

HANSARD

NOVA SCOTIA HOUSE OF ASSEMBLY

**COMMITTEE ON
NATURAL RESOURCES AND
ECONOMIC DEVELOPMENT**

Tuesday, September 24, 2019

COMMITTEE ROOM

Uranium Exploration in Nova Scotia

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**NATURAL RESOURCES AND
ECONOMIC DEVELOPMENT COMMITTEE**

Suzanne Lohnes-Croft (Chair)
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Hon. Pat Dunn
Elizabeth Smith-McCrossin
Claudia Chender
Lisa Roberts

[Ben Jessome replaced Brendan Maguire]

In Attendance:

Darlene Henry
Legislative Committee Clerk

Gordon Hebb
Chief Legislative Counsel

WITNESSES

Department of Energy and Mines

Simon d'Entremont - Deputy Minister
Don James - Executive Director

Mining Association of Nova Scotia

Sean Kirby - Executive Director
Rick Horne - Geologist
Peter Oram - Environmental Specialist



House of Assembly
Nova Scotia

HALIFAX, TUESDAY, SEPTEMBER 24, 2019

**STANDING COMMITTEE ON
NATURAL RESOURCES AND ECONOMIC DEVELOPMENT**

1:00 P.M.

CHAIR
Suzanne Lohnes-Croft

VICE-CHAIR
Hugh MacKay

THE CHAIR: Order. I call the Standing Committee on Natural Resources and Economic Development to order. My name is Suzanne Lohnes-Croft. I'm the MLA for Lunenburg and the Chair of this committee.

The committee will be receiving a presentation from the Department of Energy and Mines - Simon d'Entremont, Deputy Minister; and Don James, Executive Director. From the Mining Association of Nova Scotia, we will hear from Sean Kirby, executive director; Rick Horne, geologist; and Peter Oram, environmental specialist.

I'm going to ask committee members to introduce themselves.

[The committee members introduced themselves.]

THE CHAIR: I would like to remind everyone in the room to put your phones on vibrate or turn them off. The only photos allowed are from the media. I would like to let everyone know there's coffee and washrooms in the anteroom.

Should we have an emergency, please exit on Granville Street and proceed to the Grand Parade near St. Paul's Church. That's where we will gather for a head count or whatever we do at that point. I'm sure it will be herding cats should that happen.

I would like witnesses to wait to be recognized by me so that your microphone can be turned on. We will have introductions of our guests.

[The witnesses introduced themselves.]

THE CHAIR: We'll take opening remarks from Deputy Minister d'Entremont, followed by Mr. Kirby.

SIMON D'ENTREMONT: Thank you very much for inviting us here today. As was mentioned, my colleague Don James is here with us from the Department of Energy and Mines.

As you know, uranium exploration and mining is not allowed in Nova Scotia. This was set out in the Uranium Exploration and Mining Prohibition Act of 2009 and dates back to a moratorium that came into effect in 1981. Exploration for uranium happened for a brief period here, mainly between 1976 and 1981. There's no legacy left behind from those uranium exploration projects. In recent years, we haven't had any exploration companies approach the department with a serious request to review the Act. No communities have stepped forward to ask if their area could benefit economically from uranium exploration. Also, we're able to meet our energy needs now and into the future with the current energy mix of our energy sources, even if the proportions of those mixes change.

The government is not contemplating uranium mining or nuclear power. In fact, the current state of the global market for uranium is that there's a lot of supply, certainly enough to meet the current demands of the nuclear power industry. Prices have fallen dramatically from \$65 per pound in 2011 to about \$26 per pound today. Saskatchewan is Canada's uranium mining hub, and they have seen layoffs of late. It's a challenging time, to say the least, for the uranium mining industry.

Still, Nova Scotia does have naturally occurring uranium in our rock formations, and that brings with it certain challenges that must be addressed. Much of the work our geologists do in this area is to identify the risks of naturally occurring radioactivity. We work to provide Nova Scotians with the tools to know if they live in an area that's susceptible to uranium in well water or radon in our homes. Both issues can present health concerns. Our work is to educate Nova Scotians, encourage people to test their wells, and take action if needed. Better public health is just one of the benefits we get from having highly skilled geologists working within government and within our department.

Outside of uranium, we recognize the importance of mining to our provincial economy. This is an industry that creates benefit, produces the commodities demanded by industry and consumers, and supports good jobs in rural areas of Nova Scotia. As a department, we're working to ensure that we find the right balance between making the most of our resources and protecting our natural environment. One example of this is the

new Mineral Resources Development Act and Regulations, which came into effect in 2018. The new rules ensure responsible development and provide better enforcement.

In the future, we believe that industry will increasingly focus on finding the critical minerals that will position Nova Scotia and Canada as a leader in innovation. This will be especially important as we meet the demands from consumers globally for electric vehicles, better batteries, more solar panels and wind turbines. To get there, we need to be as competitive as possible. That means finding and developing new deposits of copper, cobalt, lithium, rare earth elements, tin, nickel and more. We have to do this in the most effective and least invasive way possible. That's why we continue to support exploration projects and leading-edge research with our universities through the Mineral Resources Development Fund.

Again, thank you for having us here today. We welcome an opportunity to discuss this with you further.

THE CHAIR: Mr. Kirby.

SEAN KIRBY: Thank you very much, and our thanks to the committee for inviting us here today to talk about this important issue and the science behind uranium and uranium mining.

Nova Scotia's mining and quarrying industry employs 5,500 Nova Scotians, mostly in the rural areas that are in such need of economic opportunity these days. We are the province's highest paying resource industry with average wages of over \$55,000 a year. An entry level job in mining such as haul truck driver pays an average of \$25 an hour.

In the past two decades, we have dramatically reduced our injury rates by 90 per cent. We are, in fact, today one of the safer industries in the province. As well, over the past several decades, we have undergone a similar transformation and improvement in terms of how we manage the environment. We take excellent care of sites as we extract on them and we do reclamation that ensures they can go on to contribute safely to communities after extraction is done.

Today's mining industry is a sophisticated high-tech science-based business. We believe that modern uranium mining is safe and environmentally responsible. It's essential to our modern standard of living. We all benefit from it each day of our lives, even if we are unaware of that being the case and we believe that Nova Scotia should lift the ban and allow uranium exploration and mining in the province.

Nova Scotia had a lot of exploration for uranium in the late 1970s and early 1980s. Companies like Gulf, Shell and Esso came to Nova Scotia, invested tens of millions of dollars in uranium exploration. Occurrences of uranium were found all over the province,

as you can see from the map on this slide. The PowerPoint presentation has been distributed to committee members as well, in case you want to look at it there and see it more clearly.

Unfortunately, in 1981 in the middle of a provincial election campaign, a moratorium was imposed on uranium exploration by the government of the day. We say, with all due respect, that the moratorium was a political decision imposed at the most political time. It was not based on science or facts. Unfortunately, that moratorium has continued for almost four decades and it became a legislated ban in 2009.

As a result of the moratorium, jobs and investment were lost, tens of millions of dollars in investment and exploration was rendered worthless at the stroke of a pen and a very negative signal was sent to the global mining industry about Nova Scotia as a place to invest and to work. Unfortunately, the harm that has done to the province's industry and the global mining industry continues to be a challenge that we deal with today.

To understand the importance of exploring for uranium and extracting it, you need to of course understand what uranium is used for. The first thing that probably comes to mind for most people is nuclear power and, indeed, uranium is an extraordinary source of electricity: 15 per cent of Canada's electricity comes from nuclear power; 11 per cent of all global electricity comes from nuclear; and about 30 per cent of New Brunswick's electricity comes from nuclear where they have the Point Lepreau Nuclear Generating Station.

Remarkably, all that electricity is produced without generating any greenhouse gas emissions. Many scientists and environmentalists around the world have argued that nuclear power is essential to fighting climate change and to meeting our emissions reduction targets. There is no other way to generate that quantity of electricity for people around the world without generating any emissions.

Uranium also plays an important role in what is called nuclear medicine, which is using sources of radiation to perform diagnostic procedures and various treatments for things such as cancer. Radiation therapy for cancer is an example of nuclear medicine and an extremely important use of uranium, obviously a life-saving use. In Canada, 1.5 million diagnostic scans are performed each year, and 15,000 radiation therapy treatments are performed each year on Canadians. About half of all Nova Scotians will benefit from nuclear medicine in their lifetime.

When a Nova Scotian is diagnosed with cancer and needs radiation therapy in order to deal with that, we should be very grateful that many other jurisdictions around the world have not followed our lead in banning uranium mining.

A radioisotope derived from uranium is the key ingredient in smoke detectors. It is the thing that actually detects smoke and helps keep us all safe as we sit here in this room.

Certainly we and our families sleep safer at night knowing that there are smoke detectors in the building thanks to uranium.

Uranium plays an important role in growing and preserving food. For example, irradiated food reduces bacteria and prolongs shelf life. We as a globe would have even more challenges than we already do producing enough food to feed the Earth's population were it not for uranium.

There are also many environmental and industrial applications of uranium. For example, radioisotopes derived from uranium are used to check pipeline integrity and help ensure that there aren't pipeline leaks. There are a whole bunch of ways that uranium is used, ways that most people would not be aware of. It's obviously a material that's very important in our daily lives and contributes to our health and safety and to protecting the environment.

Fortunately, we don't need to talk about uranium in the abstract. We don't need to talk about hypothetical what-if scenarios. We have a concrete example in Canada of the importance of uranium mining and how safely it can be done. Saskatchewan has had uranium mining going all the way back to the 1950s. For many years, it was the single largest provider of uranium globally - today it is the second-largest supplier. It provides 22 per cent of global uranium and employs almost 2,000 people in Saskatchewan at uranium mines. They have six and a half decades of experience in uranium mining in Saskatchewan, and I think it's important that we learn from the learnings and the experience of our fellow province.

The Canadian Nuclear Safety Commission is the federal agency that regulates uranium mines and the nuclear industry in the country. Peter Elder, the chief science officer from the Nuclear Safety Commission, was quoted in a series of articles that the Chronicle Herald did last year about the province's uranium ban. The Nuclear Safety Commission said that no uranium worker has received a radiation dose above the regulatory limit, and there has never been an incident of off-site impacts.

In 2017, the average total effective radiation dose to workers in the uranium mining industry was only 3.1 per cent of the total allowable limit - an extremely low level, way below the level at which there could be any concern about health or safety. To put that in perspective, flight crews on airplanes get three times as much radiation annually as do workers in uranium mines. This is a very safe industry.

According to the Saskatchewan Mining Association, statistics collected by government agencies show that Saskatchewan's uranium mines are among the safest workplaces in the province, even surpassing at times office jobs. Peter Elder, the chief science officer from the Nuclear Safety Commission, was quoted in the Herald last year saying, "Overall, the statistics are that uranium mining is actually one of the safest types

of mining based on conventional health and safety.” That is the track record of uranium mining in Canada.

If uranium mining caused the problems that some people allege, the people of Saskatchewan would be telling us so. We would be hearing about it. We would see it in the media. We would see a lack of support from the people of Saskatchewan for uranium mining. We would see the political Parties in Saskatchewan debating whether or not to continue uranium mining. Instead, the political Parties in Saskatchewan support uranium mining, and 82 per cent of people in Saskatchewan support the province’s uranium mining industry according to polling.

People in Saskatchewan have had six and a half decades of experience with it. They have seen that it is safe and environmentally responsible. They have seen the jobs and economic opportunity created by uranium mining. They have seen uranium mining help that province transition from being a have-not to a have.

[1:15 p.m.]

Because we are not doing exploration for uranium, because we are not collecting data on uranium in our geology, because we are not improving our knowledge of where uranium is in the province and the ways in which it affects us, we are exacerbating public health risks in two areas in particular, which we’ll explain.

Due to the lack of knowledge and proactively developing data about uranium in Nova Scotia’s geology, homes are being built in areas with elevated uranium levels. Wells are being drilled in areas with elevated uranium levels. This potentially increases Nova Scotians’ exposure to the serious health risks associated with uranium in well water.

I want to be crystal clear - there is no connection between exploration for uranium or uranium mining, and uranium in well water. It is something that occurs naturally. If you have any skepticism about that, consider that we have never had a uranium mine in this province, we have not had exploration for uranium in this province for almost 40 years, but yet Nova Scotians continue to have uranium in their well water. That’s because it is naturally occurring and it has nothing to do with the industry. Because we are not doing a better job understanding our geology for uranium, we are putting Nova Scotians more at risk.

The same is true for radon gas. Radon gas is a naturally occurring gas that is produced by the natural decay of uranium underground. As the gas rises up through the ground, when it emerges into open air, it simply disperses and there is no health risk associated with that. As we have all been hearing increasingly in recent years, radon gas can rise up through the ground and seep in through the foundations into the basements of buildings, including Nova Scotians’ homes.

Radon gas is colourless and odorless, and as a result, the only way to know it's there is to get a radon gas testing kit and perform the test in your home. We certainly support the Lung Association of Nova Scotia, the provincial government and the federal government in encouraging Nova Scotians to do that. It is a serious health risk. Radon gas is the second leading cause of lung cancer. An estimated 114 Nova Scotians are estimated to die each year from exposure to radon gas.

As with uranium in well water, our lack of knowledge is hurting us. We need to be doing exploration for uranium, documenting where it is, coming to understand better our geology for uranium in order to help protect Nova Scotians from these public health risks.

In conclusion, we're going to leave you with three recommendations. These are not our recommendations. These three recommendations come to us from a committee of civil servants that in 1994 took a serious and science-based look at the province's uranium ban and made several important recommendations about it, which unfortunately were not adopted by the government of the day or any government since.

I want to be clear that the language from the report that I am about to read to you is word for word from the report - we have not paraphrased at all. "The Committee recommends the moratorium on uranium exploration and mining in Nova Scotia be lifted." Plain and simple. "The Committee concludes that there is no scientific evidence to show that exploration for uranium, if done according to the regulations of the Mineral Resources Act, 1991, either adversely affects the environment nor the health of workers associated with this task."

You need to know that there were six civil servants on this committee - two of whom are from the Department of Natural Resources, the other four were from the Department of Environment and the Department of Health. The majority of members on the committee had as their sole focus protecting Nova Scotia's environment and the health of Nova Scotians. Yet they concluded that there was no scientific evidence that either would be put at risk by exploration for uranium.

Lastly, the committee concludes that the risk to the general public as a result of uranium mining is very low and may be considered to be insignificant. Those recommendations are as sound, as reasonable, based on science today as they were back then. The only thing that has changed in the past quarter century is that we have another quarter century worth of experience in uranium mining. We have another quarter century of experience in regulating uranium mining. We have another quarter century of advancements in science related to uranium and how it is used and handled.

These are recommendations that the government should seriously consider and, in our view, adopt. Thank you, and we look forward to your questions.

THE CHAIR: Thank you both for your opening remarks. We will now take questions from the committee. We will start with the PC caucus. Each member will get one question and a supplementary. Ms. Smith-McCrossin.

ELIZABETH SMITH-MCCROSSIN: Thank you very much, both of you, for your presentations so far. I have a question, and it's because in my reading I have read differing opinions on this. Some things I have read have indicated that it's actually more dangerous to leave uranium in the ground in some areas where it's radiating naturally versus extracting it. Can you clarify to me if that's fact? Is there any substance to that?

PETER ORAM: If you have an area that's elevated in uranium, and the area is exposed to surface water - there may be groundwater runoff and things like that - if there is an area that's exposed, there may be a situation where the runoff from that would create issues. If we flip over and think about mining, it's contained. There are engineering controls. You're removing the source, you're not adding to the source. I think there are situations where it would be a greater good to contain and properly extract than there would be to leave it.

ELIZABETH SMITH-MCCROSSIN: Thank you for clarifying that. It's a very important topic. In the area where I grew up, the small community of Linden, it's actually found in a lot of well water. A lot of people's individual wells are not safe because of that. Does the moratorium restrict exploration so that you're not actually able to determine where these deposits are found in the province, to know where these higher levels may be or not?

PETER ORAM: The restriction is a little odd in that you can't explicitly look for uranium. You can look for associated minerals. You can look for other things. You can't explicitly get a licence to go and look for uranium. It is a little odd in that if you had a program that you wanted to develop and specifically look for it, you couldn't, but there are ways to look for associated things. This gets back to that whole idea that the moratorium is on data collection. It relates to uranium, but it's a moratorium on data collection. It can't be used for health reasons. It can't be used for public policy. It can't be used for a number of things.

THE CHAIR: We'll move along to the NDP caucus. Ms. Roberts.

LISA ROBERTS: I would like to go to the department. I understand that the department invests a fair amount of resources in mapping basic geological information around the province. Can you speak to what we know about how extensive uranium deposits are in Nova Scotia and how that information is disseminated to the public and could be used for public health information?

DON JAMES: It's true that our geological survey maps the geology of the province to get a better understanding broadly of the geology and its contained mineral deposits. To

my knowledge, we haven't focused on uranium for quite some time, certainly before my time.

What we have done subsequent to that of course is to make sure that all of the archival exploration information is available. If someone wanted to come back and look at all of the work that was done in the 1970s and 1980s, they could come back and do that in the library. All of the drill core that was collected is in our Stellarton core facility, so that's all available. We published maps. I can provide you with links to those maps on the distribution of radionuclides in the province and radon risk maps and risk maps for uranium in groundwater and so on and help provide people with information, the tools that they need to better understand where they live and the potential risk to their property and health and safety.

SIMON D'ENTREMONT: As Don has said, we have radon maps. If you search for Nova Scotia radon maps, you'll come to our website. It'll show the radon map showing the amount of risk of the resources.

I think it's really important for us to just talk about the public health issues around radon and radon risk. Radon is a radio-nuclear gas that comes from uranium and as Sean mentioned, it can find its way into people's homes, but it can be tested for. You can go to the Nova Scotia Lung Association or to a local hardware store and buy a radon detector. We also have a loaner program that we've given radon detectors to libraries. You can go take one out on loan and bring it to your home to do the testing. There is also some information on the provincial website on public health issues around radon.

It also may be important to talk about, from a public health perspective - I worked at Health Canada at one time - the importance of radon and risk for lung cancer, but also the cumulative risk of smoking and radon risk. Basically, it's more than just cumulative. You have a 5 per cent risk of lung cancer from radon and 5 per cent from smoking. They don't add up to 10 per cent. At one particular concentration level, the risk to a non-smoker of lung cancer from radon is 4 per cent and for a smoker it's 26 per cent. So it's very cumulative and on a multiplicative scale so it's really important for people to get their homes tested, and if you're a smoker, even more so.

LISA ROBERTS: We have also heard concerns related to uranium and exposure through well water testing. I think particularly as groundwater deposits are sometimes compromised with drought, people are having to drill deeper in order to have a secure water well source. That actually led us in the NDP caucus to introduce a private member's bill in the last session that called for free testing of water well testing for a number of different elements, including uranium.

Given how extensive that concern is - and I've heard a fair amount about it - it seems to me that there isn't really much of a map. If you map the concerns about uranium and radon in wells over the map of Nova Scotia, it would be fairly extensive. To think that

we might mine our way out of that problem seems fairly ridiculous. Am I correct? I mean, we have uranium in many parts of Nova Scotia, do we not?

SIMON D'ENTREMONT: I can start off and someone else can join in. I think the issue that you can solve one particular source of uranium through mining is one thing. Whether or not you can solve a public health challenge by mining it all out, I don't think anyone is making that progression.

PETER ORAM: I would agree. The idea of mining your way out of it, I don't think that's something that we put forward. It's a source reduction. It's a method, and it's one of the many that you might employ. It's source reduction, but it's a bit of a stretch to say that we're going to mine our way out of a uranium problem.

My tack on this is really that we don't have sufficient data. We have enough to put a map together, but that could be two data points. Not to counter what Don said too strongly, but the information is there, but I don't think everybody is capable of going to the Department of Energy and Mines and navigating and negotiating the abundance of data that's there.

We do have a situation where there is some information available, but we've decided that we've closed the book - we're not going to collect any more information associated with this or anything consistent and we're not going to do it by modern methods. We're just going to stop. We're going to use data up until 1981 and techniques and thought processes and we're just going to close it there. Then we're going to fast-forward to 2019 and continue on using data that's old. It's a tough one for me.

DON JAMES: I'm sure you don't want to spend your afternoon looking at geologists argue. (Laughter) We have enough data to tell Nova Scotians that they need to have their well water tested and that they should have their homes tested for radon gas. The maps are detailed enough that they can look at those and say, it looks like I'm living in an area where I should have my well water tested and my home tested for radon gas.

[1:30 p.m.]

THE CHAIR: We'll turn it over to the Liberal caucus. Mr. Irving.

KEITH IRVING: Thank you all for being here this afternoon. My question is for Deputy Minister d'Entremont. In your opening remarks, you commented in terms of whether there's any need for uranium or nuclear power as part of our energy mix. We have spent a significant effort in this province in terms of greening our power generation and working towards greenhouse gas targets. I'm wondering if maybe you could expand a bit on the greening of our energy mix and whether you feel that we are in a good position to meet our targets using that mix of energy that we have and we're putting efforts into now.

SIMON D'ENTREMONT: A big part of our energy ambition is around reducing the impact of greenhouse gases on our environment and the impacts of climate change on our energy mix. In Nova Scotia, about 40 per cent of our greenhouse gases come from fuel and fuel oil, gasoline and fuel oil for your home; 40 per cent comes from burning coal and other carbon-based products for energy; and 10 per cent comes from everything else.

Obviously, if we're going to make a dent here, electrification of the transportation sector, electrification of our heating - hot water tanks - these things need to be part of our future. Currently, of course, our electricity is not 100 per cent green yet, but we have made leaps and bounds, and we'll continue to make great progress with the Maritime Link and we get energy from Newfoundland and Labrador.

We started 10 years ago with 80 per cent of our electricity coming from carbon-based products. By the end of the year, a year from now, we'll be down to 30 per cent. We have made the most progress against those targets. We met the federal target of 30 per cent reduction from 2005 levels by 2030; we beat it by 13 years. We're going to hit a 45 to 50 per cent reduction from our 2005 levels of greenhouse gas emissions by 2030. We're also on target to meet our 2020 goal of 40 per cent of our energy mix from renewables as well.

We have made great progress. We put the second most wind on the grid than anyone other than P.E.I. We have made great progress, but we still have a long way to go. We started in a very tough position with 80 per cent of our energy coming from carbon-based products. We have made great progress, but we need to continue to make progress as we treat climate change as very important.

You bump up, though, a bit, into the issue of affordability. Sometimes these transitions cost money. We have higher rates of energy poverty in Atlantic Canada than anywhere else in the country, according to one scale where you decide where the cut-off is. It's 8 per cent for the rest of Canada and 12 per cent for Atlantic Canadians. We're pushing that envelope as far as we can.

To make up for that a bit, we spend \$10 million to \$12 million a year at Efficiency Nova Scotia on the HomeWarming Program, which is free energy assessments, efficiency assessments, and free implementation of the recommendations for low-income Nova Scotians. We try to take a little bit of the bite out of the impact of that transition that costs a little bit more. We have made good progress, and we need to continue to do more.

KEITH IRVING: Energy, as I think we know and understand, is complex and long term - in terms of energy planning, you're looking out 30 years. When you talk to Nova Scotia Power, capital investments have to be planned out, et cetera.

You mentioned in your opening comments that the idea of building a nuclear power plant or using some home-mined energy to create power is really nowhere on the radar for the province - can you comment on that? I think that leads one to make a conclusion that

if were mining uranium, that would be for export because based on your earlier comments, we don't intend to build nuclear power plants or move any way in this direction. Could you expand on that please?

SIMON D'ENTREMONT: Yes, that's correct. Right now, we plan to change the compositions of the mix of our energy in terms of the proportions that are coming from wind, solar, tidal - non-emitting sources. Right now, nuclear energy is not part of our energy ambitions nor part of our projected mix of energy for the future.

THE CHAIR: We'll move over to the PC caucus - Mr. Dunn.

HON. PAT DUNN: Thank you for the words that have been passed on so far. Uranium is in our rock formations so I guess I want someone to elaborate. If the province is trying to secure some rare minerals or critical minerals in the province in a least invasive way, what problems are we looking at in that manner? The fact that uranium is mixed in with other very important minerals - could someone elaborate on that?

RICK HORNE: I think the principal uranium deposits are simply uranium deposits. There's nothing else mixed within them. Low levels of uranium occur in other deposits such as a tin deposit in East Kemptville, but the uranium deposits that have been looked at as economic are simply uranium deposits.

PAT DUNN: Just a follow-up question about some comments that were made earlier. What are the areas of this province where residents should be really concerned about the amount of radon in their areas?

RICK HORNE: I'll just make some comments in a general sense with respect to the occurrence of uranium. Uranium occurs primarily in two different types of rocks - granitic rocks of what we call the South Mountain Batholith that extend from Halifax almost to Yarmouth, right through the middle of the province. There are many uranium occurrences within there - particularly in the New Ross area not far from where the Millet Brook uranium deposit occurs.

Also in northern Nova Scotia in what we refer to as sedimentary rocks in the Cumberland Basin - up in the River John area, there was a small deposit of uranium occurring in those sedimentary rocks up there. They're fairly widespread in terms of where uranium occurs. Concentrations that cause a problem are more localized low levels within the granites where most of the problems have been in the Harrietsfield area and the New Ross area. There's elevated uranium there in those granites, naturally occurring, that cause problems that relate to generation of radon gas in particular.

One of the things that goes back to one of the first questions that Ms. Roberts asked about - where these deposits occur - there's arguably all kinds of undiscovered uranium deposits. I worked for the government for 22 years. The first project that I worked on for

the first five years was mapping the granites of the South Mountain Batholith that host these uranium deposits.

We would find what we referred to as hot spots - elevated uranium - using simply spectrometers or Geiger counters, if you want. I can tell you, there are all kinds of them, particularly through the New Ross area. If you were to draw New Ross and draw a radius of maybe 10 or 15 kilometres around there, all the way over to the East Dalhousie area, all through there, there's all kinds of naturally occurring hot spots. These things occur in highly fractured rock like the major Millet Brook deposit in arguably what are fault zones. These are very porous zones where a lot of water can flow through them. There are all kinds of these on smaller scales all through the area.

Just to give you an example, when we were going down roads or whatever and people were building logging roads or small woodlot roads, they're always looking for material to put on the roads. They're looking for rock material that's easy to get at. We recognized fairly early on that everywhere these guys were digging up rock to put on the roads was where it was easiest to dig. That was where they were in small, highly altered fault zones that had uranium ionization. The best way to describe it is that the rock there is rotten. You can dig it up with a spade. Guys go in with backhoes, and they dig this stuff up, and spread it on the road. There's lots of them, all kinds of them through the area. Larger deposits, the potential for other undiscovered uranium deposits like the Millet Brook deposit - exploration was really only in its beginning when the moratorium was put on. There's lots more of them out there.

THE CHAIR: We'll turn it over to the NDP. Ms. Chender.

CLAUDIA CHENDER: The International Atomic Energy Agency has said that we have enough uranium based on identified current resources. If we look at the Fraser Institute's survey of mining companies - not the NDP's normal source, but when in Rome - in terms of mineral potential, we rank in Nova Scotia at the bottom of the pack - I think at 35 out of 100 of all the provinces and territories in Canada.

Given that we want to transition our economy, given that we need to transition our economy, given the climate crisis we're in - and this week, I'll remind everyone, is the UN Climate Summit. Given that we have all the uranium we need, notwithstanding whether we think that nuclear will bring us clean power, aside from profit, why should we consider re-opening this uranium ban?

SEAN KIRBY: There are a couple of issues being raised there. It's important to understand a couple of things, though. The cycle of exploration and ultimately opening a mine is something that takes many, many, many years. We may or may not have sufficient uranium today, but where are we going to be in 10 or 20 or 30 years? It's a long process that we go through. Lifting the ban and starting the process of exploration today will not lead to a uranium mine anytime soon. There is the potential that you could have one many

years down the road, and it's entirely possible that the amount of uranium that the world needs at that point is very different.

The United Nations International Panel on Climate Change, as part of addressing the risk of climate change, in fact, endorses an increase in nuclear power because, again, it is emissions free. The various scenarios that the IPCC has put out call for an average increase in nuclear power of two and a half times, so again, the supply the world needs of uranium is quite probably going to change in coming years.

The other thing is that, as I mentioned in our presentation, the uranium moratorium has had a very negative impact on the province's reputation as a place to invest in the global mining industry. There are various reasons why, year after year, in the Fraser Institute survey of global mining executives, Nova Scotia ranks as the least attractive jurisdiction in which to invest. The uranium ban and other policy decisions that are not based on science and fact, that are instead based on politics and misconceptions, contribute to the negative reputation that Nova Scotia has.

Lifting the uranium ban, most obviously, would open the door to uranium exploration and potentially extraction one day, but it would be a tremendous signal to the global mining industry that Nova Scotia is open for business, that Nova Scotia wants the investment in job creation that the mining industry can bring here. We employ 5,500 Nova Scotians today. There is great potential for us to employ many more. There is great potential for us to contribute significantly more even than we do today to government revenues that pay for vital programs like health and education. Lifting the ban would send a huge signal to the global industry that Nova Scotia is a good place to do business, that we're going to make decisions based on science, that public policy is going to be sound.

We think, for all those reasons, the ban should be lifted.

SIMON D'ENTREMONT: The question raises an interesting observation that we are increasingly making within the department. I agree with Sean that mining brings a benefit as there's other natural resources extraction - offshore oil and gas has brought us \$2 billion in royalties and another \$2 billion for the province where we invested it in hospitals and schools and roads and so on.

The question of which minerals we pick and why we pick them is one we're asking increasingly within the department. I think directionally where our mining policy is going is that increasingly we will be favouring the types of minerals that we need to achieve our ambitions in other areas. Our renewable energy ambitions - we need lithium for batteries for our electric vehicles. We need copper for turbines. For our smart phones, we need certain materials. The things that we need in our lives - our ambitions and other areas of social, economic, and environmental ambitions - over time, will be favouring more and more exploration and development in those sectors that help us achieve our own ambitions that we have.

CLAUDIA CHENDER: Notwithstanding the recommendations of the IPCC, the International Atomic Energy has said even in the most high-case demand scenario, current identified resources are more than adequate. Presumably that would take into account expanded nuclear power to meet clean energy targets.

When you talk about negative signals, while the Fraser Institute does give us the most negative score in terms of mineral deposits, notwithstanding the fact that there may be a lot of uranium or not a lot of uranium relative to Nova Scotia, it seems pretty clear there's not a lot of uranium relative to the world and world demand.

The Fraser Institute, in fact, gives us a 94.89 on the Policy Perception Index so it doesn't seem to me based on this report that the world sees us as closed for business - quite to the contrary. I'm sure through some of the good lobbying efforts of the Mining Association of Nova Scotia and yourself, Mr. Kirby, we are seen as open for business. We are given a very high perception score. I think the reason that we get an aggregate low score on attractiveness is because that number's an aggregate of the policy perception and the mineral availability, and the reality is that the mineral availability just isn't that high.

To piggyback on what Mr. d'Entremont was saying, I think it makes every sense that we look at how we meet those climate targets here and that we'd be very careful about further mining investment. Is there any reason that we need a higher score than 94.89 from the Fraser Institute in terms of policy perception, Mr. Kirby?

SEAN KIRBY: I think there are a couple of things that have to be borne in mind and to help illustrate, I want to talk about gold for just a moment.

The global mining industry's opinion of Nova Scotia's geology for gold had been forever that you couldn't mine gold profitably in Nova Scotia just due to the nature of our geology. That perception has been dramatically turned around by the remarkable success of the Touquoy gold mine, which opened in 2017, which is the lowest cost gold mine in Canada; the tenth lowest cost gold mine in the world. It has triggered a very significant exploration rush in Nova Scotia for gold. It has changed the global mining industry's perception of Nova Scotia as a place to work, as a place to invest, and in terms of the province's mineral potential.

The minerals that we use in society are constantly changing. Lithium was not on anybody's mind 10, 15, or 20 years ago, for example. An electric vehicle requires three times more copper than a conventional vehicle, so our needs are constantly evolving but in terms of the province's mineral potential, we have very significant mineral potential.

We have been doing commercial mining in Nova Scotia for three and a half centuries. The industry is growing and creating more jobs and opportunity for Nova Scotians, creating more revenues to help pay for vital government programs like health and education. We are very appreciative that the provincial government has, in fact, been a

strong supporter of the industry and has helped put out the signal that Nova Scotia is open for business.

There's more to be done, clearly, to improve the province's reputation in the global mining industry, but when you look at the success of the Touquoy gold mine, the interest now in Nova Scotia's potential for gold is just one example of a mineral, when forever it was believed that Nova Scotia could not be mined profitably for gold. We are doing great things in this province to create jobs and opportunity for Nova Scotians and revenues for governments and changing the global mining industry's perception of whether Nova Scotia is a good place to work.

Certainly, lifting the uranium ban would be an incredible signal to send to the global mining industry that we want jobs and opportunity here. That we are not simply going to continue to struggle on as we have in many ways with the challenges we face related to the economy, related to depopulation, related to our fiscal challenges. We need to create jobs in this province. We're very proud that, as an industry, we're contributing to the growing success of the province and we want to do everything we can in order to create more jobs for Nova Scotians.

THE CHAIR: Thank you. We'll move on to the Liberal caucus with Ms. DiCostanzo.

RAFAH DICOSTANZO: I'm just hearing about diversifying energy and renewable energy and the list that I have is hydro, solar, wind - I didn't hear anything about the tidal energy industry. I just want to know the percentages of each. You said it was changing. What is our five-year, maybe ten-year long-term as well? How do we compare, for example, to the Scandinavian countries?

SIMON D'ENTREMONT: We're here to talk about money so I might not have all the detail that you'd like, but certainly, as I mentioned, our percentage of energy coming from coal was 80 per cent 10 years ago. We'll be under 30 per cent when the Maritime Link energy comes on stream, so we'll have over 40 per cent coming from renewable.

Right now, solar is not a particularly large part of our ecosystem. We have much more in wind, which may be in the 10 per cent range, but don't quote me on that. Tidal is something that we don't have any energy being sold to the grid right now, but we do have some tidal innovation projects that are taking place. They could someday make up part of our energy mix. Right now, we're still early stages in tidal so they're not part of our immediate energy mix for the next few years.

Certainly as the next 10 and 20 years roll around, we will probably be putting more renewables on the system and, based on what's going on in the rest of the world in terms of where the prices are going down, solar and wind are becoming very attractively priced for us to add to the system.

We recently signed a memorandum of understanding with the federal government who have made a policy commitment to have 100 per cent of the federal government's energy and electricity uses come from renewable sources so by 2025. They want to do that, so we signed an MOU with them to help find a path to do that, which probably involves adding more renewables into the system.

Solar is probably going to be one of these kind of slowly creeping things. We have a residential program now. We provide a benefit of up to \$10,000 for residential solar installation under a net metered arrangement where you produce energy and sell some back to the grid.

We're also doing some solar for community buildings as well and we've done solar for shelters and a few things like. Solar adoption, I think, is something we're going to continue to move along.

Interestingly enough, solar is a great economic development opportunity throughout the province. I think solar suffers under the perception that you're ordering the solar panel from China and that's 80 per cent of the expense and you only have 20 per cent local benefit. It's exactly the opposite. The solar panel is 20 per cent of the spend, 80 per cent of it is local installation, local services, so we've got a great small emerging industry of solar installations with the benefits greatly distributed throughout the province.

Tidal, like I mentioned, is an innovation play where we're getting the benefits of hiring engineers and architects and building new things. Of course, 10 to 15 per cent of our electricity needs are going to come from Maritime Link. I would have to quantify that number to make sure that's exactly accurate. It will come from the Maritime Link sometime next year and get the energy from Muskrat Falls in Labrador.

We're going to continue to green our mix and continue the transition. There is still great opportunity for us to do that.

RAFAH DICOSTANZO: In comparison to the Scandinavian countries as well?

SIMON D'ENTREMONT: I don't have the Scandinavian numbers. Every country there would be a little bit different, but certainly they have a high reputation for having a lot of renewables on the system. They have a lot of offshore wind there as well, which is not something that we've tapped into here, but other jurisdictions, including the northeast U.S. are looking at putting wind offshore as well. We can get you those numbers though.

THE CHAIR: We'll move over to the PC caucus with Ms. Smith-McCrossin.

ELIZABETH SMITH-MCCROSSIN: I have a question with regard to the uranium in Nova Scotia - a background summary for the uranium inquiry 1982. It's around drinking water. In Section 3 of the document, it mentions that the department had revealed 6 per

cent of 3,350 wells tested contained uranium concentrations in excess of 20 parts per billion. The maximum acceptable concentrations for uranium and drinking water was lowered from 5,000 parts per billion to 20 parts per billion, which would mean that 6 per cent of the wells tested were considered unacceptable due to being in excess of 20 parts per billion of uranium.

If that is correct, I'm curious to know - were these private wells that were tested or were they test wells drilled by the department?

DON JAMES: I will have to go back and look at the study from 1982. I suspect that it's heavily weighted towards private wells with some public wells. It's unlikely the department would have been drilling wells just to monitor water. We would have been using the existing well sources.

ELIZABETH SMITH-MCCROSSIN: I guess it wasn't a very specific question, but I am concerned about people's drinking water and safety throughout the Province of Nova Scotia. There may be some wells of private residences where uranium levels are higher than acceptable, and they're not aware of this. Because of the moratorium, we're not able to explore and know fully where all the deposits are in the province.

I have another health question. I'm not sure if you or anyone else on the panel can answer it. What would the health concerns or consequences or effects of someone who is drinking water that's in excess of this 20 parts per billion be if they were drinking it regularly and long term, water with too much uranium?

SIMON D'ENTREMONT: I think that's a Public Health question; Dr. Rob Strang would be the person to ask that. We can follow up if you would like that, and have it secretarially sent in to you, if you would like.

ELIZABETH SMITH-MCCROSSIN: I think it's important. I would appreciate that. It's one of the effects, I believe.

With the moratorium on mining uranium, the concern is, do we have the knowledge to make sure that our drinking water in the province is safe? It's one of the aspects that we need to look at that could be a negative effect of the moratorium.

THE CHAIR: We'll move over to the NDP caucus. Ms. Roberts.

LISA ROBERTS: Just to build a bit on the line of question of Mr. Irving, I'm interested in our goals, our targets, for reductions of greenhouse gas emissions. If I heard correctly, Mr. d'Entremont, you said that we're on track to reduce our 2005 levels by 30 per cent by 2030. As I'm sure you're aware, there's a whole coalition of organizations and advocates who are calling for a 50 per cent reduction from 1990 levels by 2030, which

would actually be in line with the IPCC goal of keeping our planet to within 1.5 degrees of warming and represent our fair share.

I'm interested to know how the department is engaged in setting our targets moving forward, given that we're now in a review of EGSPA and - maybe I'll save my "and" for the follow-up.

SIMON D'ENTREMONT: I didn't come prepared to have a detailed conversation on energy policy, but certainly we are in constant conversation with the Department of Environment, which is co-owner of some of these policies around our ambitions for greenhouse gases. They designed the cap-and-trade system, for example, and so on. We're engaged in regular conversations there, and that will be ongoing, I'm sure.

LISA ROBERTS: Our caucus is on the record as supporting the targets that were laid out in the 2030 declaration. I really appreciated your comment about solar and about the 80 per cent benefit, that 80 per cent of the economic activity related to installing even a solar panel manufactured in China is local.

When you combine that analysis with the need to address energy poverty - there's both potential for economic development, and there's great potential for improved general social welfare and comfort - there's a whole different way of envisioning our economic future which is kind of very much in line with the analysis that the recent Ecology Action Centre Gardner Pinfold report discussed that we could both greatly reduce greenhouse gas emissions and create thousands of jobs.

I guess I'm wondering what you would say to that and what analysis your department is doing on the positive economic impact of being ambitious in terms of greening our electricity and energy sector, in general.

[2:00 p.m.]

SIMON D'ENTREMONT: That's a great question. We're having those conversations. We're talking about how we mine and extract - excuse the pun - every ounce of economic opportunity out of the benefits of transition toward a greener economy. We've got 1,400 jobs at Efficiency Nova Scotia. Energy efficiency has become an industry in itself for creating jobs in Nova Scotia, which is of great benefit to us.

We're looking for the innovation benefits of doing tidal power. As we know, we're in it for the innovation benefits for tidal more than the electricity at this point, which will be a benefit at some point. The wind power that we've done - a lot of these home-grown projects to put wind power in - and eventually, electrification of transportation and so on. There are a number of economic benefits that come from the transition to a greener economy.

We should be aligning our policies to maximize all the economic benefit for Nova Scotia, of doing something that there's a lot of alignment behind, that is good policy for the environment but also good economic policy. I think the real trick for us is finding out that economic policy and environmental aspirations are not mutually exclusive and that we should see the benefits where we can both win and try to maximize and align our policies to maximize that opportunity as much as we can.

THE CHAIR: We'll move over to the Liberal caucus with Mr. MacKay.

HUGH MACKAY: I'm taking a little different approach with my question because this morning, our Human Resources Committee sat and at that time, the Department of Labour and Advanced Education were here along with Halifax Partnership talking to us about employment and employment challenges and opportunities in the province.

I'll direct my question to Mr. Kirby, but perhaps others could jump in. I think you quoted that mining and quarrying are the highest paying natural resource sector in the province and one of the highest paying industries of all in all the province. High pay typically would have as a consideration the expertise and experience involved, but also perhaps the challenge of bringing people into a particular industry sector or into rural communities and so forth. Could you maybe comment on labour challenges within the mining sector for Nova Scotia?

SEAN KIRBY: Again, the industry employs 5,500 Nova Scotians. Fortunately, we are growing and so the story around labour is a positive one for us because we are creating jobs. As you said, we are the highest paying resource industry in the province. Our average wage of over \$55,000 a year puts mining on par with the province's financial services sector, for example.

We employ people, frankly, all the way from extremely highly-educated scientists in geology, environmental sciences, engineering, all those kinds of things where we pay very well. We also do hire folks all the way down at the other end of the scale with no experience, no skill set. The industry is a big believer in hiring people as labour and training them up and trying to make a career out of it for people. That's why, in part, an entry level job in our industry such as haul truck driver pays \$25 an hour, which I think is interesting in context of all the debate around whether, as a province, we should make the leap to a \$15 an hour minimum wage. It is simply not relevant to us.

We do, though, sometimes have challenges hiring specific skill sets. Mining engineers are something that are becoming harder to find because there's a decline in enrolment in them and yet you cannot operate at all without them - never mind safely and appropriately and take care of the environment properly - so that's something that we do sometimes have challenges hiring.

A lot of trades are something that can be a challenge for us: millwrights, electricians, mechanics, heavy duty mechanics and that kind of thing. As high paying as we are within the province, obviously those people can go make a heck of a lot of money out West if they can find positions out there and do fly-in/fly-outs. So there are skill sets like that that are a challenge for us.

For the most part, because we are such a high-paying industry, our challenges aren't too, too bad but it's something to keep an eye on, especially with the demographic consideration. We have more and more people retiring and we're going to have the challenge of finding these skill sets, which are essential to our industry and to being able to operate safely and responsibly.

HUGH MACKAY: Thank you for that. You mentioned training in your comments just now. Does the Mining Association of Nova Scotia engage with our higher education institutions - NSCC or engineering programs at universities - to advocate for particular skills that are required within your sector?

SEAN KIRBY: We have actually been speaking to the Department of Labour and Advanced Education more in the past year than we have previously. We're a small organization - we're one full-time equivalent - so there's a limit to the number of things we're able to take on. We do see it as a concern that, again with demographics in particular and with the need for specific skill sets, that we need to start thinking longer term in terms of the skills and the people that we're going to need down the road.

That is something that we have been starting to discuss with the government. The government has been terrific to deal with on it and obviously understands our concerns related to it because they're not unusual concerns across a bunch of industries, I'm sure. So that is something we have been increasingly discussing. We employ a lot of Nova Scotians, we have the potential to create jobs for a lot more Nova Scotians, but at the end of the day, we need to make sure that we have the actual labour pool here to fill those jobs and to make it possible for the industry to continue to succeed and for Nova Scotians to take advantage of the jobs we create.

On Nova Scotia mine and quarry sites, 97 per cent of all jobs are filled by Nova Scotians. We bring people in from outside the province when we don't have the skill set locally, but it is the industry's general policy to hire locally, as close to the host community of a project as possible, frankly, and then radiating out from there. That's our goal: to create jobs for Nova Scotians which are high paying, safe, excellent, and take care of the environment; and to provide the essential materials that our modern society needs, including - as Simon has mentioned a couple of times - all the minerals and metals that are necessary for green technology and all the changes that we're all trying to see happen in society.

THE CHAIR: Thank you. We'll turn it over to the PC caucus. Mr. Dunn.

PAT DUNN: Earlier, I believe, one of our panelists - it may have been the deputy minister - mentioned that in 2019 there doesn't appear to be a strong demand for uranium, at least from our province. I've also read where our uranium is found to be medium grade - I'm not sure if that's true or not - but would that be one of the reasons, or the reason?

SIMON D'ENTREMONT: Generally, our position is more around the market and there are depressed prices right now. Uranium tends to go through quite dramatic peaks and troughs, so our position around not being a particular priority area for us now is more based on the market price suppression rather than the quality of the reserves. If you guys want to comment on the quality of the reserves, you can.

RICK HORNE: I can just comment in general on the deposits that have been looked at in the past, and the Millet Brook deposit is the principal one. In terms of size and grade of uranium, it's a small deposit and the grade of the uranium there is about 0.2 per cent which, compared to Saskatchewan - they're mining on average somewhere around 7 per cent uranium, so there's quite a difference there, but that doesn't mean at some point in time that 0.2 per cent is not economic.

There's lots of deposits in the world that are now using techniques like in situ leaching where they inject hydrogen peroxide into the ground and recover the fluids and extract uranium out of it at a low cost, obviously. There's still potential for these deposits to be economic.

PAT DUNN: If you were mining uranium in the province, what would happen to the deposit? Would they be 100 per cent exported away?

RICK HORNE: I don't know. I guess that depends on where the markets are. If there's no market here for it, it would be exported, yes, I presume.

SIMON D'ENTREMONT: I don't think there's any direct market in Nova Scotia for unprocessed uranium. I think the uranium processing happens in places like Ontario where it's turned into nuclear fuel. It's turned into radio isotopes for X-ray and these types of things. There's no direct mechanism for a uranium market in Nova Scotia. It would have to go to some other processing and then enter the rest of the chain of use somewhere else.

THE CHAIR: We'll move on to the NDP caucus. Ms. Roberts.

LISA ROBERTS: I know the department plays a significant role in mapping and collecting information related to natural resources and mineral deposits, and also plays a role in promoting sometimes on the global stage the resources that exist in Nova Scotia, such as gold. What is the budget for mapping and exploration activities for fossil fuel deposits such as natural gas and offshore oil?

SIMON D'ENTREMONT: Our budget in the petroleum sector is \$3 million to \$4 million annually, and our budget in the mining sector is around \$5 million. I should point out it is greatly eclipsed by the \$30 million in my business unit related to reducing our greenhouse gas emissions from the energy sector.

We often get asked the questions: Why are you searching for petroleum, why are you looking at mineral resources, why aren't you looking at trying to reduce our reliance on those? We spend much more money reducing our reliance on greenhouse gases and reducing our use of petroleum resources, for example. We spend more on solar, tidal, electric vehicles, and the types of things that reduce our use of resources than we do extracting them.

LISA ROBERTS: I appreciate that full answer. At the same time, I'm challenged to understand what the realistic expectation is of a return on investment on money spent today promoting, for example, bids on offshore exploration when in the event that there was a bid on that and that it did result in offshore drilling, that activity we know would be at a point in the future where we would already have exhausted our carbon budget.

SIMON D'ENTREMONT: That's a good observation. I would say though that our long-term energy aspirations, even by a study by most people, suggests that there will be a role for natural gas to backstop the renewables. The sun is not always out, the wind is not always blowing, so when those things aren't happening, you need to be able to backstop it with some other form of energy.

Batteries someday will play a role there, but until that happens, we need things like natural gas to be part of our energy mix. We will eventually wean ourselves off, but for industrial processes, natural gas is one of the most effective fuels. It may play a role as part of our energy mix for a few decades yet. It's still unknown.

In places like Germany, for example, where they're putting a lot of renewables on the system - 8 per cent of their energy, I believe, comes from solar, which I should point out, they have 30 per cent less sun than we do, and they have 8 per cent solar. Some people think we're not a sunny climate, hence solar is not part of our mix, so I just want to dispel that a little bit.

Also, if they don't find new natural gas sources soon, they'll start turning on coal plants again to backstop all their renewables because their natural gas sources are running out. They need petroleum-based fuels to back up all their renewables that they have when it's not blowing and the sun isn't out, and they'll start using coal again if they can't find more natural gas.

For things like natural gas, it's probably part of our mix and part of our global ambitions around reducing our reliance on fossil fuels. The transition to natural gas may be part of that mix - maybe for us and most likely for other parts of the world, as well.

[2:15 p.m.]

THE CHAIR: We'll move on to the Liberal caucus. Mr. Jessome.

BEN JESSOME: I would like to start by just saying that I believe it's important to do things based on the evidence and the science behind any activity or any policy decision. With that being said, a large, very significant part of our job as democratically elected officials is to make decisions that are duly based on that quantified number - the feedback from Nova Scotians.

It's kind of like a balance. One could suggest that there's a more dominantly political aspect to decision making, but I would suggest that we have a role and responsibility as legislators to try to balance that to the best of our abilities and provide Nova Scotians with the best possible information to make those decisions.

My question is probably directed at our deputy minister. What feedback has the department received from Nova Scotians that would suggest that we, as legislators, should maintain that ban?

SIMON D'ENTREMONT: I would say it's not an area that's hotly discussed, at least not that I'm aware of. The absence of an active discussion from communities and the private sector companies that are actually looking for uranium is probably more the issue that that would be part of our test as to whether or not there's interest, but there's not a hot public debate over uranium mining.

Certainly radon and uranium in wells is an active issue, but those aren't from the mining sector. Those are just public health issues that need some attention.

BEN JESSOME: That's all from me.

THE CHAIR: We'll move over to the PC caucus. Ms. Smith-McCrossin.

ELIZABETH SMITH-MCCROSSIN: Mining technology's always changing, and we think back to what coal mining used to look like, for example, years ago as compared to today. Can you explain to us today, what does uranium mining look like? What are the technologies used? What are the safeguards? Is it safe for the environment? What does uranium mining look like in 2019?

RICK HORNE: I'm not going to say I'm an expert on uranium mining, because I'm not. I've never been exposed to it; it's just information that I read.

If we look at the examples in Saskatchewan, they have both open pit and underground mines. A lot of that's done because of the high grade of the deposits and the

amount of radiation. A lot of it's done remotely. They have all kinds of specialized methods of extracting the ore and treating it.

As I mentioned earlier, about 50 per cent of the world's uranium now is mined through in situ leaching. That's where they set up, they drill holes, and they inject hydrogen peroxide into the ground. They have return wells where the hydrogen peroxide puts the uranium and other things into solution, and they treat it and they recover it. There's a lot of that going on.

One of the things I would mention is that there's a lot of misconception about tailings facilities; that's always an issue around any kind of mining. One of the things that we know with uranium mining is the regulatory agency that looks after it, the Canadian Nuclear Safety Commission - I got this from the author of the report that Sean's presentation ended with, when he talked to that person at that time, and this was some time ago.

He was told that in Canada all tailings facilities for uranium mines cannot have a tailings dam associated with them. In other words, they have to either put the tailings back underground or they have to make a pit. Either it's a man-made pit, or an artificial pit of some sort, so that they can put the tailings into that tailings facility without a tailings stamp, so it reduces the potential of any tailings stamp failure.

The goal of these regulators is to have a mine in what they call a walk-away condition. After the mining is complete, there's going to be a period of time where it needs to be monitored and all that sort of thing - water treated. There are many different ways that they do this, but eventually it has to be left in a walkaway state.

PETER ORAM: If I can add a few things related to the process. It seemed to be that some of the political backdrop in the 1970s and 1981 was that if we find a deposit, it's immediately going to be mined. It's just a mad rush to tear down the hill, make a hole, et cetera.

As Sean and others have pointed out, a lot of things have changed since 1981. We do have environmental assessment legislation. We do have a number of things that are in place, so the straight line from if we were to find it - let's not look for it because we might find it - there weren't the checks and balances and the backstop in place.

The environmental assessment legislation that's in place now - we've just gone through our revisions - it's now the Impact Assessment Act, so 2012 is done and we're now into a new Act. There's a lot of things that would have to happen, from we have found a deposit that's high enough grade that is economic. First of all, is it in the right place? Have we done the baseline studies? Have we gone through environmental assessment? It's an "if, if, if," and a lot of things need to go correctly along the way.

I can understand why perhaps in 1976 to 1981, that backdrop then, it was possible to draw a straight line from we have found it; we're going to mine it. That doesn't exist now, and I think that's sort of an important thing that needs to get into the discussion.

SIMON D'ENTREMONT: If I might add, uranium mining is highly federally regulated. The Canadian Nuclear Safety Commission very much regulates the life cycle of uranium mining - all the way from the front end, from national security perspectives, to who you're selling your uranium to. The regulation of uranium is highly federally regulated anywhere from occupational health and safety, the mining, to who you're selling it to, and so on.

ELIZABETH SMITH-MCCROSSIN: Great, that's very good information to have. It's already been said right now the price of uranium is low, so it's not really feasible that anyone would be looking to explore right now even if the moratorium were lifted, if I'm correct in what I heard. You can answer that and also, I'm curious to know if a moratorium were lifted, what would be a timeline? How long would it take, given into consideration all the pieces that you went over as far as the process that would have to happen?

The reason I'm asking that is if the markets change and there's not enough world supply and the prices go up, say in five years, would we be ready if a moratorium were lifted today?

SIMON D'ENTREMONT: I'll start off and maybe pass the question around. First off, I think I stated because of the depressed prices, we weren't interested in looking at it. It doesn't mean the depressed price makes it a non-starter for any company to be interested in looking. They might be interested in looking for some future time.

As to changing the situation and how long it would take, I don't think it's fair to speculate. There are too many variables at play, I think, for me to speculate about that.

PETER ORAM: I'm a little more comfortable speculating. (Laughter) The realistic timeline based on the need for exploration, feasibility studies, pre-feasibility studies, environmental baseline, and things like that, I would say, is 10 years.

That would be, once again, a series of positive all the way through to public consultation, Mi'kmaw engagement, everything. There would have to be an awful lot of things go correctly. In theory, if a green light were to happen tomorrow and someone was ready to start exploring immediately, which there likely would not be - that might take a year or two - I would say somewhere around 10 years for a cycle.

Just to follow up on Simon's point as well on the cycle, you don't necessarily wait for prices to go high to look for something. In the mining world, there are definitely some companies that are cashed up and are always looking for things, and you're always looking at supplies. Many of the gypsum companies that do work here in Nova Scotia work on 50-

year planning windows. Where is our gypsum going to come from in 50 years? That's an example of a commodity that people know is going to be used in one way or another, and they look in 50-year planning windows.

I have a sense with uranium, as well, that it's going to be something that may be in the mix for quite some time. The planning windows are long for that.

SIMON D'ENTREMONT: Just a quick addendum. I think the sense that many people have is that exploration is the thing that happens right before development, and if there's exploration development, a mine happens. The ratio of exploration attempts versus how many mines get developed is in the 5,000-to-1 or 10,000-to-1 type of ratio.

THE CHAIR: We'll move on to Ms. Chender.

CLAUDIA CHENDER: Mr. d'Entremont, both in this session and the last time you appeared before this committee talking about solar, you made a sort of passing reference to some day when battery storage will develop such that we can talk more confidently about a larger transition to renewables. I'm wondering if you could speak a little bit more about that.

There is research going on right here, we know. It's certainly something that could, as you have sort of alluded to, be a real pivot point for us into a kind of large-scale electrification of our grid. Can you talk a little bit more about what's happening and how the department is involved?

SIMON D'ENTREMONT: I think it's great. Two hours before showing up here, I had a conversation with my staff about how exciting things were happening at Dalhousie with Jeff Dahn and research in batteries, how Tesla was developing patents for things related to technology here. Again, it led to the conversation we had a bit earlier around linking the things that we do to our own aspirations and developing the winning conditions for our own aspirations to happen here.

In terms of batteries, back to the fundamentals of how renewables work, solar power and wind power aren't on 24/7. You need a source to either store the excess energy you can build when you don't need it or have a mechanism to draw up some energy when those sources are not available. There's a law - I forget what it's called, Moore's Law? The price of microchips goes down by 50 per cent every three years. If you put on a map the price of almost any technology, on a big map, over 20 years, it just does this. The reality is, batteries are going to drop in price by 20 per cent every year for the next 10 or 20 years. At some point, they will become a very effective ally to couple with solar power and for emergency preparedness reasons.

Ten years from now, I think possibly a very popular mix to have will be to have solar panels on your roof, an electric vehicle, and a battery in your basement. You will

charge your own electric vehicle and you'll charge your battery, and when the power goes out in a hurricane, you'll have a few days of battery power coming from your own basement from your own battery. That's a mix that someday may be part of our mix.

As the price of battery technology goes down, it'll drive solar adoption, it'll drive more electrification in general. It'll make it easier and more convenient to electrify your lawnmower. Broad electrification as we continue to reduce the impact of greenhouse gas emissions in our electricity mix is just going to make electrification that much more effective as a tool to reduce greenhouse gases.

Batteries are going to be part of the mix. We have our own success story here in Nova Scotia about battery technology. I think it's exciting. We should be looking to maximize that benefit and the alignment of our story in Nova Scotia to be motivated to adopt battery technology because some of it was developed here. I think it has - I don't want to call it a romantic attraction, but it makes sense that we're something that's good for the environment. It's good for everyone, and we're getting some credit for it in Nova Scotia as well.

[2:30 p.m.]

THE CHAIR: I'm glad to hear you mention a Lunenburg County person, Dr. Dahn - raised and educated in Lunenburg County.

CLAUDIA CHENDER: Your comments are well taken, and I think they're exciting, but they also sound sort of aspirational. I wonder, as the Department of Energy and Mines, how is the department encouraging this? Are you engaged in funding, either with this project at Dalhousie or generally?

I know there was a pilot, or is a pilot, currently of those household batteries which I think is really exciting. I think that mix that you describe is something that is terrifically exciting, especially in the wake of Dorian where we now know both how vulnerable we are, but for those of us who live in certain more affluent neighbourhoods - we also know how annoying generators are. That we're pouring gasoline into a can to keep our fridge going seems wrong at this moment in time.

Are there any specific policy or funding areas where you are advocating or helping or advancing that battery storage or planning for it to come online or any specific initiatives you could point to?

SIMON D'ENTREMONT: We're not speaking about specific projects from a general perspective. Research Nova Scotia has been established, and one of its goals is to have our research money go towards the types of projects that are benefiting Nova Scotia. There's a general sense and a trend that that's where we should be going.

Nova Scotia Power has run a battery pilot out in Enfield, I believe, where we're trying out that technology. We're also looking at battery technology as part of smart grid projects and these types of things, so there are various projects going on - I don't have all the details with me - where we want to test and continue to try out different technologies to see how we can put them into our energy mix into the future.

THE CHAIR: There are no more questions from the Liberal caucus, so are there any other questions from the PCs? Mr. Dunn.

PAT DUNN: Solar, tidal, wind, and I think even electric vehicles were mentioned earlier. Does the department have any data collection with regard to job creation in those areas that I just mentioned now, or predictions going forward?

SIMON D'ENTREMONT: We have some data. The Ecology Action Centre actually released a big report last week focused specifically on the job creation and economic benefits of green transition, so there's some data out there. We also have some data from other jurisdictions and so on. That's something that we do keep an eye on and we're working actually to try to get a bigger handle now on the economic benefits of transitioning to a greener economy.

THE CHAIR: Ms. Roberts.

LISA ROBERTS: The department projections regarding renewable energy and power have been based on the power starting to come from Muskrat Falls this year. I'm wondering, can you update us on the timeline and what will happen to our renewable targets if those timelines have changed at all?

SIMON D'ENTREMONT: I would fear giving you an answer that's not up to date, so that's something I can get back to the department with and get you a more refined estimate, or an estimate that's in the public domain. These things are regulated by the URB as well and so on, so I wouldn't want to say anything that's outside-of-the-public-domain information from the regulator.

LISA ROBERTS: Thank you, and I think I'd also be interested to know if there's any forecast impact on power rates if that timeline has shifted at all.

Because it's likely my last chance to ask a question, I find your analysis interesting of looking to promote or to orient the department's activities related to mining to the actual materials that, more broadly, the province needs to achieve its goals. How does that relate at all to gold and to the expansion of gold mining?

SIMON D'ENTREMONT: I think that's a transition we'll make over time in terms of where we put our efforts in geoscience. As we've talked about, the life cycle is long in mining projects. Where you invest in geoscience at the front end can take decades to play

out in terms of which mines end up getting done. The investments we made in geoscience five and 10 years ago, we want to start reaping the rewards for those now.

DON JAMES: You're right. The alignment of the science that we do in looking for the resources of the future are not going to be in lockstep with what industry is doing today.

THE CHAIR: Does anyone want anything from the Mining Association? Are there any other questions?

Ms. Smith-McCrossin.

ELIZABETH SMITH-MCCROSSIN: My colleague suggested that I bring this up. Today's topic is uranium, but there's been a lot of discussion around solar, which is very interesting, as well. I just have to share with you, we still have a lot of work to do.

Not too many years ago, I had bought a building, and I really wanted to be on board environmentally. I costed out to get solar panels, and I could only afford one heating system as a business owner. If I were to buy solar panels, I was told I'd have to climb up on my roof in the winter and clean off the snow and the ice, and that they wouldn't always be able to provide electricity because the sun's not always shining.

If I was to have made that investment in solar panels as a business owner, I still needed another source of heat and energy for my building and I couldn't afford two systems, so I went with a different model. But I really wanted solar; I really wanted to go that route.

I think it's important to recognize that we still have a lot of work to do around that. That's just a practical, realistic example of real-life people in business who are trying to be environmentally friendly and make the right decisions, but there are still a lot of barriers.

With respect to our guests who are here from the mining industry, I wanted to ask a final question: What would you like to see us doing in government that would help? I know you've already made it clear that you believe the moratorium on uranium mining should be lifted, and we appreciate all the information you've shared with us here today around that. Is there anything else that we should be looking at that would benefit your industry in this province and that would benefit our province both environmentally and economically?

SEAN KIRBY: I think it is fundamental to everything that Nova Scotians want that we continue to create jobs and grow the economy. I think any concern that a Nova Scotian might raise about anything really, at the end of the day, comes back to growing the economy and creating the opportunity that we need here in order to pay for programs like health and education, to create jobs that allow our kids to stay here rather than moving away.

Obviously, it is vital to everybody that we take proper care of the environment, that we operate safely in a way that ensures people on any kind of work site are able to get home with their families and their loved ones at night; that's a given. There's total agreement as far as we're concerned among everybody in Nova Scotia about the importance of taking care of the environment and taking care of safety and the people in our industry or any other.

Fundamentally, we need to keep growing the economy or else we aren't going to have the health and education we want. We're not going to have the roads we want. We're not going to have all the things that are so important to us as a province and as Nova Scotians.

We're very proud that we employ 5,500 Nova Scotians in the rural areas in this province that need the economic opportunity so much. We're very proud that we're the highest paying resource industry in the province and that even at the low end, when somebody has no skills or experience related to mining, they can earn an average of \$25 an hour by joining our industry and make a career of it.

That's where we're at. We see lifting the uranium ban as an important step towards helping, potentially, end up with uranium exploration and maybe even one day uranium mining, but more than that it is a signal to the global mining industry that Nova Scotia's open for business. Whether it's gold or limestone or gypsum or any of the other materials that we explore for and extract in this province, we want to welcome investment and job creation in Nova Scotia. I think that's fundamental to everybody; that's what our industry is about.

We really appreciate the chance to discuss this with the committee today. We've had the pleasure of having some of you out for mine tours and certainly try to reach out to you as often as we can to educate you about the industry. We're always here if we can answer questions or if you have any questions or concerns about the industry, please contact me any time. Thanks very much for allowing us to come here today.

THE CHAIR: Those sounded like closing remarks. (Laughter) Mr. d'Entremont, would you like to have any time for closing remarks?

SIMON D'ENTREMONT: I'll take the opportunity to make a public service announcement. If we can encourage people to seek out the radon map and get radon testing, I think that would be a great public health benefit for the region. If any of the MLAs you know have a need of information, where to send people and so on, I'm sure we would be happy to get you all the information you need in terms of (Interruption) Yes, we can maybe make an arrangement to get a package out to all the MLAs with some information that we can hand out.

THE CHAIR: I would like to thank our witnesses today and all the caucuses for the questions and enlightenment.

I'll excuse our witnesses. You may leave the room. We're just going to have a few minutes of business here.

I believe the NDP had a motion that they would like to bring forward. Ms. Roberts.

LISA ROBERTS: Recognizing that certainty is always better than uncertainty in public policy, and given that there is a uranium ban that is law that followed a public inquiry across Nova Scotia and given that all three Parties have played roles in either establishing an effective ban or legislating it, we wanted to make the following motion.

Given the significant public concern about the risks of uranium mining, resulting in recommendations of the 1985 inquiry to issue a moratorium on the industry and subsequent legislation by the NDP Government in 2009, I would like to introduce a motion that the committee reaffirms its support for the ban on uranium mining.

THE CHAIR: There is a motion on the floor. Are there any comments or questions?

PAT DUNN: Just one comment, with the word "risk," from the information I gathered here today, from the parties involved and the information that they have from where uranium mining is occurring in Canada - I'm still at this point not at the point where I think that uranium mining is dangerous, wherever it may occur in our country, including in our province. I have trouble with that word, that it's a risky business.

THE CHAIR: Okay, noted. Ms. Smith-McCrossin.

ELIZABETH SMITH-MCCROSSIN: Just to echo some of the comments by my colleague, I think one of the things we heard loud and clear today is that there are risks with keeping the moratorium on as well, the fact that radon is emitting from our ground, and we may not be aware of all the areas in Nova Scotia where this is occurring in high amounts. Because of the moratorium, they're actually not allowed to do further exploration. The moratorium actually may be creating health risks with regard to radon emissions and high uranium levels in water in our wells, especially throughout rural Nova Scotia.

THE CHAIR: Are there any other comments? Ms. Chender.

CLAUDIA CHENDER: I think we'll just put the motion to the table, and I won't make any more comments after this. To address those two comments from my colleagues in the Conservative caucus, I would say first that the wording of our motion refers to the public concern about risks, and I think it's inarguable that despite what the Mining Association of Nova Scotia tells us, there is public concern about risks that may be proven

and may not be. That's what we refer to, not objective risk but the public perception that there's risk.

My interpretation of the comments, particularly from the Deputy Minister of Energy and Mines was that there is no danger to leaving it in the ground and that we have mapped where those deposits are, that we do have a radon map, and that there is testing available.

THE CHAIR: Mr. Dunn, you put your hand up about the same time that Ms. Chender did.

[2:45 p.m.]

PAT DUNN: I did have two comments. One comment, I'm a Progressive Conservative. I just heard the word "Conservative" - members to my left, there is a difference.

The second one is, today in my mind was a fact-finding mission - listening to some up-to-date information, and basically that was our goal today: putting that item forward and so on, just to find out where we are, and what has changed since 1981 and 1994 up until now. There was no indication that I was going to run out of here, go to a rent-it shop, get a drill, and start drilling for uranium or anything like that, that's for sure.

Again, it was a fact-finding mission. I was very pleased with the information that was provided today, the answers to the questions that all three Parties were asking.

THE CHAIR: Ms. Smith-McCrossin, and then we'll go to the vote - oh, okay. Ms. Smith-McCrossin first and then Mr. Irving.

ELIZABETH SMITH-MCCROSSIN: Certainly, public perception is important. I do think it's important for us as legislators that we do our due diligence into making sure that the public has accurate information and that our decisions are based on science and that they're evidence-based decisions. I'll leave it at that.

KEITH IRVING: I have no problems with the motion. I do have a point of disagreement with respect to the PC caucus' position that there is somehow exploration needed to discover radon. I think every citizen in Nova Scotia can get a tester and cover far more ground than an industry approach to that. I don't connect those two in this debate.

THE CHAIR: We're ready for the vote: Would all those in favour of the motion please say Aye. Contrary minded, Nay.

The motion is carried.

Moving on to our business. We're a little ahead of the time, but we are planning for our meeting in December. Those of you who might have been at our meeting this morning, we're looking for December dates because of the holidays. December 24th would be our next meeting, and I think many of us will be otherwise occupied.

We were going to choose December 12th in the morning. That was taken by the committee this morning, so we're suggesting the afternoon of the 12th. People will be in town then and we think it will fall better into people's schedules. Is that a good date for the committee? It's a Thursday afternoon and Thursday morning. We could do it the Tuesday morning, but it would allow people to travel Tuesday morning to get to other meetings.

Are we all in agreement for our December meeting to be December 12th at 1:00 p.m.? We are in agreement on that.

On November 26th, we have scheduled an agenda-setting meeting. Are you all aware of that and in agreement? You will have your topics in. Have your caucuses submit your topics. November 26th will be a regularly scheduled meeting, so it would be on a Tuesday afternoon. Our topic that day will also be Tourism Nova Scotia.

Finally, the annual report was emailed to all members. There were no amendments suggested by any of the caucuses. Can I have a motion that we accept the annual report to be submitted to the Legislature. Ms. DiCostanzo.

RAFAH DICOSTANZO: I move that we send the report to the Legislature.

THE CHAIR: Would all those in favour of the motion please say Aye. Contrary minded, Nay.

The motion is carried.

I now declare this meeting adjourned.

[The committee adjourned at 2:50 p.m.]