Signal49 RESEARCH

Fuelling Our Future: Talent and Technology in Canada's Mining and Oil & Gas Industries

Speakers

- Amber Hayes, Lead Council Manager, Signal49 Research
- James Lannigan, Senior Research Associate, Signal49 Research
- Stephen Gravel, Manager, Center for Smart Mining, Cambrian College
- Bryan Helfenbaum, Chief Operating Officer, Clean Resource Innovation Network (CRIN)

Transcript

0:04-58:58

Amber Hayes, 0:02-2:24

Along, the presenters who are not currently presenting can take the opportunity to reply back to you with typed chat if it's a question that is within their wheelhouse.

We will also have open time after the call to have some Q and A. So as we head into the session. I'm just going to go over a little bit of housekeeping. Again, welcoming everyone as you're making your way into the room, and also acknowledging that this is a virtual event. But as a land acknowledgement, we have people joining us from across Canada, our Turtle Island, and we acknowledge that we gather from many Indigenous territories. And I invite all of us to reflect on the traditional lands where we live, work, play, and gratitude for the peoples who have cared for these places in Time Memorial.

In regard to our virtual world that we're in right now, we do have certain rules of engagement. While this is a recorded session, it will be released to participants. But we do ask that you consider Chatham House rules in respect to what is shared in the room. We also ask that you not use AI devices. We will be sharing this recording after the session, And in a quick welcome to our wonderful speakers today, I'm a representative from the Council of Innovation Commercialization at Signal49. They've helped organize this event. CIC is designed to help enterprise organizations across Canada move the needle on innovation commercialization, whether it's using internal innovation to impact

bottom line or creating new products. AI is a big theme, as is innovation technology, and you'll hear some of that in in this presentation today.

We also have Stephen joining us, and James is going to kick us off with his presentation, Signal 49 Research, and again, I just want to give thanks to our presenters today. James, at this point, I would hand the session over to you because I think your report really was the impetus for all all of us being here today, and Brian, thank you as well for joining us from Crin.

James Lannigan, 2:26-7:48

Sure. So, let's go ahead then with the report. So, the report is entitled "Fueling Our Future: Talent and Technology in Canada's Mining and Oil and Gas Industries. So, my name is James Lannigan. I'm a Senior Research Associate from Innovation and Technology at Signal49 Research. I also want to acknowledge two of my colleagues that have helped make this research a success, and that would be Zafir Sonmez. He is the Lead Research Associate at Signal49 Research in Innovation and Technology, and also Adam Philip Vanzelli Yang, and he is a Senior Research Associate at Education and Skills at Signal49 Research. So, let's tell you a little bit about this research. So, first things first, primary industries we're talking about mining and oil and gas. They are an integral part of the Canadian economy here. So as you can see in this diagram, we see mining and oil and gas comprised about 5% of Canada's GDP in 2024 and 45 percent of its exports in 2025, and as you can even see today with the current tariff situation, that this is becoming one of Canada's strengths. Really, in a changing geopolitical situation, we have to look at what our strengths are.

However, there is a looming labor shortage to help support this demand, especially for these major projects that Canada is intending to build. So, as you can see here in this chart, you can see that the employment has actually the age gap has actually intensified. So, this blue line here, this 25 to 54, is maintained stability, but the 55 years and over is increasing while the 15 to 24 is going down. So basically, there's this aging workforce that's moving out while the folks that should be moving in are not moving at that pace. And what I've included here is this public perception paradox. People will say that mining and oil and gas are very essential for Canada.

However, people also don't want to work in these environments, and this could be a big problem going forward. Especially considering that we're making this our national strength, and there's not enough to support it, so with that in mind, we've conducted this research here, taking a look at both the talent and the technology that's being adopted in Canada's mining and oil and gas industry. So, we have three broad research questions here, and I'm going to go through them just in tandem, looking at automation. First automation potential, which you can see here on the far right here. So, this is the productivity potential of automation technology. We'll also look at technology adoption levels. We'll also be looking at the economic and demographic factors causing skill shortages. You

can see here there's components to this. We also have an output as well on technology and equipment skill requirements-that's available in a data briefing on our web page as well.

But I'll be focusing on the top three here. So, let's start with the exposure of employment to automation technologies. Overall, what we can see is that both the mining and oil and gas industries are more exposed to automation technologies than the economy average. So, as you can see on the far left, 22.8% of all industries.

You look at that; these are the exposure rates to automation technologies, and oil and gas higher, but mining even higher than this. So, what does this mean? This means that even though there are a smaller number of occupations, only 27. The vast concentration of mining jobs is in an area of high exposure. So you can see here, 40.2% of all employment in mining is highly exposed to automation technologies. In comparison to oil and gas, only 17.5% have that share that are highly exposed here. So, this is the difference, and it suggests that a technological disruption is likely to impact a substantial portion of the workforce in these sectors, but particularly the mining sector over oil and gas.

So, these are some of the occupations with the highest automation exposure in mining industry. So, you can see here 70.6% automation exposure, and you can see the employment over those as well. Similarly, you can also see this within the oil and gas industry again 70.6% This is your construction mill rights and industrial mechanics continuing all the way on. So, if we take a look at the technology adoption within these two industries as well.

We have to take a look at the broad classification from Statistics Canada. So, this can go anywhere from advanced material handling all the way to advanced medical devices. A lot of folks today are talking about artificial intelligence as well. This is a wide variety of the different advanced technologies in our survey that we conducted, over 200 industry leaders responded, and we also wanted to go into more depth into what this meant for these particular sectors. But before we do that, let's take a look first at the Statistics Canada classification. So even by the Statistics Canada classification, both mining and oil and gas have higher technology adoption rates than all industries economy average as well.

James Lannigan, 7:48-15:52

Now, when we take a look at the specific types of technology that we wanted to look at in our survey, which is more detailed here, we included things like environmental monitoring technologies, advanced mapping tools, advanced materials handling systems, and digital twins, for instance, another popular one is battery electric vehicles. So, these comprise the top five technologies that have been adopted here. And on the right, you can see some instances of anecdotal use cases here. So, for instance, with digital twins, we've used digital twins for years and now have digital triplets with AR VR added for training. They let us do virtual walkthroughs, design work, and problem

solving. I can even climb virtual towers. ARVR has been a great addition. Digital tools boost productivity, but they need disciplined implementation. So, this vignette I pull out here just because it connects both the talent and the technology. It's really important that we have that skilled talent in order to implement this technology.

Now, the reason why we cover both talent and technology is because technology can help the productivity, especially if you have a lower workforce, and it can also help bring or attract that younger workforce to these industries as well. When we think about tech adoption in these industries too, it's often a collaborative endeavor. So basically, instead of developing these in-house with a particular R and D development group or some kind of innovation that they're doing within the organization, they're often purchasing from a vendor or co-developing with external partners.

Now, next, I want to talk a little bit about the operating environment here and talk a little bit about some of the setbacks that are present in these industries. So, if we take a look at the constraints, we can think of things like permitting, variable life cycles, and unique geographic operations. So, permitting basically delays in permitting; they need to get hold of a variety of different stakeholders in order for projects to advance. Variable life cycles they could change based on the unique operating conditions, and then finally the geographic operations, meaning that these are mostly in remote environments that people need to either fly in, fly out, or set up camp here. In terms of the culture, what I heard. Originally was that there is a first-second culture here. So, clients want new tech, but they refuse to be the first adopters. They'd rather wait until two others have successfully used it before buying. We also know that these are legacy industries as well, and typically they tend to be risk averse.

However, as you could see in the previous slides, they're actually ahead of the industry average when it comes to technology adoption. There's also other challenges that are present here in terms of securing and retaining talent. So, we also asked in our survey over the last year how difficult has it been for your organization to find workers with the skills required for roles related to advanced technology adoption? And you see here that the majority find it somewhat difficult, and then slightly lower proportions say very difficult, and even for those folks that you get from the typical mining or oil and gas pipeline, if you further upskill them with AI or ML techniques or skills, we find it difficult to keep them within this, and in fact that they are getting pulled elsewhere. So overall, we've produced some actionable insights from this paper as well. So, for federal policymakers who are interested in enhancing the opportunities for mining and oil and gas industries, they can consider the following: namely, to modernize incentives to accelerate the technology adoption. They can reform permitting systems to reduce delays, which is already in progress.

Importantly, they can strengthen the talent pipeline, and furthermore, they can support indigenous workforce development and partnerships. And finally, we have two other sets of recommendations: one for industry and one for universities and colleges. So, for industry, build deeper partnerships with polytechnics, applied research centers such as Norcat, Semi, and Krin, and technology vendors

to pilot and scale innovations. Invest in clear reskilling pathways, especially for medium exposure roles that will evolve rather than disappear. Strengthen retention strategies for workers with technical skills, including career paths in AI, automation, and digital operations. And finally, for universities and colleges align the curricula with university with industry needs through direct collaboration with polytechnics and industry leaders and invite industry ambassadors into classrooms to address these perception challenges and highlight the sector's transformative abilities here. So overall, I think we are in a very interesting global situation here, where we can lean into Canada's strengths, typical strengths in energy sector and in the mining sector and become a world leader here. But we do need both the talent and the technology to be able to support this. So, I thank you very much for your attentiveness, and I pass over now to Brian here.

Bryan Helfenbaum, 12:41-17:16

Thank you very much, James. That was a great summary of a great report. So, I'm really happy to be joining everyone today. I've worked in, I guess, four different companies in a wide variety of roles, but endemic throughout all that has been two themes: that of innovation and that of talent and training development. So, I'm really excited to be joining everyone today, so I'm currently working with the Clean Resource Innovation Network. We are the network of networks, and so in the energy innovation space, we have over 5000 members, and we exist to commercialize clean technology into the Canadian oil and gas industry, full stop. And so, we work across a wide variety of areas, as you can see on the screen, working on that.

So, the matter at hand today, though, is how that all relates to talent. And so, when we talk about talent and energy, the elephant in the room is always around the energy transition, and so I'd like to unpack that a little bit. Here on your screen is a history of energy transition. So, this is over 200 years of global energy consumption. 200 years ago, traditional biomass or burning wood was our predominant means of energy in around the world, and of course that transitioned to coal, which transitioned to oil, to gas, to nuclear, renewables, etc. Right?

This is our history of energy transition, or, or is it? Because if you take the exact same data and instead of looking at it on a relative basis, you look at it on an absolute basis, you get a completely different story, right? That that traditional biomass that went from 99% of our energy mix to 5% of our energy mix. Well, we're actually burning more today than we were 200 years ago. We added coal, we added oil, we added gas, we added and so we have never, on a global basis, transitioned off of anything. We haven't even declined on any of these categories. We have just added to a growing need for energy.

Now, on a in specific jurisdictions like Canada, of course, we know we have seen transitions off of things like wood and coal, but. But the point here is that we are really moving towards the all of the above, and especially as James highlighted in our current times, there was a recent survey by Positive Energy out of the University of Ottawa that showed you know Canadians recognize the need for that all of the above approach, and yet you know, we have this weird paradigm because, you know, Canary in the Coal Mine, a University of Calgary's oil and gas engineering program,

actually ceased a few years ago. It's since been reinstated, but enrollment had plummeted as young talent was simply not interested in getting into the oil and gas industry, because of this perception that it's a sunset industry, right? It's on its way out and being replaced with all these other new and emerging areas, which is you know really unfortunate.

As in particular, Canada's oil is particularly strong for making things like asphalt and carbon fiber and a lot of materials that have a huge demand going into the future, and so when we look at these different and emerging areas, I've plotted them here on kind of them in the maturity curve here, and you can see as coal and wood are on their way out, oil renewables are you know in the mature area, and then some of these emerging areas.

What I think is an important message that is getting lost is that the skill set for oil and gas is the same as the skill set for all these other items highlighted in red. And for those less familiar with the acronyms, CCUS is carbon capture, utilization, and storage. DAC is direct air capture. Bitumen advanced materials, and then small modular nuclear reactors, right? And so all of these are exciting and emerging areas. This doesn't include, I'll say, non-energy related, but still applicable skills in things like helium production, which is becoming more and more of a scarce, scarce element, and a market that's growing, and so there's a huge opportunity here as we train people for oil and gas. It's the same skill set that's being applied to these other areas, and vice versa.

Bryan Helfenbaum, 17:16-20:36

And most of the startups and scale ups that are happening in those areas are with former oil and gas professionals, now we have to be mindful of the hype curve. You know, and probably hydrogen is the poster child for this. We've had at least three hydrogen cycles in the 70s, the 90s, and the 2020s. But what we see is that you know none of these opportunities are ever a silver bullet that replaces everything, and history has shown that. But none of these opportunities are all are also a complete dead end. They all find their opportunities. They may be niche, they may be large, but they're not a zero. And so, there's a significant opportunity here. So, on the more practical side of okay, what can industry do better to actually help deal with this talent shortage and to promote jobs in oil and gas. You know, number one is highlighting the commitment and the not just not just commitment, but the execution and proliferation of those innovation and sustainability opportunities.

James touched on a culture of you know people want to be first to be second, and so there's a risk tolerance issue that that needs to be addressed. But really, to help tell this story better, that organizations like Crin Emissions Reduction Alberta, Alberta Innovates, NRCAN have supported some just fantastic innovations that are that are really making changes to the performance, you know, economic and environmental performance of the industry and related industries. Secondly, to really tell that story of the skill set transferability between all these areas, and that really it draws from the same skill sets and training opportunity.

Working closely with post secondaries and other partners to ensure that curriculum are being updated, and that their opportunities for those network connections exist, and to help make sure that things are credible and real and up to date. Number four, you know, as James highlighted, AI is the the other elephant in the room, and causing a lot of concern. And I frankly feel bad for my kids who are starting university and trying to figure out, you know, what is a career that's going to be safe from AI disruption. And it's tough. I think we've all been surprised at which industries have seen disruption versus others. And so, you know, helping to identify where those opportunities are, and there's a just a breathtaking need for trades in both oil and gas and in mining, which I don't see in many of those cases AI or robotics being able to take their role in the in the foreseeable future.

So, telling that story a little more strongly. Would go a long way, and then finally, you know, these companies have been remarkably resilient financially and incredibly important to Canada. These companies have been around in some cases over 100 years and doing better than they ever have, and so in these difficult times, whether it's geopolitical, economic, whatever, helping to show talent that there are some safer places to work, and that this is not a sunset industry. It's going to be around for a long time. So, I'll leave it there and get into some other materials as part of the panel and pass it off to Steve.

Stephen Gravel, 20:35-26:00

Well, thank you, Brian, and well done indeed. It was very great to watch you navigate your slides with such ease and with so much information. I'm going to endeavor in the best for last space to live up to the previous two speakers, but I must admit that I'm a bit at a crossroads, maybe intellectually, in this because while I do run an innovation center here at Cambrian College in Sudbury that focuses on mining, I do have a bit of skepticism with regard to how much the industry is going to adopt automation technology in the next few years, just based on what I have seen, so while we on a daily basis execute automation technology projects at our center, I always have to keep in mind that what we do here is sort of the latest and greatest, and what is out there is not yet at that point.

So, Steve Ruval, the manager of the Center for Smart Mining, it's a federally funded group here at Cambrian College. We do two things. One, I already alluded to where we do actually applied research with companies on technology development, and the second is we I manage our corporate training effort, what's called corporate training in the college system in Ontario, and that is industrial upskilling. So, we always keep an eye on how we could be helping, and I'm not going to bore you with what I do in my spare time around my podcast. But you can look it up; the name of it is there. Oh, I must take control. Great.

So, I'm going to talk a little bit about the work we do and how it sort of empowers upskilling and mining. But I'll talk more so about just some perspectives that we've been able to accrue through the by nature of the work we've been able to do, and I think James alluded to some of these, so I won't spend too much time. But just from our perch in the mining sector, what we're seeing is obviously an aging workforce, as James mentioned. There's been a lot of unrealized potential so far in able being able to attract you know the other half of the population that might exist out there that is going to be

in the working world. So, you know, we could be doing better at attracting women to the to the mining workforce.

Obviously, immigration is a bit of a of a tricky thing too because we haven't we haven't been able to since mining is a very place centered or geographic centric activity we haven't been able to draw immigrants north as much as we'd like to in the province of Ontario into the sector and I just wanted to mention that the cap on international students has been particularly challenging from our perspective, and that is, you know, we aren't making students the old-fashioned way as much as we used to. If you take my meaning, and then if we're looking at being able to go internationally to look at the pipeline, that's something that has been unfortunately cut off a bit.

So, at the time where we need more people in the mining workforce the most, we're sort of saddled with a bit of extra uphill challenge. But I think you know together we could be up to that challenge. And I wanted to mention when we think about technology advancements, which was sort of the crux of James's comments. That is, I think, the opportunity to attract more young people. It is through talking about non-pickax and donkey scenarios of mining, and I think there are more and more of those instances we can point to. What we can't do is tell the youth of today and tomorrow that this is a high-tech futuristic sector that would not be the truth. There are still very manual operations that happen, particularly in underground mines. You know, if we think about automated haulage for a second, you know, there's maybe a couple mines that have really adopted that wholesale in in Canada. Won the Cote Lake project here by I Am Gold, and there's a few in in the energy sector in oil and gas as well, where there've been some some adoptions that have happened. But what that means is we still need truck drivers.

We still need people to drive these large pieces of equipment, largely, but that's going away. So, technology advancements in the workforce are important to lead with. But I would also surface things like lifestyle in the north of our province in Ontario, where I'm where I'm sitting now, salary, those kinds of things, and it makes me think, and maybe we can get this in the discussion later. But why were people more likely to go into mining earlier, and why do they not want to know? You know, there were still youth that didn't want to do what their parents were doing, you know, 30 years ago. What's really changed in that perception? I know there's really good perception studies out there, but why might that be? Again, just briefly about Cambrian College. We're in Northern Ontario and in Sudbury, 66,000 full-time students, around 90 programs. We're the Center for Smart Mining, and we train about 500 company staff per year in various ways that I'll talk about in a few slides.

Stephen Gravel, 26:00-29:57

If you look at some data from our own internal data when we survey our employers, as well as what we get from places like the MIHR Mining Industry Human Resource Council, I just chose some of these from the top 10 in demand. But you could see some of these, and I'll just advance this a little bit. This is sort of where we see our role currently is in the traditional trades, heavy-duty equipment mechanics. You know that's something that's very difficult to automate through technology. You could make less components on a vehicle that makes that less in demand, but you still need to be

able to. I think I told James this when I spoke before. You can make it automated. You can make it battery electric, but you still need to be able to crimp a hydraulic hose, and that's something that's not necessarily going away in the next 10 years if we think about that time horizon. Industrial electricians, big demand for that, especially as we add new power to some of these sites that have that that are needed in mining. Mining engineers, that's a really big one, and I saw a couple university friends. We don't make mining engineers here at Cambrian, and I'm using this as I'm sort of commodifying students, but we don't make mining engineers here, and that's something that's more and more in demand as well. Metallurgists and people who take chemical engineering with a mineral processing stream, those are kind of dying across Canada, and you wonder why you know this is this is something we really need to do, especially if we're going to do midstream development of some of these some of these ores into real products that that have value add.

We really need to focus on that, and then of course automation and robotics is surging, but still not hugely in demand yet. One thing that we don't talk about that keeps a lot of our clients up is general labor. So where do you get new production miners? They don't come from our schools. They come from the general population with interest in on-the-job learning. So, I don't know where we get those. It's hard to target that. I don't know where we get heavy equipment operators. There are equipment operating schools across Canada, but how do you how do you reach those people and try and say you know do you want a career in mining or oil and gas, general labor is same thing. So, there's a lot of question marks with where you actually get these people that we don't have necessarily as training organizations visibility, but they make up the preponderance of where the skills gap is, and then just tightness in the market.

James alluded to it specifically. Stats for our industry, you know, if baseline demand continues, we're looking at by the end of you know by the mid next decade, you know, an incredible amount of new mining workers needed, and those are made up of those roles that I spoke of before. But that's if there's no expansion. So if Mr. Carney is not successful, and we just have the same kind of mining output that we had before. We're looking at a terrible scenario. If in an expansionary scenario, we're looking at many more than that, and we're not making it up.

We're not making up that skills gap. Like we're not training enough to get to that. So unfilled hiring gap currently, you know, and within the next few years is around 65,000 employees per year in expansionary. So that's compounding year over year. So, the sky isn't falling, but you know, if I'm a mine operator, I'm thinking about that more and more. Where am I going to get people? And unfortunately, are we going to start cannibalizing oil and gas? Are we going to start cannibalizing defense? You know, what do what do we do for this? I mean, these are all industries that are very important from a GDP perspective in the future, but we're not, you know, we're not making enough of these workers currently. I'll talk a little bit about what we're trying to do. So, we do very much industry-driven training, and we see gaps that occur when there's a demographic change, of which we've been talking a lot about. When there's a regulatory change, when people have to change the way they're mining, there's a need for new skills, and of course, when technology changes, there creates skills gaps.

Stephen Gravel, 29:57-35:12

So, I'm going to talk about a few different pathways. For mining staff, but then also non-mining industrial workers to be able to get into the mining sector and to be able to explore new careers in the mining sector once they're in. So, some of the key programs I'm just going to mention briefly. James, you'll tell me if I'm going on and on and if I need to wrap up, please. But with the advent of new battery electric vehicles, we've developed a new battery electric industrial maintenance program for heavy duty equipment mechanics. I'll talk a bit more in depth about these in a second. Data analytics for mining professionals that responds directly to the trends that James is noticing. You know, they're being asked to do more with their operational data than ever before. Underground mining tech service transition program. We're working on that title. That's a bit long. We'll make it a bit more snappy and saleable. And then the underground construction miner program is another one that I wanted to surface for you.

So, this one, basically, very simply, gap created in the industry with mines adopting new electric vehicles. This is particularly for underground mines, but we're seeing it more and more in open pit, particularly globally. But they have a roster of, sometimes you know two or 300 heavy-duty equipment mechanics that have only fixed diesel their whole careers. So, we developed a program that upskills those folks from just general heavy-duty diesel mechanics to electric vehicle maintenance professionals, data analytics for mining professionals. So, this is one of those ones where if you take a mining engineer or geologist, they may have taken status in university, but when's the last time they dusted off the old ones and twos, so to speak, when it comes to advanced data analytics. So, that's something that was a direct need in our local community here between Valley and Glencore. So, how do you how do you how do you deal with that? Some of the skills we look at is obviously data interpretation, but then also how do you show data to your higher ups in a more clear way? So, it focuses on data analytics, data visualization, then introduction to AI, and it might be small on the screen, but on the right there we have a printout of one of the assignments that they do as part of this program, and that's actually using a chatbot to query their own data sets. So that's taking the reams and reams of data that they might already have and making an interface. And what you see there is them actually querying the SAG mill performance, so that's real data that they actually use to do that, and that's an easy way of getting data at their fingertips that they would have to do pretty advanced analytics before. Surface to underground transition. So, this was initially looked at as how do we get people from surface mines into underground mines. This is also being used currently as a how do you get people from other industries into underground mining?

So, it looks like very core skills to underground technical services around surveying and ground control, but it's really to alleviate some of that stress that you see when you're when you're looking to either establish or grow an underground mine, and finally, I'll just mention underground construction miner. This is one of those ones where there are undoubtedly construction workers that would be good fits for the underground space, but they might not have that underground context. So, this program focuses on how do you take a very safe and safety-oriented approach and take that context

and allow workers to transition to underground mining. I'm going to skip this, but we also have one of the things for newcomers around nomenclature is being able to understand the mining terminology in English. So, this is this is a program that we've launched in order to alleviate some of that. Again, trying to work at the margins.

How do we get a few more people that could be in our sector? And this is one of those gaps that we're trying to fill. And I think I want to end with just talking about learn and stay. A bit of a call to action here. One of the things we know we can do is more. You know, we have 6000 full-time students.

We could do more. Northern Ontario institutions can do more. One program that, if we have time later, we could talk about that's been successful in targeted recruitment to Northern Ontario in the healthcare trades has been a concept called Learn and Stay, and that is to offer free tuition to those that want to take, in this case, a mining trade, and then pair them with employers on the promise that they stay for two years in the region. So, discounting the tuition, allowing them to get those skills, and then pairing them with a sponsor organization to be able to ensure that they stay, and perhaps if they meet a Northern Ontario guy or girl during their stay here, they might take root and stay here and be in the industry forever. But that's something that we're working closely with the Ontario Mining Association on, and we're trying to get that. But it's a model that can work in most industries. Where geography is the challenge of getting workers there. I'll end with a bit of a bragging slide. These are some of our partners that we've worked with thus far. We're looking to work with more and try to broaden our impact. Thanks so much.

Amber Hayes, 35:15-36:51

Wonderful. Thank you so much to all of our presenters. I'm going to hang out on the on this little slide for a moment, but I think reflecting on you know the folks we have in the room. Thank you so much for sharing all of your insights, and you know I think you know the impetus for a lot of the folks joining today was to take a look at what your industry is doing, what you as professionals with your level of insight are doing to navigate these challenging yet full of opportunity times. So, at this point, I would love to open it up for conversations for folks that are in the room. If you do have questions, feel free to put your hand up, and we can have some of those conversations in the remaining time before I close us out for the session.

While folks are maybe navigating or typing, I'd be curious to hear a little bit more. I know attraction retention for a lot of industries is very difficult. It sounds like both Corinne and Stephen have some wins in regard to what I assume has to be a stakeholder agreement in regard to if you know if you come to our region we're going to discount your tuition as long as you stay for two years, are there other things that you feel you know are good case studies for the folks attending right now that are proving to work?

Stephen Gravel, 36:53-37:07

I should just say, if I could, for one second, this program has not yet been financed or launched. I think it has the appeal to be a very good tool to alleviate some of this, but we're using the model from the healthcare sector in order to make it appealing.

Amber Hayes, 37:08-37:34

Okay, and we do have a question here from Stefanik. Sorry if I've mispronounced that, but any insight into the reasons for shortage of mining engineers? It seems to be across the country. And either of you can well, any of you can pick that one up. Maybe I'll pick on Bribe first because he actually doesn't. He's not muted.

Bryan Helfenbaum, 37:35-38:19

Oh, I mean it's mining engineers. That's probably more in Steve's domain. But okay, yeah. I mean that being said, we do have mining engineers in Alberta's north working in the in the oil sands and some of the large oil sands mining opportunities, and I think it's I don't have a lot more to add than what was shared by James and Steve. It just some people are struggling to see the future opportunity there, or you know, are less willing to relocate to where those areas are. You know, generationally, there's generally less willingness, more of an appetite to stay where you are. But maybe Steve, you may have some additional insights.

Stephen Gravel, 38:20-39:54

Yeah, perhaps if Tony Stark was a mining engineer rather than a mechatronics engineer, we'd be doing a lot better. But I think you know, for people that don't know what the what the trade or the significance of the trade is, how would they ever know that mining engineering is a is a path. I mean, the mining engineers that I know and work with are doing that because their parents were in the industry. I don't know the like. I don't think someone who's living and going to school in high school really has role models necessarily to look at or to know what that pathway looks like. That can't be the only answer because, as I said before, we've been able to have good numbers at mining engineering schools.

Yes, Joy, that is true, and it's really unfortunate that some programs have closed because of lack of intake. I mean, at the end of the end of the day, like a lot of these programs are run on pretty narrow margins, so if you don't have the uptake, you know, while you may have five to 10 commits to that program, you might have to shudder if it doesn't make financial sense. So, I don't really have a good answer other than to say people aren't taking the programs, people aren't interested in them, and that's not limited to mining engineering. That is, you know, in a few key engineering disciplines that mining uses a lot. I mentioned metallurgy is one that like good luck if you can find a school that's still offering metallurgy. I know that Laurentian for a while had theirs suspended here in Sudbury, so yeah, I don't have an answer.

Amber Hayes, 39:56-40:13

All right and see a few more comments. One is related to high school students. I think you've already touched on that a little bit, but you know, again, for different industries, are there you know models that that work to reach those students? Although you then need to mature them.

Bryan Helfenbaum, 40:14-40:46

Yeah, I mean, there are some great examples out there. Inside Education, 10 Peaks, you know, that that helps to bring in professionals and deliver that message. They really do great work. We just need to make these bigger, more impactful. Make sure we're hitting those students at the right time. You know, on the one hand, you want to bring in you know, bring in people early and get them thinking about. On the other hand, if they're not close to that time in their lives where they're making a decision about university enrollment, it's sometimes hard to really strike a chord and get them to care as much as they could or should.

Amber Hayes, 40:47-40:58

Okay, and I see there's a few more questions in the chat. One from Michael Ellis, but Sharon, I think you had your hand up first, so I'm going to invite you to join the conversation.

Sharon (attendee), 41:58-44:41

Just yeah, just a couple comments. This has been a wonderful webinar. Thank you very much. Really, really good information and innovation going on in in the country. I just wanted to talk. I'm the director with the Newfoundland Labrador Workforce Innovation Center, administered by College of the North Atlantic. We do applied research and innovation, workforce development, and knowledge mobilization, but around workforce, so that's what we do. Although we do have another unit for applied research, and you probably know some of those. I wanted to say mining engineer is an issue here right now, and also mining instructors instruct.

So, there's a there's a dual problem going on there. I just thought about the learn and stay program. Maybe we need to go get industry. If that's where the engineers are, maybe we get them to devote and contribute some of the through a learn and stay type program to the programs you know that are going on and kind of come in and out and be and get some recognition for that. I did want to comment as well on our learnings in Newfoundland and Labrador, perceptions versus intentions of young people. That's really important that we get a good handle on that. For you know, I'd love to do it for every sector in our province, but mining is one that's really important. So, what are the perceptions?

Like, let's get the data on the perceptions and attitudes, influencers, and intentions, and then we've got the basis for a really good communication strategy. I think we can we can do things without that, but I really think we got to start there, and that'll point us in the right direction. And mining, Newfoundland, Labrador are doing some great things. Amanda, you probably know her; she's doing some great things in terms of getting into schools and things. But I think we got to do that baseline data. A couple more things you talked about industry-led programs. We're piloting now a talent

pipeline management project under well it's a future skills center project called employer led workforce development. In fact, it's focused on the mining sector in Bayford on the peninsula there, and it's a six strategy model that was designed by the U.S. Chamber of Commerce, it's the train. There are train facilitators in Elwick, which we call ourselves. We're doing we're doing the evaluation, but it's a really good model. You've got a collaboration of three in this case, three employers. They define their needs and you work through six strategies to kind of get the talent you need. But mining engineer was really they tried to kind of limit the pilot because it's a pilot test to one, but that was one key one. I just want to mention two other things really quickly because they're common and maybe there needs to be a national working group or something to more and think about it.

Job transition pathways we did a really good research project on that. So, you talked about transitioning from underground to you know from different types of mining, I think that's really important. We did a skills adjacency model. We tested it in Newfoundland, but it had been tested in Ontario, and we did it with the day instead of Toronto Metropolitan University. So, we do have a model to help do that, and maybe we can talk further about that at another time. The final thing is housing.

Housing is issue here. Newfoundland is very rural, as you know. In any case, and we have established within our economic immigration, sorry, within the workforce innovation center, a new economic immigration ideas lab focused on newcomers, and one of the first, or they've done a couple of things already. We've got a great team, but looking at housing and how are we going to get around that, and how can we prototype some best practice models? So, it's very interesting how there's some real commonalities, but would love to share some of those at some point. And I look forward to following up on the on the slides. I hope they'll be shared, and make sure I'm sharing them with others, so thank you.

Amber Hayes, 44:43-44:53

Great, thank you. I really appreciate the input, and that's what these sessions are all about-is these conversations. And Steve, and I saw your hand go up during that call or that that chat.

Stephen Gravel, 44:53-46:16

Yeah, I just wanted to say thank you for that. Those initiatives. I just wanted to plug one. Local to me, if I could, the Ontario Mining Association is doing a really good job with This Is Mine Life, which is a comms thing that they're doing. It's a you know it's for the kids. It’s hip. It's you know it's got great graphics. It's bringing in influencers. That's where we need to hit it. Uses TikTok content and Instagram stories, right? That's I think the solution. I mean, if I ever show up to a high school and I have a deck prepared, like you know, we're doing the wrong thing if we're trying to do that, right? So, you got to meet students where they are. You got to talk about it's not enough, you know, for these jobs to be well paying anymore. It has to be interesting work. That's what we're seeing with students nowadays. It's not just great job, great lifestyle. Those are still drivers, but it has to be interesting work they could tell their friends about. And one thing I'll just say as I as I as I exit this round of

comments is that one thing that does have some currency with some of the students, we talk to is mining will save the world, you know. If you're thinking about where you're going to get these transition metals, that's something that Canada could say. You know, we're going to do this in the right way, and they're metals that we need to save the world. So, we'll stop there.

Bryan Helfenbaum, 46:17-46:24

Yeah, not just interesting. But meaningful, right? The workforce is looking for something with meeting for all those reasons.

Amber Hayes, 46:25-46:37

Yep, it's an it's a brave new world out there. And again, looking at some of the questions, and I saw I just saw something pop up about Minecraft. I'll get there, I swear.

Stephen Gravel, 46:40-46:55

But well, I can't believe we don't have more metallurgists. I mean, that's like the best, the best primer you can get for that is Minecraft. I play it all the time with young people. I should say I'm not just doing that on my own time, but yeah, Minecraft is a good example of why we should have that interest.

Amber Hayes, 46:55-47:15

There you go. And similarly, a couple questions coming in related to any evidence of movement from workers for other industries into oil and gas and mining, and any known barriers other than I think what we've already surfaced around misperception, etc.

Bryan Helfenbaum, 47:16-48:00

Yeah, there's certainly lots of evidence. You know, oil and gas in particular, because it's driven by global commodity prices, tends to be more cyclical. And at the high points in the cycle, I mean, oil and gas has attracted a lot of fantastic people from all sorts of sectors and a lot of transferable skill sets. The challenge is when we hit those down cycles, we tend to lose people, and we often lose them permanently. You know, they for they dislike the cyclical nature of the industry, and then they go off and do other things. And so, certainly, there are no significant barriers. The skill sets are quite transferable, and even more so with the emerging digital technology areas. And so, yeah, absolutely, there's lots of evidence and lots of opportunity there.

Amber Hayes, 48:02-49:14

Great, and Brian, I just want to call it. I really enjoy the way that you demonstrated the relationship in regard to you know the training, the transferability, you know from some of the different industries from emerging to you know what we have in our mainstream and what's sunsetting, and I think that's something that again that translates into other industries, you know, we're seeing that across a variety of different things, whether it's you know software development and a lot of things that are a

little bit at risk, you know. So how do we how do we navigate you know training attracting in our different industries in in Canada? And just taking a look at the clock here, we have about 10 minutes left. I have a few minutes left of slides to close us out. But any other burning questions out there for folks? And the other one is sharing the presentations. They will be shared on our member only websites after the presentation, and I guess Minecraft. You know whether the industry you know gets a character in Minecraft. I'm not sure that would work or not.

Stephen Gravel, 49:17-49:47

So, but I think just on the Minecraft thing, I'll make it relevant and professional. But I don't know that there is that much communication centered around how, because it's quite it's whimsical, right? That's not translated in any way to a job, and I think that like you could also be a logger or work in the forestry industry if you play Minecraft, right? Or construction, but I don't know if that's necessarily the translation is lost somewhere in between those two things. They're more likely to want to be a game designer after playing that.

Bryan Helfenbaum, 49:49-50:08

Yeah, I think there's often a mistranslation of the concept of creativity. People who are interested in creative industries don't think of oil and gas and mining and these other you know heavy industry opportunities. That are full of innovation and creativity that that crave it and need it, but it's not what comes to mind when students think about you know applying creativity.

Amber Hayes, 50:09-50:31

Uh oh! Now someone's also saying chicken jockey. I have no idea of what that even means, but I anticipate it's another game. So, one from Ian Stephen Gravel, what do you think underpins the students' desire nowadays to seek more than good pay and opportunity as someone close to the generation in your work? Keen to hear your thoughts.

Stephen Gravel, 50:34-52:27

Well, I mean, I'm flattered first of all that these gray harris are not coming in. In no, I think the that's a really good question, Anne, and I think that's at the crux of how we begin to solve some of this because I don't think we are necessarily calibrated yet for an alignment between those two things. The ones that go into it, I think there is, and this is going to sound a bit cliche. There is a sense of adventure. There is a slight sense of adventure still in mining because mining is thought to be taking place in a hinterland.

So, it's a lot of the people that we see that enter the mining sector that end up working in what you'd call like fly in, fly out or seven on, seven offs. You know, they're typically youthful. They're typically young. They're typically outdoorsy. They're typically wanting to make hay while the sun is shining, so to speak. Unfortunately, they tend to be male. They tend to be Caucasian, and that's not doing us any favors from a scale and scope perspective. Because, you know, how do we how do we get more folks that don't meet that exact profile into this? You know, because you know, if you go to Cote

Lake, you can go fishing at the end of every shift if you want to, but not everyone likes that as a as a lifestyle. So, I don't really have a good answer, but I think you know things like what I mentioned through the OMA are trying to get at that through engaging with students and young people. Yeah, I think the same reason why some Torontonians go and do tree planting for weeks at a time in the summer is what we have to sort of grip in some way. Brian, please rescue me.

Bryan Helfenbaum, 52:27-53:14

I don't know. I don't know that I've got the right life preserver for this one, but the you know I think perceptions matter. Perceptions have always mattered, but a generation ago, you know, the job security was paramount, and now it's a bit more about what will play well over social media and to my friends and people I grew up with in terms of where I'm putting my time. And so, when industries have a neutral or even negative perception, it drives some of that opportunity away, right? And whether that's real or not, it just kind of loses some of that appeal, and that's again quite unfortunate, and underplays some of the creativity and innovation opportunities that exist within these industries that just aren't being well told.

Amber Hayes, 53:15-53:45

And I think we've got a comment here from Pat Smith, who's I think resonating on that that our research with young professionals indicates that a sense of purpose is important to attracting students. And Pat, I don't want to put you on the spot. You don't need to speak any further verbally, but inviting you if you if you want to. But I think that yeah, that is one of these things that is an increasing value.

Pat (attendee), 53:46-54:49

Yeah, we certainly heard that, and in some work that we did in Ontario and Alberta with young professionals in energy and students in energy, you know, going into the energy industry, that real sense of purpose, and one of the things that was very interesting is because of our diverse population anymore. There's many young people who maybe themselves experienced it, or family members, you know, have not always enjoyed energy security, and so they understand that you know the lights don't always go on when you flip the switch and that kind of stuff. And so, we heard that a lot from young people in terms of you know being able to personalize what not having access to energy or sustainable energy is too. So yeah, there was some, you know, I think there's some interesting sort of shifts that are happening at in some at some levels.

Stephen Gravel, 54:50-54:53

Great, thanks everyone, appreciate it.

Amber Hayes, 54:53-55:39

Definitely. Fantastic. Nope. Okay, thanks for thanks for sharing there, Steve. A few comments coming up on the chat for folks who may not have their eyes on that. We've got a couple shares

coming up about Minecraft again. But again, I keeping an eye on the clock. I know everyone's very busy here. We're coming off a long weekend. You've probably got lots to do in your in your inbox. Any closing thoughts, perhaps across the panel? We have one last question coming in from Brian, though. I think we might have time for a quick answer to this one.

Stephen Gravel, 55:39-55:45

I was going to say Brian asked a very simple and easy to answer question. Yeah, the time allotted.

Amber Hayes, 55:44-55:44

Yeah.

Stephen Gravel, 55:45-55:52

I'm of course kidding. That's a very complex question.

Amber Hayes, 55:52-56:04

Brian, I know you're an organization of organizations. I'm assuming that you're getting a sense also, Steve, and probably from your intakes. But you know, Brian, do you want to take a kick at this one?

Bryan Helfenbaum, 56:04-56:57

Yeah, I mean, I think that in general, there's evidence to show that this has improved significantly. As Steve said earlier, you know, a long time ago, it was mostly male, mostly Caucasian, and I we see much more diversity, and a lot of those barriers have been removed. Are they all removed? No, you know. And culturally, there are still some things to overcome. But you know, individual companies have made significant efforts to you know, and in particular, not just women and minorities, but I'll put a spotlight on the indigenous communities and looking to recruit from within there, that they have a massive amount of youth that are generally underemployed and represent a huge opportunity to get into. So, you know there are a lot of these opportunities. I think there has been progress. There's still opportunity for more.

Amber Hayes, 56:59-58:51

I appreciate that, and I think you know this has been a very rich conversation. It's a very important conversation, I think, for Canada, and you know it's one of the sectors I actually in metallurgy have a little bit of experience in, and it's one of my favorites, advanced materials.

And I I'm really pleased to be a part of this conversation where we can shine a bit more of a light on the innovation happening, the talent opportunities happening in Canada, and I want to thank all of our presenters today. I think very thoughtful presentations, very great conversations taking place. All of you that attended, you know, I again I appreciate that you're busy professionals out there, and we appreciate you taking the time. We will make some of these presentations available for you. There is a little feedback form if you'd like to share feedback on this session, things you'd like to see in future. The prior slide was talking a little bit about what we have planned. One of the other ones that I'm

working on is actual digital operation strategy to manage tariffs. So, we'll be we'll be sharing that webinar upcoming shortly. And again, just want to thank everyone as we wrap up our session here today. Just a reminder for those of you that are part of the Innovation Technology Councils, you do have your Infact Essential expanded packs now available. But again, thank you so much to the presenters. Thank you so much to everyone who came out. Fascinating conversation. Look forward to having more as this industry continues to grow, and as a strength in Canada. So again, thank you all for coming out, and I wish you all the very best for your post long weekend day.

Debbie Fleck, 58:54-58:54

Bye everyone, thank you for coming.

Sharon (attendee), 58:56-58:58

Thank you. See ya. Take care.