Introducing the Drawdown Georgia GHG Emissions Tracker

Summary

As Georgia works collectively to draw down greenhouse gas emissions, we can now track and visualize that progress for the first time. In this webinar, Blair Beasley of the Ray C. Anderson Foundation hosts the launch of the new Drawdown Georgia Greenhouse Gas Emissions Tracker, a free, interactive tool built by researchers at Georgia Tech and the University of Georgia. Dr. William Drummond, Dr. Marilyn Brown, David Eady, and Dr. Jacqueline Mohan walk through how the tracker works, what it reveals about where Georgia's emissions come from, and how the state's forests function as a critical carbon sink.

Key Takeaways

● The Drawdown Georgia GHG Emissions Tracker shows monthly and annual net greenhouse gas emissions, human emissions minus forest carbon uptake, for the state and all 159 counties, with data going back to January 2005 and updated monthly going forward.

● In October 2021, Georgia's average emissions were 667 metric tons of CO2 equivalent per 1,000 people, and the state's total emissions through October reached 85 million metric tons, with forests offsetting a significant share of that footprint.

● Emissions profiles vary widely by county: Chatham County (home to the Port of Savannah) runs high on transportation and industrial emissions, Rabun County in northeast Georgia is a net-negative county thanks to its forest cover, and counties like Whitfield (carpet manufacturing) and Seminole (agriculture) each have distinct emissions signatures tied to their local economies.

● Georgia's forests, covering about 60% of the state, are a critical natural carbon sink. In August 2021 alone, Georgia's forests stored nearly 500 metric tons of carbon per 1,000 people, offsetting the state's single largest emissions source, transportation, that same month.

● The research team's long-term goal is to move beyond tracking emissions toward tracking solutions, mapping where climate solutions like EV charging infrastructure and industrial decarbonization are already happening, and using that data to accelerate their adoption statewide.

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Blair Beasley: All right, we have a pretty packed agenda for the day, so I'll go ahead and kick it off. Welcome, everyone, to the latest Drawdown Georgia webinar. We have a really great program planned to officially launch the new Drawdown Georgia Greenhouse Gas Emissions Tracker. My name is Blair Beasley, and I'm the director of climate strategies for the Ray C. Anderson Foundation. We've been proud to support Drawdown Georgia in its efforts to grow high-impact climate solutions in our state, and now, thanks to the work of researchers at Georgia Tech and the University of Georgia, we can track our progress as we collectively work to reduce greenhouse gas emissions and protect and expand our natural carbon sinks in Georgia.

We'll hear today from the team of researchers led by Dr. William Drummond who collaborated on this new interactive tracker. As you'll see, Georgians now have data at their fingertips showing where emissions come from, at the state and county level, all based on publicly available federal data, which will be updated monthly. You can explore the Greenhouse Gas Emissions Tracker on the Drawdown Georgia website, as well as on Georgia Tech's website.

A few programming notes before we dive in: I'll briefly introduce our panel, and following their presentations, we'll open it up for audience Q&A. Ollie Chapman, a PhD student from Georgia Tech who's been working with Drawdown Georgia for the past two years, will be capturing your questions and posing a few to the speakers at the end. Please add your questions to the Q&A box, and we'll do our best to get to as many as possible.

Now for some quick introductions. First, we'll hear from Dr. William Drummond, the lead researcher on this project. Dr. Drummond is an associate professor in the College of Design at Georgia Tech, where he directs the Master of Science in Geographic Information Science and Technology program. He's taught at Georgia Tech since 1987, currently teaching courses in climate change planning, climate change analytics, GIS programming, socioeconomic GIS, and PhD statistical methods. Next, we'll hear from Dr. Marilyn Brown, a Regents Professor in the School of Public Policy at Georgia Tech, where she created and co-leads the Climate and Energy Policy Lab and the Master of Sustainable Energy and Environmental Management program. She also co-directs the research program supporting Drawdown Georgia, and her research focuses on the design and modeling of energy markets and carbon reduction policies. Then we'll hear from David Eady, senior manager for industry engagement at the Ray C. Anderson Center for Sustainable Business at Georgia Tech's Scheller College of Business, where he helps lead the new Drawdown Georgia Business Compact. Before joining Georgia Tech, David spent more than 23 years leading sustainability initiatives and stakeholder engagement in various professional and civic roles. And finally, we'll hear from Dr. Jacqueline Mohan, associate professor of terrestrial ecosystem ecology and biogeochemistry at the University of Georgia's Odum School of Ecology, whose lab investigates the role of global change on trees and other plants, soil biogeochemistry, soil microbes, insect herbivores, and terrestrial ecosystems broadly.

With that, I'll turn it over to Dr. Drummond to kick things off.

Dr. William Drummond: Thank you, Blair, and good afternoon, everyone. This is the Drawdown Georgia Greenhouse Gas Emissions Tracker, and I'll start with the URL to access it on the web, though I'll ask you not to go there until after the webinar's over. It's not hard to remember: drawdownga.org/tracker. Once we're finished, you're invited to go experiment with the interactive tracker yourself. For now, I want to give you a tour of its main features, built over the past year by students and faculty here at Georgia Tech and the University of Georgia. As we tour the tracker, we'll also be touring the state of Georgia, and even a bit of its history.

A couple of things worth mentioning up front. The tracker is built around monthly emissions, so most of the numbers you'll see refer to a specific month, in our examples today, October 2021, though there's data going back to January 2005. At the top of the map that anchors the tracker, the dashboard starts out showing statewide Georgia emissions, so all the graphs, charts, and numbers refer to Georgia as a whole at the outset. We're tracking net greenhouse gas emissions, meaning emissions from human activities minus CO2 uptake from forests. And many of the numbers refer to emissions per 1,000 people, which makes it possible to compare large and small population areas on equal footing.

Let's start with four key numbers for understanding emissions in Georgia. The first is emissions per 1,000 people, in metric tons, the standard unit of emissions used around the world, including in the U.S. Across Georgia as a whole, average emissions in October were 667 metric tons per 1,000 people, meaning each of us, on average, was responsible for about two-thirds of a metric ton of emissions that month. Translated into pounds, that's 1,470 pounds of CO2 per person for that one month, a metric ton being about 2,200 pounds, a bit more than a short ton in the U.S. From the perspective of the atmosphere, though, what matters isn't emissions per person, but the total amount of greenhouse gases entering the atmosphere. Georgia's total for October was 7.3 million metric tons, and that's the kind of volume that's causing the climate to destabilize and warm. Adding up all the months through October, Georgia had produced 85 million metric tons of emissions for the year, and with a couple more months of data still to come, we expect the state will be at or near 100 million metric tons by year's end.

The centerpiece of the tracker is the map, which shows the distribution of high and low emission levels across the state, in several different sections of the presentation. You can hover your mouse over any county to get a pop-up with that county's key numbers. If you hover over Chatham County, home to Savannah, you'll see it had 1,105 metric tons per 1,000 people, nearly double the statewide average. Since Savannah is the third busiest port in the United States, that's not surprising, it reflects high transportation emissions from trucking and diesel fuel, along with industrial emissions from the industry located there.

If you move to the northeast corner of the state and hover over Rabun County, you'll see very different numbers, shown in green, and negative. That means Rabun County had more forest carbon uptake than human emissions in October, putting it below net zero because of how heavily forested it is. If you click on a county rather than just hovering, the whole dashboard updates to show that county's information. For Rabun County, the bar chart shows emissions by

sector, and you can see forestry uptake overwhelming human emissions, even though people there still produce some. The time series chart shows Rabun County's emissions over time, and interestingly, right around 2013, the county transitioned from positive to negative emissions, exactly the kind of transition we all need to make, across Georgia, the U.S., and the world, to stabilize the climate and hand a stable one to our children and grandchildren. If the dashboard ever gets tangled up, there's a "clear all selections" button in the upper left of every screen that resets you back to the initial view.

Continuing the tour into northwest Georgia, Whitfield County shows industry as the majority of its emissions, reflecting its large cluster of carpet and floor covering manufacturers. There's also a "county info" link on the dashboard that takes you to the New Georgia Encyclopedia's entry for that county, the authoritative source on Georgia's geography, history, and culture. For Whitfield County, that entry includes the story of Katherine Evans Whitener, who, at 15, revived and perfected a new tufting method for quilts that turned out to be perfect for manufacturing carpets, eventually leading to the huge concentration of carpet and floor covering manufacturers in the area. Jumping forward to today, Interface, one of those manufacturers, was founded and led for many years by Ray C. Anderson, for whom the Ray C. Anderson Foundation, which supports this dashboard and Drawdown Georgia, is named.

Moving to Seminole County in the southwest, agriculture emissions dominate. Transportation, industry, and agriculture can each be the dominant source of emissions depending on where you look in Georgia. Finishing the tour in Fulton County, home to Georgia Tech, the two primary sectors are transportation and commercial, with "commercial" covering everything non-industrial, including government and Georgia Tech itself, which makes sense given Fulton is the seat of state government.

There's a lot more detail available in the dashboard, and buttons at the bottom right of the screen lead to sections with much more depth on electricity, business emissions, and forestry, which our next three speakers will cover. After the webinar, I'd encourage everyone to go explore the dashboard to your heart's content. Back to you, Blair.

Blair Beasley: Thank you so much. With that, I'll turn it over to Dr. Brown.

Dr. Marilyn Brown: Thank you, and Bill, that was a great intro. We're going to dig into the electricity sector, starting with emissions from the consumption of electricity, then turning to emissions from generation. This chart shows emissions from electricity consumed each month, both statewide and across all 159 counties, color-coded, measured in metric tons per 1,000 people. I chose to focus on August since it's a more interesting month for power generation. Homes in Georgia were responsible for emitting about 6.5 million tons of CO2 from electricity that month, to heat, cool, light, and simply live in their homes, about 1.3 pounds per person on average. Hovering over Fulton County, where Georgia Tech is located, shows 726 metric tons of CO2 per 1,000 people, compared to the state average of 591, and its total emissions for the

month were quite high, with its yearly total of 5.6 million tons making up more than 10% of the state's total of 46 million.

I should mention, on the left side of these charts, there's what we call a Keeling-type curve showing the absorption and emission of CO2 from forestry, with clear seasonal ups and downs. For electricity-generated emissions specifically, we're on a downward trend, in Fulton County, emissions in August 2021 were about half what they were in August 2010, though weather always has to be factored into any comparison like that. Statewide, the 46 million tons of emissions from electricity in the most recent data point is nearly half what it was in 2005, the benchmark year we like to use for comparison, since it's also the reference year for the Paris Accords.

Breaking things down further, we can look at emissions from electricity consumption in homes, commercial buildings, and industry, both for Fulton County and the state. In Fulton County, residential emissions are much larger than commercial and industrial in August, and in general, Fulton has very low industrial emissions compared to the rest of this highly industrialized state. Commercial sector emissions in Fulton were 394 per 1,000 people in August 2021, well above the state average of 194.

We won't spend much time on transportation's electricity consumption emissions, since they round to essentially zero, and we don't have a dedicated speaker on transportation emissions today, simply due to time. But I did want to take the opportunity to show you where we're heading: one of our aspirations for the tracker is to move from tracking emissions to tracking solutions, and we've begun doing that on the same software platform. You can already see the location of EV charging stations relative to EV ownership, concentrated in metro areas due to affluence and adoption rates, which starts to help explain why we find climate solutions where we do, and eventually, we want to link that data back to emissions by county.

Turning to a different dashboard, this one tracks emissions from electricity generation, and covers two states rather than just Georgia, since we add Alabama, because a significant amount of Georgia's electricity is generated by power plants there. I'll highlight Plant Gaston, which has four gas units and one coal unit, owned by Alabama Power, a subsidiary of Southern Company, which also owns Georgia Power. Georgia Power purchases some of the electricity Georgia needs from Gaston. This plant is actually slated for retirement under the integrated resource plan Georgia Power published just a month ago, and I'll talk about several plants and their futures under that plan as we go.

Looking at some of Georgia's coal plants: Plant Wansley, between Carrollton and Newnan, will be among the first in the next retirement tranche. Plant Scherer, with four units just north of Macon, has two units retiring soon and two more retiring after 2030. Plant Bowen has two units retiring in the next few years, which has sparked significant focus on electricity reliability in north Georgia, since without that coal capacity, there's a potential shortfall that will need to be addressed through transmission infrastructure and other investment. We also have peaking

plants, like McManus south of Savannah, which runs on petroleum, isn't used often, but is quite dirty when it is. On the dashboard, you can select a plant type on the left-hand panel to filter by fuel source, and if you select solar, you'll see a list of every solar facility in the dataset, including one recently completed solar project in southwest Georgia, privately owned, with its electricity purchased by Georgia Power through a power purchase agreement. I wanted to end on solar, because it's the most exciting part of the plans for Georgia's electricity sector over the next 20 years, with at least 2,000 new megawatts of solar planned by our primary retail distributor. That's my last slide, over to David Eady, or perhaps Blair in between.

Blair Beasley: Great, thank you so much, Dr. Brown, that was great. David, I'll turn the mic over to you.

David Eady: Thanks. While the University of Georgia, Georgia Tech, and Emory University were working on the foundational research behind Drawdown Georgia's climate solutions, we were also working with corporate partners to figure out how to leverage the leadership we already see from businesses in the state, many already pursuing ambitious carbon reduction goals, into a collective impact initiative that could accelerate deployment of those 20 solutions even further and faster. So we launched the Drawdown Georgia Business Compact in October of 2021. It's meant to be a diverse group representing the diversity of Georgia's economy: company size, location, level of carbon ambition, and sector. The goal is to move Georgia toward net zero by 2050, with intermediate goals along the way.

We currently have 23 member companies in the Business Compact, and that number keeps growing as we accelerate our outreach. At the Ray C. Anderson Center for Sustainable Business, we're focused on four channels of work: facilitating collaborative initiatives among compact members, catalyzing innovation across the state by building on Georgia's already robust innovation ecosystem, creating a community of practice where members share lessons learned and best practices, and reporting on our collective progress toward net zero by 2050. It's that last piece, reporting on progress, where the dashboard is especially relevant, but it also shapes how we target our outreach and where we look for solutions.

The data we're about to look at is facility-level greenhouse gas emissions data, self-reported annually by various industries in Georgia. You can organize it several ways, these charts group it by NAICS code, the North American Industry Classification System. If you set aside utilities, which Marilyn already covered, the next biggest wedge is manufacturing, followed by waste management. Within manufacturing, the largest piece is pulp, paper, and paperboard, followed by pesticides, fertilizer, and other agricultural chemicals, and that second category is actually 22% attributable to a single plant in Augusta, which I'll show you in a moment.

This is a display showing the various facilities in Georgia that report this data to the EPA's Greenhouse Gas Reporting Program, with bubble size representing relative emissions, and color coding showing industry type. Looking just at manufacturing facilities, you can see how they're spread across the state, and the relative emissions from any one facility, you can hover over any

bubble to see which facility it is and how much it emits. Focusing on the pulp, paper, and paperboard industry specifically, these facilities are primarily located along major waterways, scattered across the state but concentrated in middle to south Georgia, which helps guide our outreach as we try to make the Business Compact representative of Georgia's geography. We're already in conversation with several companies in this industry code.

That large plant in Augusta manufactures fertilizer, and releasing CO2 is simply part of that manufacturing process, its footprint is significant, about 1.73 million metric tons, making that single facility responsible for almost 2% of Georgia's total greenhouse gas emissions for the year. If we can work with a company like that to reduce emissions, it can make a really significant impact, which is exactly why knowing where emissions come from, and who's responsible, helps guide not just our outreach, but which solutions make sense to bring to bear.

Georgia also has a rich kaolin mining industry, spanning the state's fall line, that middle band where you can see a concentration of companies mining kaolin, a type of clay, for use in various manufactured products, along with other mineral-related industries like glass manufacturing. There may be real opportunity to find commonalities across these mineral-related industries and target solutions accordingly. The large circle in the middle of that same map is a cement manufacturing plant, and cement manufacturing, for those who don't know, is extremely carbon intensive, making it another great target for industry partnership on emissions reduction.

Looking at animal processing and food manufacturing, Georgia is the chicken processing capital of the world, centered around Gainesville and Flowery Branch, reflected in a couple of large bubbles there. Tyson also has a plant in southwest Georgia with significant emissions, and in Savannah, there's a sugar and confectionery manufacturing facility. Again, knowing where these emissions come from, and which industries are involved, helps target both our outreach and our pursuit of solutions.

Last, looking at the waste industry, these circles represent landfills across the state, about half of them publicly owned by a city or county. That presents a real opportunity for industry to partner with local governments to capture methane released from landfills and generate electricity, or find other ways to reduce landfill-related emissions, since waste is a significant share of the state's industrial carbon footprint. That's my last slide. Having this facility-level data, and being able to drill into who's involved, where facilities are located, and what processes drive those emissions, really helps us think about outreach and about deploying the solutions researched through Drawdown Georgia. Back to you, Blair.

Blair Beasley: Thanks, David. We've been talking about emissions, and now we'll turn it over to Dr. Mohan to talk about our natural carbon sinks in the state.

Dr. Jacqueline Mohan: Thank you. Today I'm going to talk about how beautiful negative numbers are, and how lovely dark green is, because those are the places and numbers representing sequestration by our land-based ecosystems, which in Georgia largely means forests. Earth has

three natural sinks for carbon, whether it's emitted by natural processes like plants and microbes, or by human activity, but only one of them is really safe. Carbon can go to the atmospheric sink, driving higher CO2 levels and climate change, it can go to the oceans, driving ocean acidification, or it can go to land-based ecosystems, and of those, forests are the most important.

Georgia is blessed with forests, about 60% of our state is forested, and we're the number one timber state in the nation. You can see gorgeous dark green, negative-emissions, carbon-sequestering counties throughout the state, from the mountains to the Piedmont to the coastal plain. Looking at a bar graph for the month of August, breaking down Georgia's different carbon sectors, the dark green bar on the far right, our forest sector, actually offsets the state's single largest carbon emitter that month, transportation, shown as the gray bar on the far left. Our forests more than make up for the carbon our transportation sector emits.

Focusing on forest carbon dynamics specifically, I want to draw your attention to the dark green patch representing the Okefenokee Swamp in the southeast part of the state. The Okefenokee is extraordinary, hydrologically, for its biodiversity, and for its carbon impact globally, if you haven't been, you really should go. It's largely a swamp forest, so we have big trees, many conifers, alongside wonderfully organic, carbon-rich, peaty soils, meaning carbon storage in both trees and soil. That carbon benefit extends into the surrounding counties too. The top three carbon-storing counties in the state, in the month of August, are all clustered right around the Okefenokee: Ware County stores 86 metric tons of carbon per 1,000 people per month, Clinch County stores 77, and Charlton County is right up there with them too.

Looking at the whole state for that same month, Georgia's forests stored almost 500 metric tons of carbon per 1,000 people, that's almost half a metric ton stored in forest ecosystems for every person in the state, not emitted by them, stored on their behalf. Translated to pounds, that's over 1,000 pounds of carbon stored per person in Georgia in the month of August alone, carbon that would otherwise freely enter the atmosphere and contribute to warming the whole planet. Georgia matters here, not just for Georgia, or even the eastern United States, but for the whole planet.

Looking at monthly emissions for the state going back to 2005, you can see a long-term negative trend, and since we're talking about negative emissions, that means we're talking about carbon storage, the more negative the number, the more carbon being stored. We're storing more and more carbon over time, in part because of agricultural land abandonment in the early to mid-20th century, true across the eastern United States and in many other parts of the world, we're growing more forests, and with Georgia's long, warm growing seasons, we're growing bigger, faster trees, storing more carbon as those forests mature. You'll also notice seasonal oscillations in that chart, reflecting the importance of growing seasons versus winter in the Northern Hemisphere, where most of Earth's land systems sit, and where Georgia's seasons play into the global carbon budget. We take in more carbon during the growing season, less during winter. All of Georgia matters here, but especially our forest and soil ecosystems, not just for

Georgia, but for North America and the globe as a whole. And I could go on listing all the other reasons forests matter, biodiversity, filtering pollution from water and air, providing jobs, free and low-cost recreation, but I'll leave it there and turn it back to Blair. Thank you all very much.

Blair Beasley: Thank you so much, Dr. Mohan. We're about to open it up for Q&A, which my colleague Ollie will lead, but before we do, I want to ask Dr. Drummond one quick question. As you were building this, was there a data trend or high-level takeaway that surprised you or really stood out?

Dr. William Drummond: What surprised me, and probably shouldn't have, is that as someone who drives in Atlanta traffic and has watched traffic and population increase, I would never have guessed our emissions are actually going down rather than up. They're not going down nearly fast enough to get us to net zero and stabilize the climate, but you heard hints of why from Dr. Brown, in our transition from coal to natural gas, electricity emissions are falling. And just now from Dr. Mohan, forest coverage is actually increasing, despite land cover loss around Atlanta and other growing areas. Those two trends more than compensate for population growth and increased electricity usage, at least so far. That's genuinely surprised me, and I noticed someone in the chat was surprised by it too.

Blair Beasley: That's great. Ollie, I'll turn it over to you.

Oliver Chapman: Great, thank you. We've gotten a lot of great questions, and we won't get through all of them, but I'd like to start with one of the last ones that came in: how difficult would it be to replicate this tracker for another state? Someone asked specifically about Virginia. Is the methodology available for other states to use?

Dr. William Drummond: We're thinking about exactly that. We made the choice to use open-source software to develop all of our estimates, even though the tracker itself lives in Microsoft Power BI, and all of our data sources are national datasets that are publicly available. So while it would take some work to rewrite the code for another state, we were careful not to use any proprietary data, or data specific only to Georgia, to make it as easy as possible to replicate the tracker and the analysis behind it for other states. Marilyn, did you want to add something here?

Dr. Marilyn Brown: Along those lines, it's also not terribly expensive to sustain updating our current dashboard, we have plans to keep doing that monthly, and the cost is quite modest, we believe we have good coverage going forward for that. So yes, there's some expense to set it up for each new state, but I'd love to see whole regions collectively characterized this way, I'd really like to see every state in the Southeast go all in on having a dashboard like this. That's one of our aspirations.

Oliver Chapman: A couple people are interested in whether soil carbon capture was included in our analysis, and if not, whether it's possible to incorporate in the future.

Dr. Jacqueline Mohan: Soils, as you all know, are critically important. I like to point out, since I love my trees, that the main way carbon actually gets into the soil is through trees. Soils can hold forms of carbon safely sequestered out of the atmosphere for centuries, some for millennia, so getting carbon into the soil is, in some ways, the whole game. This data comes from the EPA, and it does include the top meter of soil, so we're talking about trees, and importantly, we're talking about soils too. As I'm sure the person asking already knows, we actually have more carbon stored in soils than in all of Earth's vegetation and atmosphere combined. Soils literally, and I know this is a bit of a pun, really rock.

Oliver Chapman: We have a pretty specific question about industries around Augusta. What options exist for plants like fertilizer or cement plants to reduce carbon when it's inherent to their manufacturing process? Carbon capture, alternative manufacturing methods, that kind of thing?

David Eady: I'll take a first crack, though I'll say up front I'm not an expert in fertilizer manufacturing, so I'll steer away from that one specifically, but certainly you'd want to look at the underlying processes and whether substitutions are possible. On cement manufacturing, which I'm also not an expert in, I do know there are alternative additives being explored that dramatically reduce the carbon emissions associated with cement production. A lot of that's already been tested and proven out, it's really a matter of bringing it to scale and continuing to demonstrate the efficacy of those alternative mixes.

Dr. William Drummond: I'd add, for manufacturing processes that require a lot of heat, people are exploring substituting in hydrogen gas created from low- or zero-carbon electricity. I'm not an expert, but it seems like a feasible path, though one that hasn't been researched nearly as extensively as we'd like, for transitioning from burning fossil fuels to burning zero-carbon hydrogen in high-heat manufacturing processes.

Dr. Jacqueline Mohan: If I could add quickly, another role for Georgia's amazing forests is something called mass timber, or cross-laminated timber. Several of us have worked on ideas around this, we could potentially use timber from Georgia to create what I like to call high-tech lumber, essentially super fancy plywood. It sounds funny, but these products can substitute for cement and even steel in building construction. They've already been used in buildings around the planet up to about 20 stories tall, and it's a way of using a renewable material to build big buildings while bypassing the carbon-polluting effects of cement and steel. I'll stop there.

Oliver Chapman: Another question is about cogeneration, one of the solutions we've highlighted as optimal for Georgia. The question is, while such a solution would reduce emissions overall statewide, could it increase emissions specifically in the county where the plant is located, and does that raise equity concerns about where these plants get sited, given the statewide benefit versus a potentially localized impact?

Dr. Marilyn Brown: I can take that one, it's one of my favorite technologies. Yes, sometimes co-locating an electricity plant that uses waste heat from an industrial process can put it near a densely populated area, so you do have to be careful you're not driving up emissions somewhere already highly populated. These combined heat and power plants are really a great foundation for novel, innovative clean energy options, with very high efficiency, ranging from 85 to 95%, compared to a gas plant that might run at 65% efficiency. That efficiency, combined with adding pollution control equipment to those plants, helps immensely, as it always does. I'll also note that cogeneration going forward is likely to increasingly use renewable gas and green hydrogen blended with traditional natural gas over the next decade, and could eventually go fully renewable. At that point, we wouldn't have to worry as much about conventional pollutants becoming more concentrated locally. I'm looking toward the next decade, when we'll see that substitution from fossil to renewable gas running those plants at such high efficiency.

Oliver Chapman: I think we have time for one more question, so we'll end on this: are there any plans to add a modeling component to the dashboard, to test how various solutions could be applied and accelerated across the state?

Dr. William Drummond: That's our dream, Marilyn, go ahead, take it away.

Dr. Marilyn Brown: I'll let you start, Bill.

Dr. William Drummond: I'll say quickly, the real payoff, I think, will be in tracking solutions. We don't just want to track emissions, if we can track our progress on solutions too, that could have multiple positive effects in accelerating adoption. Neighboring counties will see what the county next door is doing, businesses in a given industry will see what other businesses are doing. So tracking solutions would be a terrific way to help accelerate their adoption. Marilyn, why don't you take the last word here?

Dr. Marilyn Brown: Well, that's really what Drawdown Georgia is all about. We have to understand where emissions come from in order to know which solutions matter most, but obviously our real excitement is all around the solution space. We've identified 20, though there are more than 20, and we've now partnered with business leaders who have innovative ideas for even more that can be done. So we're going to be moving pretty quickly now into geospatial tracking of solutions, and linking that back to emissions data. Thank you all so much. Blair, I imagine you have some concluding comments?

Blair Beasley: That was a pretty good conclusion already. I'll just add, thank you again on behalf of the Ray C. Anderson Foundation and the entire Drawdown Georgia team. We hope you'll go check out the tracker on the Drawdown Georgia website, and keep coming back in the days and weeks ahead. As Dr. Drummond mentioned, the data will be kept up to date monthly, so we can all keep track of how emissions are changing in the places we live, work, and love, as we work to reduce emissions across our state. Thank you again, we really appreciate you joining us today.

Dr. William Drummond: Bye, everybody, thanks.