NATIONAL PETROLEUM COUNCIL MEETING

TUESDAY, DECEMBER 12, 2023

9:00 A.M.

Reported by: George Quade, CERT

I N D E X

I N D E X (Continued)

P R O C E E D I N G S

- - - - -

(Meeting called to order, 9:04 a.m.)

MR. WOODS: All right, let's go ahead and get going. I appreciate everybody's attention this morning. I'm going to call the 133rd Meeting of the National Petroleum Council to order and begin by welcoming all of you, the Council Members, honored guests, members of the press and the public.

We have what I think will be a productive and particularly informative meeting this morning. We have a full agenda, a copy of which is in your papers amongst you, in front of you. We have the honor of having the leadership of the Department of Energy with us this morning and throughout the session.

First, before we begin, let me just make the customary safety announcements. There are no scheduled fire alarms today, so if an alarm sounds, it's real. We'll ask you to evacuate the room through the back doors, head up the stairs and through the lobby to the street. The muster point will be immediately in front of the hotel on Pennsylvania Avenue.

If there's no objections, I'll dispense with calling the roll. For the members of the Council, the check-in is at the Buchanan Room and it will serve as

our official attendance record. If any member or observer or member has not checked in, please do so before you leave so that we can get an accurate count of who attended the meeting today.

In addition to the audience in the room, we have an online audience. They'll be able to watch the livestream of our proceedings. This audience includes Council Members unable to attend today, as well as many individuals who are contributing to the study efforts that we will be discussing this morning.

I'll now take the opportunity to introduce the folks here at the table with me for the record. To my left, we're pleased to have Ryan Lance, who is chairing NPC's -- the NPC committee on GHG emissions; Mike Wirth, Chair of the NPC Committee on Hydrogen Energy; and then next to me is the Honorable David Turk, the Deputy Secretary of Energy. To my right is the Honorable Brad Crabtree, Assistant Secretary for Fossil Energy and Carbon Management; and next to Brad is Alan Armstrong, NPC Vice Chair, at least for now.

(Laughter.)

MR. WOODS: It's a little foreshadowing. A little foreshadowing.

And then next to Alan, of course, is the Honorable Jennifer Granholm, Secretary of Energy, whose

remarks will be next on the agenda.

And I'll just say this is my second meeting as the Chair and my last meeting, and I know this is your second meeting, Madam Secretary. And I'd just say it's been a great pleasure working with you and your agency and really developing advice on some -- on very important topics over the last couple of years. And I think, as you'll hear this morning, some very good ideas and discussions coming out of the work that we've done on the hydrogen and the GHG studies, which you requested. So I look forward to that conversation.

Honored to have you with us this morning, and with that, I'll turn it over to you and any remarks you'd like to make.

SECRETARY GRANHOLM: Great. Should I do it from here?

MR. WOODS: Sure, or you can do it at the podium, whichever you'd like.

SECRETARY GRANHOLM: Let me go to the podium.

MR. WOODS: Okay.

SECRETARY GRANHOLM: Thanks so much. I appreciate it, Darren. Thanks to all of you for being here. Thanks to our DOE team who is here in the front. Great to see you all. So much work to do together.

So exactly 44 years ago today, which was at --

right at the height of the 1979 oil crisis, and at the beginnings of the clean energy economy, as it was starting to take shape, the then-Secretary of Energy, Charles Duncan, delivered a message to the folks that are sitting in your seats, and he used these words. He said, “We’ve got to manage this transition, or this transition is going to manage us.”

And, of course, we’re here at that same -- not at that same -- much -- many years later, but those words are more true than ever. I know you feel it. Certainly, we feel it. Change is here. It is an accelerating freight train, and the demand for zero carbon energy is inexorably growing. It’s loud. It’s being debated right now at COP as we speak.

The calls for phasing down, phasing out fossil fuels will be louder every year as they have continued to be amplified. And those voices cannot be silenced because you cannot silence the climate. 2023 was the hottest year on record, as many of you know. It’s going to be the coolest year that we will have ever experienced, unless we get our act together.

And, so, when we hear about the island nations who are so understandably angry because their islands are being subsumed, swallowed, by sea rise, when we hear about people across the globe continuing

to die from extreme weather events that have been accelerated as a result of climate change, we know that as temperatures rise, people's tempers will continue to rise. And this issue is not going to be papered over, covered over. It will only continue to rise in importance. And for you all here, this is -- this is -- this is where your existence, your leadership, can have the biggest impact, not just in the U.S. but across the planet.

We all have to recognize -- and I know many of you do -- that we just cannot continue to operate business as usual. It's urgent, and there are no groups that are better to turn the tide on this than you all.

In fact, your ingenuity, the investments that you've made and that you are making and have made in technology, I mean, if it weren't for this industry, we would, you know, still be using whale oil candles and wood stoves. So you've got a history. This industry has a history of innovation. And we need you to -- many of you are stepping up on this and really grateful that that's happening, but we need to just really put the pedal to the metal on investing in those innovative solutions that has you investing at the level that people will trust that you understand and can meet the

moment of this crisis.

First, I think we all understand the importance of eliminating methane emissions. We need everybody not just to commit to it but to prove it with transparent and accurate measurements. I appreciate the fact that many of you agree on this, and we'll talk, I think, a bit about this today. Brad Crabtree is here and has -- and our fossil energy and carbon management team have been working on this.

Second, for those of you who have been investing in solutions beneath the subsurface, like geothermal, carbon capture, sequestration, thank you to you. And let's continue to do that and amplify and move quicker.

And, third, I think it's just -- this I want to pause on for a moment because for us at the Department of Energy, this has been a really important focus, which is on engaging with communities. Now, I know that many of you do this, but I don't think even those who've got investments in people who are engaging with communities, I just don't think it's at the level -- I know it's not at the level that is necessary to be able to ensure that the success of those communities is part of your bottom line as well.

So we -- I appreciate the fact that the

hydrogen and GHG emissions in the supply chain reports take on the subject of societal considerations and impacts. I just can't underscore enough how important this is. I just came from a tour of the River Parishes in Louisiana and in the refineries and the community in Port Arthur, and, you know, the communities there that have been affected by the refineries that have grown up around them, you know, have not had as loud of a voice, and they are starting. They've got a megaphone now. They are amplifying, and it is that issue of community benefits plans which we are evaluating all of our grant opportunities through, that you don't get awards -- funding awards from the Department of Energy without having a community benefits plan. And that plan has to engage and take account of what community needs are. So important.

You would not want to -- you would not move your family next to a refinery. You wouldn't want your family's home right now to have a refinery come up next to it. You wouldn't want to live within a stone's throw of storage tanks or distillation units or flare stacks. You would not want to. You would not want your kids to be breathing benzene or NOx. You wouldn't want that.

That's what's happening in these places, the

cancer rates, et cetera. You've heard these stories. When you see these families and you go to their homes and you see what has grown up around them, it is very deep and very important. And when you hear the stories of family members who have died and the increases in asthma, I don't know, it's just very powerful. And it's those voices that now are really rising.

I mean, in the past, you know, I think a lot was done to try to buy people's property and have them move out. It's their home; they don't want to move out. But buy people's property and then move out or, you know, do some small-level investment, try to hire folks, it's just not happening at a rate that gets communities to be accepting. It's just not, and it has to. It has to.

Your success and the communities' success are inextricably bound in a mutual garment of destiny. And these community benefit plans are a key part of how we heal and address some of the harms that these communities have experienced. So I just want to underscore it is a priority for the Department of Energy.

And, then, finally, I just want to say I think it's really important and I'm grateful to those who have been investing in these clean energy solutions

like lithium, Darren, the investments in geothermal, et cetera. I appreciate all of that, offshore wind, very important. We've got federal dollars to be able to incentivize more of these investments.

Obviously, we're going to talk about clean hydrogen, direct air capture, et cetera. But we think that there's just opportunities for all manner -- bless you -- of clean energy across the spectrum for you to participate in. So to reach our net zero goals as a nation, we'll need about $10 trillion in additional capital investment by 2050. $10 trillion. For those doing the math, it's about $300 billion every year in the U.S. alone.

And, so, we are offering these unprecedented incentives to the private sector, which is 10 years of these tax credits -- clean energy production, investment, manufacturing -- a decade of tax credits. We're trying to make it easy for investors to make the decision to invest in clean energy. And between the Bipartisan Infrastructure Law, the Inflation Reduction Act we've got hundreds of billions of dollars more for clean energy products, in addition to the tax credits. So it is a real opportunity for folks in this room, outside of this room to take advantage, and it's a priority.

I think we're making real progress in some areas. The EPA's final rule to strengthen the methane standards, for example, very important. Last month, the U.S., along with 12 other countries, the European Commission, and the East Mediterranean Gas Forum, we announced a multinational working group to develop methods to, you know, measure, monitor, report, and verify GHG emissions along the natural gas value chain. I'd like to thank those in this room that have committed to supporting that effort, and I hope the rest of you will join us.

And, then, of course, at COP, at COP28, the Biden Administration highlighted what we're doing on the Global Methane Pledge. Earlier this year, the Administration initiated the Methane Finance Sprint, and alongside an array of partners, we announced over a billion dollars in new funding to help us cut methane emissions across all sectors with a focus on low- and middle-income countries.

So since the days of the petroleum administration for war in World War II, this industry has partnered with the Federal Government to take on these tough problems. The DOE and the NPC have witnessed the rise of OPEC and the fall of the Soviet Union. We've tackled challenges from synthetic liquid

fuel production costs to natural disaster preparedness. We may not always see eye to eye -- in fact, a lot of times we don't -- but we're all committed to secure, reliable energy -- and cleaner, I hope.

Today, we aren't where we need to be yet, but I think we can get there. And the question is for all of us, are we going to get onboard that freight train, or are we going to be run over by it. I think we can do it. Let's get to work.

(Applause.)

MR. WOODS: Thank you, Madam Secretary. The Secretary has agreed to take questions, but we're going to do that in more of a conversation with Deputy Secretary Turk after he gives some of his remarks.

At this time, I'll invite the Deputy Secretary for any comments you'd like to make.

DEPUTY SECRETARY TURK: Thanks, Darren, and we'll keep this brief and just complement and supplement a few of the things the Secretary mentioned. And let me also first also express my thanks for everyone being here today, and I want to particularly thank those folks who worked on these two reports that we'll talk about, not only from the companies here but my DOE colleagues, our DOE colleagues, a number of nonprofits and others as well. It's always useful to

thank the people who are actually doing the work, and so thank you very much for all the time, effort that's gone into these two reports.

Maybe just a couple thoughts on each of these reports and broader context that may be helpful as we get into today's discussions. First, on the clean hydrogen side, I think it's worth noting and taking a step back at all of the new tools in our tool belt from a Federal Government perspective to really accelerate clean hydrogen -- accelerate clean hydrogen, which is seen as a really incredibly powerful tool to deal with some of our harder-to-decarbonize sectors.

So to just give you a sense of the breadth and the amount of funding going into these areas, aspects, the hydrogen hubs get an awful lot of attention and $7 billion of federal taxpayer funding going into these hubs across the country, but that's only one part, one tool in the tool belt to accelerate this clean hydrogen revolution.

We've got a billion dollars in a very creative demand-side stimulation mechanism. This is something that our phenomenal colleagues at DOE came up with to really use that billion dollars to complement what we're doing with the hubs and make sure we're working on the supply end and demand pieces. And I think

that's one of the recommendations of the hydrogen report that's come through.

We've got literally billions more that we've spent for decades to accelerate cost reduction with clean hydrogen, especially on the electrolyzer side of things. We've got an eagerly awaited -- I know it's very eagerly awaited -- hydrogen production tax credit that we've heard from stakeholders across the country and, frankly, across the world as well, up to $3 per kilogram for the cleanest of hydrogen. That is a generous tax credit. That's a big deal in terms of the tools in the tool belt.

We've got an interagency task force where we're trying to leverage everyone from EPA to Department of Defense to make sure we're all working as a unified government. And we've got for the first time ever a national clean hydrogen strategy where we've got very ambitious goals -- 10 million tons by 2030 and five times that by 2050. So that's just a sampling. There are other tools in our tool belt, but just to show the Biden Administration breadth and depth of what we're trying to do to accelerate the clean energy transition, again just in hydrogen, and we could use that in other examples of areas that we're trying to accelerate as well.

The second piece I'd like to mention on the hydrogen piece in particular, and the Secretary so eloquently spoke about this, and that's community acceptance, environmental justice, doing right by the communities that we all work in. I think that's particularly important in hydrogen. We've heard that from communities. We're listening to communities, as the Secretary herself has said.

Our phenomenal leadership team -- Shalanda Baker who heads our newly renamed Energy Justice and Equity Office, we're spending an awful lot of time, I think, in coming on -- all of us -- to listen to communities, to work with communities, if there's going to be acceptance in those communities of this clean hydrogen economy -- economy buildout. So that's the hydrogen report. Again, just a few broader thoughts.

The second report is focused on natural gas emissions. Just a couple comments there. One is we'll get into, in particular, this report's scope is limited, limited in particular to more Scope 1, Scope 2. It does not touch the Scope 3. So it does not get into the end use of natural gas in our country or around the world.

The couple comments I'd make on this report in particular, first on methane emissions. A lot of us

have worked on methane emissions for many, many years. I see Mark Brownstein from EDF. Our EDF colleagues, I don't know how many years you've been working on this, Mark, quite a few.

MR. BROWNSTEIN: My hair was not gray.

DEPUTY SECRETARY TURK: Maybe I'd like to say I had hair when I started work here, but that's not true. I've been bald for quite some time.

Reducing our methane emissions is the biggest no-brainer that I can think of in the energy space to make real-world progress, to make it -- make it urgent. I think this report and this analysis will provide even more light on that in terms of both the cost-effective nature of what we need to do to step up to the plate. I think it's terrific, and I feel incredibly proud to be part of this Administration with our colleagues over at the Environmental Protection Agency requiring and mandating, and I think that's appropriate.

It's a no-brainer. Everybody should be doing it. We need to have a floor. As we talked about yesterday, companies and others can do even more than what's in the floor and reduce emissions even more, but we should have a level playing field. Everybody should be held, and my hope is countries around the world step up to the plate on that as well.

The second point I'd like to make on that report, again, just to emphasize, this does not deal with Scope 3, just because this report doesn't deal with Scope 3 doesn't mean we shouldn't discuss and deal with Scope 3. Just to give you a sense of how big Scope 3 emissions are, there's a very helpful chart in the draft report page 34 for those who have the draft report. It says 28 percent of total U.S. CO_2 emissions are from natural gas end use.

Now, if you want to kind of round that out, 41 percent are from petroleum products and 19 percent from coal. The coal number used to be a lot higher. We're reducing our coal use and coal emissions, but that gives you a sense of just the scale of those end-use emissions. And, again, just because this report doesn't deal with it doesn't mean we don't need to deal with Scope 3 emissions. Everybody needs to do their part.

Just one concluding thought on the transition itself, a few data nuggets. I used to work at the International Energy Agency, and so data is something I live and breathe. But just to share, as the Secretary said, this transition is happening. It's not happening fast enough, but we're starting to see some significant numbers of what's happening, not only in the U.S. but

around the world. So just a couple nuggets for further reflection, a little bit bigger picture.

In 2000 [sic], around the world, 1 out of every 25 cars sold -- again around the world -- was an electric vehicle. That number in 2023 is one of five. So in just three years, we've gone from 1 of 25 cars sold being an EV to now 1 of every 5 cars sold is an EV. In that period of time from 2020 to 2023, we've increased globally clean energy investment 40 percent. That's a big deal. Now, it's not the level that everyone says that we need to if we're going to meet our rightfully so climate -- ambitious climate objectives, not only in the U.S., internationally.

The other -- I think it's gotten some attention, it probably deserves to get even more attention, for the first time ever, my former employer, the International Energy Agency, said that within this decade, we're not only going to see a peak in coal demand; we're going to see a peak in oil demand. This is their reference case scenario. This is not some 1.5-degree scenario. This is their reference case scenario.

We're going to see a peak in coal; we're going to see a peak in oil; and for the first time ever a peak in natural gas as well. So there's some data

points of transitions happening. As the Secretary said, it's not happening fast enough certainly to meet our climate objectives out there, and I think incumbent as we go through these two reports to take a step back, all of us self-reflect, are we doing enough as the Secretary said to be part of the solution and part of what we all need to do to step up to this incredible historic challenge. So we'll leave it there, but, again, terrific to be with you all.

MR. WOODS: Thank you.

(Applause.)

MR. WOODS: I'd just like to, in addition to thanking you for your comments, Dave, thank you for the pragmatic work you've been doing with both of the studies. It's been good to see your engagement and participation in all the discussions going on at both those very important studies.

As I said, we're going to take some questions from the Council Members. I'm going to exercise the prerogative of the Chair, though, and ask the first, and then ask anybody on the panel at the table if they'd like to ask, and then I'll turn it over to folks in the audience. And there's a microphone that will be passed around so that we can hear you.

So the first question I'll start with is just

maybe I'd appreciate perspective from either one of you around the work that the U.S. has been doing with respect to reducing emissions and how that was received at COP28 in any other perspective and feedback that you're getting from around the world as countries all work to reduce emissions and how they see our efforts.

SECRETARY GRANHOLM: Yeah, I'm going to ask Dave to take a stab at this because he just got back from COP. I was representing the country at the Argentinian president inauguration, so I didn't get to go to COP.

So, Dave, do you want to say that?

DEPUTY SECRETARY TURK: Yeah, happy to give a few, again, numbers, maybe, and I felt incredibly proud to be at the COP representing the U.S. Government and this Administration in particular and representing Secretary Granholm in all that we're doing.

I referenced all the things we're doing on hydrogen, but that's only one example. We've got $100 billion in grant funding that the Department of Energy alone is working with private sector partners and others to accelerate our clean energy transition, let alone the hundreds of billions, the dollars in tax incentives. We've got a couple hundred of our folks working with Treasury and IRS. We've got a loan

program with $400 billion worth of loan authority, et cetera, et cetera.

So the scale and scope of what we're doing, I think, shows incredible leadership from this Administration, this country, and it's not just the U.S. Government; it's state government, it's local government, it's companies stepping up and walking the talk. And we're starting to see that in the numbers.

Our emissions actually decreased in 2023. So a 3.1 percent decrease is what the latest numbers are showing in the energy sector, which is the bulk of emissions. That's despite robust GDP growth, especially given the broader economic issues the world has faced over the last few years.

The other nugget -- again it's not enough -- is this Administration along with these historic pieces of legislation, we were already decreasing our emissions, but just over the last few years, everything that we've been doing, the estimates are that we're going to double that amount of decrease in our emissions. So the latest estimates are we're going to get to a 40 -- even 41 percent reduction in our emissions by 2030.

Now, the President's goal, rightfully so, for us to do what we need to do to be part of this net zero

transition is to get to 50 percent. So we've got more work to do, but I think it's incredibly encouraging to see these kinds of emission reductions, the scale of what we're doing in the U.S. And the U.S. needs to lead, and I think the rest of the world responds to that U.S. leadership, and that's certainly what I saw at the COP.

MR. WOODS: Thank you.

Any other questions from the head table before I turn it over to the group? Council Members?

Okay, there was a question in the corner there. Yep.

JOHN WALKER (Off microphone): Yes, with several LNG facilities coming out over the next few years, where does the incremental 10 to 12 BCF value come in?

SECRETARY GRANHOLM: Where does the incremental 10 to 12 come from?

MR. WALKER: Yes.

SECRETARY GRANHOLM: Okay. Well, we're currently on LNG exporting, what, 13 BCFs. We're at record levels. There's another -- or 12, 12-point-something. There's another 12 that are under construction, so there are 12 BCFs that are under construction. There's another 20-something that have

been approved, permitted, haven't begun construction yet. So -- and the estimates of what the market will bear by 2030 is something like 45 for us.

So we're already at -- we're already well on track to meet what the market will demand, and that additional amount, as being the world's largest exporter right now, will be doubled over the next couple of years, so I think the -- it speaks for itself.

Did I answer your question?

MR. WALKER: Well, the concern is that I believe that we might have with the Tax Reduction Act, we might lose 300,000 gas wells. And, so, if we're increasing gas production, my basic question is where do we get that incremental gas production from.

SECRETARY GRANHOLM: I don't know what you're referring to in terms of losing the wells.

MR. WALKER: The incremental tax --

SECRETARY GRANHOLM: Oh, I see.

MR. WALKER: -- will cause 300,000 gas wells to be shut in.

SECRETARY GRANHOLM: Yeah, I have not seen that data. The incremental tax because of the methane requirement is what you're referring to?

MR. WALKER: (Off microphone): (Inaudible).

SECRETARY GRANHOLM: Well, I -- I'd need to see that study. That's not the information that I have.

MR. WOODS: Okay. Any other questions?

J. ROBINSON "ROBIN" WEST: Thank you. There's obviously a lot of discussion about COP and what's happening at COP. And I was struck with two conflicting experiences. One was yesterday afternoon the Deputy Secretary sat for several hours working on the GHG study, which is a serious effort, and the Department has contributed some excellent people and a lot of resources, as has the private sector. And I got the strong impression that there's a real will on the part of the companies and the Administration to deal with this issue.

Then, when you go to COP, and, frankly, the -- what some of the people were talking to describe the industry, you'd have no sense whatsoever in any way that the oil industry is trying to come up with solutions, the oil and gas industry. And is there a way to kind of temper the discussion to make it clear that this is an industry which is really, I think, very serious about finding solutions and that, frankly, solutions won't be found if the private sector isn't actively engaged, where there are some people who just

vilify the industry. And, you know, do you think that's constructive?

SECRETARY GRANHOLM: I do. I appreciate this question because I think this is -- this is the challenge, right? There are many who are doing these investments in clean energy solutions and have really stepped up and have made commitments -- public commitments, board commitments -- to doing that. And, then, there are many, as you know, who have not, and there still is a huge amount of emitting, and that fact is, you know, even though our emissions have reduced, the fact that we are still emitting and contributing to climate change is also a fact.

So I think that there's a trust deficit, no doubt, and I think that this must be something -- I know that, you know, a number of us have been protested off the stage as a result of the impatience that's out there and the lack of trust that people view that both government and the private sector are not moving at the pace that meets the challenge.

So I think that bold and loud and clear not just promises, but verified action is really important. I think that the commitment to investing in these new technologies and amplifying that is really important. I don't know that it's -- you know, people on both

sides of this are not going to hold hands and sing Kumbaya. I think that that's hard to see happening, but I do think that there is an opportunity for those represented by those in this room to continue to amplify what you all are doing on investing and in curbing emissions and in honestly reporting and verifying.

David, I don't know if you want to add anything from the COP perspective.

DEPUTY SECRETARY TURK: Yeah, maybe just three pieces and, again, coming at this having looked at the numbers. The numbers here are incredibly unforgiving, right? We're already seeing the significant signs -- manifestations of climate change in our country, other countries. I won't go through the parade of horribles here. I think people are familiar with what's going on and we're all seeing it with our own eyes and experiencing it ourselves, our families, our communities.

To get to where we need to get to, net zero by mid-century, A, mid-century is not too many years off, right? That's just a few decades off. And we not only have to clean up electricity, but it's transportation, which is the largest source of our U.S. emissions. It's industry, it's buildings, all of that, in just a

few decades' period of time.

So that is unforgiving math. Math is math; science is science. And I think we all need to acknowledge that. So I think that's part of the frustration that you see being expressed by many folks at the COP, frankly by many of us, certainly myself and the Secretary included.

Secondly, I think it's terrific, as I said in my opening, that we are making progress, including on methane emissions. Again, a no-brainer. We should have done it a decade ago when Mark's hair wasn't as gray as it is now, but great that we're making progress.

I think having the EPA step up and hopefully other countries step up, we need public/private leadership, but there is a role, I think, for regulation in there in dealing with Scope 1 and Scope 2 emissions, but I think there's a lot of frustration, and this COP has focused a lot on Scope 3 emissions, that is end use for natural gas and oil in particular, given who the host is and given the discussion.

One other nugget there is when I look at the numbers, I see Scope 3 emissions, that is the products when they get -- they get used ten times larger than Scope 1 and Scope 2 for many oil and gas companies. So

there's a lot of focus, rightfully so, on the Scope 3 piece of it. And, again, we all need to reflect on ourselves of what we're doing on that front. So I think there's been that, that part of the COP.

And, then, the third piece is follow the money, right? Like, rhetoric is one thing, and there's an awful lot of rhetoric at these climate conferences. I tend to follow the investment picture and who's investing where, and I think there's some stark numbers there as well.

Right now, an estimate has been done. Oil and gas producers account for only 1 percent of total clean energy investment globally. And more than 60 percent of that comes from just four companies. So, again, let's have a real discussion on where the numbers are, what's included in that category, but let's take some of these numbers and issues head-on, and I think that's where there's some frustration that's boiled over, over at the COP when they look at some of those kinds of numbers.

MR. WOODS: And maybe I'll just add to that, because I had the opportunity to attend the COP this year, which was a little unusual for our company and myself personally. Actually, for a long time, this discussion has been dominated by I think a fairly

narrow but loud group that saw the solution to addressing climate change as purely a wind, solar, and EV solution set. And while I do recognize that that is an important part of the solution, it is just a part. It's necessary but not sufficient.

My sense from the conversations at COP is there's a growing recognition and a much broader set of constituents coming into the tent. To David's point, do the math as to how you get from where we're at today to where the world wants to go with respect to lower emissions. And not only doing the math, but considering all aspects of the problem, not just emissions but how you continue to provide affordable and reliably energy to people all around the planet who desperately, one, rely on it for their modern living, but, two, for the billions of people who don't have access to that. And I think more realism coming into the conversation, which is good because there is a lot of math that needs to be done.

I think there's a recognition that you've got the electronic, the electric solution, the electron solution, and then you've got molecule solutions, which is the hydrogen. Biofuels, I think, will play a role; carbon capture and storage. And, so, recognition that we need more solutions, not less, and we need to figure

out how we implement those solutions at scale, which I think, again, is starting to enter the conversation.

How are we going to address such a large, complex challenge without the largest companies with the capabilities to do large projects at scale not involved? And, so, I think if you look at the industry as a whole, we have the technology; we have the scale; we have the project expertise; we have the experience of building brand new value chains all around the planet. And, so, who better equipped to then try to address this than the industry that built the existing energy system to weigh in and focus on shifting the energy system to something with less emissions, less emissions-intensive, without compromising people's standards of living?

So my sense is, while it's still a small movement, there is a growing recognition. This is a hard problem. It is a big problem, and it needs more people at the table trying to solve it, less aspirations, less hope-setting out there, and more rolling up our sleeves and developing a plan from how you get from here to there in a way that doesn't penalize people.

And, so, it's early, but that conversation has to grow if I think society's going to be successful

here.

Other questions? Yes.

MS. BURMAN: Diane Burman, New York State Public Service Commission. Can you talk a little bit at how you reconcile zero emissions while also allowing infrastructure delays, which includes CCS, hydrogen, as well as natural gas, and ensuring reliability, because that seems mutually exclusive to me?

SECRETARY GRANHOLM: How do we reconcile the permitting delays? Is that --

MS. BURMAN: So how do you reconcile? So we have your zero-emission targets, but we also have these infrastructure delays, and we're needing to ensure reliability. So how do we deal with that issue?

SECRETARY GRANHOLM: I mean, there is no doubt that the delays on deployment of clean energy infrastructure and solutions -- delays in permitting in general in infrastructure have been a huge challenge inside of both the Federal Government and on the local level as well, right? For us, we've been trying -- I mean, I know that there's a lot of talk about a permitting bill. You know, I feel like that talk has gone on for a couple of years. Congress is focused now other things, so we're trying to figure out on the executive side how we can streamline what we can.

So one example -- just an important example -- is on transmission infrastructure, which, of course, has a huge NIMBY problem to begin with, but the transmission on public lands, which for the Federal Power Act gives the Department of Energy the ability to accelerate the permitting and the NEPA reviews for transmission, which we are doing on public lands, we have a rule out, getting comment. We should be able to turn that around by January.

It's a two-year shot clock on the ability to complete permitting for transmission, which historically has taken decades. It's been ridiculous. We'd like to see that example be an example that is used in other ways, which is why the national permitting streamlining effort is important. That doesn't just address transmission. But we need to all continue to amplify the importance of speed in making this happen because you are right.

And we've been -- there's been a lot of deployment. I will acknowledge that, but if we don't have the connective tissue to get the deployment of clean energy to where it is needed, whether it is, you know, in any fashion, especially -- but especially on permitting, then we're not going to meet these goals. And, so, we share that sense of urgency of getting

Congress to act as well as doing what we can on the executive side.

MR. WOODS: We've got time for one more question.

MS. TAYLOR: This is Cindy Taylor, and I just want to amplify that point if I could. I run -- we're not all the size of the people that are sitting at the table up there. We are public, but we're small cap, and we have a lot of manufacturing capabilities and technology readily adaptable into new applications, and we're very focused on deep water minerals and metals recovery, offshore wind, pretty easy to do, geothermal, CCS. But we're small. We're constrained by our free cash flow, right?

And I would love to say I can build brand new manufacturing facilities in the U.S. and just bring it to bear. That's going to take me a long time, so I'm leveraging infrastructure I already have in place, and permitting matters. A lot of my offshore wind investments, minerals investments are overseas. Sadly, even though I'm a U.S. company, I can't qualify for IRA credits because I'm going to leverage what I've got -- people, talent, infrastructure, and those investments now are being made in Japan, offshore, Norway, Scotland, because permitting is already in place,

particularly for offshore wind.

Now, the U.S. will absolutely benefit, the world will benefit by these investments, but the first dollar is going, obviously, to where I have the right to put it in the water. And that's all I want to say. It's like the IRA money is great. Companies like we can't access it, at least to date.

I had a presentation last week, and the research development dollars, the infrastructure spending will help long-term, but we can't qualify today. And I don't know that there's an answer to that, but I want to throw that out that a lot of companies like us do have technology readily adaptable, as long as we have money to invest.

SECRETARY GRANHOLM: Yeah. I appreciate you raising that as an example of why we need to move rapidly on this and that it's -- we have given a whole array of suggestions to Congress about how to make this happen. We just have to get it across the finish line. Some of it we are not able to do via executive order.

MR. WOODS: Well, thank you, and thank you for your questions, but for the sake of the schedule, I'm going to ask us to move on here. And I thank Secretary Granholm and Deputy Secretary Turk for your time and your answering the questions.

The next order of business this morning is to hear progress report from the NPC Committee on Hydrogen Energy. Mike Wirth chairs the committee and will update us on their progress.

Mike?

MR. WIRTH: All right. Thank you, Mr. Chairman, for the opportunity to present this progress report. I've been doing the math on the agenda and the time we have, and I will be brief in my comments so we can get on with things.

First of all, I just want to acknowledge again the good work done by the team. I see a number of people in the room that have worked tirelessly now for many, many months on this project from a variety of different organizations, and I want to thank each of you for the resources you've committed to this. I think you're going to hear from Austin Knight when he updates you here in just a moment that hydrogen can play an important part in the future energy mix in this country as a lower carbon intensity product, particularly as Deputy Secretary Turk mentioned in these more difficult-to-decarbonize sectors of our economy.

So the study team has done detailed analysis on the potential role of low carbon intensity hydrogen,

and it will speak to the demand sectors where we see the opportunity for this to penetrate first and to grow, where it provides the most benefit relative to alternatives. He'll talk about the -- the study looked at the potential scale of production, including production methods and regional deployment. Different regions in the country have different inherent opportunities on both the demand side and the supply side. And the study has gone down to that level to try to help inform all of us on where these things will start first, how fast they can grow in different parts of our country.

It'll talk about the enablers required to activate this ecosystem, both in the near term, which can then expand to achieve at-scale adoption of lower carbon intensity hydrogen and also the importance of societal considerations, which we've heard a lot about already this morning and the importance of stakeholder engagement in gaining acceptance and development of new production facilities, infrastructure to transport low carbon hydrogen to consumers.

To be clear, the adoption of low carbon hydrogen won't just happen. It will require a number of things, including placing economic value on the abatement of CO emissions and mobilizing significant

quantities of capital at scale, and that is an important consideration that the team has been addressing in order to provide a very transparent and helpful view of what remains to be done for all of us.

So the study is well along, and Austin Knight, who is the Chair of the coordinating subcommittee will provide an update on the progress, and we'll try to leave a little bit of time for questions.

So, Austin, please join us.

MR. KNIGHT: Thank you, and good morning. At least year's NPC meeting, I opened with a quote from Dan Yergin about the energy transition and added that all credible views aiming towards achieving climate goals through energy transition have a role for hydrogen. The open questions were around where does it have the most impact, at what speed will adoption be gained, and what does it actually take to get there. And, so, those are some of the questions that were posed by the Secretary to NPC to evaluate as part of this study.

I'm pleased to state that we have made a lot of progress. We have a lot of those answers that we will describe today and give some insight to. And the -- today, we will give really an idea of the findings, the modeling work that we've been doing, where we might

be going with recommendations, and those final recommendations will come out in the detailed report in the spring.

And, so, we talk about low carbon intensity hydrogen, LCI hydrogen. If I say hydrogen today, that's mostly what I mean unless I say unabated hydrogen. And, so, I'll use all of those interchangeably.

The existing policies that we see in place today do a lot to help activate LCI hydrogen. And, so, we do have a lot of new tools in our toolbox. Thank you for that. But to achieve deployment at scale, it's not enough. And you'll see additional targeted policy actions are needed to close the economic gap between hydrogen and higher carbon incumbent fuels and feedstocks, and it's important that we do all that in a way that addresses societal concerns and benefits, as Mike mentioned.

And, so, we're thankful for DOE's partnership in this study. We believe what we're doing is very complementary and additive to the other recent reports released by DOE, such as the hydrogen roadmap, the lift-off report, recent progress like the hydrogen hubs, all definitely contribute to the positive trajectory that this report supports.

So just a quick reminder on the diversity of the perspectives we have in this study. This study right now has had participation from over 200 different participants from more than 100 organizations. It's a wide range of entities, including oil and gas companies, industrial gases, energy and power, manufacturing and distribution, EPC companies, plus nonprofits, academia, and government. It's extremely diverse, and that's one of the unique attributes of the study.

This expert input is informing technoeconomic modeling that I'll talk about in a minute that has been done hand-in-hand with MIT. We could go quicker with this study if we did not have the diversity opinions in the room, but because of who we have, we will go farther. The study will be robust, and it will deliver long-term impact because of the work that we've done here.

This provides much more clarity on the role of LCI hydrogen in the ecosystem. It will address what it takes to achieve emissions reduction at the lowest cost to society, and it includes regionality. No other report that we've found in the public domain goes into specific U.S. regional details that this report will, and we think these outputs are truly unique.

A quick word on the modeling. So before going into more detail, I wanted to make sure that you understand the basis of what you'll see from all of those experts. The NPC partnered with the MIT Energy Initiative to conduct a very complex model in support of this study. It starts by looking at all elements of the energy system. It projects over time with expert-informed inputs. We used the IEA World Energy Outlook from 2022 as one of the main inputs, as well as support from government entities. We looked at federal and state policies, and we had experts providing inputs on technology trajectories to deliver two main key scenarios.

And, so, what you'll see, we refer to stated policy scenario. That's based on current policies that are currently implemented, including the IRA and including state-level policies. And then we have forced a net zero by 2050 scenario. And, so, that works with the MIT tools to optimize achieving a lowest cost to society by using a carbon budget on the whole energy system to get to net zero.

I just want to say that this model is meant to be useful. The team finds it extremely useful. It is not a crystal ball. And, so, the report details come from a lot of expert analysis and debate that's

informed by the modeling but with recognition of the modeling limitations.

So let's get into some of what those findings actually are. The first important result of the study was to look at the trajectory of U.S. greenhouse gas emissions and the role that hydrogen plays in supporting the U.S. climate goals. The graph on the left, you see the emissions over time under each modeled scenario. In current policies, we see reductions in greenhouse gas emissions, but we are not on track to meet net zero in the current situation.

So achieving net zero is not only a hydrogen story. Many solutions are needed, but you see at the bottom when -- on the trajectory to net zero, low carbon intensity hydrogen does have a key role to play, focused on the abatement of emissions in the hard-to-abate sectors that we'll talk about in a minute. And through that hydrogen, about 350 million tons of CO2 can be abated per year, and that's the 8 percent that you see there in the note.

On the left side, we look at the total cost to society of achieving net zero as a function of U.S.-projected GDP, and our study estimates that the cost of reaching net zero will cost about 3 percent of GDP. Again, that's not just for hydrogen deployment, but

that's as an optimized deployment of all solutions. And if LCI hydrogen were not to be deployed, the cost to achieving those same results would increase by about half a percent to a full percent of GDP, so up to 30 percent more costly to reach net zero without hydrogen.

So, therefore, we believe it's clear that LCI hydrogen does have a role. It needs to be targeted, but it's an important role in supporting U.S. emissions.

As just an additional reference here, the model does include assumptions for deployment of all technologies, including DAC, which is one of your higher abatement solutions here. And while the average cost of abatement in net zero in terms of cost of dollars per ton of CO_2 is about $230 per ton of CO_2, at the upper range, the marginal abatement is as high as $700 per ton in what we're showing here.

So what sectors are going to benefit the most from hydrogen deployment relative to other solutions? When we look at the demand side, this is generally what we call the hard-to-abate sectors. And, so, you see industry here. This is heavy industry like refining, chemicals, steel, or others. Some of these industries are using hydrogen already as a feedstock, and some are using natural gas, coal, other energy sources with

resulting carbon emissions. But in all cases, those heavy industries are looking for reliable, high-heat solutions to run their operations.

What you also see here is heavy-duty transportation can be considered a hard-to-abate industry, and that includes not just heavy-duty truck transport but also aviation and marine fuels. And then, furthermore, you'll see that we continue to have a need for dispatchable power. And, so, there, hydrogen can help ensure resiliency of the electrical grid. And, finally, we anticipate exports as well. So much like the U.S. today is an exporter of LNG, we believe in the future there's a role for hydrogen exports, either as hydrogen or hydrogen derivatives -- ammonia and methanol -- products like that.

And, so, in the stated policy scenario, you see a modest adoption across these sectors, with industry taking the bulk of the demand, but basically overall demand growing from a little over 10 million tons a year today to a little over 20 million tons in 2050, so still a doubling. But in the net zero scenario, we're required to go much further. Demand will reach up to 75 million tons a year, which is a seven-times increase to today's demand.

And, so, if activated with these additional

policies, that demand would still be primarily for industrial heat being the main driver of about half the total, with demand for heavy-duty transportation, dispatchable power, and export about equally split across that remainder.

So let's talk about how that hydrogen will be produced. So we focus on two main pathways for production, namely electrolysis with renewable electricity. This is sometimes renewable hydrogen; it's sometimes called green hydrogen. And the second pathway from natural gas reforming with carbon capture and storage, sometimes called low carbon hydrogen or blue hydrogen.

So under stated policies, we see that most of what's produced today that is unabated hydrogen will be shifting to abated with CCS, and we see a modest increase in adoption of electrolytic hydrogen. The scaling that's required to support the net zero case results in the abatement of all currently unabated hydrogen production, plus a massive buildout of relevant facilities and infrastructure to supply that increasing demand.

And, so, for the natural gas with carbon sequestration pathway, that requires reforming technology supply chains; it requires CCS and related

infrastructure. For the renewable pathway, it means reducing the electrolyzer cost, establishing strong manufacturing capabilities at scale, and the development of renewable power. Of course, all of this needs to be able to be permitted; it needs to be accepted in the local communities; and it needs to be operated safely.

That scale-up represents a sizeable challenge. Our modeling estimates that it would cost up to $1.9 trillion of capital investment between now and 2050. That's for the production side alone, without addressing the switching cost. Ninety-five percent of that total would go to the renewable pathway because of all of the infrastructure and renewable buildout that would need to happen in that case.

When we look at where the deployment will occur, our study is going to go into a lot of regional details. So look at what anchors demand, where that demand occurs, and what the required infrastructure is across the scenarios and across time. So this is just an example. This is what you'll see on the demand side in the net zero case, showing 2030 and 2050. Primarily here, you see largest demand sectors in the U.S. Gulf Coast and the U.S. West Coast. The Great Lakes region and the Midwest region, they show the most adoption.

The regions that activate first are where we have existing anchoring demand, policy support, including the recently announced hydrogen hubs and areas that have advantage renewables, advantage natural gas resources, or access to infrastructure. While we don't show the hydrogen hubs here, we do believe there's good overlap and that those are necessary and needed for the early activation across all of these regions.

As we mentioned, with the existing policies, you still expect to see a doubling of the existing hydrogen demand, but to move to the expansion and net scale phases, more will need to be done to build upon the success of those hubs.

Just to elaborate much more clearly on this gap to adoption, our study team thinks this is very important. So this is an example showing specifically some of the modeling output, looking at the Gulf Coast region in 2050 of hydrogen supply to industrial customers. And, so, to orient you a bit, on the left side of this chart, we have the estimated delivered cost of hydrogen across both of the production pathways. And you see here the cost ranges that are resulting, including cost declines that are expected over the period with technology improvements and

infrastructure buildout.

What you see here is that the natural gas and CCS pathway -- the blue -- is somewhere around the $2 per kilogram production cost, and the green through electrolysis is somewhere in the $3 to $6 range. These do not assume 45V credits because those are assumed to have expired by that point in time, and this is, again, meant to elaborate the point that current existing policies get you activation but still leave more progress to be made in closing the economic gap. It does not naturally occur.

The right side of the chart shows the approximate cost, and this is a whole -- in 2020 dollars, the hydrogen would need to be delivered at in order to compete at parity with incumbent feedstocks or fuels for a refinery or an industrial customer. And, so, what you see here is this trajectory, unfortunately, does not meet the dollar-per-kilogram earth shot, but it shows why that is very important. And it shows that there is a gap here that if the value of CO_2 emissions reduction is not addressed, the natural adoption of hydrogen is very limited when looking at economic cost parity.

And, so, again, we believe that it's very important that current policy efforts close the cost

parity gap and encourage technology development to drive down costs, but also recognizes that there is a value to the carbon reduction that needs to be addressed.

And, so, as we go into what to expect in the final report on recommendations, we will be elaborating these in detail in the spring, but first, policy and regulatory measures are going to be most critical to close that cost gap, to recognize that there are less expensive incumbent fuels that come with a higher carbon intensity. And, so, we need to enable timely development of these projects, but it requires us having clear and long-lasting policy, and we need to be able to permit and build these facilities and the infrastructure that's required.

We also need targeted research and development and demonstration. We need technology investments that can help remove some of the technical bottlenecks and expand the potential application beyond hydrogen's current use. And that is necessary to help bring down the costs and, again, close that gap.

And, then, finally, we need to intentionally account for the safety, societal considerations and impacts, which this study calls SSCI. That will be critical in increasing public acceptance and

collaboration. That will be necessary to support timely development of these projects, and it will be important to ensure that those communities have an informed voice in the development of the market, that they understand it, that these facilities are not only built, but they're also safely deployed and operated.

And, so, reaching this at-scale deployment will require coordinated action and urgent action if hydrogen is going to reach its potential at scale beyond the initial activation stage. And, so, all of those recommendations will come in detail at the report in April.

So thank you. That concludes the progress report, and I turn it back over.

MR. WOODS: Okay, Austin, thank you for that update. We have a few minutes here to take questions from members of the Council. And I'd look to the Secretary to see if she'd like to start.

SECRETARY GRANHOLM: Yeah, just a couple of questions. Number one, I noticed that the regionality that you've identified roughly corresponds, as you noted, to the hydrogen hubs. I'm just wondering how -- if the hubs themselves will be referenced in the report. I mean, you'll be -- how will they be addressed in the report?

MR. KNIGHT: We will reference the hubs. So it's been an independent effort, as you know, in development of this modeling from the decisions made for the hubs. And what we'll be able to do is reference, as well as look at the regionalities, reference where those hubs sit. And, of course, now we know more about the projects that are proposed to sit within those hubs, and so I think we'll be able to draw some parallels here.

The report does not intend to go into detailed analysis of what those hubs actually are or what the awards are, but only reference how that supports also the views here of activation with the goal of getting to scale.

SECRETARY GRANHOLM: Great. And, then, the tax credit at $3, your concern is that it expires over a period of time. Is $3 the right amount? Are you going to have a policy recommendation regarding the amount that would get us to parity?

MR. KNIGHT: We will be discussing that, and if you go back to this view here, that would lead me to believe that on those scales, you can see the impact of what $3 would bring. And, so, we'll be discussing both that economic gap, the desire of clarity of that policy so that there's an application that's understood when

calculating carbon intensity and that there's also a longevity of that credit that matches with the way investment decisions are made. And, so, you could expect things along those lines.

SECRETARY GRANHOLM: It's going to be super helpful, super helpful as we, you know, make the case for continuation and for extension, and really the fact that this is being so thoughtfully done, and with a broad array of voices, super important. So thank you so much for the work that you're doing.

MR. KNIGHT: You're very welcome. Thank you.

MR. WIRTH: Yeah, we'll start with Mark, right up here. Mark, the microphone is on the way.

MR. BROWNSTEIN: So Mark Brownstein, Environmental Defense Fund. So first of all, Austin, I just wanted to compliment you for the thorough and excellent process that you've been running. It really, I think, is a credit to the Council, right, that such an excellent job is being done, so thank you.

Of course, we have continued to have some suggestions for how we improve the work, and, of course, we'll be sharing those with you in due time, but my question is this. Darren noted the evolving energy conversation that's happening globally at the COP and elsewhere. And, of course, the United States

is not the only country looking at hydrogen. If you spend any amount of time offshore, you hear this conversation in Europe, you hear this conversation in the Middle East, you hear this conversation in Africa.

As we think about the various dynamics that will help bring down the cost of hydrogen, how are we thinking about the influence of activities in other parts of the world relative to the innovation and cost and scale that is needed, not just in the United States but elsewhere?

MR. KNIGHT: Yeah, thank you, Mark, and EDF has been a regular supporter of the effort we're doing here, a lot of good debate, dialogue, input, and I'm really appreciative for that working relationship that we have on this study. And, definitely, when we think about all of this, anything in this space, you have to think globally around these climate goals and what exists around the world.

We also have to limit the scope of the study to something that we can actually deliver, and so specifically to the U.S., we put a lot of effort in drawing the boundary conditions on the modeling work around the U.S. And, in fact, that's pretty unique because a lot of what we see in the world right now, the reports that are out are at a global scale with not

a lot of regional granularity.

But that interaction exists, and we know that these forces do not act in a vacuum. And, so, when we look at this role, we have considered, with all of the experts that we have in the room on technology development, manufacturers, the EPC companies, the global intelligence and knowledge that we have on where these technologies are going to go, what the deployment is likely to be, what does it actually take to build these things, because all of us at the table actually build and operate these facilities. And, so, we're bringing that pragmatism into it but also that optimism for the future to take a view of what does it really take to get there.

We've included, then, an export component from the U.S., which does help in the activation and the building out the infrastructure that you can build upon to get to scale because there are many countries around the world looking to the U.S. for these solutions. They are energy importers today, and they expect to be energy importers in the future, and so they need solutions that will come from here. And, so, we've drawn our boundary conditions around what can happen in the U.S. and what's at that interface.

Again, the model is just a model, but it's

very useful, and we have that global perspective as we've started to make these recommendations. Of course, we're making recommendations for the U.S. We're not making recommendations to other governments around the world, but we hope that they do look at these as a model for what good practices are moving forward.

MR. WIRTH: Hey, Mark, I might just add to that. You know, if you think about it, the variations you see in the U.S. regionally, so the input costs, some places have got better wind and solar resource than others. Some places have got access to lower cost natural gas and have better access to carbon storage. I think that will vary around the world as well. I think technology costs are generally assumed to be widely available. These are going to be electrolyzers, best quality will be available globally. So you can think of that as being pretty neutral there.

Markets and demand will tend to vary, right? So you've got big demand centers like Asia that are going to be really important that we figure out how to serve. And, then, storage and transportation matter, right? And, so, how we manufacture the hydrogen is a big part of it, but for some markets, we may have to transport it longer distances than others.

And, so, I think those are all going to be the drivers. And, then, of course, policy, where the U.S. has led in terms of policy support continues to be very important, as Austin's noted. And I think it's going to be incumbent upon those of us that have global operations to try to help governments around the world understand, in their particular set of circumstances, what policies can help enable the kind of adoption that we're talking about here in some of the other big parts of the world.

So while the study won't address it specifically, I think a lot of the principles that come from this and the conclusions can be applied in dialogue with countries around the world that are very interested in the topic and that, you know, many of the participants in the study are currently engaged in in trying to figure out to build these new value chains.

MR. WIRTH: A question back here in the third row.

MR. KEOHANE: Yeah. Thanks. Thanks very much. Nat Keohane. I'm the President of the Center for Climate and Energy Solutions and relatively new to the Council, so I appreciate the chance to see the work that's being done, which is terrific, and just wanted to make a quick observation, and it's relevant to the

slide with the cost gap.

And you referenced the value of carbon and the need to incorporate that, and if I look at the -- I think the best work that's been done on the social cost of carbon by my friends at Resources for the Future, and Richard Newell is sitting right in front of me, if I look at their online explorer and I find that the 2050 value of the social cost of carbon, the central cost for their modeling, is about $330, so if you figured we're talking, you know, roughly speaking, it's about a hundredth of that in terms of the SMR, the kind of value of carbon associated with the SMR -- with SMR, that would be about $3.30, which would more than close the gap.

And, so, the point I would like to make is I think when you present that, when you think about how to present the threshold price comparison, it might be useful to be presenting the value of carbon that we can look at and we can project. And if you showed that value of carbon, what you'll see, and, of course, this -- we need policies to implement this, to the Secretary's point, but if you showed that, I think it would be instructive because it would show that on an economic perspective -- I'm an economist, so I think a lot about that -- if you include the cost of carbon,

what you'll see is that actually the cost, even of the renewables, would be competitive, even under the assumptions that are made in the study.

And, so, I think that would be useful just as a benchmark to show folks who read the study that need for policy is still there, but in terms of the economics of it, it still looks like a good deal to be doing LCI hydrogen. Thanks very much.

MR. KNIGHT: Thank you for the comment. It is the intention that we'll be able to speak to, in detail, the carbon intensity of these things and that gap with the scenario we have around net zero where you force a price of carbon across the whole energy system and you look at the tradeoffs, it's included in some of the output that you'll see when we look at these things.

And, so, we have all the trajectories for that CCS pathway, what you have there. You know, those pathways start out just under the four-kilogram-per-kilogram clean hydrogen threshold, but over time, they come down. By 2050, we're expecting they're actually close to one kilogram per kilogram. And the electrolytic pathway is at zero, and so that is not apples to apples to the incumbent fuels unless you consider the carbon intensity. And really you

summarized the point really well, so we'll make sure that that all is captured in the report.

MR. WIRTH: Okay, Austin, I am going to continue to pay attention to the math, and we do have -- the Secretary has got some other commitments today, so I want to thank you for your update. There will be an -- the steering committee meets immediately after this meeting, and so happy to take other comments and engage in more dialogue for those of you who are on the steering committee.

Thank you, Mr. Chairman. I'll turn it back over to you.

MR. WOODS: Thank you, Mike.

And, Austin, thank you for your effort in bringing this study as far as it's come in the time you've got. We look forward to the conclusion, which I guess we'll be presenting in the April 23rd Council meeting.

And, Mike, thank you for your leadership on this. Great work.

The next item on the agenda is we'll hear from Ryan Lance, Chair of the NPC Committee on Greenhouse Gas Emissions, with the update on the progress of their work.

Ryan?

MR. LANCE: Great, great. Thank you, Darren. Thank you, Mr. Chairman. Madam Secretary, thank you for the opportunity.

I also want to say a big shout-out and a thank-you to all the people in the room here today. Thank you for adding your staff. To the Department of Energy, thank you for your hard work in terms of helping us progress the study as well.

So, today, we're going to present an interim report on the -- to the NPC group here today on how to reduce the greenhouse gas emissions that come from the U.S. gas value chain. So there are three important -- Robin, three -- three important factors that I want you to think about as we go through the course of this study that we took into account and that you'll hear from our study lead as well, John Dabbar here going forward.

And those are what does security mean, so how do we meet the demand reliably in the United States; what about equity, how do we provide access that is affordable; and, then, of course, how do we do it sustainably, addressing both the environment and climate change that we know is real today.

So the value chain which delivers our natural gas to our consumers today produces GHG emissions.

That's clear. What you will hear today is a status report on the study that will help us deliver recommendations to the NPC on how to reduce those GHG emissions and deliver that to the Secretary of Energy.

Now, the study will also provide us an overview of a report that will be also due out in the spring of next year, but I'd like to point out some -- three unique aspects of this study that I don't think the NPC has ever really generally considered before when they brought on efforts like this. They were mentioned today by the Secretary, and I think it overlapped a little bit with what Austin and Mike talked about in the hydrogen study as well, and that is what we call LCO, or the less-capitalized operators.

So this is getting input from those small producers across the United States, which represent a fairly large production. I think John Walker was referring to that earlier today in some of his earlier questions as well, so trying to wrap in those comments from those small operators that represent a pretty significant amount of production across the United States, and also what I think we termed SCI, I think the hydrogen study termed that a little different.

Madam Secretary talked about this as well, but what -- a start to framing out what an engagement might

look like to address the societal impacts that come from the GHG emissions that we produce in that natural gas value chain, so an attempt to start to engage with communities and build a framework around what that engagement might look like.

And, then, no study would be complete without our own model, so we have a model as well. And -- but the model is important because it tries to go at the life cycle assessment of what those GHG emissions would look like through the life and across the entire value chain, dealing with what Deputy Secretary Turk talked about, the Scope 1 and the Scope 2 emissions. So we don't try to go as far to the end use emissions, so it is important to recognize that this addresses what's commonly referred to as the Scope 1 and the Scope 2 emissions that come from the natural gas value chain that we have here in the United States.

Now, the study is still a bit in progress, and it won't be finalized until Q2 of next year; however, there are some emerging themes that are coming out of that. Regulations will, in fact, reduce greenhouse gas emissions, and we're seeing some of the results of that with the recent EPA -- finalized EPA rules that came out here last week. But there is uncertainty between methane detection and methane quantification. So the

technology has to improve; the quality of that technology has to improve. So generally industry can figure out when a methane event occurs, but the quantification, the rate that it's coming out and the duration and quantification of that is still very nascent technology today and needs a lot of work. And that will come out in this report as well.

There are emerging identification of market mechanisms or incentives that will certainly help in the GHG reductions across that value chain. You'll hear some more about that. And then John will also talk about some of those societal impacts, some of what we heard from engagement with some of the local communities throughout the country that are starting to frame up that -- what a solid engagement might look like as we build out some of the infrastructure and do some of the things that are required to reduce the GHG emissions. And that's where we crossed over with Mike's study and what Austin talked about in terms of those same impacts of trying to build an industrialized facility like hydrogen.

So you have -- you've heard the details about the H2 study, and you'll see some of those linkages that we provide with the GHG study as well.

So with those opening comments, let me turn it

over to my colleague, John Dabbar, who is chairing the Subcommittee on the GHG reduction study for the NPC. Thank you.

John.

MR. WOODS: And, John, maybe I'd just add real quickly, the Secretary has a hard back end at 10:50 so we can make sure we hit the key points of the study before she has to depart.

MR. DABBAR: Yes, sir.

MR. WOODS: Okay, thank you.

MR. DABBAR: Well, thank you. This is a rapidly evolving space. We saw that the federal and state regulations on methane came out just last week, and we're rapidly working to incorporate those regulations into the study. COP28 is ongoing, and we're seeing daily headlines. There's also ongoing research on this subject. During the conduct of this study, our participants published literally dozens of peer-reviewed technical papers on GHG emission reduction. So there's a tremendous body of knowledge that's current and that's rapidly moving.

We could not pause the study until everything was settled. So we are taking into account everything that we can get and updating it up to the last minute when we deliver the study for the steering committee

approval.

A brief overview of the structure of the study, we received the request from Secretary Granholm. It's described on the left. The way we're structuring that study is shown on the right, and I'll highlight a couple of really important points. We are addressing methane and CO_2. As we look at the natural gas emissions contributions to the three goals outlined in the request, it rapidly appeared that we should address methane and the causes of methane emissions and the causes of CO_2 emissions at the same time without selecting between the two. So I'll be able to describe later in the presentation how we've categorized those and what specific areas we're going to recommend addressing.

We had the first-of-a-kind societal concerns and impacts work completely in lockstep with the hydrogen study. We also, first of a kind, actually had polling and surveys of communities to get direct input, not conclusive. This is not advertised as we've figured out how to handle societal concerns. It is really an emerging part, first of a kind, in this study.

The last point I'll emphasize is that emissions reduction infrastructure and siting and

developing to reduce GHG emissions, that requires building kit, repairing kit, modifying equipment. All of that takes place near some community and will have some impact on that community. So on the one hand, we'll be making recommendations about improving the permitting process, at the same time with recommendations on engaging communities to get meaningful input on what we're going to build, repair, and modify.

Finally, we'll talk a bit about measurement and detection, and I'll have a separate piece of the presentation on that.

In terms of our timeline, we're in the green bar right now, following the process that we'll go through for SteerCo and study committee approval and the final approval scheduled for April 23rd. Immediately after that, along with my colleagues from DOE and my co-chair, Ryan Peay, we will be communicating the findings of that study to both the Administration, to regulators, to legislators, and across state organizations to show, yes, you can read the 400-page study, but we want to draw your attention to this very specific item that you have the ability to do something about.

A brief note about the scope of the study. So

looking at the energy trilemma -- security, equity, and sustainability -- what is in scope? Well, very specifically, the value chain from wellhead either to delivered LNG or domestic users, both commercial, industrial, and residential, we evaluated six representative value chains, and that was the work that we did in our life cycle assessment meta-model, and I'll discuss that in a little bit more detail. One of the key points that it addresses, both different producing basins, different destinations, and different types of end-users, and both dry gas and associated gas.

As noted before, GHG emissions from customers' end use, the so-called Scope 3, we chose to make those out of scope, out of the study scope. For practical reasons, we think there are many ways of addressing Scope 3 emissions. We wanted to focus on for, of the natural gas that is produced, delivered, and used, how do we reduce its GHG footprint, and with a focus on what is inside the Lower 48. We did a survey of gas production outside of the Lower 48, and we said it was really something that didn't really require the work of the study group.

First-of-its-kind study elements. We really engaged with less capitalized operators, and you can

see on the chart parts of the country where we actually held workshops with over 75 operating companies to get their input, literally down to a guy that owns one well. And, so, we wanted to get that input because they are somewhat under-represented in the NPC membership, but they're roughly 20 percent of the natural gas in the gas in the country is produced by this sort of long tail of small producers, and we wanted to get their input.

One of the interesting learnings from that -- and I'll telegraph it -- is a lot of the small operators actually have great operational practices that they've done locally without waiting to be told. And we found great opportunity to share best practices, and we've been making a recommendation to DOE on how we can encourage and provide a forum for sharing of best practices between different operators in different basins.

On the area of societal concerns and impacts, you can see, also, where we had polls and focus groups in areas as diverse as Midland and New York City. And, so, we really wanted to try to get diverse input from people and get their input on how do they engage with the natural gas industry. In many cases, it was the first time they'd ever heard from anybody in the

natural gas industry.

And, finally, our meta-model, meta is a term of art. That means a model created based on the hard work of other modelers. We did not create a model from scratch; we created it based on existing input, and we validated it. And one of the key takeaways I'll talk about in a moment is that it greatly reduces the number of variables that the modeler needs to look at in order to figure what's important.

So I'm going to tell you how the story ends. These are the key findings and themes that are emerging at this point. I'm not going to work through the details of explanation and justification of each one because that will come up in the final version of the report, but I would like to point out that while natural gas will continue to play a crucial role under any of the EIA scenarios, and I'll show you some data on that, measurement-informed estimates of emissions are critical. Measurement-informed, and this is an important concept because we don't really recommend measuring every molecule at all times every place, but rather having a combination of enough measurement and enough engineering data to have good estimates of what those emissions are. And I'll talk more about that later.

We see a clear underscoring of the need to mitigate methane emissions. That's unqualified. Need to mitigate methane emissions, and that means building kit, repairing equipment, installing stuff, and that means permitting. Permitting also means engaging with communities. And we know, and we did as part of our study, identify that industry has a lot of existing best practices on how to engage with communities.

We've been doing this for years. It's done differently in different places. What we're really seeing is the opportunity for a more comprehensive analysis of not just what we already know we should do but what are the other things that ought to be doing that would really consider it as best practices so that we could all say, yes, what we have done is meaningful community engagement and that the communities would agree with that, because they are also keeping score on what we do.

And, then, finally, a brief discussion today about regulatory harmonization, market mechanisms, and technology deployment, and always recognizing the tremendous work that DOE and the National Laboratories complex have done in this space and the contributions that they provided, both to the study and to the practice of reducing GHG emissions.

One question that the Secretary's study letter asked us to address were the state of U.S. GHG emissions. And, so, I'll just briefly cover the current state. You can see primary energy by source, and the obvious line there is natural gas versus coal are sort of the main divergence, but it does show that there's sort of an all-of-the-above, even, you know, in today's measurement of primary energy production and that historically natural gas displacing coal has had a positive benefit on GHG reductions.

In the future state, we asked EIA to evaluate scenarios -- public scenarios -- on what the future of natural gas supply is. There was not a wide divergence there, and you can see that we have a reference case and even the high and low case, a fairly narrow band of what they expect in terms of that. There was a level of detail below this that we had to get into, which was where -- which basin and which destination would that gas go to.

So we do have a piece of the study where we're analyzing one level below this. I won't get into the detail on that today, but it's important because the basin and the destination actually has a big effect on the GHG emissions in that value chain.

So we looked at detection and quantification

as one of the study requests, and I'll point out that there's sort of a three-step process: detect, a rate, and an annual release. Detection is a pretty mature technology. It's really well known, and we show five of the different sort of types of technologies and platforms that are used to detect methane. It's pretty mature. We can find it, and we can find it pretty promptly.

The challenge, then, becomes converting it to a rate, and for the engineers, you'll recall a rate is quantity over time. So one of the biggest challenges is that things that can perform well in a somewhat laboratory-type setting to prove up methane detection and quantification, in a real-world setting, it's quite a bit more challenging. The work that DOE has funded in Colorado State University at METEC has given some great data, but we're also seeing that there are gaps in our ability to actually quantify it. And it's something as simple as how much do you know about what the wind is blowing at exactly that location and how complex is the wind field.

So the third point there is around calculating annual releases, which is then taking those instantaneous rates of emissions and integrating them -- sorry, we had to use a lot of math --

integrating them to come up with an annual quantity of emissions, yet another ability to calculate both the time -- the quantity, the volume, over time, and then sum all that up over a time period to come up with the overall quantity.

We basically broke this out into two sort of not conflicting but complementary goals. One is the ability to detect and react, incorporating operational data and control systems and SCADA systems so that operators can identify and respond to unexpected emissions. The second, not different but a different pathway, is how to quantify and give a good inventory for the GHG inventory and reporting system and report on a compliance basis as well as an inventory basis.

Those are not different -- they're not different -- they're not opposed goals, but they require quite a different action. As some of the operators have told me, can we just find out that we've got an emission and go fix the leak without spending time quantifying how big the leak was? That's an interesting question, and that's the kind of hard hat response to the problem that we're dealing with.

The academic team -- and thank you again for the UT Austin folks that worked on this -- gave very good input on what's needed in order to have better

quantification. I'll briefly talk about what we did on our meta-model and our life cycle assessment. The real key output from this is that we determined that while a full life cycle assessment takes hundreds of variables that all have to be accurately defined, our meta-model winnows that down to the top 21 metrics. And we use those top 21 key modeling inputs or metrics to correlate with what we saw as the things that needed to be done to reduce GHG emissions. And I'll get to that slide in just a moment.

So you'll notice here that methane on the left, CO_2 on the right, and you'll notice that the emissions that come -- that we're analyzing, they're quite different. There's literally no source of methane that's also a source of CO_2. We found very little overlap, with essentially only flaring and a little combustion slip. For the most part, we can fix methane with a set of solutions; we can fix CO_2 with mostly a different set of solutions that are not contradictory to each other.

We laid out a 2030 approach based on existing policies. Notably, when we talked about durable regulation, we assumed that everything that had been put in place up through the end of '22 -- 2022 -- Inflation Reduction Act, et cetera, that that all

stayed in place, since that was our go-forward plan.

Then we had three future plans for 2050, existing policies, which is that all stays in place. A continuing reduction, which is essentially a trajectory along that same trajectory that had been put in place, and then a technology improvement policy, which was if there are specific targeted areas that could be improved, and that was heavily focused on CO2 reduction, that could be reducing that last bar on the right-hand side.

We did a lot of work in societal considerations and impacts, as I've already mentioned, polling focus groups, best practices, and the need to have more engagement with communities. This was an important area where we had alignment with the hydrogen study. We had three areas of purposeful alignment. The first was on natural gas carbon intensity, and as my colleague, Austin, described, the carbon intensity of reformed natural gas to make hydrogen with CCS. And inside the study, we have a specific piece of work to correlate how our outputs feed into their inputs.

The second on SCI, and we'll be providing actually joint recommendations -- word-for-word joint recommendations between the two studies.

And, then, finally, the key principles on our

life cycle assessments, we worked in tandem. It's a fairly small community of practitioners that do LCAs. They all, I think, participated in our two studies.

Finally, some notable differences around our approach to carbon price, two different commodities and sort of two different approaches to that -- the details of that recommendation around carbon pricing structure and some details around safety, which is somewhat new and a lot of greenfield on hydrogen, whereas there's a lot of brownfield existing infrastructure on natural gas.

Finally, our next steps. Get 'er done, deliver to the SteerCo, deliver to the members for a vote, and then deliver it to the Secretary.

(Applause.)

MR. LANCE: So thank you, John. That's the Reader's Digest abridged version of the ending there with Madam Secretary. So any comments or questions, we'd open to you first.

SECRETARY GRANHOLM: Just briefly. First of all, thank you so much for this. I'm excited about both of these reports because of the policy prescriptions that will allow us to get to our collective goal, and I so appreciate all of the input from the groups that have been around the

table formulating. I know this has been a really comprehensive effort and, therefore, that will ensure its success.

I so appreciate your focusing on the societal question and the community benefits, et cetera. And I'm wondering if you haven't already, and you may already have, but CEQ has got the White House Environmental Justice Advisory Council. I don't know if any of those members have been part of your focus groups, but it would be, I think, helpful in many ways, and I'm happy to make that connection if you haven't already.

MR. DABBAR: Thank you. That would be helpful.

SECRETARY GRANHOLM: That would be great. So I just want to say thank you to you all for those of you who are in the room who were participating in these two studies. I just -- it's really exciting that there may be a blend of private sector and policy that gets us to this goal of reducing greenhouse gas emissions. And, so, I just -- I want to thank you for the seriousness with which the National Petroleum Council has taken this, and I'm very grateful for that and look forward to the final reports.

MR. WOODS: Thank you. And, John, I apologize

for rushing you, but I think even in the abridged version, the thoroughness of the work you've done came across to the audience, so appreciate you helping us with the time, but great work and thanks for your leadership.

And, Ryan, thank you for your leadership.

MR. DABBAR: Thanks.

MR. WOODS: And, Secretary, thank you for joining us.

SECRETARY GRANHOLM: This has been great. Thank you all.

MR. WOODS: Nice -- thank for working with us.

SECRETARY GRANHOLM: Appreciate it. Thank you.

(Applause.)

MR. WOODS: We are pleased to have with us this morning Brad Crabtree. As I introduced at the beginning, he's the Department's Assistant Secretary for Fossil Energy and Carbon Management. Brad's office provides much of the Department's support for these studies.

So, Brad, I'd like to offer you the opportunity for any comments you might like to add this morning.

MR. CRABTREE: Comments?

MR. WOODS: Comments, yeah.

MR. CRABTREE: On the report, but not closing remarks? I just wanted to --

MR. WOODS: Any comments you'd like to make.

MR. CRABTREE: Okay, so --

MR. WOODS: Feel free.

MR. CRABTREE: But, I mean, do you want -- did you want more discussion of this report, or do you want me to provide my closing remarks?

MR. WOODS: Your closing remarks will be fine.

MR. CRABTREE: Oh, okay, that's why I wanted to clarify. Thank you.

First of all, it's hard to do closing remarks, and especially following what we've already heard. I hope that -- there will be some of this is a bit of a recap. Hopefully, I'll say a few things new, and I recognize that you have other work to turn to.

Let me just start off with some thank-yous. Thank you to you, Darren, for your services as Chair of the NPC and leadership of the NPC. And, of course, I want to thank the Secretary and the Deputy for their participation and support of this effort.

But above all, Dave mentioned something that's very true about these meetings, is that folks like me speak but there are others in the room that do all of

the work. And, so, I really want to recognize John Dabbar and Austin Knight for their role on the committees and all the great work that you've both done and the enthusiasm that you bring to that. A fist bump is appropriate.

And, of course, Jen Wilcox, Ryan Peay, Christopher Freitas and Sunita Satyapal for all that you're doing on these committees and the great work that you do on on behalf of DOE and FECM and the Hydrogen and Fuel Cell Technologies Office. It really shows, and it showed in the presentations. And, then, of course, to all the members. And just I want to thank you for these reports.

In the spirit of comments, like the Secretary said, and I had written this down as I was listening to them, I appreciate the breadth, the ambition, and the sophistication all the way around in these reports. I also, as someone who prior to my service at DOE, spent years working to build consensus on energy and climate policy among diverse groups of stakeholders like you have on these committees, I also appreciate the effort to get to consensus or near-consensus on these recommendations.

In preparation this morning, I went through again some of the specific recommendations, and I was

looking for -- looking at the percentages of what level of consensus was achieved on each recommendation. And that's impressive. It's also important.

I can't remember who mentioned this morning, you can invest your end on the front -- you can invest your time and effort on the front end and get broader agreement on recommendations, or you can invest it on the back end when you don't have a cohesive response from all the affected stakeholders because you haven't put that effort in. And you're doing the former, and I think that's important. These reports will come out well received because of that work.

And I don't want to be repetitive here, but I just want to thank all of you for your serious treatment of community engagement and community benefits and impacts. You know, the Secretary spoke quite passionately about her engagement with communities in the Gulf Coast. I think many of us in the room have had experiences like that in one place or another that were quite moving, that really underscore why this is the right thing to do, and the fact that it's the right thing to do is reason enough.

It's also good business. I think as we look at the dynamics in our country, and we -- and I talked about this last year, but it's even more apparent one

year later. You know, I'm from North Dakota in the Northern Plains, and I live on a ranch, and I have very conservative rancher neighbors, and I would note that they are opposed to wind energy development, and some of them are also opposed to a proposed CO_2 pipeline. And you have environmental groups in the same region also organizing against these projects. So we're seeing a phenomenon here that spans the political spectrum. It also is not just my region; it's the Gulf Coast. We're seeing it happen all over the country.

So going forward, it's absolutely imperative that projects are pursued with really meaningful community engagement and with a real eye and attention to making sure that affected communities benefit both economically and environmentally from these projects. And, so, I think you're -- you know, it's just really important what you -- what you're doing here to incorporate that and really look at these issues in an honest way.

More generally, we started off with some discussion of the COP and sort of the general context that we're all working in. And I'll just talk for a bit in the context of these reports and what you're collectively trying to do together, a bit of a reflection on the industry and kind of what we're

seeing in this COP. In September, I had the opportunity to be part of a meeting with both international oil companies and national oil companies from around the world. And the discussion was about, well, what do we need to get out of this COP. And I think the question could be asked more broadly than just the COP, but that was the focal point of the meeting.

And I really emphasized that the narrowing window that we have for action for this industry to have a path to decarbonization and to participate in a decarbonized energy industrial future, and part of that is just the urgency of climate change. The Secretary and the Deputy talked about that, the fact that we all see it. I made the point that there's an entire generation of young people that are literally scared for their future. And that's a dynamic that we didn't have a few years back.

And, then, there's been comments made about the trust deficit. So in -- I think that in the context of this COP, you know, let's set aside the swirling debate that's going on literally today. I don't know if people have been looking at their phones, if there's any news on what the outcome of the negotiations are. We may not know until tomorrow, but

a lot has been accomplished before and separate from this broader debate that's occurring in the negotiations. And I just want to recap some of these things because I think they're really important and they're worth mentioning again.

You know, the Secretary and the Deputy both noted that just ahead of the COP, 12 countries came together as part of a working group that actually includes 17 countries, the European Commission, and the Eastern Mediterranean Gas Forum and announced a joint statement and a commitment to work together to develop a framework for measurement, monitoring, reporting, and verification of greenhouse gas emissions in both methane and CO_2 associated with the production, processing, transmission, liquefaction and ultimately transport of natural gas, both domestically and, of course globally.

And that's something that your industry has been supporting from the moment we started that effort over a year ago at the Department of Energy. That's really critical. This is something we can all do together. We can do it in the here and now, and it lays the groundwork for many of the other things that need to follow in terms of methane mitigation and fundamentally deeper decarbonization over time.

The reality is you can't solve a problem if you can't agree on how to measure it. And that's ultimately what this work group is about. And, again, I appreciate your support for that effort.

In terms of mitigating methane emissions, the Secretary mentioned the Methane Sprint. I confess I was skeptical that significant resources would be mustered around the world for this effort. I know there was a target informally to about $200 million, and the commitments now are over a billion. That's a huge step forward.

Also, at the beginning of the COP, this has not come up, but it really deserves recognition, and that's the oil and gas decarbonization charters. Some of your companies in this room are signatories to that effort. Last I heard, it was 52 companies. There may be more that have already joined. But it's roughly 40 percent of global oil and gas production is represented by the signatories to that charter.

There's a number of commitments that were made, but I would in particular note the commitment to near-zero methane emissions by 2030 and net zero in Scope 1 and 2 by 2050, but especially that near-term 2030 methane commitment, that is profoundly important. I won't repeat what's already been said about how

that's our nearest best opportunity to get traction on the climate challenge and something that your industry is absolutely -- is leading on and absolutely positioned to do more.

And, of course, more needs to be done. The charter is essentially silent on Scope 3 commitments, and I would argue that some of the Scope 1 and 2 net zero commitments should be brought forward to close to 2030. But that's not really the point. The point is that companies that never made a commitment to anything like this before are aligned globally, putting a marker down, and that's the first step. And, so, I just wanted -- I think it deserves some recognition.

The other thing that hasn't been mentioned, and that's in addition to everything that we're doing domestically on carbon management that has come up today. Your companies in terms of policy from the Administration and Congress, I was proud to see the U.S. Government at the COP continue to elevate and advance carbon management as one of the essential pathways for reaching both the 1.5 and the 2-degree goals that were set in Paris.

And, in particular, the carbon management, which President Biden announced in April, had its first meeting of leadership organized by the COP presidency.

There are now 20 countries that have signed up. It represents every major region of the world, industrialized countries, developing countries, East, West, has the largest oil and gas producers in the world. It also has two countries that have no fossil fuels and fully decarbonized power sectors.

It's probably the most diverse group of countries working together on energy and climate in the world today, and all with the collective goal of advancing projects to reach one gigaton of carbon capture and storage by 2030. That's just really exciting, and some of your companies behind the scenes played a big role in helping us get to that point, even helping recruit countries to join. So thank you for that as well.

Just in closing, at our last meeting, I noted the concern that I've had and that we often talk about, the mounting polarization and skepticism towards the oil and gas industry. It came up in the discussion about the COP. The Secretary reflected on that. I still go back to what I think the antidote to this challenge is: facts on the ground, projects and infrastructure that deliver real emissions reductions and deliver real economic and environmental benefits to affected communities and local stakeholders.

And the domestic investment and project commitments that your companies are making, including that attention you're giving to community benefits and other impacts, is really critical, the roadmaps and recommendations that are in these reports. And then the broader global commitments that I mentioned that some of your companies are a part of are all -- I think represent really critical next steps for getting to widespread deployment on the ground that will really start to change the narrative and the reality of what's possible.

So I think that with these reports, all of the other things that we've discussed today, there's an enormous amount to be done, as the Secretary and the Deputy pointed out, and I think all of you in the room would acknowledge, but you've really taken important steps to start to build that, what I would call the social and political space to be able to pursue a path to decarbonization for your industry.

So thank you for your involvement, your commitment, and your leadership in this effort.

MR. WOODS: Thank you, Brad --

(Applause.)

MR. WOODS: -- for your comments and for the work you and your team have done to support this study.

It's very much appreciated.

MR. CRABTREE: Thanks, Darren.

MR. WOODS: We're now going to move to administrative matters on the morning's agenda, before we do that, though, we're going to conclude the webcast. For those of you who are online, we thank you for watching the proceedings this morning and encourage you to download the slides presented today, which will be posted on npc.org following the adjournment of the meeting. So we'll now end the transmission.

And with that, we'll turn to the administrative matters. The first administrative item on this morning's report is a report of the Finance Committee. Byron Dunn, Chair of the Finance Committee, will present the Committee's report.

Byron, the floor is yours.

MR. DUNN: Thank you, Mr. Chairman. In addition to reviewing periodic performance reports throughout the year, the Finance Committee met three times this past year to discuss the Council's finances and most recently yesterday afternoon. Our August meeting included review of the Calendar Year 2022 draft audit report and the IRS Form 990 with Johnson Lambert & Company, which is our Council's outside auditors. The auditors provided the Council with good news, a

clean opinion letter which confirms our financial controls are sound.

Yesterday afternoon, the Finance Committee covered a variety of topics, including the 2023 year-to-date projected year expenses and contributions and collections. The Council anticipates 2023 spending to be just under the budgeted $6.2 million that you approved last year, which includes substantial expenses, as you would probably expect to support the hydrogen and the greenhouse gas studies, along with the printing of short-term actions and transition studies, reports that we approved last December.

The Council Members responded favorably -- thank you -- to the 2023 contributions request with anticipated collections for this year to be in the 92 percent range of our request. Yesterday's Council -- Committee discussed and agreed upon the 2024 budget spending authority in the amount of $5.986 million to provide the resources required to complete the remaining studies' operations, and to publish the hydrogen and greenhouse gas studies as well. This represents a 4 percent decrease from last year's budget, so progress in small ways.

As part of the Finance Committee recommendations, the individual suggested

contributions for 2024, we are recommending a 10 percent increase. The Committee believes that this increase is required to avoid further erosion of the Council's contingency fund, which we drew upon for the last two years to assist in funding the substantial costs required of these two studies.

We further recognize that much of the real cost of the NPC studies is in the people that you provide to perform those efforts, but we continue to make these commitments -- or hopefully continue to make these commitments as the Council must continue to prudently manage and scrutinize every line item of cost, and we're committed to do that.

So subject to your approval of the '24 budget, the contribution recommendations of the Council will be sent to you individually early next year. Those of you who have not made your -- I say this every year -- but those of you that have not made your 2023 contributions yet are encouraged to do so with haste.

The Council's mission is to encourage and inform governments, and it's never been more critical, and I encourage you to respond with urgency.

Mr. Chairman, that completes the report of the Finance Committee, and I move that we adopt the Council -- be adopted by Council membership.

MR. WOODS: Thank you, Byron. We have a motion to adopt the report of the Finance committee. Do I have a second?

I have a second. Thank you.

Any discussion before the vote? Questions for Byron?

(No response.)

MR. WOODS: All right. Will all those in favor say aye?

(Chorus of ayes.)

MR. WOODS: Any opposed?

(No response.)

MR. WOODS: Thank you very much. The report is adopted, and as Byron noted, the contribution requests will go out shortly after the first of the year for your hopefully prompt action.

The second administrative matter is the report of the Nominating Committee. John Walker, Chair of the Nominating Committee, will now present the Committee's report.

John.

MR. WALKER: Thank you. I've done some work to enable me to make the presentation. I'd like to recognize Marshall Nichols, who did all the heavy lifting and does so much heavy lifting for NPC, and I'm

very appreciative of all that he does.

The Nominating Committee has agreed on its recommendations for NPC officers and chairs and members of the Agenda and Appointment Committees to the Council, as well as the five at-large members to the NPC Co-Chair's Coordinating Committee. Accordingly, on behalf of the Committee, I'm pleased to offer the following nominations.

NPC Chair, Alan Armstrong. I'm sure you're happy about that.

(Laughter.)

MR. WALKER: NPC Vice Chair, Ryan Lance, who heartily agreed to do this.

For the Agenda Committee, we recommend the following as members: Deb Caplan, Bob Catell, Joe Gorder, Ray Hunt, Jeff Miller, Gretchen Watkins, Bill Way, Bill White, Mike Wirth, and Dan Yergin, with Vicki Hollub serving as Chair.

For the Appointment Committee, we recommend the following as members: John Christmann, Paula Glover, Dave Grzebinski -- my apologies, Dave -- John Hess, Olivier Le Peuch, Mike Linn, Pierce Norton, Scott Tinker, and myself, with Lorenzo Simonelli serving as Chair.

In addition, we recommend the following as the

at-large members of the Co-Chair's Coordinating Committee: Kevin Book, Maryam Brown, Ed Crooks, Marilu Hasting, and Tom Jorden.

This completes the report of the Nominating Committee, and on its behalf, I move that the above slate be elected until the next organizational meeting of the Council.

MR. WOODS: Thank you, John.

We have a motion to adopt the report of the NPC Nominating Committee. Do I have a second?

COUNCIL MEMBER: Second.

MR. WOODS: Thank you. I have a second.

Are there any further nominations from the floor?

(No response.)

MR. WOODS: Okay. Hearing none, we'll move to the vote. All those in favor of adopting the report, aye.

(Chorus of ayes.)

MR. WOODS: Any opposed?

(No response.)

MR. WOODS: Thank you for that. The report is adopted. Thank you, John.

And, Alan, look forward to handing the gavel to you. I'd just say to the group, Byron mentioned it,

I think, you know, over the last couple of years, we've done some really important work here -- the hydrogen and GHG studies, the carbon capture study that we did prior to that.

Given where the world is trying to move to and the impact and the particular -- and particularly the impact on people around the world and economies, having informed policy that tries to strike the right balance between meeting the ambitions of eliminating emissions but at the same time continuing to provide the needed products and energy that this industry does so well all around the world is critically important. I think the work that we're doing here is critically important, and so it's been an honor to participate in that and engage in those discussions over the last two years, so I thank the Council for that opportunity.

And, Alan, good luck to you.

MR. ARMSTRONG: Thank you.

(Laughter.)

MR. WOODS: All right, ladies and gentlemen, before adjourning, let me remind you that we'll be back here in the same room on April 23rd to receive the final report from our committees on hydrogen energy and greenhouse gas.

Does any Council Member have any other matters

to raise at this time?

(No response.)

MR. WOODS: Okay, hearing none, I will -- do I have a motion for adjournment?

MEMBERS: So moved.

MR. WOODS: And moved, very good. Thank you. And without objection, the 133rd Meeting of the National Petroleum Council is hereby adjourned. Thank you very much.

(Applause.)

(Whereupon, at 11:11 a.m., the meeting was adjourned.)

CERTIFICATE OF REPORTER

I, George Quade, do hereby certify that the foregoing proceedings were recorded by me and reduced to typewriting under the supervision of For The Record, Inc.; that I am neither counsel for, related to, nor employed by any of the parties to the action in which these proceedings were transcribed; and further, that I am not a relative or employee of any attorney or counsel employed by the parties hereto, nor financially or otherwise interested in the outcome of the action.

GEORGE QUADE, CERT