

Rep Keith Ammon ([00:00:05](#)):

All right. Good morning, everybody. I see some chat. we had the audio on mute. We were waiting for people to enter the meeting. My name is Keith Allen. I'm state representative for New Boston in New Hampshire. We're, we'll commence the meeting of the, the, the commission to study Nuclear Energy in New Hampshire. And the time is 9:06 AM. So we'll, we'll go around the room. We have some guests present, and I see we have folks online as well. I'm gonna put a link to the agenda in the chat for everybody that's online, so you can follow along. We have printed agendas here in the room. All right. Because I see a lot of new people. We'll you wanna just go around and just, just real briefly, just say who you're,

Rep Mike Harrington ([00:09:42](#)):

Mike Harrington, New Hampshire House.

Matthew Levander ([00:09:47](#)):

Matthew Levander, Regulatory Affairs Manager with NextEra Energy.

Marc Brown ([00:09:54](#)):

Marc Brown, Vice President, state Affairs, consumer Energy Alliance.

Dan Goldner ([00:10:00](#)):

Dan Goldner, Chairman, Public Utilities Commission.

Chris McLarnon ([00:10:04](#)):

Chris McLarnon with the UNH Chemical Engineering and Bioengineering.

Catherine Beahm ([00:10:10](#)):

Cathy Beahm, Department of Environmental Services.

Elizabeth McKenna, Senator Shaheen's Office ([00:10:14](#)):

Elizabeth McKenna, Senator Shaheen's office.

Emma Greenberg, Senator Hassan's Office ([00:10:23](#)):

Emma Greenberg, Senator Maggie Hassan's office.

Rep Alvin See ([00:10:29](#)):

Alvin See, State Representative, just visiting.

Tom Barrasso, NH DAS, Energy Manager ([00:10:33](#)):

Tom Barrasso. DAS, State of New Hampshire, Energy Manager.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([00:10:39](#)):

Billy Valderrama, US Department of Energy, Office of Nuclear Energy.

This transcript was exported on Aug 16, 2023 - view latest version [here](#).

Rep Keith Ammon ([00:10:44](#)):

Great. Just a mic check. Could someone chat and say that they can hear us on online?

Online Voices ([00:10:50](#)):

Can hear you, can hear you just fine.

Rep Keith Ammon ([00:10:54](#)):

Great. Thank you very much. Alright. And just for the commission members the minutes from last week's meeting are passed out. We'll, we'll save those until after the presentations, but if you get a chance to just scan through them we'll approve those towards the end of the meeting. We have just to open the opportunity for public input, anybody in the room would like to say anything other than presentations or for listening and anybody online, Just use the raise your hand function of Zoom and we'll have a second opportunity towards the end of the meeting.

([00:11:33](#)):

All right. Seeing no questions or comments I think first on the agenda, we have Chris Lohse, if I'm saying your last name correctly, he's the innovation and technology manager for the GAIN program. And Chris, if you have slides that you'd like to present, present, I can make you a presenter.

Chris Lohse, GAIN Program ([00:11:55](#)):

Yeah, that'd be great. I just have a few slides we can talk through as we run through the, the voucher program. And I free to share 'em afterwards if needed as well.

Rep Keith Ammon ([00:12:03](#)):

That'd be great. We, put those up on the web if they're for public consumption.

Chris Lohse, GAIN Program ([00:12:10](#)):

Yep.

Rep Keith Ammon ([00:12:11](#)):

I made you a host. You should be able to share.

Chris Lohse, GAIN Program ([00:12:15](#)):

Yep. Let me make sure I am hitting the right things here.

Rep Keith Ammon ([00:12:21](#)):

We can see. Yep. Looks good.

Chris Lohse, GAIN Program ([00:12:25](#)):

All right. Hopefully everything's coming through. Okay.

Rep Keith Ammon ([00:12:27](#)):

Yeah, it looks perfect.

Chris Lohse, GAIN Program ([00:12:29](#)):

All right. Well, good morning everyone. Thanks for the invite. Yeah, I just wanna, we'll run through here a little bit today. Really it's just a, you know, a brief introduction of GAIN, the Gateway for Accelerated Innovation and Nuclear, as well as more, probably a little more detailed introduction of the GAIN voucher program, which is a, a funding opportunity at the Department of Energy Office of Nuclear Energy runs through the GAIN program.

([00:12:55](#)):

So, just a, a brief introduction of GAIN, and if you do have any questions, feel free to you know, just jump in and ask. Happy to take 'em. So really well top left here. This is just kind, we'll just go through, we'll get into more detail around GAIN vouchers, which is really a funding opportunity. Originally is developed for advanced reactor developers. But we're seeing more interested in the end user space and other end users. And then that's really what we'll probably get into here. Briefly, we'll cover, well, if you look at the picture of the United States there, we'll cover some little bits about state level outreach and what GAIN is doing in that area. We'll come down and some of the things that's been been a big talking point when we talk about coal to nuclear. So you see energy community transitions there.

([00:13:38](#)):

We can get into there about what GAIN is doing in the coal to nuclear program, some pilot studies, and just kind of discuss what, what's happening there. Something we won't talk about GAIN does do what we call legacy document project that's over here with the light bulb. Really that's geared at supporting advanced nuclear developers and getting them information that maybe, you know, produced under historical DOE programs but is not necessarily publicly facing. So GAIN has a, a, a way to go access that and provide developers to help 'em with their licensing and commercialization efforts. And just for everyone's awareness here, across the bottom GAIN does curate advanced nuclear industry milestones. So we have a website out there. it's not every piece of a press release that you would see in the news but it is some of the more major press releases and industry milestones. Really in what it is, it is just a collection. So if people are interested in trying to figure out where things are going in advanced nuclear, what's happening you could go on that website and go look and, and figure out, Hey, I see this article, it, you open it up. It gives you like a one page description of what's going on. So you have some idea. and trying to understand where things are generally headed in the advanced nuclear space right now.

([00:14:59](#)):

A little bit, just a brief background here on GAIN and what we're doing when we come to what we call our state level outreach. So GAIN is really out there in state level outreach to support you know, people that have questions, people need information people that need technical support when it comes to advanced nuclear, right? There's a lot of activity within the states in looking at nuclear energy. But some people just don't know where to start, what advanced nuclear is, what it can do, what it can't do. So GAIN is really there to be that resource if, if that information is needed. So with that, we do track all this stuff across the United States just to understand which, which states you're moving in which directions. And then we are supporting as needed, right?

([00:15:44](#)):

So sometimes we get involved in custom workshop development webinar series to help provide information to states and, and the decision makers so they understand you know, what's happening in other states and what what's going on with advanced nuclear overall and have the technical information to make the decisions that they need to make. So really, we're, we're kind of here to help, help provide information and technical support to help people make the decisions that, that you end up making. Not not here to advise at all. It's more of just like providing information and support is needed.

[\(00:16:19\)](#):

Briefly, and this is something that's come up a lot more in the last year for sure, is the, what we call coal to nuclear GAIN is supporting a coal to nuclear research group. Really, this is where all the organizations who are doing work in the coal to nuclear space are, you know, getting together, sharing information just to make sure everyone knows what everyone's doing, and also understand, you know, share information across to make sure no one's just working in the same thing. And nuclear space, we do have, you know, limited resources. So it's always great to make sure everyone's, you know, working on something and not always, you know, working on the same things over in the same areas. There is a two pilot studies that are currently ongoing within end gain. I think we're looking at a third as well around coal to nuclear.

[\(00:17:05\)](#):

One of them is down in St. John. The first one's actually in St. John's, Arizona, where, you know, they're looking at technical, basically technical supports. So looking at reactor selection, you know, kind of what, what reactors are available. And then you look, kind of look at the economic impact of what those reactor choices could be on the area. And you know, then it, that that information will be provided to the utility, and they can then work from there on figuring out what they want to do and look at their decisions on how they look at a possible transition from their current coal station to a nuclear station or nuclear plant, or multiple nuclear plants is kind of up to them about where they want to go, but really it's basically technical information to help them support their own decision making.

[\(00:17:50\)](#):

So a main reason for this chat, right, is our GAIN voucher program. So we'll get in, this will be the more detailed section around where we go with vouchers. So GAIN vouchers a bit of history started in 2016 and really the goal was to support the advanced nuclear developers, right? So you see companies building nuclear reactors and designing them since inception we have 86 vouchers awarded, 58 completed. As of the last cycle, we are at 50 different companies supported through it, and it is almost \$31 million awarded to date. So, you know, GAIN vouchers, they're, they're open to support multiple areas for developers, and that, that's kinda the main reason. But what we're also seeing is, you know, vouchers can be used to support more than developers, and that's where you get into, you know, end users, you get into utilities, you get into other people who may be looking to deploy nuclear energy, and, you know, there are various things that laboratories can do to support people in that area, that area. So let's get into little details when we discuss kind of what that may be.

Rep Keith Ammon [\(00:18:56\)](#):

Hey, Chris, could we, yep. Just pause for a minute. We have a question from Representative Harrington in the room here.

Rep Mike Harrington [\(00:19:01\)](#):

Yeah, I've just, the vouchers, can you give us a little bit more of a breakdown of actually what the money is being spent on? I mean a little more specifics than just vouchers.

Chris Lohse, GAIN Program [\(00:19:12\)](#):

Yeah, so that's exactly a, a I'll do that here a little bit, and we'll get into that details on this slide.

Rep Keith Ammon [\(00:19:18\)](#):

Okay. Just, just one, one other interjection, I think, Chris, you're the host Now, if you see anyone waiting in the waiting room, could you admit them?

Chris Lohse, GAIN Program ([00:19:25](#)):

Sure. I'm not sure where that button is. I don't, I don't see anything popping up telling me I need to do anything.

Rep Keith Ammon ([00:19:31](#)):

Okay. So, okay. That's good.

Chris Lohse, GAIN Program ([00:19:33](#)):

I'm, I'm hoping that's a good sign.

Rep Keith Ammon ([00:19:35](#)):

That sounds great. Thank you.

Chris Lohse, GAIN Program ([00:19:39](#)):

So yeah, so vouchers, right? So this, this is, so let's get into some details around vouchers, right? So vouchers are not like, what, you know, you typically have a DOE funding opportunity, or you have like a small business, you know you know, funding opportunity, something like that. Vouchers are not funds to companies. Vouchers are funds to the national labs to do work on, like, in support of a company. So that's kind of the, this first bullet here. And with that vouchers, you know, you know, so we talk about value, you know, vouchers are around up to about \$500,000 in value, right? So that's, that's \$500,000 in DOE funding, plus there's a 20% cost share. So the money is going to a laboratory to do work, right? And that work could be experimental work, right? So you have lots of labs or, you know, have access to a lot of experimental capabilities.

([00:20:32](#)):

They have access to very, you know, complex equipment that's not necessarily available in the public, in the, you know, private side. And then there's also a lot of, you can say some sort of paper studies, right? But there's a lot of technical expertise at laboratories as well. So you have people with licensing, you know, expertise, right? How do we license a reactor? How do we, now you have a lot of people discussing microreactors. So, hey, a microreactor is not like your, you know, gigawatt nuclear station that you built, you know you know, in, in one spot. You know, it's big containment building. Some people are looking at mobile, some people are looking at running something for a little while, you know, turning it off, moving it to a new location, turning the reactor on again, and supplying power again.

([00:21:14](#)):

Those are licensing questions that, you know, no one conceived when licensing regulations were built. So, you know, they, so they have researchers looking at, you know, what does licensing look like in that scenario? How do you do it? Is there a current licensing path for it? Do they need to dream up something new? If that was new, what would it look like? How would it work? So you have a lot of, you have a lot of technical expertise, you know, that can support a lot of analyses. You have a lot of experimental capabilities, you have a lot of infrastructure capabilities. There's a, so depending on what the needs are and who the individual is, and the company looking to work with a work on a voucher

that's gonna drive kind of which direction you want to go and which expertise you're looking to access at the laboratories.

[\(00:21:56\)](#):

So with that, right? So vouchers are not, and that this is because we're set up to support advanced reactor developers. They're set up to support US companies, right? So they are not they **can't be accessed like by a state**, like a government organization, but they can be accessed by companies in your state, right? Companies supplying energy in the state, utilities in the state end users of energy. If, you know, the state was looking at hydrogen generation and there's a company looking to deploy hydrogen and then understand how hydrogen you know, how would you size a hydrogen station? How would you size how the nuclear nuclear reactor integrates into hydrogen plus integrates into renewables? And then how do you, how do you balance that build out, you know, the, those are types of capabilities that, you know, labs do have capabilities in that area and could, could work to support there. So hopefully that answers the question a bit. If it doesn't, let me know. As we run, run through the rest of this I'll, I'll try, I'll touch on a couple other things as other related vouchers as well. Hopefully it'll help.

[\(00:23:05\)](#):

So yeah, so get in the nuts and bolts in vouchers, right? So these are one-year projects. These aren't long duration duration programs. So it's more of to get in, get the technical information, get the analysis done, and get it to the company so they can move on and commercialize, you know, and take their next steps. We do have a standard agreement that we avoid a lot of back and forth and negotiation. So it's, it's a take it or leave it. We already covered, it's a US owned company. We call that greater than 51%. And then there's basically just a couple things on people are limited to one application per cycle. And we do this quarterly. So we have four cycles a year. We're in our current review cycle for our fiscal year, end of our fiscal year 23. So round four, fiscal year 23 right now.

[\(00:23:49\)](#):

And fiscal year 24, the first cycle will start review cycle will start October 31st. we do work to make these quick as quick as we can within the, within the system. So we, while we, every time you submit an application, when that due date happens, so let's just say October 31st is a due date, someone submits an application we'd be looking to award that by the middle of December. So we're around a six week timeframe, six to seven weeks is what we say until we get to that award announcement. And then people work to work on the agreement with the lab depending on the situation, you know, lab agreements can take somewhere between two to four months depending on, you know, what some of the background is.

[\(00:24:33\)](#):

Let's see, so I just, I, I threw some relevant, what we call, you know, some of our GAIN vouchers, right? You can see like all the, you know, however many we've awarded, right? All those are available on the GAIN website, the link below. People can go access 'em, but I just wanted, so here's like four that are, you know, could be relevant to people, you know, in your region looking at what's going on, right? So we have we awarded a voucher to Dow Chemical, right? That looks at, you know, as everyone knows, Dow is now tied in with X-energy to work on the advanced reactor demonstration project down there in Seaport, Texas. But before that they were looking at how they would integrate a nuclear reactor in their chemical production, right? So they're looking at thermal balancing, understanding how they'd integrate one of those reactors and then, you know, and then what that would look like.

[\(00:25:26\)](#):

So there are tools within the lab system that people have looked at all those, you know, tools and they, they come up with a plan to say, here's how we do it. Here's what it would look like. Here's some of the control systems that, that, that, that would entail. So that's, no, just, just one option. there's obviously tools that have looked at nuclear siding. It's more of a screening tool. so there's two companies that, you know, have looked at, Hey, I'd like to do some screening of all my, you know, real estate, that I have a real estate region that I'm interested in and understand where could I set a reactor, right? So if you, so if there's a company out there with a, you know, hey, I have, you know, 50 regions across the United States, you know, in theory they could look at, you know, how would they site a reactor in these or where, what should they look at?

[\(00:26:10\)](#):

How would they screen each site? And then look at which sites are amenable so they could figure out further studies to look at and do more detailed work. TVA (Tennessee Valley Authority) is also doing that across their, their they're essentially their, their you know, their location down there in the Tennessee and the other regions just to say, Hey, what, what works best? What doesn't? similar to the Dow one, Eastman Chemical, which there's a report out there. they looked at, you know, their Tennessee location, and they said, Hey, how, what, what type of reactor would we get? How would we, how would it integrate? Here's my energy needs, you know, what typically works best? And so they're, they're, you know, they have the information, they work with the lab, and the lab has says, here's this report. You know, it's kind of up to you to take the next steps.

[\(00:26:53\)](#):

But, you know, labs done a, a big lift to get them started, you know, as they don't quite under, they didn't understand at the time, how would they, how would they look at nuclear energy? What would it look like? You know, as I mentioned, there's also hydrogen production, intricate energy systems. How would you combine everything together? There's a, a range, a host of areas that people could move in. Even coal to nuclear, if there's some retired coal stations or something in the air region, people could look at as well to access the, you know, capabilities laboratory system.

[\(00:27:25\)](#):

Just a little background if people are interested in seeing what has been done in the past we do have a whole bunch of sections on our website around completed vouchers. It brings up basically a one page summary of, Hey, here's how much it was. Here's the description of what they did, here's the benefit, here's the next steps, here's what people are looking to do with it. Those are all available for anyone to go look at and kind of research and figure out what, what, what could be done or what, what has been done.

[\(00:27:53\)](#):

And basically if people wanna know, you know, how do you apply, it's all here on our website. And plus, you know, I, I know everything's on the website, but you know, everyone can always reach out to me and have, ask more questions. Happy to talk one-on-one as well about how vouchers will work, what could be done or what can't be done. So just to wrap up, right, here's our GAIN team. So everyone kind of knows who, who's who what's doing what, but it's all here. You know, just Christine King, she is on. I think if there's other questions or except for vouchers that come up Christine's kind of sitting here as well. She can answer some questions around cult to nuclear or what's happening in the state level outreach if people have other questions. So that, that's kinda all I have on the intro for the, for the vouchers. You know, happy to take any questions, you know, here offline later. Just see where it goes.

Rep Keith Ammon [\(00:28:48\)](#):

Great. Thank you, Christopher. That was a great presentation. We have another question from Representative Harrington, and then I have a question following that.

Chris Lohse, GAIN Program ([00:28:56](#)):

Yep.

Rep Mike Harrington ([00:28:57](#)):

Yeah good morning. My question is how far down in practicality does this is get, by that, I mean, could somebody come to you with a product that they thought was needed for a new generation reactor? I dunno, some digital control system or something, and you people would do the environmental and seismic qualification because it's something new that hasn't been qualified that way? Is that something these vouchers would be open for?

Chris Lohse, GAIN Program ([00:29:24](#)):

In theory, something like that could be possible. I mean, I think, so the, the, the thing, you know thing with vouchers is it's really to look at the capabilities within the laboratory system that aren't available in, say, the private public, you know, private side, private companies aren't, aren't accessing that. So in that scenario, I'd say, you know, you have a lot of things like components, parts, sensors. You know, they say, Hey, I need to put this in, in a reactor, but I don't have any radiation, you know, exposure, damage, you know, from the reactor. So yeah, the labs have all sorts of, you know, radiation facilities, right? There's test reactors, there's other places like that, gamma facilities as well, depending on which lab you're at. And so, yeah, co companies have come in and, you know, you radiate something briefly within a reactor. You do some post tear down. You, you take the data, you put it in a report and you give it to the company. It says, here's what the, here's what the, here's what happened to your component in part, right? And just say, and they, it's up to the company at that point to take that data and utilize it for their licensing efforts or their design efforts or whatever they need.

Rep Mike Harrington ([00:30:26](#)):

Okay. Thank you.

Rep Keith Ammon ([00:30:29](#)):

Chris, this is Keith Ammon. I'm off to the side here. Project Pele is involved with Idaho National Labs. Is that part of the GAIN program?

Chris Lohse, GAIN Program ([00:30:38](#)):

No, Project Pele is not. Right. So that's a, that's a DOD effort, right outta the Strategic Capabilities Office. I mean, we hear stuff here and there about what's happening on Pele. Probably the place that's doing more interaction, if anything is DOE has a microreactor program that's headed up by John Jackson at Idaho National Laboratory. It, you know, it is a little bit, from what I understand, I think that what I heard once is there's more learning probably happening from the DOD side about what's being done under the DOE microreactor program and less sharing towards you know, what's happening in Pele and going towards the commercial side. Just, you know, 'cause the DOD program and Christine just put the, the Project Pele website there in the, in the chat as well. (https://www.cto.mil/pele_eis/)

Rep Keith Ammon ([00:31:27](#)):

Okay, great.

Christine King, GAIN Program ([00:31:28](#)):

And if you're interested in I guess with any kind of project going on in Advanced Nuclear, if you're interested in talking to someone, we'd be glad to make that introduction and make those connections for you.

Rep Keith Ammon ([00:31:39](#)):

Great. Excellent. I have one other question and then we'll open it up to the rest of the room. You mentioned repurposing coal plants and in New Hampshire at least we have some biomass plants that, you know, they have an interconnect but the business model hasn't been sustainable without subsidies. So is there any interest in repurposing a biomass plant anywhere in the country?

Chris Lohse, GAIN Program ([00:32:08](#)):

I don't know if, I don't, I haven't heard the it come up any you know, on my side at all. But there's no reason. So we say repurposing coal, because that's been basically where all the interest and discussion has come from. But it really could be anything, right? You could have an industrial site somewhere that where people wanna look at revitalizing, or you wanna, Hey, how would nuclear supply all my energy and you know, heat to an industrial location for supporting manufacturing. You could be looking at repurposing natural gas assets. You know, it, it's, it's all the above really. I mean, there's capabilities there to look at almost everything. That was just kind of the example.

Christine King, GAIN Program ([00:32:46](#)):

I think we've I think we've learned or are learning that some of the most valuable assets we have in our electrical system today are transmission connections. And so those sites that have viable transmission connections or underused connections, as you look at increasing energy demand, people are looking at how to make the most of those. The coal to nuclear really was focusing there first was because of the rapid retirement of the coal stations and the desire to help prevent significant amounts of displaced workers associated with those plants.

Rep Keith Ammon ([00:33:27](#)):

So we have one coal plant, I think it's the last coal plant in the New England grid. Is that right? It's in Bow, New Hampshire, which is an here. If we thought about connecting the management of that plant with your program, is that something, is that something worth pursuing?

Christine King, GAIN Program ([00:33:47](#)):

Yeah, I'd be more than happy to talk to them and share the results that we've had. We've got two studies coming publishing this fall. There's some guidelines that I can point them to that can help them start to walk through. And I can also share whatever we already know about their site. The DOE published a report last fall doing some analysis of coal stations across the United States to see which ones might be viable for a transition.

Rep Keith Ammon ([00:34:18](#)):

Great. So there's probably already analysis that you've done that we could connect.

Christine King, GAIN Program (00:34:23):

Yeah, I will. I'll drop my information in the chat as well as Emily Nichols who manage that program for us. (Christine.King@inl.gov, Emily.Nichols@inl.gov)

Rep Keith Ammon (00:34:38):

We have one commission member join on Zoom, Mikael (Pyrtel). Welcome. And we're gonna open this up to <crosstalk>.

Mikael Pyrtel (00:34:45):

Yes. Good morning, sir.

Rep Keith Ammon (00:34:47):

Good morning. Thanks for joining. So we'll open up with any questions in the room for the GAIN program. Another one,

Rep Mike Harrington (00:34:56):

Mike Harrington. You, I noticed you had up there in the beginning it was certain states you were more active in, and New Hampshire is a merchant effect. All of New England, except for Vermont is, is merchant based. Ie. there's no vertically integrated utilities anymore. They don't, utilities don't own any generation. So anything built in New Hampshire would be built as a merchant plant. Has any place in the country that's on that same system going forward with plans for nuclear, or they've been involved in your GAIN program? You know, not someone that can say, well, as long as my cost are prudent, I'm gonna stick it to the rate payers to pay for 'em, as in Vogtle. Is that, is that happening anywhere with a similar setup as New Hampshire?

Chris Lohse, GAIN Program (00:35:41):

So really, so when you talk about like, the state level outreach we're doing, right, that's more of, you know, states are looking at, you know, hey, if some states are saying I have a moratorium, we may be looking at removing it, right? How do we go do that? You know, some states are looking at how do we want to you know, we want to create a study to go look at nuclear, right? Similar to kind of like this group, I think here, right? With within, within your state, right? Other states or, or have passed legislation to go to create a study and look at that. And that's all across the board, right? That that's regardless of whether it's say a, a, you know, a deregulated market or a regulated utility structure. I think both, both those, you know, that's, that's happening across regions, outside of that. But, you know, as, as far as, you know, supporting things with vouchers, you know, I think that's more of, you know, that's company specific, more company specific than necessarily state driven, right? Some companies are in certain areas and not always in, in others. It's, it's just gonna depend on where, where each company is looking at their market.

Christine King, GAIN Program (00:36:42):

So there's actively 15 studies going on across the United States at a state level, either through state level working groups and such. And I'd be glad to share that list with you if you wanted to look at what other states are doing. Each working group and feasibility study for nuclear is very different depending upon the state structure, the utility interest the consortium that's come together to even think about nuclear

energy. But there's, there's a lot of discussion across the United States around nuclear energy and how it might fit in.

Rep Mike Harrington ([00:37:20](#)):

That would be extremely helpful if you could send it to us. I appreciate that. 'cause I mean, as you're well aware, no one's ever built a nuclear reactor in the United States that wasn't a vertically integrated utility or funded by the federal government. Now this thing with Dow is toying with, I know they're getting some federal funding, but it'd be really interesting to see if they can actually pull it off with a lot of private financing to build a reactor. That would be the first time.

Christine King, GAIN Program ([00:37:43](#)):

I think that's a perfect question for Julie Kozeracki. Just saying. <laugh>.

Rep Keith Ammon ([00:37:49](#)):

She's our next speaker. Alright, any other questions in the room? Scanning any online, if you're on Zoom and you want ask questions, just raise your hand with the, oh, we, we do have one in the room. And just introduce yourself for the record.

Rep Alvin See ([00:38:06](#)):

Yes. State Representative Alvin See. My question is on the coal to nuclear program, does that is that essentially looking at providing a steam generator to use the existing steam generation? Or is it just using the physical location and the substation that's available?

Chris Lohse, GAIN Program ([00:38:29](#)):

It, so it, it, it could be either, most, I'd say most of the work that people are doing in cold to nuclear is more about using basically the site, right? Not, not necessarily taking a, a heat source, nuclear heat source and dropping it into a reactor, you know, into a coal plant and then using all the secondary side that is being looked at by, you know, one or two companies in terms of they, they believe that may be maybe a viable approach. but it, it's, I think most of the work in this area is really just on site repurposing, not necessarily, you know, plant, you know, dropping a heat source into a plant.

Christine King, GAIN Program ([00:39:02](#)):

I think one of the challenges that has emerged in this space is twofold. One handling the, handling any risk to future operations that are represented by the coal ash that is either still present or stored on site, as well as the transmission rights and how do the transmission rights convey over time. And so building on the same site can be challenging for both of those issues. So folks that are considering early projects right now are doing are considering adjacent to so we end up in some of the siting studies looking at all the property that the utilities own.

Rep Keith Ammon ([00:39:54](#)):

Great. Alright. Thank you both so much for the presentation. And Chris, while you're thinking of it, if you could drop those slides in the, into email to me and I'll I'll post them on our commission website.

Chris Lohse, GAIN Program ([00:40:08](#)):

Will do.

This transcript was exported on Aug 16, 2023 - view latest version [here](#).

Rep Keith Ammon ([00:40:09](#)):

Perfect. And if you could send the host feature back to me. I, I, I don't seem to know.

Chris Lohse, GAIN Program ([00:40:14](#)):

You'll have to ask me how I do that. Maybe I'll just leave and I can come back. <laugh>,

Rep Keith Ammon ([00:40:18](#)):

That might, that might work.

Chris Lohse, GAIN Program ([00:40:21](#)):

Yeah, that might be the better, that might be the better method. I'll, I'll just, I'll just leave and come back 'cause I'm not quite sure how that works.

Rep Keith Ammon ([00:40:28](#)):

That should work.

Christine King, GAIN Program ([00:40:29](#)):

I'm not sure we should experiment with your meeting, but here goes,

Chris Lohse, GAIN Program ([00:40:32](#)):

Yeah, we'll see

Rep Keith Ammon ([00:40:33](#)):

<laugh> I'm now the host. That did work. Alright. And Julie, I saw your email late, I think it was late Friday. I think I got your bio right and if there's any changes I'm happy to make those on our website. but I I stalked you online and, and scraped I think from LinkedIn.

Julie Kozeracki, DOE Loan Programs ([00:41:01](#)):

So this is where being the only Julie Kozeracki in the world comes in handy. So, no, thank you. I appreciate it.

Rep Keith Ammon ([00:41:06](#)):

And do you have any presentation that you'd like to share or is it verbal only?

Julie Kozeracki, DOE Loan Programs ([00:41:11](#)):

I do, so I will note that sometimes zoom crashes every few minutes when I screen share, so I will give it a shot and if it crashes, I might have to hand over the presentation to you, if that's all right.

Rep Keith Ammon ([00:41:22](#)):

Okay, that's fine. And you should be able to, to try it now.

Julie Kozeracki, DOE Loan Programs ([00:41:25](#)):

Okay. Let's give it a shot. Can you see that now?

Rep Keith Ammon ([00:41:29](#)):

It's, it's, it's loading. Yep. Yep. You're, you're on.

Julie Kozeracki, DOE Loan Programs ([00:41:33](#)):

Okay, excellent. Alright, so, hi folks. Thanks so much for having me. I am Julie Koki. I'm a senior advisor with the US Department of Energy's Loan Programs Office. And today I'll be talking through our recent report available at liftoff.energy.gov. And the liftoff reports represent a department-wide initiative to strengthen engagement between the private and public sectors to accelerate the commercialization and deployment of clean, of critical clean energy technologies. So nuclear was one of the first four that we did. We also did long duration energy storage, we hydrogen and carbon management, and we have ones on industrial decarbonization and virtual power plants coming out soon. So this report was a collaboration between the Loan Programs Office the office, nuclear Energy, the Office of Clean Energy Demonstrations, and the Office of Technology Transitions. And before I just dive into the content of the report, I will just give some quick background on the loan programs office.

([00:42:31](#)):

So, LPO has over \$300 billion in loan authority and was designed with nuclear in mind. So LPO expects to take a leading role in financing the deployment of new nuclear. And to date, LPO is issued more than \$35 billion of loans, including a \$12 billion guarantee of Vogtle, the first new nuclear reactors constructed in the US in 30 years. And we currently have about 150 applications in for about \$125 billion in loans. And LPO historically had closer to about \$40 billion in authority. But with the Inflation Reduction Act and the creation of section 1706, the Energy Infrastructure Reinvestment program that program now has over, has 250 billion in lending authority. And the clean energy transition will be private sector led and government enabled. So we're excited to receive applications and areas that industry finds most compelling. And in particular funds for the 1706 projects, the 250 billion have to be conditionally committed by September of 2026.

([00:43:33](#)):

So there is no time to waste in getting those applications in. And LPO has pretty broad authorities across the energy space, but just in nuclear in particular, in addition to nuclear construction, LPO can also finance manufacturing across the supply chain for components and fuel supply, everything from conversion, enrichment and fabrication to, you know, components for existing or new reactors. So happy to answer more questions about LPO or authorities at the end, but I'll plan to take the next 10 or 12 minutes or so to go through some of the key findings from the report. And please note that the reports were designed to be living documents and will be regularly updated. We're planning for probably early next year as we gather more input from industry. So very much look forward to your comments, questions and feedback.

([00:44:21](#)):

But we started this work to answer three key questions. One of those being what is advanced nuclear in its value proposition? Do we even need new nuclear with all for Net-Zero with all these cheap renewables? And then why will it be different this time? Or why won't it look like Vogtle? And so to quickly set the stage, when we talk about advanced nuclear we're talking about fission not fusion but it includes reactors of all sizes from one megawatt microreactors like Project Pele to one gigawatt, you know, utility scale reactors, as well as SMRs, many of which are in the 300 megawatt or so range. And for us, advanced nuclear also includes gen III+, or light or advanced light water reactors, like the ones we've been operating for decades, as well as gen IV reactors that use coolants like sodium or helium.

([00:45:08](#)):

And some of those require HALEU and SMRs may sound fancy, but they've been proven at scale. The US Navy's been using light water SMRs to power a whole submarine fleet since 1954. So just a baseline for when we talk about advanced nuclear in this context. So to answer the second question around whether we need new nuclear for Net-Zero, the answer is yes, and it looks like something close to 200 gigawatts. We currently have about 95 gigawatts online in the us so we're talking about tripling that capacity in the next 27 years. Because in any decarbonization scenario, whether you build a ton of renewables or an insane amount of renewables, you probably need 20 to 40% of your grid that needs to be clean firm capacity, where firm power refers to generation sources that provides stable energy during all seasons, during all periods of weeks, up to months, including during extreme weather events.

[\(00:45:59\)](#):

And of that clean firm power nuclear looks to be a good option for one to 200 gigawatts. Given we see, you know, there being probably five 50 to seven 50 added overall. And note that on the right hand side, if you try to build out most of your capacity with renewables, you have to so overbuild the capacity to make up for the intermittency that that comes with its own costs. So new nuclear has a really clear value proposition as a clean firm power source to complement the build out of renewables at scale. And when you talk about your clean firm power options, you just don't have that many options because we look at a couple of other key dimensions here when we think about decarbonizing the grid resiliently. And in addition to being clean, so carbon free generation as well as firm generation, nuclear also uses land very efficiently and requires a lot less transmission build out.

[\(00:46:52\)](#):

The only thing harder to build the new nuclear is transmission. And folks often underappreciate just how much land and transmission will be required for an at scale renewables buildout. And as Chris just talked about, you know, between 2023 and 2050, we're talking about 200 gigawatts of coal assets being expected to retire. And nuclear is really well positioned to replace those coal assets with a similar generation profile. And it's also one of the very few technologies that will help you keep the 150, 200 plus high paying, high quality jobs and tax base in those communities. In addition to, as Chris mentioned, leveraging some of the existing infrastructure. So the other thing about nuclear's profile is that it's likely more in the money when people realize when you account for the benefits it's providing, not only in terms of decarbonization, but also resiliency. Because every time my boss, Jigar Shah, posts about nuclear on Twitter or LinkedIn, the comments are filled with, you know, why are we wasting time and money on nuclear?

[\(00:47:54\)](#):

Don't, you know, you know, solar is gonna be \$2 a megawatt hour. And the thing is, it doesn't really matter if nuclear is never cheap as solar because of the value it's providing. So as a clean firm resource, nuclear's gotta compete with solar paired with really long duration energy storage or equivalently, you know, natural gas paired with carbon capture. And once you build in the costs for long duration storage transmission build out, or for natural gas, in the case of carbon capture nuclear actually looks to probably be pretty cost competitive with those other clean firm options. And so this chart shows estimated LCOE (Levelized Cost of Electricity) costs for those three sources where we would expect the cost to come down over time. So moving from right to left. And in each of these cases, we've included the roughly equivalent tax credits for each of these. So in the case of nuclear it's the 30% investment tax credit (ITC) and doesn't even include the two potential 10% adders such that there is actually up to a 50% potential ITC for new nuclear.

[\(00:48:56\)](#):

However despite these benefits, we are in a bit of a hype cycle where the conversation is changed for the positive especially since the, you know, Russian invasion of Ukraine last year. But we need to break through this stalemate that the industry is locked in because despite the three big demonstration projects, the DOE is funding TerraPower, X-energy, and NuScale there are zero commercial orders for new nuclear in the US and the only new nuclear contract in North America is in Canada where Ontario power is gonna build the GE BWX 300, which is a shrunken down, simplified boiling water reactor (BWR). And so a huge part of this work and a lot of my job is figuring out what it will take for utilities or other potential customers to accelerate their committed orders to new nuclear.

(00:49:48):

And when we talk about a committed order book important to draw a distinction between signed contracts versus press releases, MOUs, letters of intent, because the nuclear industry has a lot of those sort of MOUs that have been flying out there. But it's very difficult for us to finance a supply chain, especially at the One programs office or to build out a workforce without real signed contracts for new reactors. So it's critical to identify anything it takes to get to those signed contracts. And another piece is that it's essential to have, call it five to 10 of the same design. You can't have, you know, onesie twosie, TerraPower, X-energy, GE, NuScale. Because in order to build out a supply chain effectively as well as give yourself enough at-bats to come down the cost curve, you're looking at, call it five to 10 of the same design to ensure you're giving yourself a real shot at reaching Nth-of-kind costs.

(00:50:47):

And then once we get that right, of course we've gotta deliver those first projects reasonably on time and on budget. And if we can get that right, it's an enormous opportunity for American industrialization. Not only deploying clean energy, but establishing domestic manufacturing partnerships, hopefully with allied countries and partners and creating probably on the order of 300,000 high paying, high quality jobs in the US. But that arithmetic to 200 gigawatts is intimidating and we're a little behind, and a lot of decarb modeling will sort of drop in 400 gigawatts of new nuclear in the 2040s when you run out of other options. But part of the reason we landed on this 200 gigawatt number is that it's one where if you actually back into the annual build rate, you realize that if we got started as soon as possible, you could get to a scale where we're putting 13 gigawatts on the grid per year versus a delay of only five years could lead to us needing, call it 20 gigawatts per year, which would require, so overbuilding the supply chain to deliver that, that you'd leave stranded assets and would also be very difficult to build up a workforce to be able to deliver that at scale.

(00:51:55):

So this posture of every utility saying, Hey, I don't wanna go first, second, or third, but I'll order reactor number four or five doesn't work because we don't have that time to waste. And also there's no number four if you haven't identified a plan for one, two, and three. So important to not wait for the demo projects to be done, but to identify what it will take to accelerate those orders and hopefully help stagger and, and feather in some of those early orders so that we have the supply chains deliver it. 'Cause I think something else folks often underappreciate is that if everyone waits until they feel comfortable, everyone's gonna place their orders for new nuclear at the same time and then we won't have the supply chain to deliver on that. So getting your early spot in line is really gonna be essential ensuring that you have access to any new nuclear generation at all.

(00:52:44):

And just a final note here that getting to 200 gigawatts will likely require getting back into big reactors again, that SMRs have a huge role to play. I've gotta find a better metaphor here, but SMRs may be a bit of a gateway drug into getting back into the habit of building new nuclear again. And that if we are really

talking about decarbonizing at scale, that will likely require building big reactors as well as small. So very briefly and topical after the news last week, you know, no one is more excited than LPO that Vogtle unit three has reached COD (Commercial Operation Date) and will be with, you know, unit four providing over 2200 megawatts of clean firm power for 60, if not 80 or a hundred years to come. And we're very grateful for the perseverance and grit that the folks at Georgia Power and Southern companies showed in getting those units online.

[\(00:53:37\)](#):

But the biggest question that's been holding up new nuclear orders is why won't it be Vogtle again? So we hit it some of these lessons in the report, and I think just the headlines are that the construction and other challenges at Vogtle were not nuclear related. It wasn't issues with the nuclear island. They're very basic mega project construction issues around, you know, the AP1000 is a terrific design, but it wasn't complete enough before they began construction. Selecting the part 52 process with the NRC with less than complete design meant a cycle of rework and going back. There wasn't a resource loaded schedule before they began in earnest. So on the one hand, while it can be frustrating to do that analysis now, it does provide a level of optimism that with enough investment in pre-construction planning, a lot of these issues should be avoidable.

[\(00:54:27\)](#):

And I think we see a real incorporation of these lessons with things like the \$400 million investment that OPG (Ontario Power Generation), TVA (Tennessee Valley Authority), and Synthos are making into finalizing the GE design, recognizing that you know, a few million upfront can help save you billions down the line. So we're, we're very excited to see that. So we have some estimates in the report around cost, but let's be frank, nuclear has a real credibility problem. And one of the issues is that there aren't necessarily high fidelity cost estimates that folks can trust now. But I think it's important to recognize that the first of a kind will always be much more expensive. There are some true first of a kind costs non-recurring that you don't expect to see again, and we've locked ourselves into sort of an unfortunate cycle in the US where we'll build one or two of a reactor and get scared off and, and back away.

[\(00:55:24\)](#):

Versus in Korea or in Japan where they picked a design and stuck with it, they got really good at it. And from numbers I've seen, Korea was churning out light water reactor is at like \$2,300 a kilowatt, but a lot of that is just giving yourself the chance to be able to actually build reactor number four, number five, number six. And part of the value proposition of SMRs is that frankly, even if the first ones aren't less expensive dollars per kilowatt than a big reactor, you should be able to get to fourth, fifth, sixth of a kind with less time, less money for the same amount of megawatts in installed versus, you know, just the bigger investment in one big reactor. And it feels a lot less like a bet the company proposition than a big reactor. So again, I think SMRs and big reactors have big roles to play, but SMR is maybe helpful for getting folks into that, into that space.

[\(00:56:18\)](#):

So finally in breaking through this stalemate, couple big things. One is the value of a consortium approach. So I've talked to a number of mostly vertically integrated utilities who recognize that, you know, much easier to get to that five or 10 orders if you've pooled a number of potential buyers together. And then that also helps provide a level of cost sharing and risk sharing. but the most compelling answer we heard when I asked, you know, asked the question, what would it take for you to commit to new nuclear was an idea around cost overrun insurance. And so right now LPO doesn't have the ability to provide that, but you know, if Congress were to amend our authorities or if a private insurer were willing to take this risk we've heard that there's often just a measure of costs and schedule

certainty that folks are looking for in some level of acknowledging that there is a partner who's willing to share in some of the risk with them.

(00:57:19):

So one you know, interesting proposal we heard for that was, you know, hey, if we wanted a reactor at 2 billion, God forbid it came in at 4 billion, what if we the utility covered the first 50% in overrun and then split it with the government 50/50 past that such that of that 4 billion, the government could forgive 500 million of the total cost, hopefully reducing some of the burden on rate payers. So that's something we've been having a lot of conversations about, and I think that, you know, the intention of this report was very much to gather the specific input around what folks would need and how government support could be better tailored to supporting some of these orders. So I'll pause there. And of course, as I mentioned, there's a fuller report about 60 pages online. It's a lot of pictures though, I promise. And then I'm just happy to answer any questions either about the report or how LPO can help support.

Rep Keith Ammon (00:58:28):

Sorry, I was on mute. Just curious how was the LPO created? Was, was there recent legislation that that set it up or is, has it been around a while?

Julie Kozeracki, DOE Loan Programs (00:58:37):

So the Energy Policy Act of 2005 created LPO and then it took a, a little while for, for LPO to get going, and then it was really around 2008, 2009 when we, you know, for instance provided a half billion dollar loan to Tesla and some of the other vehicle manufacturing companies. And then frankly, there was another pause during the previous administration. So the office sort of has really gotten the wheels back on since last year. And then of course, the Inflation reduction Act granted us this extra 250 billion in authority. But LPO as an institution has technically been around for, for a little while now.

Rep Keith Ammon (00:59:16):

Okay, great. We have a question in the chat if you could share your contact information. Information.

Julie Kozeracki, DOE Loan Programs (00:59:21):

Yes, absolutely. (Julie.Kozeracki@hq.doe.gov)

Rep Keith Ammon (00:59:22):

If you could share also the slide deck that you presented.

Julie Kozeracki, DOE Loan Programs (00:59:26):

Yes, you got it. (<https://www.energy.gov/lpo/articles/program-guidance-title-17-clean-energy-program>)

Rep Keith Ammon (00:59:28):

So David, I think you heard this presentation or parts of it before. Do you have any questions for the, for Julie? Okay, so Representative Harrington r Representative Harrington, why don't you tell us a little bit about your background, just so people know.

Rep Mike Harrington (00:59:46):

Alright, I'm a nuclear engineer. I worked at Seabrook for 20 something years. I was a chairman engineering supervisor there, and before that I worked for the Navy as a civilian engineer. So one of the things I'd be interested in is a couple of things. First is the states that you're talking about, are there any places that would be merchant plants that are going, that look to be going forward through some development? It seems to me as it most likely is gonna be with a vertically integrated utility that it least will share part of the risk with the rate payers. Is, is that correct or is there any states where it's merchant plants that are looking at, I mean, in companies in the state, would it be a merchant plan?

Julie Kozeracki, DOE Loan Programs ([01:00:29](#)):

So almost all the conversations to date have been with vertically integrated utilities in the Southeast. So I think, you know how I'm talking to I will say that recently talked to some folks in a couple of non-regulated states because of an interesting potential with the CHIPS program where the fabrication facilities that are gonna be built needs so much power. It's on the order of like 150 megawatts each. And they're talking about locating six or 12 of them together. And they're probably not gonna be online for, call it seven or eight years, that those could be really powerful customers for like a new nuclear customer. So was talking to some folks in Texas and some other geographies. So I think there might be a really interesting potential collaboration there where if states or markets where there are going to be CHIPS funded facilities are being located, that that might be a really you know, helpful way to pull ahead some new nuclear commitments.

Rep Mike Harrington ([01:01:26](#)):

And, and a follow up to that, just kind of what you said about fabrication. I'm wondering is the as we look into the design, this what I think the six advanced designs that were funded by DOE I think and is there going to be a concentration or an attempt to minimize the amount of safety related equipment? Because that gets into, you know, the whole 10 CFR 50 Appendix B stuff with buying this stuff, or the option is commercial grade, commercial grade dedication, which I think would be way too expensive for a utility to take on or, or a company to take on itself. So is the, is the, the new designs, the ones that are going forward, you think it'll be the one that has the absolute minimum of safety related equipment so that they'll cut down on procurement costs.

Julie Kozeracki, DOE Loan Programs ([01:02:14](#)):

You know, I, I know for instance that the GE design that I've heard a lot of, that's probably the one that utilities share a lot of interest with me in. the prevention of the loss of pooling accident is very appealing to them. Some of the simplified measures there around the isolation of the RPV, like I know that that has been, so I get a little so I should clarify not a nuclear engineer. So on the actual like procurement dependencies on design, on safety changes in the design, I am certainly not the expert, but I will say that I have heard reflected back from utility customers that they are very interested in some of the, you know, first of all, when they talk about nearest term deployment, they're looking mostly at the Gen III, the lightwater designs just 'cause they're like, you know, it's a BWR, it's a PWR, I know what this is, I know how to operate it. and then that some of the designs in particular have made pretty meaningful, not only, as you say, are not just smaller, but meaningfully simpler. And so I know that that's been a, a key consideration for a lot of those folks.

Rep Mike Harrington ([01:03:23](#)):

Thank you.

Rep Keith Ammon ([01:03:25](#)):

This is Keith off, off camera here. The loan program, is that just for building out new generation or is it available for say your refining capabilities for fuel or supply chain build out?

Julie Kozeracki, DOE Loan Programs ([01:03:43](#)):

Yes. So available not only for new nuclear, but we can also do nuclear upgrades or upgrades at existing plants. And then the entire manufacturing and supply chain. So if there were fuel supply chain component, supply chain or even just, you know fixes or, or upgrades, you know, we have a requirement around greenhouse gas reduction. But the new authorities and I can share the the title 17 guidance document here that came out a few weeks ago. Pretty broad. And so there's a lot of support available for existing nuclear.

Rep Keith Ammon ([01:04:19](#)):

So if our state wanted to get involved in any type of supply chain manufacturing the loan program would be available to at least apply for?

Julie Kozeracki, DOE Loan Programs ([01:04:30](#)):

Should be. And I'll also note you might be eligible for 48 C, which is the new manufacturing investment tax credit. So that's a 30% investment tax credit where nuclear and nuclear component fuel supply chain should be eligible as well. And one thing I'll note. So there's something called the federal support restriction where effectively LPO can't loan to projects receiving federal grants, federal offtake on federal land, but no issue with state grants, state support, state land. So LPO pairs very well with state supported project. We just, it gets a little trickier with some of the, you know, DOD supported micro or, or things like that.

Rep Keith Ammon ([01:05:11](#)):

Alright, great. Cathy Beahm. We do you have a question in the room. Just gotta get the mic over. Make sure the green light is on.

Catherine Beahm ([01:05:25](#)):

Thank you. Julie, this is Cathy Beam with the Department of Environmental Services. That was a very informative and interesting presentation. So I understand the Department of Energy is focused on the technology and, and the industry getting built out. What about the fuel issues in terms of, is Department of Energy also working to improve or at least get started fuel generation? And then what about public relations and that sort of thing? Is that also part of your strategy?

Julie Kozeracki, DOE Loan Programs ([01:05:52](#)):

Yes, and so I imagine that my colleagues Billy Valderrama and I see Cheryl Herman on the phone in the Office of Nuclear Energy have been spearheading a lot of the efforts on fuel supply, fuel supply chain. That's a huge priority for the department. LPO's role more strictly in sort of financing any potential things that, but again, I will note that if for instance, companies are going to be receiving federal grant funding or federal offtake through something like the HALEU availability program, it might be tough for LPO to provide support to them unless Congress were to amend that. But I'll leave the fuel issue to Billy and Cheryl. And then on the public piece, I think that the fact that nuclear polls best with people who live right near nuclear plants tells me that it's an education challenge rather than a a persuasion

challenge that when folks actually come to know the cost benefit profile, the fact that the plant, you know, has employed their parents, provides good prospects for employing their children, et cetera, and they understand the safety record of nuclear that tells me that it's much more about ensuring that people have the fact base as opposed to actually trying to change their mind.

(01:07:05):

And so obviously the third piece of that, and again, I'll let Billy and Cheryl speak to this on the spent fuel portion that the department is also prioritizing consent-based siting and some other initiatives. But there's also a piece around informing people that, you know, nuclear is really the only one of the only industries that fully accounts for all of its waste versus, you know, coal, oil, gas. You just release that into the environment for other people to deal with. The fact that we can identify exactly where and when all of our spent fuel is stored and that there's really no record of anyone being harmed by it in the US that there are more solutions existing and pretty good priority efforts around ensuring there's a sustainable path there, I think is something else that we should ensure people are aware of.

Rep Keith Ammon (01:07:55):

Alright, we have another question from Representative Harrington.

Rep Mike Harrington (01:07:58):

Just as far as costs go, I know you showed those screen slides up there, but I was having a little trouble reading some of the numbers on there. So just putting perspective, there's a project now coming down from Maine bringing down hydro power from Canada. And because of a election where they screwed things around for a while and delayed it, now it's back on. So the contract was coming in for transmission and energy at about \$60 megawatt hour, and now it's gonna be renegotiated up because of the delays. What are we looking at in, in, and we're talking \$70 in that range offshore wind, what are we looking at for future nuclear for a cost per megawatt hour, given the fact that right now in New England, the cost is less than \$30 megawatt hour as we speak?

Julie Kozeracki, DOE Loan Programs (01:08:46):

Yes. So, you know, we have an estimate here in a, a ban. So for nuclear, we have it between \$66 megawatt hour and \$109, and that's with the 30% ITC. I'll note that there is an additional 20% that I think a lot of folks will be eligible for, so up to a 50% investment tax credit. But yes, I mean I think, and this has been a point that Jigger has been trying to hammer home, is that when you look seriously at your clean firm options, a lot of them are probably gonna come in around, call it \$70 a megawatt hour when you build in the costs for round-the-clock storage for renewables or for carbon capture for natural gas. You're similarly looking at, you know, again, there a lot of estimates that, a lot of assumptions that go into LCOE, but yes, it's probably something, you know four probably closer to call it \$70 a a megawatt hour. And then of course, you know, I think the first ones are always gonna be more expensive. So we provided a range for, you know, between the first and, and Nth of a kind cost projects, but it's really essential that you have a fleet of those to be able to show that there's a path and to average across, because the economics from a, you know, the first unit by itself are always going to be very challenging.

Rep Mike Harrington (01:10:00):

Yeah. Just, just a quick comment in New England, we call it balancing resources, not firm resources.

Rep Keith Ammon ([01:10:12](#)):

Alright, great. Any other questions in the room and online? Seeing none. Thank you Julie, very much for that presentation and we'll probably have more additional questions for you going down, down the road here. So thank you so much.

Julie Kozeracki, DOE Loan Programs ([01:10:31](#)):

Thank you so much. And sincerely, like any feedback, comments, questions reach me anytime. We're happy to connect you to folks and be helpful. Really appreciate it. Thank you.

Rep Keith Ammon ([01:10:40](#)):

Yeah. Excellent. Thank you so much. Alright. And now our final presentation we have Dr. Billy Valderrama and you got a mic there and I have your slide presentation, so just gimme one second. I'll get that set up and I have to share my screen. And folks online you can see that. Lemme see if I can clean up the too many things on my screen. I can't see what I'm doing here. Full screen. Alright someone online gimme a, a thumbs up that you can see that the, the full screen there.

Mikael Pyrtel ([01:11:58](#)):

You're all good Mr. Chairman.

Rep Keith Ammon ([01:12:00](#)):

Alright. Excellent. Alright, and Dr. Valderrama, would you take it away, please?

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:12:07](#)):

Sure. Thank you very much. Thank you for having me here this morning. And as you've heard from Chris and Julie this morning, kind of some of the work being done at the Department of Energy through GAIN within Idaho National Lab, the support there being done as well through the Loan Programs Office. Now I'm going to speak on the work being done within the Office of Nuclear Energy, kind of our general priorities mission and the work we're doing to advance these nuclear technologies. Next slide, please.

([01:12:35](#)):

Within NE our mission is to advance nuclear energy science and technology to meet US energy environment and economic needs. And to accomplish this mission, we're focusing on four priorities keeping the existing fleet of US reactors operating, deploying new advanced reactors, ensuring a secure and sustained nuclear fuel supply chain, and expanding our international nuclear energy cooperation. Next slide, please.

([01:13:06](#)):

And to accomplish these four priorities we have a thankfully very healthy budget of especially this ending this past fiscal year at around **\$1.7 billion appropriated by Congress to our Office of Nuclear Energy** to carry out the research development and demonstration of these technologies. And as you can see through fiscal year 20, it's grown significantly and even so past 10 years or so, I think around that time, our annual appropriation budget was about half of what it is now. So that shows along with the two recent pieces of legislation, the IJA (Infrastructure Investment and Jobs Act) and Inflation Reduction Act kind of from Congress. both a steady continued support that's bipartisan and bicameral for nuclear energy, and not only for the existing fleet, but also support of the advanced reactor technologies. Within

the IJA, it included \$2.5 billion to fully fund the federal cost share of the two advanced reactor demonstration projects.

[\(01:14:17\)](#):

The X-energy reactor at the Dow Chemicals site near Houston, as well as Terra Powers Natrium reactor out in Wyoming at a retiring coal plants also included \$6 billion in the civil nuclear credit program to support those existing plants that are at the most impacted economically to ensure their continued operation to provide those clean energy benefits and jobs. Also included \$8 billion for regional hydrogen hubs. And the legislation specifically caught up on how to utilize nuclear. The Inflation Reduction Act that passed about a year or so ago provided \$700 million for high assay low and rich uranium (HALEU). That's a fuel that many of these Gen four reactors will need to help spur the development of that domestic supply chain. It included \$150 million for infrastructure improvements at Idaho National Laboratories to help support the demonstration of these advanced technologies. It included up to a \$15 per megawatt hour protection tax credit for the existing fleet, the 45 u credit as it's called, and the 30% investment tax credit that could grow depending on additional adders that Julie mentioned. Next slide please.

[\(01:15:46\)](#):

Shifting back, using all those efforts, how we work to accomplish our priorities. Again, our first one is ensuring the existing fleet is operating. 18% of our electricity in the United States, comes from nuclear, and provides 47% of our emissions-free electricity. Next slide, please. And this map, again, kind of shows where the existing fleet is currently. We do have to modify the graphic for Georgia. So it just shows two plants down at Vogtle. It's three now. Very happy. It entered commercial operation last week and only have one commercial reactor under construction right now, Vogtle unit four. And we've also hopefully started the upward trend of reactors within the United States. It's back up to 93 from around the world's 439 or so reactors. Next slide, please.

[\(01:16:50\)](#):

And the particular work in NE that we're doing for these existing fleet is enhancing performance, reducing operating costs, and internalizing externalities. So we are supporting efforts on digitizing analog systems. In particular, the control room system is project we're demonstrating out at the Limerick nuclear power plants providing technical assistance for analysis for continued long-term operation. So within ne we've supported a lot of the technical basis that was used for the initial license renewals of a lot of the commercial fleet from 40 years to 60 years, and as well supported some of that technical basis for now plants considering their subsequent license renewals up to 80 years.

[\(01:17:39\)](#):

We're also working on commercializing accident tolerant fuels. That project was spurred after following the disaster Fukushima to find help reduce that build up hydrogen that caused that accident, but also that type of fuel should operate at longer life cycles to hopefully reduce the overall cost for commercial operation. And another exciting area we're working on is identifying new markets and use cases in particular hydrogen production within the existing fleet. Next slide, please.

[\(01:18:18\)](#):

In terms of hydrogen production demonstrations, we're working with our other offices within DOE, in particular our energy efficiency and renewable energy office, kind of demonstrating our focus on nuclear energy how hydrogen, how we can use the energy that's produced at these plants to create new streams of revenue to keep their continued operations. So we're working on four demonstrations at existing plants to David-Bessie, Nine Mile Point, Prairie Island, and Palo Verde. The Nine Mile Point plant

in particular, earlier this year their demonstration started operating, so now they're producing some hydrogen for needs within their plants. Next slide please.

[\(01:19:04\)](#):

But I'll go into the next slide after this. That kind of shows the big need for nuclear as we try to reach our very aggressive climate targets by 2050. But we're working on enabling the deployment of these technologies. In terms of technologies, these are from micro, microreactor sites that we're supporting small modular reactors to the large scale reactors. Pretty much ensuring if you, if you are in a remote community or off the grid or for a particular use case, we're supporting technologies that meet those needs. Or if you're in a medium sized, potentially coal repurposing site, we're supporting technologies that will help meet those variety of needs that's no longer that single large scale gigawatt reactor, which is great to have. But to reach these goals, we need a suite of reactors, a variety of sizes for the variety of use cases the communities need. In addition, supporting these technologies and deploying them within the US also helps ensure our continued leadership internationally on those safety, security, and non-proliferation standards that are so key. Next slide please.

[\(01:20:24\)](#):

I'll briefly just mention in addition to motivation, as Julie just mentioned in our last presentation, is the Pathways to Commercial Liftoffs that we need regardless of energy source even with a large renewable build out we will still need new nuclear here in the United States to meet those goals. Next slide please.

[\(01:20:46\)](#):

and to support the demonstration of these technologies. at DOE, one of our key demonstration projects and the one currently managed within the Office of Nuclear Energy is a carbon-free power project of the NuScale power module within the Idaho National Laboratory site. It's actually a utility of the Utah Associated Municipal Power Systems (UAMPS). It's their reactor, but it'll be sited at the INL site, a six power module. And the first module is planned for operation in 2029. Next slide please.

[\(01:21:26\)](#):

And the other reactors and efforts combined within DOE is the Advanced Reactor Demonstration Program. So mentioned earlier, the demonstration number one, those two TerraPower and X-energy designs. These were originally stood up within the Office of Nuclear Energy, but are now within the Office of Clean Energy Demonstrations within Department of Energy. However, ARDP is much broader than just those two. It's also a risk reduction portion to help solve the technical and operational and regulatory challenges of a few technologies. for demonstrations within the next 10 to 14 years. There's a Kairos Power, the Holtec SMR, the Westinghouse eVinci, Southern Company's Molten Chloride Fast Reactor, and BWXT BANR microreactor. So it's a commercial variant of the Project Pele that they're working on.

[\(01:22:27\)](#):

And as well concept development to help mature additional designs for those that come after those. So working that suite of technologies from what's close to being demonstration, but what else will be needed the next 10 to 15 years. Next slide, please.

[\(01:22:42\)](#):

And in support of all those technologies we're working on ensuring the the developers have the necessary testing infrastructure that they require that might be too expensive for them to build otherwise, but we at the Department of Energy and at our national laboratories could help support with those capabilities. In particular, the demonstration and operation of microreactor experiments or the

DOE test bed at INL will help test developers microreactors within the INL sites. in particular the and many developers are having conversations now into the process of how to test within their site.

(01:23:30):

But the key benefit of testing within the DOE, a DOE site is we have special authority to license reactors. If it's connected to the electrical grid, then that is NRC. But if it's just within the DOE site for testing or ensuring that everything operates, we have special authority to license these reactors.

Rep Mike Harrington (01:23:56):

Well, that's a good trick.

Dr Billy Valderrama, DOE Office of Nuclear Energy (01:23:57):

Yes, it's, it, it's very good. And something we're very much using fully in connection with Project Pele. So again, it's the DODs project, but they're actually gonna start up the initial test at Idaho National Lab and using that DOE authorization. So we are actually working kind of together and as well bringing in the NRC where appropriate to kind of help help ensure they learn the new processes and how it varies from these advanced reactive technologies.

(01:24:31):

How they vary from light water. So when the applications for commercial variance come to that, they have some knowledge beforehand and kind of to help speed up that the bureaucratic process that could be a authorization process within any government entity.

(01:24:50):

MARVEL is a very small 100 kilowatt microreactor that will be deployed at INL for by the end of 2024. Kind of a two part process to help work, find all those kinks within that DOE process for developers, but also will be used as an R&D microreactor. So I'm sure you've heard, and how these technologies can load follow, can be connected to integrated energy systems, produce hydrogen, that little tiny microreactor will be used to test a lot of those things in action. So we're very excited about that. that, that microreactor project itself. Next slide please.

(01:25:35):

And kind of putting it all together, these bullets kind of represent where things have been said publicly, but not specific dates because things keep evolving as designs get closer and closer to a final design stage. Things shift, but kind of working early on, supporting the MARVEL reactor, the test bed, Project Pele will be one of the first commercial movers, and you've heard from Oklo around the mid 2020s, also deploying within Idaho National laboratory. And we have Eielson Air Force Base, so a different Department of Defense project. They put out an RFP for a power purchase agreement earlier in the year, and I think it closed a few months ago. And they're looking for a microreactor to power the Eielson Air Force base out in Alaska. So hopefully they'll make some award or release the awardees later on this year. As Julie mentioned, added the GE Hitachi BWRX 300, while not in the United States, but they're moving forward in Canada. And both the Canadian regulator and US NRC are working together to kind of as, when GE Hitachi is ready to submit license application, they have some knowledge there to help speed up that process. And yes,

Rep Keith Ammon (01:27:03):

The scale of that timeline, that's present day to 2030.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:27:06](#)):

To 2030 at the end. Yes. Okay. Well, and then the other three demonstration projects that we're supporting that deal. Next slide please.

[\(01:27:15\)](#):

And then third priority again, focusing on a secure and sustained the global nuclear fuel supply chain, primarily addressing gaps in the domestic nuclear fuel supply chain for the existing fleet, low enriched uranium and high assay, low enriched uranium for advanced reactors, the Gen IV reactors. That's been a significant focus within the department and the office this past year and working as well, developing a strategy for integrated waste management and spent nuclear fuel through a consent based siting approach, particular siting and interim storage facilities. Next slide, please.

[\(01:28:03\)](#):

As I mentioned, a significant focus in the front end of fuel cycle has been on HALEU this past year. the Inflation Reduction Act provided \$700 million, which is a lot of money to help stand up this commercial capability within the United States and helping through the US government de-riskify purchasing some of this material. However, additional it's a start, but more will probably be needed. And the primary motivation is Russia was the only commercial scale supplier of HALEU, given the actions of this of last year, that's no longer an option. And same, same issue we're working on with the low enriched uranium or the domestic fleet. About 20% of enriched uranium comes from Russia. So kind of working our way to increase that capacity within the United States and as well from our allied partners to help reduce that dependence. Next slide please.

[\(01:29:10\)](#):

And in the backend, we've updated our consent based siting process. We put out a revised effort in April of this year. I think the last time it was published was right after the Blue Ribbon Commission in 2017, I believe. And it focuses on prioritizing people and communities, centers equity and environmental justice in the process, and ensures it's a collaborative phase and adaptive approach. Next slide, please

[\(01:29:40\)](#):

Kind of breaks down the different stages of this process towards interim storage facility. We're just in stage one now, just at planning and capacity building the very early stages. We awarded, I think about \$26 million to over a dozen entities within the United States that are interested in learning more about the process. So it's more just learning, starting the conversation and learning what they need to know if they would like to consider it, consider a interim storage facility at their area in the future. But there's no commitment for a site there. It's flexible in terms of learning and adaptable what, what the resources they can utilize. But also, if you're interested in joining, I think they're flexible in that manner that you can maybe join one of the existing consortium members to learn more.

[\(01:30:42\)](#):

Next slide. And our fourth priority is expanding this international nuclear cooperation. Not only will a significant amount of nuclear be needed in the United States, but globally and projected to be double or triple by 2050 could be an **export potential about \$1.9 trillion**. So not only to support US needs here, manufacture these technologies within the United States, but then also export these overseas to our allied partners to ensure that they are able to have the clean energy that they need for their needs. But also ensure we have our continued presence internationally to help support a lot of the safety, security, and non-proliferation norms for these new reactors. Because these new reactors will need new guidelines. And with our reactors, we can continue to provide that same leadership we have with the existing fleet.

[\(01:31:52\)](#):

However, there are some, again, like everything, financing is always a challenge here domestically, but also internationally. Many of our competitors, especially even friendly ones, are like France are state-owned entities. So they have unique financing vehicles that they may offer that we do not have. So being creative of what we can do. And I think we've been pretty creative the last few years and made some significant inroads in exporting our technology to overseas. Next slide.

[\(01:32:28\)](#):

Thanks. Before I close, just wanted to say a few things on state level engagement. Within the Office of Nuclear Energy, we have three main partnerships. We have one with the National Conference of State Legislators, National Association of Regulatory Utility Commissioners, and National Governor's Association. And in particular the NARU partnership, they've teamed up with NASEO, the National Association of State Energy Officials to form in April the Advanced Nuclear State Collaborative, kind of bringing together, I think the count is upwards of 28 states now, kind of interested in learning about advanced nuclear for their states in all the states.

[\(01:33:11\)](#):

Just maybe, maybe they're interested in learning a bit more of information or they've committed, some states have to advanced nuclear in their states. It brings them together about once a month, a webinar of a particular topic that's of mutual of interest, and then a separate private conversation. And that one's open to the public. So you can all listen in to, and I can send the information for the next one. I think it's sometime next month. And and then if you, if you do decide to be a collaborative member, there's a separate conversation kind of between the members to kind of discuss what's

Rep Mike Harrington [\(01:33:49\)](#):

Is New Hampshire a member at this time?

Dr Billy Valderrama, DOE Office of Nuclear Energy [\(01:33:50\)](#):

I don't think so. And, but I'll share my information if you're interested. And I can now provide the contact with the right, if it's through the NARU or NASEO, whichever one makes sense. And as well, we have additional resource. We have a big budget primarily focused on research and development, but we do have some resources available to engage states and communities in, in related to technical assistance to tailor if they want to learn more about a particular technology or if they're more committed towards nuclear energy. A great example is the work being done through GAIN. But happy to have those conversations with you all. Thank you.

Rep Keith Ammon [\(01:34:36\)](#):

Great. Thanks so much. Just throwing open to questions in the room.

Rep Mike Harrington [\(01:34:44\)](#):

I'm always good for a question, you know, that.

Rep Keith Ammon [\(01:34:46\)](#):

Okay. Representative Harrington has a question.

Rep Mike Harrington [\(01:34:47\)](#):

Just want to ask. Just a couple of questions. First, the Pele, who's the manufacturer of that?

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:34:55](#)):

That'll be BWXT.

Rep Mike Harrington ([01:34:58](#)):

Okay. And you know, you keep the, there's a lot of talk about expanding, keeping the fleet that we already have, expanding the new one. Mm-hmm. <affirmative> maybe with advanced reactors, maybe with the Gen III reactors. Yep. All if we, any expansion like that is gonna require a big step up in supply chain. Absolutely. And especially with Gen III, because you've got a lot of safety related equipment, which means Appendix B and all that stuff. Is that going to be, how do you get over the chicken and egg problem? How are you going to get people to expand? So I'm gonna build a new reactor and I need to buy switch gear and I need to buy valves and I need to buy, you know. I can remember Westinghouse wanted \$200 for a screw once. Yeah. Because it was safety related. I'm not gonna pay that kind of money for a screw <laugh>, but so you get commercial grade dedication. But that's a lot of put on the individual utility to do that. And it almost limits it to utilities that have multiple reactor sites so they can, you know, pull that cost up. How do you get over that hump to get the supply chain going until, you know, you can't build it until it's being built.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:35:59](#)):

Yeah, no, I think that's an excellent question and I think it's something we're still grappling. One particular area within the HALEU area, it's been kind of that chicken egg, right? We've received this infusion of funding, but it's still, we're trying to see, there's at least a draft RFP a few months ago, got some comments to see from industry, is that enough now they're working take, took that comment into account and have an industry day. I think it's tomorrow morning kind of figuring that out. But I think that's still a work in progress, figuring out that right level of support.

Rep Mike Harrington ([01:36:31](#)):

It almost seems as if the government's gonna have to finance the first batch of HALEU and then sell it to someone who wants it because mm-hmm. <affirmative>, no one's gonna invest in doing it until someone sell it to.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:36:40](#)):

Exactly. Yep. Yep. And, and that's kind of supporting it 'cause supporting buying, procuring for those first demonstration reactors. Kind of hoping that's enough to spur.

Rep Mike Harrington ([01:36:52](#)):

One more follow up question. We were told by Westinghouse that they were actively working with Poland on some.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:36:59](#)):

Yes.

Rep Mike Harrington ([01:36:59](#)):

I don't know if it was the AP 300 or the AP 1000.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:37:02](#)):
AP 1000. Yes.

Rep Mike Harrington ([01:37:03](#)):
And have they got signed contracts for those now?

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:37:06](#)):
I'm not sure if they've yet signed the commercial contract, but at the highest level from the Prime Minister and announced there was an announcement last October at that and I think.

Rep Mike Harrington ([01:37:19](#)):
They were desperate for energy last winter over there.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:37:22](#)):
Oh yeah. And, and the problem, especially that central Eastern European areas, they are so heavily dependent on coal and being part of the EU members, they need to decarbonize fast and the electricity prices are, are a lot higher than they are here. So nuclear makes

Rep Mike Harrington ([01:37:36](#)):
More sense.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:37:37](#)):
Makes sense. And even and particular large base load needs. So they're looking at SMRs too, but they need the large reactors there.

Rep Mike Harrington ([01:37:45](#)):
Thank you. You very informative.

Rep Keith Ammon ([01:37:49](#)):
I see a hand online, but I have a question first. this slide here that talks about the \$700 million in the IRA. (Yes.) I'm looking at the, how it's made part. (Yes.) Recycled use mm-hmm. <affirmative>. So in, in, at the Seabrook plant, there's a fairly large storage of of spent fuel from the, the Gen III reactor. Right. So is there a possibility that we could recycle some of that?

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:38:17](#)):
I think there is a possibility much further down the road. We're doing research and development in this area, improving the economics. Right now, it doesn't make sense for the existing recycling that for the existing fleet. It could in the future for HALEU reactors.

Rep Keith Ammon ([01:38:37](#)):
That's where I was going with that. Yeah. So you would refine it upwards to the five to 20% range for the HALEU. Is that possible to

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:38:47](#)):

It, it, it could be possible. It's possible. The, the economics are always very expensive. Very expensive right now.

Rep Keith Ammon ([01:38:54](#)):

So what would you recycle? Is that nuclear warheads?

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:39:01](#)):

No, right now we're recycling the LEU fuel for use at a existing commercial plant. So one that's just <inaudible>, but it, the economics do make more sense when we're talking about HALEU, both in terms of as being the spent fuel product, but being what's needed.

Rep Keith Ammon ([01:39:20](#)):

Okay. So, "recycle used, government-owned, HEU."

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:39:25](#)):

No, that's, that's kind of our, in addition to the 700 now I see your question. Okay. In terms of the \$700 million that's for new fuel, what's being recycled is we do have some material from DOE stockpile, especially some of the fuel used in our research reactors, kind of, that may have some impurities, but blending them down from highly enriched uranium down to HALEU. Okay. So, so that's one path that is being used for some of these demonstration reactors and or initial tests that developers may need.

Rep Keith Ammon ([01:40:03](#)):

I see. So it's down blending, not, not up blending.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:40:06](#)):

Yes, correct. It's down blend.

Rep Keith Ammon ([01:40:08](#)):

Alright. Paul Gunter, do you have a question for us? And take yourself on mute please, Paul, off mute.

Paul Gunter, Beyond Nuclear ([01:40:16](#)):

Yes. Thank you. this is Paul Gunter, Beyond Nuclear. we're in Tacoma Park, Maryland. First of all, thank you to the commission for opening this up for public comment that's really really appreciated. But I wanted to follow up on the question that Representative Harrington raised with regard to the chicken or the egg for, you know, the expansion issue coupled with the supply chain. And, you know, we're seeing this play out right now with NuScale where just 116 megawatts of the planned 462 megawatts are subscribed. So that leaves about 254 megawatts that need to be attained. And I'm curious if the Office of Nuclear Energy is working as part of that effort to find other subscribers in for the UAMPS project. And if so, what, you know, what I, as I understand it, the the UAMPS project for NuScale they have to come up with this extra subscription. I guess it's triple what is currently needed, but they have to come up with that by early 2024. So it sounds like you know, there are time limits with this chicken and egg problem. I'm wondering how you're looking to approach that. Thank you.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:42:10](#)):

Sure. Thank you for that question. Unfortunately, I'm not as involved in that project so I cannot speak to those specifics.

Rep Keith Ammon ([01:42:25](#)):

Alright, Paul, sorry. That's probably the best answer we can give you at this time. We could, we could give you Dr. Valderrama's contact information and maybe he can point you to some other resource. Yes.

Paul Gunter, Beyond Nuclear ([01:42:43](#)):

Thanks.

Rep Keith Ammon ([01:42:45](#)):

Thank you Chris Lohse, you had your hand up. Did you have something to say?

Chris Lohse, GAIN Program ([01:42:51](#)):

I was just gonna mention quick you know, talking about supply chain GAIN, did do an advanced reactor supply chain assessment. It kind of ran through some critical components and kind of capacity in the US and what could be expanded to you know, if, you know, where some suppliers believe they could get to, assuming all the sorts of firm orders and everything else. So I put the link in the chat if anyone's interested in going to look at it. (<https://www.osti.gov/biblio/1973747>)

Rep Keith Ammon ([01:43:13](#)):

Okay, great. And I'll make sure the chat gets into transcript. Marc Brown, do you have a question?

Marc Brown ([01:43:22](#)):

Sure. It's green. It's on right?

Rep Keith Ammon ([01:43:24](#)):

Green is on.

Marc Brown ([01:43:25](#)):

Okay. my question I guess is someone all encompassing and anyone can feel free to answer it, you know, that's presented. Right now you've got a lot of large manufacturers looking at advanced reactor technology. You've seen the MOU with NuScale and Nucor, there's what, 12 to 15 data centers being planned. You know, some of, some of which will have up to, you know, 350 megawatt requirements for continuous power. Obviously you look at that with what's going on with NERC warnings about, you know, elevated risk for reliability, capacity, shortfalls, you know, all of the above. What is being done to make sure, and I know a lot of this may be outside of your purview, but that those businesses have the ability to site generation on site to ensure, you know, reliability of their operations?

Rep Keith Ammon ([01:44:24](#)):

I see Julie has her hand up.

Julie Kozeracki, DOE Loan Programs ([01:44:29](#)):

Yes and then court, Billy, did you wanna answer? So have been spending actually a good amount of time. So you are exactly right. There is, tech companies not only have a huge amount of demand, but a huge amount of money for this clean 24-7 power. so actually have been participating in workshops between tech companies, Google, Microsoft, Amazon, et cetera, with some utilities and other potential customers to figure out how those tech companies can best structure that money and that demand in such a way that those utilities can actually pull ahead their projects. Because it's not clear that the traditional PPA model is gonna get them all the way there. So we might have to get a little bit more creative in structuring, whether that's, you know, tech companies helping to you know, prepay on a PPA to help fund construction or if there's a way for them to buy all of the output from a first reactor such that the impact doesn't hit rate payers. But that collab you are exactly right that tech companies are likely to be some of those early customers, but we've gotta figure out how to partner them up with the folks who are gonna be in charge of, you know, constructing, owning, operating, and getting them through the PUCs. So actually if you, if anyone here has any thoughts on how to help structure that've been spending a good amount of time on that in the last few months,

Marc Brown ([01:45:46](#)):

Real quick follow up. And you, you know, what about the nuclear regulatory commission? And I know you probably can't speak for them, but we know there's obviously issues with siting and permitting and you know, all of that. Is there any pressure trying to maybe be put on them to make it a little easier to site reactors?

Julie Kozeracki, DOE Loan Programs ([01:46:05](#)):

The main comment I have on the NRC is that <laugh>, a lot of people like to scapegoat the NRC and from my perspective, they are not the long pole in the tent right now. The reason utilities and other folks are not moving forward is because of the fear of cost overruns. It's not 'cause of the NRC. (Okay.) The NRC is viewed as the gold standard for a number of reasons. And they, you know, they could become the bottleneck when we're at mass deployment stage. So we gotta make sure that they're staffed up and resourced appropriately. But from our, you know, the NRC have been very very strong partners and we just have to make sure that they have the resources they need to be able to support deployment at scale.

Marc Brown ([01:46:42](#)):

Great, great. Thank you. 'cause I know groups like the Breakthrough Institute, which are very pro new, have been pretty critical of the NRC, so yeah.

Rep Mike Harrington ([01:46:50](#)):

Well near defense Vogtl was a Westinghouse problem, not an NRC problem. (Right.) They just screwed it up.

Marc Brown ([01:46:56](#)):

Julie, thank you for that answer. It was great.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:47:03](#)):

And one thing to add is on the NRC, especially the emergency planning zones, kind of reducing the scale, they've agreed, especially on the NuScale designs, it's the only one that's gone through full design

certification, that it does have that much smaller footprint can be sited next to a potential site that would need instead of having that 10 mile wide radius that these does

Rep Keith Ammon ([01:47:27](#)):

Have. Right. Thank you very much. Sure.

([01:47:31](#)):

Alright, great. Thank you. So last chance for questions, just, I won't, I won't look anyone in the eye. I'll just scan the room. Alright, Dr. Billy, we really appreciate your time coming here. And are you local? Did I read that you're from Maine? Is that

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:47:50](#)):

No, no, no, I'm not local.

Rep Keith Ammon ([01:47:51](#)):

Okay. maybe I'm mixing something up.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:47:53](#)):

Yeah, no, I'm not local, but I was I think that's her colleague from the congressional and intergovernmental affairs office is, he is local, but No, no, I was just.

Rep Keith Ammon ([01:48:05](#)):

I thought I read something that you had a connection with Maine.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:48:07](#)):

Not yet. Just coincidence.

Rep Keith Ammon ([01:48:09](#)):

Live. Okay. Just coincidence.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:48:10](#)):

Yeah, I'm in BC but just coincidence.

Rep Mike Harrington ([01:48:12](#)):

Couple cool days.

Dr Billy Valderrama, DOE Office of Nuclear Energy ([01:48:13](#)):

Yeah,

Rep Keith Ammon ([01:48:14](#)):

There you go. Alright. Alright. Excellent. So that concludes the presentation portion of our meeting. we have just a few minutes of commission business that we'll go over. And if it's not interesting for you we won't have our feelings right if you drop off. So just going through the agenda, we have about 15 more minutes till 11 o'clock and then we'll have a hard stop then.

[\(01:48:38\)](#):

So one of the things I want to go over is the interim report. This report was due in July which was a terrible time to have it due. But I'd like to get it finalized for in the next week or so. And I wanted to give you all a chance to have input on it. It's about 20 pages. The total report's gonna be about 60 pages with all the meeting minutes attached. So I only printed out the 20 pages of content and we'll consider this interim report to be sort of a draft for our final report. It's probably 70 to 80% of what the final report will be. I have some critiques of it in a, in a list that I'd like to include in our final report. But I'd like you to give me any input that you can as far as the structure, the substance.

Rep Mike Harrington [\(01:49:35\)](#):

Did you hand out copies of this.

Rep Keith Ammon [\(01:49:36\)](#):

You should have got a copy if you didn't. I'll make sure you get one.

Marc Brown [\(01:49:40\)](#):

I'm here, it says executive summary on it, right?

Rep Keith Ammon [\(01:49:43\)](#):

It's the one that says executive summary on it.

[\(01:49:46\)](#):

Yeah. Yeah, I had, so here you can look at up. there's just <inaudible> it, it just didn't want to eat up all the paper and ink in my thank you guys for coming. Thank you too. Really appreciate it. And if you have any questions or input, please feel free to reach out. Okay. Absolutely. Thank you. Yeah, you too. Thank you. You too. yeah, so we'll consider this a draft for our final report, but I'd like to get it out in the next week or so. I'll email you a link to an online version that you can write comments on or make edits on. or you feel free to mark this up and like take pictures of it and send it to me and I'll incorporate that. But I, I, I'm not a hundred percent happy with it. I, I'll probably do a little more tweaks this week, but I think it'll be acceptable for our, our interim report.

Rep Mike Harrington [\(01:50:36\)](#):

And you gonna give us a link where this is online?

Rep Keith Ammon [\(01:50:38\)](#):

Yeah. Later today. I'll send you that link electronically. Right, right.

Rep Mike Harrington [\(01:50:42\)](#):

Can I keep this copy in?

Rep Keith Ammon [\(01:50:43\)](#):

Sure. You can keep that one for paper. Yeah. It's easier to read on paper. so anyway, I won't go too much into it. You can read the, the structure for yourself, but it's in a nice outline. I can move things around and, and expand or collapse different sections as needed. All right. So we'll follow up together. I'll probably give you till like Friday at five to give me any feedback. And then if I don't hear from you, I'll

consider your, you, you've signed off on it. But I'll be making changes to that this week as, as they come in.

[\(01:51:17\)](#):

I wanted to give you an update. We have this we, we've had this discussion about this statute that goes back to the 1950s in New Hampshire state law. I have a minor update to that. let's see here. This is from De Juris. I'm just gonna read this. so the position was most recently filled in 2007 as far as she's the director of appointments at the governor's office. So she would know and that the man who most recently filled his name was Richard Flynn of Dover, that he passed away unfortunately. And so that, that was the last that she can find. He passed away in 2021 at 93 years old. So it's a, it's an old statute and it hasn't been filled since then as far as we can tell. The filing period for new legislation in the house, at least is September 11th through the 15th. We have very one week window to file legislation. So we have ideas on how to update that statute. That would be one opportunity to do that.

[\(01:52:24\)](#):

In the report towards the end, the version that you guys have there's some recommendations for updating state policy. And I just took everything that was sort of mentioned in all our meeting minutes. We've gone over a lot of information, but the meeting minutes are 40 pages. We've heard some from fuel manufacturers, you know, the, the NEI, the NRC, Centrus Energy LightBridge most of the manufacturers that we've been talking about. So we've gone over a lot of things. we had the ANS present, we had Matt Wall present. Those were really content that's presentations and we have every word of it in writing, so that's kind of cool. so trying to, like, trying to give, you know, when you write things, you realize that people don't always wanna read what you write <laugh>.

[\(01:53:21\)](#):

Right. So trying to give people like the most condensed, you know, the Governor's office, the Speaker's office, the, the Senate president, trying to give them the most dense version of all the things that we've gone over. And then a path forward for the state, you know, as best as we can. So alright, so, and then we, we talked about doing a Seabrook site visit, but Matt suggested that July would probably be the worst month to do it 'cause it's very hot in the in the facility. So very hot. Yeah. So I was thinking the beginning of September, our next meeting is scheduled September 17th (correction 18th), so that's after the filing period. So if we have any suggestions for legislation we need to do before the next meeting.

Speaker 16 [\(01:54:08\)](#):

I'm sorry, what's the next meeting?

Rep Keith Ammon [\(01:54:09\)](#):

September the 17th.

[\(01:54:11\)](#):

I thought it was seventh. Sorry.

[\(01:54:12\)](#):

Yeah. Nos. Today's the seventh. So

[\(01:54:14\)](#):

September 17th. It's Sunday.

Speaker 16 [\(01:54:16\)](#):

Yeah. I thought it was September 7th.

Rep Keith Ammon (01:54:18):

No it's not. Well I have my date wrong. Lemme see. It's in the, can I see that report? Sure.

(01:54:24):

Oh, I, you're right. That's, you know what? I think you're right. My, I think I looked at that from <inaudible>. That'll be a very sparsely attended meeting.

(01:54:32):

If it's on a Sunday,

(01:54:33):

I won't be there because I'm gonna be on

(01:54:34):

September 18th. September 18th.

(01:54:36):

18th, okay. It's

(01:54:37):

A Monday and it'll be at nine o'clock. Okay. And the reason is but you

(01:54:41):

Know, I won't be, you'll be hopefully under underwater in the Red Sea.

(01:54:44):

Okay. So there's no, there's no Zoom connection underwater.

(01:54:48):

<laugh> not need. I don't even know how I'm gonna file legislation. I figure out that period too

(01:54:54):

Crazy. Yeah, the first Monday was Labor Day. So we, we figured maybe people would be away on vacation that week, <inaudible>. but maybe we can do it the first or second week in September. And Matt can I Yeah, I'll get with you offline some days. Yeah, yeah. And I, so I think that needs to be noticed in the House Calendar at least. So I'll, I'll have to make sure that that gets in. And we'll, I think Doug Thomas representative Thomas wanted to had some ideas on how to facilitate that.

(01:55:25):

So yeah, he's, he does that stuff with science

(01:55:27):

Actually for science and tech and, and then the science tech, he all the stuff and I know, you know, maybe Kevin Avard's, Senator Avar's committee might be Sure we could, we could open it up to the, to the House and Senate Energy Committees, every counterpart. And is is, can we open up to the public or what, what are the limitations?

Matthew Levander (01:55:46):

I probably would not open up to the public usually the, the biggest group that I would wanna bring in is probably about 20 people.

Rep Keith Ammon ([01:55:51](#)):

Okay.

([01:55:52](#)):

Alright.

([01:55:54](#)):

Alright. So I'll get with you on that. We'll get that scheduled first or second week in September. And then I mentioned the filing period. I think I went over everything. Alright. Any other suggestions for me or comments they can make? As far

([01:56:09](#)):

As the second week of September, that's my first week better for me. I'm gone the ninth through the 25th. Alright,

([01:56:18](#)):

So there's four days in in that week. The

([01:56:19](#)):

21st.

([01:56:20](#)):

Yeah. First week of September. Right. Any, any other input on that, that timing? Is, is anyone not interested in doing that? Or maybe you've done it before?

([01:56:30](#)):

I did it in elementary school.

([01:56:32](#)):

In elementary. Did you?

([01:56:33](#)):

Back when they had the elementary schools wait to, before, before nine 11 Science Center, whatever you guys called it there. That's a discussion

([01:56:41](#)):

Before nine 11

([01:56:42](#)):

Is pretty, it's closed now,

([01:56:45](#)):

I think. Dr. Valderrama, you mentioned the, the limerick of power

([01:56:50](#)):

Plant, the tank. Yes.

([01:56:51](#)):

When I was a kid, my uncle, I was telling Cathy, my uncle used to organize a road rally, which was like, you get a clue at one spot. Mm-hmm. <affirmative>, it's two people in a car and you get a clue at one spot and you drive to the next one and you get the next clue. Yeah. Right. And there's maybe 20 or 30 hops and it's a race, like the, the team that gets to the finish line first wins. One of the clues was at the Limerick power plant, inside the power plant. So we had cars racing in there going into the visitor center

trying to find a clue somewhere in the visitor center. And that, that was before the security was locked down. Yes. It's a fun memory.

[\(01:57:27\)](#):

Alright. oh, oh yes, we do. I've already read them over, but are we comfortable doing that? Yeah. Aye, motion. Motion to approve the minutes by Cathy. Second by Marc Brown. All right. All in favor? Aye. Any opposed? Aye. Aye. Okay. I think that was unanimous. Alright. Motion to adjourn.

Rep Mike Harrington [\(01:57:53\)](#):

Motion to adjourn.

Rep Keith Ammon [\(01:57:54\)](#):

All right. All in favor to adjourn.

[\(01:57:57\)](#):

Aye. Aye.

[\(01:57:58\)](#):

Alright. Thank you, everyone.