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Corn Saves America
Episode 2 – Origin Story

Sarah Mock This is Corn Saves America, a podcast exploring agriculture’s environmental solutions, from ethanol to carbon markets. I’m Sarah Mock.

Walking by a used bookstore the other day, I spotted something intriguing on the \$1 table outside. A book, a tome, really, clocking it at just under 600 pages, about the height and width of a really solid phonebook. The cover featured a window shaped illustration through the window was a farm - I guess? But you don’t really see it, because your eyes are immediately drawn to a yellow truck, a red pickup, and a blue convertible, all of which have faces. Their satisfied smirks are directed at a burly farmer, who’s in the process of filling up the convertible with a neon green liquid out of an old-fashioned moonshine jug. In the middle of the whole scene - a steel tank reading “fuel farm” topped with an American flag. This book is called *Alcohol Can Be a Gas!* The subtitle: *Fueling an ethanol revolution for the 21st century*. One David Blume published this hefty volume in 2007, but the project was started nearly 30 years earlier, in the 1970s. This book really captures what I learned in so many conversations about the three decades between the record high-gas prices of the 1970s and the sequel in the 2000s. The era was when ethanol was just beginning to gain traction, when it was still indie, rebellious, and even a little weird, and championed by many with goals that had nothing to do with selling corn. During this time, in fact, many in ag were not yet thinking about ethanol’s potential.

Here’s David:

David Widmar: There was always the stories of making small batches of it at your home or sort of this renewable fuel idea. Biodiesel was a huge thing. I worked at a fried chicken restaurant in Kansas when I was in high school, in addition to helping out on the family farm. And so, there was this always this intrigue about renewable energy, but then people were starting to steal the grease out of this, used grease bin, because the rumor was that you could filter it and you could burn it in your diesel engines. And so, there was always kind of backwater, back-channel rumblings about there's this technology or these ways that you could, kind of get off the grid with gasoline consumption.

Sarah Mock: The funny thing about these underground “rumblings” is that ethanol, or as it has been known in the past corn alcohol, gasohol, or agrol, was not a product of the 1970s in the way that bell-bottoms or disco were. Ethanol’s story starts around the same time as the combustion engine’s does. In fact, you might be surprised to learn that in the late 1800s, the world’s first biofuels policy was put into effect in Germany, in a perhaps not-so-surprising twist, they did this to stabilize the local farm economy. it’s a longer story than is worth going into right now though. So, for our purposes, we’ll start America’s ethanol story just after the turn of the last century.

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Aaron Smith: if you go back to the period right after the first World War, so that a hundred years ago. That was a period where agricultural commodity prices were really low.

Sarah Mock That's Dr. Aaron Smith, professor of ag economics at UC Davis, and longtime researcher of both ag and energy markets.

Aaron Smith: So, the first World War had finished. Europe had increased its agricultural production again. So, there were a lot of crops being produced and prices were low, and people were looking around saying, "What can we do with all this extra corn?" There's these quotes from Henry Ford, for example, saying, "What can we do with all this corn?"

Sarah Mock Henry Ford had some ideas, too, and he designed his Model T and A vehicles to run on either gasoline or alcohol, but the dream of being able up to fill up your car at any farm died with prohibition, which wouldn't end the hard stop on alcohol distilling until 1933. By then the specter of another world war was looming and perspectives on using alcohol for fuel started to shift again as the runup to World War II, and the war itself, strapped the market for gasoline.

Aaron Smith: That was at the same time where people were worried, we were going to run out of oil. So, the oil fields in Pennsylvania, were looking like they're going to dry up and we have all these crops lying around that we can make fuel out of so maybe we should do that. And then and there were a lot of sort of agricultural interests, obviously pushing that as a way to sort of create value from agricultural production. And then they discovered oil in Texas, and then that was like, that was it for basically 60 years.

Sarah Mock Those 60 years between 1940 and 2000 were the heydays of U.S. oil. By the 1970s, domestic production was topping out and global supplies were incredibly tight.

Aaron Smith: And it wasn't until the 70s then when oil prices again spiked up and there's all this concern about the availability of oil and the price of oil that you started to see sort of movement in Congress in the late 70s to try to get mandates for producing ethanol, from corn primarily, as an additive into fuel. And, at that time, it was just too expensive. And so, I think that's why it didn't really happen.

Sarah Mock What happened to ethanol between the 1970s and the early 2000s, is not quite so simple as to just say, "it was too expensive, so it didn't really happen." We'll come back to Aaron, but I want to bring in someone who knows the ethanol origin story from the 1970s because he had a front row seat to it.

Scott Sklar: In the 1970s, I was working in the U.S. Senate for the senior Senator of New York, Senator [Jacob] Javits. They didn't have really energy staff back then.

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Sarah Mock Meet Scott Sklar - he's a long-time alternative energy expert and current director of the George Washington University Solar Institute. He's been working on and around ethanol and other renewables for the better part of the last 50 years. Some parts of his story will be particularly familiar to fans of Escaping 1980. Back to Scott:

Scott Sklar: And then we had the '74 oil embargo and everybody, anointed instant energy staff. I was one of them and no one knew anything of course. And that's what I realized actually, when I was young was, people were talking about energy and frankly, there weren't a lot of experts at all. Even the experts weren't experts.

So, we had 3% of our oil, embargoed and it caused long gasoline lines and fistfights in the state of New York and gunfights in some cases. Which never happened before in the United States. Remember oil and gas was discovered here - 1859 Titusville, Pennsylvania. And of course, nuclear was invented here and coal wasn't but we had the world's largest railroads and were big coal users. So, energy was never an issue in our country until the embargo. And, of course, that's when all the renewables came to be and, being young at that time and having more hair on my head, I gravitated more to the renewables, which really wasn't an industry back then, other than hydropower. And, of course, while electricity was a big issue - and just so you know, back in the mid-70s, 40% of our electricity was from oil and now it's less than 5%. So, we really weaned ourselves off of oil on the electric side. The transportation side was obviously oil dependent. At the same time all of that was going on the farm community was in deep distress. We had grains rotting in silos in the mid-70s. The costs of what they were getting in the market was less than the cost of producing. So, we had an existential angst in the agricultural community that nothing was looking good and particularly the medium and small farmers were at four alarms - their world was changing, and it was very scary.

Sarah Mock Where the energy crises and the agricultural crisis collided, Scott was surprised and excited to find that ethanol, looked to be a possible solution to both problems at once, and farm groups were taking notice – with many enthusiastically supporting Scott's, and thus Senator Javits's, work on biofuels promotion. And the thing is, for a brief few years, lawmakers did flirt with standing-up to the economy-unmooring power that is the oil sector. A key piece of legislation, the Crude Oil Windfall Profit Act of 1980, raised federal funds out of the profits of oil companies to invest in alternatives, including tax credits for alcohol fuel plant construction. But the oil industry, newly flush with money earned because of OPEC's price setting, wasn't just going to roll over.

When President Jimmy Carter was voted out in 1981, the solar panels he installed on the roof of the White House were removed, acting as the symbolic end of the U.S.'s brief but serious reprimand of oil. Over the coming years the Reagan administration redirected funds from the Windfall Profit Act away from investments in ethanol, back towards the fossil fuels sector, and corn alcohol was again pushed out of the mainstream. And throughout this and previous eras of interest in biofuels, the oil industry fought fiercely in public and behind closed doors to maintain the status quo.

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Scott Sklar: If you look at electric utilities or the oil industry and their gasoline stations, they're, you know, obviously very anti-competitive, they do not want alternatives in front of the consumer. And, the story was, they did that from day one. The oil industry did not want these technologies to surface. This hurt their bottom line and of course at, by the 70s, they had trillions of dollars of sunk costs in the infrastructure, they were not willing to say, "Oh, excuse me. We're willing to give up that asset and make it a stranded asset and lose money for a bunch of farm yokels that wanted to make fuel and try to beat us at the gas station." That was just not going to happen. They are well-financed, they went up on Capitol and said, "This stuff didn't work" first of all and then, of course, some of us, again, brought experts from everything from the racing circuit that went on wood alcohol, methanol, and, of course, the head of Volkswagen of Brazil that was making 100% ethanol cars while Ford, Chrysler, and GM said, "technically impossible." And so, we were playing a game of tit for tat for a decade and a half. Really.

Sarah Mock Ethanol wouldn't fight its way back into the mainstream for decades. But sometime in the late 90s and early 2000s, something started to shift. Scott links all this back to a small group, and then mainly to one key player - someone who could bring together a set of truly unusual bedfellows.

Scott Sklar: There was a group of us - one of the leaders who's long since passed away, a guy named Bill Holmberg - came out of the military, was a decorated veteran from the Korean War, joined EPA, and was very active there. And then when the oil embargo occurred, and the Department of Energy became created join that. And he was actually an interesting person. He linked the environmental side to ethanol fuels. He linked the military to ethanol fuels, and he had very good connections in the agricultural community. So, he had actually been a personal force in a lot of these linkages, and you know, where I was in my 20s in the 70s, he was already in his 40s and had a distinguished career. So, get a little more gravitas on the issue.

Sarah Mock: Bill Holmberg would go on to champion ethanol and other biofuels at EPA until 1990, and in the private sector until well into the 2000s. He passed away in 2016 at age 88.

But back to Scott - working on Capitol Hill he was focused on bringing stakeholders together, especially environmental groups who were focused on solar and wind, to push forward the ag energy discussion, and over the course of his efforts, he narrowed in on his personal theory of change - a realization which he says shaped his whole future.

Scott Sklar: It was, we can't just say things are good and pollute less. We have to say, "How do we create economic wealth from those as we transitioned to do fuels and different choices?" And it was very clear that creating alternative markets for grains in particular was very important. And remember, in the 70s, again, farmers were going out of business, they needed alternative markets for these rotting grains in silos or on their fields. And it wasn't just the farmers. Of course, you had Archer Daniels Midland, and the corn sweetener people, cause they're playing

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around with sugar anyway. And it became a bellwether for me personally, but also for me to shake the environmental community and say, “Hey, we got to pay attention here.”

Sarah Mock: This marriage - tying a renewable energy solution to, a new revenue stream, was the secret sauce in Scott’s mind. Without the opportunity for someone to generate wealth by transitioning from one source of energy to another, Scott believed the change would never happen.

This is Brent’s concern from last episode, reframed. He worried that the price of change is high, and no one will want to pay it, but Scott identified a scenario where someone would have an incentive to drive, and even force, the change - namely, the farmers who would earn revenue from it. So, the cost of change would still be high, but allowing the benefits to accrue, especially to a politically powerful group like agriculture, could get it done anyway.

Scott believes these opportunities to make money in agriculture, especially amongst the major agribusinesses, were the reason why ethanol beat most other renewable technologies out the door.

Scott Sklar: You had some big players. Yeah, this is good for us, for sure. And so, you know, there's that part of it. You had some of the food processing industry, particularly - believe it or not in the fruits - they ended up with sugar water. So, if you were doing pineapples and all that kind of stuff, you have peaches, canneries, you wound up with a lot of sweet water that you couldn't dump in the streams anymore. The cheese industry had cheese whey and EPA was saying you can't dump that in the water anymore because it raised bacterial levels. And I still remember a mill brew out of Wisconsin, a cheese manufacturer and we were able to get them funding to do their first ethanol plant, and they actually made more money off selling the ethanol from their cheese waste than they did and making cheese. And I use that all over the place. I was very proud of that and very proud of the owners for stepping up. So, there are a lot of good stories like that.

Sarah Mock: What Scott is describing here is some real economic magic. The agri-business and food processing industries had, in ethanol, a technology that promised to turn a waste stream - something they had to pay to remove or dispose of - into an income stream.

The bigger question seemed to be about access - how were regular people actually going to get their hands on ethanol? Consumers, for better or worse, are very well trained to seek vehicle fuel from gas stations. So, were oil companies actually going to sell ethanol?

The answer to that question is simple. Yes, oil companies were willing to use ethanol by the late-1990s, not as a standalone product that might displace gasoline, of course, but they were willing to blend it into fuel at a limited rate. The explanation for this about-face in the oil industry can be distilled in four words:

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Hanna Breetz: MTBE - methyl tertiary butyl ether.

Sarah Mock: That's Dr. Hanna Breetz, she's a political scientist and sustainability researcher at Arizona State University, where she runs an interdisciplinary doctoral program focused on sustainable energy. She's researched the technical, political, and economic aspects of ethanol extensively for decades. And from her research, the evidence is clear-- the original mechanism that led to the ethanol boom of the 2000s was the need to replace the pesky little molecule called MTBE.

Hanna Breetz: So back in the day, we had leaded gasoline. Lead is obviously terrible for all kinds of reasons. So, lead was phased out and instead what got used as an octane booster and, an anti-knock agent was this thing called MTBE methyl, tertial butyl ether, which is a petroleum derived fuel additive.

Sarah Mock: I'm not going to embarrass myself here with a deep dive into how combustion engines work, but basically, to boost a fuel's octane is to increase the temperature and pressure at which it ignites. So, add an octane booster like ethanol to achieve higher temperatures, which prevents knocking, or igniting the fuel too early. if that made things clearer for you, great. if not, here's what I know - fuels with additives have higher octanes which prevent knocking and make cars go better.

Hanna Breetz: In the late 1990s, MTBE was found to be leaking into ground water from some underground storage tanks. When MTBE was found to be leaking into groundwater, you started to see a whole bunch of different states beginning to pass bans on it. And this was something that the oil industry didn't like. It doesn't like to have lots of different standards across different states so, they were interested in federal action to try to figure out some way to remedy it. The oil industry doesn't normally like to have federal action, but if it's a way of staving off this patchwork of state regulations, then they're happy for it.

So, in the late-1990s or 1999, 2000, 2001, when you started to see this movement towards state bans of MTBE, that's when the oil industry, or I should really more specifically say refining industry, began moving towards the use of ethanol because ethanol was the closest substitute at hand, and it was biodegradable.

So, when we look at the original rationale for including so much ethanol in fuel, it was all about finding these biodegradable alternatives that could maintain fuel quality as we were phasing out MTBE. So, going back now, again, late-1990s, early-2000s, you're getting all these state bans on MTBE, and there really wasn't agreement, but lots, and lots, and lots of different coalition who were focused specifically on groundwater quality. That ethanol was going to be superior to MTBE and so there was very broad support.

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Sarah Mock: I'm going to bring Aaron Smith back - the UC economist we met at the beginning of this episode notes that there was at least one other regulatory motivation for the fuel industry to make the switch from MTBE to ethanol.

Aaron Smith: Part of the Clean Air Act - this is probably about 1990 - we wanted to reduce smog in cities. And so, I developed a reformulated gasoline. And so, what part of what you do there is you add an additive to oxygenate the fuel and there was a sort of lobbying battle - will ethanol be the additive that has this property? Because ethanol's, would provide this oxygenation service or another product called MTBE, which came from natural gas and MTBE was cheaper and so it won the battle and became about sort of 3% of gasoline was these oxygen additives.

Sarah Mock: Taken together, these two motivations for moving away from MTBE, makes for an ethanol origin story is not particularly epic, nor does it bare much resemblance to the idea that many in ag have in their minds of a fuel - created and championed by farmers first - that rose to prominence on a wave of grassroots support.

This is a much humbler story for ethanol, of the oil industry avoiding a burdensome policy patchwork, and of environmental groups fighting a hazardous pollutant, one that had little to do with “alternative energy” or “carbon reduction arguments The oil industry needed a less environmentally risky fuel additive, and they found one, one that was pretty cheap, due to the excessive supplies of corn, and notably, one that allowed them to continue pretty much with business as usual.

Here's David again:

David Widmar: I think what made ethanol so darn appealing from a technology standpoint is we were already raising corn on this end of the supply chain. And we were already using gasoline. And I think what really made ethanol successful, is that it didn't have it a unique input and it didn't have a unique output. The technology revolution was in the middle.

Brent Gloy: You call out a drop in fuel, right? Ethanol is a drop-in fuel, so we can just drop it into the gasoline, and it still works. And there aren't a lot of those. There's a lot of things that kind of screw up gasoline if you just drop it in.

David Widmar: Well, electric vehicles, right? We have the power grid, which is there, but we don't have electric recharging stations. Right. We don't have, the energy is not the readily used by our existing fleet. I think that was what made it, the drop-in fuel so appealing.”

Sarah Mock: Though perhaps not the main driver, A contributor to this overall trend was the unprecedented volatility that struck oil prices in the mid-1970s and really never went away. Prices have reached near all-time peaks three times in the last 30 years, in between sinking to near-record lows.

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Brent Gloy: The other thing that happened is oil prices went higher as we developed the fossil fuel industry in the United States, tremendously over that time period. And that changed the economics of everything as well. The key event was probably the start of the higher oil prices. And I remember going to the gas station, in Ithaca and paying about \$5 a gallon for gasoline about having a heart attack.

Sarah Mock: As the oil sector struggled with this very public uncertainty, the nascent ethanol industry was cranking out their fuel additive, made from whatever feedstock was the cheapest and most abundant. It was not at all a sure thing at this point that ethanol would rise become a major force and a major player in the corn market, that would take much more policy, more outside pressure, and frankly, more good luck. But I want to stop here to take stock of what we've learned from ethanol's origin story. Insights and applications to carbon - right after this.

[[COMMERCIAL]]

Sarah Mock: So, what are the lessons we've learned from ethanol's origin story? Here's how I see it.

1. Throughout history, a major motivator for increasing ethanol production was to get farmers paid for over-produced agricultural commodities that inevitably had low prices.
2. The oil sector, directly or indirectly, has dictated what fuels are used in the U.S., effectively controlling, and usually minimizing, ethanol's market share.
3. Ethanol became popular for two big reasons - because it allowed farmers, a group with some political clout, to collect revenue, and because it became a useful and cost-effective gasoline additive, not replacement.

In other words, too much corn made ethanol cheap and attractive, but Big Oil got it shelved it for years, until it became useful to them.

So how do we apply these lessons to help us better understand what's happening now as carbon markets experience their own origin story?

First, let's consider what we know about the motivations for carbon markets. There's certainly a perception, both within agriculture and without, that the reason ag carbon markets have become popular in recent years is due to the increasing effects of climate change and a mounting interest in doing something about it. But it's worth pointing out that, according to a trove of surveys, and farmer and farm advocate statements, agriculture's key concern about carbon markets is not whether or not these markets will actually sequester enough carbon to avert the worst effects of climate change, farmers are worried about how much these markets will pay.

That makes sense, in no small part because prior to the fall of 2020, U.S. commodity grain prices had been stuck in a rut for years caused by too much production and not enough demand. Carbon markets might not raise demand for grains, like the growth of ethanol promised to, but it would have a similar effect on bottom lines of farms, boosting farm income without increasing

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production. In effect, it does seem that the ag community is viewing carbon markets as a path to increasing revenue without adjusting commodity output.

To the second and third point, we'll need another perspective to understand how outside actors, the oil industry of carbon markets, so to say, might be coming into play. But what sector is the Big Oil of carbon? Believe it or not, it's Big Oil.

Aldyen Donnelly: Back in the early 1990s, I was a consultant. Generally, my client base was big energy companies and pipeline operators - oil and gas.

Sarah Mock: That's Aldyen Donnelly, she's a cofounder of Nori, an ag carbon removal marketplace and she's been helping companies, especially energy companies, prepare for limits on carbon emission for nearly 30 years.

Aldyen Donnelly: And, it's going to sound almost, naive, but in those days, some of Canada's largest pipeline and, electricity companies were about to expand their operations by developing new projects and acquisition into the U.S., Australia, and Great Britain. And a few of them came to me and said, "So there's this greenhouse gas issue." That's what they called it, "The greenhouse gas issue." And before we dive in and spend a lot of money in the U.S., and Australia, and the UK can you sort of do a greenhouse gas risk assessment, so that we incorporate that in our investment decision-making? And after three unrelated companies sort of brought that question to me we formed a non-profit consortium of large emitters that had the same view. Initially it started with seven and it grew to be 14. And instead of me writing some theoretical report about how carbon markets are going to work, everybody agreed to pretend, last week, a bunch of, binding regulations were put in place, and everybody had to reduce their emissions absolutely by 10%, within 10 years globally.

Sarah Mock: So Aldyen went out, on behalf of her clients, to figure out how to do greenhouse gas offset credit purchase agreements. That's a bit of a word salad, but the short version is, she went out to make the kind of deals her clients might have to make in a future where carbon emissions are regulated. To buy carbon reductions from others so that her clients wouldn't be forced to reduce their own emissions.

Aldyen Donnelly: And so, what we decided was it would cost was it would cost everybody less to actually pretend this was real life and have that experience of doing transactions and taking them seriously as if it was real life. So, we did real deals in that context. And this is where ag comes in. So, I'm sitting there with a bunch of big companies saying, "Don't act like a broker where you're replicating the same kind of deal all the time but do the first of different kinds of offsets securing agreements." And I had to get back to the companies with a view as to what's the most they should spend per offset credit and where they should focus as a priority.

Sarah Mock: As Aldyen worked on answering these questions in a time well before even "global warming," let alone climate change, were household ideas, her motivation was clear -

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find a way to limit the risk to her energy clients bottom lines from looming emissions regulation. And, in her search for the most profitable way forward for Big Energy, she realized that ag carbon markets make a lot of sense.

Aldyen Donnelly: Imagine you're an electric utility and you have two choices spend \$40 a ton to reduce emissions in your own operation. You do that - you then have to increase your rates to recover \$40 a ton plus your return on investment - that's option A. Or send \$40 a ton to your most important and rate sensitive customers in exchange for them reducing emissions and sequestering carbon. You still have to increase your rates to recover your costs if you're the utility, but you just sent a new revenue stream to your biggest customer base.

So, we quickly sort of thought that through and thought that if you were operating prudently, you would start by trying to source reductions in two communities - your critical strategic suppliers, those from whom you take price. And your most important rate sensitive customers. Well, for a lot of utilities, oil, gas, and companies that rely on easement agreements, that second category always includes farmers. So, in 1994 I had no idea whatsoever if there was anything a food or fiber producer could do to reduce emissions or sequester carbon. I just knew that if you were implementing a rational business plan, that would be the first place any well-managed big energy company would look for opportunities.

And there are a number of utilities where the biggest chunk of their rate base is farmers. So, you've got only two options, increased the rates you're charging them and not deliver them a new revenue stream or increase the rate you're charging them and deliver them a new revenue stream, which is going to make it easier for them to tolerate the rate increase.

Sarah Mock: The implications of Aldyen's conclusions here are fascinating to consider. Much like ethanol, which also has an origin myth shrouded in environmental goals, the source of much of the business interest in ag carbon markets, according to Aldyen, is not eco-altruism or grassroots activism, it comes from a desire in the energy sector to avoid the financial impact of looming regulation. And further, the most cost-effective way to sidestep that regulation, involves financially rewarding their politically powerful ag partners and customers.

But it's worth considering the other half of what Aldyen is saying - the reason that purchasing ag carbon credits is desirable for energy companies is because they expect to soon begin passing on potentially significant rate increases. Could those future rate increase wipe out what farmers earn selling carbon credits in the end? It's possible, maybe even likely - because energy companies are incentivized to pay as little as they can for credits and to charge as much as they can for rates. In other words, if control of ag carbon markets is left up to the voluntary participation of largely the energy sector, they don't look like much of an opportunity in the long term.

So, what does all this mean for our predictions?
Here's what we've got:

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One – we expect farmers will support and participate in ag carbon markets if they can meaningfully raise farm incomes. And we'd expect there to be more interest and adoption when commodity prices are low, as farmers will use carbon markets as a way to maintain income while overproduction continues.

Two - We expect the money for ag carbon markets to come from outside of agriculture, namely from the energy sector. Absent regulation, that will mean that the demand (and thus price) of ag carbon credits, much like the demand for ethanol pre-2005, will be dictated by buyers who are well-positioned to hold down the price.

The third point is complex, so I'll break it into two parts: We expect ag carbon markets will be popular, as compared to other sequestration options, because they motivate change by earning farmers revenue, just as ethanol did. But there's also a hint of risk here. As Hanna pointed out, ethanol was a useful additive to gasoline, and ended up being the least costly way to avoid regulation.

As Aldyen outlined, ag carbon credits also look like cost-effective to the energy sector right now, but that doesn't mean it will always be true. We've seen that shift for ethanol. The relationship between farmers and the energy sector matters. So, we'd expect that, if that relationship changed - say, if farmers significantly reduced their energy demand, and so stopped being major customers, or if farmland energy easements became less prominent, and farmers stopped being key partners, or if, for some other reason, agriculture and energy were put at odds – many of which are imaginable - this could erode support for ag carbon credits from the energy sector. From 1970 to the mid-1990s, we saw what happens to an idea - ethanol - when the energy sector doesn't like it. And in the absence of a mandate, if the energy sector, our country's largest carbon emitters, turn their backs on ag carbon markets, they likely won't survive.

We know this, in part, because we have experience in seeing ag carbon markets collapse when they failed to garner and hold enough demand. Ag carbon markets have a history that spans well beyond the last few years, one that many have forgotten, or prefer to ignore. In fact, in the mid-2000s, a full-fledged ag carbon market was already up and running. Here's Jeanne Merrill, policy director for the California Climate and Agriculture Network, describing that market at a House Ag Hearing in September:

Jeanne Merrill: The Chicago Climate Exchange was the first national effort to put a carbon market in place in 2003. The exchange set up a market for offset credits generated by farmers whose practices reduce greenhouse gas emissions. Practices, such as rotational grazing, conservation tillage, prairie plantings, companies and local governments would buy those credits as a way of voluntarily offsetting their own.

Farmer response to the exchange was considerable. Within two years, the farmers' union had 2.6 million agricultural acres under contract with the exchange in Minnesota, Wisconsin, Montana, and the Dakotas. The Iowa Farm Bureau had another 600,000 acres under contract. By 2010, the

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exchange had collapsed. The carbon market was swamped with offset credits from willing farmers but didn't have enough buyers. And as a result, the price of carbon credits went from a high of roughly \$7 to just \$0.05 per metric ton of CO2 equivalent. In December 2010, the exchange closed its doors, leaving farmers without support for their projects.

Sarah Mock: What happened to this early ag carbon market? There were likely many factors, but a key one is this - 2009 was a critical year for early carbon market projects, as the UN Climate Change Summit, or COP15, was taking place that year in Copenhagen and many expected a global emissions reduction agreement to result in a cap-and-trade system, or something similar, in the U.S. No such international agreement materialized, nor did American lawmakers move independently to make a mandate.

Had a mandate been put in place requiring the America's biggest carbon emitters to offset their emissions, it's possible that an ethanol-like boom in ag incomes could have followed, as ag carbon credits would have been in high demand, as a valuable tool for meeting the offset requirement.

Given this big, missed opportunity for agriculture, you might expect that by now, farm state lawmakers would be pushing for a carbon offset mandate, maybe one that reflects the scope and scale of the ethanol mandate. The reality is, though, even amongst farm state lawmakers who are largely enthusiastic about carbon markets, the idea of growing demand with mandatory participation, as was done with ethanol, is, well, here's some choice sound from that recent house ag hearing, where lawmakers and witnesses alike - even the farmer on the panel - argue for something less than a mandate:

Multiple Speakers: A national scale science-based voluntary ecosystem service market program

-

This community can help voluntary markets participating in voluntary carbon markets -
And I stress the word "voluntary."

The voluntary carbon markets.

The number one priority is that any programs remain voluntary,

We feel that the voluntary works well.

I underline the word voluntary carbon markets.

Participate in voluntary carbon markets.

Again, voluntary carbon markets –

we're just looking at voluntary markets, voluntary credits,

The voluntary carbon markets. It starts off voluntary, and then we asked the government to get involved and then it becomes mandatory.

Sarah Mock: That's right. The keyword in ag carbon policy discussions, Is the opposite of a mandate. In fact, lawmakers and witnesses said the word "voluntary" 43 times in the that three-hour hearing. Granted, it seems like there might be a bit of confusion here

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about whom, exactly a carbon market needs to be “voluntary” for. Firstly, there’s not really a question about whether farmers would be forced to sell credits. Ostensibly, then, the fear is that farms, along with every other business in the economy, might be required to buy carbon credits. Similarly, as to how refiners are required to buy ethanol, we’ll talk more about why farmers, and their representatives, might be against that kind of mandatory carbon offsets in a later episode. But for now, consider that this obsession amongst farm advocates with voluntary participation in carbon markets flies directly in the face of the success of the ethanol sector, because had lawmakers stayed away from energy mandates in the mid-2000s, it’s likely that ethanol would still be a backwater of the fuel market, blended only as needed into gasoline, at a rate determined directly by the refining sector, likely as low as 3%.

Past lawmakers were not quite so squeamish about fighting for mandates, especially when doing so involved building on previous policy, rather than creating new rules from whole cloth.

Aaron Smith: So, when we came to the early 2000s, ethanol was already an industry that was, you know, producing, maybe I think about 3% of gasoline was, was coming from ethanol through this oxygen requirement. And so, then I think we had this alignment, where there were agricultural interests and environmental interests, both saying, “Fossil fuels are bad. Ethanol would be better. And so, we can push this.” And so, in 2005, we had the first renewable fuel standard got passed. It required a certain number of gallons to be used of biofuels, which was mostly ethanol in our fuel supply.

But basically, all that did really was baked in what was there anyway under these sort of Clean Air Act requirements. And the big change came then a couple of years later in 2007, where again, I think, especially pushing from, from agricultural interests, they passed what is currently the Renewable Fuel Standard, which essentially doubled the amount of biofuel and ethanol in particular that would be required to be used in our gasoline supply.

Sarah Mock: Aaron’s synopsis leaves out much of the wider context that drove interest and enthusiasm around ethanol and biofuels in the mid-2000s. And man, was there a lot of context - 9/11, s contested election, economic unrest, a war in the Middle East, and skyrocketing fuel prices - all of that matters a lot, Hanna says, when we think about energy policy.

Hanna Breetz: Energy is a classic issue where there is, a really, uneven amount of attention. And this is true at an individual level, it's true at policy-making level, most of the time, people don't pay any attention to energy unless there is some kind of a crisis. So, if you look at kind of the - when do we actually have major federal legislation on energy? It's a very rare event. And they're often large gaps of time - 10, 15 years in between energy acts. Because as long as there's no crisis, as long as everything is humming, nobody cares about energy. And then all of a sudden there's a shortage or there's a price spike, or there's some kind of a crisis. And then everybody cares about it at what do we do at those moment?

Sarah Mock: What do policy makers do in these moments of crises?

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That's next time, on Corn Saves America.

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