

Ep.3.42 - Reuben Sarkar & Zachary Kolodin

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SPEAKERS

Zachary Kolodin, Announcer, Ed Clemente, Reuben Sarkar

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, I'm your host Ed Clemente, and welcome to the show. We're fortunate that two guests today, Zachary Kolodin and Reuben Sarkar. And welcome to the show, both of you respectively. Thanks for being here. [Thanks so much for having us.] [Yeah, appreciate it.] And just for the audience's sake, I'll start out with Zachary a little bit. You're the Chief Infrastructure Officer for the Director of Michigan Infrastructure Office. We're going to be talking about hydrogen a lot. But why don't you say quickly what your responsibility is at State?

Z

Zachary Kolodin 01:05

Yeah, absolutely. Thanks for that question, Ed. You know, when the Bipartisan Infrastructure Law was signed by President Biden in November 2021, he hired a nationwide infrastructure czar, Mayor Mitch Landrieu, who had previously helped New Orleans recover from Hurricane Katrina. And the mayor did a nationwide tour, called on the governors of every state to appoint an infrastructure coordinator. So that's the origin story of the Michigan Infrastructure Office. Governor Whitmer heard that call and said Michigan doesn't just need an infrastructure coordinator. It needs an infrastructure office to provide capacity to go after federal dollars on sort of complicated new initiatives like the clean hydrogen hubs that we're talking about today. And then also to coordinate between the different state agencies and provide some aid to local governments. So that's really the Infrastructure Office in a nutshell.

E

Ed Clemente 02:00

All right. And Reuben, you're the CEO at the American Center for Mobility. We've had someone on before way back about two years ago, but I know things are always being developed there. So why don't you sort of give what you think the mission is for ACM?

R

Reuben Sarkar 02:16

Yeah, and the mission's changed probably since the last person who's been on the podcast here. But ACM was originally formed as an advanced proving ground for connected and automated vehicles. So to test them and help commercialize them. But since then, in fact, just this year, we released a new strategic plan to better align to the priorities of all of our automotive users to focus broadly on safe, sustainable and secure mobility technologies. So the safe piece still ties in the connected and automated piece. The sustainability brings in things like electrification and the topic we're going to talk about today on hydrogen, and then the secure piece brings in the cybersecurity and the resiliency, which includes things like infrastructure. So we're now a global development center focused on the testing and validation of these technologies to advance them. And then as you'll hear about, we're also leaning forward into being able to provide green fuels into the marketplace to service regionally transportation, so not just a test facility.

E

Ed Clemente 03:15

And I get a little excited always when I have people who, from Michigan, but have been in other states and done other things. We'll start with you anyway, Reuben, because you were just talking. Why don't you tell us a little bit about your path to get to this position and how you're putting your imprint on it and things like that?

R

Reuben Sarkar 03:32

Yeah, so I actually started my career 25 years ago or so, to date myself, at the facility that was once General Motors Powertrain in the Willow Run Industrial Facility that is now ACM. So I started here 25 years ago. And then I went on a journey through my automotive career through a number of startups. And a stint in Washington, DC. And the back end of the role of startups before I came back to Michigan, so it was kind of a circular path. I started where I was at this facility, which was had GM Powertrain and the largest single floor plant at the time it was built, to it now being a advanced proving ground. And I went from Michigan, to some other places that had some startup hubs and obviously in DC for the purpose of working for the federal government. But I came full center back to Michigan, like a lot of Midwesterners do because family, the automotive industry, and a lot of opportunities to kind of revamp the facility that I started my career at, to turn it into something a little bit more more forward leaning.

E

Ed Clemente 04:35

And I know that some of your other experiences have probably come out in what you're going to be explaining. Zach, why don't you sort of tell us. I know you've got a more interesting story

to be explaining. Zach, why don't you sort of tell us, I know you've got a more interesting story, even a family lineage we've had on the show before.

Z

Zachary Kolodin 04:49

Wow. Yeah, sure. Happy to chat about how I came to Michigan a little bit. I'm originally from Massachusetts, and I'm a lawyer by training. So I went to NYU Law School, graduating almost a decade ago. And my practice was mainly focused on litigation and a little bit of renewable energy, project finance matters. But I was always super interested in getting back into government service. Prior to law school, I had worked in the Corporation for National and Community Service, which is basically the organization that runs AmeriCorps, and done some nonprofit work. My family decided to move out to Michigan and be closer to my wife's family. I was able to land a job in the governor's legal office. So I was deputy legal counsel for three years in the governor's legal office, working on a range of issues from the relationship with the legislature to COVID-19 policy, really all across the board. And as COVID-19 kind of wound down and the whole of government response to the pandemic wound down, I was looking for the next challenge, the next kind of whole of government challenge. And this infrastructure opportunity represented an incredible chance to work across state agencies trying to find the best of government and deploy all that to pulling down federal dollars and making them work for the people of Michigan.

E

Ed Clemente 06:36

Well as a side love of infrastructure, my first job out of college, I was a sewer inspector for an engineering firm. So I know how important infrastructure is. It doesn't get the sexy publicity it deserves. But we wouldn't have the society I think we have without the great infrastructure that's here. And I'm glad to see there's an office now to kind of deal with it directly. So that's great.

Z

Zachary Kolodin 06:58

Not to forget that MDOT is full time on infrastructure, EGLE, our our Office of Environment, Great Lakes and Energy, keeping our water clean. And making sure that you know that our wastewater systems work. So, people really notice when infrastructure is not working for them. And we need to sort of keep the promise that government makes to people that these systems will work, that they'll be able to get to work on time, that they'll be able to rely on their power grid, and that clean water will come out of the tap. And that's before we even get to the point of building the infrastructure to support the energy transition, which is what the clean hydrogen hubs are all about.

E

Ed Clemente 07:44

Why don't you just transition to that right now, just explain sort of how this came about the whole Midwest Alliance for Clean Energy? [For clean hydrogen]. I said energy sorry, hydrogen, sorry.

Z

Zachary Kolodin 07:58

Yeah, so the Midwest Alliance for Clean Hydrogen is the consortium that won up to \$1 billion in funding from the Department of Energy. But I think telling that story requires going back to why we should care about clean hydrogen as a fuel in the first place. Hydrogen is this incredibly flexible fuel that burns clean. And what I mean by that is, at the point when you use the hydrogen in an engine or a fuel cell, the emissions are basically non-polluting like a fuel cell will emit water as it produces energy. And so that creates this incredible opportunity to replace fuels that burn dirty like diesel fuel with hydrogen and clean up our air while meeting our climate goals. The key piece of whether hydrogen helps us meet our climate goals is whether it is produced in a clean way. So in order to make hydrogen, you've got to separate molecules, right? Because hydrogen doesn't occur naturally, on its own. And so there's a variety of processes to do that. But we have a variety of ways now, including making hydrogen by a process called electrolysis, or making hydrogen by steam methane reformation and then capturing the carbon dioxide and storing it underground, that produce hydrogen without carbon dioxide emissions. And so as long as we can do that, at scale, at an effective cost, that gives us this potentially transformative fuel that takes carbon dioxide out of our transportation and industrial processes, and burns clean. So that's why it's so important that these clean hydrogen have succeed. They are the tool that the Department of Energy is using, along with an important tax credit that we can discuss later, to meet the Department of Energy goal of bringing the cost of hydrogen down to \$1 per kilogram within one decade, which is what we believe would be necessary for this for clean hydrogen to really take off as a fuel of the future.

E

Ed Clemente 10:18

Thanks, Zach, and go ahead, Reuben, jump in, now, I know you have some points. Go ahead.

R

Reuben Sarkar 10:23

Yeah, just to elaborate or build on what Zach said. Because if we go back and just a little background that I didn't give it the beginning. So I've actually worked on fuel cell technologies, hydrogen-based technologies in a couple of startups. And then I was also at the US Department of Energy. And one of the offices that I used to oversee was the Hydrogen and Fuel Cell Technologies Office. So a lot of these conversations around hydrogen or why hydrogen, we were mapping out some of these things seven or eight years ago, and now we're starting to see them come into play right now. So hydrogen has been on a long pathway to get to the point we're at now, it seems to be at a tipping point. But just to build a little bit on what Zach said, probably just a little more than a year ago, before the Regional Clean Hydrogen Hub grant award proposals came out. People were heavily focused on electrification. So electric vehicles, and people used to often think that it was a choice between battery electric vehicles, or hydrogen versus battery electric vehicles and hydrogen. And so if you think of a fuel cell electric vehicle, technically it's an electric vehicle, it's getting its electron from clean hydrogen, as Zach just mentioned, right? So still an electric vehicle, or you can use hydrogen and use it in combustion or in other processes, right? So it's a way to uptake renewables. And it's an energy carrier that can remove that renewable content or low carbon content into transportation and into different industries. And I think once people realize that it's not necessarily an either or conversation, that hydrogen fits neatly into areas where perhaps all electric doesn't necessarily

get the right duty cycle, for example, heavy duty freight, that it's a complimentary conversation. And we often like to remind people that fuel cell electric vehicles technically are our electric vehicles, right? They just get a clean electron from a different source.

E

Ed Clemente 12:13

Yeah, it was funny. When I was in the legislature back in like 2008, and I hosted in my chair of a committee, EV discussions with all the big three, at least back then. And that was like an and-or, because, on one hand, they said they were separate. And sometimes you had the engineers at the OEM saying, Yeah, we really think it's maybe more hydrogen, or we think it's more EV. I'm so glad to hear how you describe that as a way to do that. And can you break down a little bit more how ACM, the American Center for Mobility fits in this?

R

Reuben Sarkar 12:51

Yeah, a couple of different ways. I think one was when the topic of hydrogen started to come up, I had some background in hydrogen having been at the US Department of Energy. So I had a good understanding of the narrative and started to help brief and inform people, get people up to speed. But we had also announced a separate hydrogen project outside and ahead of the DOE Clean Hydrogen Hubs, to move a company, BayoTech, who is in the process of doing their due diligence to build a hydrogen production facility at ACM. And then on the heels of that, because we have a lot of land, and we have power, we have a large power station, we're sort of looking at it from the lens of, could we bring electrolysis to ACM. And so that's how we got involved in the conversation, was looking at the different needs of the transportation industry, we have a couple of the largest fuel cell manufacturers on the automotive side who are residents at ACM, who do testing for other purposes, but have an interest in hydrogen. So how can we help service their needs? And again, it was also a way to be more broadly focused on mobility and taking advantage of the assets that we have, which was land and power.

E

Ed Clemente 13:58

Yeah, and I'm gonna go back again to Zach over at the Office for Infrastructure. Go ahead, Zach.

Z

Zachary Kolodin 14:05

Well, I, you know, we Reuben and I both use some big words. And I worry that we're breaking them down for people. So since Reuben has at least a decade more experience in this than I do, I'll just ask him. Could you just break down for people? What electrolysis is and why it works?

R

Reuben Sarkar 14:24

Yeah, so well, I'll give you the traditional method and compare it to electrolysis. So traditionally, people use something called steam methane reforming, SMR, where they take natural gas, and they convert natural gas into hydrogen. And you can do that with and without carbon capture,

for example. Electrolysis takes electricity and directly splits water into hydrogen and oxygen. And to Zach's earlier comment you can get that electricity from the grid mix. But your ideal goal is to get it to be green, you want to get it from renewable grid mix or direct renewable, for example, behind the meter, solar. If you think of electrolysis as the reaction that cuts water in half to create the stored energy and a fuel cell would then recombine it to create the electricity to drive a drivetrain, right? So one splits the water and one puts it back together again. But, electrolyzer is the water splitting, using electricity.

E

Ed Clemente 15:23

Yeah, it's not quite obviously, it's more about the clean part of it too, that the other part is not as clean. In fact, often when I read stuff about hydrogen, there's like gray, blue, white hydrogen, and it seems like there's a lot of different stratifications depending how it was processed. And in this case, we're talking purely I think it's white hydrogen, or is it the cleanest hydrogen or at another rate?

R

Reuben Sarkar 15:46

Yeah, by the way, the colors, green is when you talk about pure renewables, like solar and wind. But the reality is pink hydrogen can be low-carbon intensity, blue hydrogen made from natural gas, if you capture the carbon can be very low hydrogen intensity, and the markets not likely to differentiate between those if they're equivalently clean, right? So in these hubs, you're seeing different methods being used even within the same hub to produce the hydrogen, you're gonna have a mixture of blue, pink and green. But ACM is focused on trying to get to a green hydrogen.

A

Announcer 16:19

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E

Ed Clemente 16:35

One thing too, is I'm so glad you broke those out, Reuben, because part of the show actually is, I think a lot of people, I want everybody to hear this, I even want parents to hear the program. So they might tell their kids to say, Hey, this is a field to think about. And that kind of ties into I think what both of you are talking about not only just green energy in general, but opportunities for talent, too. And maybe I'll turn that over to Zach a little bit on that one, if he wants to describe how we've also, in fact, recently, the Nel project, and how all these other things sort of all kind of hopefully will fit together at some point and help Michigan's infrastructure as well as talent, sort of.

Z

Zachary Kolodin 17:14

Yeah, absolutely. So I want to make the point that even though bringing clean hydrogen to

mean, absolutely. So I want to make the point that even though bringing clean hydrogen to market at scale is relatively new. The use of hydrogen in our economy is not right. So hydrogen jobs exist, they are basically jobs in the oil and gas industry now, because hydrogen is a gas. And so that means the kinds of folks who make our pipelines safe, who make fuel pumps safe, who operate that kind of equipment will feel comfortable with the kinds of problems posed by the hydrogen industry. Now, there are some differences. Hydrogen is an unusually small molecule. So you need especially tight seals, and you need to be very careful as you move the clean hydrogen around the country. But these are not new problems. And they're problems that folks have tackled for many years. So when we bring clean hydrogen to scale, that means growing that kind of job. And I think that that's such an important thing that like, we may be seeing certain parts of our economy change a fair amount, right, like, as we transition in consumer cars from internal combustion engine vehicles to electric vehicles, we will see less maintenance, less maintenance cost, less maintenance labor associated with keeping your car operating well, because EVs are simpler machines than internal combustion engines, internal combustion engine driven cars. But hydrogen is a continuation of a long history with oil and gas work in America and in Michigan, and it shows that there is a future in that sector for folks from all walks of life. And then I think, you know, more broadly, we are bringing new kinds of manufacturing facilities to Michigan as a part of this. So, the hydrogen economy will depend on a reliable supply of electrolyzers, in other words, machines that perform electrolysis to split water into its components, into hydrogen and oxygen. And we have announced recently that Nel hydrogen is opening the largest electrolyzer manufacturing facility in North America, in Plymouth, Michigan, an investment of over \$400 million. And it's a great example of how Michigan is leading the clean energy transition and making the stuff that the entire country needs to decarbonize.

E

Ed Clemente 20:20

And so I saw you had your hand up. Reuben, did you want to add something?

R

Reuben Sarkar 20:24

Oh, no, no, I would just say that, yeah, from a jobs creation perspective, I think Zack hit all the major points. But, you know, vehicles will need to be serviced differently. So just training people on that. The fueling infrastructure, fueling stations an opportunity to upskill there, in addition to the manufacturing, of the new hydrogen systems, right, that will be built.

Z

Zachary Kolodin 20:48

Right, I don't want to understate that training is needed in order to ready people for this sort of next generation energy opportunity and all the opportunities that are going to be produced by the transition from dirtier energy to clean energy. But I do want to emphasize that it's not such a radical transformation that this is not the kind of job that's unprecedented in this country. In many ways. It is a continuation of a long tradition.

E

Ed Clemente 21:17

And in fact, aren't there some partners with higher education involved in this process, too?

Z

Zachary Kolodin 21:23

Yeah, absolutely. So we've got Kettering University, providing training out of the Flint area. They're an incredible partner, and really forward thinking in how they're preparing folks for the jobs of the future. And I just want to say more broadly, I think Kettering is a great example of an institution that's thinking strategically about creating a specialty and producing a certain kind of graduate, right? And community colleges all across the state can do that. They can think what skills do employers in my area really need, and begin to develop programs that produce those graduates in high numbers. So I think Kettering is a great example of that. The University of Michigan, too, has invested heavily in a program called MI Hydrogen, where they're trying to supply the really intellectual firepower behind producing clean hydrogen. So, you know, it's not just building the infrastructure in order to transition to a clean hydrogen economy or, you know, even more broadly to an electrified economy, as Reuben was talking about a moment ago. It's not just building infrastructure, fueling stations, pipelines, whatever you need to support that transition. It's also developing these technologies and bringing down the cost of these technologies. And institutions like the University of Michigan, are at the forefront of that transition. Isn't that isn't that basically how you think about it, Reuben?

R

Reuben Sarkar 23:04

Yeah. So we also were involved in workforce development, by the way, it's another component to the projects that we have ongoing, once you have the infrastructure available, we plan to use that for kind of onsite on the job training. And I've been getting approached by even some of the auto companies looking for us to try to tie in training into things like community college programs and the like. And so I don't know if I'm directly answering your question there, Zach, but we do feel that we're getting an equal amount of interest on the the workforce development side of things as we are on the production side. And for every program that we have, whether it's a federally funded hydrogen program, we're thinking about it from a dual purpose perspective to produce something, but also you to use it to train people, you know, physically using places like ACM, right, where the community colleges and colleges can come and get access to, to infrastructure.

E

Ed Clemente 24:05

And maybe this is a naive question, but is all the science done on this? Or is this sort of an evolving science? So like tech transfer programs? Is there going to be opportunities to do those kinds of things, too?

R

Reuben Sarkar 24:17

I'll kind of chime in on that, because I have been working on hydrogen for a long time, right? And people have been working on it for quite some time. It's come a long way. I think you have two parallel paths. You have the clean hydrogen hubs, which is a deployment program, right? Which is meant to push things out commercially, right? So the goal of the hydrogen hubs is to get things out commercially. But there also is still a need to reduce the cost of the technologies

and the cost of the fuel in parallel. Zach mentioned, there's a hydrogen shot from DOD to get down to \$1 per kilogram of produced hydrogen, right? And there's still R&D and work required to get there. But they're happening in parallel, right, because there are certain technologies that are mature enough now to go to market with, but that you still need to turn the R&D crank on the technologies, on the hydrogen side to get the cost down. And on the fuel cell side, for example, to get the durability up on trucks, for example, because you're going to be driving them quite a few miles. So they're happening in parallel. I'll get to you in one second, Zach. So this sounds like it's also both going to be applied in basic research somewhat, because there's opportunities on both sides of that coin, right? Yeah, I would still place most of it in the applied category. Yeah, obviously, there may be things that people are doing to advanced catalysts and all the things in the basic side that might be game changing someday. It's mainly applied research that's happening. For example, we talked about electrolysis, right, which is using electricity to split water. But there are more advanced ways that people are looking to split water, right? That's an applied research project that could be fundamental game changers to the cost of these things when they get there. And the technologies in some cases when I was at DOE, they existed, but they just hadn't yet gotten to the cost or the durability that they needed to get to, but they were there. So I placed most of it in the applied spectrum, but some of it could be considered earlier stage applied research.

E

Ed Clemente 26:20

Go ahead, Zach, I cut you off.

Z

Zachary Kolodin 26:22

No you didn't, no you're good. I want to point that in order to be successful in a clean hydrogen hub or in electrification of the transportation sector or really anything, we have to not just look at technological innovation, we also have to look at innovation in how government works, the scale of what we have to build in all of these cases is really massive. And it's massive at a level that the United States hasn't built in many years. So we have to learn how to review and approve projects that are needed to help us meet our clean energy goals on an expedited basis in order to meet our goals, when it comes to keeping our climate in check and, in the Michigan context, to meeting our healthy climate goals. So that certainly applies to hydrogen and delays in permitting these projects could produce cost overruns that that are a significant risk. So it's not only technology, innovation, it's also really government effectiveness. And that doesn't mean that we compromise our environmental standards, it means that we move the environmental review process forward in a predictable and transparent way.

E

Ed Clemente 28:00

Well, like any inventions or innovation, a lot of times you figure out how not to do stuff to eventually figure out the best way to do it. So it's always some friction getting to that point, I would guess. The last question for you two, and you both can do it. But any, I wouldn't exactly call them because you've been talking about future trends, but is there anything else you think we should highlight for your last bit of comments here. We can start with you, Zach, and then we'll go to Reuben.

Z

Zachary Kolodin 28:25

Well, I want to thank the incredible work that's being done in the Midwest Alliance for Clean Hydrogen specifically. So the Flint Metropolitan Transit Authority was one of the first movers in this space. And they really demonstrated what you can achieve in a short period of time. In 10 years, by replacing their diesel buses with fuel cell electric buses that run on clean hydrogen, they have reduced their annual usage of diesel fuel from 2 million gallons down to 30,000. And they have they have set a goal of eventually getting down to zero. Other transit authorities across the Midwest could replicate that model. And Flint is really a leader in that space and a model. The Infrastructure Office which I run in partnership with our Mobility Office, run by Justine Johnson, who I hope you've had on this podcast or soon will.

E

Ed Clemente 29:29

She's on the list.

Z

Zachary Kolodin 29:31

Well, get her on here. We're partnering with other folks to develop a hydrogen truckstop that will sort of demonstrate how these technologies can work in the logistics space. And so we think that'll not only include refueling, but it could also include hydrogen production, hydrogen storage on site, perhaps even testing, we are still developing the final concept. But I think this is a really exciting project that could demonstrate exactly how the infrastructure to support hydrogen-powered freight movement could look. And then BP, which is producing blue hydrogen, that is hydrogen produced by a steam methane reforming with the carbon capture underground, they are putting together a hydrogen mobility corridor across the entire Midwest to facilitate vehicle movements that are powered by clean hydrogen. So, I mean, these are really exciting projects, they are concentrated in the mobility space in keeping with Michigan status as a mobility innovator. And I think that they really demonstrate that we are as a state, and specifically Governor Whitmer, is thinking about what we need to do to remain on the bleeding edge of mobility and to decarbonize our transportation sector.

E

Ed Clemente 31:09

Reuben, you got anything else on the hydrogen sort of future world?

R

Reuben Sarkar 31:13

Yeah, and maybe I'll take a retrospective view just for a moment to give you the future view. So as I mentioned, we were looking at some of these things a number of years ago at DOE, and the aha moment for a lot of people was when they realized that hydrogen can be used to decarbonize a large number of industrial sectors, not just transportation. And as Zach mentioned, it's a molecule we're familiar with, we make millions of metric tons of your hydrogen. But if you just make it with lower carbon intensity inputs, whether it's renewable energy, or nuclear energy, or even fossil fuels with carbon capture, you can move that hydrogen into different industrial sectors and decarbonize them. So chemical manufacturing,

fertilizer manufacturing, steel manufacturing, making sustainable jet fuel, refining oil. So there's so many different industrial applications. And so even for people that said, Well, I don't know whether hydrogen is going to be the fuel for light duty cars, I think a lot of people have that aha moment, right? That it can be used for freight, it could be used for rail, it could be for all these different things. So I think that the future is yet to come in terms of all the different spaces that hydrogen will be applied into. And that there's an advantage to us deploying technology in these hubs, while at the same time still having some research to do because as Zach mentioned, it's not just about the technology development, it's about the policy development. It's about the market implementation. It's about learning what it takes to actually implement all of these things in an integrated fashion. And so I think there's great value in these hubs coming forward with technologies that are available today, while still acknowledging that there needs to be technological advancements to keep driving down the cost of these technologies in parallel. And I do think you're going to see hydrogen pop up in a lot of different conversations. I mean, we're still hearing about hydrogen for aviation, for ground based transportation, but also for flight. And so you know, I think we're just kind of at the tipping point right now. And these, these hubs are actually helping us get, you know, get some momentum going.

Z

Zachary Kolodin 33:14

Can I make one last point, Ed?

E

Ed Clemente 33:16

Even though you're violating my rules, go ahead.

Z

Zachary Kolodin 33:23

So I just wanted to paint a picture, because I think it's important that people people understand not only how hydrogen can decarbonize our economy, but also how important the co-benefits of a clean burning fuel are. So we just built this beautiful new bridge over the Detroit River, the Gordie Howe International Bridge, connecting Ontario to the city of Detroit. And we know that 1000s of medium and heavy duty trucks are going to rumble over that bridge every day. And that's been happening for years, right with the Ambassador Bridge as well. Historically, what that has meant is that communities like southwest Detroit, are choking on diesel fuel. And we see the consequences of that in the form of higher asthma rates, and other negative health effects. If those trucks were running on hydrogen today, you would not have that diesel fuel hanging over southwest Detroit. So I just think that is such an important visual for people to keep in mind as they think about what this could mean, not only for our entire country, but what it could mean for our most environmentally overburdened communities.

E

Ed Clemente 34:35

And I want to thank you both. Again, Zachary Kolodin is the chief infrastructure officer and director of Michigan Infrastructure Office, and Reuben Sarkar. He's the CEO and president at the American Center for Mobility. I appreciate both of you doing this and hopefully we'll be

hearing from both of you in the future maybe on a future podcast as well. [Great.]



Announcer 34:58

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