CleanLaw 91

Global and US Methane Reduction Progress

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Intro: Welcome to CleanLaw, from Harvard's Environmental and Energy Law Program. In this episode, Harvard Law Professor and EELP's founding director Jody Freeman speaks with Bjorn Otto Sverdrup, Chair of the Oil and Gas Climate Initiative's Oil and Gas Executive Committee, Riley Duren, CEO and founder of Carbon Mapper, and Peter Zalzal, Distinguished Council and Associate Vice President of Clean Air Strategies at Environmental Defense Fund, as well as EELP's Executive Director, Carrie Jenks.

They discuss international and domestic efforts to reduce methane emissions, the Oil and Gas Decarbonization Charter from COP 28, the Biden administration's recently released final methane rule for the oil and natural gas sector, and the technology innovation that is making it increasingly possible to detect methane leaks, as well as the climate benefits of focusing on methane. We hope you enjoy this episode.

Jody Freeman: Welcome to CleanLaw. I'm Jody Freeman, Harvard Law School professor and your host today for what will turn out to be a deep dive on methane control both domestically and globally. We're affectionately calling this podcast Methane-Palooza and we have terrific expert guests today to get into this in detail. So without any delay, let me first introduce them.

We have Peter Zalzal, who is Distinguished Counsel and Associate Vice President for Clean Air Strategies at the Environmental Defense Fund. He's a member of EDF's Domestic Climate and Air legal team. Welcome Peter.

Peter Zalzal: Thanks so much Jody, and really appreciate the opportunity to join today.

Jody: In addition, we have Riley Duren, the founder and CEO of Carbon Mapper and a research scientist at the University of Arizona. Welcome Riley.

Riley Duren: Thanks for having me.

Jody: Also joining us is Bjorn Otto Sverdrup, the Chair of the Oil and Gas Climate Initiatives Executive Committee. Thanks for being here, Bjorn Otto.

Bjorn Otto: Thanks for having me on the show.

Jody: And last but not least, our own Carrie Jenks, the Executive Director of our Environmental and Energy Law program at Harvard Law School. Thanks, Carrie for joining.

Carrie Jenks: Thank you. I'm looking forward to it.

Jody: So let's start off our methane discussion with just a few background facts that I want to provide so people understand the importance of methane as a greenhouse gas and as a contributor to global warming. It's odorless and invisible. This is a highly potent greenhouse gas that's responsible for about half of the one degree centigrade temperature rise in global average temperature since the pre-industrial era. And many people say it's the single most effective strategy to reduce warming in the near future if we can cut methane. So it's not surprising there's a lot of focus on methane at the moment. And the major sources of methane are of course the oil and gas industry, but also coal, agriculture, and landfills.

We're in something of a methane moment right now, both globally and domestically. And I hope our participants, our guests today will talk a little bit about why that is.

I think that we have seen some historic commitments and agreements both by governments and by industry on methane, and we now have technology that's able to detect methane leaks and we want to talk about all of that to understand the potential here for addressing climate change through methane regulation and reduction.

So with all of that as background, let me turn to Bjorn Otto first to talk about the COP 28 that just happened, the Conference of the Parties to the UN Framework Convention on Climate Change. These are, of course, regular meetings of the parties who signed the UNFCCC 30 years ago now. And this one was a little controversial because it was held in Dubai and hosted by Sultan Al Jaber and it resulted in several commitments and agreements that I hope Bjorn Otto, you can give us a sense of.

Maybe start with your key takeaways from COP 28 and then we can talk more specifically about methane.

Bjorn Otto: Thanks. Yeah, I think it was an important meeting for many different reasons, and I think the backdrop is of course, that you cannot really fix climate without fixing the energy system because so much of the emissions, both methane and CO_2, are related to the way we are using energy and producing energy.

So the statement itself I think is important because a couple of very important things were agreed among all the countries present. So there was a pledge to triple renewables going forward. There was another pledge to double the energy efficiency of the economy. Both are so important to really address climate issues as part of the energy system. And then there was also landmark text saying there was a commitment to a just and equitable transition away from fossil fuels. Of course, the text on that was subject to a lot of discussions and intense negotiations, but at least there is such text in there to say a transition away from fossil fuels.

On coal, the language is even more clear. It says there's a phase down of coal. And then I think also importantly, there was a commitment among all the signatories to

accelerate the reduction of non-CO_2 gases, in particular methane, and also to do that by 2030.

So to me that was a major statement from the COP itself and all the countries present. Then on top of that, we saw some very important industry initiatives.

Jody: So I want to ask you about one in particular, which you had a lot to do with, which is the Oil and Gas Decarbonization Charter. I'm not sure if that name will stick, maybe it will be called something else, but I think for now that's its name. Can you tell us how that agreement came to be, who agreed to do what, and you were deeply involved in it, so if you can give us a little bit of inside baseball on this particular methane agreement and what you really think it will accomplish?

Bjorn Otto: Yeah. So let's take a step back and look at the oil and gas industry itself. Of course, often when we discuss it the focus is on the products, the oil and gas production, but actually the oil and gas industry is also using a lot of energy itself in order to provide energy. This is what we call the scope 1 emissions. And if you aggregate that for this giant industry that's called the oil and gas industry, the number is very high. It's nearly 5 billion tons of CO_2.

To put that into perspective, it's nearly 10% of the world's total greenhouse gas emissions is coming from this industry alone. So nearly half of that is methane emissions, so basically natural gas outside of the pipelines somehow.

So this sector can actually contribute significantly to lower emissions by addressing and decarbonizing this sector in itself. So I think that's the backdrop that even if there is a discussion, what will be the duration of this industry, everybody believes it's going to be around for quite some years still.

So to really address the scope 1 emissions is very important. And I think the president [of COP 28], Dr. Sultan Al Jaber had this at the back of his mind when he talked about an inclusive COP and also having a bit of a pragmatic lens because the global stock take shows that the world isn't really reducing emissions at the pace as it should.

So there was an effort to say, is this year the best opportunity we have to, in oil and gas companies from all over the world, to join an effort to decarbonize the industry. And have in mind the oil and gas industry there are some household names in that industry. Even the giants only have, let's say, 5 to 6% market share at maximum.

Jody: So Bjorn Otto, when you say household names, Exxon?

Bjorn Otto: Yeah, that could be Shell, BP, Exxon, Chevron, ConocoPhillips or Equinor, my, the company from Norway. But all of them are being dwarfed in comparison to the production combined from the national oil companies. This would be the national oil companies of countries like Iraq, Saudi Arabia, Iran, Libya, Kazakhstan, Nigeria, Indonesia, Malaysia, what have you. And it's a striking fact that even if we have seen

quite a lot of companies over the last years put forward, I would say fairly sophisticated climate plans to reduce emissions, many national companies have never done that before.

So this year, I think this is, to me, the significant part with the charter that was announced in Dubai, that this group of companies, more than 50 companies came together, covering nearly 50% of the world's total oil and gas production. They committed to get to net-zero operations by 2050. And, importantly, to reduce methane emissions to near zero by 2030, similarly to achieve the same by flaring.

Jody: So just to underscore this, this COP was a global stock take, right? This is the first, sort of, taking the measure of how countries are doing on their commitments to the Paris Agreement. And the consensus view, of course, is we're falling well short of where we need to be to control global average temperature rise to the 1.5 degree goal. But the focus on energy at this COP was unique. It seemed like this is the first time we have a set of commitments around energy, such as you mentioned, the tripling of renewable energy pledge, for example, the goal to double energy efficiency as you said, but also this charter, which we can talk later about whether we think it's significant, or not significant, or likely to be implemented or not, but just on its face is the first time the national oil companies have committed to do anything about methane. Is that a fair assessment? I mean that in itself sounds potentially significant.

Bjorn Otto: I think it's significant because I think the sum of this is that it has reach that we haven't seen before. It's a scale. Look at it, it's 5 billion tons, is a huge price if we had all companies joining. And it's also very action oriented because this is not saying, "Oh, we as society should reduce emissions," but these are companies with the emissions themselves saying, "We're going to take care of our emissions and try to bring them towards near zero."

Of course, the proof will be in the pudding here, whether the companies are able to deliver on the promise, but still I think we should celebrate the fact that they are actually daring to come forward and for the first time articulate the ambitions.

Jody: So I guess one way to encapsulate it is to say that even if we think the oil and gas industry should go out of business, and there are lots of people who want them to go out of business very quickly, right, Bjorn Otto, I think I've heard you describe this as too big a prize to ignore this amount of methane emissions that can be potentially controlled from these companies, both the IOCs and the national oil companies.

Bjorn Otto: So to put it into perspective, if all oil and gas companies in the world had joined, it's only 50% now, but if all had joined, the methane for instance, would've been 2 billion tons covered by this pledge. So to put that into perspective, 2 billion tons, that's equal to all airplanes in the world, plus all shipping and all shipping one more time. So it's huge.

There are very few other gigaton schemes out there that you can say, if we only do this, we can get hold of 2 billion tons of CO_2 emissions. So it is a unique opportunity. And then I think this is also the scope 1 where you would say that these companies are accountable for it. The production, the so-called scope 3 is of course much more of a complex transition for entire society.

Jody: Now I want to talk about what's happening in the United States as a kind of piece of this puzzle because timed with COP 28, the United States Environmental Protection Agency dropped the long awaited methane regulation that I'm going to turn to Carrie Jenks to describe because it encapsulates what the United States is doing on methane to help fulfill its pledge to the Paris Agreement.

And then we can get input from Riley on measurement science and technology, which is helping us accomplish these methane goals. And from Peter who can talk a little bit more about what the EPA's rule looks like to him and give us his assessment of these developments.

So Carrie, can you give us a primer on EPA's methane regulation under the Clean Air Act?

Carrie Jenks: Sure. I think we are seeing significant emission reduction opportunities projected from the final rule, and I'll mention four reasons for that. So this is the first time we're seeing EPA regulate existing sources. The Obama administration started this process and they just regulated new and modified sources. But now EPA has started the process to look at existing sources as well.

Jody: So here's why this matters. Existing sources are, if you will think about it, sort of the oldest leaky equipment, the pneumatics, the valves, the flanges and so on, the equipment that's involved in oil and gas production and processing and transportation. That's where a lot of the source of the leaks are. We call them fugitive emissions because they're not meant to be escaping. It's actually valuable product that's escaping. It's the gas. It's the methane molecule.

So I just wanted to put that in context because the Obama administration was going to regulate new sources, but the prize is the old sources. And under the Clean Air Act, if you set a standard for new sources, it triggers an obligation to set guidelines for the existing sources too. And that's what the Biden team has managed to do.

Carrie Jenks: Exactly. So for the first time, EPA is going to regulate methane emissions from these existing sources, which is a lot of sources. So I think that is going to lead to significant emission reductions.

The second piece is that they're requiring more technologies and more technologies that are going to reduce emissions. So for example, they're essentially eliminating routine flaring and they're also requiring companies to install zero-emitting processing technologies or controllers so that all of these sources, new, modified and existing, are going to have a lot less leaks that are happening from these sources.

The third component is that it's important to remember, and one aspect you mentioned at the beginning, is that methane is odorless and the methane emissions are happening as what people call intermittent. So it's happening infrequently, and you only know it's happening if you actually are looking in the right spot at the right time.

So what EPA is doing is trying to encourage companies to look more frequently. So the rule requires companies to look for fugitive emissions or leaks at least quarterly. And if they find those leaks, then there's specific timeframes and requirements for them to fix those leaks.

They also heard from stakeholders that there's new technologies, and these new technologies such as aerial surveys, drones, and satellites have the opportunity to better find these leaks if you're looking more frequently or more comprehensively. And so EPA worked with stakeholders over the past two years to think through how can they enable technologies to be used by companies assuming that they meet certain detection or frequency criteria.

And the last piece that I want to mention is the super emitter program. And that's what in broad strokes enables EPA to use third-party data from satellites, for example, to find really big leaks, 100 kg/hr. And EPA will look for that information, let the public know about big leaks that are happening and let the operators know about those leaks. And if that leak is a result of some underlying requirement to fix that leak or to improve the technology that's leading to that leak, then the companies have an obligation to address it.

So those are the four things that I think are really important to flag at the start of this conversation.

Jody: Now Carrie, you're saying there are a bunch of other technologies, we'll talk about them, that the rule actually allows and encourages the facilities, the owners to use. And what that means is they might be able to very inexpensively, ultimately, detect these leaks over time as the technologies evolve, and we might be moving toward a kind of system of continuous monitoring, which will allow us to see the leaks better. We'll talk about all that with Riley in a moment, but I just want to underscore that we have a rule here that's designed to accommodate and include the movement of technology as it gets better and cheaper, which I think is really important.

Peter, can you reflect a little bit on this rule that I know you've worked hard on, give us some more insight into what's new about it, what's important about it, but also speak specifically to the super emitter program?

Peter: Absolutely. So I think just in terms of some of the overarching important aspects of the rule, underscoring the points you made at the outset, Jody and Carrie, about the degree of emission reductions of a really vital pollutant that it's going to secure. So 58 million tons of methane reduced for context, that's almost five gigatons of CO_2 equivalent if we're looking on a short-term basis.

Another thing that's important to underscore here is that it's not just methane. The oil and gas pollution that will be reduced by these safeguards includes smog forming and other toxic air pollutants as well. EDF has done some mapping analysis looking at people who live in close proximity to oil and gas wells in the US. There are 10 million people within a half mile of a well that will be covered by these standards. So these are vital protections in terms of their impacts, both in stabilizing the climate and also in protecting people's health.

Turning to the super emitter program for me, for EDF, that's one of the most exciting and important features of the program. Reflecting back on this, we've had historically in the oil and gas sector regulatory approaches and then approaches where science and monitoring has occurred in parallel to those regulatory approaches. They haven't talked to one another in the past. This is the first time the Environmental Protection Agency has adopted a set of standards that really allow us to leverage the full weight of information that we have out there, including information that's being produced by Riley's group, Carbon Mapper, by EDF, by many others to help us to reduce pollution where and when it's happening, which is so vital for this sector.

Jody: So just to be clear, when we say super emitter, I want to make sure we know what we're talking about. When we talk about fugitive emissions, I think of that as just like equipment leaks. The equipment's old or it's failing or it hasn't been maintained — the flange, the pump, whatever's not working well and so methane's leaking. But when you say super emitter, we're talking about like a steam hatch is left open and the methane is pouring out and it's huge volume of methane. And that's the kind of leak that is sort of catastrophic if it keeps operating and nobody detects it, right? Is that a fair way to say it, Peter?

Peter: That's exactly right. And these are things like flares that are supposed to be combusting methane, but are just unlit and are venting methane directly into the atmosphere. When we've done surveys, we've found that a large number of those in places like the Permian Basin are unlit and contributing just an enormous amount of methane pollution.

Jody: Okay, great. Riley, can I get you in here finally? Will you educate us about all the technologies we've been talking about and where are we in the measurement science of methane and why is it so important?

Riley: Yeah, I think it's helpful to look back on where we were a decade ago versus where we are today and why the technological advances really have been transformative and why they help underpin and enable a lot of new policies and initiatives that are being put in place today to tackle methane and other greenhouse gases.

But just looking back at the progress that's happened over the last decade, on the measurement and monitoring front, there are two major applications to consider. One is accounting and accountability. So think here about inventories at the level of nations or states. The other is operational decision making. It's data that guides action right at the level of an individual facility or site.

We've made tremendous progress over the last decade, and when I say we, I mean a large ecosystem of governments, private sector companies, non-governmental organizations, academia. So that community has made tremendous progress in improving how we make measurements and account for methane emissions.

And to give you some context, a decade ago, the only methods we had for accounting for methane emissions were so-called bottom-up methods or inventories. And inventories are based on things like energy statistics and activity data, and emission factors, standard emission factors. That is to say if someone burns this much fuel, and you assume there's an emission factor, that translates this into so much methane and so much CO_2.

And the problem with that approach is those emission factors don't cover the real world perfectly. There are many ways that they can be wrong or incomplete. And one way that Peter alluded to is super emitters. One problem with standard emission factors for methane is they don't account for this skewed distribution where a small number of facilities emit disproportionately.

And so one of the major advances that we've seen over the last few years is the advent of top-down methods, or direct atmospheric measurements, where different sensors can detect concentrations of methane in the atmosphere and convert that into an emission rate, and not just estimate the emissions, but to actually pinpoint the emissions to their source at very fine scale.

So to give you an example, a decade ago with methane leak detection at say an oil and gas production site, the methods that were available were limited to a person walking around with a handheld infrared camera whether you would have to walk up to a piece of equipment, get pretty close to it to detect a leak, or very old school, audio visual olfactory approach. That is, can you hear it, see it, or smell it? And those were literally the state-of-the-art in finding leaks 10 years ago.

Today there's a proliferation of advanced technologies that include sensors that are flown on satellites and aircraft using remote sensing, instruments that sniff the air from drones and mobile surveys like cars, on some routine basis, and continuous monitoring sensors, not unlike a smoke detector that you might have in your house, but located right at the facility. And it's the combination of these technologies that are giving us increased situational awareness. And I emphasize the combination because each of these technologies have strengths and weaknesses.

Remote sensing technologies from aircraft and satellites give us very wide area coverage and basically unrestricted access. As long as clouds aren't present, you can sample every day or multiple times a day using remote sensing, you leave no rock uncovered. Continuous sensors are measuring literally 24/7, and they're designed to catch the burps and dynamic releases of gas that you would otherwise miss with a satellite overpass that only happens once a day. And the drones and the other sensors give us ability to go in and pinpoint and find emissions over large facilities and follow up on things detected from the continuous sensors and the satellites.

So it's this system of systems that's emerging that did not exist 10 years ago or even five years ago. And the not just advances in technology, but the overall growth and the number of actors who have access to this technology and are deploying it and can interpret it and apply it is also significant. The ecosystem of people today and the capacity that's on the ground today to deploy these technologies and interpret them and apply them is much larger than what we had a few years ago. It was limited to a few facility operators and some academics.

So those two things, I think both the increase in the number of actors as well as the new technology and science advances are laying the foundation for taking serious action on methane reductions.

Jody: So let's get into this a little bit because there are some concerns about, let's call it the democratization of methane detection, if you will. The original design of the program EPA adopted as its super emitter program, the one that Peter talked about, that Carrie mentioned, was to allow third parties, including private actors who have access to these technologies you described Riley, to go around, deploy those technologies and then essentially report them and identify the companies responsible. But that design didn't make it into the final rule. And instead, Carrie, maybe you can speak to this, instead a different design emerged. Can you describe the super emitter program, how it finally wound up and why you think it wound up being designed the way that it was with EPA more in the center of it?

Carrie Jenks: We saw in the final rule that EPA's taking more of a central role where they're looking for information from third parties, but they have to certify that third party to make sure they get the information in a way that is credible and that is transparent. And then EPA will make sure that the data meets its criteria and then give notification to the operator to say, "We think this happened. Go figure out what happened. You can look at your maintenance activities to see if you knew this was happening. You can look at maybe your aerial surveys or your last OGI [optical gas imaging] and tell us what you think was happening."

But there was also a push, I think from the NGO community that these communities Peter was talking about want the information as well. So EPA is also going to publicize the information that this super emitter event happened, but there is an opportunity, 15 days, for the operator to go out, make sure it was them, make sure they own the equipment that they think leak happened from, and make sure that they then do the attribution about 15 days later so that the public has full information in the end, but there's a back and forth that's going to need to happen between EPA and the operator.

Jody: So the idea here is to not name and shame the company before it has a chance to say, "Hey, it wasn't us, and we can show you it wasn't us." But then to put a deadline on that so that they have to investigate. And if it's them, they have to obviously repair it. Right?

Carrie Jenks: Yes.

Jody: Let me turn to Bjorn Otto back for a moment because as part of OGCI, the Oil and Gas Climate Initiative, which is an industry-led effort by the major oil companies, like you said, the household names, and you chair the executive committee of this effort, you go around, don't you Bjorn Otto internationally with funding from this group of companies to address big methane leaks. It sounds very much like what Riley was describing in terms of deploying advanced technologies to detect where these big, super emitter events are and to address them. Can you talk a little bit about that initiative, which again is industry led?

Bjorn Otto: Yeah, exactly. So as Riley said, I think we've been in a technological revolution basically over the last five, ten years in the ability to detect and also to act on new methane data. And of course this is something happening in the US, but it is a big challenge. How could we allow that technology to detect to travel to other markets where perhaps the access to technology is lower, but the methane emissions are even higher? Think North Africa, Central Asia, Middle East.

So what we have been doing as part of our program is to use satellite data to monitor oil and gas facilities at international sites, and then based on that, engage with the national oil companies, and they have actually been able to verify emissions and also to remove those emissions. So we found it as a collaborative way to provide data and then also to support and advise on how to fix those methane emissions. And the numbers are really significant.

Jody: But just so I understand because I don't really get it off the top, that you, an organization led by a bunch of oil companies, goes to Azerbaijan or Kazakhstan or somewhere and says, "Hey, we've noticed a massive plume of methane and you should pay to fix it," and then they just do? I don't understand why that would work.

Bjorn Otto: No. So what we're doing is that we're using GHGSat, which is a satellite provider, which has developed this technology to over time, they do flyovers, they are able to detect methane leaks. They run it through algorithms to make sure that it's corrected for weather or you're able to attribute it to a certain facility. And then using our national or local organizations, because OGCI members are present in most countries of the world, we are knocking on the door of various factories and saying, "Hey, we saw this data. Are you aware of this situation? Could you please have a look at it? Are you able to verify the leak?"

And the striking thing is that most of them are not aware of the leak. None of them have slammed the door in our face. On the opposite, they have embraced the approach and they've been able to verify the leak and also most of them actually been able to address those emissions and remove it.

So through this collaborative process at some individual facilities, we're nearly able to remove as much as one big company's total year emissions on methane.

Jody: It's so interesting. That's why I wanted you to talk about that a little because it seems like a program that a lot of people may not know about, but that is having an impact globally.

Riley, let me ask you a question about the super emitter program. I think there's a precedent for it, that is operating or has been operating in California that provides some of the basis for the federal approach to the super emitter program. Can you talk a little bit about that?

Riley: Sure. At Carbon Mapper, we've been working for some years to prototype the use of remote sensing to detect and pinpoint methane super emitters and then notify operators. And this is actually work that started when I was at NASA's Jet Propulsion Laboratory, jointly funded by NASA and the state of California some years ago. But more recently, the last two or three years, we've been conducting aerial surveys of multiple US states and we've been working both with regulators in those states and facility operators, and I mean oil and gas facilities, as well as landfills.

And what we do is we fly over large areas. If we detect methane above our threshold of detection, which tends to be a super emitter and they tend to be high emissions, we report that to someone. And in these pilot efforts that someone has ranged between regulatory agencies in the states of California, Colorado, and Pennsylvania, who then took the information and issued an email notification to the operators where we detected the methane, not as a regulatory action but just as a simple questionnaire, "Hey, an airplane flew over your site, they saw high methane emissions, they saw it repeatedly. It wasn't just a one-off. Can you let us know? Is that an expected emission? If it wasn't, if it's a leak, did you fix it?"

And interestingly, in all of these studies and roughly half the cases, the operators reported back that they were unaware of the emission until we reported it and they were fixable. And in a number of cases they fixed the emission. And then we flew over it again multiple times for weeks and months and verified that it was fixed. And that's been done now repeatedly over several years in several US states. And not just working with the regulators. We've notified operators directly for those that were responsive. And we've seen similar statistics both from the oil and gas and waste sector with operators taking voluntary action.

Again, the devil's in the details. Some of the things we've learned is it's important to get attribution correct to make sure you're calling the right people. And as much as anything that means having an accurate Rolodex, I'm going to date myself, that means you know who to call, because some of these are big organizations and you may not know in advance. But what we found is when you provide people with actionable data that's trusted, in many cases, they're incentivized to act. And so I think that's a good existence proof of what might be achievable if we provide incentives to scale this up and do it across the US and across the globe and to do it quickly.

Jody: Peter, can I ask you to explore one particular item we haven't touched on yet, which is the methane waste charge or methane fee, or if you'd like to describe it as a methane tax, that seems also accurate, that was embedded in the Inflation Reduction Act, the domestic legislation in the US that contained a lot of incentives to transition to cleaner energy technologies. But there was one feature of the IRA that is actually a tax on methane. And can you talk about how that interacts with the rule Carrie described? Because understanding that relationship I think is very important to understand what is the US doing about methane and what are the pushes and the pulls, what are the incentives and the penalties associated with it?

Peter: Absolutely. And as you said, Jody, I think this is a really important program. The Methane Emission Reduction Program, which is now a new section of the Clean Air Act, section 136 of the Clean Air Act Congress enacted this as part of the Inflation Reduction Act just last year. So this is Congress speaking directly to and affirming the importance of methane mitigation and creating a program that's separate but complementary to the EPA standards that we've been discussing here.

So there are a number of features of this program. The first is that it provides resources, provides funding for methane mitigation, for methane monitoring and the like. The second is that it requires EPA to update its greenhouse gas reporting program to ensure that the data is more accurate and based on more direct measurements than that program had previously been based on. And the third feature of the program is what you referred to as the waste charge.

What that does is to provide a charge on excess, and this is important, excess methane emissions beyond certain kind of industry-defined levels. And these are some of the same levels that are the basis for the oil and gas pledge that we discussed earlier.

So if operators are emitting beyond those levels, then emissions above those levels will be subject to a charge of $900 rising to $1,500 over time. So that's the basic structure of the program, and I think there's some important features to underscore about it in terms of how it works really well and consistently together with EPA's regulatory requirements.

There are a number of ways in which as part of the legislation Congress provided that if operators are subject to and in compliance with EPA standards that deliver emission reductions, at least as great as the proposal that was on the street when Congress passed the IRA, then operators will not be subject to the methane fee. So really this is intended to work as kind of a complement to EPA standards and to reinforce those standards.

Another thing I just underscore as being an important piece of this program is it helps to address methane emissions from sources and from categories that aren't a part of EPA's standards. So this is levied potentially on all emissions from a site and also for categories of sites like offshore oil and gas developments and the like that simply just aren't subject to EPA standards. So in that way, it helps us to get at other

important sources of emissions. It does it in a really performance-based manner, and it does it in a really intentional way working together with EPA standards that are in place.

Jody: So Peter, just one little detail there. Are you saying that let's say industrial ag operations that if we can measure methane coming from a big ag operation, that would be captured or I can't believe that's true?

Peter: No. I'm sorry. So this is all of the oil and gas sources that report to EPA's Greenhouse Gas reporting program. It's just that the categories there are broader than the categories that are covered by EPA standards.

Jody: Great. I just wanted a clarification on that so people don't think it's a bigger program than it is.

Carrie, I just want to come back to you on one more aspect of how the methane fee works together with the rule. Peter outlined it, but can we just do a little lawyerly nerd out among all of us for a moment on this? The way this works, please correct me if I'm wrong, is that if all the states have filed plans to comply, which is how this Clean Air Act provision works. So EPA sets these emission guidelines. That's the standard setting process. That's the first step. The states still have to file implementation plans, and that's the next step. And if in fact, all the states have filed their plans, and if the individual operators are in compliance with those plans, then they do not have to pay the methane charge.

I think what that translates into is a huge lever that is trying to force the operators in all of these different jurisdictions to get the states not to delay in filing their plans because these operators don't want to be paying the fee. Do I have that about right, Carrie? And Peter, feel free to jump in too.

Carrie Jenks: Yeah, I think that's right. I think a couple of caveats or conditions. EPA is going to propose this in the coming weeks. So we'll see what they propose and I'm sure they'll take comments on each of those points that you just made. But that is, I think, how we're interpreting what Congress wrote into the statute. And either way, I think it's important to flag that because of the role of states that you mentioned at the beginning of this podcast, there's going to be time when the fee starts, you pay it on 2024 emissions. All states are not obligated to submit their plans until around 2026. So either way, I think there is going to be a gap when companies will be paying this fee until all states have an opportunity t o submit their plans. But then it is a lever to try to get states to submit their plans so that companies are not paying this fee and are in compliance with the rule.

Jody: So we do expect revenue to come from this, which is partly why the name Inflation Reduction Act. It makes a modest amount of sense because there will be some billions of dollars raised by the fee into the US Treasury. Peter, you were going to say something?

Peter: Yeah, and if I could add just a couple things to Carrie's points. One of the ways just broadly I've thought of this structure is that Congress provided, if there is a uniform national set of standards in place, as is contemplated and required by the Clean Air Act; so if there are new source standards in place, and if existing source standards are in place, then we can rely on those. If that's not the case, then Congress provided an alternative structure to ensure that we're achieving emission reductions. So I think that's one thing.

The other thing I just want to underscore about this is this is the way in which Congress was really intentional about the interaction between standards and the methane emission reduction program. Of course, operators at any point can choose to reduce their emissions to below these levels and avoid paying the fee. So there are many different ways. I think it's important to characterize this as an incentive to reduce emissions, which it is. Operators won't necessarily have to pay fees if they reduce their emissions based on their own voluntary actions, which can start right now.

Jody: So Riley, can I get you in here with your comment on the methane fee, the methane waste charge, and other points that you may want to make about what we just talked about?

Riley: Yeah, I think one thing that's interesting to note with several EPA proposals that are underway, one being the methane emission reduction program, but also updates to the greenhouse gas reporting rule for oil and gas. And that is this move towards more empirical methods for determining intensity or leakage of an operation.

And I think this is important to see because you can see a thread running through these proposals not just from EPA, but some states. The state of Colorado, for example, is working on a methane intensity verification rule. And what that rule proposes to do is to allow operators to provide objective, empirical evidence of their methane intensity. And if they don't have the resources to do that, then the state of Colorado will develop a default emission factor or a default intensity for an oil and gas basin that those operators can use.

And I think it'll be interesting to see what the proposal is from EPA for the methane emission reduction program. But I just want to underscore this move towards more empirical methods of direct measurement based verification of intensities and that it's important in these frameworks, not just to address the super emitters, but all of the smaller emitters.

What we're ultimately after are the lifecycle emissions from natural gas and oil production. And empirical methods that cut across these supply chains will be critical not just for domestic regulations, but for emerging concepts like differentiated or certified gas frameworks that are being discussed by many actors.

So I just want to make a plug for empiricism in this discussion.

Jody: I want to make sure we understand where things are at because one often hears that while we're getting better with this whole variety of technologies at detecting methane, it's not clear that we're yet able to quantify emissions. In other words, you hear from folks in industry that they're being asked to monitor more often, they're being asked to spend money on technology to detect leaks, but that there's still a problem with quantification and with, I'll just call it attribution or allocating responsibility for leaks that it's still imperfect. Are those fair objections Riley, or not fair?

Riley: So let's unpack this, okay, because what we're talking about with quantification really depends on the application. So it's one thing to quantify the emissions of a super emitter at a location to convince yourself that it's above the reporting threshold and it's subject to the super emitter program and it needs attention.

And so there, simple threshold detection where one has confidence that the emission rate is at least a 100 kg/hr should be sufficient to drive action. That's like a smoke detector in your house. There's a fire, do something about it. That's different than quantifying the annual average emissions for that facility that accounts for how things vary in time because many of these emissions are variable or completely intermittent. There are examples of malfunctioning equipment where a lot of gas is released, but only when a certain activity happens. And so it really is important to address this time axis when trying to quantify emissions. And that's why when we talk about monitoring systems, we do talk about a range of technologies that account both for this variability as well as that threshold detection. So we should be clear that the question of how good is good enough for quantification depends on the application.

The other point I want to make here is that we're never going to completely get rid of bottom up accounting and models because to really understand the emissions of a facility or an operation, one also needs activity data. And so you can't get away from needing to understand information about how the facility is operated.

So there are teams of people in government, in the private sector, in academia, in the NGO space working on frameworks, the so-called monitoring measurement reporting verification frameworks that account for all of this. They account for what the measurements can and can't see. They account for different data sets including machine learning and models so that at the end of the day, we have correct and comprehensive and complete accounting.

Jody: I do want to pivot and ask you Bjorn Otto to take us back up now to a kind of international level for the moment, and with your experience in the industry and with the oil and gas industry, help us understand something. Why is this a moment in which one sees prominent players in the oil and gas industry, the publicly traded companies, some of the national oil companies finally stepping up on methane? Can you help us understand the incentives, the motivations, and the dynamic at play within the industry at the moment? Why are we in this big methane focused moment and why are they prepared to make some commitments?

Bjorn Otto: I think it's a very good question, Jody, but the way I see it is that we're seeing an alignment of different forces happening at the same time. So you're seeing a lot of evolvement or development not only in the US but also in Europe and elsewhere on the regulatory space. You're seeing industry initiatives coming forward. And then you're seeing a bit of breakthrough on science over the last years as well, recognizing the importance of methane because it wasn't always the case. And then adding that to the technological progress made.

And I think the real thing is that these things are all coming together saying there's a recognition that to address methane is possible, it is impactful and it's also doable and it's probably the most cost-efficient, large scale climate effort available across any sector. And the important part of that is that if we're able to do that, it's going to give us the time to develop more complex solutions and to scale all the low carbon energy solutions needed.

So we need to have full speed on a portfolio of things. But the methane one is particularly important. The way I think why so much of the industry is recognizing the challenge is that there is an analog in the history of this industry from before when it comes to safety incidents for instance, because in safety, most companies have adopted a philosophy of zero tolerance. So basically you have the assessment that virtually all safety incidents can and should be avoided.

Similarly, I think most oil and gas companies have the view that any oil spills, oil on the ground or oil in the sea can and should be avoided. And what we're seeing now is that more and more companies come to recognize that methane emissions also can and should be avoided. So trying to adopt this mindset of zero tolerance or getting to zero, and to me that is the big breakthrough. And the positive thing is that I actually believe that most engineers, they would like to run a well-run plant and they're biased to have good operations and methane emissions is not good operations.

Jody: Yeah, that makes a lot of sense and it's really helpful context to have. I also will say that one can be in favor of the methane agreement, the decarbonization charter from COP, while still wanting to see other steps on scope 3 emissions for example. One can still say, look, the industry ought to make commitments about dropping overall production, right? Or the industry ought to commit to no new field development or it ought to show more investment in renewables. You could say all those things are urgently needed and yet at the same time think that the methane progress is important.

Bjorn Otto: Exactly. Even if you agree or disagree to those things, I think everybody can agree to that, let's try to fix methane, and that is what's the focus now. So it's a source of optimism. And I think to me, this climate meeting in Dubai, the COP, was also important because it wasn't only about US companies reducing the emissions in the US. It was also recognition that let's broaden the tent, get more companies on board, and also to try to give a bit of a helping hand.

So a part of the agreements that were presented, there was a establishment of a fund to make financial resources available for countries that struggle to finance their methane mitigation programs. And there was also an effort of the industry also with EDF, Environmental Defense Fund, and Peter's team to go together to say, let's try to work together to help accelerate the transition of best practices in the emerging markets and developing countries.

I think the combination of awareness, financial resources, but also technical support is maybe the cocktail that we need to really see things moving quickly. And 2030 is only a handful of years away, so we don't have that much time. There's a big job to be done.

Jody: I love that you said this is a source of optimism. I'm always of that mind myself. One can look at these COP meetings and come away with a very different reaction depending on what one's baseline is, right? If you want to say that success is an agreement to phase out fossil fuels and nothing else counts as success, then you're disappointed by the meeting. But if success is a fair assessment, the global stock take is performed and people have a level set on what we need to still do. And then there is the first ever language about transitioning away from fossil fuels, and there's a first ever decarbonization charter to reduce methane with national oil companies making first ever commitments. I mean, you could come away with a more optimistic view.

We have a colleague at the Harvard Kennedy School, Rob Stavins, who says, you just can't say a COP is successful or it's a failure. That one on-off switch doesn't work. These are complex negotiations. They evolve from meeting to meeting and you have to put things in context. And I really agree with that. So I actually feel somewhat optimistic coming out of COP 28, but maybe that's just my temperament.

Bjorn Otto: I think the COP is starting to become at least two things because you have the negotiated agreements between governments. That was a statement. That was the articles being evolved. And then you're starting to see this nearly like a jamboree of businesses and societies coming together to put up voluntary efforts and trying to contribute. And I was lucky I was there myself, and I found it actually quite inspiring to see it was close to 100,000 people every day inside the gates. And knowing that all of them are working on different parts of this challenge and are eager to solve it, I think it's a bit of inspiration.

Jody: I love the methane example, and I love each of your contributions to this, Peter and Carrie and Bjorn Otto and Riley, because I think this is an illustration of the complexity of climate change and also the potential for solutions to emerge when the politics, the industry trends, the technology, the economics, they all align. And then maybe some magic can happen.

I mean, there's a domestic push in the US on methane that's being driven by regulation in a top-down way for the first time from the federal government, but it's meeting the moment of some bottom-up commitments from the oil and gas industry,

and it's matched with a congressional effort to put finally a methane program in legislation. And it's interacting with a global dynamic where there are international pledges on reducing global methane and an industry-led effort coming out of COP 28. And you put all of this together, and that's why I say it's a methane moment and why I wanted you all to be here to talk about it.

Can I ask for closing thoughts from all of you? Perhaps what you're looking at now, whether it's to see what developments will happen or what you're really watchful around that you think will be an indicator of whether we're going in the right direction? Let me start with you, Peter, and then we'll go through everyone.

Peter: Thanks so much, Jody. Just I guess first want to echo the optimism here, and I think specifically on the EPA front, and Jody, you noted a number of stakeholders across industry, environmental groups, governments, community groups who've been engaged here. One of the things that's a source of optimism for me is that EPA's rule here in the US was broadly supported by just a wide range of stakeholders. And so that's I think really important and something we'll be watching going forward.

In addition to that, there are a number of other important levers that we can deploy here to continue driving down methane emissions. Of course, there's the methane emission reduction program that we've discussed and will be implemented over the coming year. There are standards that the Department of Transportation is moving forward with to reduce pipeline methane leaks that rely on many of the same technologies we've been discussing here. So these are approaches that work for other sources, and we're in the process of expanding.

And then beyond that, I'd say some of the really important developments that EPA has advanced here, we're thinking about how we use data more effectively to reduce pollution, are things that we can think about working in other contexts. So Riley mentioned just briefly earlier, landfill methane emissions. Some of the approaches that we've developed and have really worked here can be applied to reduce emissions more broadly. And I think we have a real opportunity to accelerate and advance actions like that.

Jody: That is terrific. And again, optimistic. Riley, closing thoughts from you?

Riley: I'm also cautiously optimistic. I think what we've talked about here and other work shows that there is an existence proof that when properly incentivized and equipped with tools including technology and science and data and good policy, that many actors will take action to reduce emissions. We've seen this in prototyping and pilot efforts we've done in various US states and now some countries in the Global South. And I think that's a good start. But I want to underscore that the devil's in the details. And what I mean by that is implementation.

I've spent over three decades working in the space program, and I know that implementation is critical. You don't get an A for a 90. You have to get 100%. And I think that's important for us with methane.

What's next for us as a community is we have to scale up. We have to achieve velocity. We have to establish true transparency. And that requires commitments from governments in particular and the rest of civil society. And not just for oil and gas methane, but for other key sectors, landfills, coal, agriculture. And I think it's important for us to be able to walk and chew gum at the same time. We need to be tackling those other sectors in parallel.

And I believe if we can be successful with that, we can also have lessons that apply to the other big greenhouse gas sectors, including CO_2. So I am optimistic, and now we just got to double down and deliver.

Jody: Excellent. Carrie, closing thoughts from you?

Carrie Jenks: Yeah, I would agree with what everyone has said about optimism and opportunity. I think if you're stepping back, EPA started this rulemaking process knowing that technologies were advancing faster than it might be able to keep up with and design a rule for. So they designed this first rule to enable technologies, and the question is, can we also align the waste charge rule, Subpart W and this implementation that Riley was just talking about, to really keep those incentives going for technologies so that companies have the incentives to look better and look more frequently.

Jody: Just an additional comment there. It just underscores how policy design is so important. Whether it's the design in legislation or the design of the regulation by the agencies, you really need to be smart. You really need to figure out what the companies will need to do a good job on compliance. You need to keep up with technology and trends. And so smart regulation by smart people doing smart things helped by smart people on the outside, that's where it's at. That's what I'm selling.

Bjorn Otto, can you bring us to a close with your thoughts on the methane moment?

Bjorn Otto: In the climate I think one of the challenges is that for many parts of the solution, we really don't have the solution. We don't have the technology. We have to do a lot of innovation before we're able to find solutions.

To get oil and gas operations to near zero methane it's not science fiction. There are companies out there, Equinor, and I may surprise you to tell you that Saudi Aramco of Saudi Arabia, both of them are proof that it's possible to produce oil and gas large scale operations with near zero methane emissions. And the IEA is actually saying, if all oil and gas companies had produced with that footprint, 90% of the problem would've been solved.

Now we have a toolbox that we haven't had before on technology, policy awareness. So to me that's a source of a lot of optimism. But the job is not done until the implementation is really happening. So the clock is ticking. We have seven years to get the job done, and I think it can be done because this industry is also good at execution when it knows that this is part of the solution that it needs to apply.

Jody: And again, nobody's claiming that this is the solution to climate change because you still have to deal with the phasing out of fossil fuels, and that's a commitment that is a separate one from, while oil and gas is being produced, you must deal with the methane problem. I think that's what we're saying, right?

Bjorn Otto: That's the important part. And I think probably somehow the oil and gas industries addressing methane emissions will also be very important for our overall ability to address methane emissions in coal mines bleeding off or in landfills or even agriculture. So there is learning, but this is the sector that have the biggest potential to move quickly within this decade.

Jody: So I'm going to leave it there with thanks to you, Peter, Carrie, Bjorn Otto and Riley for joining us. I mean, as always, we don't succeed until we've succeeded. The devil is in the details. Implementation matters. I always like to invoke the scene from the movie Charlie Wilson's War. If any of you ever saw that movie, there's a CIA agent played by Philip Seymour Hoffman in that movie. And every time there's a new development, this happens to take place in the context of the war in Afghanistan in the 1980s the CIA agent says, "We'll see. We'll see." Which is exactly the place we have to be, which is, we'll see. This all sounds very optimistic, but we'll see. And I know you'll all be working hard at it from your various vantage points. I thank you for all the work you've done. Thanks for joining us on CleanLaw, and I hope we can all revisit this in time and see where we've gotten to. Thanks everyone.

Bjorn Otto: Thank you.

Peter: Thank you.

Carrie Jenks: Thanks Jody.

Riley: Thank you.