THE BROOKINGS INSTITUTION
Climate Sense podcast

"Reduce methane leaks and flaring for cleaner oil and gas production"

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Episode Summary:

Burning fossil fuels for energy is the primary source of global greenhouse gas emissions. However, fossil fuels are so central to the global economy that phasing them out will take time. Host Samantha Gross speaks with Deepak Anand from GHGSat and Halfdan Millang from IFC Finance about how to reduce greenhouse gas emissions in oil and gas production, through eliminating methane emissions and flaring.

MILLANG: I spent 40 years, or more than 40 years, actually, in the oil and gas industry. The industry has got the legacy of doing “Mission Impossible.”

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We’ve been building production station in thousands of meters of water depth. We’ve been drilling 15 kilometers wells with centimeters of precision. We have financed the largest projects on the planet. We have black belt in partnering and contracting. Fixing flare gas problems and methane leaks? That’s a walk in the park.

I think it’s about time that the industry joined forces. and use the capabilities that we have, and we should lead the path into net zero. And we can do that.

GROSS: The oil and gas industry is central to our energy system, and we all know that burning fossil fuels is the key cause of climate change. But greenhouse gas emissions don’t just happen when oil and gas are used. There are also emissions in the production process.

We’ll talk about two of those emissions sources today, and about efforts to reduce them. The first important source of emissions is methane leaks. You might remember in episode one last season when we talked about methane. Methane is the primary component of natural gas, but if it leaks into the atmosphere, it’s a really potent greenhouse gas—as much as 30 times stronger than carbon dioxide, depending on how you measure it. Scientists estimate that nearly a third of the warming we’re experiencing today is due to methane emissions.

The second source is flaring—burning natural gas produced along with oil instead of putting it to use. This sounds kind of dumb on its face, but if there’s not infrastructure in place to move the gas to somewhere useful, it is burned away and wasted. Clearly this is better than releasing natural gas, which is mostly methane, to the atmosphere, and a whole lot less dangerous! But still, burning that gas for no use is a source of greenhouse gas emissions.

When it comes to eliminating both of these emissions sources, we know how to do it. The answers are some cool new technology and investment.

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I’m Samantha Gross. I’m the director of the Energy Security and Climate Initiative at the Brookings Institution and I’ve spent my career focused on energy and environmental issues. I’ve been in Washington for more than 20 years, working on energy policy in government and private industry before I came to Brookings. But I started my career as an engineer, designing technical solutions to environmental problems. My work now focuses on how to transition to a clean, zero-carbon energy system—the technical, political, and social challenges in getting from here to there.

Let’s start with a focus on the technology side of dealing with methane leaks.

[3:20]

ANAND: So, my name is Deepak Anand. I’m the chief revenue officer at GHG Sat. we are a Montreal-based green tech company. We help operators around the world

of landfills, oil and gas, coal mining sites to better understand their emissions, and really specifically their methane fugitive emissions.

We use proprietary technology that we have built into sensors, and we actually mount these on satellites and on aircraft to do these from space and from the skies. This allows unprecedented scale and allows us to cover many more parts of the world than have been able to done in the past.

GROSS: It's easy to understand why you want to find methane leaks. But why do you need airplanes and satellites to do it?

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Methane is difficult to detect, and it is lighter than air, so it rises as it's released. Ground level sensors won't necessarily pick up leaks, plus you would need many expensive, finicky sensors to cover all the area of a large production or processing facility.

Putting the sensors on airplanes or satellites allows them to cover a wide area of the surface with just a few sensors. This is especially great for large operators that are bound to have a few leaks somewhere, just based on their size. But the question is where?

[4:50]

ANAND: And the way I compare it is, if you live in a really small house with one or two windows, yeah, you probably don't have a leak for air conditioning or your heating from a window or a door. Now, if you live in a bigger house that has four different doors and 18 windows, you probably have a leak. Well then, what about someone who owns an office building that's 65 floors and has over 4 million square feet of building space? They have a leak. Something somewhere is leaking.

So, we help those clients that are that big. So, think large oil and gas, large landfill, large coal mining. We work with the biggest in the world and we help them to find those leaks.

Then there's also a lot of clients that are like 15, 20, or even 50 different sites all around the world. So, you need that constant monitoring at scale.

GROSS: Okay, so now we've found those methane leaks that are bound to happen in equipment. Nobody and nothing is perfect. Mistakes and equipment malfunctions happen. Then what?

[5:58]

ANAND: I think a lot of these operators know they have leaks. They know they have the issue and they also know that the solution is often going to be A, B, or C. They have the data to say, well, the last 25 leaks that we fixed, they were of these three categories. So, the issue is not the what and the how. The issue is the where. It's where do we go to fix this? And again, if you're a house with two windows, and I say a window's leaking, you can check both windows. If you're a house with 40 windows, it takes a little bit longer. But if it's a condo building with 10,000 windows, different

story, right? So, it's just the idea of being able to identify where the problem is. Figuring out the problem and then fixing it is usually not the hardest part.

The other nice thing that we've noticed is that most operators want to know where the problem is. They want to fix it. Nobody's burying their head in the sand. Nobody's ignoring it. Even in jurisdictions where regulations are not pushing them to do anything, even in those jurisdictions they're coming out saying, hey, can you help us to identify where problems are? Because we want to be the cleanest oil and gas producer or the cleanest waste management company in the world.

So, it's really, really nice to see that both the intent is there, the resourcing, whether it's people or funding, and the technology have all met at a time when, to be honest, we needed it pretty much yesterday, so everyone's ready to do something about it because we really need to do something about it.

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Like, we have to fix this. If half the oil and gas companies in the world have no leaks and half continue to leak, nothing's going to matter. We really need to work on this together. So, it's really nice that everyone wants to share that information.

GROSS: Yup, clearly, we do have to fix these problems. They make a serious difference in terms of our greenhouse gas emissions, right now. Deepak is focused on finding methane emissions from the sky. My next guest is working on the ground to reduce greenhouse gas emissions from oil and gas production in some difficult places. You heard him speak at the start of this episode.

[7:51]

MILLANG: My name is Halfdan Millang. It's a Norwegian name. It actually means half Danish, but I'm not. I'm the CEO of ICA Finance, that short for Immediate Climate Action Finance, it's a company based in Oslo. We're not that many people, but we have operations countries where there are no or very little regulations,

We're helping national oil companies and independent oil companies to reduce emissions from their operations.

GROSS: How do you chose where to work and what kinds of projects are we talking about?

MILLANG: We operate in countries with little or no regulations that coincides with countries where you have a lot of emissions from the upstream oil and gas industry.

So, we have operations in Nigeria, in Iraq, Algeria, Turkmenistan, Uzbekistan, Azerbaijan. So, basically where you find a lot of emissions. And also that's where we have the best potential for doing impact.

We're doing pretty basic things like methane emissions from operations. Basically, we go out and find gas leaks and we fix them. So that's one type of projects. The other type of project is that we are doing flare gas recovery projects. We basically put out gas flares. And we're doing vapor recovery, that is vapors coming off storage tanks.

A few years ago, I was doing projects in Nigeria. And I tried to explain to my son, he came to me and said, Dad, what's your job? Because they have friends, they're doctors, lawyers, bus drivers, carpenters, you know. I was sitting there thinking, what am I doing? And I showed him a picture of a flare in Nigeria. And I said, I go out and I put out these, I stop them from burning.

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So, a couple of days later I came to the kindergarten to pick him up, and one of the ladies in the kindergarten came to me and said, Halfdan, I didn't know you're a fireman. I thought, fireman, where does that come from? She said, your son Julian told me that you're putting out fires in Africa.

GROSS: I love this story, but it's exactly right. And these are some important fires to put out. Frequently, projects were built to produce oil, and the natural gas that often comes along with oil was wasted, sent up to the flare to be burned. It didn't make economic sense to build the pipeline infrastructure to recover the gas and send it to be used, like for power generation. Or sometimes the political structure of the country or its energy companies just didn't support building that sort of infrastructure.

Policies can bring about results that don't make a lot of sense when you look at them from the outside. But natural gas *is* valuable, and many countries with flaring issues also want gas for power generation. You just have to get these projects done.

[10:52]

MILLANG: Let's start off with a big picture. We're flaring the same amount of gas as we did 30 years ago. We need to have financial incentives in place to make people stop this wasteful practice. And the order of magnitude is quite staggering. We're burning about 140 BCM. That's a huge number, but it doesn't mean anything to anybody.

GROSS: But that number does mean something to me. One hundred-forty billion cubic meters is enough natural gas to meet all of U.S. demand for nearly two months. The world is wasting that much gas every year through flaring.

MILLANG: Let me take one country in which we operate. And I'm not going to name it for confidentiality reasons. They burn 5 BCM.

GROSS: That's 5 billion cubic meters per year of natural gas flared. Just for comparison, five BCM is enough gas to meet the entire needs of the United States for about two days. That's not small potatoes, especially just for one country.

MILLANG: That is about 10 million tons of CO_2 per year. That is, it depends how you calculate that, but that's about two and a half million cars, roughly, you can take off the road from one country. The value of that gas, if you could sell it at gas prices, which we have in the U.S for example, that's gives you a revenue of about 200, 300 to 500 million U.S. dollars per year, which is just burnt. Just up the chimney doing nothing except for polluting the environment.

Why do people keep on doing that? And I think point one, there is no regulation. So, they don't really have to, this is legacy. I mean, that's the way they developed oil fields back in the days. There's no financial incentive to do so.

And if you put on an oil company hat, this particular country, they're screaming for more gas for the domestic markets. So, when they're given a budget, that budget goes to exploration for gas and developing new gas fields. And that's what oil companies do.

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They don't do small … we're talking 50 flare sites, 50 flares. They do not have the people, the resources, or the capacity to do that. So, I think that's part of the explanation at least.

GROSS: This is a sad fact. Incentives are such that it makes more sense to go out and drill new wells to produce natural gas rather than capture the gas that is currently being wasted. Different regulation and incentives could help in the long run, but sometimes you need outside help to just get a project done and stop wasteful practices.

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The other way that Halfdan's company is reducing greenhouse gas emissions in these countries is finding and fixing methane leaks.

[14:11]

MILLANG: The methane leaks are hard to find because you don't necessarily see them when you're on site and you, they're not that easy to detect. We just signed a contract with both the Minister of Oil in Iraq, and also Sonatrach, the national oil company in Algeria, to help them decarbonize their operation. And we typically start off with doing internal capacity building because we want to be able to communicate on the equal footing when it comes to the terminology and so on.

The next thing is to build an inventory, and to see how large is the problem? That's where the satellites comes in, and that's where Adnan and his merry men at GHGSat doing a fantastic job. And incidentally, GHGSat is also partly owned by Climate Investment that's also invested in our company.

So, we do a lot of in Iraq at the moment in phase one of this project. That's exactly what we're doing. We're downloading all the information we get from GHGSat and we start building the inventory and start ranking the projects and building methane emission mitigation cost curves to see where we could go first and generate the maximum impact and so on.

And it's in fact the currently the only area where new, innovative technology comes into the picture. The rest going out and fixing these methane leaks is known technology. I would say that more than 90 percent of all methane related problems we do have the technology and we do have the knowledge and we know how to deal with it.

After you have gone through the first program of, of fixing the leaks, you need continuous monitoring and verification work where there's a lot of development in terms of sensors and that sort of stuff that comes in handy.

GROSS: It's exciting to me that fixing these leaks is often the easy part—sometimes just a person with a wrench. Finding them is the more difficult part, and where the cool new technology comes in.

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How does this work get financed? These countries don't have incentives in place to do this work—either regulations against flaring and leaks or even financial incentives to build the infrastructure to sell the natural gas.

The financing comes from selling offsets, also called carbon credits—businesses paying for emissions reductions elsewhere because they are cheaper and easier than making them in their own operations. We talked about the peril and promise of carbon credits in the climate finance episode. But the market for carbon credits has its own issues and raises challenges in getting this necessary work done.

[17:05]

MILLANG: We are getting the revenue from carbon credits. And we're also part financing these projects through carbon credits. When you go in and you do a project, you don't know exactly the volumes you're going to get out. You definitely have no idea about the carbon credit pricing you're going to get.

I gave a presentation in Houston a couple of weeks ago and I showed the projects we had, and we had Iraq, Nigeria, Turkmenistan. One of the representatives from a financier looking at this and saying, Halfdan, I look at this and I see all the country names. These are all red flags all over the place. The country risk is unbelievable.

And I told him, listen, it may look like that, but Nigeria is possibly one of the easiest places we operate. And I said, our largest country risk at the moment is actually Germany. And the guy looking at me and he was about to fall off his chair and saying, what are you talking about? We have financed or part financed these projects, putting money on the table for implementation of these projects on the premise of being able to sell these credits in the German FQD [Fuel Quality Directive] market. And in the middle of the process, the Germans turn around and they change the law. And we adapt to the law, and we continue investing. And we're in a situation where they're just blocking it for some internal domestic German environmental discussions.

Ad this is in a country that has signed an agreement with Uzbekistan to help them with environmental issues. And at the same time, they're blocking now six projects we have on the ground in Uzbekistan that would actually deliver measurable emission reduction.

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I think it goes to show, Samantha, that when it comes to risk, I didn't see this coming, and I didn't have the imagination to go there. And you, you tend to think that, okay,

Niger Delta, that sounds problematic. Yes, it is. And these projects, they go for a long time. The last project we did in Nigeria, we monetized in Nigeria, it took 12 years from when we started until we got paid. And that's not because of the Nigerians, it's because basically the project went on and on and on and on, until we actually managed to complete it.

GROSS: Risk comes from all different directions, and sometimes those you don't expect. The discussion with environmentalists in Germany raises a key question that a lot of our listeners probably have too. These efforts are helping the oil and gas sector run better. Is this a great idea in a world where we want to get away from fossil fuels? Should we be shutting these facilities down, not fixing them?

[20:10]

MILLANG: Let me start off, why can't we just shut off this oil and gas production? Well, for a start, you can only do that when you have alternative, renewable energies in place, and unfortunately the development or the implementation of renewable energies goes at the given pace. And as long as it's not going quicker, then you end up with filling up with oil and gas or even coal or whatever you can.

The government's one of the key responsibilities is to make sure that the society has access to energy, the security of supply. So, unfortunately, we can't just cut back on oil production before we have any alternatives. So, the answer to that, we need to invest a lot more money a lot quicker into renewables.

The second question you come up with and must say I actually agree with the people that are saying, the oil industry makes money, they should clean up their own mess, and you just put regulations on them, and they have to fix it. In principle, fully agree, the polluter pays.

Unfortunately, if you look at history, and this is back to where we started, Samantha, is that we're flaring as much gas now as we did 30 years ago. So, good how is this strategy working? And it's not … we need to have some financial incentives in there.

The heading of what we're doing: it's a fair, just, and equitable transition to net zero. And that transition is not going well Samantha. That transition is not moving with the pace it should be moving. And in this game, every ton matters. And I think I'm going to have this … I never planned to have a tattoo. If I'm going to have a tattoo in my life, it's going to be that. "Every ton matters."

And in particular if you look at it in the 2030 perspective, look at emission reductions and have a full focus on that, we should at least remove all the unnecessary emissions we have at the moment, read upstream oil and gas.

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And by the way, there is no other place on the planet where you could have so large impact with so little money as you can in the upstream oil and gas industry. So just go out and get it. And then you're coming into why can't oil companies pay for it themselves? It's partly because how they operate, and it is also becoming back to this just transition.

And let me just take one example, which is probably the easiest to understand. International oil and gas industries developed oil and gas production facilities in the Niger Delta. They did it on the standards at that point in time, which included flaring. They made lots of money on it. And when the going started to get really tough, they pulled out.

So, most of the international oil companies have pulled out of the Niger Delta. It's taken over by the local oil companies that are notoriously underfunded. Whether you like it or not, we need financial incentives such as carbon credits to ensure that we will be able to implement these projects in the upstream oil and gas. And we will have to accept that under the heading, just transfer, just an equitable and fair transition into net zero. And if we don't, it won't happen.

GROSS: This isn't easy, and it's an example where parts of the oil and gas industry don't have the deep pockets that we're used to hearing about. A lot of oil and gas producers in the developing world rely on energy revenues to keep their country going. And thus, producers push their equipment hard and are often strapped for cash.

But Halfdan points out that these are some relatively inexpensive greenhouse gas reductions that we know how to do, right now. Deepak Anand lets us know that the technology part really is possible too.

[24:26]

ANAND: I think we're actually at a critical point right now where the technology has reached a point where we can now start to make a tangible impact and actually start to fulfill the 2-degree goal that we have for the world.

And, you know, we've never been there before. I think now what has to change is that it's there, it's on the shelf, it's ready to go. Now it's less talk, now it's less about theory and planning, and it's all about action.

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There's lots of debate, but the one that I like to hold on to is if we correct the methane issues that we can correct right now, so with technology and data and hardware we have right now, we should be able to get to 1 degree of the 2 degree pledge. So, we can get halfway to our goal just even with one greenhouse gas, and then we deal with the other one.

This is that big chunky part we need to do first. And the nice thing is I think people get that now because people have been talking last year was the methane moment. Now it's starting to happen. We just need to all keep doing more and more of it.

GROSS: I'll go back to my earlier point on fossil fuels. We can get hung up on the long-term goal of eliminating fossil fuels and forget that making fossil fuels better is still a worthwhile endeavor, especially if these are emissions reductions we can have today. I'm a big believer that the fossil fuel industry must be part of the clean energy transition, and while we still use fossil fuels, we want them to be as clean as possible.

[25:55]

ANAND: We're at a critical point where we now have what we need to fix probably the biggest problem facing the world. And that's both scary and awesome at the same time, but it'd be much scarier if we just had the problem with none of the solution.

And there's a lot of very dedicated people and smart people that want to fix this. And there's also, it's big business. There's a lot of money, which is kind of a good thing because. If it wasn't, you just don't get as much interest in it and, you know, governments are interested, agencies are interested, businesses are interested.

If everyone wants to fix this problem for whatever reason, and now they have the tools to do it, we're in a great spot.

GROSS: This is an optimistic episode. And for good reason; I'm telling you that an important contributor to global greenhouse gas emissions is fixable.

We sometimes focus on the really hard things we need to do to cope with climate change. Changing the world's energy system is hard. Changing how key heavy industries fuel themselves is hard. But there are easier things we can do in the short term to bring emissions down and help buy us more time to accomplish the harder changes. Eliminating greenhouse gas emissions in oil and gas production is one of those easier tasks. We can do this.

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Many thanks to the experts I talked to in this episode. This is the final episode of season two. Thanks so much for tuning in, and I hope you have enjoyed listening and learning as much as the team and I have enjoyed pulling this season together.

Climate Sense has been brought to you by the Brookings Podcast Network. Fred Dews is the producer; Gastón Reboredo the audio engineer. Thanks also to Kuwilileni Hauwanga, Daniel Morales, and Louison Sall, and to the communications teams in Brookings Foreign Policy and the Office of Communications. Show art was designed by Shavanthi Mendis.

You can find episodes of *Climate Sense* wherever you get your podcasts and learn more about this show at Brookings dot edu slash Climate Sense Podcast. You'll also find my work on climate change and research from the Brookings Initiative on Climate Research and Action on the Brookings website.

I'm Samantha Gross, and this is *Climate Sense*.