



HOUSE OF COMMONS  
CHAMBRE DES COMMUNES  
CANADA

# **THE FUTURE OF CANADA'S MINING SECTOR: SUSTAINABLE GROWTH BEYOND THE GLOBAL DOWNTURN**

## **Report of the Standing Committee on Natural Resources**

**James Maloney  
Chair**

**MARCH 2017**

**42<sup>nd</sup> PARLIAMENT, 1<sup>st</sup> SESSION**

---

Published under the authority of the Speaker of the House of Commons

**SPEAKER'S PERMISSION**

Reproduction of the proceedings of the House of Commons and its Committees, in whole or in part and in any medium, is hereby permitted provided that the reproduction is accurate and is not presented as official. This permission does not extend to reproduction, distribution or use for commercial purpose of financial gain. Reproduction or use outside this permission or without authorization may be treated as copyright infringement in accordance with the *Copyright Act*. Authorization may be obtained on written application to the Office of the Speaker of the House of Commons.

Reproduction in accordance with this permission does not constitute publication under the authority of the House of Commons. The absolute privilege that applies to the proceedings of the House of Commons does not extend to these permitted reproductions. Where a reproduction includes briefs to a Standing Committee of the House of Commons, authorization for reproduction may be required from the authors in accordance with the *Copyright Act*.

Nothing in this permission abrogates or derogates from the privileges, powers, immunities and rights of the House of Commons and its Committees. For greater certainty, this permission does not affect the prohibition against impeaching or questioning the proceedings of the House of Commons in courts or otherwise. The House of Commons retains the right and privilege to find users in contempt of Parliament if a reproduction or use is not in accordance with this permission.

Also available on the Parliament of Canada Web Site  
at the following address: <http://www.parl.gc.ca>

**THE FUTURE OF CANADA'S MINING SECTOR:  
SUSTAINABLE GROWTH BEYOND THE GLOBAL  
DOWNTURN**

**Report of the Standing Committee on  
Natural Resources**

**James Maloney  
Chair**

**MARCH 2017**

**42<sup>nd</sup> PARLIAMENT, 1<sup>st</sup> SESSION**



# **STANDING COMMITTEE ON NATURAL RESOURCES**

## **CHAIR**

James Maloney

## **VICE-CHAIRS**

John Barlow  
Richard Cannings

## **MEMBERS**

T. J. Harvey	Shannon Stubbs
Denis Lemieux	Mark Strahl
Michael McLeod	Geng Tan
Marc Serré	

## **OTHER MEMBERS OF PARLIAMENT WHO PARTICIPATED**

Guy Caron	Robert J. Morissey
Sukh Dhaliwal	Pablo Rodriguez
Nathaniel Erskine-Smith	Don Rusnak
Randy Hoback	Jamie Schmale
Wayne Long	Robert Sopuck
Lloyd Longfield	Brad Trost
Rémi Massé	Arnold Viersen

## **CLERK OF THE COMMITTEE**

William Stephenson

## **LIBRARY OF PARLIAMENT**

**Parliamentary Information and Research Service**

Mohamed Zakzouk  
Jesse Good



# **THE STANDING COMMITTEE ON NATURAL RESOURCES**

has the honour to present its

## **THIRD REPORT**

Pursuant to its mandate under Standing Order 108(2), the Committee has studied The Future of Canada's Mining Sector: Innovation, Sustainable Solutions and Economic Opportunities and has agreed to report the following:



# TABLE OF CONTENTS

---

THE FUTURE OF CANADA'S MINING SECTOR: SUSTAINABLE GROWTH BEYOND THE GLOBAL DOWNTURN .....	1
INTRODUCTION .....	1
BUILDING A FOUNDATION FOR SUSTAINABLE GROWTH BEYOND THE GLOBAL DOWNTURN.....	2
MAXIMIZING ON CANADA'S COMPETITIVE ADVANTAGES.....	4
A. Geography and Resource Development Infrastructure .....	4
B. Investment Climate .....	7
C. Environmental Impact Assessment.....	8
D. Carbon pricing.....	10
FOSTERING INNOVATION IN MINING TECHNOLOGY AND PRACTICES .....	12
A. Collaborative Innovation: from Research to Commercialization .....	12
B. Productive Mining: from Exploration to Value-Added Products .....	13
C. Environmental Reclamation .....	17
ENABLING MEANINGFUL ENGAGEMENT WITH INDIGENOUS PEOPLES .....	18
DEVELOPING A SKILLED LABOUR FORCE .....	22
RECOMMENDATIONS.....	23
APPENDIX A: LIST OF WITNESSES .....	27
APPENDIX B: LIST OF BRIEFS .....	31
REQUEST FOR GOVERNMENT RESPONSE .....	33
DISSENTING OPINION FROM THE CONSERVATIVE PARTY OF CANADA.....	35
SUPPLEMENTARY OPINION OF THE NEW DEMOCRATIC PARTY .....	43



# THE FUTURE OF CANADA'S MINING SECTOR: SUSTAINABLE GROWTH BEYOND THE GLOBAL DOWNTURN

---

## INTRODUCTION

The mining industry is a major generator of wealth and employment for Canadians. In 2015, it accounted for about 3.2% (\$60.3 billion) of the national gross domestic product (GDP), with ripple economic benefits in other sectors of the economy – from the supplies and equipment industry to the financial and insurance sectors. According to a representative from Natural Resources Canada (NRCan), “it is said that for every \$1 billion of output in the minerals and metal sector, the direct demand for goods and services in Canada increases by \$615 million.”<sup>1</sup> Furthermore, mining is one of Canada’s highest-wage employers and proportionally the largest private sector employer of Indigenous peoples.<sup>2</sup> With nearly 380,000 employees nationwide, the sector has approximately 10,000 Indigenous workers, and accounts for 20% to 25% of the GDP of the northern territories.<sup>3</sup> Mining wages averaged \$36 an hour in 2013, which is about 60% higher than Canada’s all-industry average.<sup>4</sup>

At the international level, the mining industry has played a central role in establishing Canada’s position as a resource-based economy.<sup>5</sup> In 2015, the sector accounted for 19% of all Canadian exports, with commodities like uranium and potash representing as much as 30% and 22% of the global supply respectively.<sup>6</sup> There were about 1,700 exploration and mining companies headquartered in Canada in 2014, with operations in 105 countries and global mining assets of almost \$260 billion.<sup>7</sup> Finally, almost 60% of international mining deals take place on Bay Street, making Toronto, in the words of one witness, the “mining financial capital of the world.”<sup>8</sup>

Over the past few years, the global mining industry has been experiencing a cyclical downturn, with many commodity prices dropping below their average or

- 
- 1 Standing Committee on Natural Resources (RNNR), [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 6 June 2016 (Marian Campbell Jarvis, Assistant Deputy Minister, Minerals and Metals Sector, Department of Natural Resources).
  - 2 Mining Association of Canada, *Facts & Figures of the Canadian Mining Industry 2015*.
  - 3 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 22 September 2016 (Andrew Cheadle, Executive Director, Prospectors and Developers Association of Canada).
  - 4 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 18 October 2016 (Richard Paquin, Mining Director, Unifor).
  - 5 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 3 November 2016 (Peter Hollings, Director, Centre of Excellence for Sustainable Mining and Exploration, Lakehead University).
  - 6 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 27 September 2016 (Pamela Schwann, President, Saskatchewan Mining Association).
  - 7 RNNR, [Evidence](#) (Jarvis, NRCan).
  - 8 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 25 October 2016 (Vic Pakalnis, President and Chief Executive Officer, Mirarco Mining Innovation).

desired value.<sup>9</sup> In view of the consequent impacts on mining in Canada (and as part of its broader study entitled *The Future of Canada's Oil and Gas, Mining and Nuclear Sectors: Innovation, Sustainable Solutions and Economic Opportunities*), the Standing Committee on Natural Resources (the Committee) sought to investigate the overall state of the Canadian industry with a long-term view of recovery and growth beyond the current downturn. Between 6 June and 15 November 2016, the Committee held 12 meetings, hearing from a wide range of mining experts from industry, government, Indigenous peoples, academia and civil society. The Committee is pleased to present its report, which concludes its study on the mining sector and presents recommendations to the Government of Canada.

## **BUILDING A FOUNDATION FOR SUSTAINABLE GROWTH BEYOND THE GLOBAL DOWNTURN**

Canada's mining sector has been experiencing a cyclical downturn, with many commodity prices dropping in value – for example, iron values dropped by 35%, copper by 25% and gold by 11% since 2011.<sup>10</sup> According to Carl Weatherell of the Canada Mining Innovation Council (CMIC), “in 2015, the global mining industry experienced record impairments of \$53 billion, far outstripping similar losses in the oil and gas industry for the same time period.”<sup>11</sup> The Committee heard that the exploration sector has been the hardest hit, with investment declining from a high of \$2.8 billion in 2011, at the peak of the super cycle, to an estimated \$683 million in 2016.<sup>12</sup> In addition, the number of exploration companies has declined since 2012, and 431 project operators are expected to have merged, become dormant, or ceased to exist by 2016.<sup>13</sup>

There was general consensus among the witnesses that the current downturn is cyclical rather than structural, and that some recovery is already underway. According to Marian Campbell Jarvis of NRCan, the challenge facing Canada's minerals and metals sector is twofold: “the first is the economic competitiveness of Canadian operations and maintaining an attractive investment climate, and the second is one of social acceptance, environmental performance, community involvement, and a sense of shared benefit and risk.”<sup>14</sup> The Committee heard that the Canadian mining sector already benefits from a number of competitive advantages, namely Canada's resource wealth, taxation policy and position as a global centre for mining finance and innovation. Maximizing on these advantages to ensure a stable investment climate is particularly important given the long-term horizon of most mining exploration and development projects,<sup>15</sup> and considering

---

9 RNNR, [Evidence](#) (Jarvis, NRCan).

10 Ibid.

11 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 18 October 2016 (Carl Weatherell, Executive Director and Chief Executive Officer, Canada Mining Innovation Council).

12 RNNR, [Evidence](#) (Jarvis, NRCan).

13 Ibid.

14 Ibid.

15 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 29 September 2016 (Dale Austin, Manager, Government Relations, Cameco Corporation).

the potentially devastating consequences of mine closures on employees and the local economy.<sup>16</sup>

The sustainability of Canadian mineral exploration is of special concern for the mining industry. The Committee heard that the exploration business is becoming riskier and more costly, especially for junior companies that account for approximately 70% of Canadian discoveries and create almost 30% more value per dollar expended compared to major mining companies.<sup>17</sup> The likelihood of an exploration project leading to a discovery that will become an operating mine is one in a thousand, or less;<sup>18</sup> hence, the vast majority of Canadian mining operations never move beyond the exploration stage<sup>19</sup> and are confronted with rising operational costs.<sup>20</sup> Furthermore, considering that many mineral reserves have been declining over the past three decades (e.g., zinc, by 86%, and nickel, by 63%), and that higher-grade ores are becoming scarcer, mining companies have to dig deeper, operate more remotely or mine lower grades in order to stay in business.<sup>21</sup> Ugo Lapointe of MiningWatch Canada explained that mining lower grade ore consumes more energy and water resources, generates more waste, and is thus more likely to have negative impacts on the environment and encounter social and political resistance.<sup>22</sup>

The Committee heard that infrastructure development and innovation are central to the long-term competitiveness of the mining sector. In many remote and northern regions, the development of mineral deposits is contingent on the availability of basic infrastructure and services, such as railways, roads and electric power.<sup>23</sup> Furthermore, innovation and technological upgrades can address some of the industry's economic and environmental challenges – for example, by improving the productivity, energy efficiency and cost-effectiveness of mining operations; facilitating the development of niche commodities for new and emerging markets; and strengthening waste management and environmental reclamation practices. According to NRCan, “energy, water, and waste are the areas of greatest challenge and opportunity to increase competitiveness and to reduce environmental impacts and improve performance.”<sup>24</sup>

---

16 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 1 November 2016 (Trent Mell, President and Head of Mining, PearTree Financial Services).

17 RNNR, [Evidence](#) (Cheatle, PDAC).

18 RNNR, [Evidence](#) (Jarvis, NRCan); [Evidence](#) (Cheatle, PDAC).

19 RNNR, [Evidence](#) (Mell, PearTree Financial Services).

20 RNNR, [Evidence](#) (Cheatle, PDAC).

21 RNNR, [Evidence](#) (Jarvis, NRCan).

22 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 1 November 2016 (Ugo Lapointe, Canadian Program Coordinator, MiningWatch Canada).

23 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 22 September 2016 (Joe Campbell, Director, Northwest Territories and Nunavut Chamber of Mines); [Evidence](#) (Cheatle, PDAC).

24 RNNR, [Evidence](#) (Jarvis, NRCan).

With regards to social acceptance, the Committee heard that sustainable resource development requires social licence in order to remain sustainable.<sup>25</sup> Meaningful engagement with affected Indigenous communities is especially critical, given the Crown's constitutional duty to consult and, where appropriate, accommodate Indigenous peoples on resource development projects.<sup>26</sup> The Committee also heard that industry needs to remain proactive about corporate social responsibility (CSR) practices by protecting its employees, local communities and the environment.<sup>27</sup> Finally, the Committee heard that the industry needs a skilled and sustainable labour force, and would benefit from efforts to facilitate mining education, training and recruitment, especially among unrepresented groups such as women and Indigenous people.<sup>28</sup>

With a view to sustaining the long-term economic growth and sustainability of the Canadian mining industry, the following sections expand on four main themes based on evidence from the witnesses: 1) maximizing on Canada's competitive advantages; 2) fostering innovation in mining technologies and practices; 3) enabling meaningful engagement with Indigenous peoples; and 4) developing a skilled labour force through education and training.

## **MAXIMIZING ON CANADA'S COMPETITIVE ADVANTAGES**

The following sections discuss some of the advantages and challenges of operating in Canada for the mining industry in four areas: a) geography and resource development infrastructure (including mining clusters); b) Canada's investment climate; c) Environmental Impact Assessments (EIAs); and d) carbon pricing.

### **A. Geography and Resource Development Infrastructure**

Canada is endowed with rich mineral resources in terms of quantity, quality and variety. Canadian mineral deposits include gold, potash, copper, nickel, lead, zinc, diamonds, coal, chromite and uranium, among others, in addition to niche commodities – such as lithium, graphite, cobalt, indium, molybdenum, tungsten and the rare earth elements – that could be “leveraged to establish new supply chains”<sup>29</sup> for the advanced and clean technology sectors. According to Pamela Schwann of the Saskatchewan Mining Association, Canada's potash and uranium deposits are the “world's highest grade,” giving Canada a “clear geological advantage” along with the status of being the world's top producer of these commodities.<sup>30</sup> In addition, Christopher Zahovskis of Northcliff

---

25 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 1 November 2016 (Jason Batise, Executive Director, Wabun Tribal Council); RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 22 September 2016 (Pierre Gratton, President and Chief Executive Officer, Mining Association of Canada).

26 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 27 October 2016 (Hon. Bob Rae, Partner, Olthuis Kleer Townsend).

27 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 1 November 2016 (Ken Neumann, National Director for Canada, United Steelworkers).

28 Ibid.

29 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 4 October 2016 (Brian St. Louis, Manager, Gouvernement affairs, Avalon Advanced Materials Inc.).

30 RNNR, [Evidence](#) (Schwann, Saskatchewan Mining Association).

Resources Ltd. told the Committee that the sizeable Sisson deposit in New Brunswick could become the largest operational tungsten mine in the world when it starts production.<sup>31</sup> A few witnesses also spoke of rich chromite deposits in Northern Ontario's Ring of Fire region, with an estimated value of \$60 billion and enough ore to sustain more than a century of production.<sup>32</sup>

While some mining centres have the advantage of being connected to export ports at tidewater or marine transportation corridors in the Great Lakes region,<sup>33</sup> much of Canada's mineral deposits are located in remote regions of the country where the lack of infrastructure like roads, transmission lines and high-speed telecommunications increases the cost of developing and operating mines.<sup>34</sup> For example, the Committee heard that remote exploration projects located 50-to-500 kilometres from a supply route can cost 227% to 300% of the cost of non-remote projects.<sup>35</sup> As a result, according to Joe Campbell of the NWT & Nunavut Chamber of Mines, many known deposits in Northern Canada remain uneconomic because of their remoteness and inaccessibility.<sup>36</sup>

Some witnesses also argued that the lack of infrastructure connecting mineral deposits to markets and population centres is a barrier to attracting investment in Canadian mineral exploration. For example, the Committee heard that billions of dollars are required to build the infrastructure needed for mineral development in Ontario's Ring of Fire region, including transmission lines, power grids, fibre optics, railways and roads.<sup>37</sup> According to Frank Smeenck of KWG Resources Inc., an estimated \$3 billion investment is needed for transportation assets alone before any mines can begin operating.<sup>38</sup> Iain Angus of the Northwestern Ontario Municipal Association pointed out that addressing the infrastructure deficit in the north will likely lower the cost of mining activities and advance the development of remote Indigenous communities.

Finally, some witnesses called for additional support for Canada's mining clusters in order to advance innovation and resource development in the sector. As shown in Figure 1, mining clusters are regional networks of interconnected businesses and

---

31 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 22 September 2016 (Christopher Zahovskis, President and Chief Executive Officer, Northcliff Resources Ltd.).

32 RNNR, [Evidence](#) (Pakalnis, Mirarco Mining Innovation); RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 27 October 2016 (Frank Smeenck, President and Chief Executive Officer, KWG Resources Inc.); RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 20 October 2016 (Iain Angus, Vice-president, Northwestern Ontario Municipal Association).

33 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 20 October 2016 (Gavin Dirom, President and Chief Executive Officer, Association for Mineral Exploration British Columbia; and John Mason, Project Manager, Mining Services, Thunder Bay Community Economic Development Commission); [Evidence](#) (Angus, Northwestern Ontario Municipal Association).

34 RNNR, [Evidence](#) (Campbell, NWT & Nunavut Chamber of Mines); [Evidence](#) (Cheatle, PDAC).

35 RNNR, [Evidence](#) (Cheatle, PDAC).

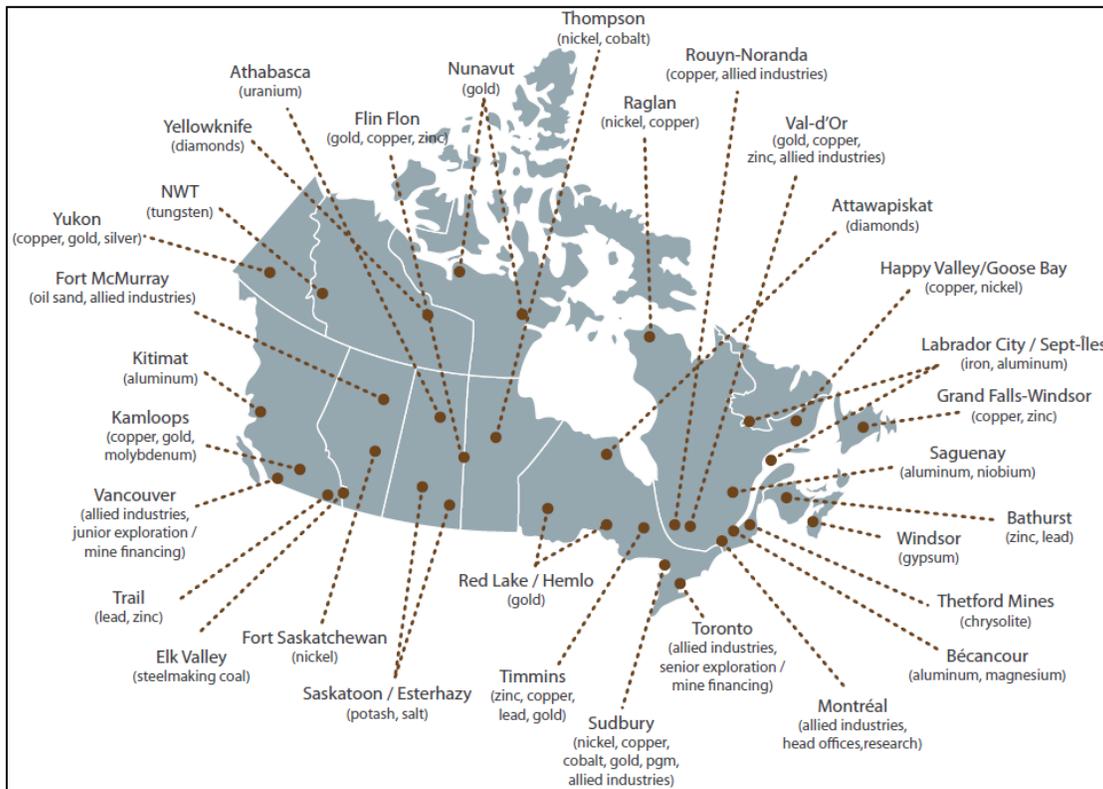
36 RNNR, [Evidence](#) (Campbell, NWT & Nunavut Chamber of Mines).

37 RNNR, [Evidence](#) (Angus, Northwestern Ontario Municipal Association).

38 RNNR, [Evidence](#) (Smeenck, KWG Resources).

institutions that specialize in different mining-related fields,<sup>39</sup> and that have the potential to facilitate innovation and accelerate the commercialization and adoption of new technologies.<sup>40</sup> John Mason of the Thunder Bay Community Economic Development Commission argued that aligning the local service and supply sector with specific mineral development opportunities is a way of advancing the development of clusters around mine and mineral development.<sup>41</sup> Furthermore, Vik Pakalnis of MIRARCO Mining Innovation suggested that the recent federal allocation of \$800 million for the government’s “cluster networks strategy” should be seen as an opportunity to revisit the strategic orientation of Canada’s mining clusters – for example, by consolidating and focusing research and development activities in research clusters.<sup>42</sup>

**Figure 1: Canadian Mining Clusters**



Source: Mining Association of Canada, [Fact & Figures 2015](#), p.18

39 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 27 September 2016 (John Mullally, Director of Government Relations and Energy, Goldcorp Inc.); [Evidence](#) (Cheatle, PDAC); [Evidence](#) (Weatherell, CMIC); [Evidence](#) (Pakalnis, Mirarco Mining Innovation); [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission).

40 RNNR, [Evidence](#) (Mullally, Goldcorp); [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission); [Evidence](#) (Pakalnis, Mirarco Mining Innovation).

41 RNNR, [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission).

42 RNNR, [Evidence](#) (Pakalnis, Mirarco Mining Innovation).

## B. Investment Climate

Given that 60% of all international mining deals are made at the Toronto Stock Exchange on Bay Street, a number of witnesses identified Toronto as a centre for Canadian and global mining finance activities.<sup>43</sup> On the other hand, the Committee learned that mining investment has dropped significantly in recent years, especially in the exploration sector. Australia surpassed Canada as the world's top destination for mineral exploration investment for the first time in 2015,<sup>44</sup> as investment in the Canadian exploration sector declined from a high of \$2.8 billion in 2011 to \$823 million in 2015, and an estimated \$683 million in 2016.<sup>45</sup> While the Mining Association of Canada (MAC) has identified up to \$145 billion in potential new investment in Canada's mining sector, some companies have already had to delay their mine development projects due to insufficient access to financial capital.<sup>46</sup>

Many witnesses highlighted the Mineral Exploration Tax Credit (METC) and flow-through shares as critical financial tools for catalysing investment in Canada's mining exploration sector, especially junior companies.<sup>47</sup> According to Andrew Cheatle of the Prospectors and Developers Association of Canada (PDAC), flow-through shares accounted for more than two-thirds of all exploration-focused financing in Canadian exchanges over the past decades. Almost 90% of PDAC's membership reported that if the METC were not renewed, it would have "a negative to severely negative impact on their ability to attract investors."<sup>48</sup> Similarly, speaking of the ongoing review of flow-through tax incentives by Finance Canada, Gavin Dirom of the Association for Mineral Exploration British Columbia stated the following:

Removing these important tax incentives at a time when the industry is still recovering from [the downturn in mineral commodity prices], could have a crippling effect on the recovery of the industry. These incentives support the discoveries of new deposits, and advance the development of mining projects and the creation of socio-economic opportunities across the country. They support and benefit remote and aboriginal communities where natural resource development is the only source of jobs and economic opportunity, infrastructure and skills development, and community capacity building.<sup>49</sup>

---

43 RNNR, [Evidence](#) (Pakalnis, Mirarco Mining Innovation); [Evidence](#) (Mullally, Goldcorp); [Evidence](#) (Cheatle, PDAC).

44 RNNR, [Evidence](#) (Cheatle, PDAC).

45 RNNR, [Evidence](#) (Jarvis, NRCan); [Evidence](#) (Cheatle, PDAC).

46 RNNR, [Evidence](#) (Gratton, Mining Association of Canada); [Evidence](#) (St. Louis, Avalon Advanced Materials).

47 RNNR, [Evidence](#) (St. Louis, Avalon Advanced Materials); [Evidence](#) (Schwann, Saskatchewan Mining Association); [Evidence](#) (Cheatle, PDAC); [Evidence](#) (Dirom, Association for Mineral Exploration British Columbia).

48 RNNR, [Evidence](#) (Cheatle, PDAC).

49 RNNR, [Evidence](#) (Dirom, Association for Mineral Exploration British Columbia).

A number of witnesses recommended that the government renew the METC and continue supporting flow-through financing.<sup>50</sup> For example, Ms. Schwann thinks renewing the METC for a period longer than a year would benefit exploration companies, while Mr. Mason recommended that the METC and flow-through financing be renewed for at least three years, or even made permanent.<sup>51</sup>

Witnesses also recommended the creation of new funds to support the development of infrastructure and mineral resources.<sup>52</sup> Pierre Gratton of MAC thinks the Alaskan infrastructure bank is a model that could be emulated in Canada; it “provides long-term, low-interest financing for major infrastructure projects that allow economic development that might otherwise not take place [...helping] finance projects that banks won’t touch.”<sup>53</sup> Alternatively, Gregory Bowes of Northern Graphite Corporation called for the creation of a national resource bank managed by the private sector and supported by public funds that would “invest directly, debt and equity, in resource projects in Canada.” Such bank, according to Mr. Bowes, could be modelled after Quebecois organizations – such as Caisse de dépôt, Ressources Québec, and Sodémex – that invest directly in junior resource companies.<sup>54</sup>

### C. Environmental Impact Assessment

The Committee heard different views on how the Canadian Environmental Impact Assessment (EIA) process affects the competitiveness of the mining industry. Some witnesses, such as Ms. Schwann and Dale Austin of Cameco Corp., praised Canada’s EIA process and regulatory regime for being strong, robust and science-based.<sup>55</sup> Furthermore, Susanna Cluff-Clyburne of the Canadian Chamber of Commerce stated that “Canada’s legal and regulatory stability is a competitive advantage to our businesses and attractive to prospective foreign investors.”<sup>56</sup> Ross Beaty of Pan American Silver Corporation also commented on the industry’s general environmental performance for having “an outstanding reputation globally for best-practice environmental standards.”<sup>57</sup>

---

50 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 27 October 2016 (Ryan McEachern, Managing Director, Canadian Association of Mining Equipment and Services for Export); [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission RNNR, [Evidence](#) (Dirom, Association for Mineral Exploration British Columbia); [Evidence](#) (St. Louis, Avalon Advanced Materials); [Evidence](#) (Schwann, Saskatchewan Mining Association); [Evidence](#) (Cheatle, PDAC).

51 RNNR, [Evidence](#) (Schwann, Saskatchewan Mining Association); [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission).

52 RNNR, [Evidence](#) (McEachern, Canadian Association of Mining Equipment and Services for Export); [Evidence](#) (Gratton, Mining Association of Canada); RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 29 September 2016 (Gregory Bowes, Chief Executive Officer, Northern Graphite Corporation).

53 RNNR, [Evidence](#) (Gratton, Mining Association of Canada).

54 RNNR, [Evidence](#) (Bowes, Northern Graphite Corporation).

55 RNNR, [Evidence](#) (Schwann, Saskatchewan Mining Association); [Evidence](#) (Austin, Cameco Corporation).

56 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 22 September 2016 (Susanna Cluff-Clyburne, Director, Parliamentary Affairs, Canadian Chamber of Commerce).

57 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 29 September 2016 (Ross Beaty, Chairman, Pan American Silver Corporation).

In addition to these views, several witnesses also saw room for improvement in Canada's EIA processes, for example:

- Ms. Schwann stated that the “constant review” of federal environmental legislation over the past decade is contributing to investor uncertainty. She discussed a uranium mine project in northern Saskatchewan – representing 400 long-term jobs and a \$2 billion investment – that did not proceed due to uncertainty stemming from the designation of woodland caribou as *threatened* under the *Species at Risk Act* (SARA) and the implications of that designation with regard to habitat and species protection. Ms. Schwann also stated that introducing concepts such as “free, prior and informed consent” to Indigenous consultation requirements under the CEAA review process creates “confusion and uncertainty.”<sup>58</sup>
- Mr. Gratton told the Committee that ever since the *Canadian Environmental Assessment Act* (CEAA) and the *Fisheries Act* were amended, “federal oversight of mining is greater than ever, intrusion into provincial jurisdiction is growing, duplication with provinces remains, and coordination with provinces in environmental assessment has deteriorated.” Mr. Gratton is especially concerned with “how cumulative effects are addressed for CEAA projects, and the interplay with the *Species at Risk Act*.”<sup>59</sup> He noted that three mine projects were found to have a “significant adverse effect on the region” under federal EIA processes, a finding he attributed to uncertainty about the actual cumulative impact of mining relative to other activities.<sup>60</sup>
- Mike McDougall of the Klondike Placer Miners’ Association identified issues such as “costly and time-consuming reassessments for unchanged projects, inconsistency and lack of accountability between designated offices, and a lack of clear timelines” as shortcomings of EIA processes.<sup>61</sup>
- Mr. Bowes told the Committee that regulators changed or introduced requirements during an EIA process without explanation, leading to “additional costs, expenses and delays.”<sup>62</sup>

In discussing ways to improve Canada's EIA processes, some witnesses called for more balance in weighing the needs of economic development and industry with environmental, social and Indigenous concerns,<sup>63</sup> while others emphasized the importance

---

58 RNNR, [Evidence](#) (Schwann, Saskatchewan Mining Association).

59 RNNR, [Evidence](#) (Gratton, Mining Association of Canada).

60 Ibid.

61 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 25 October 2016 (Mike McDougall, President, Klondike Placer Miners' Association).

62 RNNR, [Evidence](#) (Bowes, Northern Graphite Corporation).

63 RNNR, [Evidence](#) (Bowes, Northern Graphite Corporation); [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission).

of bound timelines as a means of improving the predictability of the regulatory process.<sup>64</sup> Mr. Gratton thinks the CEAA should “still have the rigour of timelines, but [...] include some flexibility to work with provincial governments.”<sup>65</sup> He advised that timelines consider the regulatory processes enforced by all levels of government.<sup>66</sup> Similarly, Mr. Bowes stated that Canada’s EIA processes need to be “simplified” and “streamlined” with greater substitution between equivalent federal and provincial EIA processes, where appropriate.<sup>67</sup> Finally, Mr. Beaty argued that “applying an economic value to natural capital in assessing the impact of mining will help quantify the loss of natural lands and the mitigation needs.”<sup>68</sup>

#### **D. Carbon pricing**

For an industry known to be “emissions-intensive and trade exposed” (EITE), mining emits more greenhouse gases (GHG) than the industrial average, while selling globally-traded commodities at prices set by international markets.<sup>69</sup> In view of the carbon pricing system recently announced by the federal government, the cost of carbon-emitting fuels – such as gasoline, diesel, natural gas, and coal – is expected to rise. For mining firms that have no choice but to use fossil fuels in their operations, a carbon tax will incur a direct increase to their operational expenses.

The Committee heard varying opinions with regards to the potential impacts of a carbon price on the mining sector. Some witnesses saw carbon pricing as an incentive to advance innovation and energy efficiency in the sector.<sup>70</sup> For example, Jean Robitaille of CMIC stated that carbon pricing would “force the industry to develop new technologies and new ways of operating to reduce the use of vast quantities of fossil fuels.”<sup>71</sup> In addition, Mr. Beaty stated that a carbon tax is “the best and most transparent way of applying a price on pollution and encouraging innovation to reduce emissions,” and is likely to lead to the development of “a really strong, innovative clean tech industry,” with economic benefits in other sectors of the economy.<sup>72</sup> According to these witnesses, even though carbon pricing may be costly in the short term, it should encourage innovations that will lead to cost savings and improved productivity over the long-term.

On the other hand, some witnesses expressed concern that carbon pricing would make certain operations unprofitable (or less profitable), thereby affecting the economic

---

64 RNNR, [Evidence](#) (Austin, Cameco Corporation); [Evidence](#) (Bowes, Northern Graphite Corporation); [Evidence](#) (McDougall, Klondike Placer Miners' Association); [Evidence](#) (McEachern, Canadian Association of Mining Equipment and Services for Export); [Evidence](#) (Zahovskis, Northcliff Resources); [Evidence](#) (Gratton, Mining Association of Canada).

65 RNNR, [Evidence](#) (Gratton, Mining Association of Canada).

66 Ibid.

67 RNNR, [Evidence](#) (Bowes, Northern Graphite Corporation).

68 RNNR, [Evidence](#) (Beaty, Pan American Silver).

69 RNNR, [Evidence](#) (McDougall, Klondike Placer Miners' Association).

70 RNNR, [Evidence](#) (Beaty, Pan American Silver); RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 18 October 2016 (Jean Robitaille, Chair, Canada Mining Innovation Council); [Evidence](#) (Austin, Cameco Corporation).

71 RNNR, [Evidence](#) (Robitaille, CMIC).

72 RNNR, [Evidence](#) (Beaty, Pan American Silver).

feasibility of some projects.<sup>73</sup> Mr. McDougall told the Committee that the new tax would raise the operational costs of the placer mining industry considerably, given that industry's heavy reliance on diesel-powered equipment.<sup>74</sup> Similarly, Mr. Mason and Mr. Angus were both concerned that new mine developments in their region may not proceed if new input costs are imposed on the industry, particularly in a low commodity price environment.<sup>75</sup>

To account for the EITE and cyclical characteristics of the mining business, some witnesses recommended that the government reduce the cost burden of carbon pricing for the mining sector.<sup>76</sup> For example, Mr. Beaty recommended that carbon pricing systems include offsets for certain internationally-traded products to protect the competitiveness of Canadian exporters against suppliers in countries with no carbon tax.<sup>77</sup> Furthermore, Mr. Bowes suggested that commodity industries should be allowed to “build up credits in good years that could be used in bad years [...] to help to smooth out [their business] cycles.”<sup>78</sup>

With regards to the revenue collected by governments through carbon pricing, Mr. McDougall told the Committee that the funds should be returned to the companies, either directly through income tax rebates or “as an incentive in some other form to try to reduce [the industry's] use of fossil fuels [...]”<sup>79</sup> John Mullally of Goldcorp suggested that the \$8 billion in carbon price revenues expected to be raised by the Government of Ontario by 2020 could be used to build infrastructure in northern Ontario.<sup>80</sup>

Finally, some witnesses discussed alternatives to carbon pricing with the same objective of reducing the sector's greenhouse gas emissions. Sarah Fedorchuk of Mosaic told the Committee that her company “strongly supports additional efforts to reduce emissions through offsets, cogeneration, carbon capture and storage, and energy efficiency.”<sup>81</sup> Moreover, Mr. McDougall told the Committee that low-interest loans for efficiency upgrades and renewable electricity production, accelerated capital cost allowances on new equipment purchases, pilot projects to field test new technologies, and

---

73 RNNR, [Evidence](#) (Robitaille, CMIC); [Evidence](#) (Angus, Northwestern Ontario Municipal Association); [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission); [Evidence](#) (McDougall, Klondike Placer Miners' Association).

74 RNNR, [Evidence](#) (McDougall, Klondike Placer Miners' Association).

75 RNNR, [Evidence](#) (Angus, Northwestern Ontario Municipal Association); [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission).

76 RNNR, [Evidence](#) (Beaty, Pan American Silver); [Evidence](#) (Bowes, Northern Graphite Corporation); [Evidence](#) (Dirom, Association for Mineral Exploration British Columbia); [Evidence](#) (McDougall, Klondike Placer Miners' Association).

77 Ibid.

78 RNNR, [Evidence](#) (Bowes, Northern Graphite Corporation).

79 RNNR, [Evidence](#) (McDougall, Klondike Placer Miners' Association).

80 RNNR, [Evidence](#) (Mullally, Goldcorp).

81 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 4 October 2016 (Sarah Fedorchuk, Senior Director, Public Affairs, Mosaic).

educational programs are options that the Klondike Placer Miners' Association would like to see explored.<sup>82</sup>

## FOSTERING INNOVATION IN MINING TECHNOLOGY AND PRACTICES

Based on evidence from the witnesses, the following sections discuss the challenges and opportunities facing Canadian mining innovation in three areas: a) the industry's overall capacity to develop and commercialize mining innovations; b) the productivity and cost effectiveness of mining operations, including energy efficiency and ways to improve exploration practices and develop niche commodities for emerging markets; and c) waste management and environmental reclamation.

### A. Collaborative Innovation: from Research to Commercialization

In a cyclical industry with high capital costs and long investment horizons, mining companies are cautious to adopt unproven technologies and processes.<sup>83</sup> In discussing barriers to supporting mining innovation, some witnesses expressed the need for funding mechanisms that support the full innovation cycle, from the research to the commercialization stage.<sup>84</sup> According to Mr. Weatherell, "the existing funding mechanisms to support research, development, and innovation – over 7,000 – are generally focused on research in academia, restricted to select regions of Canada, and are generally incompatible with the requirements of mining-related innovation projects."<sup>85</sup> Furthermore, Douglas Morrison of the Centre for Excellence in Mining Innovation (CEMI) argued that innovation funding is disproportionately allocated to research compared to commercialization. He stated the following:

The fact is that we have 30 years of research in the Sudbury basin on our deep mines, and very little of that has actually moved off into industry to be commercialized. It's because we don't have the mechanisms. It's not just finishing up with the research report, and then somehow it magically becomes a product. It doesn't. You go from a bench scale, [...] to pilot scale, to operational scale, to full-scale field trial, then to commercialization of that field-trial result. The money that you have to spend to make those things happen, especially in a heavy industry like mining, is getting bigger and bigger all the time. One of the issues for us is the funding ratios for government funds versus industry funds. Right now it's dollar to dollar. You can see that the cost of innovation is very much larger when you move up through building physical machines and plants to do things more efficiently. That's much more expensive than large-scale trials and academic studies, yet the ratio we have to work with is still 1:1, exactly the same as for research.<sup>86</sup>

Similarly, Richard Adamson of the Carbon Management Canada (CMC) Research Institutes used his organization as an example to make the point that certain innovations

---

82 RNNR, [Evidence](#) (McDougall, Klondike Placer Miners' Association).

83 RNNR, [Evidence](#) (Jarvis, NRCan); [Evidence](#) (Mell, PearTree Financial Services).

84 RNNR, [Evidence](#) (Pakalnis, Mirarco Mining Innovation); [Evidence](#) (Weatherell, CMIC); RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 3 November 2016 (Douglas Morrison, President and Chief Executive Officer, Centre for Excellence in Mining Innovation).

85 RNNR, [Evidence](#) (Weatherell, CMIC).

86 RNNR, [Evidence](#) (Morrison, CEMI).

do not benefit enough from the current funding system. He stated that CMC, which addresses barriers to advancing climate-related technologies from the research to the commercialization stage, “is itself an innovation; as such, it does not fit easily into the traditional funding models available to universities [and] for-profit technology developers.”<sup>87</sup>

The Committee also heard that research and innovation efforts across the mining sector are diffuse and would benefit from further collaboration. Ms. Campbell Jarvis cited research from the Canadian Chamber of Commerce estimating that there are 4,000 R&D programs and 40 different mining innovation research organizations across Canada that are “not necessarily connected.” She argued that the greatest potential for mining innovation “will not come from developing technology alone but from a broader industry-level systems model and process approach that builds platforms and integrates technology, data, and information – the so-called Internet of things [...]”<sup>88</sup>

One major industry-wide innovation is the Canada Mining Innovation Council (CMIC) – an umbrella organization that was created with the endorsement of the federal, provincial, and territorial ministers of energy and mines.<sup>89</sup> It employs a collaborative open innovation model to address industry-defined challenges, with members from academia, government, research laboratories, Fortune 500 companies, start-ups and small and medium-sized enterprises (SMEs), and Indigenous-operated businesses. According to Mr. Weatherell:

CMIC created an innovation strategy for the industry called *Towards Zero Waste Mining*. *Towards Zero Waste Mining* defines the future of the industry in 10-plus years by focusing on the grand challenges common to the industry related to energy, environment, and productivity. [...] With *Towards Zero Waste Mining* and CMIC, we're proposing a new model for innovation. This is how we're doing industry-led innovation that reduces the risk we've already identified.<sup>90</sup>

Mr. Robitaille added that a roadmap is being drafted to align all companies to a common goal. Industry is involved in the management board and various technical committees “to ensure that the project is really geared to the needs that may have an impact and bring the Canadian mining industry to another level.”<sup>91</sup>

## **B. Productive Mining: from Exploration to Value-Added Products**

The Committee heard of a wide range of innovations, technologies and initiatives that aim to improve mining operations from the exploration stage to the development of value-added products for strategic and emerging markets. The following are some of the areas highlighted by the witnesses:

---

87 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 1 November 2016 (Richard Adamson, President, CMC Research Institutes).

88 RNNR, [Evidence](#) (Jarvis, NRCan).

89 RNNR, [Evidence](#) (Weatherell, CMIC).

90 Ibid.

91 RNNR, [Evidence](#), (Robitaille, CMIC).

- **Facilitating research for more targeted mineral exploration:** Research efforts, such as the Metal Earth initiative, could facilitate mining exploration by identifying and targeting the most promising sites for mineral development, particularly in large areas of land such as Canada's north and far north.<sup>92</sup> The initiative comprises 21 partners and uses data from six geological surveys representing 70% of Canada's land mass.<sup>93</sup>
- **Increasing productivity with digital and autonomous equipment:** The digitization of underground mining using smart control and tele-remote equipment could allow companies to operate more continuously and rely less on personnel at the rock face.<sup>94</sup> In addition, the application of unmanned aerial vehicles (UAVs) could potentially be used to guide the development process in surface mines (e.g., by identifying unstable rock conditions and assessing the particle size distribution of fragmented rock piles).<sup>95</sup> While autonomous mines already exist in other parts of the world, tailoring them to mining in northern climates could make the Canadian industry "a world-class leader in this space."<sup>96</sup>
- **Enhancing the energy efficiency and air quality of underground mining systems:** Electric and battery-powered equipment is more energy efficient, less polluting and has lower maintenance cost than diesel-powered equipment.<sup>97</sup> In underground mines, ventilation accounts for 40% of energy consumption and costs about \$10 million for an average-sized mine; automation could help reduce this energy consumption by 20% to 50%.<sup>98</sup>
- **Reducing energy consumption in comminution:** Grinding and crushing ore into smaller particles (i.e., comminution) is an energy-intensive process that accounts for an estimated 30% to 40% of the industry's energy demand, and about 2% of global electricity consumption.<sup>99</sup> CMIC has identified a technology with the potential to reduce the energy

---

92 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 25 October 2016 (Harold Gibson, Professor and Metal Earth Director, Mineral Exploration Research Centre, Laurentian University of Sudbury).

93 RNNR, [Evidence](#) (Gibson, Laurentian University of Sudbury).

94 RNNR, [Evidence](#) (Mullally, Goldcorp).

95 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 18 October 2016 (Brent Sleep, Professor, Department of Civil Engineering, University of Toronto).

96 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 3 November 2016 (Ginny Flood, Vice-President, Government Relations, Suncor Energy Inc.).

97 RNNR, [Evidence](#) (Mullally, Goldcorp).

98 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 4 October 2016 (Magdi Habib, Director General, CanmetMINING, Minerals and Metals Sector, Department of Natural Resources).

99 RNNR, [Evidence](#) (Sleep, University of Toronto).

used in comminution by 50%. The technology would be developed over three phases for an estimated total cost of \$6 million to \$11 million.<sup>100</sup>

- **Reducing GHG emissions in *in situ* oil sands extraction:** According to Ginny Flood of Suncor Energy, the oil sands industry is “keenly aware of the focus currently being placed on the transition to a low carbon economy.” The industry is investing in new technologies to reduce the GHG emission intensity of oil sands mining, including waterless extraction processes, froth-treatment technologies, autonomous haul systems, solvent and microwave-assisted *in situ* extraction processes, and more efficient steam generation technology.<sup>101</sup>
- **Developing innovative methods to produce value-added commodities:** KWG Resources Inc. has developed a natural-gas-based technology for the beneficiation of chromite that is 80% more environmentally friendly than current electric arc technology. According to Mr. Smeenk, commercializing the new technology, which is currently being tested by NRCan’s CANMET lab, would make Canada the world’s lowest-cost producer of ferrochrome, and enable the industry to export the value-added commodity to countries like South Africa and China where ferrochrome production is costlier, less efficient and more harmful for the environment.<sup>102</sup>

The Committee heard that many mining companies are interested in switching from equipment that runs on fossil fuels to electric systems powered by alternative, renewable or lower-emission energy sources.<sup>103</sup> Currently, fossil fuels, particularly diesel, are the primary fuel for mining operations, and many alternative technologies fall short of technical and/or economic feasibility. According to Mr. Pakalnis, part of the challenge is the transition cost of technology upgrades. He stated the following:

We have to move from diesel underground to all electric. There are a number of companies that are already starting to supply different types of scooptrams and a variety of different vehicles. [...] but we have a transition issue. We have thousands of pieces of equipment that cost a fortune. One scooptram underground costs you a million bucks, so you’re not going to just discard that, especially when the mining industry is in tough shape right now because of the commodity prices. You have to develop a transition plan. Eventually, new mines will probably go all electric, but in the meantime we have to get to cleaner diesel filters and that sort of thing.<sup>104</sup>

Mr. Campbell added that mining requires baseload energy supply (i.e., continuous power, 24 hours a day, 7 days a week), which limits the applicability of some renewable

---

100 RNNR, [Evidence](#) (Weatherell, CMIC).

101 RNNR, [Evidence](#) (Flood, Suncor Energy).

102 RNNR, [Evidence](#) (Smeenk, KWG Resources).

103 RNNR, [Evidence](#) (McDougall, Klondike Placer Miners’ Association).

104 RNNR, [Evidence](#) (Pakalnis, Mirarco Mining Innovation).

options.<sup>105</sup> For example, he explained that in the absence of grid power in remote mines, even electric equipment would need to be powered by diesel:

[...] if I have electric equipment underground and I need to power my mine with a diesel generator, it doesn't really make much difference: I'm still burning that diesel fuel. All of the other green solutions that are currently available to us, in terms of wind and solar, are not ones that can effectively run a mine in the north. When you have a mine 300 kilometres away from anything else, your first concern is to make sure you don't kill anybody. We need a power source that we can rely on 24/7. Right now the only thing the industry has is diesel. Yes, we'd love to have electric power, but we need a grid to get to those mines to do that.<sup>106</sup>

On the other hand, Mr. Beaty told the Committee that, while renewable sources are typically intermittent forms of energy not ideally suited as a baseload power supply, “[they] can be adjunct, especially in places where mines rely on diesel power, which is typically imported from far away.” He stated the following:

[Diesel] is expensive power. You can decrease the cost of that using the new reality of renewable energy, which is that it's competitive with almost every other form of electricity generation. Costs are coming down quickly in those businesses, and this is just good business. Almost every mine that I know of is looking at putting in renewable energy as an adjunct to their existing forms of energy generation, electricity generation. It's just good business to do it. It decreases your costs.<sup>107</sup>

Other alternative energy sources include nuclear power, which is non-emitting and costs “five times less than diesel,” according to Mr. Pakalnis.<sup>108</sup> He highlighted the potential role of small modular reactors (SMRs) to power mining operations:

[...] I was talking with Bruce Power about a research project on small modular nuclear batteries, so to speak, 20 to 30 megawatts, where you can put them in a small mining operation. Then you can mine it out, and you can put it somewhere else. In other words, you would not have all the transmission lines that have to be built. If we develop that particular source of energy, we'd be able to meet those greenhouse gas targets, [and] increase our production as well.<sup>109</sup>

One of the main challenges associated with electrifying mining operations is related to the technical limitations of market-available battery storage technologies. As Mr. Mullally explained, lifting heavy material using batteries or electric equipment is still problematic using market-available technologies, particularly in terms of the battery's life and charging cycle. While Goldcorp is on the verge of adopting near commercialized battery-operated equipment, Mr. Mullally thinks that emerging electric equipment still short of commercialization represents a “huge opportunity for Goldcorp, the industry, and for government to see significant improvements in mining's performance with respect to energy, clean technologies, and health and safety.”

---

105 RNNR, [Evidence](#) (Beaty, Pan American Silver).

106 RNNR, [Evidence](#) (Campbell, NWT & Nunavut Chamber of Mines).

107 RNNR, [Evidence](#) (Beaty, Pan American Silver).

108 RNNR, [Evidence](#) (Pakalnis, Mirarco Mining Innovation).

109 Ibid.

According to Brian St. Louis of Avalon Advanced Materials Inc., the production of battery-grade lithium hydroxide from lithium minerals represents an emerging business that requires innovative new processing technology. Lithium production and refining is different from traditional commodities in terms of investment risk and opportunity. He explained:

The risks and challenges are more similar to a new manufacturing venture in that the developer is essentially bringing a new refined chemical product to market and needs to invest in downstream processing infrastructure and to develop relationships with customers. The upside for Canada in leveraging its natural resource wealth in critical materials is to build out the full supply chain for energy storage and electric vehicles rather than just being an exporter of the unrefined raw materials.<sup>110</sup>

Mr. Bowes further highlighted the economic potential of battery storage technologies, stating that the international lithium ion battery industry is already worth \$20 billion, and growing by more than 20% each year.<sup>111</sup> While this growth is mainly for use in smaller devices like cell phones, laptops and power tools, Mr. Bowes suggested that a much larger market for battery storage is emerging for use in electric vehicles and power grids, which is further increasing the global demand for commodities like lithium and graphite (another key component in lithium ion batteries).<sup>112</sup> Mr. St. Louis reiterated this view, stating that “lithium ion battery technology has evolved and continues to evolve to become the energy storage solution for electric vehicles and other emerging applications such as home and grid energy storage as the world transitions to a low-carbon economy.”<sup>113</sup>

### C. Environmental Reclamation

Different mine sites have varying potential for environmental reclamation. As Brent Sleep of the University of Toronto explained, in Canada and globally, the sites that are easy to clean up (e.g., ones with contaminants near the ground's surface in permeable grounds) have already been cleaned up using a wide range of available technologies. At the other end of the spectrum, he added, there are sites that are more difficult to clean up due to challenges that remediation scientists still struggle to address – for example, sites with contaminants hidden deep in fractured rock, including polychlorinated biphenyls (PCBs) or heavy metals that are difficult to remove.<sup>114</sup>

The witnesses discussed a wide range of innovations that aim to improve the industry's waste management and environmental reclamation practices, including ones with potential to generate new revenue streams for mining companies. For example:

- CanmetMINING has developed a technology that uses mine waste as an alternative to Portland cement. According to Magdi Habib, the

---

110 RNNR, [Evidence](#) (St. Louis, Avalon Advanced Materials).

111 RNNR, [Evidence](#) (Bowes, Northern Graphite Corporation).

112 Ibid.

113 RNNR, [Evidence](#) (St. Louis, Avalon Advanced Materials).

114 RNNR, [Evidence](#) (Sleep, University of Toronto).

implementation of this technology would reduce GHG emissions by up to 90% in certain sites, while decreasing the quantity of mine waste and saving an estimated 50% on backfill binder costs.<sup>115</sup>

- Green mining techniques could use organic waste, such as municipal compost and forestry biomass, to reclaim mine lands by growing energy crops. According to Mr. Habib, “some estimates suggest that oilseed production on mine tailings would generate approximately 3,600 litres per hectare, and CanmetMINING research estimated [that] a profit of approximately \$900 per hectare per year could be achieved.”<sup>116</sup>
- Carbon capture and storage (CCS) technologies could make use of mine tailings to capture carbon (from carbon dioxide, CO<sub>2</sub>) in mineral form. According to Mr. Adamson, a research team at the University of British Columbia has developed approaches “to accelerate the absorption of atmospheric CO<sub>2</sub> that could allow individual mines to offset carbon emissions from mine operations, possibly even becoming net carbon sinks.” The team has developed a tool box approach, in collaboration with international mining companies, providing CO<sub>2</sub> solutions “tailored to individual site characteristics.” They now face the challenge of scaling up their research for demonstration under real operating conditions.<sup>117</sup>
- Optimization technologies could use mining waste to produce new products (e.g., mixtures of materials with characteristics that respond to the growth of certain trees and plants).<sup>118</sup> In the oil sands sector, Canada’s Oil Sands Innovation Alliance (COSIA) has created a \$20-million prize, known as the X-Prize, for innovations from around the globe that aim to use carbon emissions as a product rather than atmospheric waste.<sup>119</sup>

As discussed in previous sections, the Committee heard that many of the mining industry’s common environmental concerns can be addressed through sector-wide strategies, such as CMIC’s *Towards Zero Waste Mining*.<sup>120</sup>

## **ENABLING MEANINGFUL ENGAGEMENT WITH INDIGENOUS PEOPLES**

The Crown, at both the federal and provincial level, has a constitutional duty to consult and, where appropriate, accommodate Indigenous peoples on resource

---

115 RNNR, [Evidence](#) (Habib, NRCan).

116 Ibid.

117 RNNR, [Evidence](#) (Adamson, CMC Research Institutes).

118 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 3 November 2016 (Roussos Dimitrakopoulos, Professor, Mining and Materials Engineering Department, McGill University).

119 RNNR, [Evidence](#) (Flood, Suncor Energy).

120 RNNR, [Evidence](#) (Weatherell, CMIC).

development projects.<sup>121</sup> As the Honourable Bob Rae of Olthuis Kleer Townsend explained, “the Supreme Court has made it clear that the provincial government is as much the Crown as the federal government with respect to resource development. At the same time, the federal government has key jurisdiction [...under the Constitution], to take responsibility for issues affecting aboriginal people.”<sup>122</sup>

The Committee heard that developing positive relationships between mining companies and local Indigenous communities can have mutual benefits for both parties. From the industry’s perspective, it is good business practice for mining companies to obtain “social license” in the communities where they intend to operate.<sup>123</sup> According to Michael Fox of PDAC, “the industry recognizes that it is critical to develop and maintain robust, open, and trusting relationships with aboriginal communities affected by, or with an interest in, mineral exploration and mining activities.”<sup>124</sup> Moreover, mining can contribute to socioeconomic development in Indigenous communities, especially in remote and northern regions, where resource development can bring new employment and business opportunities, as well as legacy infrastructure for the benefit of generations to come.<sup>125</sup> As Mr. Campbell explained:

Over the past 25 years, with the discovery of diamonds in the Northwest Territories, the mining industry has made even greater strides in aboriginal communities, creating thousands of person-years of employment, supporting a wave of new aboriginal businesses, and producing a flow of millions in taxes and royalties, not only to public governments but now to aboriginal governments too. Mining has significantly catalyzed the creation of a middle class in the aboriginal communities in the north.<sup>126</sup>

Impact benefit agreements (IBAs) are one way for companies and Indigenous communities to align their interests through benefit sharing. Nearly 500 IBAs have been signed between the mining industry and Indigenous peoples in Canada since 1974, with over 350 signed in the past decade.<sup>127</sup> As Mr. Fox explained, each IBA is unique:

The content of agreements varies depending on a number of factors, particularly with the type and stage of a project, as well as the potential impacts of a project on communities. Company-community agreements contain provisions related to employment, preferential contracting and joint ventures, capacity funding, environmental measures and monitoring, traditional land use and knowledge provisions, training programs, shares and warrant

---

121 RNNR, [Evidence](#) (Rae, Olthuis Kleer Townsend); RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 27 October 2016 (Sheilagh Murphy, Assistant Deputy Minister, Lands and Economic Development, Department of Indian Affairs and Northern Development).

122 RNNR, [Evidence](#) (Rae, Olthuis Kleer Townsend).

123 RNNR, [Evidence](#) (Batise, Wabun Tribal Council); [Evidence](#) (Gratton, Mining Association of Canada).

124 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 3 November 2016 (Michael Fox, Co-Chair, Aboriginal Affairs Committee, Prospectors and Developers Association of Canada).

125 RNNR, [Evidence](#) (Campbell, NWT & Nunavut Chamber of Mines).

126 Ibid.

127 RNNR, [Evidence](#) (Fox, PDAC); [Evidence](#) (Murphy, Department of Indian Affairs and Northern Development); [Evidence](#) (Gratton, Mining Association of Canada).

opportunities, infrastructure opportunities, financial provisions, confidentiality clauses, and dispute resolutions and implementation mechanisms.<sup>128</sup>

While IBAs are voluntary, they have become a virtual requirement for companies operating in or around Indigenous territory. According to Jason Batise of the Wabun Tribal Council, they provide companies with social license to operate and are “mandatory” for any mining company that intends to develop new mines or extract new minerals in Wabun territory. The Wabun Tribal Council also requires exploration companies operating in its territory to sign exploration agreements, addressing financial compensation, business opportunities, employment and training, elders’ knowledge, environmental considerations, and future IBA negotiations should a mine be developed.<sup>129</sup> Other effective mechanisms to engage Indigenous communities include co-management boards, as well as committees and working groups that address different aspects of resource development.<sup>130</sup>

In light of the aforementioned legal and voluntary efforts to enhance relations between industry and Indigenous peoples, the Committee heard that there is room for improvement in the current consultation and engagement process. Many witnesses expressed that navigating the responsibilities, requirements, and relationships implicated by the Crown’s duty to consult can be challenging and uncertain in practice.<sup>131</sup> For example, Ms. Cluff-Clyburne stated the following:

Governments can delegate the procedural aspects of their duty directly to businesses, usually by mandating consultation with indigenous peoples as part of the regulatory process. The lack of a clear framework for if, when, and how this delegation can occur and for the roles of the Crown, business, and Indigenous peoples often causes confusion, and this can lead to projects being delayed and even being cancelled.<sup>132</sup>

Furthermore, there is concern that many Indigenous communities in Canada have insufficient capacity to engage meaningfully in resource development issues, which can undermine the industry’s ability to attain social acceptance, as well as the Crown’s duty to consult.<sup>133</sup> As Mr. Fox explained, there are two types of capacity when it comes to Indigenous communities and resource development: one is the capacity to understand the project and its impact on their communities; the other is the capacity to participate in the regulatory and environmental assessment process.<sup>134</sup> He listed the following barriers to realizing multi-stakeholder benefits from mining projects:

---

128 RNNR, [Evidence](#) (Fox, PDAC).

129 RNNR, [Evidence](#) (Batise, Wabun Tribal Council).

130 RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 27 October 2016 (Stephen Van Dine, Assistant Deputy Minister, Northern Affairs Organization, Department of Indian Affairs and Northern Development); [Evidence](#) (Willy, Des Nedhe Development); [Evidence](#) (Schwann, Saskatchewan Mining Association); [Evidence](#) (Zahovskis, Northcliff Resources).

131 RNNR, [Evidence](#) (St. Louis, Avalon Advanced Materials); [Evidence](#) (Zahovskis, Northcliff Resources); [Evidence](#) (Rae, Olthuis Kleer Townsend); [Evidence](#) (Mullally, Goldcorp); [Evidence](#) (Fox, PDAC); [Evidence](#) (Murphy, Department of Indian Affairs and Northern Development); [Evidence](#) (Cluff-Clyburne, Canadian Chamber of Commerce).

132 RNNR, [Evidence](#) (Cluff-Clyburne, Canadian Chamber of Commerce).

133 RNNR, [Evidence](#) (Fox, PDAC).

134 Ibid.

Awareness gaps between companies and communities; skill gaps and capacity issues in communities; Crown-Aboriginal legacy issues; socio-economic conditions; health, education, and social issues; land tenure uncertainties; jurisdictional issues and unsettled land claims; government resource revenue sharing; resource benefit sharing; and, the duty-to-consult challenges across Canada.<sup>135</sup>

Now that the Government of Canada has signaled that it would support the UN Declaration on the Rights of Indigenous People (UNDRIP) – including the principle of free, prior and informed consent (FPIC) – witnesses stated that more clarity is needed on what is expected of mining companies in terms of Indigenous consultation.<sup>136</sup> In the words of Mr. Mullally, Canada needs “a principled framework that aligns interests for industry, First Nations, and government, and that potentially get people to a better understanding, a consensus, over what projects work and don’t work.”<sup>137</sup> Sean Willy of Des Nedhe Development explained that Indigenous people want to be treated as partners and are generally supportive of environmentally sound resource development. He stated:

Our communities want to ensure that their views and inputs are incorporated throughout the development of mineral resources, especially when it comes to environmental planning, monitoring, and into decommissioning. The bottom line is that Indigenous communities will support mining development, but not at the expense of a poor environmental stewardship plan.<sup>138</sup>

Moreover, witnesses said that companies must communicate early, often, and transparently with Indigenous communities.<sup>139</sup> The Committee heard that good industry-community relations require meaningful engagement,<sup>140</sup> and that companies should be open to modifying their development plans in order to address Indigenous concerns adequately.<sup>141</sup> In reference to the growing legal framework for Indigenous participation in resource development decisions, both in Canada and internationally, Mr. Rae told the Committee that “[we are] living in a world in which the question of how to successfully engage First Nations is the key to future resource development.”<sup>142</sup>

---

135 Ibid.

136 RNNR, [Evidence](#) (St. Louis, Avalon Advanced Materials); [Evidence](#) (Rae, Olthuis Kleer Townsend); [Evidence](#) (Mullally, Goldcorp); [Evidence](#) (Schwann, Saskatchewan Mining Association).

137 RNNR, [Evidence](#) (Mullally, Goldcorp).

138 RNNR, [Evidence](#) (Willy, Des Nedhe Development).

139 RNNR, [Evidence](#) (Fox, PDAC); [Evidence](#) (Mason, Thunder Bay Community Economic Development Commission); [Evidence](#) (Batise, Wabun Tribal Council); [Evidence](#) (St. Louis, Avalon Advanced Materials); [Evidence](#) (Hollings, Lakehead University).

140 RNNR, [Evidence](#) (Batise, Wabun Tribal Council); [Evidence](#) (Fox, PDAC); [Evidence](#) (Willy, Des Nedhe Development); RNNR, [Evidence](#), 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament, 3 November 2016 (Glenn Nolan, Vice-president of Government Affairs, Noront Resources Ltd.); [Evidence](#) (Rae, Olthuis Kleer Townsend); RNNR, [Evidence](#) (Mullally, Goldcorp).

141 RNNR, [Evidence](#) (Zahovskis, Northcliff Resources).

142 RNNR, [Evidence](#) (Rae, Olthuis Kleer Townsend).

## DEVELOPING A SKILLED LABOUR FORCE

The Committee heard that developing a skilled labour force is a prerequisite for a competitive mining industry. According to Richard Paquin of Unifor, the skilled trades across Canada will be 80,000 workers short of demand within the next five years.<sup>143</sup> On the other hand, certain groups, namely women and Indigenous people have long been underrepresented in the mining sector.<sup>144</sup>

Indigenous people may have more difficulty acquiring mining jobs because of barriers to attaining educational and training opportunities. For example, Peter Hollings of Lakehead University explained that many Indigenous youth have difficulty getting through high school; their main challenge is “not getting through university, it’s getting to university.”<sup>145</sup> Indeed, according to Mr. Sleep, of the first year intake of 22 students in the University of Toronto’s mining engineering program, not one is an Indigenous person.<sup>146</sup> Similarly, Mr. Pakalnis – who told the Committee of his school’s pride to have graduated Canada’s only Indigenous Ph.D. mining engineer last year – thinks there should be far more Indigenous students in post-secondary mining programs across Canada.<sup>147</sup>

In light of these challenges, witnesses described two strategies for increasing the number of Indigenous people working in mining: 1) targeting Indigenous students at all levels from early childhood through to post-secondary to develop the knowledge and skills that will be in demand by the sector in the future, and 2) training local Indigenous populations to develop the skills needed in the sector today.<sup>148</sup> Glenn Nolan of Noront Resource Ltd. argued that addressing these elements would:

[Lay] a foundation for building awareness of the industry and building trust within the community. It showcases the importance of continuing education for students, not just for mining jobs but for the opportunities advanced education allows. [...] Any time you put people to work, you're creating a legacy, you're building skills, you're building knowledge, and you're building experience they can take elsewhere, if that's the opportunity and that's their desire in the future. [...] In regard to sustainability, while the ore resource might be diminished or taken away, what you have is a group of trained individuals and companies that can then provide opportunities elsewhere, or go elsewhere for the same kind of work, or deliver the same kind of service.

Some witnesses called for the federal government to increase funding for on-reserve schooling by matching the provincial funding and removing the 2% per year cap on Indigenous education funding.<sup>149</sup> Other witnesses called for post-secondary recruitment programs and incentives that aim to increase the intake of Indigenous students to

---

143 RNNR, [Evidence](#) (Paquin, Unifor).

144 RNNR, [Evidence](#) (Neumann, United Steelworkers).

145 RNNR, [Evidence](#) (Hollings, Lakehead University).

146 RNNR, [Evidence](#) (Sleep, University of Toronto).

147 RNNR, [Evidence](#) (Pakalnis, Mirarco Mining Innovation).

148 RNNR, [Evidence](#) (Nolan, Noront Resources); [Evidence](#) (Batise, Wabun Tribal Council); [Evidence](#) (Pakalnis, Mirarco Mining Innovation); [Evidence](#) (Gibson, Laurentian University of Sudbury).

149 RNNR, [Evidence](#) (Willy, Des Nedhe Development); [Evidence](#) (Batise, Wabun Tribal Council).

mining programs.<sup>150</sup> Finally, some witnesses recommended targeted programs that expose Indigenous students to mining careers from an early age – from kindergarten through to secondary school.<sup>151</sup>

The Committee also heard of existing opportunities for Indigenous adults to continue their education and develop qualifications for potential employment in the mining sector. The *Aboriginal Skills and Employment Training Strategy* and the *Skills and Partnership Fund* are examples of such programs, administered by Employment and Social Development Canada.<sup>152</sup> Furthermore, some IBAs contain provisions that require companies to provide scholarships to Indigenous students for post-secondary education.<sup>153</sup> The Committee also heard about educational partnerships that address the specific needs of the industry and Indigenous communities, such as the partnership between Noront Resources Ltd., the Matawa First Nations Employment and Training Services, and Confederation College in Thunder Bay that provides professional development training and advice to members of Matawa communities with interest in mining careers.<sup>154</sup>

## RECOMMENDATIONS

Based on the evidence presented in the previous sections, the Committee recommends the following:

- 1. The Committee recommends that the Government of Canada continue to encourage investment in mining exploration activities:**
  - a) by renewing the Mineral Exploration Tax Credit (METC);  
and
  - b) by maintaining flow-through share investment options for Canada's mining sector.
- 2. The Committee recommends that the Government of Canada work in collaboration with industry, Indigenous governments and communities, and provincial/territorial governments to develop the infrastructure needed to enable and/or facilitate exploration and development activities in northern and remote regions with mineral resource potential.**

---

150 RNNR, [Evidence](#) (Batise, Wabun Tribal Council); [Evidence](#) (Willy, Des Nedhe Development); [Evidence](#) (Pakalnis, Mirarco Mining Innovation); [Evidence](#) (Gibson, Laurentian University of Sudbury).

151 RNNR, [Evidence](#) (Pakalnis, Mirarco Mining Innovation); [Evidence](#) (Willy, Des Nedhe Development); [Evidence](#) (Nolan, Noront Resources).

152 RNNR, [Evidence](#) (Murphy, Department of Indian Affairs and Northern Development).

153 RNNR, [Evidence](#) (Batise, Wabun Tribal Council).

154 RNNR, [Evidence](#) (Nolan, Noront Resources).

- 3. The Committee recommends that the Government of Canada work in collaboration with industry, Indigenous governments and communities, and provincial/territorial governments to provide more clarity with regards to land access and tenure in northern regions with high mineral potential:
  - a) by working to address the settlement of Indigenous land claims; and**
  - b) by continuing to invest in geo-mapping initiatives, such as the federal geo-mapping for energy and minerals program (GEM) and the targeted geoscience initiative (TGI).****
- 4. The Committee recommends that the Government of Canada work with provincial, territorial and Indigenous governments to streamline and simplify Canada's regulatory and environmental assessment (EA) process. At the same time, the government must ensure that Canada's regulatory process continue to minimize the environmental impacts of mining projects as much as possible, based on scientific evidence and, following robust stakeholder consultations, reflecting the interests of local and Indigenous communities.**
- 5. The Committee recommends that the Government of Canada work with the provinces and territories to create a pan-Canadian framework on pricing carbon pollution to ensure that industry is provided with certainty, stability and clarity, while driving innovation in the mining sector.**
- 6. The Committee recommends that the Government of Canada provide further support for innovation, clean technology and clusters in the mining sector by continuing to invest in R&D and innovation initiatives in the sector, especially the work of industry-led organizations such as the Canada Mining Innovation Council (CMIC) and the Centre of Excellence in Mining Innovation (CEMI).**
- 7. The Committee recommends that the Government of Canada work in collaboration with industry, Indigenous governments and communities, and provincial/territorial governments to create a framework for a clear and consistent process and protocol for Indigenous consultation and participation.**

- 8. The Committee recommends that the Government of Canada address the socioeconomic barriers that hinder the ability of Indigenous peoples to participate meaningfully in resource development decisions:**
  - a) by improving access to clean drinking water, adequate housing, education and healthcare;**
  - b) by helping them build their capacity to review and assess resource development proposals and fairly represent their interests;**
  - c) by improving their capacity to access capital, and thus, to become mining entrepreneurs and business owners; and**
  - d) by helping them develop the business expertise needed to conduct business-to-business interactions with the mining industry.**
- 9. The Committee recommends that the Government of Canada work in collaboration with industry, Indigenous governments and communities, and provincial/territorial governments to improve mining education and skills training opportunities, especially for women and Indigenous peoples.**
- 10. Finally, the Committee recommends that the Government of Canada work with industry, Indigenous governments and communities, provincial/territorial governments, as well as international governments and organizations to promote and improve responsible mining practices in Canada and abroad by ensuring that enough financial securities are available to conduct environmental reclamation effectively regardless of the profitability of mining projects and in cases of unexpected spills or accidents.**



# APPENDIX A LIST OF WITNESSES

Organizations and Individuals	Date	Meeting
<p><b>Department of Natural Resources</b></p> <p>Louis P. Arseneau, Acting Director Sustainable Mineral Resource Development Division, Policy and Economics Branch, Mineral and Metals Sector</p> <p>Marian Campbell Jarvis, Assistant Deputy Minister Minerals and Metals Sector</p> <p>Magdi Habib, Director General CanmetMINING, Minerals and Metals Sector</p> <p>Photinie Koutsavlis, Director Strategic Policy and Economics Division, Policy and Economics Branch, Minerals and Metals Sector</p>	2016/06/06	15
<p><b>Canadian Chamber of Commerce</b></p> <p>Susanna Cluff-Clyburne, Director Parliamentary Affairs</p> <p><b>Fertilizer Canada</b></p> <p>Garth Whyte, President and Chief Executive Officer</p> <p><b>Mining Association of Canada</b></p> <p>Pierre Gratton, President and Chief Executive Officer</p> <p><b>Northcliff Resources Ltd.</b></p> <p>Christopher Zahovskis, President and Chief Executive Officer</p> <p><b>Northwest Territories and Nunavut Chamber of Mines</b></p> <p>Joe Campbell, Director</p> <p><b>Prospectors and Developers Association of Canada</b></p> <p>Andrew Cheatle, Executive Director Deanna Pagnan, Senior Manager</p>	2016/09/22	21
<p><b>Goldcorp Inc.</b></p> <p>John Mullally, Director of Government Relations and Energy</p> <p><b>Saskatchewan Mining Association</b></p> <p>Pamela Schwann, President</p>	2016/09/27	22
<p><b>Cameco Corporation</b></p> <p>Dale Austin, Manager Government Relations</p> <p><b>Northern Graphite Corporation</b></p> <p>Gregory Bowes, Chief Executive Officer</p> <p><b>Pan American Silver Corp.</b></p> <p>Ross Beaty, Chairman</p>	2016/09/29	23

<b>Organizations and Individuals</b>	<b>Date</b>	<b>Meeting</b>
<p><b>Avalon Advanced Materials Inc.</b></p> <p>Brian St. Louis, Manager Gouvernement affairs</p> <p><b>Department of Natural Resources</b></p> <p>Patrick Chevalier, Director Green Mining Innovation – Environment, CanmetMINING</p> <p>Magdi Habib, Director General CanmetMINING, Minerals and Metals Sector</p> <p>Laura Rostas, Senior Advisor to the Director General CanmetMINING</p> <p>Janice Zinck, Director Green Mining Innovation – Processing, CanmetMINING</p> <p><b>Mosaic</b></p> <p>Sarah Fedorchuk, Senior Director Public Affairs</p>	2016/10/04	24
<p><b>Canada Mining Innovation Council</b></p> <p>Jean Robitaille, Chair</p> <p>Carl Weatherell, Executive Director and Chief Executive Officer</p> <p><b>Unifor</b></p> <p>Richard Paquin, Mining Director</p> <p><b>University of Toronto</b></p> <p>Brent Sleep, Professor Department of Civil Engineering</p>	2016/10/18	26
<p><b>Association for Mineral Exploration British Columbia</b></p> <p>Gavin Dirom, President and Chief Executive Officer</p> <p><b>Northwestern Ontario Municipal Association</b></p> <p>Iain Angus, Vice-president</p> <p><b>Thunder Bay Community Economic Development Commission</b></p> <p>John Mason, Project Manager Mining Services</p>	2016/10/20	27
<p><b>Klondike Placer Miners' Association</b></p> <p>Mike McDougall, President</p> <p>Jonas Smith, Executive Director</p> <p><b>Laurentian University of Sudbury</b></p> <p>Harold Gibson, Professor and Metal Earth Director Mineral Exploration Research Centre</p> <p><b>Mirarco Mining Innovation</b></p> <p>Vic Pakalnis, President and Chief Executive Officer</p>	2016/10/25	28

Organizations and Individuals	Date	Meeting
<p><b>Canadian Association of Mining Equipment and Services for Export</b>  Ryan McEachern, Managing Director</p> <p><b>Department of Indigenous and Northern Affairs</b>  Sheilagh Murphy, Assistant Deputy Minister  Lands and Economic Development  Stephen Van Dine, Assistant Deputy Minister  Northern Affairs Organization</p> <p><b>Des Nedhe Development</b>  Sean Willy, Vice President  Creative Fire</p> <p><b>KWG Resources Inc.</b>  Frank Smeenk, President and Chief Executive Officer</p> <p><b>Olthuis Kleer Townsend</b>  Bob Rae, Partner</p>	2016/10/27	29
<p><b>CMC Research Institutes</b>  Richard Adamson, President</p> <p><b>Mining Watch Canada</b>  Ugo Lapointe, Canadian Program Coordinator</p> <p><b>PearTree Financial Services</b>  Trent Mell, President and Head of Mining</p> <p><b>United Steelworkers</b>  Ken Neumann, National Director for Canada</p> <p><b>Wabun Tribal Council</b>  Jason Batise, Executive Director</p>	2016/11/01	30
<p><b>Centre for Excellence in Mining Innovation</b>  Douglas Morrison, President and Chief Executive Officer  Bora Ugurgel, Managing Director  Ultra-deep Mining Network</p> <p><b>Lakehead University</b>  Peter Hollings, Director  Centre of Excellence for Sustainable Mining and Exploration</p> <p><b>McGill University</b>  Roussos Dimitrakopoulos, Professor  Mining and Materials Engineering Department</p> <p><b>Noront Resources Ltd.</b>  Glenn Nolan, Vice-president of Government Affairs</p> <p><b>Prospectors and Developers Association of Canada</b></p>	2016/11/03	31

Organizations and Individuals	Date	Meeting
Michael Fox, Co-Chair, Aboriginal Affairs Committee President of Indigenous Community Engagement Inc.	2016/11/03	31
<b>Prospectors and Developers Association of Canada</b>		
Lesley Williams, Senior Manager Aboriginal and Regulatory Affairs		
<b>Suncor Energy Inc.</b>		
Ginny Flood, Vice-President, Government Relations		
<b>Vale Canada Ltd.</b>	2016/11/15	32
Angie Robson, Manager Corporate and Aboriginal Affairs, Ontario Operations		

# **APPENDIX B LIST OF BRIEFS**

---

## **Organizations and Individuals**

---

**Labourers' International Union of North America (LIUNA)**



# REQUEST FOR GOVERNMENT RESPONSE

Pursuant to Standing Order 109, the Committee requests that the government table a comprehensive response to this Report.

A copy of the relevant *Minutes of Proceedings* ([Meetings Nos. 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31](#)) is tabled.

Respectfully submitted,

James Maloney  
Chair



## **Dissenting Opinion from the Official Opposition**

As Members of the Official Opposition, we would like to thank the witnesses who appeared before this committee to contribute to this study on the future of Canada's mining sector.

While the committee enjoyed general consensus in acknowledging the importance of the mining industry to the Canadian economy, the recommendations as presented in the majority report fail to reflect the concerns expressed by many witnesses. On the contrary, many of the recommendations have no basis in testimony but seem to have been drafted to conform to pre-existing government policy. For example, the term "pan-Canadian strategy" was never uttered by any witness, but was used in a recommendation on carbon pricing in the majority report.

It is out of respect for the witnesses who testified to this committee and to the thousands of hard-working middle-class families whose livelihoods depend on the success of our mining sector to put food on their tables, that we submit this dissenting report.

We urge the federal government to consider the following recommendations:

**1 - The Government of Canada should conduct a comprehensive economic impact assessment of a federal carbon tax on the mining sector and release it publicly before imposing this tax on this emission intensive trade exposed industry.**

The Natural Resources Committee heard from numerous witnesses and stakeholders who held varying points of view on the issue of a federally imposed carbon tax. Although some witnesses were open to the idea of a carbon tax, many others voiced their concerns. Several witnesses stated that the new carbon tax could have a detrimental impact on the industry and could mean the difference between some projects proceeding and others not. This could mean substantial loss of economic development in Canada and the loss of many well-paying jobs. The implementation of a carbon tax could make Canadian industries – particularly the natural resource sector – uncompetitive on the global market, meaning investment and jobs could head elsewhere.

For instance Pamela Schwann of the Saskatchewan Mining Association stated: “As an industry, particularly with potash and uranium, we are not able to pass on to the markets any carbon taxes that we might be incurring. It’s just not possible, so we need some protection of trade-exposed sectors, like we have with Saskatchewan.”<sup>1</sup>

Further to that, Mike McDougall of the Klondike Placer Miners’ Association stated the following: “[w]e can’t pass our tax on since we sell an international commodity. Our gold is sold and always priced on the international [market] and we can’t pass any costs on. Any costs accrue to our bottom line.”<sup>2</sup>

It is clear from the testimony we heard, the federal government must conduct a comprehensive economic impact assessment of a federal carbon tax on the mining sector and release it publicly before imposing this tax on this emission intensive trade exposed industry. For a government supposedly committed to evidence based decision making, they should accept this recommendation based on the expert witness testimony we heard over the course of the study.

By refusing to undertake a comprehensive economic impact assessment, the government either knows what the economic impacts will be already and is keeping it secret, or it does not know what the impacts will be and is putting billions of dollars of economic activity and tens of thousands of jobs at risk.

If the government does know what the economic impact will be, then this data should be made public. However, if they refuse to do an economic assessment, then they are breaking their promise of making decisions based on evidence. This decision would be irresponsible and risk billions of dollars of investment which could flow elsewhere if Canada becomes uncompetitive. This would hurt the families, indigenous communities, and other communities that rely on the success of the mining sector.

---

<sup>1</sup> RNNR Evidence, 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament 27 September 2016 (Pamela Schwann, President, Saskatchewan Mining Association)

<sup>2</sup> RNNR Evidence, 1<sup>st</sup> Session, 42<sup>nd</sup> Parliament 25 October 2016 (Mike McDougall, President, Klondike Placer Miners’ Association)

As Iain Angus, Vice-President of Northwestern Ontario Municipal Association pointed out in response to a federally imposed carbon tax, “some of the mines that we hope to see come to fruition, they're really challenged... The ongoing expense of operating costs will actually contribute to the decision of whether or not they will put a shovel in the ground.”<sup>3</sup>

## **2 - The Government of Canada should conduct an analysis to determine how Canada’s mining industry can remain competitive in the global marketplace, especially with a federally imposed carbon tax.**

Ross Beaty of Pan American Silver Corporation who stated, “[F]or export industries in Canada such as mining companies, there should be some kind of offset to a carbon tax that makes the products more competitive internationally in places where there are no carbon taxes.”<sup>4</sup>

Furthermore, responding to the federal government’s carbon tax announcement, Sarah Fedorchuk, Senior Director, Public Affairs of Mosaic pointed out, “I think our biggest concern right now for our market is competitiveness. The Russians can produce potash a lot cheaper than we can because of where their currency is at. Anything that gives Canadian potash producers a competitive advantage is seen as a positive at this stage... but we are concerned about the competitiveness of Canadian potash.”<sup>5</sup>

Mining is an extremely capital intensive industry, and the capital necessary to fund major projects is fluid and will flow to jurisdictions that can provide certainty. Projects will only proceed when costs are predictable and competitive.

U.S. President Donald Trump has promised to cut corporate taxes, eliminate red tape and regulations in the energy sector and will not impose a federal carbon tax. Canada must ensure we do not drive away major investments because of our burdensome approval processes and increasing costs through carbon pricing.

---

<sup>3</sup> RNNR, Evidence, 1<sup>st</sup> Session 42<sup>nd</sup> Parliament, 22 October 2016 (Iain Angus Vice-President , Northwestern Ontario Municipal Association)

<sup>4</sup> RNNR, Evidence, 1<sup>st</sup> Session 42<sup>nd</sup> Parliament, 29 September 2016 (Ross Beaty, Chairman, Pan-American Silver Corporation)

<sup>5</sup> RNNR, Evidence, 1<sup>st</sup> Session 42<sup>nd</sup> Parliament, 4 October 2016 (Sarah Federchuk, Senior Director, Public Affairs of Mosaic)

It is our recommendation that the federal government conduct an analysis to determine how Canadian mining companies can remain competitive in the global market.

### **3 – The Government of Canada should make permanent, effectively immediately, the Mineral Exploration Tax Credit (METC) and Flow-Through Share Financing.**

Exploration and prospecting continue to be a high risk investment, but global demand for minerals will continue to grow exponentially in the years to come.<sup>6</sup> Canadian policy makers, and mining professionals, need to work towards discovering new resources for global sustainability, security, and growth within the sector.

Junior explorers –thousands of small, entrepreneurial companies across Canada –often take the highest level of risk. Data shows junior mining companies also take in the larger share of discoveries, while getting 30% more value per dollar expended than larger mines.

The Canadian minerals industry has faced an ongoing downturn in exploration investment over the past 10 years. Lack of investment threatens the sector’s continued ability to generate benefits, which includes 375,000 jobs created across Canada and nearly 3.5% of national GDP. Global trends indicate financing for mining and exploration is decreasing. Between 2007 and 2015, financing for mining has dropped 40%, while financing for exploration fell over 90%.

Flow-through shares account for more than two-thirds of all exploration-focused financing on Canadian exchanges over the last decade.<sup>7</sup> In the past, Finance Canada has estimated the flow-through share system stimulated 3 dollars in exploration for every one dollar in forgone tax revenue.<sup>8</sup> Supporting flow-through shares, along with the Mineral Exploration Tax Credit (METC), will keep investment dollars in Canada. Removing these important tax incentives at a

---

<sup>6</sup> RNNR, Evidence, 1<sup>st</sup> Session 42<sup>nd</sup> Parliament, 25 October 2016 (Gavin Dirum, President and Chief Executive Officer, Association for Mineral Exploration British Columbia)

<sup>7</sup> RNNR, Evidence (Dirum, Association for Mineral Exploration British Columbia)

<sup>8</sup> Flow-through Shares: An Evaluation Report, Oct 1994, Department of Finance Canada

time when the industry is still recovering from the worst down-cycle in decades, could have a crippling effect on the industry's recovery.

Canada has an opportunity to learn from successful initiatives around the globe. In 2016, Australia adopted the METC program and rolled it into their flow-through system.<sup>9</sup> This has led to Australia becoming a global leader and top jurisdiction for exploration in the world. Historically, flow-through played a critical role in the discovery of key deposits, such as the Ekati Diamond Mine. Combining METC and flow-through will ensure a continued and diverse mining sector in Canada.

The METC has played an important role for small and medium sized mining companies here in Canada. Industry needs stable regulatory and tax conditions in order to plan for the long term.

The Government should implement tax cuts, instead of tax increases, as means to encourage further development. That is why Conservative members of this committee recommend the government make flow-through shares and the METC permanent, effective immediately.

#### **4 – The Government of Canada should ensure that mining exploration and prospecting companies continue to have reasonable access to land, especially in Canada's north.**

Recent court decisions and government actions could severely limit the ability for small mining companies and prospectors to discover valuable minerals which will provide revenues and thousands of jobs to Canadian workers. The Government should ensure mining exploration and prospecting companies continue to have reasonable access to land, especially in Canada's North.

If Canada is going to foster a favourable environment for exploration, firms need to have fair access to land, as well as security of tenure. Exploration activities not only generate economic activity and employment, but they are also low-impact to the environment and temporary in

---

<sup>9</sup> RNNR, Evidence, 1<sup>st</sup> Session 42<sup>nd</sup> Parliament, 20 October 2016 (John Mason, Project Manager, Mining Services, Thunder Bay Community Economic Development Commission)

nature. The environmental impact of current mining activity ranges from .005-.03% of the land nationally, which is a small in comparison to the level of employment and revenue that they generate as well as the necessity of the raw materials that are extracted. Exploration is short-lived and it has low environmental impact.)<sup>1011</sup>

The Government must remove roadblocks to global exploration investment in Canada such as secure land tenure and accessibility by reducing land withdrawn from exploration.

**5 – The Government of Canada should take into account the accumulative effect of human and other industrial activities in a given region rather than assess only large clearly defined projects such as mines. It should also reduce duplication in provincial processes and federal intrusion into provincial jurisdiction.**

Mr. Pierre Gratton, President and Chief Executive Officer, Mining Association of Canada testified that under the Canadian Environmental Assessment Act, 2012 mining projects are often the only projects that fall under federal jurisdiction and the sole opportunity the federal government has to assess the environmental impact of development projects on a region. ~~and~~ As a result these projects are put under greater scrutiny than other projects in other sectors.

As an example, Mr. Gratton pointed to the Sisson mine project as one example of “the federal government concluding that this project can have a significant adverse effect on the region, even though to our point, it’s a tiny dot in a broader landscape. There’s a lot of other activity going on around it. Whether its natural gas exploration, forestry, or logging, these have impacts that are much greater with respect to the land base...It may be that a mine should not proceed, but you can’t just look at the mine; you have to look at the broader issues. That’s the problem we’re now

---

<sup>10</sup>RNNR, Evidence (Dirum, Association for Mineral Exploration British Columbia)

<sup>11</sup> RNNR, Evidence, 1<sup>st</sup> Session 42<sup>nd</sup> Parliament, 22 September 2016 (Joe Campbell, Director, Northwest Territories and Nunavut Chamber of Mines)

facing under the Canadian Environmental Assessment Act, 2012, which is a pretty significant one.”<sup>12</sup>

Several witnesses affirmed if there’s one thing the mining industry values most, it is certainty in the regulatory environment. There has been a lack certainty from this government. Constant review of environmental legislation is challenging for the sector.<sup>13</sup> The committee heard from witnesses who told us about the impact this uncertainty has had on their projects. These witnesses talked about projects that did not have any environmental impact issues, but Environment Canada decided that there could, in fact, be issues down the road. This was based on research that ‘may’ be conducted in the future. As a result, Environment Canada decided they were not prepared to give a no adverse impacts ruling that would allow mining to proceed.<sup>14</sup> The Committee was told of projects, which had a conditional go ahead from Environment Canada, but were told the department reserved the right to come back years down the road, looking at future evidence, and potentially impose operational conditions on their mine sites. Not surprisingly, given the responsibilities those in the private sector have to their investors and shareholders. This type of uncertainty undermines confidence and the ability to get projects built.

Uncertainty in the approval process is an increasing challenge for exploration and mining projects in Canada. Federal oversight of mining is greater than ever, intrusion into provincial jurisdiction is growing, duplication with provinces remains, and coordination with provinces in environmental assessment has deteriorated.

## **Conclusion**

This committee heard from a number of witnesses who expressed concerns with the growing international competitive pressures facing Canada’s mining sector. We urge the federal

---

<sup>12</sup> RNNR, Evidence, 1st Session, 42nd Parliament, 22 September 2016 (Mr. Pierre Gratton President and Chief Executive Officer, Mining Association of Canada)

<sup>13</sup> RNNR, Evidence, 1<sup>st</sup> Session 42<sup>nd</sup> Parliament, 22 September 2016 (Pierre Gratton, President and Chief Executive Officer, Mining Association of Canada)

<sup>14</sup> RNNR, Evidence (Dirum, Association for Mineral Exploration British Columbia)

government to implement the common sense recommendations outlined in this dissenting report to ensure the long-term competitiveness of Canada's mining sector.

## Supplementary Opinion of the New Democratic Party

The mining sector continues to face challenges with many hard working Canadians from coast to coast to coast being adversely affected. New Democrats recognize these challenges and have faithfully worked in this study to ensure the long-term sustainability of our resource sector and the well-being of those who work in it. We would like to thank our colleagues on the Natural Resources committee from the Liberal and Conservative parties for working together on this study in a constructive and collegial manner. As a result of that work, we believe this report is a strong reflection of our many shared concerns for this important sector to the Canadian Economy.

But we do have some areas of concern that require a stronger response or more attention. We have approached this study with some guiding principles that we believe are important to the future of our mining sector. Sustainability is crucial, including ensuring the application of the polluter-pay principle so that costs are not left to future generations. Partnership is required to make sure that communities, provinces and Indigenous peoples all benefit from mining development and that we create value-added, well paid jobs here in Canada.

Long-term prosperity must be our goal in leveraging our natural resource wealth to invest in modern, clean mining technology to keep Canada on the cutting edge of the mining sector. Testimony from the majority of witnesses, representing diverse backgrounds in the mining industry, academia and Indigenous governments and communities, raised many concerns that the majority report speaks to but that we feel require a stronger response.

We heard much testimony from industry representatives about the importance of stability to funding mechanisms offered by the Government of Canada. One specific example of this was the Mineral Exploration Tax Credit and the majority of witnesses who spoke to this issue recommended its continuation. We agree with this view and

while we appreciate the majority report commending its renewal, we recommend that this credit either be made permanent or that the Government of Canada introduce a permanent replacement credit to give the same support to the mining sector. Continuing to renew this credit on an annual basis adds uncertainty to the mining sector that need not be there. Choosing a permanent path will help give the sector more of the certainty that they have asked for and will allow them to better plan their activities and potential projects going forward.

During testimony we heard a great deal from the majority of witness from all backgrounds about the importance of creating proper infrastructure to support mining activities and the communities in which they operate. We also heard unacceptable examples of infrastructure deficits, such as the lack of a proper electricity grid in Northwestern Ontario, which are hampering potential mining developments from becoming a reality. We refuse to believe that the majority of Canadians would accept that a major job-creating development could not go forward in their community due to the lack of capacity in the hydro grid and find that it is unacceptable that rural, economically depressed areas of Canada are being told to accept this sad state. It is a function of government to fix this problem and we strongly recommend that the Government of Canada start to work with Provincial and Territorial partners to invest in this kind of essential infrastructure. We also recommend that the Government of Canada agree to the request made by the Province of Ontario for \$1 billion to help fund infrastructure in the Ring of Fire. During the last election campaign, the Prime Minister told us that all we needed was stimulus spending to support the creation of this kind of essential infrastructure and to put people back to work. We take him at his word and call on him to keep that promise in order to support the Ring of Fire.

The Government must also act quickly to honour its obligations to a Nation to Nation relationship with Indigenous peoples including proper consultation and accommodation on all energy projects and the protection of Indigenous rights. Industry representatives were clear about the need to fix the consultation process sooner rather than later. Many witnesses offered strong, practical experience in engagement and

relationship building between industry and Indigenous governments and communities. Many members of the mining industry have a good story to tell and decades of experience that other industries and the Government of Canada could learn from. But the fact remains that the Government of Canada, as representative of the Crown, is responsible for these duties around consultations and accommodation. While proponents of projects should be a part of this process, we believe these responsibilities should not be devolved to proponents to fulfill. The Government must take a much larger, hands-on role in creating the environment in which meaningful consultation can take place. The Government has made many commitments to Indigenous Peoples and we believe that now is the time to start meaningfully fulfilling them.

One of the new government's key commitments to a new relationship with Indigenous peoples is the implementation of the United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). New Democrats believe that the UNDRIP should be fully implemented as soon as possible. We believe it does provide a path forward and are concerned that the majority committee report makes no mention of the UNDRIP in the recommendations. We therefore recommend that the Government support Bill C-262 and work with the mover of the bill, Mr. Saganash, to start the process of the proper implementation of the UNDRIP as soon as possible.

Many witnesses who appeared before the committee also spoke to the concerns around the difficulties they face in their attempts to get more Indigenous peoples involved in the mining sector at all levels from academia to the workforce. This testimony brought into stark focus the effect of the long-term underfunding of First Nations education by the Government of Canada. To address this issue, many in industry spoke to short-term measures they have taken to help transition Indigenous peoples into the sector, helping to overcome the shortfalls created by government funding policies. In Canada, it is a basic expectation not only of citizens, but of industry and business, that everyone has access to a proper education. With that in mind, we strongly recommend that the Government of Canada work to address Indigenous youth

unemployment through capacity-building initiatives aimed at improving their educational and employment prospects, including funding of K-12 education equivalent to provincial funding levels and removing the 2% funding cap on Post-Secondary education for First Nations students.

Finally, during hearings, we heard concerns about the activities of some Canadian mining companies abroad. While the activities of Canadian mining companies abroad do not fall under the direct purview of the Natural Resources committee, we believe it is important to address these concerns in the context of Canada being a world leader in mining technology and practices. We believe that the majority of Canadian mining companies operate at home in a responsible and world leading manner. We also believe that it is a reasonable expectation that Canadian mining companies should apply those same responsible practices when they go abroad. With that in mind, we do recommend that the Government of Canada establish a human rights ombudsperson to oversee Canadian international mining operations.

In Canada we are blessed to have significant natural resources which, if managed properly and sustainably, can be an important driver for our economy. We must ensure that these resources are managed and developed in the best interests of all Canadians with a focus on protecting the environment, ensuring meaningful consultation with affected communities and Indigenous peoples, and maximizing economic benefits. We believe that if the Government of Canada enacts the recommendations above, we will be able to better ensure the viability and success of the mining sector to the benefit of all Canadians.