

Ep.3.01 - John DeMaio

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SPEAKERS

Announcer, Ed Clemente, John DeMaio

- A** Announcer 00:01
Welcome to The Michigan Opportunity, an economic development podcast featuring candid conversations with business leaders across Michigan. You'll hear firsthand accounts from Michigan business leaders and innovators about how the state is driving job growth and business investment, supporting a thriving entrepreneurial ecosystem, building vibrant communities and helping to attract and retain one of the most diverse and significant workforces in the nation.
- E** Ed Clemente 00:29
Hello, this is Ed Clemente, I'm your host today. We're glad to have John DeMaio with us. He is the president of the graphene division of Graphex Group Limited and the CEO of Graphex Technologies. And welcome to the show, John.
- J** John DeMaio 00:43
Thanks. Great to be here.
- E** Ed Clemente 00:45
You got a long title. I think you're going to probably break that and unpack that for us at some point of what all the different things are you do. And we should also mention, I think you're coming from California, correct?
- J** John DeMaio 00:59
I'm dialing in from California, rainy California right now.

E**Ed Clemente 01:03**

Yeah, well, might need the rain sometimes. [Yes, we always do.] Yeah. And so, John, why don't you, you know, it's not like graphene, Graphex rolls off the tongue always. So if you go to a party, what do you tell people kind of what you do when you meet someone?

J**John DeMaio 01:20**

Yeah, the quick pitch for folks that are, you know, somewhat aware of the electric vehicle, kind of proliferation, in simple terms, we provide the graphite that goes into the batteries of electric vehicles. It's a major component of those batteries. It's a necessary component. So where most of the attention is placed on the, as we refer to it, the more sexier metals like lithium and cobalt and nickel, about up to 40% of the battery is comprised of graphite, and we provide that graphite.

E**Ed Clemente 01:58**

Yeah, it's so funny, because I've probably listened to, you know, a ton of podcasts and listen to speakers about it. But the extra elements that go in are pretty interesting, because it's, you know, I listen to one podcast where they talked about who are going to be the new sort of electro-states versus petrol-states, you know, where you get materials from? And so the rare metals is sort of interesting. And I know you just went over it, but can you kind of break down, not that there's any scientists listening, but I think it's pretty important, sort of people realize that this is not really that easy to just make these batteries like simply right?

J**John DeMaio 02:37**

No, no, there's a lot of science that goes into it, you know, to start with the basics, any kind of battery, even the ones in the flashlight, they're comprised of four basic elements, you've got a cathode, an anode, a separator, which separates the two those are basically the two electrodes, cathode, anode, separator and electrolyte, electrolyte providing the medium for the electrons to travel back and forth. So when a battery during charge, the electrons go from one to the other. During discharge, they go the opposite direction. So from cathode to anode, anode back to cathode. And that happens multiple times during charging and discharging cycles. So the cathode side of the battery is where a lot of the attention is placed. So that depending again, on the configuration, there are lithium iron phosphate batteries, there are nickel manganese cobalt-type batteries, and that all refers to the cathode chemistry, right, and there's multiple configurations. And each battery company is, you know, experimenting, if you will, and using what they feel is the best solution for their vehicle. And in battery technology the a holy grail, right now is for fast-charging, and long cycle life, right? So long-distance, long-range, etc. and there's usually historically been a trade off between the two. So cathode side, again, made up of the exotic metals, again, lithium, cobalt, nickel, manganese. The anode side is almost entirely graphite, and sometimes a combination of natural and synthetic graphite. But 95 to up to 100% of the anode is currently, and for the foreseeable future, comprised of graphite. Did you have a question?

E

Ed Clemente 04:36

Yeah, I was just going to say too, that, you know, like, it sounds like everyone has sort of their own recipe somewhat for how to do this, that they equivocated to cooking. But, but also, probably I would have guessed, like the payloads, you know, like, do heavier vehicles need different kinds of batteries? Or is it really subjective to the sort of the you know, the whims of what the OEMs want? Or whatever?

J

John DeMaio 05:02

Yeah, that's a great question. So battery size can vary, right. So you know, a Hummer, I think the battery in a Hummer, the electric Hummer may weigh up to like 8,000 pounds or something crazy, it's a huge battery. Whereas a Tesla Model S, maybe about 400 pounds. And the number of cells and there are, again, different configurations of the battery cell itself. Probably the most typical is a cylindrical cell, looks more or less like a an overgrown flashlight battery, the jelly roll configuration as it's called, then there are prismatic, which are basically square batteries, and others called pouch batteries. But if you think about a Tesla Model S, there could be, or a Tesla, different models, there can be from 800 to 1,800 of those individual cells that go into the battery packs that make up the battery. So depending on the vehicle, and how it's intended to be used, whether it's passenger, SUV, you know, off-road, etc, or, you know, pickup truck, for example, that will, to some degree determine mostly the size of the battery, but also, in some cases, you know, the configuration of the cells themselves. Now, that's an area that really is in the purview of the battery cell makers and the automakers, we, you know, get in at a more basic level in just providing the type of graphite they need to fulfill that recipe, as you call it, right. So depending on how they're approaching their cathode, and anode configuration, and there are, as you can imagine, you know, hundreds or 1000s of variables that go into it, and it really is up to, as we call them, the chef, that is, you know, configuring that battery chemistry per what they're trying to get the performance to be.

E

Ed Clemente 07:10

So not that I'm doing a great job of taking you off the questions I was gonna ask you, but I'm still gonna get to some of those. So this is just a weird question. Because of the we interviewed somebody not too long ago, we talked a little bit about the semiconductors. Do individual batteries have their own sort of like semiconductors or chips too, or is that totally integrated to more of the frame of the vehicle?

J

John DeMaio 07:36

That's really, you know, again, a little bit outside of my purview. But really, the battery is, it's complex, but it's simple, it really is just the repository for charging and discharging the battery management systems is where you get into all of the really elaborate kind of controls and monitoring and safety issues and whatnot, the battery is able a charge and discharge as efficiently and effectively as it can. The rest of the of the system is on top of that if you will, or really just taking information from the battery and managing the rest of the vehicle, including

battery performance and power needs, etc. So a little bit outside my purview. But that's a basic understanding. Batteries do what batteries do. And the rest of the car is there to you know, control monitor and extract maximum performance from it.

E Ed Clemente 08:33

Yeah, and I appreciate you doing that too. Because I think a lot of people just think this is like magic and it's not you know, but there is science and I should mention you are a New Yorker originally, actually. So you're coast to coast right?

J John DeMaio 08:49

I am. I am.

E Ed Clemente 08:50

Where'd you grow up? But I forgot you told me somewhere around New York City. Bronx?

J John DeMaio 08:55

I grew up, no, on Staten Island. [Staten Island.] At the time it was the forgotten world, right? Yeah, now it's become a little bit more prominent with things like Pete Davidson and unfortunately things like Mob Wives but when I grew up there, which was a while ago, it was very nice. In fact, it was, without hopefully not dating myself too much. In historic times, you know, people from the city right, Manhattan, Bronx, etc. They would vacation on Staten Island. Very nice, waterfront, you know, boardwalk, etc. has since kind of gone into kind of disrepair and whatnot. But it was nice, it was a nice place to grow up.

E Ed Clemente 09:40

Yeah, and you got your degree from Cornell right, upstate? [I did. Yes. Big Red.] Yeah, Cornell is a beautiful university, isn't it?

J John DeMaio 09:50

One of the most pretty in the country. You know, it does get some snow. But you know, between the gorges, as they call them, you know, and just the lushness of that area in New York. It's a wonderful campus.

A Announcer 10:06

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E

Ed Clemente 10:23

Let's sort of get to why I think you know, you're a good guest for the show is you recently did some investing into Michigan. And can you kind of, because I know you've got a really rich background in this field. But can you tell us how you sort of came to Michigan? And you know, why you came here?

J

John DeMaio 10:41

Yeah, absolutely. I mean, you know, part of it was we'll call it happenstance. But, you know, things that a lot of times I believe they happen for a reason, right? So we had made the decision as a company to expand, you know, into the US and look at Europe as well. And this was even before you know, it became quote-unquote, fashionable, right? So late '20, early '21, you know, the company made a conscious decision that, the electric vehicle revolution was here, we had already, I think he might have mentioned this, we have current operations in China, where the electric vehicle industry is decades ahead of the rest of the world, really. So, and we can get to that in a second about why we operate in China, etc. But we made a decision to move, you know, to expand into the US and to bring, you know, to share basically, our expertise that we had amassed over the last decade or so, and bring that, to the US to support, you know, the electrification movement. So, obviously, the canvas was pretty blank as to where we would look to locate. So, we did have a kind of a loose connection, if you will, to a site in Warren, where we were familiar with the rehabilitation that was going on at this particular business park in Warren called the Emerald business park. And we were aware of that property, but we decided to take a more, you know, a wider look. And we weren't, we wanted Michigan, we targeted Michigan, because that's where the automotive industry was kind of born. And whether that's a nostalgic look or not, that gave us a reason to focus on Michigan. And the more we looked, the more we liked, because we really felt like, as part of not just bringing technology over, but why not bring it to an area that was A. familiar with automotive, but B. would benefit, from the electrification movement, right. And the more we learned about the, you know, the city of Warren, and kind of what went on there, basically meaning the exodus of a lot of industry, particularly automotive. Over the past several decades, we really looked hard at whether it would make sense for us to do, to install a plant there. And the more we looked, the more we found, like I said, the more we liked, the site itself had some advantageous kind of qualities to it. First of all, the group that was rehabilitating it are native Michiganders, right? It's a small group of folks that, born-and-raised in the area, in and around Warren and Detroit. And they were, you know, they had been successful in other areas, but they wanted to kind of reinvest and redevelop the area that they knew. So they had already started to rehabilitate this particular property. And this property had been, I think the last tenants there were called Utilite, and they were a, what do you want to call it, a undercoating, waterproofing or rust-proofing kind of operation? That supported, I think Chrysler primarily but other car companies. So it was already an automotive kind of facility, and had been lying dormant for for a number of years. So this group of Michiganders was in the process of rehabilitating that they had done brownfield remediation. They had started to lease out parts of the structures to, at the time I think it was cannabis growers and cannabis processors, and as a result of that, or as part of that, the group decided to bring in a power substation to support the power needs of what they thought would be more and more kind of cannabis operations. So when we looked at the site, it

hadn't been fully rehabbed yet, there were certain parts of it that were ideal for housing, our process, right? And the fact that our process is somewhat energy-intensive, the fact that there was a power substation already built on the property and just about ready to be energized, really would short circuit a longer if we were to approach a greenfield project. So we factored all those things together and said, "You know what, this seems like this feels right." You know, that we can bring jobs back to a city like Warren, that has suffered some in the past, that we bring technology, from Asia to the states, which is kind of counter to what's been going on and what the concern has been over the last several decades. And we felt like we could, we would be in the backyard, of, you know, the major players. So that was really what drove us to make that decision, and we're happy about it, and we look forward to getting that plant fired up.

E

Ed Clemente 16:15

You know, that's a great story. And many levels, really, to me. I mean, it's someone who used to do a lot of economic development, and brownfield work. But I think the one key thing in there is that that substation, because I don't think people realize how much electricity you need to also make batteries. It's pretty intensive, and you almost have to have your own sort of controllable sort of source a little bit, right. Is that why that's very attractive to that? Is that a big thing to have?

J

John DeMaio 16:46

The power is definitely of major importance, right, having ample power and stable power as economically as you can get it is definitely a big factor in any processing, but in ours in particular. So that was a very important point.

E

Ed Clemente 17:10

And, you know, I would like you also to, because I know, you've mentioned onshoring, now, somewhat, but you also talked to me a little bit ahead of time, about you have some other maybe potential opportunities down the line that you might be either, you know, I don't know if they're all in China, but specifically, you might be wanting to come back to the United States, North America. But tell me about what you want to do with those things, too.

J

John DeMaio 17:37

Yeah. So maybe a good place to start is with what the overall demand picture looks like. Yeah, so when you look at the the announcements that have been made by the automakers and their associated battery counterparts, the next several years, there can be the equivalent demand, meaning for the number of vehicles, they want to put out a number of batteries that will be needed to support those, there can be a demand for graphite for over 500,000 tons of finished product. The plant in Michigan that we're targeting is going to produce about 15,000 tons per year, which is a pretty good number. And that's a nod of the hat to our commercial expertise, right? But at 15,000 tons versus 500, there's obviously much more demand and supply. So as much as the Michigan site is very advantageous to plant a flag and get get to operations quickly. It doesn't, it's more or less landlocked, right? Because it's relatively small, when you

think about what we need to produce something, a quantity that can take a dent out of that 500,000. So we are looking at other sites, that would afford a much larger footprint. And we're looking at sites in Michigan as well, right? But we're looking at sites all around the US and some in Canada, that can supply the, not only the land area, but have power available, logistics, right for shipments of materials in and out, etc. So we're looking at doing those things in parallel, right? So to establish that, that warring facility, but also to address an industry-wide need, right. And that's really what we're trying to do is be supportive of this whole transition to electrification. What we supply is a foundational element. I mentioned the graphite that goes into the batteries. We want to supply not only the graphite but also the support as a contributor to the ecosystem to be a good player within the industry, right? So we occupy what's called a midstream, we take material, we don't do mining, but we take material from graphite mines. And we transform it through a series of processes into the anode material that goes into the batteries. So we have, in the midstream, we have variability on both ends. So we have the ability to access raw materials from multiple sources, and those sources being in free trade countries that are closer, like Canada, even in the US, you know, if and when those resources come online, South America, Australia, Southern Africa, so we have the ability to vary our input stream, which gives flexibility to the industry. And we have the ability to match the needs of the customer base. So by operating in that midstream, and having the experience we do, we feel like we're very well positioned to again, to be successful as a company, but more importantly, to be an integral and responsible player to keep this electrification movement moving, so to speak. So we're proud of, of the space that we occupy, and we really look forward to being a integral part of that whole ecosystem for the foreseeable future.

E

Ed Clemente 21:18

Yeah, and actually, in the last few minutes of the podcast, just a couple more questions. But is there any other future trends you didn't get a chance to mention? Or do you think he kind of covered them all? For that, at least for you?

J

John DeMaio 21:32

There's a lot of activity in the space, right, and there's a lot of technologies that are emerging that are being floated out there. There's always room for improvement, right? So we have been doing what we do for a long period of time, but we consistently look for leading edge, bleeding edge technologies that might be disruptive, that can make a big difference. We see and hear a lot of potential trends, particularly around our side of the battery, which is the anode side. Now, there's a lot of discussion around silicon being a very attractive material, very conductive, as we know, from Silicon Valley, etc. And a potential replacement for graphite, a lot of challenges with the use of just 100% silicon as an anode material. Without getting too technical. You know, there's an expansion issue, there's a shelf life issue, and there's a morphology kind of issue that, again, companies are trying to deal with. But yeah, so we keep a close tab on battery chemistry developments. How graphite plays and doesn't play in that, how we can assist with the advancement of technology. So we're not just, we were not just happy to be graphite processors, we are taking an active role in research and development, and look forward to working closely with battery companies and automakers and universities for that matter, to advance to use and share what we've learned over the last 15 years to advance the system and the ecosystem of battery tech.

E

Ed Clemente 23:31

Well, I think you and I could probably talk for an hour, because I'm just naturally curious about a lot of these things. But I think, you know, it's very relevant to how the world's moving right now at a macro level as well. So your very last question is a simple one. You've been around the world, you've lived, I think, different places. But is there any advice you would give your sort of 17-year-old self if you are looking for a career today?

J

John DeMaio 23:58

You know, well, that's a great question. Yeah, I think it's the same advice I try to give my kids, reminds me of a I forget what song it is, but tell him you know, listen, as much as you hear, right, so, definitely listen to yourself, right, and follow your dream. I mean, everybody says that, but when you're out there, you know, be constantly learning, right? No matter how much you think you may know about any particular subject, you constantly listen, constantly learn, right, and be a good contributor, right? Always try to do, you know, leave any situation better than when you found it. And that's worked for me. You know, it gets me excited every day to see what we can do to advance the human condition, if you will, in some small way, right? You know, when you think about graphite production, that doesn't seem to be a world changing thing. But it does play a part in something that is changing the world. So for me, I've been a part of this energy transition long before it was called that, right? So I spent time in energy management, energy production, solar, water, wastewater, and the energy and water-energy nexus, etc, etc. And I've never been as excited as I am right now about the fact that the momentum is so overwhelming. You know, it hasn't been, in my experience where all of the forces that are required for change have aligned so well, meaning you've got political will, you've got societal will to change to move away from fossil fuel as much as possible. And that is a really beautiful thing. So, ambition has led to intention, intention has led to legislation, legislation has led to funding. And that's never been aligned quite like that in anything before. I think you and I have probably seen this happen, but solar, etc, where the ambitions are there, and then there's a misalignment usually somewhere in that food chain, and it doesn't really happen as much it could. The electrification of mobility is happening. This is a one way trip. We're not going back to proliferating internal combustion. You know, there may be a technology in the future that that even is even better. But for the foreseeable future electric vehicles is where we're going to be part of that.

E

Ed Clemente 25:41

Yeah, it was really well put, and, sorry to shorten it for you. But I want to thank you, John, for being on the show today, again, [My pleasure, Ed. Yeah.] You're the president of the graphite division of Graphex, which is a group limited, and you're the CEO of Graphex Technologies. Thanks again, John, for taking time and I know you call from California, so we appreciate you working it into your schedule today.

J

John DeMaio 27:03

My pleasure, Ed, anytime you want to continue the conversation, I'm available.

E Ed Clemente 27:07

I hope you move everything here to Michigan, but I know you got a lot of decisions.

J John DeMaio 27:11

You bet. All right. We'd like to do that too.

E Ed Clemente 27:14

Join us next week. Our guest is Dawn Hines. She's the CEO of Hines Industries, a family owned business that does a lot with manufacturing, and we look forward to hearing what she has to say.

A Announcer 27:26

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