06 - 15 - 2023

Green Plains Inc

IRA Teach-In

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PRESENTATION:

Operator^ Good morning, and welcome to the Green Plains Inc.'s Inflation Reduction Act Teach-in. (Operator Instructions)

I will now turn the call over to Phil Boggs, Executive Vice President of Investor Relations.

Mr. Boggs, please go ahead.

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Phil Boggs^ Good morning. And thank you for joining us today for our teach-in on the Inflation Reduction Act and the opportunities it presents for Green Plains.

There is a slide presentation available on the webcast, and it is also available on our Investor Relations website.

On Slide 2 of the deck, we have included a safe harbor statement.

In summary, it indicates that we may make forward-looking statements on today's call. which are intended to be covered by this statement and that actual results could materially differ.

Today we will provide a brief overview of our progress on our transformation take a deep dive on the inflation Reduction Act; review various decarbonization strategies; and conclude with the overall impact to Green Plains.

Joining us today is Todd Becker, President and CEO as well as several guest speakers. I'd like to welcome [Anthony Reed], industry policy expert from FGS Global, along with a couple of members of our management team; Devin Mogler, Senior Vice President of Government Relations; and Jordan Sunderman, Director of Strategy and Development. After the prepared remarks, we will open the Q&A. Please keep your questions focused on the topic of the day, the IRA, carbon capture and storage and related decarbonization opportunities. For any other company-related questions, please direct them to Investor Relations after the call.

Now I'd like to turn the call over to Todd Becker for opening remarks.

Todd Becker^ Thanks, Phil, and good morning, everyone. As we talked about on our conference call, we are very excited to have an IRA Teach-In, and that's what we're going to do today. And hopefully, you'll find it educational, encouraging and exciting for our company. So we're excited to have you join us today for a deeper dive into the inflation Reduction Act and to discuss the opportunities we have to monetize the ongoing decarbonization of our platform and ingredients as discussed on our last quarterly call.

Lowering our carbon input is not new, our carbon output is not new as we have a long history at Green Plains of reducing carbon having a positive impact on the environment. For starters, Ethanol has a 46% lower greenhouse gas footprint in gasoline; increased use of biofuels, such as ethanol through expanded blends like E15, which is often sold now as unleaded 88 already has a positive impact on global emissions today. With carbon capture and potential alcohol-to-jet fuel opportunities in sight, we are positioning ourselves for the future to further decarbonize liquid transportation fuels and the IRA, which we're here to discuss today. I'll provide the necessary monetary incentives to further decarbonize our platform.

Even before the IRA though, we were an early investor in the Summit Carbon Solutions project to capture biogenic carbon from 8 of our 11 ethanol plants, lowering our CI score by nearly half. Additional investment is needed globally to further reduce the CI of our liquid transportation fuels, and there are numerous initiatives across our platform to do this, which we'll talk about today later in the call. As we've been saying since it was passed last August, the IRA is a game changer in that it provides an overall structure framework and precise incentives that enable additional carbon reduction investments while enabling pioneering organizations such as Summit and Green Plains to earn a return on these investments.

The IRA accelerates our strategic transformation by incentivizing additional investments in decarbonization so that we can realize our long-term goal of achieving a net 0 CI while also providing greater returns to our shareholders. So where do we stand today? How are we transforming our assets for the low carbon future. Today, we have the capacity to bring in approximately 330 million bushels of corn annually. This renewable crop feedstock absorbs CO2 from the atmosphere as it grows in stores it in kernel. Think of a corn plant as a direct air capture carbon system and the kernels as little solar-powered batteries. This biogenic carbon capture from the natural carbon cycle is already uniquely positioned from the carbon release from fossil fuels and is part of why we've always been renewable.

Our focus has always been how do we maximize each kernel of corn and unlock its potential through a whole kernel solution to produce increasing amounts of diverse, high-value products. Our traditional dry mill process produces 3 products, ethanol, distillers grains and a little bit of corn oil as well as the biogenic CO2 that resulted from the fermentation process. We have focused for a while now on our acquisition of Fluid Quip and what it means for our expansion into ultra-high protein ingredients, clean sugar technology and higher renewable corn oil yields, but we haven't spent as much time spelling out the full value opportunity for carbon and how we are going after it.

Today, we're going to spend most of our time discussing how we can capture the biogenic CO2, reduce our carbon intensity scores with additional technology investments and earn a return on these investments in the process. Our first major initiative on reducing our carbon intensity is through carbon capture. We have 8 of our plants committed to the Summit Carbon Solutions pipeline, which is on track for 2025 start-up right in time for the IRAs new 45Z. Clean Fuel Production Credit to kick in, which we'll cover later in the call. This not only begins to position our assets to produce lower carbon alcohol that can become a key feedstock for sustainable aviation fuel and existing low carbon fuel markets, but also enables us to earn a return on any necessary investments to capture the carbon.

Our 3 Southeastern locations that aren't on Summit have potential for carbon capture and utilization as well. We're actively exploring a direct injection opportunity at our Mount Vernon, Indiana plant and anticipate this announcement in the near future, along with a carbon utilization strategy and partnership with Tallgrass and Osaka Gas out of Japan to

utilize our biogenic CO2 from our Madison and [Obion locations] to produce synthetic methane as well as exploring direct inject our transport solutions to an indexing site at those locations as well. So the IRA is a game changer for Green Plains and accelerates our transformations to Green Plains 2.0 and beyond, with key benefits in a number of areas such as corn oil, transportation fuels and the benefit of the capture and utilization of biogenic CO2 itself.

A number of programs exist today, whether it's the low carbon fuel standard programs across California, Oregon, Washington and Canada, with additional states exploring incentives for low carbon fuels, new federal programs, such as the 45Z. clean fuel production credit, which is essentially a national low carbon fuel standard that provides a carbon-based incentive for each gallon of low carbon fuel produced across our 1 billion gallons of capacity or the 45Q incentives that are tied to tons of CO2 captured and stored. And now we are in early days of seeing state-level sustainable aviation fuel credits, including programs from Illinois, Washington State and Minnesota, all enacted this year, and we are strategically reviewing and executing to participate in these programs.

Later, Jordan is going to discuss some of the individual strategies we are pursuing. For those that have been following along for a while or who have read our sustainability report, this is not a new concept, but we believe there's a path ahead of us to significantly reduce the carbon intensity of our platform. Carbon capture has the largest impact for us with about a 29-point reduction. So it's the biggest bite of the apple and the first item we are executing on. We will get into calculations around value of the 45Z Clean Fuel Production Credit later and what it means to our platform overall. But here's some simple math that the IRA provides. $0.02 per gallon for every point of CI below 50 multiplied across our 1 billion gallons of production or 20 million per point of CI across our platform once we are below that 50 CI threshold.

This transformational technology neutral tax credit fundamentally revalues our asset base and those of the industry and that of any other company who can produce low carbon fuels. To be clear, we don't need to turn our ethanol into SAF to qualify for this. We are simply getting credit for RCI reduction on every gallon we produce, which previously only had an uplift in the low carbon fuel standard markets such as California.

Beyond carbon capture and storage, we are having numerous discussions on cogeneration opportunities, which can be executed in a capital-light manner to generate a portion of our own electric power while reducing the CI from what we can pull off the grid today. Additionally, future opportunities exist as we explore thermal energy and work with our farmer customers and regenerative agricultural processes, which can lower the CI of their crops, our feedstocks and ultimately lower the CI of every gallon of fuel, every pound of renewable corn oil and clean sugar and every ton of ultra-high protein we produce.

All of our customers want to see a lower CI for these ingredients and are willing to pay a premium. All combined, we could see our average CI score go from 60 to 0 or below and some of our plants are already below 60 as a starting point. Our total platform has

approximately 3 million tons of opportunity for biogenic carbon, that we can capture for storage and utilization. This is the equivalent of removing 7 million barrels of oil used annually or taking 668,000 vehicles off the road each year, that's more than the equivalent number of EVs that most automakers are selling today.

Our 8 locations in the pipeline would capture nearly 2 million tons of our total biogenic carbon starting in 2025 and our 3 Southeastern locations stand to benefit from additional investments and partnerships. There is significant upside to every gallon of ethanol we produce as we decarbonize our platform from 45Q, which could be based on every ton of carbon we capture to the 45Z which would incrementally benefit each gallon based on our overall reduction in CI value to low 50 to various low-carbon fuel standard programs, which are on top of the IRA value where the lower we can get our CI, the more opportunity there would be.

It used to just be California but now Canada, which has a fuel market the size of California, plus Washington State and Oregon with New York and other states moving in this direction as well. We are on this journey focused on decarbonization and the IRA provides a game-changing impact that helps drive the allocation of capital to decarbonize liquid fuels production, benefiting the planet as well as providing a return to our shareholders, truly a win-win program.

Near-term projects could provide nearly $1 per gallon of gross opportunity with regenerative agriculture and natural gas reduction strategies that are a little further out to the opportunity increases to over $2 a gallon. I'll come back on the call toward the end to summarize the overall impact of these investments and programs could have on our financial outlook.

But right now, it's my pleasure to hand the call over to Anthony Reed, a biofuels and carbon policy expert with FGS Global. You've heard me discussing these programs since last August, and I thought it would be great to have a third-party expert who has spent his entire career in D.C. on Capitol Hill at the EPA and as a biofuels lobbyist, take you through some of the finer points of the IRA as they pertain to Green Plains. Anthony, welcome to the call.

Anthony Reed^ Great. Thanks, Todd. As you all know, last August, President Biden signed the Inflation Reduction Act into law after months of Democratic intraparty negotiations. It's $369 billion in investment in climate change and clean energy, including $270 billion in tax credit. It Is the most significant in U.S. history. After years of piecemeal short-term extensions that limited the potential of clean energy investment, the IRA spells out energy tax policy for the next 5 to 10 years, which have allowed project sponsors and technology developers to plan with greater certainty.

And it has already made a significant impact as recent estimates show that the clean energy provisions alone will be worth $1 trillion over the next decade. Most relevant today, the IRA extended the biodiesel tax credit and advanced biofuel credits while

extending and expanding the 45Q credit for CCS. It also created a stand-alone SAF producer tax credit, which took effect this year. These fuel credits then transition to a new, broader technology-neutral 45Z clean fuel production credit for both aviation and non-aviation fuels that adjust the value of the credit based on reductions in greenhouse gas emissions achieved.

This approach, which uses the tax code as an undisguised climate policy tool is arguably one of the most significant policy changes in the package. Taken together, the IRA provides a historical set of systemic funding and tax incentives to enable the ethanol industry to monetize their products for current and future markets.

To start, distillers corn oil will continue to be well positioned in the biodiesel and renewable diesel market with the extended BTC, while the advanced biofuel credit will continue to benefit [cellulosic] ethanol production. In preparation for a marketplace which rewards increasingly lower carbon fuels, the expanded 45Q credit provides an additional $35 per ton which will incentivize the build-out of carbon capture infrastructure, offering on average a 29 CI point reduction per ethanol gallon. Without any other carbon reduction strategy, that would be enough to qualify an average ethanol producer for both the 45Z and SAF tax credits.

An additional $500 million in biofuel infrastructure funding was also included in the IRA to expand offerings of higher ethanol and biodiesel blends at the pump. And then the law supercharges the SAF market and low carbon fuel markets with the creation of the SAF and 45z credits, creating additional market optionality and opportunity for low carbon fuels, including ethanol. And those benefits increased, as Todd said, by $0.02 a gallon for each point of CI reduction below 50, while enabling further carbon reduction opportunities such as working with farmers to source low-carbon feedstocks produced with climate smart agricultural practices.

These are transformative market measures not seen since the first RFS was created in 2005. Like all laws, how the IRA provisions are implemented is a critical step. And as I often say, carbon is the new currency, and these regulatory processes will define the specifics of each credit and have substantial impact on eligibilities and valuation. For the clean energy credits, the regulatory process involves Treasury, the Department of Energy and EPA among others, as the statute requires consultation and treasury's inexperience in energy policy is limited. Treasury has been prioritizing its work based on deadlines in the statute, the complexity of the tasks such as simple extensions are likely to move more quickly than newer credits and then the effective date of each credit.

While the credits we've been discussing do not have regulatory deadlines, the industry has been making an effective case that given the time to build a project and the shorter expiration date for 45Z of 2027, treasury should prioritize guidance for these credits. So far, the biodiesel tax credit extension is already in place and treasury has issued guidance for the SAF tax credit, which went into effect this year, except for the greenhouse gas modeling provisions, which I'll touch on. They have also already taken public comments

on the GHG modeling for the SAF credit as well as the 45Z and 45Q credits and the transferability and direct pay regulations were just proposed yesterday.

We expect guidance on the SAF credit to be finalized in August or September, which will inform a lot of the details of how 45Z will be administered as well. Unlike the SAF credit, where rules were issued as guidance, we are expecting treasury to issue a formal rule-making proposal for 45Z, which would take additional time and public comments, but also provide longer-term stability. We expect that proposal by the end of the year with the final rule-making in midyear 2024 in advance of the 2025 implementation date.

There are several key issues that still need to be resolved for the SAF and 45Z credits. Arguably, the most important is greenhouse gas modeling for the SAF and aviation portion of the 45Z credit. The IRA stipulate that either the ICAO CORSIA model or a model with a similar methodology may be used. For non-aviation fuels under 45Z, the IRA requires the use of the Department of Energy's Argonne GREET model to calculate GHG emissions which is a scientifically rigorous, transparent model using up-to-date data that demonstrates the increasing efficiency of ethanol production and on-farm practices.

SAF stakeholders, including airplane and engine manufacturers, airlines, current and prospective SAF producers and the broader biofuels and agriculture industry are asking treasury to be able to utilize the GREET model for SAF due to the shortcomings of the ICAO CORSIA model, which relies on data published over a decade ago.

Other guidance provisions, which we expect to be favorable include the ability for producers to generate facility-specific GHG scores that may be better than default values, the applicability of low CI feedstocks in generating those scores and the ability for developers to structure projects such that the 45Q and 45Z credits can be fully monetized. Moving forward, as we've seen the Republican House consider forms of [IRA repeal], I would point out several important considerations as it pertains to the future of the 45Z credit. Number one, it's extremely unlikely that any changes to the IRA will be made during this congress. Any changes to the IRA would need to be approved by the Senate requiring 60 votes and then signed by the President who considers the IRA a legislative crowning achievement.

This means any efforts to scale back or eliminate IRA provisions are extremely unlikely to succeed while democrats hold one or more chambers of Congress or the White house. And the recent jet fuel debate in the house showed us that these biofuel credits, in particular, have bipartisan support which caused Republican leadership to withdraw or significantly modify the IRA repeal provision in the original (inaudible) package. This was further reflected in this week's Republican economic tax package, which had no mention of repeal or modification of any of these credits.

Number two, despite the 2024 election outcome, it's very likely 45Z tax credit will get further extended. As someone who's worked firsthand on several extensions of the

biodiesel credit and even the prior ethanol tax credit, Congress is always likely to extend expiring tax provisions, particularly ones important to a broad set of stakeholders like 45Z. It's usually more a function of finding a legislative vehicle to do so.

And as shown on this slide, a number of important tax provisions have expired or will expire that will push Congress to act on tax legislation, including in 2025 when we will see a significant number of the Trump tax cuts expire that Congress will want to address after the 2024 election. From a budgetary process standpoint, it's also cheaper and easier to do shorter extended extensions that provide permanent, which is why continued extensions are much more likely.

So I think we are in a great position moving forward on this front. With that, let me turn it back to Todd.

Todd Becker^ So thanks for the recap, Anthony. As we've been saying since last August when this bill was first passed, there's immense upside for Green Plains and for other industries as well, including others in the ethanol industry, from the new feedstock and fuel agnostic credit And while there's still some pen-stroke risks associated with some of these provisions, we are in a new era where carbon reduction has real value, and we are well positioned to capitalize on that opportunity.

As Anthony pointed out, these are transformative market measures, not seen since the first RFS was created almost two decades ago. Now I'm going to introduce Jordan Sunderman, who's going to walk you through the details of the technologies we are implementing to allow us to unlock the full value of the IRA and low carbon fuel standard programs. We are carefully evaluating each of our locations to ensure we are deploying capital in a manner that will provide the greatest CI reduction in return on investment. Jordan?

Jordan Sunderman^ Thank you, Todd. We are focused on executing the strategy to greatly lower the carbon footprint of our assets while maximizing return to our shareholders. As you can see on the example we have shown, our near-term opportunities have substantial impacts to carbon intensity. Together, CCUS and cogeneration resulted in a total reduction of 35 CI points. That is over half the carbon footprint of our biorefineries today.

As Todd mentioned earlier in the presentation, the 45Z tax credit provides an incentive of $0.02 per gallon per CI point under a threshold of 50 points. For example, if we took a biorefinery with a 50-point CI score and added cogen and CCUS, these projects together would earn $0.70 of value per gallon from the 45Z tax credit. When we include low carbon fuel credits, assuming a price of $100 per ton, we had another $0.26 per gallon. These programs together can close to $1 per gallon of value. Longer term, we are exploring opportunities to implement regenerative agriculture programs as well as strategies to reduce and eventually replace the usage of natural gas.

This includes a combination of utilizing renewable natural gas, recycling excess heat in our production process and driving less feed product. Together, these projects further reduce our carbon footprint to net 0. When adding up the benefits of all these projects, Green Plains has an opportunity of over $2 per gallon from 45Z tax credits and low carbon fuel credits. I want to clarify for those on the call that the amounts in this example are before expenses, discounts and sharing arrangements with partners.

Also, our platform currently averages a CI score of 60 points, and therefore, 10 points would be above the 50-point threshold required for the 45Z tax credit. Though we are confident in the IRA language and the value to ethanol, we are awaiting guidance from treasury on how the 45Z credit will be applied to our industry and low carbon fuels in general. Our first key decarbonization project involves carbon capture utilization and storage, which will reduce the carbon footprint of our biorefineries by approximately 50% and we'll further establish ethanol as one of the most effective solutions to decarbonize transportation fuels.

Carbon capture and storage is a process that involves capturing the biogenic carbon dioxide that we generate from fermentation of ethanol. We will then compress the CO2 to be safely transported and permanently stored in deep, underground geological formations. Because the biogenic carbon dioxide released from our fermentation is almost 100% pure CO2 and contains a little-to-no impurities, capturing compression of the CO2 is relatively simple and inexpensive compared to other industrial sources of CO2 capture.

We view CCUS as a major step towards decarbonization of the industry, and we are pursuing carbon capture at all of our biorefineries. At many of our locations, we have capital-light options with our partners to amplify returns for our shareholders and minimize risk. Our first CCUS partner, Summit Carbon Solutions remains on track to hit an early 2025 operational start date, and we continue to see them make meaningful progress. Summit has over 70% of the necessary right-of-way signed up. They have more than 80% of the required pore space leased. They already secured access to a fully permitted Class 6 well and they have submitted additional well permit applications in North Dakota.

Green Plains has eight biorefineries signed up with Summit, equating to almost 2 million tons of biogenic carbon produced annually from these facilities. We believe that being first to market with low CI products will have sizable benefits for Green Plains, enabling us to realize the value from the 45Z tax credit earlier and having the ability to sell ethanol into low carbon fuel markets with a distinct advantage. Our partnership with Summit creates substantial value for the platform with no capital investment required from Green Plains. The reduction in carbon intensity from CCS would put any of our facilities below the 50-point threshold required for the 45Z tax credit and sets us up for additional projects like cogeneration.

Cogeneration is a highly efficient system that offers a reliable and cost-effective approach to meet our energy needs and sustainability goals. These systems utilize natural gas to

drive a generator, producing a reliable source of electricity. The excess heat from the electrical production has been recovered and utilized for a steam at a high efficiency, maximizing the overall energy efficiency of our assets. We estimate that cogeneration will reduce the CI score of our bio-refineries by 6 points on average. We are pursuing the installation of cogen systems at up to six of our sites. We expect these systems to come online in 2025 and 2026. This time line could be impacted based on lead times for equipment and approvals from regional transmission organizations.

We see multiple benefits from installing cogeneration in our biorefineries. Cogen is a mature technology that is reliable with an expected time of 98% and reduces our dependency on the electrical grid. Also, at some of our locations, we could realize a reduction in operating costs compared to buying electricity and the co-generation systems we are pursuing will have the ability to utilize renewable natural gas and hydrogen as an alternative fuel source. This gives us the optionality to further reduce the carbon intensity of our process. We are pursuing a capital-light structure for these projects where would retain all the benefits of the CI reduction without any of the burden of the capital costs.

In summary, we view cogeneration as an important piece of our strategy to decarbonize our platform while improving the operational reliability of our assets. With that, I will hand the call back to Todd.

Todd Becker^ Thanks, Jordan. So outside of the decarbonization of each of our production facilities, there's also a massive opportunity for our farmer customers to lower the CI of their crops they produce through implementation of regenerative agricultural practices. While many farmers have already adopted conservation tillage practices, split application of nutrients and cover crops to benefit the long-term health of their soil, they may now have additional incentives to implement these production practices as the reduced CI of their crops could translate to an enhanced 45Z credit for the renewable fuels that we are producing from them.

This is the final big bite of the apple that can take us to carbon-negative liquid fuels and further position us for markets like alcohol-to-jet, sustainable aviation fuel. Decarbonized alcohol through these various initiatives is key to positioning our platform to be a low carbon feedstock for SAF and motor fuels and joining us today to discuss some of the dynamics of this potential market is Devin Mogler. Devin?

Devin Mogler^ Thanks, Todd. Now that we've walked through our plan to decarbonize our assets, let's turn to the prospects for SAF. The market opportunity in this space is actually larger than that of surface transportation. At SAF, like renewable diesel is a drop in fuel that is not face blend limitations. The total U.S. jet fuel market is over 20 billion gallons today and is projected to grow to $35 billion by 2050. And the administration has targeted that date as a goal for having all petroleum Jet A in the U.S. you replaced with SAF.

Globally, jet fuel demand is over 100 million gallons today, and multiple countries are setting blending requirements and introducing new incentives for SAF. Likewise, airlines have set aggressive GHG reduction commitments and almost all of their Scope 1 and 2 emissions are from burning petroleum jet fuel. In short, the airlines need us to produce this fuel at scale, and they are quite literally begging for it. This is a stark contrast to the service transportation market, where we have historically had to fight tooth and nail for every incremental percentage of the gas tank. We don't have to push SAF into this market. The airlines want to pull it into their planes. And in order to do it at scale, you need readily available decarbonized feedstock and the U.S. corn ethanol industry is well situated to provide it.

It takes approximately 1.7 gallons of ethanol to make 1 gallon of SAF. So today's 17 billion-gallon capacity of the existing U.S. methanol industry could, in theory, produce 10 billion gallons of alcohol-to-jet SAF. The majority of SAF today is made from the same feedstocks that go up renewable diesel, soybean oil, fats and tallows, used cooking oil and of course, our renewable distillate corn oil.

As with RD, our Corn oil is advantaged to soybean oil as a feedstock because it has a lower CI, which today means a higher value in LCFS markets like California, Oregon and Washington State. Today, under the federal biodiesel tax credit, that gallon of RG gets to $1 per gallon regardless of feedstock. But starting in 2025, when all fuel specific tax credits transition to the 45Z, the low CI of our renewable corn oil will be advantaged there as well, not only with RD, but also with SAF.

As Anthony mentioned, treasury is currently promulgating rules for the 40b SAF tax credit, which will inform their approach to 45Z. We are watching two things very closely in this rulemaking. First, whether an ethanol producer can claim 45Q for carbon capture as the feedstock producer and then the SAF producing entity can also claim 45Z. And second, which life cycle assessment model they propose as an alternative to the ICAO CORSIA model. Airlines, agriculture and biofuels are aligned on recommending the Department of Energy's Argonne GREET model, which is codified for all non-SAF fuels under 45Z.

As detailed earlier, this model allows for CI reduction for carbon capture and on-farm practices to count and have a less punitive indirect land use change penalty. If the administration wants to see SAF produce at scale, they must allow for decarbonized corn ethanol to serve as a feedstock or domestic production will simply not take off. I'll now hand the call back to Todd to tie this all together. Todd?

Todd Becker^ So thanks, Devin. So if you asked me 2 years ago, and I said this before, if we would see alcohol to get sustainable aviation fuel at scale, I would have said no way. If you ask me today, the answer is absolutely. And what's the difference? The IRA. So where does that leave us regarding the financial opportunity for Green Plains from carbon? When we first began discussing the opportunity, we laid it out at approximately $0.15 per gallon net to Green Plains from our 658 gallons capacity we had committed to

the pipeline. This was primarily related to sharing the potential uplift from LCFS programs.

Whilst the LCFS pricing has dropped from what it was when we started discussing carbon, our opportunity has continued to grow, thanks to new incentives from the IRA with expanded 45Q and the potential to benefit from cogeneration on-farm programs under 45Z, our opportunity based on the entire program and if we assume $100 ton per LCFS or potential carbon credit value market going forward, it puts our annualized 2025 opportunity to nearly $120 million, with the potential to double that by 2027 as we execute on additional direct injection opportunities and put up to 6 cogeneration systems in the service. This is due to the 45Z and the $0.02 per gallon per CI point below 50.

If we see the 45Z get extended beyond 2027, then this opportunity continues with the potential to grow as we work through additional carbon reduction initiatives. If it expires, then our strategy continues to be supported by the 45Q and LCFS programs, which could still be well over $100 million annually based on our 8 plants on the pipeline, cogeneration, LCFS opportunities and direct inject in Mount Vernon. These projections depend on the overall value of LCFS and carbon credits as well as how many cogen systems we have deployed. We are not factoring any upside from the on-farm program as -- at this point, so any CI reduction there, which, by the way, would have no capital investment is pure upside.

Our strategy is clear, and we are already executing. Our first step is decarbonizing our platform through carbon capture and storage, CCS, through a combination of pipeline commitments and direct injection. This gets us in the money on the 45Z and provides a 12-year backstop with the 45Q Then we get tax of the various low-carbon fuel markets that want to pay you for a lower carbon fuel, which ultimately be paying a feedstock into alcohol and jet, which would be the cherry on top. Cogeneration would occur in parallel and quickly after in order to maximize the returns in the 45Z. So this is all shaping us up to allow us to have a decarbonized platform in time to benefit from the initial 45Z time frame of 2025 to 2027.

And then we'll have to see if it's extended. But based on our views and the discussions today, we believe that it's more likely than not. As they say, there's nothing more permanent than a temporary government program. While there always will be Penn stroke risk, the broad coalition of support from industry stakeholders will only grow and with it, the bipartisan support for these programs. Finally, the opportunities for the on-farm programs could lead to further upside with minimal capital. With carbon layered on top of where we are going with our protein, renewable corn oil and clean sugar opportunities in the years to come, the future of Green Plains is bright. Our 2025 plan continues to be intact across all phases.

We have 5 MSC facilities completed with our JV and track to start up in early 2024. We are awaiting permitting from the state of Illinois, so we could take the next steps on our Madison location. We have a real opportunity to begin commercializing 60 Pro late in

2023 and could have 20% to 30% of our portfolio going to 60 Pro in 2024. At a minimum, and rest assured, we will keep you apprised of our progress. Our first clean sugar location is under construction in Shenandoah and on track to start up in early 2024, and we continue to find new ways to unlock more of the renewable corn oil from each kernel. But 2025 is not the end destination for our business, but rather an important milestone in our transformation.

So I want to give everyone a peak that the potential of the platform if we can go out a little bit further. Remember, this is blue skies. But if we blue sky the opportunity, what could 2027 begin to look like across all 4 pillars of our protein, oil, sugar and carbon. We wanted to lay out the potential. And while we may not hit 100% in every phase and some of this is just out of our control, the opportunities are real.

In protein, we have an opportunity to continue to expand our 60 Pro sales program, and we will go after as much as we can. Achieving 60 pro -- 60% protein adoption widely could drive significant value to our platform. At every $100 a ton premium equals $0.06 per gallon. So if we are able to achieve an additional $200 to $300 a ton premium on top of the premium we received relative from DDGs to soybean meal now to these higher values from our completed platform you can see that this potential is enormous, all without investing additional capital to achieve it.

And again, this is without any government policy pen-stroke risk. We have some exciting aquaculture prospects that are willing to pay for a 60% protein and even more, if it is low CI and the recent challenges with anchovy season in Peru is supportive to our strategy. Our corn oil is trading at $0.12 -- up to a $0.12 premium to soybean oil, driven by our lower CI as it provides us the feedstock. With the growth in renewable diesel demand and the enhanced value from the IRA, on top of the LCFS programs, it could once again track into these price ranges we have laid out in the future.

For Clean Sugar, once Shenandoah is online, we are focused to move quickly to expand our capacity to several billion pounds in the future depending on demand. Demand for this low CI 95 dextrose equivalent is even stronger than we originally anticipated. And every prospective customer conversation gives us more optimism for the transformative nature of this technology. While this program will require some capital, which we believe in the neighborhood of $1 per equivalent gallon of ethanol converted, the market is seeking incremental low-carbon dextrose capacity and we have the IP and the platform to provide it.

And again, without any government policy, pen stroke risk. Add that to all the opportunities we defined on this call to decarbonate our platform and the concrete incentives provided by the IRA to do so, and we have the opportunity to expand our impact well beyond 2025. The opportunity for our business continues to grow and the opportunity to provide low carbon feedstocks by decarbonizing our platform positions our ingredients to have a meaningful impact as feedstocks for low carbon transportation fuels and low carbon feed ingredients.

As Anthony said, carbon is the new currency, and our platform is well positioned to be at the nexus of agriculture, energy and technology to capitalize on the opportunities to decarbonize. Before we take any questions, I also did want to provide just a quick company update on the status of our Wood River facility. We are beginning to start it up as we speak and anticipate that it will be online fully by the end of the month.

With that, we would be happy to take some questions at this time, if we can open up the call.

Thank you very much.

QUESTIONS & ANSWERS:

Operator^ (Operator Instructions) Our first question comes from the line of Kristen Owen from Oppenheimer.

Kristen Owen^ As usual, lots of material that we can dive into. But I wanted to come back first to some of the treasury guidance and how we should think about those milestones. So Anthony, you gave us a lot of great information. But if I could ask you to sort of double click on timing of treasury guidance and how to think about those milestones maybe over the next 18 months.

Anthony Reed ^ Yes. So as I said, I think we're expecting the SAF, the 40B tax credit guidance here in August or September. And that will be final guidance for that credit, giving us line of sight on how they're addressing the modeling issues, which are also contained in 45Z then we're expecting a proposed rule-making approach to the 45Z credit because it's new and a little more complicated, but it also gives us some lasting -- it's harder to undo rule making. So we expect that the rule making later this year. They'll take public comment like a normal rulemaking and then we expect a final rule-making on the 45Z credit guidance probably midyear next year in advance of the credit going into effect Jan 1, 2025.

Kristen Owen^ Okay. And then if I could tie that to what you just walked through, Todd on sort of the uplift some of the Blue Sky outlook Just help us understand how much of the premium pricing you're assuming from the lower CI score versus say using protein as an example, just the incremental protein and move up the J-curve, so we can parcel that out a little bit.

Todd Becker^ From the standpoint of the ingredient, the consistent message from our end users, especially around going to 60% protein, it is how does it compare to the carbon intensity of competing products from corn glut meal through soy protein concentrate all the way up to fish meal. And we believe through the data that we have, when you put into an regenerator farm programs, we have the lowest CI ingredient out there, which satisfies

a lot of their desires, which is why we're just starting to see acceptance of our 60 Pro market into global -- our 60 Pro product into global aquaculture.

We have -- we are in process of negotiating on sales for late '23 and '24, and we think we'll have some success there. And we're seeing expansion in interest both domestically and globally and actually mainly globally for a 60% protein product. So we believe like when we look at a couple of our lanes, we own and control the 60 Pro market today based on our technology package as well as our partnership on the biology side. We think we own and control the dextrose 95 DE opportunity coming out of a dry grind facility, first of its kind. It takes a lot of time, a lot of money, a lot of effort and a lot of science and technology, and we believe we own and control that lane.

And our first plant comes out in 2024, early '24. And we believe that's a game changer for us, as we mentioned in previous calls. And a lot of it still comes down to can you provide us lower CI dextrose than what we can buy today And what's the opportunity to co-locate near this dextrose and is there hydrogen available? That's often times, we get a question, is there hydrogen available?

Well, the cool thing about our industry, when we look at things from renewable chemicals that will need hydrogen to SAF that will need hydrogen is our biorefineries actually, the whole ethanol industries, refineries, sit on natural gas pipelines and are going to sit on -- and a lot of them are going to sit on a carbon pipeline like the Summit line. And so when you crack open that natural gas molecule and you break it down and you take the hydrogen, you could still ship the dirty carbon on a pipe -- their carbon on a pipeline while shipping our biogenic carbon as well or while using that hydrogen shipping it on a pipeline and then making something out of the sugar as well.

So it's really interesting how this is all kind of starting to play out. Number one, you have to have the asset base. And while at times, we've had as high as 1.8 billion gallons, we have somewhere around 1 billion gallons of capacity today. And again, opportunity is wide open for not just us, but lots in the industry around decarbonization. But I think what's really interesting is when you kind of take a look at all of that's happening in our industry, and I said this on the last call, I believe that this industry, from an asset value perspective is off its lows, and we'll continue to -- because you can't just build them the next day and it's going to give us great opportunities. And we take all of that and put it together, there isn't any more available feedstock for sustainable aviation fuel than low carbon alcohol will be.

Kristen Owen^ That's great. I'd ask a lot more questions, but I'll leave it there.

Operator^ Our next question comes from the line of Manav Gupta from UBS.

Manav Gupta^ I just want to -- I know you are on a capital-light strategy. It's a great strategy. But out there is -- part of this IRA and everything is DOE handing out a lot of loans at a very low interest. Are there any of your projects you think could qualify for a

DOE loan? Are you talking to them? Help us understand if you can use this chief financing to your growth advantage?

Todd Becker^ Yes. I think when we look at our capital light strategy, it's going to be around things like cogeneration and combined heat power systems, where we partner with a cogen partner who is looking for a PPA or power offtake we get to buy our energy at market or below they get a return on the investment and we get to keep all the CI.

For us, that's the best opportunity that exists from a capital light.

We can buy our CHP systems, but from our standpoint, let somebody else with possibly cheaper capital to go do that, and we participate there. In terms of the pipeline, certainly, that's capital light today where we participate, and we don't have to buy our compression equipment, which is, yes, do we give up some value for that to do that, yes, but we also don't have to spend $0.5 billion on compression equipment either, and we get -- we still get a significant benefit. So we're very happy with the decision that we made, not having to outlay the capital for the compression equipment with our partnership with Summit.

And then lastly, when we look at things that are available under the DOE, we're getting a lot of interest actually in our dextrose to energy dextrose to chemical partners, which that's where I think the DOE will be a big opportunity for us is that we bring to the market new sources of low carbon that can be created into everything from energy to biochemicals. Again, we'll make the investment into dextrose, we want to sell the Dextrose, uplift our margin but our partner then makes the investment into the energy or the chemical side, and that's also capable of DOE loans. And then that would benefit our ability to not use our own capital because the dextrose facility would be part of that.

So we're working on partnerships like that as well. So yes, some of it applies, but some of it we're probably not just going to go after just because no reason to put any excess leverage on our balance sheet and the fact that we can make these capital light, that works really well.

Manav Gupta^ Perfect. I'm just going to quickly go back to the IRS guidance. you gave us an understanding of the timing. Also help us understand that as these guidelines come out, what's the absolute blue sky scenario for you in terms of what would you like to see in those clarity on guidelines, which would help [GPRE] the most.

Todd Becker^ Yes, I'll turn it back over to Anthony and Devin and let them kind of comment on that, and I can close after they speak. Guys?

Devin Mogler^ Yes. The most important thing is being able to have facility-specific credits, which we think they're moving in that direction. And then also the life cycle analysis modeling. It's very much locked in and statute that it's the Argonne GREET model for non-aviation fuels for 45Z but getting that an alternative model to ICAO

CORSIA to open up that cherry on top scenario for SAF would be important there as well. Anthony?

Anthony Reed^ Yes. I would add the other piece of that, too, which we also think is going to our direction is the ability to quantify low-carbon feedstocks like low carbon and corn for smart (inaudible) ag processes given how much of a percentage of that can contribute to carbon reduction for ethanol production

Operator^ Our next question comes from the line of Ben Bienvenu from Stephens.

Benjamin Bienvenu^ I appreciate all the information here. I want to ask, like, Manav, I think the asset -- the asset-light strategy here makes a lot of sense as you kind of wait for the permanence of some of these things to become more tangible. As you see the road map unfurled and particularly as you start to continue to kind of close the chapter on the capital spending with MSC in clean sugar, what are the things that you'd like to see to perhaps allocate more capital and be less capital light as you move to take advantage of some of these opportunities? And then I have a follow-up question.

Todd Becker^ I think on the carbon program, when you look at it, it's pretty well in line with how we're thinking. Yes, I think in our Eastern program, if we do finalize this opportunity we are working on, which we think sometime in the next 30, 45 days, we're going to have a plan to talk to you about some of our eastern facilities. That will be capital that will be needed to be deployed. Could we go capital. There's a possibility, but the economics of that are very far superior to just shipping it on a pipeline.

They always will be. And so we think potentially there is an opportunity to deploy capital in the Eastern programs. I think value add, if we do find value-added opportunities that and potentially going all the way to SAF, I mean you saw 1 project announced already. I think there's going to be a multitude of strategies deployed to put SAF a destination, put it at origin, where is the hydrogen, where is the demand, our partnership with Tallgrass and United is an example of that where we would look to potentially all 3 of us deploy capital to do a something in between Denver and Chicago.

So I mean I think it's -- the big thing first is, let's monetize our decarbonization in the most efficient capital strategy that we have. And then from there, where do we deploy -- where can we deploy some of that free cash flow next I think that's something that we'll look at. But as we have said, if sugar hits, that will take capital as well, and we have to start thinking well beyond Shenandoah, clean sugar number one to start already planning for -- we're expecting success based on the customers we're talking to, where would we start to work with our customers and we are working with many customers today in clean sugar to where they want us to deploy #2 and #3.

So we would do that in concert with potential customers that would want to use those locations to maximize their returns as well. So we will have no shortage of places to

invest kind of post MSC. But I think we have to remain a bit open to where the direction of that will go and remain as capital light as we can on some of these carbon strategies just to get to that next level.

Benjamin Bienvenu^ Okay. Very good. My follow-up is related to kind of your positioning within the industry, which I think is relatively advantaged when you look at your peers. I'm wondering, you did allude to the fact that you would expect the industry to be able to participate in some of these programs. And I'm wondering kind of as a consequence of that, how you would expect kind of the ethanol margins of the overall industry to shift ex this, meaning as there's more participation in these programs, maybe the cost curve steepens and then flattens again, what do you think could ultimately happen to the industry as that kind of tug of war takes place with participation juxtaposed with potentially these huge demand in markets like SAF for alcohol to jet.

Todd Becker^ Yes. The first thing is who's going to be decarbonized first, which pipeline gets up and running, which pipeline gets funded and who's going to be able to do that, which direct inject project. There are several that are underway with our peers that I wish I had some of those opportunities because those are excellent opportunities that some of our peers have been talking about.

And then on top of that, what are other ways to use carbon so that others are announcing as well. So I think there's going to be -- first is is who gets to attack the 45Z from 2025 to 2027 first. Our view is the -- our view is that Summit is -- has a great opportunity to go early. And if you're on that pipeline, you're going to be able to attack early opportunities around monetization of carbon. Some will take longer. So that's the first step. And then ultimately, will the rest of the industry catch up? Will other pipelines get built as fast. We'll wait and see on some of those.

There's some that will probably be faster than Summit and some that will be not as fast as Summit. So we're looking at those opportunities. I think when you take it to the end game, yes, if everybody does carbon, will we have to give it away. I don't think that's the case this time because you do have the 45Z, you do have a growing blend rate in the United States on motor fuels. Low carbon fuels are extremely important to anybody that sells fuel to the consumer. And on top of that, the SAF alcohol a jet to SAF is a real opportunity.

And as I said, I wouldn't have believed it 2 years ago, but I believe it today because of the credits and the programs that are in place, and there's technologies out there. We're developing one, but it doesn't mean we wouldn't buy another. And we've talked about some of what we believe are the ones that are available today that are ready to be commercialized. So if we get to 2028, after we all decarbonize and we start making -- somebody starts producing alcohol to jet, you are going to have a push/pull that we've never seen before in this industry because jet fuel can take everything we make.

And how are you going to satisfy the Clean Air Act for motor fuel, which is about 9 billion gallons of base need if the economics are so good for jet fuel. And I think that's going to be the -- probably the bigger opportunity for this industry. And I think those discussions on will we have to give it away, who's going to take it, how is it going to get shared? How are we going to use it? Those are going to be all in the past.

Operator^ Our next question comes from the line of Adam Samuelson from Goldman Sachs.

Adam Samuelson^ So I guess the first question is I wanted -- as you framed these EBITDA scenarios in '25 and '27 relative to the potential implications of the different tax credits. I want to make sure kind of I'm properly understanding how you're seeing kind of the net value capture to GPRE, given some of the capital light sharing that you're -- and project sharing that you're doing.

It looks like on the decarbonization in '27, which presumably is 100% either on the pipeline or capture are direct injected with cogen, the decarbonization line on a base case is worth roughly $200 million of EBITDA which I believe would correspond to the $0.70 gallon full value of the 45Z that you present on Slide 17. So you're capturing around 1/3 of the full 45Z value. Am I interpreting that right? And again...

Todd Becker^ Yes, you have to do it. Well, not 1/3, probably a little -- it's somewhere between kind of $200 million and $280 million is kind of how we're rounding it out. Just depending on what you can go after. Remember, there is expenses. So you get your 45Z tax credit, but then you have to pay your pipeline charges or you have to pay your direct inject charges. So there's going to be expenses after that.

So you're going to definitely be -- that's the gross number and then the net numbers are going to settle in those ranges of about 30% to 50% of what you'll be able to keep out of that. So if you go after all of it, you get -- you get cogen, you get direct inject or you get pipeline opportunities. And then on top of that, you get some other carbon points elsewhere for some other things like RNG and other opportunities that's the opportunity that we kind of look at is what's the net available capital.

And so we're trying to be at least a bit conservative from that $200 million to $280 million range for the ultimate amount that you can go after conservatively. And then on top of that, you can get creative ongoing after farmer, carbon and other things as well. But we just want to give it from our base platform.

Adam Samuelson^ No, that's exactly that gross-to-net conversion is exactly what I was trying to make sure I understood. Then along those lines from an LCFS perspective, I mean, between Canada, California, Washington, Oregon, I mean, maybe New York down the road, I mean, what percentage of your [liquid] fuels do you actually think you could sell into markets that actually have a state level or non-U.S. federal LCFS standard that, that would be additive.

Todd Becker^ Yes. I mean when you look -- well, it's not just -- but you have to take it in 2 parts. Yes, we're going to go after those markets. But also, yes, we believe that carbon will have value as well. So the question really is, is there going to be markets that are satisfying carbon obligations. And so what are those credits going to be worth versus monetizing them in the LCFS markets. And so yes, I mean, there's definitely billions and billions of gallons of alcohol that can go that way.

And when you look at Canada, what they're going to import California demand over a couple of billion gallons, you've got Washington, Oregon, New York, a couple of billion gallons-plus. You start to have real demand for these gallons. And with -- and Jordan can comment with what Carbon is doing around pulling forward some of these targets. That's why we're using $100 today, maybe $90, maybe $120, maybe $60, we kind of settled in at $100 because of what carbon is doing around pulling some of these credits for it. Correct, Jordan?

Jordan Sunderman^ Yes, they plan to raise their targets to a reduction of 30% by 2030. We are estimating that those targets will start to be impacted in 2025. So we should start seeing prices rise from that market near term, maybe as soon as 2024. But in terms of reaching those markets, we believe all of our Western Corn Belt plants can reach LCFS markets today. And now with Canada's program, we think some of our eastern plants can now reach it. So a vast majority of our plants are going to be able to reach these markets, especially when we can get [CCS] installed at these facilities.

Adam Samuelson^ Got it. All right. There's a lot of ground covered today. I guess that was 2 questions, so I'll pass it on. I really appreciate it.

Operator^ Our next question comes from the line of Salvator Tiano from Bank of America.

Salvator Tiano^ Yes. Great presentation. I wanted to ask, firstly, about -- I want to see if I understood correctly on some of the slides where you have the components of 45Z and other benefits. And if I understood correctly, you mentioned that because you're going from 60 CI to 29 points lower, you could get $0.58 from 45Z, if I understood correctly. And you are assuming, therefore, the $0.10 -- [the 10-point decrease to 50] is also going to give the credits (inaudible) understand it. And also, that's also based on Slide 10 as well? Or is that your interpretation of what you're pretty much trying to say here?

Todd Becker^ No. I mean, remember, we are starting with an average of 60. So if you get 30 points off of that, you get down to 40. So you get 20 CI points to monetize. So this is your first 20 CI points to monetize. Now some plants we already have are below 50 or at 50, so you're going to get full monetization. There some of it's a bit scaled. And then after that, if you go to your cogeneration, you have an opportunity there of another 6 to 10 CI points, depending on how you do it, again, another $0.12 to $0.24 -- [under] $12 to $20 gallon, which we kind of put on an average of $0.17 a gallon. So there's just -- you

have to start it you start earning below 50, and you can see something there as well, but you don't start at 60. The first 10 points are not -- you don't get anything for it. And that's kind of how we came up with those numbers, if that makes sense for you.

Salvator Tiano^ No, I agree. I'm just looking at Slide 10, where it's the 45Z tax credit would be $0.58 implying that you will get a benefit from going from essentially from the 10 points from 60 to 50, unless some mix is happening that's charged.

Todd Becker^ We're just showing that as a generalization overall of the program. That if you get 29 points times $0.02, then you're going to get [58] that's where you're starting point is. If I plan to start at -- Yes. And so then it's the incremental. So it depends what your starting point is. If you start at 50, you get all of it. If you start at 60, you don't get all of it. So where are you starting point.

Salvator Tiano^ Across your network, though, if were to apply it with a broad brush, actually we should take the first 10 points out on average because you wouldn't realize that. Okay. Perfect. And the second, since we do have the opportunity to ask some policy experts, above the 45Z tax credit expense, which is only for 2025 to 2027, firstly, what's your view about not being extended because the cost of the IRA has ballooned?

I know you mentioned that typically, many of these credits have been extended until the 45Q, but I think -- there were recent articles saying that the cost of the IRA was budgeted at $400 billion and already based on projects being announced, we're talking about $1 trillion. So is there actual concern that these many of these provisions, including 45Z may not be extended? And secondly, when we talk about an extension, historically, many times, the extension doesn't mean that you keep on getting the credit. It just means that new projects qualify for it or to say differently, if you produce SAF in 2025, you only get the 45Z credit for 3 years. An extension doesn't mean you keep on getting for more years. It just means someone who starts in 2028 will also get a 3-year credit. So can you talk about your [return on expansion] and what it truly would mean? How many years you would get the 45Z credit?

Todd Becker^ Devin or Anthony, do you want to address that?

Anthony Reed ^ Yes, yes, sure. This is Anthony. So I'll take the second 1 first. So just to clarify, you would continue to get the credit in any year that the 45Z credit exists. So if you think about it like the biodiesel tax credit, as long as it's live for a calendar year or up until its expiration date, you can continue to get the money per gallon for that tax credit. There's no stipulation about when the projects are constructed or begin operation. So any extension would continue to benefit anyone who's producing enough -- a carbon reduction to qualify for the credit.

On the cost, a couple of things. This is a mission that's come up in the past with other credits. And what I would say is that historically speaking, when Congress does their tax extender package to extend tax credits by and large, they are not paid for. So the idea is

that there needs to be an offset or they need to go make cuts and other government spending to pay for it, that has generally not been applied to tax extender packages. Again, I used the biodiesel tax credit has referenced the last major extension of 5 years, which not paid for.

I would further point to the House tax package that just was approved this week. Republicans as a general rule kind of view tax policy as accretive to revenue. And so generally, they view those as not necessarily having to be paid for. But that is how Congress has generally handle the extensions of existing tax policy as not paying for it. So I understand the concern about the cost. But when they use these extensions, that's how they handled it in the past. And that's how I would expect it to be looked at going forward.

Operator^ Our next question comes from the line of Craig Irwin from Roth MKM.

Craig Irwin^ So most of what I would have focused on has already been asked. So one near-term question, right, that I think drives the model for all of us is corn oil yields in your High-Pro process. Can you maybe update us on your progress developing higher yield processes? What will it take for us to get to blue sky as far as the potential capture rate of corn oil in the future? And what sort of CapEx is involved in that to roll that out across the existing platform?

Todd Becker^ Yes. We have three major R&D initiatives around what we're doing. I'll give you a couple of them. First 1 is 60 Pro and potentially up to 70 Pro on protein. On oil, it's getting our yields to 1.3 and above. And then obviously, on dextrose making sure that our 43 DE product is of the highest quality, and we're in process of doing that at York today. So if we focus solely on our oil opportunity. Fluid Quip has upgraded a system -- a third-party system actually to prove the value of their technology. We didn't want to do it in line with our systems. And today, they're getting as high as 1.3 and 1.4 pounds. And we're going to -- we'll update the market on that as we just get more and more data around it.

So we are understanding on how to unlock the oil in the kernel. There's still another half a pound after that, potentially or 0.6 pounds. So we're going to then take that -- those learnings and put them back into MSC. We think there's some other technologies to apply. Part of the thing about corn oil today is that the starting points are now higher. So we have plants without MSC that are over 1 pounds already today because technology has changed, but that's OpEx versus CapEx. So we're looking at the combination of that as well.

So I mean, the industry is learning how to get more oil out. They're paying more attention to their machines. But I think there's ultimately that limits itself right around 1.0. So we think we're going to make good progress to not just stop at 0.15 to 0.2 pounds per bushel uplift to go to 0.2 to 0.4 pounds per bushel uplift. We think we're very close, and we think that that technology is ready not only to deploy within our own platform at our

MSC sites but also externally as an opportunity for clients to get towards that 0.25 to 0.35% uplift.

Craig Irwin^ Great. Great. That's solid progress. Good to hear that. So my second question is about the $0.30 again you outlined for natural gas reduction replacement in the 45Z tax credit. Am I correct in assuming that this is predominantly from the adoption of cogen. And this technology has been settled technology for a long time, right? Cogen is relatively low risk for adoption. What do we need to understand or see for the potential risk around this $0.30? And is there potentially any upside in the existing 45Z credit as expected?

Todd Becker^ Yes. I'll let Jordan talk in a second here, but cogen is cogen and natural gas replacement is natural gas replacement. So I think those are 2 absolute differences. The first 1 is cogen is through our reduced electricity using natural gas actually to power the turbines to make our own electricity cheaper and lower carbon. On top of that, then you could have natural gas reduction strategies, we have products today that need to be digested on site and made into renewable natural gas on our own sites today.

We're just slow as an industry and we -- I don't know that the technology is close to take some of our products today that maybe we put back on, maybe we make disappear, maybe we sell off cheap to put those in anaerobic digesters and start to capture the renewable natural gas from that. So that's the next step for this industry, not just Green Plains, but this industry where we believe that -- where we're going to go next is to not use those waste streams for anything, but natural gas replacement in the future. And I think within the next 5 years and even probably quicker than that, you're going to start to see the ethanol industry transition to doing things like that, Jordan, what else was on that?

Jordan Sunderman^ I think you covered a good portion of it, Todd. The 15 CI that we're attributing to that isn't really related to the cogeneration fees. It's going to be a host of strategies around what's the impact on natural gas after we do our near-term strategies on our platform. And we have a host of different solutions to attack that score. Depending on location, we can drive less feed product and gain the CI from using less natural gas there. And then there's longer-term strategies, as Todd mentioned, around the RNG piece. And then further heat recovery and natural gas reduction work that we can do to get that score removed from RCI.

Todd Becker^ Some of it, again, Craig, is post-combustion carbon that we don't even talk about that we're capturing off of all the other equipment. That actually has a potential for any -- again, if you own an ethanol plant, so it's not just Green Plains, but post-combustion carbon alone is not in many of these numbers, And there's many CI points there to go capture off of boilers and other parts of the equipment and ship that on a pipeline as well. And so we made sure that when we negotiate with our partners wherever we are going to ship or store or sequester carbon, it's not just going to be the biogenic from the fermentation carbon but the other post-combustion carbon that we capture as well.

And that is already being worked on and is the next step to carbon capture in this industry, and it's not just for Green Plains, but it's a technology available today.

Craig Irwin^ Okay. And just as a point of clarification, if I can. -- anaerobic digesters are also settled technology. Obviously, many, many examples out there that are functioning well, not necessarily for the ethanol industry. But these tend to be quite capital-intensive projects to build. I'm assuming that your analysis is that these would be built by third parties in part.

Todd Becker^ Yes. You are correct. We have been approached and have been in discussions with third parties who want to do that, while we get the benefit of what we need out of it without having to put the capital out there as well. There's some technologies in South America that are being deployed today for some of our flows out of our plants that we can put in place as well. But again, that would be -- try to be as capital light as we can on those processes.

Operator^ Our final question comes from the line of Andrew Strelzik from Bank of Montreal.

Ben Mayhew^ This is Ben on for Andrew. What a great presentation

I have just a question on corn oil. A, how do you view any current offtake agreements materializing and b, if you could, now that we have the government experts on the phone, what are your views on the RVO delay?

Todd Becker^ I'll answer and I'll let Anthony and Devin answer be. So we have been in and out of discussions for the last several years. And thus far, we haven't found anything that is more appealing than just being in the market. We are constructive on our view of vegetable? pricing long term. While we have -- while we came down pretty aggressively here earlier in the year, we've come back aggressively on the other side. But what we have finally -- and I think this is really important because we delayed or we didn't do anything, when corn oil would trade at a slight premium or a slight discount to soybean oil, not locking in something long term was the right decision.

Because today, we can get somewhere between kind of $0.05 to $0.12 a pound over soybean oil consistently. Yes, I mean some days, it might be a little less than that, but we have sold forward in the last half of the year as high as $0.12 -- $0.10 to $0.12 a pound over soybean oil. If I would have been locked into an offtake agreement, I would be locked in a much lower premium than what we believe the market was capable and willing to pay once we got through a couple of things on the RVO, but more so once we got through the or once we got to some of the start-ups of the new RD plants that are out there.

And then on top of that, what Devin mentioned, and it might be good before you start, Devin, on the government program, talk one more time about the impact of corn oil to SAF and why that's even worth more as a premium to vegetable oil as well. So I think we did the right thing. We're still in lots of discussions. We still have discussions with people about longer-term offtakes, monetizing our corn all flows.

We know it's always there. We're increasing our corn oil. We want to get up to 400 million pounds once we deploy all our systems. And I think that's a pretty good given that most of those cash flows will be there and are intact and now we're achieving better premiums. And now it's time to maybe reup some of the discussions. But I think you have to listen to Devon 1 more time because he talked about it in the script earlier on the impact of SAF from corn oil. Devin, if you can talk 1 more time on that and maybe comment on the RVOs.

Devin Mogler^ Sure thing. So today's structure of $1 per gallon biodiesel tax credit, that the feedstocks are treated the same. The CI doesn't matter. So soybean oil and corn oil have the same value under the federal tax credit. But starting in 2025 with the 45Z, the CI matters, where it already matters in the California and Oregon and Washington state programs. Now it's also going to matter for the federal credits. So you get more value from a gallon of renewable diesel you produce or a gallon of sustainable aviation fuel you produce, if you make it from our renewable distiller corn oil versus soybean oil.

And I'll let Anthony take the RVO delay question.

Anthony Reed^ Yes, on the RVO delay. I don't think I would read anything into that. If you remember, there was a consent decree for them to issue the proposal in November that got delayed. EPA asked for a 2-week delay before they put out the proposal and there was nothing kind of knew that they were trying to get finished or changed on the proposal side, there's nothing we picked up that they need another week to adjust anything. I think this is just general government. They want another week to dot the Is, cross the Ts, pick their own announcement window. But we haven't -- I wouldn't attribute it to anything specifically changed or being reconsidered in the proposal.

Todd Becker^ Thank you. So thanks, everybody, for coming on to the call today. A lot -- we covered a lot. We wanted to get in front of you to talk broadly about the impact of the IRA to our company but also educate you more deeply into some of the nuances that are very important to our programs going forward, such as what Devin just discussed around 2025 and what happens to the value of corn oil then as a premium to soybean oil because you do get even a higher credit under the new 45Z program.

So those are all beneficial. But those are all nuances that potentially, as all of us read the IRA, we don't see some of those things. So we wanted to give you a good education on -- with experts, so not just me talking on the IRA and the impact to our company and our industry and broadly. On top of that, we wanted to kind of give you another look into where we're heading. We're making great progress on our protein oil, sugar and

decarbonization, protein with our 60 Pro initiatives we are putting in place. Hopefully, we start to see some success there. That takes our returns significantly better on our assets that we put in place and really lines us up well for our 2025 plan oil.

We're using $0.70 a pound a day, plus or minus, we're not that far away from that in our numbers but we're going to have to watch and see what happens there. But you can see the value of corn oil and low carbon oil continues to gain traction. Dextrose, more to come on that. We have lots of discussions with potential customers, high-value multinational very large conglomerates all the way down to smaller independent food companies. More to come on that as well. And then decarbonization, you see the opportunity. So when you look at all that, our guidance remains on track. What we're doing is everything to set ourselves up for that area going forward.

I think also which we didn't talk about, and I appreciate that we stayed on task here is that the fundamentals of our liquid fuels that we produce every day around ethanol whether decarbonize or not are actually very interesting at this point as we see gas demand recovering from pre-COVID lows, weekly driving demand is up, exports are up, Canadian programs are up. And hopefully, that sets ourselves up as a company, as an industry for the last half of 2023 as well into 2024 to fundamentally have a better market than we saw for the last couple of years, and we're hoping for that as well.

And again, as we said, Wood River is in the process of starting back up. So we appreciate you jumping on the call today.

If you have any other questions, Phil's always available. We can jump on calls with you for follow-ups. Hopefully, this was educational.

Hopefully, this helped you understanding of the IRA and the impact of Green Plains. And we really appreciate your support.

And we'll talk to you soon. Thank you.

Operator^ Thanks, ladies and gentlemen. This does conclude today's call. Thank you for your participation.

You may now disconnect.