal from In Situ Bitumen Recovery Induced the M_L 5.6 Peace River Earthquake" (2023) 50:6 Geophysical Research Letters 1, s 4.4.

similar seismic events.[384] It was suggested that going forward, to ensure safe injection and long-term storage of CO_2, there will be a need to understand fault reactivation potential, and high sensitivity monitoring for seismicity throughout the duration of a CCUS project.[385]

As part of the site planning process for CO_2 injection wells, proponents conduct extensive analysis to map the subsurface region and identify any structures present. Required MMV plans will monitor for seismic events using a micro-seismic array, which continuously monitors for seismic activity.[386] The equipment is sensitive enough to detect seismic events that are far smaller than events that could be felt at the surface.[387] Publicly available data from the *Quest Project* shows that its micro-seismic array has detected small seismic events in the subsurface layers below the storage complex.[388] The events detected to date are not large enough to be felt at the surface and pose no risk to containment. This information is being shared with the Government of Alberta and is publicly available to other hub operators seeking to develop MMV plans for future CCUS hubs.[389] Pre-existing fault identification, MMV obligations, reporting, and the sharing of such data among industry participants going forward will be instrumental in further developing the technologies available for CCUS projects, as well as refining the regulatory scheme in the province. Through the sharing of MMV information among industry participants, regulators, and proponents will better understand: (1) the impact of pressure fronts on adjacent projects and how multiple injection sites may be managed effectively; (2) the possibility of seismicity; and (3) the development of safe and sustainable injection practices, all while creating monitoring, mitigation, and risk-based management strategies to address such questions.[390]

VI. OPTIONS FOR REGULATING OPEN ACCESS CCUS HUBS AND PIPELINES

A. INTRODUCTION

As discussed, Alberta is proceeding with a hub model to grant carbon sequestration lease agreements as opposed to taking a centralized infrastructure planning approach or granting tenure to individual emitters wishing to store only their own CO_2.[391] In its second RFPP process for carbon sequestration hubs in 2022, the Government of Alberta indicated that sequestration lease agreements would include requirements around open access to hubs for third party emitters and rates to provide the project proponent with a "just and reasonable cost recovery."[392] While it did not set out specific requirements for "open access" and "just

384 *Ibid*.
385 *Ibid*.
386 AER, *Directive 065*, *supra* note 10 at 3.
387 Quest CCS Facility: Microseismic Observations GeoConvention Memorandum by Stephen Harvey, Simone O'Brien, Anne Halladay (20–23 September 2020), Shell.
388 *Quest Project*, *supra* note 180.
389 *Ibid*.
390 Schultz et al, *supra* note 383, s 4.4.
391 Alberta, *CCUS Growing Demand*, *supra* note 114.
392 Alberta, *RFPP Guidelines*, *supra* note 119 at 3, 12.

and reasonable rates," the Government of Alberta did set out the following two objectives for this proposed economic regulation:

- Mitigating market power – [p]reventing agreement holder[s] from controlling access [and] exerting unreasonable conditions as a result of market position.

- Public good – achieving efficient development of [CCUS] infrastructure to reduce costs, support [CCUS] development, reduce the environmental impact of the pipeline system, minimize safety risks and support development of EOR markets.[393]

Open access to CCUS infrastructure has been of concern in other jurisdictions, including the European Union which has incorporated requirements for third party access to transportation and storage sites in its *Directive on the Geological Storage of Carbon Dioxide*.[394] In addition, the International Energy Agency (IEA) has identified access to shared transport and storage infrastructure as a key regulatory issue in CCUS hub development.[395]

Some have suggested that at least some form of economic regulation is needed for the development of CCUS infrastructure in order to allow for centralized infrastructure planning, economies of scale, and to address potential market power problems as the CCUS industry develops.[396] Options for economic regulation may range from treating CCUS infrastructure as a regulated utility, to requiring an open season on new transportation and storage projects to solicit interest and determine necessary capacity before construction, to a mixed model with commercial agency and recourse for parties where a commercial agreement cannot be arrived at, such as with Alberta's common carrier and processor regimes, discussed below.[397] The Government of Alberta has already awarded 25 CCUS hubs pursuant to the RFPP and has not taken any steps to implement utility style regulation, nor has an open season for access been mandated.[398] Hub project proponents have entered into the RFPP process as commercial entities, so implementing utility style regulation at this stage would seem to be a disincentive to proponents to move ahead with their projects.[399] However, the above objectives suggest that the Government of Alberta is considering economic regulation in some form in order to ensure open access and fair rates for hubs, though perhaps not in the strictest sense as with a regulated utility.

In this section we look at the potential approaches to the regulation of CCUS infrastructure to ensure "open access" and "just and reasonable rates" as may be included in the

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393 *Ibid* at 12–13.

394 EC, *Commission Directive 2009/31/EC of the European Parliament and of the Council of 23 April 2009 on the Geological Storage of Carbon Dioxide and Amending Council Directive 85/337/EEC, European Parliament and Council Directives 2000/60/EC, 2001/80/EC, 2004/35/EC, 2006/12/EC, 2008/1/EC and Regulation (EC) No 1013/2006*, [2009] OJ, L 140/114, art 21 [*Directive on the Geological Storage of Carbon*].

395 "CCUS Legal and Regulatory Handbook" (July 2022) at 16, 18, online (pdf): *International Energy Agency* [perma.cc/SFS9-VUGY] ["CCUS Handbook"].

396 Bankes & Nilson, *supra* note 91 at 251; See also "CCUS Handbook," *ibid* at 84.

397 Bankes & Nilson, *ibid* at 237–38, 246–48, 250. See Part VI.C, below, for discussion about the common carrier model.

398 Alberta, "Hub Development Process," *supra* note 117. We note that an open season prior to building CO_2 transportation infrastructure was one of the recommendations of the Alberta Energy, *Regulatory Framework Assessment* (*supra* note 3 at 53), though this has not been implemented by the Government of Alberta at this time.

399 Bankes & Nilson, *supra* note 91 at 247–48.

sequestration lease agreement as well as alternatives, including a commercial and market-based approach with no economic regulation, and a common carrier approach.

B. APPROACHES TO THIRD PARTY ACCESS IN SEQUESTRATION LEASE AGREEMENTS

The final form of the sequestration lease agreements to which hub proponents will be expected to agree remains under development at the time of writing. The sequestration lease agreements are expected to include provisions ensuring that third party emitters have open access to carbon sequestration services and pore space at fair service rates.[400]

It is unknown how disputes between hub proponents and third party emitters will be resolved and whether this will be addressed through regulation, existing regulatory avenues (for example, through the AER[401]), or as a new process set out within the terms of the sequestration lease agreements themselves. How the Government of Alberta addresses dispute resolution raises several procedural and substantive questions about the regulation of open access to CO_2 transportation and sequestration services. One key question will be to identify the entity that will adjudicate such disputes, including whether such decisions will fall to the AER or the Minister.

1. IS MINISTERIAL DISCRETION AN APPROPRIATE DECISION-MAKING FORUM TO ADJUDICATE "OPEN ACCESS" AND "FAIR AND REASONABLE RATES"?

If the Province of Alberta incorporates the Minister into a dispute resolution or the decision making process, it will be a departure from other similar regulatory regimes with respect to how access and rates are determined.[402] As discussed in Part V, there is some lack of clarity of the responsibilities allocated between the Minister and the AER under the current regulatory regime.[403] There is a similar lack of clarity here in relation to the Minister's potential powers and responsibilities under the proposed sequestration lease agreements. This lack of clarity creates significant uncertainty for hub proponents as commercial entities faced with significant investment decisions. Having fundamental terms and conditions governing sequestration hubs subject to political decision making could pose an unreasonable investment risk and create a barrier to the development of this industry in Alberta.

2. HOW WILL "OPEN ACCESS" AND "FAIR AND REASONABLE RATES" BE DETERMINED?

CCUS proponents are waiting to understand other specific questions, such as how open access will be determined and hub capacity be allocated, given the finite capacity for both

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400 Alberta, *RFPP Guidelines*, *supra* note 119 at 3, 12.

401 "Alternative Dispute Resolution," online: *Alberta Energy Regulator* [perma.cc/GL6S-2XVB].

402 For example, pricing for natural gas utilities under the *Gas Utilities Act*, RSA 2000, c G-5 or common carrier or processor matters under sections 48 and 53, respectively, of the *OGCA* (supra note 14, ss 48, 53). See also Bankes & Nilson, *supra* note 91 at 243–247.

403 See Part V.B, above.

sequestration pore space and for transportation to a hub. Will the principled requirements of open access under sequestration lease or transportation and sequestration service agreements enable project proponents to provide priority capacity to project owners, over third party emitters? What constitutes a "just and reasonable cost recovery," and what criteria will be referred to for this determination? We note that proponents in the RFPP process were required to include their commercial strategy or business plan for the proposed hub, including approaches to accepting volumes of CO_2, soliciting clients, and setting service rates and volumes already secured through an anchoring project or third party agreements.[404] Depending on the final form of the sequestration lease agreement, the answers to the above questions may require parties to amend these commercial arrangements that are already in motion.[405] Further, we anticipate hub proponents will require further clarity on these and other questions before entering into the sequestration lease agreements in their final form.

3. MARKET-BASED APPROACH

The use of ministerial discretion and a potential dispute resolution process creates uncertainty for project proponents, who are expending significant capital and taking on a large amount of long term commercial and operational risk in developing these projects. Questions of this nature in Alberta have long been resolved by the Alberta Utilities Commission (AUC) and AER in rate regulated industries where they balance long-term investment certainty for project proponents and reasonable rates for customers.

However, incorporating aspects of a regulated utility model in CCUS would mean a reviewable and regulated return on capital and investments, which could fundamentally change the calculus for project proponents.[406] Proponents may have entered into the RFPP process expecting market-based revenues and a market-oriented approach to open access and pricing as being most consistent with an industry where 25 hubs have been selected, inherently mitigating the risk of market influence.[407] Most CCUS project proponents would rather the free market be allowed to function in commercial rate-making decisions, as has been the case in gas processing.[408] Alternatively, as is discussed below, a common carrier approach administered by the AER according to its rules of practice instead of the Minister of Energy in accordance with discretionary power, may be appropriate in order to ensure predictable results of disputes related to open access and reasonable rates.[409]

In 2011, the Government of Alberta kicked off a multi-stakeholder Regulatory Framework Assessment process to review and make recommendations in respect of existing and future regulations related to CCUS in Alberta.[410] One of the principles espoused by the Regulatory Framework Assessment working group in relation to open access was that "[m]arket considerations should be the primary driver behind access to CO_2 pipelines. In this regard,

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404 Alberta, *RFPP Guidelines*, *supra* note 119 at 6.

405 *Ibid* at 6, 8.

406 For example, under section 37 of the *Gas Utilities Act*, RSA 2000, c G-5, the Alberta Utilities Commission determines a rate base for the utilities and then fixes a fair rate of return. See also Bankes & Nilson, *supra* note 91 at 247.

407 Alberta, "Hub Development Process," *supra* note 117.

408 Bankes & Nilson, *supra* note 91 at 247.

409 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 41, 73. See also Bankes & Nilson, *ibid*.

410 Alberta Energy, *Regulatory Framework Assessment*, *ibid* at 7.

pipeline operators and third parties should be expected to explore all reasonable avenues of private negotiation before applying to the regulator for access."[411]

Prioritizing market considerations would allow hub proponents to first allocate capacity for their partners and equity participants who have invested in or backstopped the development of the hub before contracting with third party emitters for any excess capacity. Under a commercial approach, capacity allocation procedures could also be negotiated between the parties within each hub's negotiated transportation and storage agreements. Given the expectation that numerous hubs will eventually be developed and operational, if a third party cannot come to reasonable terms for sequestration services at one hub, they may negotiate with another.

In relation to rate-setting, as unregulated commercial facilities, proponents may suggest that pricing for access should reflect market principles and that regulation of rates may be inappropriate or unnecessary.[412] Further, each hub project carries with it unique considerations which may affect pricing in the market, such as the proponent's technical expertise and creditworthiness, as well as geographical considerations related to the hub and the interested third party. Third party emitters may also have unique service needs which puts them in the best position to survey the market and determine which hub(s) and rate(s) are most appropriate for their service needs.

This approach may be limited, however, by geographical area and the number of hubs with available capacity at a reasonable distance from the third party emitter.

C. COMMON CARRIER OR COMMON SEQUESTRATION MODEL

Recognizing that there may be instances where parties cannot come to a reasonable commercial agreement and that some geographical areas may not be served by as many hubs as others, developing an approach similar to the common carrier and common processor regimes already in place for oil and gas pipelines and processing facilities may be a suitable option to address the need for third party access to sequestration services and CCUS infrastructure. Common carrier and common processor declarations help to ensure that the owners of oil and gas rights can access pipeline transportation and processing infrastructure in order to access market benefits from the resources that they own and avoid issues of drainage.[413]

While CCUS infrastructure does not currently fit in to the common carrier regime, this could be accomplished by an amendment to the *OGCA*.[414] CCUS infrastructure may include a pipeline gathering system connecting emitters to a hub — analogous to a pipeline under the common carrier designation — while a sequestration hub may be analogous to a processing

411 *Ibid* at 41.
412 Bankes & Nilson, *supra* note 91 at 247–48.
413 Nickie Nikolaou & Allan E Ingelson, *Canada Energy Law Service* (Toronto: Carswell, 2021) (loose-leaf revision), ch 30 at 3251. In Alberta, common carrier and common processor matters are governed by sections 48 and 53, respectively, of the *OGCA* (*supra* note 14, ss 48, 53).
414 Bankes & Nilson, *supra* note 91 at 245.

facility as it provides the service of sequestering a party's carbon. Unlike a common processor, however, a designation for common sequestration may need to give consideration to how a hub proponent prioritizes their sequestration capacity and also consider the commercial arrangements hub proponents may already have with their partners and equity participants for sequestration in order to finance and develop the project. Further, unlike a gas processor, a sequestration hub has a finite ultimate storage capacity so the addition of unexpected third party volumes may be shortening the operating life of the CCUS project that the project proponents have invested in to decarbonize their own emissions, unless they can acquire additional pore space. The Regulatory Framework Assessment working group also included recommendations that the common carrier regime be amended to apply to CO_2 pipelines and that a mechanism be created to provide for third party access to existing sequestration services.[415]

A potential benefit of adopting a common carrier or common sequestration regime is that the Government of Alberta, project proponents, and third party emitters could draw on the existing expertise of both the AER and the AUC for access and rate-setting matters. The AER, in its capacity as the Regulator under the *OGCA*, already has experience in dealing with similar matters of access in the oil and gas space.[416] While not directly analogous, there are a number of similarities between the considerations that the AER will draw on when making a common carrier or common processor designation and concerns of open access to carbon sequestration services or to sequestration pore space.[417]

While the common carrier and common processor regimes are based upon the underlying principles of the *OGCA* and are often concerned with preventing sterilization of resources,

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415 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 41, 73.

416 *OGCA*, *supra* note 14, s 1(1)(vv.1).

417 The criteria that the AER will consider when evaluating a common carrier or processor order application are set out in AER, *Directive 065* (*supra* note 10, ss 1.3.4, 1.4.4). The AER will consider (*ibid*, s 1.3.4):

> whether the applicant has demonstrated that:
> - producible reserves are available for transportation through an existing pipeline,
> - there is a reasonable expectation of a market for the substance that is proposed to be transported by the common carrier operation,
> - the applicant could not make reasonable arrangements to use the existing pipeline, [the designation of a delivery point, the proportion of production to be delivered to the pipeline, and/or the setting of the transportation fee to be paid], [and]
> - the proposed common carrier operation is the only economically feasible way, the most practical way to transport the substance in question, or clearly superior environmentally"

The criteria that the AER will consider when evaluating a common processor application are (*ibid*, s 1.4.4):

> - producible reserves are available for processing and processing facilities are needed,
> - reasonable arrangements for use of processing capacity in the subject processing plant could not be agreed upon by the parties,
> - the proposed common processor operation is either the only economically feasible or most practical way to process the gas in question or is clearly superior environmentally, and
> - when an application is being made under sections 53(5)(a) or 53(5)(b) of the *OGCA* for the allocation of production or a direction of the total volume of gas from the pool to be processed at the plant the applicant could not make reasonable arrangements on these matters.

See also *Home Oil Company Limited and Scurry-Rainbow Oil Limited: Application for a Hamburg Area, Common Processor, Rateable Take, Special Two-Section Gas Drilling Spacing Unit, Sweet Natural Gas Pipeline, Fuel Gas Pipeline* (26 June 1991), Decision 91-8, *Alberta Energy Resources Conservation Board*, s 7.1.

the regime could be adapted to serve the Province's current hub model approach to awarding sequestration pore space. Since Alberta Energy is responsible for awarding sequestration pore space, and has developed the hub model, including the selection of 25 proposed projects, a third party emitter who has invested the capital in CO_2 capture infrastructure (which is substantial[418]) would have only a finite number of hubs with which to negotiate for transport and storage of CO_2, if it was unable to develop or purchase an interest in its own hub. However, emitters have several acceptable avenues for compliance with provincial or federal emissions reductions requirements, including electrification and the purchase of credits in the open market.[419] Similar to existing common carrier and common processer regimes, the first step would be commercial negotiation before seeking recourse to a common carrier or common sequestration designation.

In the common carrier or common sequestration context, a third party emitter may instead have to demonstrate that: (1) they have CO_2 available for transportation or sequestration; (2) they were unable to negotiate reasonable access to the applicable CCUS infrastructure on commercial terms; and (3) and the proposed CO_2 pipeline or sequestration hub is the only economically feasible way or the most practical way to transport or sequester the third party's CO_2, or is clearly superior environmentally. Similarly, the Regulatory Framework Assessment working group suggested an application for sequestration be subject to certain limited scenarios.[420] We suggest these considerations could be assessed by the AER in the event of a dispute, rather than settled by the Minister.

Some additional principles applicable to pipeline common carrier designations under the *OGCA* may also be applicable in the CCUS context, for example, "the desirability of avoiding unnecessary duplication of facilities."[421] In such cases, it may make more environmental and economic sense for a third party emitter to procure space on an existing carbon pipeline in order to access a hub, rather than develop duplicate infrastructure to transfer their own carbon to a hub. However, the operational complexities of having connected pieces of infrastructure operated by various parties along the value chain to achieve CO_2 transport have yet to be fully identified and solved.

With respect to rate-setting, under the *OGCA*, in the event the proponent is subject to a common carrier or common processor designation and the third party user cannot agree to the tariff to be charged for such access, either of the parties may apply to the AUC to fix the tariff.[422] The AUC is already well familiar with setting tariffs in the common carrier and common processor context and we propose the Government of Alberta could further draw on this expertise in setting tariffs in respect of sequestration services, and access to sequestration pore space, if parties cannot come to commercial terms on their own.

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418 With the cost of capture representing approximately 80 percent of the overall cost of a CCUS project (*Quest Project*, *supra* note 180), it is hard to imagine an emitter making such an investment without first having made transport and storage arrangements for a guaranteed initial term, but in a case where one hub encounters operational issues it is conceivable that emitters with existing capture capability may be seeking alternative transport and storage arrangements.

419 See discussion of TIER compliance options at Part IV.A.I, above.

420 Alberta Energy, *Regulatory Framework Assessment*, *supra* note 3 at 73–74.

421 *Signalta Resources Limited: Common Carrier, Sugden Grand Rapids H and Colony Undefined Pools* (16 April 1992), Decision D 92-1, *Alberta Energy Resources Conservation Board Decision* at 7.

422 *Supra* note 14, s 55.

The common carrier regime is a system that is well known and well understood in the industry, and will enable adjudication of commercial disputes by bodies such as the AER and AUC who already perform this function for other industries and also play a key role in licensing and operation of CCUS hubs. The use of the existing commercial carrier regime is more efficient and may also add more certainty to the process than disputes solved by ministerial discretion, or a dispute resolution process under development. It would also promote a market-based approach, allowing parties the space to negotiate commercial agreements for transportation and sequestration of CO_2, while providing a regulatory backstop in the event appropriate access for a particular third party emitter cannot be achieved through commercial negotiations. Additionally, similar common carrier regimes for pipeline owners exist at the interprovincial level and such a model could be adapted to other jurisdictions within Canada.[423]

VII. GOVERNMENT INCENTIVES FOR CCUS

Many jurisdictions acknowledge the need for some form of government incentives and policy frameworks to foster the development of CCUS industries and technologies as a tool for climate change mitigation.[424] While some risks to investment in CCUS projects may be appropriately managed by the private sector — who are familiar with the risks associated with developing large infrastructure projects, such as operational and construction risks — other risks of the developing CCUS market may be more appropriately addressed by government policies and financial incentives.[425] These risks and barriers to investment in CCUS projects may include market failures across the supply chain, including lack of appropriate pricing, risks of asset stranding through adoption of newer technologies in subsequent competitive facilities, and limitations in experience and information.[426]

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423 See e.g. *Canada Energy Regulator Act*, SC 2019, c 28, s 239; *The Pipelines Act, 1998*, SS 1998, c P-12.1, ss 10, 19.

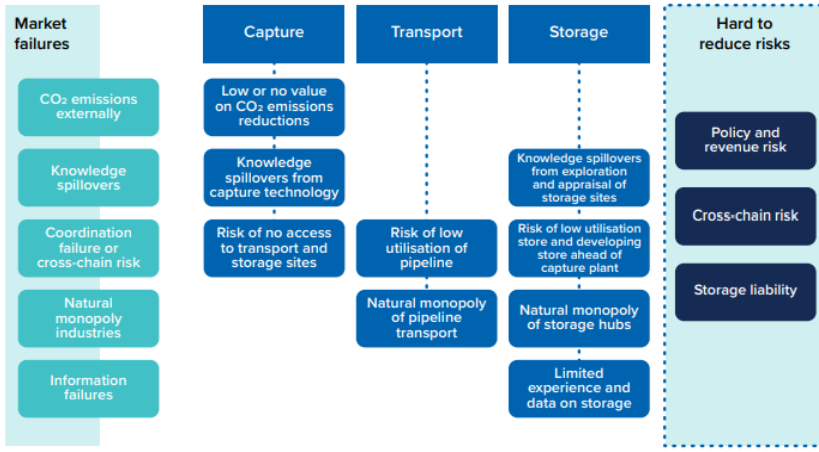
424 For example, CCUS policies and project characteristics in several jurisdictions are discussed in Alex Zapantis, Alex Townsend & Dominic Rassool, "Policy Priorities to Incentivise Large Scale Deployment of CCS" (April 2019) at 10–13, online (pdf): *Global CCS Institute* [perma.cc/5DJ9-F798], and the European Union has also developed policy directives, including the *Directive on the Geological Storage of Carbon*, *supra* note 394.

425 Zapantis, Townsend & Rassool, *ibid* at 7.

426 *Ibid* at 7–8.

These market failures and risks are helpfully captured in the below illustration, borrowed from the Global CCS Institute's report on policy priorities:[427]

Figure 1: Market failures across the CCS supply chain



[4] Market failures occur when the operation of the free market leads to an inefficient allocation of goods and services from society's perspective. For example, rational decisions made by individual firms to maximise financial performance may not in the best interests of broader society.
[5] Risks that are not possible to mitigate or can only be partially mitigated.

Previously, CCUS projects were often developed for use in the EOR space and were able to use revenues generated by EOR to finance and develop the project.[428] However, as jurisdictions implement goals and strategies for climate change mitigation, CCUS projects are centring less on EOR and more toward permanent geological sequestration or other uses, thus requiring different revenue streams, funding, and incentive models. For example, a report by the Global CCUS Institute found that, outside of EOR, investments in large scale CCUS projects globally has been largely supported by grant funding rather than debt financing as risks associated with a developing industry may make qualifying for debt financing more difficult.[429] Carbon pricing and emissions regulation, tax credits, and elements of state ownership or investment have also been used in jurisdictions around the world to incentivise the development of CCUS projects.[430] One example is the public-private cooperation model of Norway's Longship CCUS project, developed in response to a need to overcome investment barriers, such as uncertainty of market potential and policy, to encourage CCUS development.[431] One of the key principles behind the state support agreements developed for Norway's Longship project is that state funding will only cover actual costs up to a certain limit, with the expectation that parties will either sell emissions

427 *Ibid* at 7. Permission to reproduce obtained by authors from Global CCS Institute.
428 *Ibid* at 11.
429 *Ibid* at 5.
430 *Ibid* at 11–13.
431 "Developing Longship: Key Lessons Learned" (January 2020) at 12, online (pdf): *Gassnova* [perma.cc/3P5G-XD7N].

credits into the EU's Emissions Trading Systems or sell surplus capacity to third party customers to generate income.[432]

In Canada, carbon pricing and the creation of credits from recognized environmental attributes is one tool being used to promote the development of CCUS as a means of meeting climate mitigation goals and is discussed in Part IV of this article.[433] Additionally, several Canadian jurisdictions, including the federal government and some provinces, have implemented various forms of incentives and funding for the development of CCUS technologies and projects.

A. FEDERAL INCENTIVES

There are a number of programs at the federal level aimed at incentivizing investment in the development of technologies and projects in the energy transition and clean technology space, including CCUS. Possibly the most impactful of these is the Investment Tax Credit for Carbon Capture, Utilization, and Storage (CCUS ITC) for eligible CCUS projects.[434]

1. CCUS ITC[435]

As part of the 2022 federal budget, the federal government announced a new refundable ITC to promote the development of and investment in CCUS projects.[436] Pursuant to the 2022 federal budget, the CCUS ITC would apply to eligible expenses incurred by CCUS project developers after 2021 through 2040.[437] The federal government subsequently released draft legislation in respect of the CCUS ITC in August 2022.[438]

The 2023 federal budget reaffirmed the federal government's intention to move forward with the CCUS ITC and announced additional details in response to consultations following the release of the draft CCUS ITC legislation.[439]

The proposed rate of the CCUS ITC depends on the type of expense and the date in which the expense is incurred. Between 1 January 2022 and 31 December 2030, the following rates apply:

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432 *Ibid* at 26.

433 See Part IV, above, for a discussion regarding the generation of carbon and clean fuel credits.

434 Canada, Department of Finance, *Tax Measures: Supplementary Information*, Catalogue No 978-0-660-42906-9 (Ottawa: Department of Finance, 2022) at 20–24, online (pdf): [perma.cc/679L-X53R] [Department of Finance, *Tax Measures* (2022)].

435 Following the date this paper was finalized, the Minister of Finance tabled final legislation implementing the CCUS ITC in Parliament on 28 November 2023 (Canada, Department of Finance, "Government of Canada Announces Legislation to Make Life More Affordable, Build More Homes, and Create Good Jobs for Canadians" (28 November 2023), online: [perma.cc/WE67-SVZC]). The discussion in this paper may not reflect or fully describe the CCUS ITC as is to be enacted. Please refer to the *Fall Economic Statement Implementation Act, 2023*.

436 Department of Finance, *Budget 2021*, *supra* note 18.

437 *Ibid* at 21.

438 Canada, Department of Finance, *Legislative Proposals Relating to Income Tax and Other Legislation* (August 2022), online (pdf): [perma.cc/9YNW-TQVE] [Department of Finance, *Legislative Proposals*].

439 Canada, Department of Finance, *Tax Measures: Supplementary Information*, Catalogue No 978-0-660-42906-9 (Ottawa: Department of Finance, 28 March 2023) at 22, online (pdf): [perma.cc/L52M-HXGK] [Department of Finance, *Tax Measures* (2023)].

(1) 60 percent for expenses related to eligible equipment used in direct air capture projects;[440]

(2) 50 percent for expenses related to eligible equipment used in projects other than direct air capture projects;[441] and

(3) 37.5 percent for expenses related to eligible transportation, storage, and use equipment.[442]

The CCUS ITC will be phased out after 2030. Between 1 January 2031 and 31 December 2040, the rates are one-half of those rates described above.[443] After 2040, the CCUS ITC will be eliminated.[444]

The CCUS ITC is expected to apply to eligible expenses (Eligible Expenses). An Eligible Expense is comprised of three components and may be claimed: (1) on eligible equipment (Eligible Equipment); (2) with an eligible use (Eligible Use); or (3) as part of a qualified eligible project (Eligible Project).[445] Each of these relevant components is discussed further, below.

a. Eligible Equipment

Eligible Equipment is equipment of which the sole use is to capture, transport, store, or use CO_2 as part of an Eligible Project situated in Canada.[446] Equipment that captures CO_2 in Canada, compresses it, and transports it to another jurisdiction to be stored will be considered to be used in Canada.[447]

Additionally, the 2023 federal budget announced that dual use equipment producing heat or power, or that uses water, and that is used for CCUS together with another process will now be eligible for the CCUS ITC, on a pro rated basis based on the proportion of energy balance or material balance of the equipment supporting the CCUS process over the first 20 years of the project, provided that the following conditions are satisfied:

(1) the equipment meets all other conditions for the availability of the CCUS ITC;[448]

(2) where the equipment produces heat or power, more than 50 percent of the energy balance must be expected to be used to support either the CCUS process or hydrogen production eligible for the Clean Hydrogen Investment Tax Credit;[449] and

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440 Department of Finance, *Legislative Proposals*, *supra* note 438 at 31.
441 *Ibid*.
442 *Ibid*.
443 *Ibid*.
444 *Ibid*.
445 Department of Finance, *Tax Measures* (2022), *supra* note 434 at 20.
446 *Ibid* at 21.
447 *Ibid*.
448 Department of Finance, *Tax Measures* (2023), *supra* note 439 at 31.
449 *Ibid*.

(3) any CO_2 emissions resulting from equipment producing heat or power must be used, or must be captured and stored.[450]

The CCUS ITC may only be claimed by one owner of a piece of equipment. So, a subsequent owner may not claim the CCUS ITC if a previous owner has claimed the CCUS ITC in respect of the same piece of equipment.[451]

b. Eligible Use

Eligible Uses are either: (1) the storage of CO_2 in underground geological formations in eligible jurisdictions; or (2) the storage of CO_2 in concrete that meets the 60 percent mineralization requirement, as validated by a qualified third party.[452] Per the 2023 federal budget, the eligible jurisdictions for geological sequestration are British Columbia, Alberta, and Saskatchewan.[453]

The use of CO_2 for EOR is not an eligible use.[454]

If a portion of the Eligible Expense will not be utilized for an Eligible Use, the CCUS ITC is reduced by the percentage of CO_2 that will be put to the ineligible use.[455]

c. Eligible Project

An Eligible Project is a qualified CCUS project that supports a CCUS process by capturing CO_2 that would otherwise be released into the atmosphere or directly from ambient air, transporting captured carbon, or storing or using captured carbon.[456] Specifically, in order to be qualified, the project:

(1) must be "expected to support the capture of [CO_2] in Canada";[457]

(2) must have had "an initial project evaluation … issued by the Minister of Natural Resources, … in respect of the project following the filing of [the] most recent project plan" that meets certain enumerated requirements;[458]

(3) must ensure at least 10 percent of the total quantity of captured carbon per year that the project is expected to support is for storage or use in an Eligible Use in each of the project's first 20 years;[459]

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450 *Ibid*.
451 Department of Finance, *Tax Measures* (2022), *supra* note 434 at 21.
452 *Ibid* at 22; Department of Finance, *Tax Measures* (2023), *supra* note 439 at 31.
453 Department of Finance, *Tax Measures* (2023), *ibid*.
454 Department of Finance, *Tax Measures* (2022), *supra* note 434 at 22.
455 *Ibid* at 23.
456 Department of Finance, *Legislative Proposals*, *supra* note 438 at 31.
457 *Ibid* at 27.
458 *Ibid* at 28.
459 *Ibid*.

(4) must comply with all applicable federal, provincial, and municipal environmental laws, bylaws, and regulations;[460] and

(5) "is not a project that is … operated to service a facility that existed [prior to 7 April 2022], and … undertaken for the purpose[s] of complying with emission[s] standards [regulations] … under the *Reduction of Carbon Dioxide Emissions from Coal-fired Generation of Electricity Regulations*."[461]

2. OTHER FEDERAL FUNDING OPPORTUNITIES

In addition to the CCUS ITC, the Federal government has developed a number of application-based programs and funds aimed at the emissions reduction sector, which may apply to CCUS projects. These include the Strategic Innovation Fund (SIF), which provides investments in innovative projects intended to help with the growth of Canada's economy.[462] The SIF's Net Zero Accelerator initiative is targeted toward industrial sectors to promote the reduction of GHG emissions and at the time of writing is accepting "transformative" decarboniation proposals.[463] Previous CCUS funding initiatives include the Federal Government's Energy Innovation Program, which included a research and development call for CCUS technologies to invest up to $319 million.[464]

In 2022, the Government of Canada announced the upcoming creation of the $15 billion Canada Growth Fund (CGF) for the purposes of investing in the commercialization and deployment of emissions reduction technologies, and mitigating some of the risks faced by private investment in these sectors.[465] The mandate of the CGF includes "accelerat[ing] the deployment of key technologies, such as low-carbon hydrogen and carbon capture, utilization, and storage."[466] While the full details of the CGF's program have not yet been announced, it is expected that the CGF will employ a range of investment instruments, including equity, debt, contracts for difference, and offtake contracts in order to complement existing federal initiatives aimed at fostering the development of emissions reduction technologies and projects.[467] The CGF program, and the use of contracts for difference, could serve to manage the risk that future federal governments may implement changes in carbon pricing and policy that would be detrimental to a party's investment in an emissions reduction project. Since it is the federal government setting carbon pricing and policies, not industry, this type of contract for difference may help to create price certainty for project proponents considering large investments in emissions reductions projects, such as CCUS,

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460 *Ibid.*

461 *Ibid* at 28; *Reduction of Carbon Dioxide Emissions from Coal-Fired Generation of Electricity Regulations*, SOR/2012-167.

462 Innovation, Science and Economic Development Canada, "Strategic Innovation Fund" (18 October 2023), online: [perma.cc/223V-DXPB].

463 Canada, Innovation, Science and Economic Development, "Current Investment Priorities: Strategic Innovation Fund," online: [perma.cc/MU2Z-7N76].

464 Natural Resources Canada, "Energy Innovation Program: Carbon Capture, Utilization and Storage RD&D Call," online: [perma.cc/Q9QU-NT8R].

465 Department of Finance, *Canada Growth Fund: Technical Backgrounder* (Department of Finance, 2022) at 2, online (pdf): [perma.cc/Q6ZC-3M7W] [Department of Finance, *CGF Backgrounder*].

466 Canada, Department of Finance, *Fall Economic Statement: 2022*, Catalogue No F1-523E-PDF (Ottawa: Department of Finance, 2022) at 29–30, online (pdf): [perma.cc/5Y9N-UVKJ].

467 Department of Finance, *CGF Backgrounder*, *supra* note 465 at 6–8.

by allocating policy and pricing risks back to the government through the CGF.[468] However, it is uncertain the full effect or potential that the CGF may have on CCUS projects.

B. ALBERTA[469]

The Government of Alberta also offers funding opportunities for CCUS developments within the province. Many of these opportunities are funded through the *TIER Regulation*, as discussed below. In addition to the *TIER Regulation*, the *Fiscal Plan: Securing Alberta's Future 2023–26* announced increased commitments to the Alberta Petrochemical Incentive Program (APIP) that may be applied to CCUS developments.[470]

1. TIER FUND

As described in Part IV of this article, Alberta's *TIER Regulation* stipulates emissions compliance options for regulated industries in the province.[471] Industry participants regulated by *TIER Regulation* have the option to pay into a fund (the TIER Fund) if they do not meet emissions reduction targets nor use emissions reduction credits.[472] The Alberta Treasury Board and Finance, *Fiscal Plan* provides that the first $100 million in annual revenue plus 50 percent of the remaining revenue paid into the TIER Fund support emission reduction initiatives.[473]

Historically, the TIER Fund has been used to fund Alberta's Industrial Energy Efficiency and Carbon Capture Utilization and Storage Grant Program, which provided a total of $100 million in funding across seven CCUS projects, announced in November 2021.[474]

Presently, the Alberta Treasury Board and Finance, *Fiscal Plan* provides that $733 million over three years will be put towards "Innovation and Technology and Carbon Capture and Storage Projects."[475] According to the Alberta Treasury Board and Finance, *Fiscal Plan*, the TIER Fund will continue to be used to fund programs offered by key partners, including ERA and Alberta Innovates.[476] The CCUS incentives provided by these key partners are summarized below.

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468 Memorandum from Dale Beugin & Blake Shaffer to Catherine McKenna (4 June 2021), "Re: The Climate Policy Certainty Gap and How to Fill It," online: *The CD Howe Institute* [perma.cc/6WSE-STJ8].

469 Following the date this article was finalized, the Government of Alberta announced a new incentive through the Alberta Carbon Capture Incentive Program which will provide a grant of 12 percent for new eligible capital costs (Alberta, "Alberta Carbon Capture Incentive Program," online: [perma.cc/7AQ7-XE7Y]). Specifics of the grant are expected to be released in spring 2024.

470 Alberta Treasury Board and Finance, *Fiscal Plan: Securing Alberta's Future 2023–26*, presented by Travis Toews (Edmonton: ATBF, 2023) at 107, online (pdf): [perma.cc/72ZU-Y9K2] [ATBF, *Fiscal Plan*].

471 See Part IV: Generation of Carbon and Clean Fuel Credits, above.

472 ATBF, *Fiscal Plan*, *supra* note 470 at 97.

473 *Ibid*.

474 Alberta, "Carbon Capture, Utilization and Storage: Development and Innovation, online: [perma.cc/CMF5-E5P5] [Alberta, "CCUS: Development and Innovation"].

475 ATBF, *Fiscal Plan*, *supra* note 470 at 97.

476 *Ibid*.

a. Emissions Reduction Alberta: Carbon Capture Kickstart

Funding from the TIER Fund has been applied to the ERA "Carbon Capture Kickstart" program. In July 2022, ERA and the Government of Alberta announced 11 funding recipients for the Carbon Capture Kickstart program, collectively receiving $40 million from the TIER Fund to develop their CCUS projects.[477]

The projects selected for funding represent diverse industrial sectors, including power generation, cement, fertilizer, forest products, and oil and gas, at large emitter sites across Alberta.[478] All funded projects plan to be up and running by 2030.[479]

b. Alberta Innovates: Clean Technology Program

Through the TIER Fund, "Alberta Innovates has provided $53 million in funding opportunities including supporting 43 CCUS related projects."[480] Alberta Innovates, through its Clean Technology funding program, provides support to researchers, innovators, small and medium-sized enterprises, and large companies seeking to advance CCUS technology development from Technology Readiness Levels three to seven.[481] Funding from Alberta Innovates is awarded on the "basis of technological innovation, environmental improvement potential, social and economic impacts and potential for deployment in Alberta."[482]

2. ALBERTA PETROCHEMICAL INCENTIVE PROGRAM

The APIP provides grants to petrochemical facilities "to encourage private sector investment in certain types of new or expanded Alberta-based petrochemical manufacturing facilities to produce value-added, petrochemical, hydrogen, fertilizer and fuel products."[483] The APIP Program Guidelines provide that carbon capture projects associated with "[s]tandalone hydrogen projects and projects that produce fuels from natural gas and natural gas liquids [that] capture the [CO_2] by-product generated from the production process" are eligible to apply for funding.[484]

Furthermore, the Alberta Treasury Board and Finance, *Fiscal Plan* expressly states that APIP may be expanded to include funding from the TIER Fund reserved for future carbon capture and storage projects.[485] However, given the early stages, it is uncertain what this funding will look like and how it will specifically apply to carbon capture and storage projects.

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477 *Emissions Reduction Alberta*, *supra* note 224.
478 *Ibid*.
479 *Ibid*.
480 Alberta, "CCUS: Development and Innovation," *supra* note 474.
481 John Zhou et al, "Clean Resources Program Guide: Continuous Intake Process" (April 2022) at 6–7, online (pdf): *Alberta Innovates* [perma.cc/M89A-TJJ7].
482 David Butler, "Review of Carbon Capture Projects Funded by Alberta Innovates and Related Entities with Recommendations" (1 February 2022), s 2.3, online (pdf): *Alberta Innovates* [perma.cc/Y8X5-ADYN].
483 Alberta Energy, *The Alberta Petrochemicals Incentive Program: Program Guidelines Document* (AE, 2022) at 5, online (pdf): [perma.cc/AAQ7-GQTS].
484 *Ibid* at 7.
485 ATBF, *Fiscal Plan*, *supra* note 470 at 107.

In addition to the above initiatives, the Alberta Treasury Board and Finance, *Fiscal Plan* has committed a further $246 million over three years for the "Carbon Capture and Storage Initiative," but no further details on how this initiative will work have been released so far.[486]

C. OTHER PROVINCES

Funding opportunities in other provinces are less developed than in Alberta and at the federal level, however, both British Columbia and Saskatchewan do have some provisions applicable to CCUS. For example, British Columbia developed the CleanBC Industry Fund for the purposes of investing the province's carbon tax revenues to support projects and innovations in emissions reductions.[487] The program announced investment in 41 new projects in 2022 and, while it does not include large scale funding for CCUS projects, it does include $2.89 million in funding for feasibility studies, including several related to implementing CCUS technologies at existing natural gas plants, and proposed conversions to blue hydrogen plants.[488]

Saskatchewan has taken a different approach than British Columbia and Alberta and, rather than develop funding programs for the development to technologies such as CCUS, they have, as discussed above in Part II, incorporated CO_2 pipeline projects into the province's *OIIP Regulation*.[489] For qualified projects, the *OIIP Regulation* provides up to 20 percent of eligible project costs as a transferrable tax credit on oil and gas royalties or freehold production.[490] CO_2 pipeline projects may be eligible for the *OIIP Regulation* if the project:

(a) directly increases oil or carbon dioxide pipeline capacity in Saskatchewan;
(b) is not considered to be redundant service;
(c) has not become operational, as determined by the minister, before the eligible project application is submitted; and
(d) involves a minimum investment of $10 million in eligible costs.[491]

Proponents under the *OIIP Regulation* are not able to apply for any eligible costs until the project has commenced operation, and the proponent has incurred eligible costs of at least $10 million.[492]

Overall, both the federal government and the Government of Alberta have made significant investments in recent years in order to incentivize and stimulate the development of the CCUS industry as a key component of their climate mitigation plans. It remains to be seen, however, what effect these programs will have on the development of the CCUS industry, particularly in light of competitive pressures from the United States and the

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486 *Ibid*.
487 British Columbia, Environment and Climate Change Strategy, *B.C. Invests in Cleaner, More Innovative Industry* (News Release) (Victoria: ECCS, 2022), online: [perma.cc/T639-PXPY].
488 British Columbia, "Funded Projects," online: [perma.cc/CCH5-QKJA].
489 *Supra* note 50, s 7(10). See Part II.A.2, above for further discussion about Saskatchewan's approach.
490 *OIIP Regulation*, *ibid*, s 7(10).
491 *Ibid*, s 4.
492 *Ibid*, s 7(5).

incentives for CCUS and other energy transition industries implemented through their *Inflation Reduction Act of 2022*.[493]

VIII. CONCLUSION

Canada is well positioned from a policy and regulatory perspective to develop CCUS at scale due to its ongoing emissions reduction mandates, set carbon price, mature trading market, and provincial and federal fiscal incentives. In addition, Alberta is particularly advantaged with its existing CCUS regulatory regime, available pore space, and the *Quest Project*'s operating data, which informs industry and provides a blueprint for MMV and other key CCUS operational challenges. However, the CCUS industry is changing from one project to multiple hubs and will have to be developed in a way that manages simultaneous challenges and dilemmas including:

(1) management of potential technical risks such as pressure regimes and seismicity;

(2) linked to technical risk, continued public outreach to canvas local opinion on CCUS development so stakeholders can listen to and address concerns, where feasible;

(3) leveraging existing regulatory expertise to mitigate commercial risk arising from market uncertainty, creditworthiness of proponents, duplication of infrastructure, stranded assets, and other key risks that are familiar in the oil and gas industry;

(4) enhancing investment by clarifying conditions of maintenance and renewal of sequestration lease agreements as well as favouring existing processes for dispute resolution over ministerial discretion; and

(5) enabling the existing mature credit trading platform to buy and sell credits, incorporating carbon tax prices, as adjusted by free market balancing supply and demand pressures.

We have seen a great deal of progress in the industry in a relatively short period of time, however, to truly capitalize on this opportunity, the industry is, and will continue to look for certainty in the applicable regulatory framework and the necessary incentives and financing arrangements to ensure viable development and a competitive landscape. Overall we see a huge opportunity for Alberta to lead the way in CCUS within Canada and globally, with the potential to make a meaningful contribution to Canada's emissions reduction targets. This article has addressed how far we have come thus far to pave the way for CCUS in Canada, but there remains uncertainty that will continue to need to be addressed by industry, the government, and all stakeholders to ensure CCUS is a pillar in Canada's decarbonization picture.

[493] Pub L No 117-69, 136 Stat 1818.

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