

**Oral History Interview of
Mark Harral**

**Interviewed by: Andy Wilkinson
February 18, 2014
Lubbock, Texas**

**Part of the:
*Wind Interviews***

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Interview Series Background:

The roots of the National Wind Institute run almost fifty years deep. In the spring of 1968, a powerful sandstorm blew through Texas Technological College, taking down two light standards at the school's football stadium. As the relatively-new structures had been designed to withstand such winds, two of the college's engineering professors, Kishor Mehta and James McDonald, thought that the incident bore investigation. Two years later, on May 11, 1970, a massive group of tornados struck the surrounding city of Lubbock, killing 26 people, injuring over 1,500, and doing over \$200 million in damage (in 1970 dollars). The day after the storm, Mehta and McDonald hurried to investigate as much as they could of the wreckage strewn along its path, knowing that the evidence of how the storm winds worked would be quickly destroyed during rescue, recovery, and clean-up. They were joined by two other engineers from what was now Texas Tech University, Ernest Kiesling and Joe Minor, and by the end of the first day, the group realized the need for focused study on wind and wind damage.

From the beginning, their work was interdisciplinary and soon involved researchers from atmospheric science, economics, and social science. The focus of their work broadened as well, first strictly on wind mitigation, then on education, and eventually including wind energy. Along the way, the organization added faculty, students, and degree programs to include the doctoral level. At the time of this writing, 2014, it is among the most highly-regarded wind science and energy programs of any university anywhere.

The collection includes oral history interviews from most of the key founders and developers of the program, along with a substantial number of leaves of documents.

Transcript Overview:

This interview features Mark Harral, CEO of Group NIRE. Harral discusses his early legal career in wind-lease agreements, and the subsequent development of Group NIRE. Mark explains the logistics of creating the group and the various projects involved. Andy and Mark discuss the novelty of Group NIRE, its future, and its use as a model for other research projects at Texas Tech University.

Length of Interview: 01:18:32

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Keywords

Texas Tech University, National Wind Institute, Group NIRE, Wind Energy, Renewable Energy, Wind Law

Mark Harral (MH):

—just a little bit of flavor. I am pretty flavorful, I guess.

Andy Wilkinson (AW):

Me, too. I told you, I started out as a cop, so—

MH:

Oh, that's right. (laughs)

AW:

I'm probably in bad shape for that. Let me start by saying though, this is the eighteenth, right? Of February? It's about 10:30 in the morning, Andy Wilkinson with Mark Harral of NIRE, N-I-R-E.

MH:

Group NIRE.

AW:

Group NIRE. That sounds like a racing team.

MH:

Um-hm. It kind of is.

AW:

Yeah. And we just had a nice, interesting tour of the facilities out here at Reese Technology Center. Let me get some basic information about you so that a hundred years from now, people know which Mark Harral we're talking about. M-a-r-k—

MH:

H-a-r-r-a-l.

AW:

Okay. And date of birth?

MH:

January 11, 1985.

AW:

Just had a birthday. And where were you born?

MH:

Midland, Texas.

AW:

Midland. Did you grow up there?

MH:

I grew up on Fort Stockton, Texas on a ranch.

AW:

Really? Oh, that's right. I've done a lot of oral history work in Fort Stockton.

MH:

My family's been in Fort Stockton since 1886.

AW:

Yes. You'll know then Molly and Paul Yeager?

MH:

Yes, yes. In fact, she used to take me into town driving for school in the mornings.

AW:

Well, I—my other job is I write music and perform and she would have me go down there and play in the schools and such for years and I always got to stay at the White-Baker Ranch, which was big fun. Really cool.

MH:

Yeah, I haven't seen her in a few years now.

AW:

I haven't either. I call her and talk to her, the two of them. They're great folks. Well, what propelled you to get out of ranching and into wind?

MH:

So our family was originally contacted by British Petroleum, BP, to develop a wind farm on our family's property. And so at the age of nineteen, I started working with my grandfather, my father and great-uncle to negotiate this land-lease agreement. I guess we leased them about sixteen sections of land. Which, we're one of the fortunate people where the wind farm actually got built.

AW:

Did Paul happen to bulldoze the roads for you?

MH:

He may have.

AW:

He did a lot of that work for wind farms in the area, I remember.

MH:

In fact, we ended up getting the seeding job for our own ranch, which was nice. So after all the construction and everything else, we did that. But it took us—it took us three or four years to negotiate the agreement with BP, so by the time we finished, I was already well-versed in wind farm, leasing, and those types of things.

AW:

Were you going to college by this time?

MH:

So I just—well, there's one year in high school where this got started, and then I left and went to the University of Texas at Austin. I did finance and accounting and then I always knew I wanted to be an attorney [since] back when I was a little kid. So I applied for law school, got into Tech, went to Tech to do the energy program they had. I didn't even know about the wind program whatsoever.

AW:

Really? You came here for law school?

MH:

I came here for law school. I wanted to do oil and gas law as well as land-use planning and do those types of things. Very interested in a wind energy career, but I had no idea Texas Tech had a forty-seven year history in wind energy at that point in time. So I went into law school, I spent the first year just doing law school, because you basically go into a cave for the first—you know, for three years and then come out the other end, hope you're still alive. Second year I worked for Calloway Huffaker out of Tahoka, Texas. He's an attorney.

AW:

I know him.

MH:

I did wind farm leasing for him, land stuff. I was just getting my feet wet. And then I saw— actually, I was contacted by one of my friends at the law school who saw an advertisement on the Tech Announce e-mails or whatever it was for a wind project manager at Texas Tech. And so everybody knew I liked wind energy and I was really passionate about it. So I applied for the job during the summertime. I didn't have any other internships with any other major law firms or anything else, because most of the time in law school, your second year you get some sort of big job or big internship with a major law firm. Due to the economic crisis of 2008, all the law jobs had basically drained up. So I applied for the position right before I went on a fishing trip. I got a phone call back that day saying, We would like for you to come in, when can you come in? Well, I'm going on a fishing trip for a week. Can you wait one week, and I'll basically get started? Or I could come in and interview. So the following Monday when I get back, I interviewed for the job with Reagan Hales, who really helped get this program started.

AW:

Spell.

MH:

Reagan. R-e-a-g-a-n. Hales. H-a-l-e-s.

AW:

H-a-l-e-s. Okay.

MH:

I interviewed with her. I got the job the same day and I started working the following day. The project at that point in time was just a twenty-eight megawatt project. It was all federally funded by President Obama and was laid out in the budget, and it about twenty-eight million dollars was being allocated to it to build a wind farm with Pantex, which is NNSA in Amarillo, Texas where they decommission nuclear weapons.

AW:

Yeah, so at the Pantex facility?

MH:

Yes. So they were going to build the wind farm and tie it directly to the Pantex facility.

AW:

So the energy was not going to the grid, it was going to Pantex?

MH:

That's correct. And so the federal government would buy the power that's produced on their own site. At that period of time, everybody was wanting to do it, but nobody knew how to do it. So that's the first day, everybody explains the whole project, how it's federally funded, and I'm just going to help manage it and do things—

AW:

And pardon me—their knowledge of how to do it was technical, or was it organizational? The issue?

MH:

They didn't know either.

AW:

Yeah, okay.

MH:

Tying directly into a load, a consumer of that magnitude—we're not talking one megawatt—we're talking ten megawatts of power being consumed locally. There are going to be substantial issues with that.

AW:

Sure.

MH:

But nobody knew what—we didn't know what we were doing, to be perfectly honest. So now it's the second day. By nine o'clock the second day, we received news from basically the President—I forget who in the federal group told us this—but all the federal funding got pulled.

AW:

Wow.

MH:

So twenty-eight million dollars disappeared overnight, and it wasn't the Democrats, it was actually the Republicans, because they didn't want the federal government to get into the power business which I completely understand.

AW:

Well yeah, I mean, it's your constituents who are making money in the power business and you don't want the competition.

MH:

The whole reason Texas Tech wanted to see this move forward was to give their researchers access to real-world data from operational wind farms. That was the entire purpose of this. And to put our flag in the ground, saying we're the best in the world. So third day comes around, I don't know if I'm going to have a job at this point in time. I was working for David [L.] Miller, who was the then vice-chancellor of technology commercialization within Texas Tech University System. And so Reagan and I reported to David. So David and I get pulled into a meeting, he brought me along just because my background with BP and the wind farm my family did. We sat down with the Chancellor, Chancellor told David, "Well, this isn't going to work, so figure it out. How are we going to do this?" So David, after we got done, we went back to his office and he goes, "Mark, figure it out."

AW:

(laughs) This is day three?

MH:

This is day three. And so we spend the next two months going over a scenario. Within the first two weeks I told David and some other people at Tech, "There's no way you are going to be able to operate your own wind farm," because that was the goal. You got to have—

AW:

It would be a Texas Tech-owned farm?

MH:

Yeah, a Texas Tech-owned farm. The problem with that is, at that time we need federal tax incentives to make these products work. Well, you lose all the federal tax incentives if Texas Tech has an ownership stake. So that wasn't going to work. I couldn't very well take that news back to Texas Tech, so what I told them is, "You can't own it. But why don't you create a for-profit company outside the university to do all your work for you and make sure that its board's been stacked in your favor but you don't legally control it and you just let it do it for you?" Nobody ever proposed that before, as far as I'm aware. And at that point in time, Texas Tech, all that they cared about was not only this, which was getting real-world data for the researchers, but it was becoming Tier One. How are we going to become Tier One? So David takes the plan back to all the upper administration people, saying, "We need to create a for-profit company to own these assets and to develop it and we're going to go out and we're going to find funding from the Texas Emerging Technology Fund, which the system has great relationships to mainly due to the governor. We're going to compete for the money, we're going to win ETF money and then we're going to build and then we're going to just move." And David, he is a real venture capitalist. He's an entrepreneur. It's amazing he was even within the university.

AW:

Yeah, I was going to say, he doesn't really fit the mold.

MH:

No, he didn't. Once you get something in his mind, that's it. We're going to do it, come hell or high water. So we were basically told by upper administration that okay, we'll believe when we see it.

AW:

Now, Kent Hance was chancellor?

MH:

Yes, that's correct.

AW:

Well, this seems like something that probably is right up his alley.

MH:

He's the one telling David Miller, move. Figure it out. If it wasn't for Kent Hance, or Chancellor Hance, pushing this, it never would have happened. Because when you think about it, the university is going to create a for-profit company outside the university that it doesn't legally control. Universities don't do this.

AW:

No, and I was just going to say, especially when there's development money involved. I can see how difficult this would be to sell past development and deans—

MH:

So the decision was—basically, everybody said, great. Nobody believed we would ever be able to do anything.

AW:

I was going to ask, is that the reason they were happy to give you your opportunity because they didn't really think it would happen?

MH:

Well, they weren't putting in any money. They didn't think it was going to work at all. So they said, Okay, we'll let you do it, because nobody believed we could actually do it. At that point in time, the Wind Science Engineering Center was the multi-disciplinary research center that's been in existence now for over forty-seven years. That center basically had been working out of Reese

for a very long period of time, trying to get a wind turbine manufacturer to use the site but they never did. And there wasn't enough room to deploy a wind turbine. And it would ruin the other assets out here. So at that time, David Miller and I started talking with the Reese Technology Center to see if we can go ahead and get another land-lease in place. And so they were open to it, they said maybe four turbines. We generally had an idea of everything. Once again, nobody believed we could do it, but we set up the structure we thought we could execute on. So we made the application to the Texas Emerging Technology Fund in January of 2010. And we're still continuing all these different discussions. We applied for it, we got letters of support from different entities. We had no idea what we were getting ourselves into. And then I guess it was April or March came around and we got a call from Alstom Power Inc., which, they're a French company that bought a Spanish wind turbine manufacturer.

AW:
How do you spell Alstom?

MH:
A-l-s-t-o-m. And they're a major international company valued at over twenty-two billion dollars and they were getting into the wind business. So they'd already made the decision to build a manufacturing facility in Amarillo, Texas to manufacture wind turbine parts for the North American market, for Canada, Mexico and the US. But they needed a good research partner, and they needed to deploy two research turbines to be certified to what is known as the IEC standards. They didn't have a place because there aren't many places you can employ a certification turbine in North America. There just aren't.

AW:
And why is that?

MH:
Nobody knows what they're doing. I mean, this is back in 2000 and—

AW:
It's not an issue of not having the wind, it's having a place where people know what to do with it?

MH:
You have to have a combination of things. One is good wind. You need good wind. You need low environmental impact. You need the ability to transport power and sell it. So those are two different issues. You got to have FAA approval. It may seem simple to have all that, but it's very, very rare to have every single thing and be able to deploy it in a short period of time. So Alstom at this point wants to—they got to have this thing up and operational August of 2010.

This is April. This is April.

AW:

Yeah so four months.

MH:

Yeah. We don't even have a land-lease agreement signed. We don't have anything done. And so we sign a non-binding letter of intent with Alstom. This is David Miller and I. They send in their legal counsel, the product managers and we sit in a room basically for a full day and negotiate the full agreement. The following week I remember going into a meeting with all the upper administration people. David had already called ETF and said, "We got this project, why aren't you approving this thing?" And we went back into the meeting, after ETF says, Yes, we're going to find a way to get this thing done, which is an eight million dollar award to the university, or 8.4 depending on how you look at it. And we also put on the table a four million dollar research agreement with Alstom Power Inc. which an additional million worth of pure research with the university over a three to five year period. And everyone in the room is like, well, we kind of have to do this now. But nobody knew—I mean, we didn't know what we were doing. We got everything done in four months. I graduated from law school on May sixteenth or somewhere in that realm, started working the next day, studying for the bar about forty, fifty hours a week and I was project manager for the Alstom project for forty to fifty hours a week, so my summer was a complete nightmare.

AW:

That doesn't leave many hours in the week.

MH:

No, there was no hours. I remember getting up at five o'clock in the morning, studying until probably eight, going into the office, working usually through lunch until about six or seven-ish, going home, study until eleven, go to sleep. I did that for about two to three months until I finished the bar exam. I was very thankful to finish the bar exam. And I passed the first time through so I was very happy that it turned out that way. But we got that Alstom project done in four months.

AW:

Where were you officeing then?

MH:

I was officeing with David Miller in the office of technology commercialization. And then we received notice in the middle of the summer—actually, it may have been May after we showed them the Alstom contract that we were going to be approved by the ETF for this eight million

dollar award, two million of which goes to NIRE, Group NIRE, to basically—it's their start-up money, to get started. Do all that fun stuff.

AW:

Real quickly: what is Group NIRE? What is the acronym?

MH:

NIRE stands for the National Institute for Renewable Energy.

AW:

Right, okay.

MH:

But we go by Group NIRE because nobody wants to say that. And even in the industry, we're known as Group NIRE—it's gotten to the point now that nobody even asks that question. So we did the Alstom project, four million dollars project in less than four months. Everything got routed through the university. And I can say with absolute certainty: had it not been for the creation of NIRE as well as this four million dollar expenditure, which got routed through the university, Texas Tech would not have been Tier One. We got all four million dollars in within both the academic year—I don't know if it's 2009 or 2010, and the following year. All four million dollars were spread equally over those two years. Had it not been for that, the university would not have been able to get Tier One. It was that critical of a project, because I believe the first year and the second year, had we lost a million here or there, that would have been it. So Texas Tech did it. We did it in a heartbeat. And then Group NIRE got formed, so we spent the next two to three years trying to explain to the board of regents what is NIRE, which they approved four months earlier. Everybody was moving so quickly because we had to get the money, we had to reach Tier One status. Nobody knew what we had created. But David Miller and Reagan Hales were involved from the very beginning. And then I worked under them, so we had a very small team basically working on it. During the summer—

AW:

Did that help?

MH:

It did help, but then we had to start explaining stuff to people, because nobody understood what we had done. In fact, we fought for two and a half, three years within the university to explain why, because at this point, everybody was like, Thank God, we did it, but wait, what have we created? And everybody was scared.

AW:

Yeah, and how do we control it.

MH:

How do we control it? The point that I made was, every time you try to control it, you take up more liability. You need to get as far away from us as possible. Let us function like a for-profit company should, because what ended up happening was I got spun out of the university and into NIRE whenever I graduated. So I spent probably nine months within the university getting everything set up and I got spun out into NIRE itself. And so I've been working there now going on four years.

AW:

And Reagan and David, where are they?

MH:

Reagan is now in Amarillo. Her husband graduated from law school. They're in Amarillo and he's working for a law firm. David has returned back to private industry and he's doing some venture capital activities or entrepreneur-type things.

AW:

Is he living—where?

MH:

I believe Abernathy is where he lives now.

AW:

So this area?

MH:

Yeah.

AW:

When you get a chance, if you could give me some contact information, I'd like to see if they'd be willing to talk about this. It's a very exciting story.

MH:

Yeah. It's nuts. No one knew what we were—nobody knew what we were doing.

AW:

Well, universities aren't well-known for being able to move like that.

MH:

No, they're not.

AW:

Of being very nimble. And so the whole of this—I mean, to me, having listened to people talk now for a couple of years about wind and Texas Tech, everything about this is unusual. I mean, it's a bottom-up program for a long period of time, which is very unusual in universities. It's inter-disciplinary, which despite the talk, is still pretty rare in universities. That's unusual. And then here's NIRE, which is—

MH:

It's a for-profit company outside the university.

AW:

And then it happened in four months. That is also very, very unusual.

MH:

So we did the Alstom project. We provided basically a four to five million dollar benefit to the university within the first few months of us being formed. We did Alstom at lightning speed which nobody could have expected. And really, what Group NIRE does, it does all the activities that have to be done for wind turbine projects, which the university and [inaudible 0:20:34] can't do. Which led into the next big project we got put on, which was the Sandia National Labs SWiFT project, or Scaled Wind Farm Technology Facilities, SWiFT. SWiFT has now turned into an eight million dollar expenditure using DOE and private money, which is out here at the Reese Technology Center.

AW:

Okay and what kind of a project is it?

MH:

We install three smaller-scale turbines, so about three hundred kW. The Alstom turbines are 1.67 megawatt turbines. So we've got these three turbines, heavily instrumented, they were done very uniquely. They cost a ton of money. It's unbelievable how much they cost. And—

AW:

And is that because of the instrumentation to measure what's going on with them?

MH:

And also we had to basically gut all the controllers in the turbines and re-design everything.

AW:

And where are these turbines erected?

MH:

So they're erected on Texas Tech's leased land, which is on sixty-seven acres that they've owned with the National Institute for a long period of time now. Whenever we did the Alstom project, NIRE leased our own land from the Reese Technology Center and that's where we deployed it. We've also at this point leased over four thousand acres of land adjoining the Reese Technology Center for future growth which we'll have additional announcements within the next month or so about what we're doing at that property, which I can't discuss at this time period. But we did SWiFT, and Group NIRE, we weren't really going to be a big part of the grant until Tech and Sandia ran into pretty big issues, which was the interconnection agreement and the power purchase agreement. A national lab and a state institution, a governmental entity, cannot execute those agreements. They can't legally do it. So what they ended up doing is basically paying NIRE to do all the studies and everything else and we ended up losing probably fifty to a hundred grand on that project, but we did it because it was a benefit to the university and it's the right thing to do. Then Sandia brought in Vestas, which is a large wind turbine manufacturer. And Vestas, they didn't have personnel to basically build the project. So they contracted with NIRE to construct their entire turbine. During the construction phase, we were heavily involved the last month and a half with the project construction-wise. So we were providing construction support, I was acting as project manager on that project, working for NIRE at this time. And I was the director of commercial development during this whole period of time that we were basically doing all the work. So we did that project at the same time we landed what's known as the utility scale battery project here at Reese. So we've actually got the only utility scale, which is greater than one megawatt battery, deployed on our system.

AW:

What technology does that battery use?

MH:

Lithium-ion technology. So if you've got a cell phone, like an Apple, there's a one-third chance that you have a Samsung SDI lithium-ion battery in it. What they've done, Samsung, they basically stack these batteries, stacked it, basically packaged it a certain way, but it's the same technology that's in your cell phone. And what we've done, all those batteries work in connection with each other. And it's in a container. And that's what it does. I mean it's unbelievable technology.

AW:

Yeah, because these produce heat.

MH:

They do. We have air conditioners running twenty-four hours a day and the vents going.

AW:

Of course, the interest is that that kind of battery technology can be made commercially available.

MH:

Um-hm. And we're doing the research to make it commercially available. In fact, we're already being paid by utilities in Hawaii, Italy, to do tests on our battery system to prove out the technology before they'll use it. Batteries don't just store energy, and then discharge during the daytime potentially when wind power's not—they provide frequency regulation, they stabilize the local electric grid—the uses of these batteries are far greater than what we originally thought they were. But we're the ones testing it all out. And no one else has it.

AW:

Yeah, I was really interested—I've forgotten all my high school physics. I got to interview Phillip, who's behind Tres Amigas switch, and what an education on how difficult the grid is in terms of things like the frequency-matching of the power sources. Where they're doing the AC/DC switch, your battery would do some of that same thing, right? Get the frequencies—

MH:

It does frequency regulation, and it does it within three cycles. So the electric grid in the United States, in North America is operated at sixty times a second, it's on the sixty Hertz market. We can respond to any grid event in three cycles when the battery's in automatic mode, which means you and I don't have to touch a button to make it work. It's already programmed to adjust, change, do things that the other entities, the other traditional sources can't do. So it's very interesting seeing that technology deployed out at our site, and that's a 2.2 million dollar project. And a lot of what I've been mentioning—you've got Alstom, which was four million fully erected, you've got eight million dollars erected with Sandia, so that's twelve million, you've got the battery, which is an additional 2.2 million. That's not even including the amount of research that's been done. We've done over 2.6 million dollars-worth of research since 2010.

AW:

Okay. Let me understand. So when NIRE does research—

MH:

We sub-contract the work to the university.

AW:

Got it. I wanted to make sure I understood that correctly.

MH:

We don't do research per se, we let the researchers at Texas Tech do the research. We let them focus on that and we do everything else. And there's a lot to be done 'way outside of that, and that's where my area of expertise comes in. I'm an attorney. I don't have an electrical background. I don't have an engineering background.

AW:

But you also have a finance background from your undergraduate?

MH:

I do have finance and I've been very fortunate to work with some of these major researchers at the university like Dr. Giesselmann, Dr. Bayne, Dr. Schroeder, Dr. Swift. Dr. Ancell, we have—we've got so many researchers, it's unbelievable. I've been lucky enough to work with these research groups for over three to four years and I've been able to learn what they do. So it's been very helpful for me at least to understand what the technology is. So we did these projects, got the battery, and then we were approached by Gamesa to install a two megawatt turbine.

AW:

By who?

MH: Gamesa? G-a-m-e-s-a. Which is also a Spanish company, an international company. And that's a six million dollar project deployed here at Reese. So we're over twenty million dollars invested since 2010.

AW:

That's quick.

MH:

Yeah, it's a lot of money.

AW:

Let me stop just a minute and change the battery if I might.

MH:

Okay.

AW:

Good. All right, this is Andy Wilkinson back with Mark Harral and new batteries.

MH:

Okay.

AW:

So are we kind of caught up to where NIRE is at the moment without these new things that you have yet to be—

MH:

So we have signed two agreements at this point in time. One of them is to deploy another wind turbine out at Reese, which we announced—it's in our contract at the end of this week. I mean, we're being paid to do the work. That's about a four to five million dollar project with one of the largest US manufacturers of wind turbines. That's going to be a big, big thing for Texas Tech.

AW:

What's going to be the use—what will Texas Tech do with this particular turbine? What's the object of having it?

MH:

The object is to provide the researchers access to data and also bring these companies here to Reese. See, Group NIRE does not mandate they do research with the university. We don't mandate that. But—and here's why we don't: if they're here at Reese, in Lubbock, they're substantially more likely to do research with the university, with Texas Tech University and the National Wind Institute than anyone else.

AW:

Right.

MH:

Because they've got people on the ground. You can do more research in Lubbock, year-round than you can do anywhere else. Because of the wind conditions we have here.

AW:

Sure. And you've got the infrastructure, you've got the university, you have a place you can fly in and out of, you have all the other kinds of things that you would want to do if you were doing research.

MH:

Yes. And the big thing we have, and the reason we've been able to gross so substantially is not just because of Group NIRE and Texas Tech's researchers, it's also due to South Plains Electric Cooperative and Golden Spread Electric Cooperative. See, Golden Spread—

AW:

This is pretty interesting. How do these two co-ops, and they're related, they have a relationship, correct?

MH:

Yes they do.

AW:

So how does that make this more attractive?

MH:

What we do with our generation assets, we sell power to Golden Spread Electric Co-Op, and Golden Spread sells power to South Plains Electric Co-Op who then takes the power and provides it to the local customers. So all the power we produce is consumed locally in this distribution network of substations and homes and schools that are all in the South Plains Electric Co-Op system.

AW:

Now, Golden Spread is in the Southwest Power Pool? Not in ERCOT?

MH:

Yes, they're actually in both.

AW:

They're in both?

MH:

And so is South Plains. But we provide power to the SPP, which is the Southwestern Power Pool market. But we're doing research now with Golden Spread and that is just nuts.

AW:

Golden Spread seems to have taken a bit of a lead amongst particularly co-ops but utilities in general in terms of investigating and getting their feet wet in wind energy, correct?

MH:

Yes. In fact, the first wind farm deployed on their system was here at Reese. And then they've purchased several different other power purchase agreements with other wind farm operators recently. They've got their own natural gas generation facility, both combined-cycle and simple-cycle. And they've also installed a 150 megawatt quick-generation natural gas facility, which means they can produce—it can go from zero production to 150 megawatts in five minutes.

AW:

Now, that's not the Antelope [Power Station]?

MH:

That's the Antelope. That's the Antelope. It's a quick-gen natural gas plant.

AW:

Right. I got a nice interview with South Plains on that when they were just getting ready to put it online.

MH:

And so our wind turbines here and the battery are actually inserted into all of this generation mix.

AW:

So the battery's actually working?

MH:

Yes.

AW:

It's not just here to be looked at.

MH:

Everything we do is being looked at and is connected to an operational system. And so, if we—

AW:

Now, is that unusual amongst research centers?

MH:

No one does that. The only people who do that are South Plains, Group NIRE, Texas Tech, and Golden Spread. To be perfectly honest, we have the most unique setup to advance projects than anyone else in the country right now. Because nobody has the ability to put power in the electric grid and provide power to the local distribution system without going through a year and a half

to a two-year-long process with the SPP [Southwest Power Pool] to interconnect their system. We're able to bypass that, which no one else can do.

AW:

No. In fact it strikes me in the interviews I've done that the regulatory side may be a far bigger impediment than the technological side.

MH:

It's huge. Yeah. You know, we've never had a technical problem out at Reese before. But the regulatory market, and that's why I'm now I guess the CEO of the company, because it's my job to get us through the regulatory process. And it's a nightmare. And it's changed a lot since 2010. And we're only in 2014. It's been an interesting four years to get to this point.

AW:

Yeah. And I was going to ask what is your current status and you just told me, CEO. How's the rest of the company structured?

MH:

So underneath me I have—right now it's just me and Julie Banderas, who's my office manager. And then we have a lot of contractors that I contract work out to. In the next six months, we're adding three full-time people and we're going to start adding people now that we have the funding to basically support ourselves. So there'll be a project manager who's more on the technical side, there will be a project manager who's got more of a legal background, and then we're also going to have a person who is really, really technical with a PhD to assist us with the activities we're doing. But right now we have more work—we have more work to keep us busy now than we've had in the last three and a half, four years.

AW:

You mentioned, when you were talking about creating it that it was independent, but with a board that could be—I think the word you used was influenced by Texas Tech. So how is your board organized—where do your board members come from, what is the ownership like in a company like this?

MH:

So Group NIRE is the for-profit company. Group NIRE has three board of directors. Those three are not Texas Tech employees. They're completely separate. They may have graduated from Texas Tech, here and there, but they are separate and apart from the university.

AW:

Like, they're not professors?

MH:

They're definitely not professors.

AW:

Right, in the engineering department or something.

MH:

So Group NIRE, the ownership structure is very simple. It's one hundred percent owned by the National Institute for Renewable Energy, which is a separate organization, non-profit. That organization was originally intended to do everything a for-profit company does. But we learned early on that wasn't going to be the case. So all the work now gets down in the for-profit company, as it should, to comply with all sorts of different laws and everything else. But the institute still exists. It's almost like—it's a governing board, the way to think about it. There are five board of directors. John Schroeder is one. The vice president of research at the university is the other one. You have Jodey Arrington who's the Vice Chancellor for technology commercialization, or they've got a different acronym now. Russell Thomasson is on the TTU system and he works for Jodey in that office. I believe he's responsible for corporate engagement. Yeah, the office of corporate engagement on the system side. And then you have Bob Stafford, who's a former board of regent of Texas Tech who also sits on that board. That board, they have their own duties of loyalty to the institute and to Group NIRE. So when they sit on that board, they're not Texas Tech employees. They have a completely separate responsibility, they have their own insurance that's provided by Group NIRE, the institute that covers them for their own decisions. They provide advice and they appoint the board of directors of Group NIRE, who then give me instructions. It's separate corporate structure. So we have a close affiliation with the university, but we act as a for-profit company. Now the question that normally comes up is who owns what I call the institute, the National Institute for Renewable Energy? Which I call The Institute. Who owns it? Nobody does. No one owns it whatsoever.

AW:

This is almost a "something out of nothing" story.

MH:

Well, it is. It's completely different than anything anyone's ever done. But the institute, nobody owns it. And if no one owns it, nobody requires a dividend or a return on investment, which means that allows Group NIRE, even though we're a for-profit company, we don't have to provide dividends back to anybody which means we can do projects cheaper than anyone else in the country, which makes us extremely competitive. And that's—

AW:

Yeah, you may have operating costs that you have to deal with and commitments that you make

in your projects, but beyond that you're free to do what—

MH:

Whatever we want. With board approval, obviously. In fact, I've got a board of directors meeting tomorrow which I'm preparing for today. But the whole structure is completely different.

AW:

Yeah, it's a very interesting, very interesting structure. Surely people around the nation, around the world have set up and taken notice about this way of going about doing business. This has got to be a model for people to—

MH:

Yes, well, universities have a hard time adopting this model. Because whenever we started back in 2010, the goal we had, besides reaching Tier One was—we have to beat A&M, because A&M had their own wind program that was getting off the ground also. We had Alstom, they had Gamesa that was going to be doing a project with them. We started off on the same page, so everybody, we have to beat A&M. That was the goal. We had to be bigger and better than A&M. We bypassed A&M in less than a year. They never did the Gamesa project. In fact, Gamesa came to us and is now working with us because they could never get off the ground with A&M. So then the goal is, well, who else do we have to beat? I mean, how do we become the best in what we do? So the goal was to be bigger, quicker, and faster and more efficient than the National Renewable Energy Lab site which is in Colorado, which they call the National Wind Technology lab.

AW:

Was that the one at Colorado State?

MH:

Maybe. They partner with Colorado State's NWTC.

AW:

Because earlier they were a partner with Tech, they were doing wind tunnel and Tech was doing on-the-ground with the building.

MH:

Yes. So Colorado State and NREL actually have a field site. Problem is the wind turbines there will produce power probably fifteen percent of the time. If you come to our site, you're producing power forty-two percent of the time with the old technology. New technology we're deploying, we'll be producing power 55 percent of the time. We have great wind here. And that's one of the huge advantages we have over every other site in North America. Nobody can

touch us on our wind regime. The other big benefit we have it we move extremely quick and we are much cheaper than the alternative. The next turbine vendor we're going to be deploying out here is a two point five megawatt turbine. If they deployed it anywhere else it would take them two years. We were able to do it in ten months.

AW:

That's a huge difference.

MH:

It's huge. And so people come to us because of our speed.

AW:

Yeah, and especially in a market where conditions change so rapidly.

MH:

They do.

AW:

I mean, economic conditions change so quickly.

MH:

Yeah. But right now with the announcements we're going to be making in the very, very short term, we've even bypassed NREL. We're larger than NREL is.

AW:

Really?

MH:

From a turbines deployed standpoint. We are larger. And there will be an announcement, we're hoping, we're crossing our fingers that the deal gets signed, which it should, everything looks really good. We will not only bypass NREL, because the next one will be RISO, which is in Europe, which has I think fifteen wind turbines deployed or something else like that. We will bypass them by a factor of three.

AW:

Wow, that's a big difference, too.

MH:

It's huge. That will make Texas Tech and Group NIRE the world leader in renewable energy research facilities. So—and the only reason I wanted to mention this now is because it looks as

though—I'm 90—95 percent confident it's going to move forward.

AW:

Well, no one's going to hear this until you're ready for them to hear it.

MH:

No, it's fine. I don't care. But the goal has always been we got to be bigger and better than everybody else. And we're very, very competitive and we're a for-profit company so we can be competitive.

AW:

What do you see as the future?

MH:

The future, so long as I'm CEO of the company, which no risks on that after this past year. I want to expand beyond wind.

AW:

Into?

MH:

Well, we're already involved with battery. Grid management systems is another activity I want to do.

AW:

Yeah, because one of the things—I know that I've heard in these interviews is that we have a grid management system that is like—it belongs in the Third World. Here you have the United States with this enormous opportunity because of our geographic spread over the progress of the sun from one coast to the other that we could be doing such a remarkably good job utilizing solar and wind renewables if we could move the power around. But that's the problem, right? Moving the power.

MH:

Well, moving the power's one. Using the power is the other issue and then predicting the weather is the other huge issue. I mean, there are all sorts of different things happening here. See, you have grid management of what I consider what's known as a virtual power plant concept. You have multiple generation assets working in sync twenty-four hours a day. It's not even twenty-four hours a day. It's sixty times a second. We're getting to the point now with the electric grid, we can no longer operate the electric grid on SCADA data, which is two-second data.

AW:

What is SCADA?

MH:

Supervisory control and data acquisition is what SCADA stands for. But—

AW:

And that's say, within the Southwest Power Pool that is how they measure the data?

MH:

That's across the entire United States. It's not just SPP—

AW: Well that's what I mean in the individual grid, that's how they're looking at the—

MH:

Yes. And the way to think about it is this: if you're driving down a highway, it's like—you've got your eyes closed and you blink and you open them and shut them every two seconds. And you're driving based upon every two seconds worth of data that you're gathering. The likelihood of getting in a car accident is substantially higher at that rate because you're not seeing what's actually going on. The only way we're going to reduce blackouts that you see in California, that you saw in 2003 in New York, which the state of Texas has come to very close to having blackouts on probably three or four occasions over the past six years, the only way to resolve that is through the use of data systems that are looking at the electric grid thirty times a second.

Thirty to sixty times a second you've got to be monitoring the electric grid. And you've got to have actionable data coming to you. You've got to be able to make smart decisions.

AW:

So a factor of up to sixty times?

MH:

What we're currently doing.

AW:

Yeah.

MH:

And the moment we start changing the way we manage the electric grid to do that, we are opening ourselves up to for not only blackouts, for cybersecurity attacks, and everything else. So part of what NIRE and Texas Tech are really pushing, we want to do grid management systems, not just the software, not just the hardware, but the cybersecurity aspect. Because I can tell you

right now, our electric grid system is being hacked.

AW:

Well it's amazing to me that no one is talking about not only electric power, but water utilities, natural gas delivery, all those things which are—you drive around and see a transfer station with a chain-link fence around it and half the time, the locks aren't even on.

MH:

Yeah, nobody's there.

AW:

It's amazing—how much energy we expend at airports and we're not doing anything to speak of.

MH:

Yeah. Well and another thing we have the first—what time is it?

AW:

11:09.

MH:

Good, because that clock's off by an hour. We already have a research project with Intel and McAfee. We are helping to test their next-generation cybersecurity initiative. If it passes our test, it will most likely be deployed on ERCOT, which is the rest of Texas. So we're testing out ,using real-world data that we're gathering form the electric grid, to see if it's sufficient enough to work on an actual grid, a larger one.

AW:

In the future, will NIRE expend as much energy and interest on the political side?

MH:

I try to stay as far out of the politics as possible because the moment you start getting drawn in to the politics, you waste time. And so what we typically—I do consulting all the time, but our primary focus is to do big projects. If a project is less than probably two hundred or three hundred thousand, we don't even look at it anymore. Because in order to justify our time and Texas Tech's time working on a project like that, it's got to be several hundred thousand if not millions of dollars at stake. And we do construction. We do regulatory. We do do regulatory, but it's getting through the system, more from a legal standpoint.

AW:

That's using the system that's there and not the discussions about how do we alter the system?

MH:

Yeah, and we'll provide technical expertise to that, but I try to stay as far out of the actual political drafting of those documents as possible because there are people with far more money than us, they're going to end up getting their way. So it's better for us to spend our time working on what we can change and what we can control. And the only thing that we can control is complying with utility regulations and with complying with contracts and just moving as fast as we possibly can. That's just what we do.

AW:

What do you see the future like for Mark Harral? What are you interested in?

MH:

Very good question. I get asked that question a lot by my board. Whenever I took over the company, there were a lot of issues that nobody was willing to deal with. So it was my job to fix the issues.

AW:

Yeah, issues like—

MH:

I can't even discuss those issues. Corporate structure. Corporate expenditures. Corporate—not producing anything. You know, where is the money going to come from? There were no solutions to that. When I took over the company, we had about ten thousand dollars in our bank account, which we had no idea whenever I took over, me and the accounts person, she knew about it, but she didn't know why it was in this state. So we basically had to rebuild the company from scratch over the past six months. And there are two different sides of our business. One is the R&D activities, which I was in charge of. So the actual projects that we've covered so far today, batteries, Sandia, Alstom, Gamesa, all these projects were on one side of the books. There's another side of the business, which was trying to raise money for large commercial projects. That project, or that side of the company was not producing anything and it was actually dragging down the rest of the organization. So the board of directors made the decision to basically cut what wasn't working and refocus on what was working. So it's been my responsibility to fix or get the company in a much better state which as of this week, we've come further in six months than we have in three and a half years, from a corporate standpoint. We've got more things going on now than honestly we could have ever anticipated. And we always hoped we'd be doing this four years ago, but all of our goals four years ago, every one of them is now proceeding forward and it's marching through. And here's the kicker on the whole thing: we're now off of federal and state money. Group NIRE is fully funded using private money. And we don't get a stipend from the university. The university can't pay us to do anything. So we've got to sustain ourselves on our own. So our corporate structure's even changed some, where we

focus more of our time away from projects that aren't going to generate income for us and we focus on the for-profit ones that we can actual control the activities. But as for what I—right now, I'm very content where I am. What I want to see is for NIRE to be on a very strong footing, which we should be there in less than two weeks.

AW:

I guess what I was maybe more interested in was—is this part of the world now, renewable energy, is that something that's really of interest to you?

MH:

Um-hm. In fact, I've even been retained as an expert witness—and I'm only twenty-nine years old — I've been retained as an expert witness on a ninety-six million dollar lawsuit on why wind turbines are failing on a wind farm. I represented the—

AW:

What side?

MH:

Manufacturer.

AW:

Manufacturer.

MH:

So me, Dr. Swift, Carsten Westergaard who is a new researcher here, he wasn't working for the university at that period of time, and then Jamie Chapman who's a former researcher here, we all got retained by the same manufacturer and it was our job to look at the field data. What does the field data show us? The manufacturer implemented a lot of changes because they noticed failure rates were occurring. We had to give our opinion about whether those fixes actually fixed the problem, whether it reduced the failure rates. During that—I mean, it was seven-day event. I've never seen anything like that. And it had always been my hope to actually see what was going on behind these warranty disputes because that's not something that ever gets publicized.

AW:

Nobody wants to talk about it.

MH:

Nobody wants to talk about this, especially—

AW:

On either side.

MH:

On either side. So we got retained by the manufacturer and we went through a three month, four month process of learning, analyzing data, putting it out there. And so when we went to trial, we had—I'm an attorney. I'm not an engineer. You can look at my resume. You can see I've done product management. I've been involved with certifying wind turbines out at Reese. I'll say eight days before trial the attorneys for the manufacturer, they go, Look, we really need to consider giving up a point, because there are three parts to this case. One of them was whether the turbines were properly certified to the IEC standards, the other one was whether the fix worked, and the last one was whether the blade was designed properly. Well, eight days before trial, the manufacturer, the manufacturer's attorneys, all their expert witnesses, all the manufacturer's employees, they couldn't read their own certification documents. They didn't know how to understand these documents, because this is four or five years post. And it takes three to four years to go through the certification process. So you're looking at eight years' worth of data. Over probably two-thousand pages worth of documents. So I get down to Houston. This is where it was all going on. Their attorneys said, We need to give up on this point. We've got to re-focus on getting ready for trial on Monday and we've got to do this, and this is Friday. And I sit down and I'm at one end of the table and I just—I go, "I don't understand why you are so freaked out about this. I can draw it out for you why and how you got certified. This is what I do for a living." Because they never asked me to focus on the certification of their own turbine. I was retained to look at the failure rates. And so eight days before trial—and I drew out everything on a big board. I go, "This is how you get to them and you start at the turbine supply here, because I'm an attorney, so I know how to look at there, and it specifically states the standard by which the turbines should be certified to. I can track every single line through over two-thousand pages." And I read it all the week before. But I wasn't supposed to cover that part, so we're three days before trial. I've now become the IEC certification expert on a ninety-six million dollar lawsuit. We are very fortunate because the experts we were going up against, they are model people.

AW:

No data—modeling?

MH:

Yeah, they don't use field data. They don't use field data. They do modeling and simulations on computers and software. That's all they do.

AW:

Yeah, I would think that having real data would be a real step up.

MH:

Yeah. And we beat the crud out of them for seven days straight. We beat them to a pulp. It was unbelievable. But the thing that ended up happening during the trial, their experts took the stand first. And this is an arbitration hearing, so you have an arbitrator who's a sailing expert and did construction and all these other cases before. So he understood wind a whole lot better than you would expect him to. So their experts come in with these fancy modeling and everything else. They start talking about how the turbine wasn't certified to the right standard and how it should've been certified to this other standard. Well, because I basically gave our attorneys—the manufacturer's attorneys — all this pathway, they sat their experts down and started from the very back of the document. I mean, this very, very first document eight years prior. Walked them through step by step over twenty different documents and finally got to the turbine supply agreement. And they go, "Now you said that this turbine was certified to the wrong standard. Have you even looked at the turbine supply agreement and the warranty agreement?" And the guy goes, "No I haven't done that, it doesn't matter." "You don't think it matters?" He goes, "No." The attorney slaps down the turbine supply agreement, turns to the page, makes him read—here's the funny thing. He made that expert—quote, unquote, expert — read everything into the record. The expert read every sentence. And this is over twenty different documents. When the turbine supply agreement was slapped on the table, he read it and it specifically states that it is applied to this standard. He didn't know what to expect. I mean, everyone on that table on the developers' side, they didn't know—none of them had made the connection.

I thoroughly enjoy wind energy quite a bit. It is mind-numbing sometimes because of the ups and downs and everything else. One thing I'm doing, I'm focusing the company on where our strengths are. Our strengths are what we do out at Reese. It's the relationship we have at Texas Tech University. It's our speed. The way we're able to move at business. It's data-driven.

AW:

Yeah, I was going to say, it strikes me that the real difference is the data.

MH:

It's the approach to data. Some people—you can get all sorts of data from simulations and modeling, but it's the field data that matters.

AW:

Right. The real-world data.

MH:

If models and simulations don't track field results, they're worthless. And Texas Tech and Group NIRE's strength is that we focus on the field data which most researchers and most companies, they don't—they've hired people who are used to doing modeling.

AW:

And also it strikes me that the problem with the other approach is that when you do wind up having to deal with field data, it's always in a contentious circumstance because whatever modeling provided has failed and so now you already have money invested and there's going to be a fine. Whereas you're looking at the data to start with.

MH:

Yes.

AW:

At the beginning of the process.

MH:

Yes.

AW:

It's a very different thing.

MH:

Well, and the other big thing that Texas Tech has going for it right now, and you'll talk with John Schroeder at some point in time—Texas Tech has a unique ability to actually see the wind.

AW:

You were showing me some of those examples when we walked through.

MH:

It's the Ka band radar technology, which has been used with hurricanes, thunderstorms, tornadoes ever since they were formed. That's why they were created. So they've been upgraded and upgraded, and now they're being used for wind farm purposes, for wind energy purposes. So the wind, you can't see the wind. You can always feel it. And so everybody's been doing these models and simulations, assuming wind does this, this, and this. All of them are wrong. We have the only technology in the world that can actually document every nine meter block of wind speed. This is a cube. Every nine meter cube across ten to fifteen thousand meters from ground to two hundred meters height across the entire rotor-swept area. No one else in the world can do that.

AW:

Wow.

MH:

So we can actually see the wind and see exactly what it's doing in an entire wind farm. No one else can do it. And Texas Tech's wind program is benefiting substantially from it. I also teach at the university. I teach the wind law course and some other courses.

AW:

In the School of Law?

MH:

No, actually in the National Wind Institute.

AW:

Oh, okay.

MH:

So I teach for the program. We got a hundred and thirty-five undergrad students.

AW:

That seems to be also a real strength of this program, having the degrees and the students.

MH:

We have undergrad students, which that's a relatively new program, three years in the making. Three or four, maybe. We got the PhD program, which is what we started with, which was the right approach to take. That way we have TAs, we've got everybody else for the undergrads. But what blows my mind about the students in particular—our students—I kept track of probably six or seven students that have graduated because it's still a relatively new program. These people, on average, with undergrad degrees are making over eighty grand a year, starting salaries as project engineers for construction companies, for engineering companies, for developers. They're making more money than I think engineers are making to some extent. And they're not engineers. But they have this multidisciplinary approach to things. It's unbelievable. I never would have imagined the students that went through our program, especially the very beginning ones, some of them had a real hard time getting through the program, but even those students are now making tons of money. And the unique thing is that these students are now in the workforce in still relatively new industries. The wind industry is not mature.

AW:

Oh, no.

MH:

And so our students are working for all these companies. And they are literally—

AW:

Which shows the footprint of Texas Tech is going to get larger.

MH:

It's going to be huge. If you give it three more years, I can almost guarantee you our undergrads will be in almost every major company in the wind industry across the United States. For example, Blattner Energy or construction, they have hired three of our graduates to work for them on transmission lines, on wind farm construction, on solar arrays. Our students are now—I mean, three of our students. We've probably had twenty-six people graduate. A large percentage of them have gone there, to Blattner Energy, Cielo Wind has hired one or two of our students. Fluor Engineering—one of our students is managing off-shore oil and gas projects and he's basically—he got hired because he understood enough mechanical, civil and electrical engineering to lead teams with individual people in their silos that he could understand enough from them that he could put projects together. And he's making—it's nuts. I've never seen anything like that before. One of the undergrad students—she's getting her master's now, she's twenty-three. She got a phone call two weeks ago. She was offered a job for a hundred and ten, a hundred and twenty grand. That's nearly twice what I made when I got started. But they have the knowledge base that nobody else has.

AW:

And you mentioned the interdisciplinary approach, which I think is—

MH:

It's critical.

AW:

Yeah, because this is an industry that is not silo-driven.

MH:

Well, it was silo-driven and that's why you have the problems.

AW:

Exactly. But we're trying to get away from it.

MH:

And I don't know—the law class I teach is probably one of the harder classes in the program right now. Undergrad students are expected to write a fifteen-page paper, single-spaced. That's not including citations. They'll have three or four pages' worth of citations, or endnotes. I don't know, it's been fun. The funny thing is we're only four years old. NIRE's only four years old. We went through probably a two-year period that not much got done. Now, we've got more stuff

going on now than we ever could have anticipated and we're very thankful to have that. We're very, very thankful to have that.

AW:

Cool. Well let me ask two other things. One is I'd like to kind of keep up with what's going on with you and with Group NIRE as this develops for our archive. And the second is: since you're an independent entity, you probably are not covered under our university records agreement with NWI.

MH:

We haven't—so Group NIRE has a non-disclosure agreement with the National Wind Institute, with Texas Tech. And that's where we'll share documents, share ideas and all the other fun stuff. But all record-keeping is kept completely separate with the exception that if we partner on a grant with the university, we provide the documentation necessary to prove our activities on the grant and also to meet milestones.

AW:

So I would suggest that the archive, Southwest Collection, would be interested in a separate collection for Group NIRE so that over the years, you can—and again, the object of this is for people who look at things in the future, fifty years, a hundred years from now—

MH:

There are some things that we can provide and there are other things that we probably can't.

AW:

No, and I understand that. Every business has that sort of thing, but there are things that can be restricted and there are things that you can keep and then turn over years later when it's possible to do that. But I'm thinking mainly the interest that people are going to have is—well, when I was in my stint in graduate school, I was interested in the sociology of organizations, and I can see how someone interested in business or social structure and organizations would be particularly interested in the development of this entity because of the unusual way in which it came about, and the unusual way in which it functions. I'm thinking there are other people who will eventually catch on to it and say, we should do something like this.

MH:

And I think you're right. One of the things we've always been worried about is, what if another Texas university would do it? And I'll say the saving grace is that whenever they go to their board of regents or go to their chancellor or president and suggest, we want to create a for-profit company outside the university, the universities are so conservative they're not willing to take that approach. But the benefit of it is—I mean, we've got over twenty million dollars invested

since 2010.

AW:

Well, you're there first, for one thing.

MH:

Yes, and they're going to have to catch up, which ain't going to happen.

AW:

And so people look at how do I catch up and take this big—what they see as a risky idea—and that's going to stifle a lot of that, but at some point, people are going to look at this and say, this is a way of thinking. And also one of the things that I admire about Texas Tech is that we're young enough still, and we're the scrappy kid on the block that we're willing to take this point of view, and so there may be other aspects besides wind that can profit from the same model. So that kind of thing makes me think that some way of archiving your information over a period of time will be of value to people.

MH:

I think you're right and the unique thing that we've done, we've set up NIRE at the institute level, to where other for-profit companies can be created to support Texas Tech's other research initiatives. So with Group NIRE, maybe we partner with electrical engineering, National Wind Institute, computer science, these other different departments for renewable energy projects. Maybe the agriculture school wants to have a situation set up very similar like this. Well, the institute can very quickly, within probably less than two months create a for-profit company, another one, very similar to Group NIRE but dedicated to agriculture, and the same setup gets used over here. We talked with the new VPR, new President about that very same thing just so they know what's available to them.

AW:

Well, as a person in the arts, I can tell you, there are places in the arts where this could work as well. You know, one of the things people don't talk very much about at university-level are games, but the amount of education for lack of a better term, it goes one with children in today's world through gaming situations. All that's being done in people's garages and over their kitchen tables, and as universities, we're missing out on a lot of that kind of thing. It would take something along this order—

MH:

The good thing is that we've already set up the structure, and so all it will take to create it is going to be really—it's going to take the institute being told that's—I mean the board of directors of the institute will have to collectively decide, what we need to do is good for the

institute which means it's good for Texas Tech. Let's create another organization to do, say games for kids, or the department of agriculture, or water, or any of these things. Now, the seed capital to get started is where the hard part's going to come in. Where does that money come from? But that's not—we can find the money.

AW:

The key is you're taking that out of the pretty hidebound university system where money is looked at as a zero-sum game. In other words, if I'm in English and you're in history and you get money, then I consider that's less money—

MH:

For you to take.

AW:

Right, right. Whereas you're looking at a very different model.

MH:

Yeah, you're expanding the pot of money.

AW:

Exactly. And that's a unique thing. Well, when you have an opportunity, if you would like, I'd love to show you what we're doing at the Southwest Collection so you get some idea and to see if we can structure some way that we could capture this kind of information. I mean, we're not looking for people's paychecks and that kind of—that's not—what we're interested in is the structural issues that researchers are going to find very interesting.

MH:

The way we structure NIRE, I can provide that. I can also probably provide the formation documents for both organizations. Maybe not the by-laws, but the formation documents, because those are all open—the Secretary of State anyway could look up anybody's there. And also we've made God knows how many Powerpoints with—

AW:

That would be great.

MH:

—about why we structure this way, what's been the return back to the university, how have we benefited the university.

AW:

Those kinds of things, to preserve those would be really good. Well, just let me know. Think it over and think about whomever else you'd need to visit with about that. I think it's something that first of all, it goes hand-in-glove with what we're archiving for NWI and the university as a whole, but I think also it's unique, its own critter.

MH:

Yeah. No one else has this structure. I sometimes think about to 2009 when I came up with the structure. I don't know. I always knew it was possible to do this. I'm not sure I actually believed it would have done as well as it did.

AW:

Well, there is a certain amount of the perfect storm here.

MH:

It had to be. And we got very fortunate with the fact of—if it wasn't for South Plains Electric Co-Op and Golden Spread, none of this would be here. And all of the interviews I always give, any press announcements I always give praise back to those organizations because if it wasn't for them, none of this would have happened, because it's such a unique setup.

AW:

One quick question: does part of that have to do with the fact that a co-op utility has a fundamentally different way of looking at the world than a—

MH:

They're a non-profit. Anything they do is non-competitive, which means they can give out access to their wind farm data, their natural gas data. It's almost a zero-sum game for them. They've got to break even. If they make money above what they need to operate, they provide a credit back to their customers. Golden Spread and South Plains are some of the most innovative organizations in the country because they don't have to provide a return back to people. What they have to do is not lose money.

AW:

Yeah, and it actually curiously gives them a longer-term point of view.

MH:

They're looking twenty, thirty years—I think it's a thirty-year return.

AW:

And in today's world, corporate America looks at—

MH:

Two, three-year return.

AW:

Well, and almost day-to-day, what are your shares doing? It's crazy how that does. All right, what should I have asked you that I didn't?

MH:

Some of the key people that have been involved.

AW:

Besides Reagan and David?

MH:

Besides them, John Schroeder, who you're going to talk to, Andy Swift who you've already talked to. Anna Young, who replaced Reagan.

AW:

A-n-a?

MH:

A-n-a. Or A-n-n-a, sorry. Young.

AW:

As in J-u-n-g?

MH:

Y-o-u-n-g. Anna Young, Sheila Kidwell, general counsel. Jennifer Horn in ORS. Amy Cook, ORS. Kathleen Harris in ORS, Taylor Eighmy, who was the vice-president of research who worked with David Miller in that period of time to get all this going.

AW:

And he's now gone?

MH:

He's now gone. Who else? Of the original people involved, which was David, Reagan, Taylor and myself and the chancellor, the chancellor's leaving, I have the longest historical knowledge of everything associated. Michael San Francisco was the VPR also during this time.

AW:

Oh, really? Cool.

MH:

So he was heavily involved with the grant, the state grant that helped provide start-up capital for NIRE.

AW:

Would it be important for our collection to interview Reagan and David?

MH:

Yes. Reagan and David will have a little bit of a different point of view than mine. Reagan was in the thick of it for two and a half, three years. David was in it for two years. Both of those people would be good to interview. Anna Young is also the project manager for the Sandia project, I would interview her. From a legal standpoint, if you want to understand the structure, talk to Sheila Kidwell in general counsel. We've had God knows how many discussions between us on how we structure everything and keep everything moving. Those are the people I would talk to. But Reagan, she knows the history of it. David—if it wasn't for David trusting me and believing in himself to get all this done and seeing the opportunity—because David came up with the long-term vision. I just did the execution of it. David is actually now the board chairman of the Emerging Technology Fund, also. He's done a very good job for the ETF. He's supported us. It's been probably one of the most wild rides you can imagine.

AW:

It sounds like it.

MH:

Yeah.

AW:

But it sounds like a lot of fun.

MH:

It has been a lot of fun, it's been a lot of sleepless nights also.

AW:

Yeah, well, fun does never come without some sleepless nights.

MH:

And we've had those. Had quite a few. But that's the long and the short of it. And as we develop

or are able to announce the other projects, I will be sure to keep you up to speed with that.

AW:

Great. I'd appreciate that. And then I'll touch base with you as things develop just to see about.

MH:

Could you give me three months? Give me three months. Because in three months, things are going to change substantially in the right direction in a way that most people won't even imagine—I mean, hopefully in three years, if this other stuff comes through, it's going to be nuts. It'll absolutely be crazy; we'll be bigger than any national lab in the nation.

AW:

That's pretty impressive.

MH:

And so that was the original goal and that's what we're working towards day in, day out. But I do appreciate your time.

AW:

Well, thank you very much.

End of interview.

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