

LOW-COST, CARBON-NEUTRAL ALGAE OIL TO REVOLUTIONIZE FUELS AND FEED TODAY

Professor: George Philippidis, MFA, Guest Speaker: Lawrence Walmsley

Lawrence Walmsley, as George said, we've known each other even pre-dating working at USF. And I think one of the broader lessons I want to leave you guys with about entrepreneurship is that in the end, it's all about the people you meet along the way. And that's how you build an organization out of nothing. So it's important to maintain relationships, meet people, talk to people, ask questions, read books, attend schools like USF, and take classes like this too. Because it might be useful. You don't know how your life will take a course later on.

So what I want to discuss are these three things. In a more descriptive part, initially, tell you what we did. As George said, there were a lot of issues and questions and decisions we made, some things that we resolved, some things we haven't resolved, and kind of where we are today. And then move on to sort of summary of some lessons for energy entrepreneurship. If that's you guys thinking, at some point in your life, to actually start a company in energy, some of the things to keep in mind. And then I'll open it up to questions and answers afterwards.

So this was the dream. So we have 100-year-old petroleum-based oil industry. We dig a hole in the ground. We take something out. We refine it. We ship it around the world. And that's what we've been doing for 100 years now in very, very efficient way.

And as George said, algae is this really great potential replacement because it grows very, very fast. They double their weight in three days. So imagine us doubling our weight in three days. These are really fast growing organisms that don't use fresh water and don't require agricultural land. So it's a perfect replacement.

It can be grown in almost any part of the world. It means every nation can grow its own oil instead of having to buy from a few countries and use the few dollars that they have. So it could really change the world, if we can make this happen.

So this was always the dream. Maybe there's 1,000 companies now worldwide working in algae industry. So we thought we could be one of them.

Now, the problem is it's never like this, right? It's usually something more like that because things happen along the way that never follow the plan that you set along the way. And when you're raising money, this is what investors hate because investors want a straight line. And life is never a straight line.

So my story began, I went to business school at MIT. I was there in 2004 to 2007. And when I was there, I got involved in two types of activities.

I knew I liked entrepreneurship. I wanted to start a company. Most people talk about that when they go to business school as a goal. And I knew I didn't know enough about startups. I'd come from a big company background.

So I got involved in the business plan competition that MIT had. And I was one of the organizers. And I became the president of that organization. That was very helpful, especially in the Boston world, talk about startups and what does it mean, valuation, division of equity, founders, technology. What is a venture capitalist? And what are these term sheets they talk about and just getting some exposure to that world.

And the second piece is energy was becoming more and more important in those post 9/11 days. So I knew I wanted to do something in the energy world and probably combine these two things.

While I was at MIT, this company came out. This was the first true algae startup, or company, that wasn't just a laboratory research experiment.

So Green Field Technologies, I think, was founded in 2002. They were growing 2003, 2004. And then they raised a lot of money in the bubble, so '05, '06, '07. And that's when I first heard about this algae as a potential technology. It just stuck in my head.

So then after business school, I joined a consulting company in New York. I was working, initially, in financial sector. And then I pushed my way into the energy space.

And in the summer of 2008, which we called it the summer of algae, a lot of investments finally started to happen in this sector that, as George said, had been behind all the other parts of energy. Solar has been around for 50 years. Wind's been around for 30, biomass 20 years at least, and algae was really behind. And this was the first summer that things started to happen.

So this is Bill Gates' investment vehicle, which put \$100 million into a company called Sapphire Energy that summer. Venrock is the Rockefeller family. They put a lot of money into another company. And then ExxonMobil did a huge partnership with a third company. And it really seemed like the industry was starting to mature.

And so I got involved in projects from a consulting side in the space, trying to understand what are the options. And as George showed, there's just so many technical pathways that you don't really know what's the right way. Which is the winner? You have no idea. But even like, what is the range of options for cultivation, for harvesting, for conversion? There's so many options.

So I started working more and more on that in North America. And then one day I got a call from a partner in the Brussels office who said, hey, if you're working on this stuff, you might want to speak with our German expert who has a patent on a different way to cultivate algae. And that was Andreas.

So he had a patent, a conception of there's open pond systems and closed photobioreactors. What if we combine them together into a floating reactor where the algae grows inside. You have a running water body, which provides cheap cooling. Because this gets really hot with the sun, and it gets hot inside. The water can cool it.

They can also float it. It's also perfectly flat always at the surface. So you don't have to make these very flat ponds, which are expensive to make. And you can do it in a low cost way.

So we started talking in end of '08, early '09, mostly trans-Atlantic phone calls discussing different models, different technologies. And then at the end of this year, end of '09, I asked him if he'd like to start a company together.

And it's actually kind of like dating. You've been sort of flirting a lot. But then you're like, OK, you got to get to the point. And I said, hey, do you want to start a company? Because I think I have a really good business network. He was a Ph.D. In biology. You know the technology. I have a business network. Why don't we combine?

And he said, well, there's only one question is, can we get capital to start? In the end, you need initial capital. There's just no other way to start a company. Well, that's the difference between a company and a laboratory is, do you have external investors who will give you some capital to get going? So that fell to me.

So we did a quick budget of what it would cost to do a first initial prototype of this, to manufacture it and test it. And we estimated we'd need about \$100,000. So that was the initial amount of capital I needed.

And I talked to my friends. And we figured maybe I could probably ask all of them for \$10,000. So what I ended up doing is sort of here, this friends and family round, which was phase one.

I talked to 25 of my friends, which are very awkward conversations to have. Take them for coffee and yeah. And then of that, 11 said they were interested. The others politely changed the topic. And eight of them committed. And at the very, very end, only seven of them actually came through. And these were, actually, five were friends and two were family members. So they each put some. That's what we started the company with in 2010, with that capital.

And so he lived in Germany. So I spent the summer of 2010-- I quit my job at that point, moved to Germany for the summer. And we built-- actually, the video's now.

So then we built the first version. And I have a little video of what it was.

So this is polyethylene plastic film. And so we welded this system. And then there's a little video of what it looked like.

So this is you see. So we made it. And then we put green dye inside. We set up a small pond in the back of his apartment block. We bought an air compressor. And then we were running this. And then we filmed it. And we thought this was something we could then use to show investors as well afterwards of like how the system worked.

I knew George from before. And he set us up with a place in Melbourne, Florida that was a research institute where we could actually take this and test it. Because we couldn't test the system ourselves. And investors are not going to believe our results anyway.

So we made it. And then we took it to this institute. And then we negotiated a contract. And they tested it.

And so George and I knew each other from before business school. Once we knew that we were going to start a company, Florida seemed to make a lot of sense for the resources, natural resources, technical resources. So I called George up and asked him if he would be an adviser to us. And he said, yes, I could do that, and I know these people at this institute. So that's where this relationship began, middle of 2010.

So fortunately, at this place, the results were good. George talked about the productivity target, grams per meter squared per day. The number that we always target is 20 grams per square meter per day, which would allow you to make a cost competitive fuel, if you can do that.

So I'd never grown algae in my life. So this was all theoretical to me. 20, 10, 50, it's all the same because I have no idea if this is going to work. What is realistic? Is this just a scientific number that people talk about?

And up until the day that the institute called us and gave us the results, I didn't know what to expect. I didn't know if it was going to be a massive catastrophe and all the money of my investors were gone. And family's not going to talk to me. Because I didn't have a feeling for the technology. It's just a book or something that you read.

And I think we came with like 17 or 18 grams per square meter per day. And that was enough to take us to the next level because it had done what it needed to do. We knew the system was low cost. But it had to also be productive. So that was phase one.

Another thing that we did is we joined a business plan competition. So Clean Tech Open now is national. I think they have chapters in every region. This is probably the main energy business plan competition in the country. And they were very good.

So through this, we got mentors who are experts in some way, either in manufacturing or in biology or in technology, different parts. Some are venture capitalists. Some are former entrepreneurs. And they give you their advice on different topics.

They give you advice on how to improve the business plan. You practice your presentation. You're just beginning at that time. And you get some free advice, basically, on how to improve things.

You get a network. And you get the seal of approval, which is very important at the very beginning when you don't have a brand, you don't have anything. And potentially, if you win, you could get prize money.

So one of the big questions we had with these guys was, should we sell the final fuel? Or should we sell this equipment? It's a business model question.

If we truly believe that the technology can lower the price of production, then you should produce fuel. Because you'll then capture all the value of that. And you'll make a lot of money.

The other path is that you sell the equipment. And that means you only sell when you get an order. That means you don't need to have inventory. You have very low fixed cost. You just manufacture working capital. And you sell it. And that means you can have a much higher return on your invested capital.

So two very different models. One is a very big company. You're starting to recreate an oil company, in effect. You're building another Exxon. You need an enormous amount of capital to do it. Or the other one is a smaller business that is lighter and more about the technology improvement.

We asked our mentors this question. And they all said, given that it's two of you guys, the economy at that time was in very bad shape, focus on one thing. Do it well. And other people will do other things, so you partner up with them. You find them. You meet them. But you don't try to do everything.

But this is one of the questions that we've been wrestling with the whole time. And until now, we don't really have an answer. We move around a little bit. But we're mostly down the equipment path.

But that's the kind of question that mentors can help with that you don't know yourself. You don't have enough experience.

So then the first test results were good. So we said OK, let's try to raise angel round, which would be a larger round. And for that, we calculated we'd need about a million dollars. So that was the target for the second round.

And I asked other entrepreneurs that I'd met along the way. And I was like, how do you raise that kind of money?

And they said, the only way to do that is you talk to your former boss' network. So the guy I used to work with at some company, talk to him. If he doesn't want to invest, he might introduce you to his

friends. But then you're moving along a dimension that is not yours. It's, obviously, a higher level than what you're at.

And that's what I ended up doing. So I think these were even more awkward conversations because these are like people you used to work with. And then they're older than you. They're very senior in experience. And then you're asking them to introduce you to their friends for money.

And so we did that. This was, you can tell, was really long round. It took 18 months from start to finish. And we ended up having to actually spend the capital as it came in. We couldn't wait for the whole round to close because you just can't wait for 18 months.

So we had about 100 discussions, just to give you guys a sense for how time consuming this is. Of that, about 20 expressed interest. And then 16 committed. And then we ended up raising about \$600,000 from 14 different people.

I think, initially with the discussions, we were asking for a minimum of \$50,000 or \$75,000 per person. And as the discussions went on, that bar started to go down because you've got to close this somehow. And then another thing to think about is, how do you create a deadline so people actually commit and do this as opposed to discussions just going on and on and on?

Anyway, so that was phase two. And George, at that time, had moved from FIU in Miami, where he was initially, up to here. So we set up here in Lakeland at the beginning.

And so this is what we set up in the back of his laboratory, now an outdoor system. The objective was to have an all-weather real test for what this would look like, get real data to then do fundraising later on.

George told us about something called the Florida High Tech Corridor, which is the three universities along I-4 that provide financing to companies that are supported by universities in the space. And so together we applied. And we got \$50,000 of cost match. So every dollar the culture fields put in, they put in as well. So that helped as well.

And then Mike Welch had been in contact with George. He's a USF graduate. And he joined the team to work on that project that was financed by the Florida High Tech Corridor.

So this went well, again. And we finally were starting to get some real capital. Because the thing here is you have output, but you have cost. And it's always a ratio between how much does it cost you to produce the output.

So now we started to get some real hard evidence of how much it would cost to manufacture the system. And the natural thing is then you do a third wave of fundraise, which is an institutional raise, which is venture capital, basically, in this industry.

And I spoke to a lot of VCs. I went to California a lot. I went all over the place.

And they weren't interested. They said, look, algae is a tiny sector. It's not anywhere on the scope yet. We don't know what's going to happen.

And on top of that, you're selling equipment to that industry. So it's a second order demand. They need to grow. And then they need to purchase your system. So then it's, prove to me there's much consumer demand, basically. Show me market traction.

So we couldn't show that at the time. So we went to second best way, which is we applied for more government money. And we ended up getting a lot of money from the state of Florida from the Department of Agriculture.

And so we got a \$600,000 grant for two years to develop the technology further. This had some real timelines on what to do. And that's really pushed the technology into a commercial phase, which is kind of where we're now.

And then with that, we've been able to construct these are now 500 square foot units. This is a landfill in southwest Florida that has a biogas facility that emits methane gas. And so this is the biomass facility. And they've given us access to these two acres of which in there is our pond. And we can grow from that.

So that's the demonstration facility to then show to customers who come down. This is what it would look like and have real data that we're collecting.

And then I think the last thing was we finally found our first customer. So I presented at a algae biomass summit, which is the big industry conference, in Orlando last October. And in the audience there was a French company that was growing algae today for cosmetics, for the high value sector. And they wanted to get into fuels and proteins. They knew to do that, you need a different type of cultivation system. So a floating system might be the way to go.

So they negotiated for a long time. And then they purchased our first system. And Mike went over to Paris in September to install it. And now they're currently testing it.

And assuming that that goes well and they come back, or a few other leads that we're pursuing, that would, hopefully, allow us to go back to the VC market and then say, look, now we do have customer traction. And now we do have an operating system. We have real data. We're ready for that next step.

OK, so I think as a final slide, I just want to talk about our geographic spread. Because that's, I think, one of the very unique things about culture fuels.

So I started in New York. Then Germany came in the picture, then Florida when we started working with USF. California was our main source of funding that we tried to go to many, many ways. We got our first customer in France. And then, along the way, we've been chasing conferences and customers in Norway, Colombia, and South Africa and having discussions all over the place.

So that's one of the things I want to leave you with is you don't have to be a big multinational company with 10,000 employees to start thinking about different countries. Because these are small markets. You need to find them all over the world and look for them. So that's the end of that.

Lessons learned, and I think these are some. And this is where I'll open up to you guys, if you have any further questions.

But I think one thing that's very important is every market has a different dynamic to it. So in New York, I work in an incubator. We had an incubator space with a lot of other startups. And all the other startups are in social media, every single person making apps of some kind. And that world has a completely different dynamic than energy.

So a couple thousand dollars is enough to test a product in six months. Either they take off, or they go away. There's just four or five people together, coding quickly and then building something. Energy is very different.

And so the first question is understanding your dynamic of your market. How fast does it move? What are the capital requirements? What do you need to know from a content perspective versus a networking perspective? So just understanding that uniqueness of it.

Secondly, this takes time. Any company is going to take time, even in social media, but especially outside. And therefore, what staying power do you have? Is it financial, reputational, emotional? All kinds of stuff.

You need to get health care. Now it's less of an issue. But before, if you're not working in a big company, you don't have access to health care. So what do you do if you have a family or you want to have a family or however that works?

Building a team, it's easier to go alone where you don't have to answer to anybody. But in the end, you're going to be much more successful as a team. Maybe find complementary people that give you complementary skills. Go global, as I said, there's investors and teams of people everywhere.

Read, there's books on every single topic. Nothing that you're going through is unique. Everything has been done by someone else. So you just got to go find that situation that someone else has dealt with in their life.

Talk to people and get help. Join a business plan competition. Get mentors and do whatever else possible.

That's it. Thank you very much.

[APPLAUSE]

Given that algae is so small that you need a whole lot of it to really go full scale, is it realistic that algae production can really go to the full scale to produce biofuels and animal feed? And then will that make sense economically since you have to increase also labor and also capital cost? It's fast growing too. But you have to harvest it every two days. And that's labor. Wouldn't that be economically not sound to do?

Yep. So I'll answer the second question first. The graph that George showed with the step up waterfall, that includes labor for that at the speed that you need to harvest. So yes, you need labor. And it is costly. But you're producing enough volume that actually you can make a profit with that. So the main issue is you need to make it large enough to produce enough volume to carry all those costs. And that's why to do that, you need a lot of capital.

And that's, I think, to your first question that it's going to take a long time. No one is going to give you enough capital just to make it the first time. So everybody wants to see stepping stones along the way. But first you make a five acre one for algae paste. Then you make a 10 acre plant. You expand that to 100 acres. And you make some kind of protein. And then you go to 1,000 acres.

No investor is going to just gamble on you because these sums of money are so big. So they're going to want to see that you or your consortium of companies have come very close to that before they invest in the next step.

A follow-up one, do you believe that algae can possibly replace fossil fuel?

Yes, definitely. Not entirely, nothing will ever entirely replace fossil fuels. We know, if we get to 10%, I'd be ecstatic. That would be huge.

My question's about investors. And like you said in the beginning of the presentation, it's not really a straight line. What is like the biggest selling point do you give? Because you are asking for quite a significant amount of money. And since it's a new venture, what is the biggest selling point? Is it just financial incentives? Or what's the biggest selling point that you did sell? Some of those people, like you said, aren't your friends at all. So what was like--

Yeah, so one thing I realized was that as you go through the phases, you start talking to people who are farther away from you. So the friends and family phase are only investing because of you. They don't know what you're doing actually. But I mean, one, they like you. Two, they want to support you. But three, they also recognize that in your life you've been reasonably successful. So there's a good chance you're going to try to make this work.

And it's not a big amount of money for them. In the end, this is basically money they can afford to lose. That's the challenge oftentimes. Can you find enough of those people in your circle? So that was the first one.

The second one, because it ended up being my boss' network, it was two degrees away. So then it's less about that. The return starts to become more important. So it's a balance between they know me, they know of me, let's say. I've been well referenced. And they think there could be a return.

Then, when you go to the third round, which is an institutional and venture capital, it's only return. They don't care about you at all. It's purely on the merits of the industry and your company.

So there's a progression as you go along the way. And that means each round is different and what you have to provide to them is different.

I was wondering what the biggest hiccups were in this process for you.

Time, I think that the main was how long things took. We had a business plan, when I was initially fundraising in 2010, for how long each step would take. And everything's taken longer than that in all kinds of ways. So the technology took longer to develop. The fundraising took longer to close. Finding partnerships took longer, everything just either unreasonable expectations or the world's been really, really slow in these years. The economy's been slow and been a lot of uncertainty.

And then another thing that happened is energy got dragged into the political minefield. And investors hate that. Because then you're dependent on who wins an election and all this stuff. And that's not something investors want to deal with. So that makes everything even slower. So I think timing is one.

I think it was also we all are working in silos in the industry. So all the different companies are working on their own piece of the puzzle and partly because the investor base requests that. They want to invest in one company that's going to make money. And they don't really want you sharing information with someone else.

But it makes everything much slower because, as we were discussing today, there could be someone else who's figured out something that could be helpful to me. But I don't know. And they're not really going to tell me. And so we're probably moving in parallel paths and wasting a lot of time and money along the way.

And it's partly because the industry is just so small. At some point, it gets big enough that people start to be more public about things. Universities publish research. Then you know where the state of the art is. And right now, everything's more like behind curtains.

Do you think that investors might be reluctant to invest at this point because there's so many different technologies kind of developing and they're kind of waiting for one to be like a winner or prove itself?

That's definitely true. And that's true in many industries where there's a lot of pathways. But I think investors feel comfortable. They understand them.

I think here, because there's both a wide spectrum of technologies and we're pretty new, there's not many dedicated investors just in algae. So they're maybe energy broadly or maybe biofuels. If they look at ethanol and biodiesel and everything, they're not going to be very deep in algae.

And then the only thing they know is that a lot of money has been lost already. And there's a lot of options. And therefore, they don't really know how to decide between them. So yes, they'd rather wait. That's definitely something that's happening now.

And so government's been kind of helping. Well, obviously, Florida was very helpful. And maybe the federal government will find something along the way.

But that's kind of the challenge, right? How do you consolidate the different pathways into a few standards, let's say, so that then private investors can come in. So that's what we're dealing with now.

And there's one other question. The scale that you produced down in southwest Florida, is that kind of the optimal scale for efficiency and then you just make like a replica of that pond? Or is there anything to be gained from actually making larger ponds?

We think they're going to be a little larger but not like an order of magnitude larger. But they might be like twice as large. But they shouldn't really change significantly.

There's a lot of optimization questions like that. How big do you make them? Can you manufacture the rolls that the plastic comes in? Because we're dependent on another industry producing the rolls. You also don't want them so big that if one of them gets contaminated, it brings down a whole big chunk of your facility. So those are things we're still figuring out.

I wanted to ask, in this class, we've learned that the next big thing is what you call energy grass. Can you compare algae to energy grass? Anyone you know and--

Well, algae's better.

[LAUGHTER]

OK, in terms of energy density?

Yeah, the main comparison would be if you have an acre of land, how many gallons of fuel can you get off it? Basically, per acre, how many gallons can you produce? And generally, all the energy crops can get around 500, 600, 700 gallons per acre, something like that. Because remember, there's not much liquid in there, right?

I mean, you look at energy crop. There's something in there that you can kind of get out. But there's not very much.

Algae, non-optimized, can get 2,000 gallons, so three times more per acre. And if you really improve it, you can get to 3,000, 4,000 gallons per acre.

Because, as George was saying, usually a crop you harvest once a year. And it doesn't have very much liquid in it. Algae are growing all the time. So you're harvesting all the time. And it's full of liquid, oil, inside.

And also, algae oil and crude oil are basically the same thing. Crude used to be algae that a billion years ago went down underground and became pressurized, so phytoplankton, these stuff in the water, all of that was. So when we grow it, we're basically producing the same thing, which means the refineries can take it and refine it without requiring major conversion of the infrastructure.

And so I think it fits in very nicely with our existing system so that oil companies can be partners in this. In the same way they have an oil well upstream, they can have an algae farm upstream. And then it combines at the refinery. And then it's all the same.

I thought I read something like that with the Sapphire company, so yeah. So my last question, I come from Nigeria. And this whole thing is a dream in my head. I want to take it home sometime.

I'd like to ask you, what do you know about the strain of Nigerian algae, that side of West Africa? Is it good? Is it productive?

Yeah. Well, I don't know anything about it. But I'm sure there's at least 500 strains of algae in Nigeria because there's so many around the world. Every lake is going to have a different strain.

So the first thing you always have to do is find a university in Lagos, probably, that has a laboratory that's looked at all these. And just the same chart that George showed, which had protein, carbohydrates, and lipids. They will probably know, of our local strains, these are the top five that have the most oil content, that are local. That's the first thing you need to find out, what are you working with?

And then I'm pretty sure there's going to be a few that will be able to grow well enough. And then we should talk about how to build a project around that, definitely. I'll give you my business card afterwards.

(OFFSCREEN) Thank you.

So my question is going to go a little bit more politically. Because it sounds like you had a really good opportunity with the state of Florida and getting some of that funding for one of your phases. However, do you feel like there's political viability? Just I wonder, curious, because pretty much the state has quashed solar expansion. And I wondered really what the political realm is. Does it seem to be an open window because it's more of a fuel base as opposed to like threatening Duke Energy or any of the other--

Exactly. So that's the point. So one of the reasons I got into fuels instead of power is that the only real main driver to change power is climate change. There's an environmental driver.

Whereas on the fuel side, you're replacing oil. And that brings in national security. So you have both an environmental reason and a national security reason. And that usually makes it bipartisan support regardless of how things are going, as long as it's in the money somehow.

So generally, fuel has been more supported. And in the case of Florida, we actually applied to the federal government and Florida, almost at the same time, for two grants. And we got Florida. We didn't get the federal government.

And I think the state governments, if you make a jobs argument, they will bite, especially if it's tied to a university that they respect and all that stuff. Whereas federal government, obviously, they're working at a much higher level. So they're not thinking about jobs. They're thinking about something in the future. And then that future thing can be fought over, whether that's a good use of funds or not. Whereas states might be in a different track.

So I don't know how to answer your question. I mean, the government hasn't helped. But it hasn't hindered necessarily. Like investors, everyone's just waiting to see how these things figure out. Can you solve the problem and everything?

But the military was an interesting one because the Navy would like algae fuel to work. And they've actually been running it on some ships. And there was a Pacific Rim test, practice, that they had. And they actually ran a couple of jets and ships on 50% algae fuel.

But that also got caught up in the wars in Washington because, obviously, no one's producing oil yet at \$2 a gallon. So obviously, it costs more than that. And the whole debate of us, can we invest in this as R&D or not got caught up.

So I try not to think about it too much. And we just have to hit our marks and develop the technology.

And the industry's now big enough that they've had to do as everyone else, get lobbyists in Washington. And there's five really big companies, like Sapphire, that have hired experts and

marketing guys. And they do that. We're sort of the smaller guys just during our piece. And then, hopefully, things will work out.

I'm just going off of his question. So you mentioned you never worked with algae before this. This is the first time. So what was that challenge like for you as far as like education?

I would imagine that the more degrees away from you you went, people didn't come into this project willingly because they knew you. I feel like you'd maybe have to convince them. Like what was education process like, talking to different businesses about algae and you not being a professional in that?

Yeah, so I'm kind of like the center of a big web of people. There's people external to the company and internal to the company. And it all kind of goes through me in a way. So the investors come in, people we hire internally.

And one thing, obviously, is you have to know your audience. So you have to change the way you talk based on who they are and how much they know and that sometimes you're kind of guessing, trying to figure out.

But investors will generally, obviously, focus much more on the economics and the customer side and much less on the technology. But an expert in the sector is going to care much more on technology. If you're presenting a poster at a conference, it's only about the technology.

But I also know that I can only go up to a certain point. I can't lie. I just don't know some things. So then I turn it over to George or Mike or Yannus to answer the questions.

But they don't expect that out of me either. There's no reason I should know which part of the cell grows when you give it nitrogen versus phosphorus. And you pick up things along the way. But like I know when someone tells me something I know is wrong. But I'm not entirely sure like why things happen in the cell and these kind of things.

But you know that you need these and these things to make the algae grow. These are the environments that you need. And when I go to find people, I'm looking for these certain environments for them.