

## Transcript of the Climate Positive Podcast: Going beyond megawatt hour matching

**Chad Reed:** I'm Chad Reed.

**Hillary Langer:** I'm Hillary Langer.

**Gil Jenkins:** I'm Gil Jenkins.

**Chad:** This is *Climate Positive*.

**Chad:** Of those four different strategies, which do you find is the most impactful in terms of emissions, and which is the most cost-effective?

**Hank:** Most cost-effective and most impactful on carbon emissions are both the carbon matching strategy because using this strategy, it allows you to target your investment towards areas where there are still abundance of coal generation on the margin, or there are still a lack of clean energy policies.

**Chad:** For several years, well-intentioned companies seeking to reduce their emissions from electricity consumption – a primary component of their Scope 2 emissions – have bought Renewable Energy Credits (RECs) or signed Power Purchase Agreements (PPAs) to offset the emissions associated with their consumption. Known as energy or megawatt hour matching, this approach, which forms the backbone of the Greenhouse Gas Protocol's Scope 2 Market-Based Method accounting system, does not distinguish the time, location or emissions profile of a company's electricity consumption from that of its REC and PPA interventions to offset this consumption.

But as different grids have decarbonized at different rates over the years, the emissions impact of a REC purchased or PPA signed in one location at a particular time no longer necessarily has a similar impact to RECs purchased or PPAs signed in different locations at different times. In essence, at least as it pertains to carbon impact, not every megawatt hour is created equal.

In this episode, recorded at the GreenFin 23 conference in Boston, I lead a panel of industry experts – including Katherine Collins of Putnam Investments; Hank He of Tabors Caramanis Rudkevich; Lee Taylor of RESurety; and Rob Threlkeld of General Motors – on the deficiencies of energy matching, the benefits of a new approach known as carbon matching and the resulting implications of ongoing efforts to reform Scope 2 of the Greenhouse Gas Protocol.

**Chad:** Thank you, everyone, for joining. I think we'll get started now. We're here today to talk about the Greenhouse Gas Protocol, a very sexy topic that only attracts the devotees, the real environmentalists among us. I'm Chad Reed and I lead strategic initiatives and ESG for HASI, formerly Hannon Armstrong, a leading climate-positive infrastructure investor. To set up today's panel before we get to introductions, I'll just note that more than 90% of the Fortune 500 companies report their emissions using the Greenhouse Gas Protocol, or GHGP, which supplies the world's most widely used greenhouse gas accounting standards. Specifically, the release of the Scope 2 guidance in 2015 coincided with significant growth in corporate voluntary procurement and has been foundational to corporate decarbonization strategies ever since.

Despite significant advances in data analytics around emissions measurement, it's been nearly a decade since the GHGP was last updated. Thankfully, WRI and the World Sustainable Business Council – the NGOs that manage the GHGP – recently kicked off the update process, soliciting feedback from stakeholders across the spectrum. Today we have a very esteemed group of influential stakeholders, including a corporate buyer, an investor, a power market software and service provider, and an energy and economics consulting firm that specialize in the electric grid to discuss how we can best update the GHGP to focus on maximizing emissions impact in support of sectoral decarbonization. First, I'll ask our panelists to introduce themselves. Rob, do you want to start?

**Rob Threlkeld:** Sure. There's two of us that have wired microphones, so we can't get anywhere if they decide-- I'm just kidding. Rob Threlkeld, Director of Global Energy Strategy at General Motors. I lead the team that does all the procurement of all of our energy for all of our facilities in North America and then support our global operations as well. Then I also lead an energy strategy team that's starting to bridge across a lot of our business as we electrify the transportation sector.

Obviously, we're going from internal combustion engine to EVs, so I bridge into that area of our business as well as supporting our broader efforts in that space. The team itself leads the RE100 goals. Scope 2 is an instrumental component of our work that we do as a team within my sub-teams.

**Lee Taylor:** Hi, I'm Lee Taylor. I'm the CEO of REsurety. We're the power markets software firm that was the bucket introduced earlier. Specifically to this conversation, we publish data and create software that uses some of our partners' data – A group like WattTime, which is an affiliate of RMI, basically to provide information to all sorts of buyers, sellers, investors in renewable energy, clean energy – to say, A, first, "How accurately am I reporting my actual emissions impact?" Then B, arguably more importantly, "How do I make sure that my next investment goes the furthest towards accelerating decarbonization?" That's our role in this ecosystem and appreciate the opportunity to be here.

**Katherine Collins:** Hi, everyone. I'm Katherine Collins. I'm the Head of Sustainable Investing at Putnam Investments. Some of you might know Putnam right across the water here. It's about 160 billion in assets under management. The legacy of Putnam is very focused on active management. What that means is that they're actual humans trying to figure out what we're investing in in the most complete way possible. I make a point of saying that because a lot of finance these days is done very differently. It's done with a more automated rule set. That focus on fundamental relevance and the context of every individual investment we're making and what's important to that specific company is really at the heart of our process. My team and I run about eight billion of that total that I just mentioned at Putnam.

We are active decision-makers in allocating capital, and our focus is really on identifying companies where excellence in sustainability is making the company stronger. Not companies that are trying to do three somewhat conflicting things at once all well, spinning lots of plates in the air, but companies where excellence in sustainability is improving their long-term strategy or their cost structure, their ability to grow their value in the world. A very specific focus, and one that is very linked to thinking about investing in the real world and where they intersect.

**Hank:** My name is Hank Ho. I'm a consultant at TCR here, based in Boston. We are an energy economic consulting company specializing in the electricity power market. We do a lot of power market analysis and power market design. My team works primarily in renewable energy integration,

grid decarbonization, and asset management. Previously, a lot of work has been done for power market owners, private equities, and utilities, but in the past few years, we've seen our client base transitioning more towards getting more attention from big corporate buyers who's participating in voluntary clean energy procurement and using that procurement to decarbonize their Scope 2 carbon emissions.

**Chad:** Thank you. I'm with HASI and we have the unique position of serving as both a corporate buyer, we're a publicly traded entity, and an investor in the assets that decarbonize the grid, like wind and solar and building efficiency, et cetera. We have a special interest in this topic. We only invest in assets that do have avoided carbon emissions or otherwise improve our environmental future. We've been doing it as a public company since 2013. We've been a real leader in this space. I want to start first with the Greenhouse Gas Protocol itself. Rob, what is it, why was it established, and how has it really helped drive corporate procurement of renewables?

**Rob:** Oh really, it was critically established, I guess I would say really for a couple of reasons. One is, data drives decision-making processes and you really got to understand what you're consuming and what your emissions really are. When you think about what a manufacturing facility like General Motors has, which is, call it, manufacturing, assembly of vehicles or our foundries or our engine manufacturing components, transmissions, it really is a great way for us to understand both directly what we're producing from a carbon dioxide perspective and then also from a greenhouse gas accounting perspective, I guess you could say. Then also what we're indirectly consuming, then ultimately what our products are doing as well. It really helps us to make decisions as a business where we're investing our money.

I would say from a more critical part of what we do in the area of power procurement, it helps us make better decisions about where we're going to procure our power. We did join RE100 back in 2016, but I would say we were an early leader in the space, both from an energy efficiency perspective because obviously, we want to optimize energy efficiency and then actually sourcing renewables. Going back to WRI we're actually one of the founding companies back in the 2000s at the Green Power Market Development group, which was really starting to think about how do we scale up renewables really as a way to help address our greenhouse gas footprint, specifically our Scope 2, which was at that time our electricity consumption, although we were looking at Scope 1.

Fast forward to where we are now, it really helps us make decision-making processes as we joined RE100 and we secured about 1.6 gigawatts of renewables. It has enabled us to really look at where we're going to source our renewable energy procurement and we've really been focused on buying renewable energy whether it's through power purchase agreements and more recently a lot of-- and in green tariff arena in the utility footprint that is our manufacturing footprint as well. When you really start to think about the granularity of what we're looking for and why a lot of the discussion around today's changes in the greenhouse gas accounting protocols, to look at it in real-time, what are you really trying to do, as you make sourcing decisions or in the case of EVs, as we start to transform our business from ICE to EVs, how does that have an impact on the communities as well?

**Chad:** Let's dig in a little bit to scope two itself. There's the location-based method of scope two emissions, and then there's the market-based method. Can you just explain that quickly for folks here?

**Rob:** Yes. Think of it in the sense of Location-Based by electricity from the grid, this is what I'm getting, and it contains any given component of carbon dioxide or greenhouse gas emissions or clean energy. In the case of Market-Based, as I was mentioning, it gets down to more of the granularity of what we're trying to do. As we source green tariffs within the utility footprint, you're actually making changes in the emissions factors that are within that location, that state, or that municipality. As we think about the emissions that are being released associated with primarily in our case, Scope 2 will be electricity consumption. Think of the grid as a whole. Wherever you are, that's basically what the grid is providing you. Then what we're doing in the Market-Based is making changes that actually have a fundamental change in the emissions of that location.

**Chad:** Great. Lee, what is the problem with Scope 2 accounting today?

**Lee:** Maybe before we bash it, what has it done very well? First, from a quantity perspective, Rob introduced what-- Market-Based method came into effect in 2005. Prior to that you couldn't retire a renewable energy credit and count that against your consumption. Starting in 2015, you could. If you have a manufacturing facility or a data center in Virginia and it consumes 100-megawatt hours of energy a year, and then you go buy power associated with 100-megawatt hours with RECs from Southern California, you are in the eyes of the carbon accounting world today carbon-free. You have sourced all of your power from carbon-free sources. What that did-- when you think about corporate

procurement, GM's been a leader and with them and their peers, there have been 75 gigawatts roughly at the end of last year of corporate PPAs that had been signed in the US alone.

73 of those were announced post-2015. It really drove an enormous demand for renewable energy credits and what it succeeded at was quantity. It drove a huge demand for more renewable energy. What it didn't succeed at and what it ignored was quality. We gave that example of Virginia and Southern California. Year to date the carbon intensity of a solar project, like what a solar project in Southern California is displacing, is about 150 kilograms per megawatt hour. In Virginia, that's about 550 kilograms per megawatt hour. You have a three-and-a-half times difference in the carbon value of every megawatt hour. Scope 2 accounting today treats those as identical. Now, it's worth noting when Scope 2 accounting was written, A, the data didn't exist to do that math, and B, at the time it was probably closer to 450 in California. The reason California has dropped to 150, 450 is about a gas plant.

The reason it's 150 in California is because in large portions of the day, the California grid is totally clean. You can add more demand at that location and all it will do will uncurtail a solar project that's shutting down because there's more solar than the grid can absorb. In the middle of the day, the carbon value of power might be zero tons of carbon per megawatt hour, whereas it's close to half a ton in the middle of the day, or excuse me, at night when the sun goes down and the gas plants ramp back up to fill it in. Basically, in time and space, you have these huge differences in the carbon content of your megawatt hours. What is being considered in a rewrite of Scope 2 emissions is say, "Let's no longer measure success for tons of carbon in units of megawatt hours. Let's start measuring them in tons of carbon."

The analogy I often use is if you're trying to lose weight and you try to lose weight by eating fewer pounds of food, that might work, but if I was limited to how many pounds I could eat, I would just eat more hamburgers and ice cream. You could eat very little salad and you could lose a lot more weight. I think the concept here is at the end of the day, megawatt-hours are a vessel for their carbon content. They're a proxy for carbon content, and what Scope 2 is trying to be rewritten is to say, rather than use a proxy, let's just use the unit itself, which is tons of carbon.

**Chad:** That was a great analogy. [chuckles] Catherine as an investor, part of the reason that companies report-- The large part of the reason that they report their emissions is because investors

care, investors like you who care about sustainability. Talk to us about how you think about emissions reportings of companies and your own emissions as an asset manager.

**Catherine:** Sure. On the emissions front, I would say in many ways we think about emissions data the same way we think about all kinds of other data that is decision-useful from an investment standpoint. What is your goal as an investor? Again, it's to have the most complete information possible, and so the more important and material emissions have become in the world, the more important and material they are to all investors. For me, being an investor focused on sustainability, it's really at the heart of my process, but it's true for my colleagues as well. This increasing fluency, increasing focus on emissions, and really on materials and energy intensity of all sorts has become much more center of the plate. Having said that, what are the ingredients that make information decision-useful?

These are pretty generic ingredients, but I think they're important to keep in mind in this conversation as well. First, it does have to be relevant information. I will freely admit that if I'm talking to a small cap software company, emissions is pretty far down my list of things we're going to talk about. If I'm talking to a heavy industrial company, it's much further up. I think that's totally appropriate, and really important to keep in mind. The context both geographically and in terms of type of business really varies quite a lot, and to assume otherwise we lose a lot of valuable information. The second thing is the information itself needs to have high integrity. It needs to be timely, it needs to be accurate. It needs to be as fit for purpose as possible.

Again, that's a generic description, but you don't have to dig too far into most climate data before you find an estimate on top of an estimate on top of an estimate. Then you abstract that even further across time and space and you're just in the realm of fiction. Again, I think to be rooted in that real world, that data integrity is really key. Those two things put together are what make the data useful. Utility is the third criteria. You need those first two ingredients in order to have utility, but you also need user-friendliness if you will. One thing that is tricky in this area, at least at this stage of development is that it's so tempting to take shortcuts there. I cannot tell you the number of conversations I've been in where someone says, "Oh my God, can you just give me a number, just a number, any number, I don't care what it is so I can just sort high to low and be done with this."

Even the people who really, really care feel that kind of frustration day to day. I think for all of us who are more focused specialists in this field, this tension between the fascinating nuance that is what makes something really valuable and insightful over time and that ease of use is something we're all really navigating day to day.

**Chad:** Excellent. Hank, your firm recently released a very compelling white paper on the various procurement strategies companies can use to reduce their Scope 2 emissions, some of which are more valuable or credible than others. Could you briefly walk us through each of these strategies and what you guys found about the actual impact of them?

**Hank:** Sure. I'll try to keep it short. Some clients have invested in clean energy projects for a long time and some of them have already met their carbon neutralities through the current Scope 2 accounting, but they're still thinking about investing more on great decarbonization and a clean future. We've been asked to evaluate some of the more popular, voluntary, clean energy procurement projects based on cost and their carbon displacement potential. We look at four strategies. The first one is the most popular one right now is a US-wide annual energy matching as they described. That's consistent with the Scope 2 accounting method. Now, using this strategy, you would figure out how much load you are using in the US and then try to procure RECs – **bundled or unbundled – through** PPA projects in the US so that your annual REC matches your annual electricity load. We also looked at two variances--

**Chad:** I just want to make that real clear. Folks who are using annual average look at their annual consumption and they use an annual average emissions factor to figure out the emissions associated with it if they care about that at all and then they actually just try to buy a commensurate number of RECs produced at any time, at any place across, in this case, let's say, the US to offset their consumption. I just want to explain what that means.

**Hank:** Yes. Using these examples, your load could be a data center in Virginia and you can buy RECs from California to offset your load in Virginia. That would allow you to claim net-zero using current Scope 2 accounting method. We looked at two other variants of that methodology. The first one, we call it local annual matching. Understanding that the emission factors are different in different parts of US. We shrink the footprint and try to locate the PPA closer to the load in the same balancing authority or energy area. Under this strategy, for example, if your load is in Virginia, you



have to procure PPA in the PJM Interconnection. That's a balancing authority where Virginia is part of. Then, the other variant, the third option we looked at is 24/7 Hourly Matching.

In addition to shrinking the footprint, you also constrain the timescale of the matching. Under this strategy, you have to make sure your load and your clean energy generational RECs match on hourly basis in the same balancing authority. Still using the Virginia example, under this 24/7 strategy, you have to make sure your PPA, RECs, and your load are the same every hour in the PJM footprint. These are two variants of the energy-matching strategy. The third strategy we looked at is what we call carbon matching. Using this strategy, we take the granular locational and temporal carbon emission data, translate the load into tons or kilograms of carbon emission, and then we translate the displaced carbon from renewable generation into carbon displacement and try to match these two in terms of kilogram carbon throughout the US on an annual basis.

Calculate how much carbon emission your load is responsible for, and then try to figure out the portfolio of renewables to offset the same amount of carbon throughout the US.

**Chad:** Of those four different strategies, which do you find is the most impactful in terms of emissions, and which is the most cost-effective?

**Hank:** Most cost-effective and most impactful on carbon emissions are both the carbon matching strategy because using this strategy, it allows you to target your investment towards areas where there are still abundance of coal generation on the margin, or there are still a lack of clean energy policies. States, for example, you would go to Southwest SPP in West Virginia where there's still a lot of coal on the margin. In Wyoming (the Coal County) instead of trying to place your generation in California where they don't need more PV generation, or in Western Texas where the transmission's already limiting wind generation.

**Chad:** Your analysis finds that what's most important is not the time of day or the location from which you procure your renewable energy, but wherever that is and whatever time of day that is, that the renewable energy has a similar carbon benefit as your actual consumption?

**Hank:** Yes. Meaning your renewable energy can displace more carbon per megawatt hour than your load, and you don't have to procure as much energy.

**Lee:** Right. I think you clarified it, but where and when matters a lot because where and when you are in the grid dictates how clean or dirty that power is. What's different from carbon matching, is that you're accumulating so you don't try to match. If you are consuming electricity in Southern California, that's a really clean grid. You could match identically to that. You could build another solar project in that location. You would add more clean-- Or you could say, "I'm accumulating carbon impact much more slowly than I would elsewhere in the world because I'm on a clean grid, but I'm going to go build the second solar project in West Virginia instead of the 800th solar project in California because the same amount of investment will reduce carbon twice as fast. I'm going to be carbon negative." The time and place is very important, but it's a question of are you using that to accumulate over the course of some period, or are you trying to match? Just flagging.

**Chad:** Great point. Rob, what are the implications of these findings for how you would advise the Greenhouse Gas Protocol to be updated with regard to Scope 2?

**Rob:** We've been actually a big proponent of going to a real-time carbon tracking. We were the ones that started to study this because it has a huge implication when you think about transportation electrification. Now you've got an ability to take EVs. Not only can you look at charging at the lowest cost of the day, which time of use rates that the utilities are starting to really encourage you on because they want you to charge your electric vehicle when the grid is least taxed, generally, also the time when the grid actually has the most amount of renewables. When you really start to think about the EV becoming an asset, you're able to do a lot through the EV itself in order to be able to really start to decarbonize the grid also improving both affordability and reliability at the same time.

You're taking a lot of the intermittent resources, you're taking a lot of the potential resources that could be curtailed, in the case of California, where you may have too much solar. You could actually start to send out signals to your EV drivers and pretty much do this automatically, because things can be done pretty much automatically now to actually start to encourage people to charge those electric vehicles. As we get down to the future of where you really start to see vehicle-to-grid potentially become an opportunity, you can now start to think about aggregating up all of these distributed energy resources or stored resources in the case of EVs, and actually discharge it while you're offsetting the need to have that gas peaker plant start.

You really can start to see that as we change the Greenhouse Gas Accounting Protocol, you're starting to see some huge benefits that can come to consumers, both in the area of affordability as well as reliability, but also have a huge impact on how you can decarbonize at the same time. When I think about this as a procurer of a bunch of renewable energy for our own manufacturing sites, you can really start to see how you can parse all of these together in ways you really get to a grid, to getting to near zero emissions can become a true possibility, leveraging how the assets are actually being consumed on the grid. Real-time carbon tracking gives you that signal to really look at that. In all reality, that real-time carbon tracking, and why we encourage PJM to publish it, is a price signal, because in reality most of that price signal is already available.

It actually has a very strong component of carbon that you can then utilize to really get benefits of both. That's where I see a huge opportunity in changing of the Greenhouse Gas Accounting Protocol for Scope 2 specifically benefiting all of us as we go down that journey.

**Chad:** Lee, if we do try to change the Greenhouse Gas Protocol, Scope 2 especially to at least allow for carbon matching along the lines that we discussed, what data infrastructure would need to be in place relative to what's available today?

**Lee:** Yes, it's a good question. I think this often comes up and it's been, "What's the right long-term answer, and then what's implementable today, and how do we close that gap?" What you basically need, as Rob was describing, is you basically need this carbon signal. In the same way that at all the different locations in the grid-- We'll go to Texas for a little while, we talked a lot about California. There are 800 different generator nodes in Texas. Texas publishes every five minutes, 800 different prices for all of the locations in Texas.

They do that because they know as the grid operator which plant has to ramp up or ramp down in the event that demand or supply changes at any one of those locations. They have to do that to keep the grid resilient and to publish prices. The data that is needed for carbon to be done in the same way already exists. The independent system operators and balancing authorities, these are the groups who publish prices and maintain grid stability, already know which plants are on the margin. The plants on the margin means that's the one that will respond to incremental demand. If you plug in one more EV, that's the one that's going to ramp up. If it's a coal plant, that costs you about a ton per megawatt hour. If it's a solar facility, it costs you zero tons per megawatt hour.

The data already exists in the electrical operators today. GM was on the forefront of advocacy with PJM. I think State of New Jersey joined you and some others that said, "Hey, why don't you publish this?" and they did relatively quickly. They publish real-time five-minute interval data today on emission rates. That data, I think the first point is the data already exists. It's just a question of whether stakeholders have pressured those groups to publish it. Secondly, how does it get made available? The 2021 infrastructure bill that was published had included in it a section that said the EIA, the Energy Information Administration for the US is required to publish locational marginal emission data wherever it is available. The moment it is made available under congressional mandate, it has to be made available through the EIA.

What's the question right now is how long does it take stakeholders as private companies, does it take the EPA, does it take FERC, they don't get to rule in Texas, but what is the acronym soup of regulators, et cetera, who can provide either the incentive or the requirement to publish that data? Because I think it's often presented as this future of science fiction state that we will know what the marginal unit is at any moment, anywhere in the grid. We know it today because it's the underpinning of our entire financial system in the energy markets. I think, long story short, provide pressure to publish the data at the ISO level so the EIA can make it available to everybody in this room or anyone else in the world who wants it.

**Chad:** Katherine, when we talked earlier, we talked about greenwashing and how investors can be concerned about it and how companies can not do it. In this context, could you talk to us a little bit about how you think about greenwashing and these net-zero pledges in the context of this broader effort to make our admissions reporting more precise and impactful?

**Katherine:** Sure. I think it's really helpful and maybe even helpful within the context of this conversation to take a step back and recognize the simple truth that we want all the data but for different purposes at different times. What we're talking about here is a really interesting and somewhat convoluted system that you would probably never recreate the way it currently exists if you really had a clean sheet of paper. There's a layer of data that is at that primary level. Where is energy being used and towards what end and by whom? I don't want us to lose sight of that in the context of this next-level conversation. That primary layer of data is really key. There's a mesolayer of data that is on a more regional basis looking at a system or a subsystem and thinking about its

long-term health, about its composition, about its emissions profile, and how that's improving over time.

That is not only the sum of that primary activity, it's something more complicated than that. Then, if you bubble that out across regions and across the world, you get this much more complete global picture, which is what really matters for our climate discussion. One thing that's very challenging in this arena is that we're trying to match metrics and reporting from that first layer towards a goal that is way up here at this planetary layer. They're not unrelated, they're not totally different conversations, but they're also not a one-for-one linear match. I see a lot of conversations that are mixing and mingling across those different levels, and a lot of the concern around greenwashing relates to that mismatch. It's more of a communications and expertise mismatch than people overtly lying and misleading.

This you can tell from the last 10 minutes, it's very complicated. It should be complicated. We're lucky to live at a time where it can be this complicated. We have enough information to work through all the nuances. You can see if you're a corporate communications officer who has not earned a PhD in this arena and someone told you, "Put out a press release that explains this in three sentences to your customer base," that's a really tall order to do that with high integrity. I'll just leave it at that. I think those different layers of data are really, really important to keep in mind. When it comes to thinking about things like establishing standards to keep alive in these conversations, the question of towards what end? A lot of information is useful, but it's useful for a specific subset of purposes.

If we can avoid mismatching between the form and the substance that we're looking to match, an awful lot of other complications can be avoided. I'm in a lot of conversations where the premise is that there's a single right way, and we all need to duke it out. If we just reported it right, the world would be a better place. I'm sorry to say, my greatest fear is that we will end up with a long stack of beautiful reports where all the lines are down and to the right and the world will be in peril. It's entirely possible. To narrow that gap, I think, is our primary goal. One thing that's really exciting about everything we're talking about here today is that within these added measures, this incremental data that gives you a different point of view on a really important and different set of questions, we have the chance to decrease that gap between the world on paper and the actual world we get to live in. That's really exciting, but it's not simple.

**Chad:** Excellent. Rob, your company and my company and a few others are part of what's called the Emissions First Partnership, which was just started towards the end of last year, I believe. Talk to us a little bit about what it is, how it came about, and the key objectives of the group.

**Rob:** I think a number of us have been in this space for quite some time, obviously, seeing the-- going back, I've been at GM 23 plus years now and seeing the changes of the Greenhouse Gas Accounting Protocol over that time. I think as we saw more and more data that became available, and we saw the complexities, what you said, it's not simple. Trying to really explain to the leadership team why we were setting goals and how we were setting goals and how we were backstopping the data that was going into those goals, it was a very complex process. As our company really started to transition and really started to put a lot of focus on the areas of renewables as we source the scaled-up renewables, there were a few of them that got the question, "Well, the electron at that facility is going to be a different shade than the electron at that facility."

They just knew enough to know why and how that occurred. It really came to us to saying, "Hey, there's the reason why we have issues with trying to explain to a lot of folks that how the grid functions is completely different in point A and point B and point C in a different time of the day." It really came to us. Then as we started to electrify the business that we needed to do this more real-time. We really needed to understand real-time what was going on at a given point in time. We had started-- As Lee was commenting too, that we started having conversations with PJM to say, "Look, you do price signals, the market operates off price. There's got to be a component of carbon associated with that. How can you not start to do that, too?"

Really helps us make some of the decisions that we do as we look at sourcing the renewables and the efforts that we're doing from a procurement strategy. That's really how we started to formulate this some years ago, actually. Then it was great to see a few other companies starting to think along the same lines and saying, "Hey, we really need to look at this from, we call it the Emissions First Partnership, but look at it in ways that can really help us make the decisions in how we procure, but also the decisions in how we look at our products that we're producing in the future in order to really inform the public about ways that you can actually address your emissions footprint."

That was really the precipitance of really forming the Emissions First Partnership was ways to help simplify, and it's still complex, but the ways we can articulate how we're actually making changes in

our emissions footprint, both at the manufacturing level then ultimately at the product level too because we do have a number of EV drivers that are solar on the rooftops. They're very interested in understanding what their emissions footprint is. Now, that isn't going to be everybody, obviously, but if you start on price and they want a reliable grid, you can actually start to see where you can draw affordability, reliability, and decarbonization into the same story. That was really what drove a lot of the support into this and really the articulating of the message.

**Chad:** You can learn more about Emissions First at [emissionsfirst.com](https://emissionsfirst.com). Lee, this debate not only has implications for corporate reporting, but also the government expenditures and subsidies associated with the Inflation Reduction Act, which was passed late last year. There is a provision of the Inflation Reduction Act that provides for hydrogen production tax credits to Section 45 V. The highest level of these credits, you get \$3 per kilogram of hydrogen produced. This could be hundreds of billions of dollars in subsidies that the government is going to give out to support what is ostensibly green hydrogen production, which is a good thing. The Inflation Reduction Act failed to define what is green or green enough for this highest level of the credit, and it's leaving the US Treasury to write the rules for what is green and what gets that highest level of the credit.

There's obviously intense lobbying about what that is, what that should mean. You recently wrote a letter with a few other stakeholders on this topic advocating your view. Could you tell us a little bit about what you think about this issue?

**Lee:** Yes. I think we've been talking about this in the Scope 2 carbon accounting rewrite, which is a three or four, maybe five-year process. It takes a long time for these rules to be rewritten so it's a relatively slow process and it was primarily applicable to voluntary reporting. You choose to report yourself. All of a sudden overnight, the IRA brought \$100 billion of tax incentives along with IRS setting the rules into the exact same debate. Basically, the same ways that Hank laid out those are different options for doing your carbon accounting. Those options are being debated actively by Treasury with support of EPA and DOE and a number of NGOs in support of it. It really just brought a very bright light to this conversation that's happening in Scope 2 accounting because there was \$100 billion of tax credits associated with how it was defined.

Ultimately, there is a debate that is active. I think it's one of the few things in the IRA that has not gotten guidance yet today, and it'll probably be one of the last ones to get guidance, is how do we

define what counts as green? Basically back to our examples earlier, if you put an electrolyzer in Virginia to consume a lot of electricity that's a relatively dirty grid, and you add more solar to Southern California that's already relatively clean grid, does that count? There's a very large contingency that says yes. If you have your electrolyzer in Houston consuming electricity that's relatively dirty for Texas, and you just add another wind farm in the Panhandle of Texas, which at the moment is choking on a lot of the wind power it has because there's not enough transmission to get it to Houston, and you consume them at the exact same time back to the matching, does that count? Or are we just doing the accumulation of the carbon credits?

Those are really the three things that are actively being debated around the hydrogen debate. I think it's important because it will drive how an enormous amount of potential new build infrastructure is built, where it's located, where it decides to buy power, will anybody be willing to pay a premium for power for projects that are in more valuable places but are more expensive to build, for example? It's basically brought an intensity of visibility into this debate we're talking about in Scope 2 tied to that hydrogen tax credit.

**Chad:** Climate Positive is produced by HASI, a leading climate investment firm that actively partners with clients to deploy real assets that facilitate the energy transition. To learn more please visit [HASI.com](https://hasi.com)

**Chad:** Excellent. I want to open up-- We've provided a lot of information I think over the last 35, 40 minutes. I'd want to open up to the audience and see who has questions.

**Tyler:** [laugh] My name is Brant Tyler. I work for Caterpillar in sustainability. I think my question is, I'm actually still having a hard time understanding the kind of proposal that you guys are talking about. I'd love to just ask a question, which is, I realize this is still in the voluntary realm, but if I'm a corporation now, and let's say I want to be 100% renewable electricity, so this change that you're saying in the Greenhouse Gas Protocol, would it basically take away the need for dual accounting? Would it mean that I don't need to have certificates and credits that match my electricity both here in the US and also in Europe? Would it essentially mean that I wouldn't need to be doing that dual accounting and how would it allow me to do that?

**Lee:** Sure. I think the first point you made was really good. "Am I 100% renewable?" I think there's an important distinction because there's, "Am I 100% renewable or am I carbon-free?" Because you



can say, "I've consumed X amount of electricity, I have bought RECs for the exact same amount, I'm 100% renewable," but if those two energy sources have different carbon intensities, you aren't carbon-free. There increasingly is this difference between the two. I think that's an important distinction. Towards what you're talking, you could do Location-Based accounting today and you do Market-Based accounting. Will this change that? I think the assumption is, well, TBD, because the rules haven't been written yet, but I think what is largely being advocated for-- I know the letters we provide and others disagree if they feel otherwise, I don't think Location-Based is going away.

I think Location-based is going to stay there. That's where you are, that's one way to measure it. I think there's a question as to whether the Market-Based is either changed and replaced with, for example, an impact base to say rather than tying it to RECs, you tie it to carbon and I'll get to RECs in a second, or do we have, god forbid, three different carbon accounting? You have Market-Based, Location-Based, or Impact-Based. I would advocate for the replacement because I think this is an area where more is not better. I think your point about RECs is important. I think RECs will continue to be a vessel for tracking that that credit was only given once, but I think the fact that it's a REC or that it's a megawatt hour can and should become less valuable and less important.

At the end of the day, a REC is a-- There are a number of groups that are doing this already today, MRETs as an example, but they're starting to stamp every REC with where was it generated, when was it generated, and what's the carbon intensity of that REC? You're talking about a REC being basically a credit that tracks with quality. At the end of the day, you'll say, "I want to offset 100 tons of carbon." That might be 100 RECs, it might be 500 RECs depending on where in the world those RECs are coming from. It becomes a vessel, but I'm getting some nods of disagreement, so please feel free to jump in.

**Chad:** Yes, I think that the overarching point is you can and should still procure through RECs and or PPAs, but it's just not all megawatt hours, all RECs, not all them are created equal. Some will be more subtractive to your footprint than others. Having the data necessary to measure that and have the RECs stamped with that is something we're working on as well. I think that's what many of us here are advocating,

**Katherine:** You still need all the same information as the unit of accounting. That's the primary shift here. You can't get that unit of accounting without having all the same ingredients that you already

have. I'll just note this is really important. Sometimes we end up standardizing again, at the wrong layer. The layer of the most granular primary information, we mostly have it now, which is amazing and incredible. If you just go back a few years to think of the information we have, it's now a question of how can we combine those ingredients in a way that is the most useful and impactful. That's a great thing. To standardize at that tiny little ingredient level is the way to go. To standardize the recipe is often a fraught exercise.

**Rob:** Really you're seeing how technology's changing things quickly. When Location and Market-Based came about, part of that rationale was most relied on eGRID, which was how the grid is changing way quicker than what eGRID was updating. As a result, they went to a Market-Based because you could actually start to make the changes yourself based on what you're doing, procuring green tariffs and PPAs. As the granularity has gotten better, it's now how do we best more reflect what is out there and available for corporations as they set goals and be able to explain to their leadership team, if I set a net zero goal or I set a carbon neutral goal or I set a renewable energy goal, they mean different things. How do I explain that in a way that I've got the data to explain it to them?

**Cynthia:** Hi, I'm Cynthia Cummins from Deloitte. I used to be the deputy director of Greenhouse Gas Protocol. Very familiar with this conversation.

**Rob:** I know.

**Cynthia:** Ever since we published the Scope 2 Guidance, we were thinking for years about like, "Is it really driving impact or not?" and really pearling our hair out trying to understand that. I like this load-matching potential, but as a replacement for Market-Based accounting. I think three accounting approaches would be crazy and Location-Based accounting's not going away because that's real accounting. I just have an observation really, you are all talking in a very US-centric perspective and GHG Protocol doesn't work that way. It's got to be an approach that's global and it's going to work in emerging economies. When you're talking about technology that's going to be useful, it has to be something that can be applicable in a voluntary and a mandatory system in any country in the world. That's more maybe just a recommendation when you're advocating to GHG Protocol, you got to talk in a way that's very global perspective, not so US-centric.

**Rob:** Glad you brought that up because we are reminded as a global company, you are absolutely correct.

**Chad:** I think one point that we would make there is, one, there are marginal emission factors across the globe available today through the UN by country. There is an ability to do this already in every country of the globe that I'm aware of. Lee, feel free to correct me. Two, one of the benefits of what we're advocating with carbon matching is if I'm a US company, and not everyone thinks you should get rid of market boundaries, but let's just say for the purpose of this discussion, I am advocating for that, if you get rid of market boundaries and I'm a US company and I can procure the most cost-effective carbon avoidance, I'm actually maybe more likely going to get it from Indonesia or some part of the developing world and not from another US state.

**Cynthia:** Then it's an offset though, then it becomes an offset. That was the other point I wanted to make too, is I see a lot of stakeholders pushing for redefining how the market is defined in the quality criteria in Scope 2 and making it tighter. What you guys are asking for or would need to make this work is a broad definition of market and not tightening it. I think there'll be some tension in the revision process because I think there's a lot of stakeholders that also want to move to more specificity, more accuracy, so matching more the location of the emissions with the renewable. That's just again an observation. That's why I think you asking for broadening the definition of the market, there's going to be a lot of tension around that.

**Chad:** Not everyone advocates for that. I'm saying some are and I think that's one benefit of doing so.

**Cynthia:** Yes.

**Jason:** Hi, my name is Jason Prince from Momentum X. Thank you very much. This has been a great panel. It seems the focus has been on the supply side both for today's discussion and generally with Scope 2. I'm curious if anyone's either doing work or aware of work being done to consider also the demand side of the equation. For instance, instead of a renewable project, creating another megawatt hour and getting credit for that, demand flexibility in someone with load reducing by megawatt hour and that in some way, shape, or form being monetized or considered in Scope 2.

**Rob:** That's one of the added benefits try and electrify the transportation sector in the future as we really start to get a plethora of EVs out on the market. Can you aggregate EVs up in a way that you can start to shift the carbon content of the grid based on how those vehicles are being charged, aggregate it up, and then charging when there's a bunch of renewables, discharging them when there's fossil generation? That still has to be something that's getting proved out and worked through and you obviously have to be able to aggregate up, prove to the RTOs that it's an asset just like it is any other resource. That's one of the issues they have with, as I'm sure the net metering around rooftop solar is, but in this case, battery energy storage can actually be a proven amount of energy, both capacity and quantity that you can discharge.

I do see some added benefit in going forward in that to be able to truly shift the carbon content, leveraging the excess renewables when there's excess renewables on the grid so you're not actually curtailing them in markets where they're currently getting curtailed.

**Tomerica:** Tomerica. The issue that we've been facing now, I would like to add another perspective between demand and supply. We have the transmission grid, so the issue we've been having since we've been developing in the US is a transmission grid and the bottlenecks. Is there a way to recognize the value in terms of carbon impact of investing in grid upgrades?

**Hank:** Yes, I can take that. I think the one benefit of moving to a carbon accounting that we haven't covered is it unlocks more technologies to be looped into the voluntary clean energy procurement. Right now, when you look at Scope 2, it's only counting megawatt hours. Battery doesn't really have a place in that because you think about this lithium ion battery, it consumes energy, it produces less energy than output as your input. You are actually eating away your RECs if you will. If you move it to a carbon accounting, battery definitely can help you shift your load or generation from high-emission hours to low emission hours in terms of load and your generation from low-emission hours to high emission hours. The carbon accounting would also allow you to evaluate investment in grid-enhancing technologies or even new transmission projects.

For example, we all know there's a large transmission constraint preventing upstate New York renewable assets from serving downstate. Currently, there's no incentive for any corporate buyers to invest in technologies or projects to improve that because it doesn't produce megawatt hours of RECs. If we move to a sophisticated, and granular carbon accounting, you can definitely put a value

on how much a new transmission line would be able to displace carbon because it allows wind farms from upstate New York to go to downstate where it wouldn't without this transmission project. Once this system is in place, it can unlock grid enhancing technologies, new transmission investment from the voluntary buyers where they are not able to account for them in their Scope 2 emissions or account for their benefits right now.

**Katherine:** I'll just note this is one of the bigger gaps that could potentially be narrowed by a new set of metrics like this. Again, looking at the gaps on paper versus the real world, another example came back to me from a CEO who said, "Look, I can make this accounting turnout however you want it to with enough money and enough time, but if we have a brownout next to my major plant, which is increasingly likely, you're not going to care what this report tells you, we're not going to be able to function." I think again, that that primary localized layer that is actually attached to the activity in the world is sometimes forgotten the further away our accounting gets. This is a really interesting proposal in that it potentially gets closer to connecting those two things, potentially not. I'll just say. There's all unintended consequences when we shift metrics, and I want to keep that alive in this discussion as well.

**Chad:** I think a final point is if we move towards a carbon matching accounting system, we actually disincentivize the overbuild of generation, in let's say West Texas, which leads to transmission constraints, which hurts both developers and operators in different ways. It helps to address the transmission ingestion issue by itself simply by changing the accounting because you don't incentivize overbuild in certain regions.

**Jason:** Jason Row with Ceridian. We're an HR software company. I have a question less about methodological changes on Scope 2 accounting and more on strategy. Sweden, I think it was last week or the week before, said that their 100% renewable energy goal has transitioned to 100% fossil free, and the indication was that they may be looking more at scaling up nuclear power. I'm curious to get your perspective on how this could be integrated in whether it's a fossil-free electricity certificate or some other, is that something you anticipate happening in the future or something you'd want to consider?

**Lee:** Yes, so I think you're right. To Hank's point, there's an unfair focus today on wind and solar, but geothermal and hydro and nuclear -- Was it a couple of weeks ago, Microsoft denounced a PPA with Fusion. Which is the one we don't do? Whichever one we don't do today, the other--

**Chad:** Fusion.

**Lee:** Thank you, [laughs] I think the view is that, to Hank's point, there is no silver bullet. Just building a ton of wind farms isn't going to get us where we need to be or solar projects specifically to the examples we're seeing today. "Oh, if we just build wind in the panhandle of Oklahoma, and we just build solar in Southern California," that starts to have severe impacts keeping the lights on in addition to the accounting. I do think that a shift away from treating the megawatt-hour from a renewable project as the definition of success and more just what is on the grid at that moment, whether it's demand or supply. If nuclear doesn't set the margin very often, but hydro can, and geothermal can. What is it that is fueling your demand and what are you displacing when you build something new?

If the focus is really on just that carbon content, and back to counting calories, not pounds of food, I think that opens up what different avenues there are to succeed in that goal.

**Rob:** I think it's going to open up a lot of other technology aspects as different types of battery storage chemistry comes into play, but when you really start to think about the fact that we're going to have low growth, we've got to address it. This starts to help hopefully drive some of the appropriate decision-making processes. New technology becomes available and it isn't just wind and solar, because for a fact, as we sit there and I run the large manufacturing facilities, you're not running them off of wind and solar alone. You're going to be running them off a plethora of zero-carbon resources and technology that helps drive additional excess renewables that were on the grid that could have been curtailed to the grid. All of those combined together should drive us to get to where we need to be, but real-time carbon tracking gives you a lot of the idea of how you can start to think about it from all aspects of affordability, reliability, as you decarbonize.

**Chad:** Any final questions?

**Lee Shuanan:** Hi, I'm Lee Shuanan. I work for a company that's very quietly managing 550 gigawatts of renewable assets for many, many companies in the world. That's about 25% of the

renewable assets. I wasn't going to ask this question, but since Sweden was brought up, I have to ask this silly question for my daughter. We moved from Sweden to California five years ago and a few weeks after we arrived, my daughter asked me, "Why is there no solar panel on top of all cars?" This question is for you Rob, because I want to have this answer for her today.

**Rob:** It has been looked at. The biggest issue is that you don't have a lot of square footage on the vehicle for what you can actually do. You have a weight and an aerodynamic issue that you've got to start to build into it. There's the benefits and negatives when you really start to look at the broader aspect of that. Car companies have all looked at that, but that has been the primary driver. It really has not been feasible from a cost perspective, but there's just not enough really square footage on your vehicle to do a lot more than just maybe power a little bit of a fan. We have done the math to be able to-- There just isn't really that much available.

**Chad:** I will say I drive a Hyundai Sonata hybrid and I do have a small solar panel on the top. It doesn't do much at all in terms of increasing the gas mileage of the car, which is actually really good in general. I do recommend the car even though it's not made by GM. Rob's point, obviously he doesn't know more about cars than I do, but it doesn't do much.

**Rob:** We've had a lot of people ask that. We've had employees ask that question. They've done the R&D and they've really looked over it. When you start to really think about all the safety aspects that go into vehicles, the motor vehicle safety standards, and all the other things that go into it, what little it provides it's a significant cost. A lot of that's being now focused obviously into electric vehicles and the batteries because you can do a lot more with the batteries that are in the vehicle than you really can with anything else.

**Rob:** Good question though. **[unintelligible 00:53:00]** That was good. It was a good question. I've had that asked about 500 times within the company because I get emails to that every now and then. If there are no other questions, let me ask the panelists one final takeaway you want everyone to leave with today from this panel. Rob?

**Rob:** EVs are going mainstream. Let's get an EV.

**Lee:** When you read the word deliverability in a matching scenario, ask what that means and whether it includes any awareness of transmission because I think the concept of deliverability matching is dramatically oversimplified in the public domain and at a significant cost to impact.

**Katherine:** Well, I would just note whenever something's changing, especially when it's something important, there's an amazing set of opportunities. Sometimes conversations like this, at least to me, feel a little heavy and convoluted at times, but boy, this is a big, big change and there is a lot of opportunity to do things better and I believe more profitably as well.

**Hank:** I would just say a more comprehensive carbon accounting system could not only help the investors in procuring more impactful projects, but also can help the grid improved reliability and open up more technologies for voluntary participants to invest in.

**Chad:** Great. Well, I want to thank the panelists for a very substantive discussion and for the audience for your participation and great questions.

**Chad:** If you enjoyed this week's episode, please leave us a leave a rating and review on Apple and Spotify. This really helps us reach more listeners.

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I'm Chad Reed.

And this is Climate Positive.