WEBVTT

00:00:07.240 --> 00:00:21.500
<v SPEAKER_2>Hello and welcome to Energy Security Cubed, Canada's foremost energy geo strategy podcast, where we explore the factors shaping energy and economic security in Canada and around the world.

00:00:21.500 --> 00:00:27.800
<v SPEAKER_2>I'm Joe Calnan, Vice President, Energy and Calgary Operations at the Canadian Global Affairs Institute.

00:00:35.704 --> 00:00:46.944
<v SPEAKER_2>For today's podcast, we're featuring Jahara Matisek, expert on defence supply chains to talk about critical minerals and other vulnerabilities for the defence industrial base.

00:00:46.944 --> 00:00:52.964
<v SPEAKER_2>But before that, I'm going to quickly go over some of the news stories affecting global energy security this week.

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<v SPEAKER_2>First up, let's talk about the big return of the United States with some interesting partners to nuclear supply chains.

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<v SPEAKER_2>On Tuesday, US Energy Secretary Chris Wright was quoted by Reuters about a recently announced deal between the US government and Orano to build an enriched uranium production facility in the United States.

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<v SPEAKER_2>This deal will see Orano receive $900 million to build the site at Oak Ridge, Tennessee, where the US previously enriched uranium for the Manhattan Project.

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<v SPEAKER_2>Importantly, Orano is a French state-owned nuclear company, indicating that despite the transatlantic tensions the United States still has deep trust in European state-owned firms, to the extent that it's willing to give one of these firms nearly a billion dollars to play a critical role in this supply chain.

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<v SPEAKER_2>The total cost of the facility is estimated by Orano to cost $5 billion.

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<v SPEAKER_2>Two other companies, Centris Energy and General Matter, have also received $900 million each to build additional nuclear fuel enrichment plants.

00:02:01.904 --> 00:02:16.604
<v SPEAKER_2>While Orano's facility seems to be focused on traditional nuclear fuel, Centris Energy and General Matter seem to be building or expanding manufacturing capacity of high assay low enriched uranium for small modular reactors.

00:02:16.604 --> 00:02:26.704
<v SPEAKER_2>In another piece of news, on Tuesday, the US Commerce Department announced a first tranche of projects enabled by the 2025 trade agreement between the United States and Japan.

00:02:27.384 --> 00:02:32.284
<v SPEAKER_2>This includes an absolutely massive natural gas fired power plant.

00:02:32.284 --> 00:02:41.484
<v SPEAKER_2>The plan would see Japan invest 33 billion dollars into a 9.2 gigawatt natural gas power plant in Portsmouth, Ohio.

00:02:41.484 --> 00:02:49.744
<v SPEAKER_2>Interestingly, this is also the location of the Centris Energy site for its high assay low enriched uranium manufacturing.

00:02:49.744 --> 00:03:03.384
<v SPEAKER_2>Speculating here, but it's not unlikely that the natural gas power plant will be built on a brownfield nuclear enrichment site currently owned by the US Department of Energy, and that part of the energy at least will go to the enrichment of uranium.

00:03:03.384 --> 00:03:11.544
<v SPEAKER_2>The investment is planned to be led by SB Energy, a subsidiary of the Japanese investment manager Softbank Group.

00:03:11.544 --> 00:03:16.164
<v SPEAKER_2>Further details on the commercial arrangements are not public yet.

00:03:16.164 --> 00:03:20.304
<v SPEAKER_2>9.2 gigawatts is an enormous amount of power for a single site.

00:03:21.164 --> 00:03:30.224
<v SPEAKER_2>This would be by far the largest power plant in the United States, more than 2 gigawatts larger than the Grand Coulee Dam in Washington State.

00:03:31.464 --> 00:03:42.824
<v SPEAKER_2>The PJM system, the Regional Transmission Organization that includes Ohio, has a peak power demand of around 160 gigawatts,

and I believe that that's summer peaking, not winter peaking.

00:03:42.824 --> 00:03:54.484
<v SPEAKER_2>However, the 20-year forecast for PJM sees peak electricity use at 224 gigawatts by 2041, meaning that a great amount of additional capacity will for sure be needed.

00:03:54.484 --> 00:04:05.144
<v SPEAKER_2>I believe that the total generating capacity of all PJM is only 180 gigawatts, so they'll need at least 224 plus maybe another 20 to 30.

00:04:05.144 --> 00:04:11.084
<v SPEAKER_2>So we're talking about 50 or 60, 70 new gigawatts of electricity.

00:04:11.084 --> 00:04:18.164
<v SPEAKER_2>The huge buildup of data centers in the United States is leading to mind-boggling solutions for providing electricity.

00:04:18.964 --> 00:04:29.164
<v SPEAKER_2>According to the Wall Street Journal, jet engine leasing and maintenance companies, which typically do business with airplane manufacturers, are jumping into electricity generation for data centers.

00:04:29.164 --> 00:04:30.464
<v SPEAKER_2>Just think about that.

00:04:30.464 --> 00:04:34.804
<v SPEAKER_2>We're having jet engines being repurposed for electricity.

00:04:35.024 --> 00:04:39.124
<v SPEAKER_2>That's how much electricity is needed right now.

00:04:39.124 --> 00:04:47.064
<v SPEAKER_2>And one last story on Venezuela, where the US Energy Secretary, Chris Wright, made an extraordinary and extremely undercover trip to the country.

00:04:49.004 --> 00:05:08.144
<v SPEAKER_2>Despite Venezuela's official position that Nicolas Majuro is still the country's official leader, Wright and Venezuelan de facto leader, Dulce Rodriguez, were all smiles last week in Caracas and at oil facilities around the country, where the two officials had photo ops and shook hands with various workers.

00:05:08.144 --> 00:05:15.624
<v SPEAKER_2>This is despite growing pushback from some parts of the

Venezuelan public sector and leftist factions worried about the implications of these oil reforms.

00:05:16.744 --> 00:05:19.044
<v SPEAKER_2>Nevertheless, it seems that things have changed.

00:05:19.044 --> 00:05:24.644
<v SPEAKER_2>On Friday, the US government loosened its sanctions on Venezuela to help spur investment.

00:05:24.644 --> 00:05:36.284
<v SPEAKER_2>And on Tuesday, Qatari Prime Minister Sheikh Mohammed bin Abdul Rahman al-Thani touched down in Venezuela for a visit focused on agriculture and investment.

00:05:36.284 --> 00:05:43.444
<v SPEAKER_2>The US government now has its eyes set on Cuba and Iran, which are both subject to heightened American economic and military pressure.

00:05:43.984 --> 00:05:59.464
<v SPEAKER_2>I suppose that following this perceived success in Venezuela, the US is becoming quite a bit more aggressive with the use of economic and military pressure to cause changes in policy in these countries.

00:05:59.464 --> 00:06:03.144
<v SPEAKER_2>And we shall see exactly where that goes.

00:06:04.964 --> 00:06:15.244
<v SPEAKER_2>And I'd like to once again, before we jump into our discussion with Jahara, I'd like to flag our upcoming Energy Analyst Summit happening in Ottawa on March 9th.

00:06:15.244 --> 00:06:18.424
<v SPEAKER_2>This is a fantastic event and tickets are going fast.

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<v SPEAKER_2>So please do look it up on our website, where you can find both the plan, the program.

00:06:24.024 --> 00:06:29.964
<v SPEAKER_2>I'll be updating that with all the speakers very quickly here, as well as the link to register on Eventbrite.

00:06:29.964 --> 00:06:31.684
<v SPEAKER_2>So please do register yourselves.

00:06:31.684 --> 00:06:34.364
<v SPEAKER_2>It's considering the value of this event.

00:06:35.064 --> 00:06:36.364
<v SPEAKER_2>The tickets are quite cheap.

00:06:37.264 --> 00:06:40.804
<v SPEAKER_2>So now we'll switch over to our discussion with Jahara.

00:06:42.344 --> 00:06:46.024
<v SPEAKER_3>Hi, I'm Dave Perry, the President and CEO of the Canadian Global Affairs Institute.

00:06:46.024 --> 00:06:50.544
<v SPEAKER_3>I hope you're enjoying Energy Security Cubed, Canada's leading podcast on energy issues.

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<v SPEAKER_3>If you're listening and you'd like to help us keep bringing informed discussion of Canadian energy issues to key government decision-makers, thought leaders, and the business community, then consider sponsoring the podcast.

00:07:00.124 --> 00:07:05.424
<v SPEAKER_3>Reach out to us at contact at cgai.ca for options and pricing.

00:07:05.784 --> 00:07:08.224
<v SPEAKER_3>That's contact at cgai.ca.

00:07:10.804 --> 00:07:27.264
<v SPEAKER_2>For today's interview, recorded February 17th, 2026, we talk about critical mineral supply chains and other key economic vulnerabilities for rebuilding a defense industry and how lessons being generated in the United States could be applied to Canada.

00:07:27.264 --> 00:07:30.724
<v SPEAKER_2>With us to discuss this is Jahara Matisek.

00:07:30.724 --> 00:07:40.644
<v SPEAKER_2>Jahara is a Lieutenant Colonel in the US Air Force, serving as Command Center Director for the Joint Operations Center at US Northern Command.

00:07:40.644 --> 00:07:59.084
<v SPEAKER_2>He is also a Military Fellow at the Department of National Security Affairs, US Naval War College, a Senior Research Fellow with the Paine Institute for Public Policy, a Research Fellow with the European Resilience Initiative Center, and an Advisor and Consultant at JLM Strategy and Research LLC.

00:07:59.084 --> 00:08:05.304

<v SPEAKER_2>He's a prolific author and he has published two books and many articles on Warfare Strategy and National Security.

00:08:05.304 --> 00:08:09.664
<v SPEAKER_2>I'll make sure to link those books in the show notes here, as well as any articles we talk about.

00:08:09.684 --> 00:08:16.564
<v SPEAKER_2>But really a fantastic person to have on to talk through this, and delighted to have you on the podcast, Jahara.

00:08:16.564 --> 00:08:18.444
<v SPEAKER_1>Thanks for having me, buddy.

00:08:18.444 --> 00:08:30.824
<v SPEAKER_1>I do have to give you the standard DOD disclaimers, so the views of Lieutenant Colonel Matisek are my own, not those of the US Air Force, US Northern Command, Department of Defense or Department of War and US government.

00:08:30.824 --> 00:08:35.844
<v SPEAKER_1>So once we get that out of the way, I can be as honest and forthright as you want with you.

00:08:35.844 --> 00:08:38.024
<v SPEAKER_1>So feel free to ask me whatever you want, brother.

00:08:38.024 --> 00:08:38.244
<v SPEAKER_2>Yeah.

00:08:38.264 --> 00:08:39.304
<v SPEAKER_2>Fantastic.

00:08:39.304 --> 00:08:39.644
<v SPEAKER_2>Yeah.

00:08:39.644 --> 00:08:45.264
<v SPEAKER_2>Getting some real opinions from you and conveying those to our audience, I think that's what I'm looking for.

00:08:45.264 --> 00:08:50.124
<v SPEAKER_2>So it's great to know that we're not going to be stepping on your toes with-

00:08:50.124 --> 00:08:50.524
<v SPEAKER_1>Yeah.

00:08:50.524 --> 00:08:58.224
<v SPEAKER_1>Well, and I think this is an easy conversation, I think, to have it in one sense because we're talking about the defence

industrial base today, right?

00:08:58.224 --> 00:09:06.644
<v SPEAKER_1>And most people, when they hear that, they think of like the corrupt big prime companies, missiles, platforms, other weapon systems.

00:09:06.644 --> 00:09:17.284
<v SPEAKER_1>And a theme I hope your listeners walk away from is I treat this more as an ecosystem, so that the materials, the processing, the labour certification and the capital.

00:09:17.284 --> 00:09:23.104
<v SPEAKER_1>And if you have any sort of choke point or issue in between any of that, the whole system basically breaks.

00:09:23.104 --> 00:09:24.984
<v SPEAKER_2>So, yeah, yeah, absolutely.

00:09:24.984 --> 00:09:31.704
<v SPEAKER_2>And that's exactly what we want to dive into here with those, that ecosystem thinking and how it can be applied to Canada.

00:09:31.704 --> 00:09:51.684
<v SPEAKER_2>But before we get into that, I'd like to start off with something that I think our audience will be interested in, just to get where you're coming from and also maybe to provide some advice to some of our listeners, because many of them are either, you know, people with promising careers in the military or other people who are interested in jumping into this sort of research.

00:09:51.684 --> 00:09:54.144
<v SPEAKER_2>And we'll just get to know a little bit more about you.

00:09:55.264 --> 00:10:00.144
<v SPEAKER_2>So in your resume, we see your career progress from active duty as a pilot.

00:10:00.144 --> 00:10:02.644
<v SPEAKER_2>And I believe that you're still serving as a pilot here.

00:10:02.644 --> 00:10:03.984
<v SPEAKER_1>I am still active duty.

00:10:03.984 --> 00:10:08.124
<v SPEAKER_1>I have not flown a plane since October of 2022.

00:10:10.584 --> 00:10:21.484
<v SPEAKER_1>So not that I'm counting that or anything, but I'm probably permanently chair-forced bound in a chair here on out.

00:10:21.884 --> 00:10:25.364
<v SPEAKER_2>But you did have tours in Iraq and Afghanistan.

00:10:25.364 --> 00:10:29.184
<v SPEAKER_2>But you've transitioned more into academia now.

00:10:29.184 --> 00:10:36.404
<v SPEAKER_2>So what lessons would you like to pass on for our listeners who might be interested in a similar career path?

00:10:36.464 --> 00:10:45.944
<v SPEAKER_1>Wow, so the problem is you have to be willing to accept and own that you're going to be a unicorn and an oddball.

00:10:46.284 --> 00:10:55.784
<v SPEAKER_1>And you're going to stick out and probably bother almost all your bosses that you're not following the normal career trajectory.

00:10:55.784 --> 00:11:04.704
<v SPEAKER_1>And I remember back in 2014 when I broke it to my boss that I'd gotten into the Air Force Academy pipeline to get a PhD.

00:11:05.984 --> 00:11:10.844
<v SPEAKER_1>He was like, oh, so you were actually serious about doing this whole PhD thing.

00:11:10.844 --> 00:11:17.024
<v SPEAKER_1>And I was like, yeah, being a pilot was getting boring, which I know may sound pretty incredulous to some of your listeners.

00:11:17.024 --> 00:11:19.964
<v SPEAKER_2>Yeah, writing paper is much more exciting.

00:11:19.964 --> 00:11:21.104
<v SPEAKER_3>You know?

00:11:22.124 --> 00:11:36.284
<v SPEAKER_1>Yes, so that's where, you know, I kind of ended up in a completely different track that I wish I could say exists for others, but I don't think it exists for anybody because no one's done what I've done, which was went off, got a Ph.D.

00:11:36.284 --> 00:11:47.204
<v SPEAKER_1>at Northwestern in Political Science 2015 through 2018, then went to the Air Force Academy in Colorado in 2018, taught there until 2022.

00:11:47.204 --> 00:12:00.844

<v SPEAKER_1>Oh, by the way, the Air Force, in their infinite wisdom, said, hey, go to Afghanistan, not to use your Ph.D., even though my dissertation was on how to build militaries in weak states, go there to fly airplanes.

00:12:00.844 --> 00:12:15.824
<v SPEAKER_1>So I literally, I guess you could say, I got the best of both worlds because I was flying the E-11 Bacon out of Kandahar, Afghanistan, and we would just orbit for nine hours on autopilot, and I would just be up there with my laptop, just reading and writing papers.

00:12:17.004 --> 00:12:22.424
<v SPEAKER_1>So that's actually where I end up actually writing most of my book, Old and New Battlespaces as well.

00:12:22.424 --> 00:12:23.944
<v SPEAKER_2>So we're up in the air, hey?

00:12:23.944 --> 00:12:24.684
<v SPEAKER_1>Yeah.

00:12:24.684 --> 00:12:34.744
<v SPEAKER_1>Then when I got back, my boss was like, I understand you want to be a tenured military professor, but that's not really what the Air Force wants you to do.

00:12:34.744 --> 00:12:35.924
<v SPEAKER_1>It's not what I want you to do.

00:12:35.924 --> 00:12:38.844
<v SPEAKER_1>So I want you to go out there and do an operational assignment.

00:12:38.844 --> 00:12:44.584
<v SPEAKER_1>So I volunteered for a bunch of operational assignments, and the Air Force sent me to the Naval War College to be a professor again.

00:12:47.344 --> 00:13:19.744
<v SPEAKER_1>So the Naval War College, I would actually say that's what got me, I guess you could say to the next level of being a professor and a researcher, because I had written a lot of strategy and warfare, but like most people that kind of live at like the lower part of the food chain, the military, you just think we have weapon systems, we have missiles, we have artillery, we have all these things, and we just put the contract out there, throw a bunch of money at it, and we get what we want in return.

00:13:19.744 --> 00:13:23.884

<v SPEAKER_1>And for the longest time, that's kind of just how I assumed how the world worked.

00:13:23.884 --> 00:13:49.984
<v SPEAKER_1>And then as my time at the Naval War College went on, I started being exposed to more coursework and a lot of students at a higher rank than me in most cases, because I was still a lieutenant colonel, was getting their perspective, especially because of the drone war with the Houthis in the Red Sea, how the US was expending more missiles than they could build them at that rate.

00:13:49.984 --> 00:13:51.164
<v SPEAKER_1>And I was like, that makes no sense.

00:13:51.164 --> 00:14:02.864
<v SPEAKER_1>And of course, you probably also heard it there in Canada, how your country, Europe writ large, and even the US has been trying to produce enough artillery shells to help the Ukrainians win.

00:14:02.864 --> 00:14:10.604
<v SPEAKER_1>And we keep promising and pledging and throwing money at the problem, and we're not producing them at the rate and scale that we want.

00:14:10.604 --> 00:14:19.264
<v SPEAKER_1>And as I kind of spent time at the Naval War College, that made me really realize, wow, there is a huge gap in our understanding and knowledge on this.

00:14:19.264 --> 00:14:30.924
<v SPEAKER_1>And that's where I got very lucky and fortunate as I was coming back to Colorado, not to be a professor anymore, but just to be a shift worker at NORAD NorthCom.

00:14:30.924 --> 00:14:35.704
<v SPEAKER_1>So a couple of days, I'll be going to work at 10 o'clock at night and do that for a whole week straight.

00:14:36.804 --> 00:14:49.904
<v SPEAKER_1>But that's where I got linked up with Morgan Bazillion at the Payne Institute for Public Policy because I wanted to sort of continue my investigation and sort of the bridging between the gap of war fighting and logistics and the industrial base.

00:14:49.904 --> 00:15:01.664
<v SPEAKER_1>And that is a reason why a couple of weeks ago, if you didn't see this article, we started talking about this idea of pre-logistics because too much of the US war fighting focus is on logistics right of boom.

00:15:01.664 --> 00:15:19.724
<v SPEAKER_1>And the whole idea was, hey, we need to stop being as worried about that because if you don't have the mass to put out of the seaport or the airport, logistics doesn't matter because the Chinese, the priority turned off the supply chain of minerals and rare earths and other sort of critical inputs.

00:15:19.724 --> 00:15:25.364
<v SPEAKER_1>You need to make missiles and other weapon systems months or years prior to the actual war.

00:15:25.364 --> 00:15:37.584
<v SPEAKER_1>And so that's sort of what we're trying to increase and heighten the awareness on the defence industrial base because it's not just an American problem, it's a Canadian problem, it's a European problem.

00:15:37.584 --> 00:15:48.164
<v SPEAKER_1>And right now, we're seeing a lot of policy signals, at least from all these Western capitals, that we want to do something about it and throw money at it, and we want to cooperate on it.

00:15:48.164 --> 00:15:56.044
<v SPEAKER_1>But I don't know how that's going to fix certain parts of the ecosystem, which I know you probably have some other awesome questions to follow up on that about.

00:15:56.044 --> 00:15:57.124
<v SPEAKER_2>Yeah, yeah, absolutely.

00:15:57.124 --> 00:16:02.904
<v SPEAKER_2>And we recently had the announcement of the Canadian Defence Industrial Strategy.

00:16:02.904 --> 00:16:07.764
<v SPEAKER_2>And yeah, there is concern that this could just be, like you said, throwing money at a problem.

00:16:07.764 --> 00:16:14.624
<v SPEAKER_2>And then if you have a real physical bottleneck, then that effectively just inflates the issue rather than resolving it.

00:16:14.624 --> 00:16:16.644
<v SPEAKER_2>So yeah, that's definitely a concern.

00:16:16.644 --> 00:16:26.924
<v SPEAKER_2>And it's also interesting that you mentioned the HUTIs and the issue of spending missiles that cost millions of dollars on drones that cost $20,000 to $50,000.

00:16:26.924 --> 00:16:27.264
<v SPEAKER_2>Yeah.

00:16:27.564 --> 00:16:33.664
<v SPEAKER_2>That's a huge concern, especially when we're talking about the security of shipping routes and those choke points.

00:16:34.104 --> 00:16:37.904
<v SPEAKER_2>But that's getting into another big conversation.

00:16:38.064 --> 00:16:45.764
<v SPEAKER_2>We should probably focus down on the defence industrial supply chain and starting with the critical raw material side of it.

00:16:45.764 --> 00:16:55.444
<v SPEAKER_2>And I'd like to dig into this through one recent article that you co-wrote with Morgan Bazilian, and this was for the national interest.

00:16:55.444 --> 00:16:58.544
<v SPEAKER_2>And I'll link this article in the show notes for our listeners.

00:16:58.544 --> 00:17:03.944
<v SPEAKER_2>But you and Morgan make a pretty stark assessment, and I'll quote from your article here.

00:17:03.944 --> 00:17:10.004
<v SPEAKER_2>The American defence industrial base or DIB is broken, unquote.

00:17:10.004 --> 00:17:21.464
<v SPEAKER_2>And you also say that the new national defence strategy, the one released by the Trump administration earlier this year, and I quote, the treatment plan is insufficient, unquote.

00:17:21.464 --> 00:17:30.484
<v SPEAKER_2>So specifically, you and Morgan claim that the defence industrial base is built for accounting, not war.

00:17:30.484 --> 00:17:50.264
<v SPEAKER_2>So I was really interested in this statement because quite a bit of what we do is looking into the way that procurement is dealt with and how Canada's defence industry and the Canadian military has been kind of suffering under a restricted budgetary environment, I guess.

00:17:50.264 --> 00:17:52.844
<v SPEAKER_2>But I'd like to get your thoughts.

00:17:52.844 --> 00:17:59.104
<v SPEAKER_2>Could you unpack what you mean by the defence industrial base is built for accounting?

00:17:59.104 --> 00:18:03.644
<v SPEAKER_2>And what decisions do you think led the United States to get to this point?

00:18:03.644 --> 00:18:08.804
<v SPEAKER_1>Yeah, so I think we need to start with the basics, which is just mining.

00:18:08.804 --> 00:18:10.864
<v SPEAKER_1>So we'll call this industrial physics, if you will.

00:18:11.644 --> 00:18:19.504
<v SPEAKER_1>Depending on where you're in the world, it takes you about 12 years from discovery to actual production to get anything out of the ground.

00:18:19.504 --> 00:18:20.164
<v SPEAKER_1>So 12 years.

00:18:20.164 --> 00:18:30.104
<v SPEAKER_1>So that means in some of the worst places in the world where they don't care about child labour and people dying while digging and safety, it still takes 12 years.

00:18:30.104 --> 00:18:33.164
<v SPEAKER_1>The US takes 26 to 29 years.

00:18:33.164 --> 00:18:46.384
<v SPEAKER_1>So even if the current administration just threw all the rules out of the rule book and just bulldozed over various areas and communities across America, it's still going to take you about 12 years.

00:18:46.584 --> 00:18:56.504
<v SPEAKER_1>I don't see how we fix this in the short term, just when it comes to mining and to sort of the inputs of the raw ore, you need to do a lot of this stuff.

00:18:56.504 --> 00:19:14.984
<v SPEAKER_1>So once we go to that, then we have to talk through sort of the issue of just getting a new defence supplier that can take years to qualify a new prime or sub tier two or sub tier three contracting company to actually provide materials to the Dib, the defence industrial based.

00:19:14.984 --> 00:19:24.024

<v SPEAKER_1>And when we actually get to sort of, OK, well, if we've done all that, what about if the Chinese do turn off certain minerals and materials we need?

00:19:24.024 --> 00:19:33.144
<v SPEAKER_1>Well, again, you can almost always re-engineer your way out of a problem, kind of like how Matt Damon did in the Mars movie, like The Martian, right?

00:19:33.144 --> 00:19:35.504
<v SPEAKER_1>You know, I'm going to engineer like the shit out of this.

00:19:35.504 --> 00:19:44.464
<v SPEAKER_1>Well, again, that still takes you months to years to re-engineer a new material that you may need to use for an actuator or a sensor.

00:19:44.464 --> 00:19:51.244
<v SPEAKER_1>So once you get past all that, then you start realizing, holy crap, we're not really built for war, we're built for accounting.

00:19:51.244 --> 00:19:58.344
<v SPEAKER_1>Everything we've done over the last three or four decades has really moved towards sort of accounting and efficiency.

00:19:59.164 --> 00:20:14.584
<v SPEAKER_1>And it was basically optimized for financial control, compliance and sort of predictable program management, which if you go to a proper school for an MBA, they teach you all this important sort of little bureaucratic and legalistic steps.

00:20:14.584 --> 00:20:26.124
<v SPEAKER_1>Well, when you start imposing that on the defense industrial base, that adds to the cost because now you're dedicating admin to being compliant when they should be using that money to have people build stuff for you.

00:20:26.384 --> 00:20:28.084
<v SPEAKER_1>Right?

00:20:28.084 --> 00:20:35.464
<v SPEAKER_1>And so if we were to have to say, okay, well, what's the starting point of the beginning of the end of the US defense industrial base?

00:20:35.464 --> 00:20:36.884
<v SPEAKER_1>It really goes back to 1993.

00:20:36.884 --> 00:20:38.764

<v SPEAKER_1>It's known as the Last Supper.

00:20:38.764 --> 00:20:45.404
<v SPEAKER_1>It's where Pentagon leaders basically told the defense industrial base, we need you to be more efficient.

00:20:45.404 --> 00:20:49.404
<v SPEAKER_1>We need you to combine with each other, work with each other.

00:20:49.404 --> 00:20:54.644
<v SPEAKER_1>And so what you ended up with was a huge reduction in the number of companies.

00:20:55.484 --> 00:20:58.204
<v SPEAKER_1>And also like the fusion and the mergers of them.

00:20:58.204 --> 00:21:07.224
<v SPEAKER_1>And it did create efficiency, but then you just created a bunch of single source dependencies, which again, works great because that was the end of humanity, right?

00:21:07.224 --> 00:21:10.124
<v SPEAKER_2>That was no more war.

00:21:10.124 --> 00:21:16.724
<v SPEAKER_1>Let's all enjoy the peace dividends and let's demobilize all of the data, right?

00:21:16.724 --> 00:21:24.064
<v SPEAKER_1>But then that of course generally happened because we decided to do stuff in the Balkans and all over Africa and Eastern Europe and Asia, the Middle East, etc.

00:21:25.304 --> 00:21:32.644
<v SPEAKER_1>So, what you kind of get from that is sort of some acquisition reform that prioritized compliance over capacity, right?

00:21:32.644 --> 00:21:37.244
<v SPEAKER_1>We have to get the corrupt Defence Industrial Base compliant, right?

00:21:37.244 --> 00:21:40.464
<v SPEAKER_1>Get rid of the fraud, waste and abuse, right?

00:21:40.464 --> 00:21:42.884
<v SPEAKER_1>So, we went on the documentation, the contract procedure.

00:21:42.884 --> 00:21:51.384
<v SPEAKER_1>Again, at this point, the Defence Industrial Base became,

again, less about producing stuff, like the war material became more about being compliant first.

00:21:53.124 --> 00:21:59.444
<v SPEAKER_1>And so, the bureaucratization of the Defence Industrial Base, I bet it happened in Canada as well, just as much as it happened in Europe.

00:21:59.444 --> 00:22:07.284
<v SPEAKER_1>We just decided that there's going to be lots of rules and regulation because we were all afraid of the Defence Industrial Base being corrupt.

00:22:07.284 --> 00:22:11.384
<v SPEAKER_1>I don't think it actually stopped it from being corrupt, but that's neither here nor there.

00:22:11.384 --> 00:22:40.064
<v SPEAKER_1>And so, because of that and because of, especially in the US, because we've been unable to have a properly run government for a few decades with long time horizons in Congress to fund the government and to fund procurement, what you ended up with with a lot of companies was just-in-time production that was very lean because you didn't know if you were going to get any purchases or orders for the next fiscal year.

00:22:40.064 --> 00:22:57.424
<v SPEAKER_1>So that led to sort of also a perverse incentive for most defence firms to do just the bare minimum to have what they need in terms of people and capital and factories so that they could meet that bare minimum requirement of producing.

00:22:57.424 --> 00:23:04.364
<v SPEAKER_1>And then they'd always find a way to be like, well, we actually had to charge you 20, 40% more because the cost of materials went up or we couldn't get the labor we needed in time.

00:23:04.364 --> 00:23:07.884
<v SPEAKER_1>So we had to pay for a new labor pipeline to make this stuff.

00:23:07.884 --> 00:23:21.744
<v SPEAKER_1>And because of this, what I would call sort of the number four problem, it was the fact that we messed up the whole demand signal for the Defence Industrial Base, which again made it short-term and unstable, as you probably heard me.

00:23:21.744 --> 00:23:32.164
<v SPEAKER_1>And then of course, I'd say like the fifth biggest thing within this bigger concept and contract was because of finance

becoming such a big deal.

00:23:32.164 --> 00:23:38.224
<v SPEAKER_1>Again, going back to efficiency, it was about margins, cost control, and trying to maintain predictable program revenue.

00:23:38.224 --> 00:23:44.244
<v SPEAKER_1>Because of that, we essentially took away any ability for surge capacity.

00:23:44.244 --> 00:24:04.104
<v SPEAKER_1>If you take away the ability to surge wartime production, then if the country does go to war and needs to make missiles faster than they shoot them at Huthy drones, you'll be surprised to find out that our replacement rate is probably 10 to 50% depending on the missile we're using.

00:24:04.104 --> 00:24:05.924
<v SPEAKER_1>That's highly problematic.

00:24:05.924 --> 00:24:27.724
<v SPEAKER_1>So you put all that together and you get a system that was extremely efficient when demand was stable and predictable but has really struggled when demand spikes, even if you give it years of lag time like we see with artillery production to help the Ukrainians and the fact that we've tried to give them drones and the Ukrainians are like, oh, these are old.

00:24:27.724 --> 00:24:34.324
<v SPEAKER_1>This is old news because we're producing just bunches of them every two to six weeks because they have to innovate so fast.

00:24:35.984 --> 00:24:47.824
<v SPEAKER_1>So again, we basically created an accounting system for the Defence Industrial Base, which wasn't built for war and it's barely built for peace as far as I'm concerned.

00:24:47.884 --> 00:24:56.264
<v SPEAKER_2>Yeah, it's like kind of trying to treat these products as if they're regular consumer good, which is just not the case at all.

00:24:56.264 --> 00:25:03.124
<v SPEAKER_2>These are the things that you need to have capacity to build when you don't need them for when you do.

00:25:03.124 --> 00:25:06.184
<v SPEAKER_2>So yeah, I completely get that.

00:25:06.184 --> 00:25:19.564
<v SPEAKER_2>And like you said, one specific area, like you said, even

in a case where a mine where you don't have to follow all these regulatory requirements and all that sort of stuff, it still takes 12 years.

00:25:19.564 --> 00:25:28.524
<v SPEAKER_2>But China has been planning out their own dominance of these mineral supply chains for well over 30 years or even longer than that.

00:25:28.524 --> 00:25:31.884
<v SPEAKER_2>So they do have those supply chains set up.

00:25:31.884 --> 00:25:48.824
<v SPEAKER_2>And so I kind of want to dig into that specific area of supply chain security and the single node dependence on China for these high performance rare earth magnets, gallium, germanium and other important minerals and the materials for military applications.

00:25:48.824 --> 00:25:54.304
<v SPEAKER_2>So you've helped author a few articles recently, and I'll link these in the show notes here too.

00:25:54.304 --> 00:25:59.944
<v SPEAKER_2>And this is about the recent moves by China to restrict these materials to the United States.

00:25:59.944 --> 00:26:02.344
<v SPEAKER_2>And this has had big impacts on US foreign policy.

00:26:02.344 --> 00:26:09.524
<v SPEAKER_2>It's actually a lot of people think that it's caused the US to kind of relent on putting pressure, economic pressure on China.

00:26:09.524 --> 00:26:13.424
<v SPEAKER_2>And this is of course a direct impact on defence supply chains.

00:26:14.024 --> 00:26:25.804
<v SPEAKER_2>So, I just like to kind of unpack this a little bit, because I'm aware that it's important for military supply chains, but I'm a little bit more fuzzy on exactly why these are so irreplaceable.

00:26:25.804 --> 00:26:32.724
<v SPEAKER_2>So could you unpack what makes these materials just so absolutely irreplaceable for military hardware?

00:26:33.164 --> 00:26:47.564
<v SPEAKER_1>Yeah, so what you're getting at is the problem, the fact that China controls about 70 to 90% of the most important minerals and rare earths we need for the US economy, or let's just say just for any

modern economy or any modern military.

00:26:47.564 --> 00:26:54.684
<v SPEAKER_1>Not to mention they basically control 100% of the graphite supply chain that you need to make batteries.

00:26:54.684 --> 00:27:01.064
<v SPEAKER_1>So literally every human on earth is using a battery probably today and tomorrow and next week and beyond.

00:27:01.544 --> 00:27:06.084
<v SPEAKER_1>And the graphite in that battery 100% comes from China.

00:27:06.704 --> 00:27:15.044
<v SPEAKER_1>That is a crazy dependency that the Chinese have basically locked into the global supply chain ecosystem if you will in that context.

00:27:15.044 --> 00:27:34.784
<v SPEAKER_1>And what you're getting at is the bigger problem and the reason why I think people started caring about this all of a sudden over the last two to three years is because since 2023, the Chinese have decided to start putting export bans on gallium, germanium, antimony, and a few other obscure, rarest that I can't pronounce.

00:27:35.164 --> 00:27:37.624
<v SPEAKER_2>Biodimium and all those weird ones, yeah.

00:27:37.624 --> 00:27:38.704
<v SPEAKER_1>Yeah.

00:27:38.704 --> 00:27:43.384
<v SPEAKER_1>And that's shown how vulnerable America and the rest of NATO is.

00:27:43.384 --> 00:27:59.904
<v SPEAKER_1>And if you were to force me to be a proper political scientist, I guess I would give you, there's two ways to answer this bigger problem, which is on the physics side, the rarest magnets are all about power density and thermal tolerance.

00:27:59.904 --> 00:28:11.464
<v SPEAKER_1>So they let you make motors and actuators way smaller because they can generate stronger magnetic fields and smaller volumes and keep performance under sort of extreme heats and vibration.

00:28:11.464 --> 00:28:12.264
<v SPEAKER_1>Why does this matter?

00:28:12.264 --> 00:28:27.784

<v SPEAKER_1>Well, for pretty much any weapon system that has precision guidance, radars, aerospace, sort of tech, anything that needs reliable motion and sensing, you need these rare earth magnets.

00:28:27.784 --> 00:28:40.104
<v SPEAKER_1>Now, you probably heard in the news finally this past year, the US did sort of a public-private partnership with MP Materials to start sourcing domestic the rare earths.

00:28:40.104 --> 00:28:54.984
<v SPEAKER_1>It had to be basically heavily subsidized by the US because they need to have guaranteed profit margins if they're going to mine and process it in America because that just became really sort of financially unsustainable.

00:28:54.984 --> 00:29:02.764
<v SPEAKER_1>And again, neighborhoods and communities don't want these things in their backyard because they pollute, they're smelly, they're stinky.

00:29:02.764 --> 00:29:09.064
<v SPEAKER_1>Yeah, they bring some jobs to the neighborhood, but not enough to offset sort of like the pain that it causes.

00:29:09.064 --> 00:29:13.844
<v SPEAKER_1>So, you know, if you're a NIMBY on this show, you probably don't want this in your backyard either.

00:29:16.084 --> 00:29:27.084
<v SPEAKER_1>And then when we're getting to the specifics of, say, gallium and germanium, this is what makes semiconductors and other sort of sensing tools work.

00:29:27.084 --> 00:29:37.624
<v SPEAKER_1>So again, you need this for your economy and your military because we're all going towards sort of this information aids, digital economy, where we need lots of semiconductors, right?

00:29:37.664 --> 00:29:47.684
<v SPEAKER_1>And so for weapon system side, again, with those two minerals, again, this is what helps your optics work and your detection system.

00:29:47.684 --> 00:29:54.204
<v SPEAKER_1>And oh, by the way, this also is used for pretty much all of our comms and P&T.

00:29:54.204 --> 00:30:00.164
<v SPEAKER_1>So right, precision navigation and timing, which is part of the whole GPS satellite architecture.

00:30:00.164 --> 00:30:09.284
<v SPEAKER_1>And then you start realizing that if any of these inputs get squeezed, you basically start losing what it looks like to have a modern economy in the 21st century.

00:30:09.284 --> 00:30:14.344
<v SPEAKER_1>So you lose all that, you kind of go back to like the 19th or 20th century when it comes to an economy and war fighting.

00:30:14.344 --> 00:30:17.744
<v SPEAKER_1>And so as I described all that, now let's look at the production side issue.

00:30:17.744 --> 00:30:25.344
<v SPEAKER_1>These, you know, they're not irreplaceable per se, again, because I just give you the MP materials example of a few billion dollars being thrown at it.

00:30:25.344 --> 00:30:32.164
<v SPEAKER_1>But again, a lot of platforms are designed around these specific material properties, right?

00:30:32.764 --> 00:30:36.264
<v SPEAKER_1>So we go back to like, hey, let's re-engineer a solution to this.

00:30:36.264 --> 00:30:44.344
<v SPEAKER_1>Well, yeah, but that's going to take time and more than likely, whatever you decide to use is going to cost way more and it may weigh more.

00:30:44.344 --> 00:30:48.484
<v SPEAKER_1>And when it comes to a lot of these weapon systems and platforms, weight is everything.

00:30:48.484 --> 00:30:58.764
<v SPEAKER_1>That's why you want to use these really, you know, exotic minerals and rare earth because it allows you to have weapon systems that perform, you know, sort of at the leading edge.

00:30:58.764 --> 00:31:05.084
<v SPEAKER_1>And that's also really important for like aerospace weapons that want to go Mach 5, right?

00:31:05.084 --> 00:31:06.824
<v SPEAKER_1>Because we're all going into hypersonics now.

00:31:06.824 --> 00:31:07.324
<v SPEAKER_1>So guess what?

00:31:07.324 --> 00:31:16.744
<v SPEAKER_1>Those things have a lot of have to undergo a lot of thermal stress because they get really hot going Mach 5 at 60 to 70,000 feet in the atmosphere.

00:31:17.284 --> 00:31:24.164
<v SPEAKER_1>And you need specialized metals, alloys, and coatings so that these weapon systems will work.

00:31:24.164 --> 00:31:30.384
<v SPEAKER_1>So, you know, I kind of talk about the mining there, but the processing is also where it becomes super important.

00:31:30.384 --> 00:31:43.024
<v SPEAKER_1>And finally, just when you think it was going to get any worse, there's something that's a very common metal that we all take for granted, but it's literally the foundation of what makes our modern economies and militaries even function.

00:31:43.024 --> 00:31:44.184
<v SPEAKER_1>Even the 19th or 20th century.

00:31:44.504 --> 00:31:45.764
<v SPEAKER_1>It's copper.

00:31:45.764 --> 00:31:49.624
<v SPEAKER_1>I don't know how many people are listening about the copper boom that's coming our way.

00:31:49.624 --> 00:31:55.664
<v SPEAKER_1>Because all these data centers, AI and quantum computers need so much electricity, guess what?

00:31:55.664 --> 00:32:04.684
<v SPEAKER_1>You need a better power grid and you have to install extra power grids to ensure you can actually power the data centers and all this sort of fancy new tech.

00:32:04.684 --> 00:32:15.544
<v SPEAKER_1>Well the problem is we think we're going to need at least 50% more copper by 2040, but we have no where near enough mines right now.

00:32:15.544 --> 00:32:40.844
<v SPEAKER_1>So for my listeners in Ottawa, if you have any friends that may have a copper deposit, I would highly encourage you buy, buy, buy, dig, dig, dig, because copper is going to be sort of the new future metal, which is really funny when you think about it from like a historical civilizational perspective that we're getting back to our

roots of copper matters more than anything else when it comes to your economic might and your war fighting ability.

00:32:41.004 --> 00:32:42.944
<v SPEAKER_2>Yeah, kind of going back to the Bronze Age.

00:32:42.944 --> 00:32:43.524
<v SPEAKER_2>Yes.

00:32:43.524 --> 00:32:55.644
<v SPEAKER_2>But yeah, and Canada does have some kind of national champions where it comes to copper, tech resources as an example, that we are a big copper producer.

00:32:55.644 --> 00:32:59.844
<v SPEAKER_2>So that's one thing to notice that BC has tons of copper.

00:32:59.844 --> 00:33:05.884
<v SPEAKER_1>So for any high school or college kids, maybe don't get that degree in art literature and get that degree in copper mining.

00:33:05.924 --> 00:33:07.344
<v SPEAKER_2>Yeah, absolutely.

00:33:07.344 --> 00:33:08.744
<v SPEAKER_1>It's like working out those copper muscles.

00:33:08.744 --> 00:33:11.764
<v SPEAKER_1>I don't know what you need to do to get it out of the ground.

00:33:11.764 --> 00:33:13.144
<v SPEAKER_2>But yeah, don't worry.

00:33:13.144 --> 00:33:18.504
<v SPEAKER_2>I think we have some of the best mining companies in the world up here in Canada.

00:33:18.504 --> 00:33:25.944
<v SPEAKER_2>So that's something that I'd like to flag for people working on this in the US, that we do have that knowledge.

00:33:25.944 --> 00:33:56.704
<v SPEAKER_2>I guess on a related note, something that I worry about a little bit where it comes to China having such a dominant role, not necessarily in the mining, but in the processing of these materials, is that I'm worried that they are the ones developing the new expertise and kind of the material science that is crucial for getting to these new technologies and actually like further miniaturizing all of these military, you know, the missiles and satellites and all of

those different things.

00:33:56.704 --> 00:33:59.344
<v SPEAKER_2>So that's something that I'm concerned about.

00:34:00.064 --> 00:34:09.464
<v SPEAKER_2>But now to kind of turn a little bit to solutions and you're already getting a little bit into some of the solutions being proposed on the United States.

00:34:09.464 --> 00:34:15.824
<v SPEAKER_2>We're talking right now about the United States using kind of its fiscal firepower to stand up.

00:34:15.824 --> 00:34:25.384
<v SPEAKER_2>Like you said, like currently these are uncompetitive on the free market because China just has such incredible overcapacity in this and these sorts of things.

00:34:25.964 --> 00:34:28.604
<v SPEAKER_2>And it's a relatively opaque market.

00:34:28.604 --> 00:34:36.284
<v SPEAKER_2>So China just produces these and then they go into the commodity traders and then, you know, enters into the supply chains.

00:34:36.284 --> 00:34:43.224
<v SPEAKER_2>People aren't really aware of where all these supplies are necessarily coming from until you back it all the way up and you realize it's all coming from China.

00:34:44.384 --> 00:34:56.844
<v SPEAKER_2>But the United States is setting up these initiatives to provide for more secure supplies by setting up, like you said, those partnerships.

00:34:56.844 --> 00:35:03.224
<v SPEAKER_2>But these vulnerabilities to these supply chains really do affect smaller militaries like Canada as well.

00:35:03.224 --> 00:35:08.044
<v SPEAKER_2>And we have our own concerns where it comes to our security of our supply chains.

00:35:08.224 --> 00:35:19.064
<v SPEAKER_2>So what advice would you give a country like Canada for building resilience in these materials with not necessarily the same level of fiscal firepower as the United States does.

00:35:19.704 --> 00:35:26.384

<v SPEAKER_2>But while we are really taking an aim at improving our own military procurement systems?

00:35:26.384 --> 00:35:32.824
<v SPEAKER_1>I mean, obviously you have to buy those American F-35s you're supposed to buy to replace the CF-18s.

00:35:32.824 --> 00:35:35.504
<v SPEAKER_2>Well, let's not dig too deep into that.

00:35:35.504 --> 00:35:37.264
<v SPEAKER_2>That's for defence deconstructed.

00:35:38.764 --> 00:35:56.924
<v SPEAKER_1>Which even bringing up F-35s, I think, is important, because the whole reason why that MP Materials deal came to fruition was because the Pentagon tried to enforce a new policy about get Chinese minerals and metals out of any US weapons system.

00:35:56.924 --> 00:36:04.404
<v SPEAKER_1>And it turned out they could not get rid of one rare earth that we need to use to make an F-35.

00:36:04.404 --> 00:36:14.704
<v SPEAKER_1>So we literally had to issue a waiver saying, OK, well, in this case, it's OK to use this one magnet that we get from the Chinese because we literally could not get any other alternative source.

00:36:14.704 --> 00:36:21.464
<v SPEAKER_1>So, you know, what does that mean to Canada sort of building its resilience as a middle power?

00:36:21.464 --> 00:36:24.384
<v SPEAKER_1>Well, the good news is, and again, I don't know.

00:36:24.384 --> 00:36:32.404
<v SPEAKER_1>I mean, good news to me from an American perspective, I don't know how it is for the average Canadian, the fact that I heard you guys are gonna have that new defense budget of 6.6 billion.

00:36:35.004 --> 00:36:48.084
<v SPEAKER_1>Again, I don't know if that's actually gonna translate into anything because just like other NATO countries, like Germany, they keep saying they're gonna double or triple their defense budget and I've seen nothing come to fruition.

00:36:48.084 --> 00:37:06.824
<v SPEAKER_1>So I guess the question really becomes from, you know, for Canada is if you're actually gonna follow through on this new

strategy, because I dug into it, it sounds like you want to, you know, take that $6.6 billion obviously improve Canadian military readiness.

00:37:06.824 --> 00:37:12.924
<v SPEAKER_1>I think they said something about at least 70% of those contracts have to go to the Canadian defense firms.

00:37:12.924 --> 00:37:20.444
<v SPEAKER_1>So I don't think you have, do you guys have that many, like enough to actually do what your leaders think you can do?

00:37:20.444 --> 00:37:30.464
<v SPEAKER_2>In terms of, you know, the full supply chain of suppliers for the military, I'd say that there are efforts currently under way to identify suppliers.

00:37:31.244 --> 00:37:37.924
<v SPEAKER_2>I can't say for sure whether we have all of the companies that are necessary to actually do that, but...

00:37:38.064 --> 00:37:41.724
<v SPEAKER_1>Because I know the US like barely does too, right?

00:37:41.724 --> 00:37:52.664
<v SPEAKER_1>I mean, that's, you know, but again, I think the intent is that at least the way I read it was like, okay, we're at least going to create 125,000 new Canadian jobs in the next seven, eight years.

00:37:52.664 --> 00:37:54.564
<v SPEAKER_1>So I hope that works for you guys.

00:37:54.564 --> 00:38:02.404
<v SPEAKER_1>It's just like I keep hoping that we're going to, you know, the US is actually going to supercharge its defence industrial base.

00:38:02.464 --> 00:38:09.324
<v SPEAKER_1>I just hope that actually is with policy, with teeth, not just more PowerPoint slides and another rhetoric.

00:38:09.324 --> 00:38:11.284
<v SPEAKER_2>Yeah, I hope too.

00:38:11.284 --> 00:38:12.164
<v SPEAKER_2>Yeah.

00:38:12.164 --> 00:38:21.384
<v SPEAKER_1>But you know, I guess again, going back to really answering your question, I guess there's four rules for the Canadian

defence industrial base.

00:38:21.584 --> 00:38:25.584
<v SPEAKER_1>If I had to, again, I'm not trying to Americanize your Canadian system.

00:38:25.584 --> 00:38:29.964
<v SPEAKER_1>But you know, I guess I would probably go with step one.

00:38:29.964 --> 00:38:35.384
<v SPEAKER_1>You need to focus on your control nodes, not the whole supply chain.

00:38:35.384 --> 00:38:40.304
<v SPEAKER_1>So you guys can't replicate the American industrial base.

00:38:40.304 --> 00:38:42.284
<v SPEAKER_1>But you can have your own critical nodes.

00:38:42.344 --> 00:38:54.764
<v SPEAKER_1>So that means processing, advanced material science and engineering, focusing on specialty components, certification infrastructure and repair capabilities.

00:38:54.904 --> 00:39:06.644
<v SPEAKER_1>I think this is a theme, I think is going to be important, I think for Canada and other middle powers, which is what can you do to be the indispensable ally to the greater NATO industrial defense base?

00:39:08.824 --> 00:39:22.704
<v SPEAKER_1>And so, step two or rule two, I would probably say, you may want to use procurement to scale firms, especially with your subject matter expertise.

00:39:22.704 --> 00:39:25.384
<v SPEAKER_1>I know you guys have been really good at aerospace.

00:39:25.384 --> 00:39:30.164
<v SPEAKER_1>I don't know if you remember me mentioning how I flew the E-11 Bacon in Afghanistan.

00:39:30.164 --> 00:39:34.244
<v SPEAKER_1>The E-11 Bacon is actually a Canadian Bombardier Global Express.

00:39:35.604 --> 00:39:39.344
<v SPEAKER_1>And we like that airplane a lot, and we use it in the US military.

00:39:39.344 --> 00:40:11.484
<v SPEAKER_1>So, I think a lot of what you guys need to also focus on, because again, you do have a lot of subject matter expertise, maybe not always making the biggest weapon systems, but maybe like sort of like tier 2, tier 3 support, is again, creating sort of an ecosystem for your country, where you can focus on sort of those critical nodes that you can fill reliably and competitively, so you're not having to just subsidize your industrial base like the Americans are going to have to do.

00:40:12.704 --> 00:40:15.664
<v SPEAKER_1>Rule 3, start building stockpiles.

00:40:17.144 --> 00:40:31.424
<v SPEAKER_1>You know, I'm not trying to force the American model on you, but you know, at the height of the Cold War, the US had a stockpile that would be valued at about $700 billion in minerals and other important materials at the height of the Cold War.

00:40:31.424 --> 00:40:33.924
<v SPEAKER_1>Now, it's like $900 million.

00:40:35.304 --> 00:40:39.864
<v SPEAKER_1>So you need to have stockpiles.

00:40:40.184 --> 00:41:01.804
<v SPEAKER_1>And again, this is where I hope maybe colleges will start offering a degree in sort of like defense industrial base or just industrial base choke points when it comes to like the minerals and inputs because there's a lot of work to be done in actually identifying like the bottlenecks and choke points at where you can actually, you know, increase capacity there and focus your investments.

00:41:01.804 --> 00:41:11.304
<v SPEAKER_1>You know, if you're going to throw money in a problem, focus on the parts that actually expands the pipeline of what you want to do.

00:41:11.304 --> 00:41:13.124
<v SPEAKER_1>So that's a really important point.

00:41:13.124 --> 00:41:30.424
<v SPEAKER_1>And again, you have to be willing to say, hey, we have to stockpile for at least two years because in wartime, it's going to take you at least two years if a certain mineral or other critical input, at a minimum, it's going to take you at least two years to find an alternative or, you know, a different supplier.

00:41:30.424 --> 00:41:31.984

<v SPEAKER_1>So that's a really important thing.

00:41:32.304 --> 00:41:49.064
<v SPEAKER_1>And finally, and I think you guys have actually already done the rule for at least you're moving that direction because of that whole idea of the defense bank with BMO and Deutsche Bank sort of as part of a broader NATO construct is you need to treat finance as a part of defense.

00:41:49.064 --> 00:41:56.844
<v SPEAKER_1>So industrial resilience across all of NATO basically requires capital and it needs to be patient capital.

00:41:56.844 --> 00:42:11.784
<v SPEAKER_1>It has to be the willingness to have people put money into this because it is so important, but also the governments need to basically be willing to back these types of investments because it's going to take a long time to kind of move out of like the subsidy phase.

00:42:11.784 --> 00:42:15.144
<v SPEAKER_1>So I believe it's called the Defense Security and Resilience Bank.

00:42:16.484 --> 00:42:18.044
<v SPEAKER_1>And Canada wants to be a big player in that.

00:42:18.044 --> 00:42:49.804
<v SPEAKER_1>I think that's fantastic because it's about, again, trying to create an industrial base that can surge in wartime in a way that is sort of efficient and effective and, again, is not wasteful, but also is important about sort of building your broader infrastructure and providing jobs and sort of a part of the world where you need to actually manufacture yourself because we're going, because we're deglobalizing, and we're friend shoring, and we're decoupling in a way that now manufacturing is coming back to the West again.

00:42:49.804 --> 00:42:50.604
<v SPEAKER_2>Yeah, absolutely.

00:42:50.604 --> 00:43:00.604
<v SPEAKER_2>And I think that there's that key trade-off between waste and security, where I think that the United States kind of has a bit more margin of error, I guess.

00:43:00.604 --> 00:43:11.284
<v SPEAKER_2>Like there's more wiggle room where it comes to what investments you guys can make because you just have more capacity where it comes to like the financial firepower, like I said.

00:43:11.284 --> 00:43:30.904
<v SPEAKER_1>But yeah, well, as I say, if I had to give you bumper sticker advice to Canada, I don't know if you can fit this on a bumper sticker, but build leverage, build qualification pathways, and build financing that matches the industrial base time horizons, and most importantly, be an indispensable arsenal ally for NATO.

00:43:30.904 --> 00:43:32.324
<v SPEAKER_2>Yeah, absolutely.

00:43:32.324 --> 00:43:40.304
<v SPEAKER_2>So I guess this brings us, allows us to loop back kind of your original critique of the defence industrial base, the DIP like you call it.

00:43:40.304 --> 00:43:53.624
<v SPEAKER_2>So another really useful article of yours for the Foreign Policy Research Institute recently published is titled, The US Is Not Built for War or Peace, America's Industrial Resilience Gap.

00:43:53.624 --> 00:43:57.264
<v SPEAKER_2>And this was co-authored with Jesse Humphall.

00:43:57.264 --> 00:44:09.004
<v SPEAKER_2>And it confronts the brittleness of US industry and the steps needed to build like you say in the article, quote unquote, ecosystem resilience.

00:44:09.004 --> 00:44:14.944
<v SPEAKER_2>So I'm really interested in this because I think this is the key part of this conversation.

00:44:15.084 --> 00:44:20.844
<v SPEAKER_2>Can you really unpack for us what you mean by ecosystem resilience?

00:44:20.844 --> 00:44:21.144
<v SPEAKER_1>Yeah.

00:44:21.144 --> 00:44:28.464
<v SPEAKER_1>So ecosystem resilience to me and my co-author, my co-author Jesse Humphall had actually worked at the National Security Council.

00:44:29.304 --> 00:44:34.204
<v SPEAKER_1>He's actually a lieutenant colonel like me, pilot and PhD as well.

00:44:34.204 --> 00:44:36.444

<v SPEAKER_1>He worked on infrastructure resilience.

00:44:36.444 --> 00:44:38.424
<v SPEAKER_1>So and he happens to be my neighbor here in Colorado.

00:44:38.424 --> 00:44:48.124
<v SPEAKER_1>So it actually worked out well that we're having beers and we started talking about this big gap that he saw from the national security side and what I saw from the academia side.

00:44:50.244 --> 00:45:01.584
<v SPEAKER_1>What we really started realizing is that when we talk ecosystem resilience, they build an industrial system to sustain military capability across the entire material life cycle.

00:45:01.584 --> 00:45:06.664
<v SPEAKER_1>So not just production, but the full chain from extraction and to end of life recovery.

00:45:07.884 --> 00:45:19.424
<v SPEAKER_1>When I mentioned end of life recovery, we didn't actually mention them in the article, but I think having done my research and preparing for you, I realized there's an extra part of that ecosystem from the beginning of life to the end of that of life.

00:45:19.424 --> 00:45:24.484
<v SPEAKER_1>So I would say there's six steps to ecosystem resilience.

00:45:24.564 --> 00:45:27.904
<v SPEAKER_1>So if you get out your pens, step one is easy.

00:45:28.464 --> 00:45:31.404
<v SPEAKER_1>I want to call it easy, but it's resource extraction.

00:45:31.404 --> 00:45:33.884
<v SPEAKER_1>Get the stuff out of the ground, right?

00:45:33.884 --> 00:45:35.864
<v SPEAKER_1>Number two, processing and refining.

00:45:35.864 --> 00:45:38.204
<v SPEAKER_1>Okay, you got the stuff out of the ground.

00:45:38.204 --> 00:45:39.584
<v SPEAKER_1>What do you want to do with it?

00:45:39.584 --> 00:45:40.924
<v SPEAKER_1>Do you want to melt it?

00:45:40.924 --> 00:45:43.164

<v SPEAKER_1>Do you want to turn it into a powder?

00:45:43.164 --> 00:45:46.804
<v SPEAKER_1>Like, how do you want to refine this?

00:45:46.804 --> 00:45:48.344
<v SPEAKER_1>What purity do you need it for?

00:45:48.344 --> 00:45:55.744
<v SPEAKER_1>If you're making submarines, a lot of that stuff has to be the 99.99% purity.

00:45:55.744 --> 00:46:00.864
<v SPEAKER_1>It's still like the triple nine process in refining.

00:46:00.864 --> 00:46:05.644
<v SPEAKER_1>And then once you get to that, now we're talking about step three, that intermediate manufacturing.

00:46:05.644 --> 00:46:12.184
<v SPEAKER_1>So now you're like, okay, now we have the powder or the metal or the gas or whatever we have.

00:46:12.184 --> 00:46:13.884
<v SPEAKER_1>What are we going to do with it?

00:46:14.124 --> 00:46:16.864
<v SPEAKER_1>Are we going to make a magnet, a semiconductor, an alloy?

00:46:16.864 --> 00:46:20.084
<v SPEAKER_1>Are we going to use this to make artillery go boom boom?

00:46:20.424 --> 00:46:23.864
<v SPEAKER_1>Or is it going to be a part in an airplane or a missile?

00:46:25.424 --> 00:46:31.624
<v SPEAKER_1>This is a really big bottleneck issue because this is so dependent on having qualified suppliers.

00:46:31.624 --> 00:46:45.144
<v SPEAKER_1>So you have to have people there that can pass a basic sort of national security background check that they hope you're not going to be selling this to the Russians or Chinese.

00:46:45.144 --> 00:46:46.724
<v SPEAKER_1>And it has to be all certified.

00:46:46.984 --> 00:46:52.424
<v SPEAKER_1>And this is sort of like that huge compliance, a bottleneck I alluded to earlier.

00:46:52.424 --> 00:46:57.464
<v SPEAKER_1>And again, this is where the cost of everything kind of goes up a lot because now you have to hire people that just do the admin, right?

00:46:57.464 --> 00:47:10.124
<v SPEAKER_1>You have to have the lawyers and the accountants that handle this part of making sure you're doing everything by the book so that the metal or part you're making actually meets like the standards that it needs for the input of the defence industrial base.

00:47:10.124 --> 00:47:13.604
<v SPEAKER_1>And then step four is sort of that system integration.

00:47:13.764 --> 00:47:19.404
<v SPEAKER_1>So that piece or part is now being put into the aircraft, the ship, the missile, the sensor, the comm system.

00:47:19.404 --> 00:47:25.324
<v SPEAKER_1>This is usually where the big primes usually feast the most because they don't want to make, they don't be in the business of making little parts.

00:47:25.324 --> 00:47:26.884
<v SPEAKER_1>That's up to the tier two and tier threes.

00:47:26.884 --> 00:47:31.124
<v SPEAKER_1>The primes just want to like take all the stuff and say, hey, we have the big big old clean room.

00:47:31.124 --> 00:47:36.004
<v SPEAKER_1>We're going to put this weapon system, the satellite together, things like that.

00:47:36.004 --> 00:47:46.744
<v SPEAKER_1>Of course, the problem is if you have a bottleneck issue with getting the right materials or metals, this is where it becomes really hard to substitute, right?

00:47:46.744 --> 00:48:00.164
<v SPEAKER_1>Because if you design this weapon system that weighs 2,500 pounds, but now you have to use a different magnet that's bigger and weighs more now, that throws the whole weapon system out and now you're not meeting the contract requirements.

00:48:01.224 --> 00:48:03.564
<v SPEAKER_1>Number five is like the sustainment and repair.

00:48:03.564 --> 00:48:12.224

<v SPEAKER_1>So cool, you made this weapon system, but like every few months or every few years, you have to do certain things to make sure the weapon system is going to work as advertised, right?

00:48:12.604 --> 00:48:23.304
<v SPEAKER_1>And then, you know, I think that's actually why the Ukrainians ended up with a lot of the High Mars missiles because they were all going to expire because they had all been made in like 96, 97.

00:48:23.304 --> 00:48:26.024
<v SPEAKER_1>So a lot of times, I mean, the mission just expires.

00:48:26.024 --> 00:48:28.604
<v SPEAKER_1>So that's another thing too.

00:48:28.604 --> 00:48:30.184
<v SPEAKER_1>So that becomes another big issue.

00:48:30.184 --> 00:48:43.304
<v SPEAKER_1>And then this is the part that I had my eyes open to just the other day because I didn't realize, but like, yeah, obviously you can't recycle an artillery shell or missile once you fired it at an adversary.

00:48:43.304 --> 00:48:52.044
<v SPEAKER_1>But most big weapon systems, say like a ship or a vessel, when it reaches its end of life, it has to be dismantled and scrapped properly.

00:48:52.044 --> 00:48:58.864
<v SPEAKER_1>And the whole material recovery of that is actually pretty labor and time intensive.

00:48:58.864 --> 00:49:12.924
<v SPEAKER_1>And I discovered when I was kind of going through that rabbit hole that like 85% of all the world's ships are basically broken down in three places in India, Bangladesh, and I forget the other neighboring country, and China, I think.

00:49:12.924 --> 00:49:13.844
<v SPEAKER_1>Like literally 85%.

00:49:14.004 --> 00:49:15.404
<v SPEAKER_1>And those jobs-

00:49:15.404 --> 00:49:16.964
<v SPEAKER_2>India by and large is the largest.

00:49:16.964 --> 00:49:17.544

<v SPEAKER_2>Yeah, and it's-

00:49:17.544 --> 00:49:19.044
<v SPEAKER_1>Yeah, and those jobs suck.

00:49:19.044 --> 00:49:29.724
<v SPEAKER_1>Apparently, I guess the person went down the rabbit hole and discovered that they all get very sick because they're dealing with toxic vessels that are spewing all kinds of stuff that have just been exposed to conscious stuff.

00:49:29.724 --> 00:49:41.644
<v SPEAKER_1>And oh, by the way, there's another part of that of the material recovery as well, is that when you're manufacturing a lot of these weapon systems, you get a lot of your excess metals and minerals and other things.

00:49:41.644 --> 00:49:44.184
<v SPEAKER_1>Normally, most firms just throw that away.

00:49:44.184 --> 00:50:01.684
<v SPEAKER_1>Well, the Department of Energy is now realizing, holy crap, if we actually captured a lot of those micro minerals, we could actually solve a lot of our domestic supply chain issues.

00:50:02.404 --> 00:50:18.044
<v SPEAKER_1>There's a DOE effort to fund upstarts that can find a way to more cheaply and sustainably recycle and capture a lot of these lost minerals and materials that used to just be thrown away and nobody ever thought of again.

00:50:18.484 --> 00:50:29.504
<v SPEAKER_1>That's another important aspect that I think the Canadians will at least hopefully enjoy a lot, that we're going to go towards recycling, reducing or using our Dib waste, if you will.

00:50:29.504 --> 00:50:34.704
<v SPEAKER_2>Yep, no, that's for sure something that we would be interested in up here in Canada.

00:50:34.704 --> 00:50:39.184
<v SPEAKER_2>But yeah, overall, I think there's tons of lessons to learn for Canadians.

00:50:39.184 --> 00:50:43.004
<v SPEAKER_2>And this is just the first of many conversations.

00:50:43.004 --> 00:50:45.464
<v SPEAKER_2>There's tons of conversations happening around this.

00:50:45.464 --> 00:50:50.684
<v SPEAKER_2>Many Canadian companies are interested in getting involved in the defence supply chain.

00:50:50.784 --> 00:50:55.644
<v SPEAKER_2>But like you said, quite a few challenges still for them to actually get involved.

00:50:55.644 --> 00:51:06.844
<v SPEAKER_2>And one thing that we really should be doing here at CGAI is spreading more information on all of the security requirements for these companies and all of the necessary documentation.

00:51:06.844 --> 00:51:09.304
<v SPEAKER_2>But we could talk about this all day.

00:51:09.304 --> 00:51:12.204
<v SPEAKER_2>Jahara, I'm super interested in all of these things.

00:51:12.204 --> 00:51:15.444
<v SPEAKER_2>So we'll probably have you back on the podcast fairly soon here.

00:51:16.064 --> 00:51:24.484
<v SPEAKER_2>But just to wrap up the conversation on a bit of a different topic, and this is something our listeners are always interested in.

00:51:24.484 --> 00:51:27.284
<v SPEAKER_2>What is a book you'd like to recommend to our audience?

00:51:27.284 --> 00:51:30.084
<v SPEAKER_1>Well, again, obviously, buy my book.

00:51:30.124 --> 00:51:32.224
<v SPEAKER_1>And buy American-made F-35s.

00:51:34.784 --> 00:51:35.644
<v SPEAKER_1>Okay.

00:51:35.644 --> 00:52:01.984
<v SPEAKER_1>No, but seriously, for your listeners, if you just now come to the realization that the modern world we live in is actually on a really fragile foundation, I would actually recommend you read this book, and I hope I pronounced his name right, but it's Vaclav Smil, how the world really works.

00:52:01.984 --> 00:52:04.084
<v SPEAKER_2>He's Canadian.

00:52:04.084 --> 00:52:04.824
<v SPEAKER_1>I didn't know that.

00:52:06.224 --> 00:52:06.964
<v SPEAKER_1>I should have known that.

00:52:06.964 --> 00:52:08.604
<v SPEAKER_1>That's such a Canadian name.

00:52:08.664 --> 00:52:10.864
<v SPEAKER_1>Or he's Ukrainian.

00:52:10.864 --> 00:52:13.164
<v SPEAKER_1>Yes, a Ukrainian, the Canadian.

00:52:15.044 --> 00:52:24.364
<v SPEAKER_1>But what's so important about it is that he basically gets past sort of the abstractions of like, we get the, you know, with the minerals, we just have a modern economy.

00:52:24.364 --> 00:52:30.204
<v SPEAKER_1>It just works because it's just a self-sustaining, virtuous economy or industry or country.

00:52:30.204 --> 00:52:31.544
<v SPEAKER_1>And it just keeps on working.

00:52:31.544 --> 00:52:32.324
<v SPEAKER_1>But I think it's cool about it.

00:52:32.324 --> 00:52:41.984
<v SPEAKER_1>He focuses on the energy systems, the material flows, industrial production and the infrastructure required to sort of maintain the Western way of life.

00:52:41.984 --> 00:52:51.044
<v SPEAKER_1>And I think it's a really good reminder to folks that economic and military power actually rests on really simple things that most of us ignored in high school and college.

00:52:51.044 --> 00:52:58.344
<v SPEAKER_1>So like thermodynamics, how to make metals and alloys, logistics and engineering constraints.

00:52:58.764 --> 00:53:10.584
<v SPEAKER_1>It's sort of what you need to know if you want to start really considering what the defence industrial base means for Canada, the United States and NATO in general.

00:53:10.584 --> 00:53:15.704

<v SPEAKER_1>And what I think is important about the book as well is going back to the idea of industrial physics.

00:53:15.704 --> 00:53:18.944
<v SPEAKER_1>He explains why it's so slow.

00:53:18.944 --> 00:53:20.844
<v SPEAKER_1>You can throw all the money you want at this.

00:53:20.844 --> 00:53:28.024
<v SPEAKER_1>But if you don't have the factory or the metals or the supply chains or the people to even do this, this takes years.

00:53:28.024 --> 00:53:41.764
<v SPEAKER_1>And you know, I guess if I was to say a broader recommendation, not just for Canada, but for the US and all of NATO, we're going to have to start encouraging high school kids that say, Hey, I don't like history or math classes.

00:53:41.764 --> 00:53:46.904
<v SPEAKER_1>And we say, Hey, how would you like to be part of the industrial base making this stuff?

00:53:46.904 --> 00:53:59.824
<v SPEAKER_1>And that's going to be a big paradigm shift for parents to tell their kids, how would you make like to make $120,000 right out of high school without having to do any more math or history classes or philosophy class, and just make stuff for the industrial base?

00:53:59.824 --> 00:54:01.964
<v SPEAKER_1>And I'm not just talking, you know, making subs and airplanes.

00:54:01.964 --> 00:54:07.944
<v SPEAKER_1>I'm talking anything else for the industrial base because AI is replacing all of us, right?

00:54:07.944 --> 00:54:11.184
<v SPEAKER_1>So you're going to need people that can actually make and fix the robots now.

00:54:12.204 --> 00:54:18.564
<v SPEAKER_1>Ideally, we can figure out how to way to make the robots go into the mines and do that really dirty, nasty work that no one wants to do.

00:54:18.564 --> 00:54:27.144
<v SPEAKER_1>So I guess my advice would be is we can no longer zoom call our way to making a tank or an artillery shell.

00:54:27.144 --> 00:54:29.524
<v SPEAKER_1>It requires you to be there in person and do it.

00:54:29.524 --> 00:54:31.204
<v SPEAKER_1>And it's not easy work.

00:54:31.204 --> 00:54:32.024
<v SPEAKER_1>It's hard.

00:54:32.024 --> 00:54:41.224
<v SPEAKER_1>There's a reason why I think we're supposed to have 250,000 people make subs, or at least that's the projection we need.

00:54:41.224 --> 00:54:52.544
<v SPEAKER_1>And I don't think we have the pipeline in the US to even make subs at the rate we want for that new AUKUS partnership to make subs, because we're supposed to be making two subs a year right now and we're only making 1.2.

00:54:52.544 --> 00:55:21.744
<v SPEAKER_1>So I don't see how any of this is going to happen unless there's sort of a huge sort of big policy change and an educational approach in Washington, Brussels and Ottawa that says if you want to do this and we want to actually have the industrial like resilience capability to endure sort of Chinese supply chain coercion, we need to basically change our economies to be much more dependent on having our own people make stuff.

00:55:21.744 --> 00:55:22.844
<v SPEAKER_2>Yeah, completely agree.

00:55:23.444 --> 00:55:27.444
<v SPEAKER_2>Kind of the physical side of the economy is what this podcast is all about.

00:55:27.444 --> 00:55:36.764
<v SPEAKER_2>Of course, energy is part of it, but all of these materials are so important and a great recommendation of that book by Vaclav Smil.

00:55:37.024 --> 00:55:40.844
<v SPEAKER_2>I've read it and yeah, I really recommend it to our listeners as well.

00:55:40.844 --> 00:55:41.484
<v SPEAKER_2>Awesome.

00:55:41.484 --> 00:55:42.264
<v SPEAKER_2>Well, fantastic.

00:55:42.264 --> 00:55:43.404
<v SPEAKER_2>Thanks so much for coming on.

00:55:43.404 --> 00:55:44.704
<v SPEAKER_2>This is a great conversation.

00:55:44.704 --> 00:55:49.664
<v SPEAKER_2>Like I said, we'll have you on again sometime very soon to talk more about this.

00:55:49.664 --> 00:55:50.544
<v SPEAKER_1>Yeah, for sure.

00:55:50.544 --> 00:55:51.724
<v SPEAKER_1>Thank you.

00:55:52.884 --> 00:56:00.424
<v SPEAKER_2>Thanks for listening to this episode of Energy Security Cubed on The CGAI Podcast Network.

00:56:00.424 --> 00:56:03.504
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00:56:03.504 --> 00:56:05.644
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00:56:05.644 --> 00:56:10.464
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00:56:10.464 --> 00:56:21.484
<v SPEAKER_2>If you like this podcast and want to help us maintain our contributions to Canadian foreign policy research, you can support us by donating on our website, www.cgai.ca.

00:56:25.804 --> 00:56:30.044
<v SPEAKER_2>Energy Security Cubed is brought to you by our team at CGAI.

00:56:30.044 --> 00:56:33.044
<v SPEAKER_2>Thanks go out to Drew Phillips for our music.

00:56:33.044 --> 00:56:34.364
<v SPEAKER_2>I'm Joe Calnan.

00:56:34.364 --> 00:56:36.584
<v SPEAKER_2>Thanks for listening to Energy Security Cubed.