Ramona Schindelheim, WorkingNation editor-in-chief:

You're listening to Work in Progress. I'm Ramona Schindelheim, editor in chief of WorkingNation. Work in Progress explores the rapidly changing workplace through conversations with innovators, educators, and decision makers, people with solutions to today's workforce challenges.

Ramona Schindelheim, WorkingNation editor-in-chief:

In the five episode series, Destination Tulsa: Tech Hub in the Heartland, we explored how this city, once known mostly for oil, gas, and aerospace, now has big plans to be a major player in several technology fields, but we interviewed more experts than we could use. So we made a bonus episode featuring some of other key players in that tech revolution. One of the five areas that the Tulsa innovation labs targeted for the city's technology renaissance is energy tech. We spoke with an entrepreneur in that field, Staci Taruscio, the founder and CEO of Rebellion Energy. It's an environmentally conscious oil and gas company, which might sound like a contradiction, but Taruscio explains that the company minimizes the environmental effects of oil and gas extraction by using logistics management to plug orphan wells.

Staci Taruscio, Rebellion Energy founder & CEO:

So it doesn't matter if it's a large operator or a small operator, all operators have this issue. That's called asset retirement obligation, ARO. And so an asset retirement obligations means you have all of these old wells that are no longer creating cash flow revenue stream for you. They're just sitting on your books and all they are is a liability. And so those are wells that need to be plugged, need to be remediated. So we work with operators to build a strategy around bundling those wells into packages that can be remediated more efficiently, capitally efficient. So think about it this way, if I send a rig out to plug one well, it takes a long time to drive out to that location, plug that well, come back. And then the next day I send a rig out to that same area to plug a different well, I probably could have plugged those two wells in one day if I'd known about it and if I had planned properly.

Staci Taruscio, Rebellion Energy founder & CEO:

And so what we do is that logistical management, when an operator plugs a well now, it's kind of a one off, right? So they'll come to a plugging service company and they'll say "Hey, the state's told us we need to plug this well, can you plug this well for us? And they'll go yes". What we really do is we say "Yes, we can plug that well, but really what you have is...", and we have the data to substantiate this, "...really what you have are 300 wells that you're going to have to plug in the next three and a half, four years. Let's talk about that contract". And so that's kind of our approach to some of these companies, often times we'll do that in the context of some of the one-off needs they have. More often we're talking to sort of the management level group at an operating company and discussing their needs sort of into the future.

Staci Taruscio, Rebellion Energy founder & CEO:

So that can be on the consulting side, or it can be on the execution side. The other people we talk a lot to are states because states have all of these orphan wells that they're responsible for, that also need to be addressed.

Staci Taruscio, Rebellion Energy founder & CEO:

The other thing, and the thing that's actually the most fun, is the environmental side of that. So as opposed to just plugging this well, what can we do in addition to that surface to create a better space?

Whether it's returning it to its most native state, whether it's incorporating it into, let's say surrounding farmland, or maybe there's a carbon offset project that we can, maybe it's reforestation, maybe it's a butterfly habitat.

Ramona Schindelheim, WorkingNation editor-in-chief:

The company also consults with the oil and gas producers to minimize the environmental impacts of the extraction.

Staci Taruscio, Rebellion Energy founder & CEO:

There are all these opportunities on the environmental side to really maximize carbon sequestration from the atmosphere. And that's a really cool thing, there are a lot of value options emerging in the carbon offset market at this point that make that a viable solution for some of these companies and something they can do on top of what's required.

Staci Taruscio, Rebellion Energy founder & CEO:

And then there's some new technology that we all need to think about. A lot of folks make money on these assets, right? There are people that may want to continue to produce these assets, but there are also some really cool new technologies like battery storage in these old wall boards, mechanical storage in these old wall boards that would connect directly into the electricity grid and help provide consistent electricity. And there's a value proposition to that too. So it's a focus on these assets and it's a management of these assets as their own separate value proposition, as opposed to just an afterthought to the oil and gas industry.

Staci Taruscio, Rebellion Energy founder & CEO:

I am on the board of a nonprofit group called Fellow Environmental Partners. And that's a group that is specifically addressing sort of this lack of data associated with the impacts of orphan wells, which are state owned wells. And so, one of the things that happens very frequently is we hear methane emissions or groundwater contamination on a single well, and it gets sort of expanded into being this major problem for all orphan wells or all abandoned wells and the data just isn't there to substantiate that at this point. And so what that organization will focus on, especially this year, is a lot of measurement and a lot of sort of level setting, from a scientifically measured data perspective, to arm, both the public and the regulators and the operators, with the tools they need, hopefully to bring them together to a solution space on how we can address orphan wells specifically.

Ramona Schindelheim, WorkingNation editor-in-chief:

Oklahoma has been a big gas and oil producing state for more than a century. Taruscio says the industry is beginning to look at doing business in different ways.

Staci Taruscio, Rebellion Energy founder & CEO:

I do think they see a requirement to think differently about not only the mixture of oil versus natural gas versus cleaner alternatives. We have to think about that. We also have to think about how we produce any of those things. What are the social and environmental impacts of producing each of those things and, as individuals, because we oftentimes fall back on the structure of a large company or a company to kind of shield us from consequences. I think we're learning that as individuals we have to raise our hand and say "This is something I believe is a good solution and is a valuable way for me to spend my

time and career." We have to raise our hand and say yes or no, and stop defaulting to a company structure as our sort of excuse, if you will, for the decisions that we make.

Ramona Schindelheim, WorkingNation editor-in-chief:

In episode three of Destination Tulsa: Tech Hub in the Heartland, we featured professor Jamey Jacob from Oklahoma State University. He shared the university's cutting edge work in advanced aerial mobility, or drones. We also did an interview that didn't make it into that episode, Benjamin Loh, an assistant research professor who works with professor Jacob. Loh explain one of the project he's working on, with a $90,000 proof of concept grant from the state of Oklahoma for an urban air mobility solution, what some people call a flying taxi. He's working with the Choctaw Nation on this drone, which would be much larger than drones in use today.

Benjamin Loh, Oklahoma State University associate professor:

The whole goal here is to, hopefully, whatever you try to prove the concept is going to lead to a commercialization that can help the economy of Oklahoma, the state of Oklahoma. So what I'm doing right now is to basically developing a platform where my first phase of my projects is to investigate different kind of motor configuration. So imagine the drone that I'm building right now, the propeller itself is about 40 inches. 40 inches is quite huge and it's like the motor can produce trust up to like 70 kilo per motor. And I'm working with 12 motors right now. So the initial phase of mine goal is to test all these different motor from four motors, six motor, eight motors to 12. And then my commercialization part will involve developing this.

Benjamin Loh, Oklahoma State University associate professor:

We call it the heavily EVTO, where we can actually deliver cargo, like up to a hundred or 200 pounds. And one with the thing that we are trying to demonstrate right before end of my grant, a proposal, is to actually help Choctaw Nation because Choctaw Nation, the beyond site, they have their facilities and the people to kind of do all this conduct, or the drone or EVTO capabilities. I will use my platform that I be custom built to do, we call it the beyond visual site for drone delivery. We try to deliver like supply, up to like a hundred pounds to the family, the tribal family of Choctaw Nation.

Ramona Schindelheim, WorkingNation editor-in-chief:

Most drones can only hold a few pounds. The drone Loh is developing would deliver large amounts of food, supplies and even people.

Benjamin Loh, Oklahoma State University associate professor:

Choctaw Nation, as you know, basically is a tribal country, tribal government. So what they want to do is like, because they have their own food distribution center for their tribal member who needs supply, like basically living in the rural area. So what happened is that they typically have to rely on people to drive to the rural area and distribute the food to the tribal member. So what they're having in mind is that they have been working on drone for years. Drone means that under 55 pound, right, what happens is that Choctaw Nation wanted to have a heavy lifting drone that carry up to 200 pounds or whatever capacity we can think of to deliver all the supply to the family member, I mean, to the airspace. So maybe they can drop, ship it or land it close to their home or something. That goal is to replace the regular methods.

Benjamin Loh, Oklahoma State University associate professor:

Remember when Amazon promised to have like a drone delivery, right? I'm not going to go for that direction, but mainly think about like medical delivery on the battlefield [inaudible 00:10:27] a blood supply. But instead of carrying a small amount, you can carry like a hundred pound, 200 pounds of supply, immediately, in the battlefield, for example. So, I mean, I'm speaking for the military application, but in a commercial world, I mean, such as rescue, shipping supply to disaster area. So now we are talking in the bigger scale of the... I mean, as you can acquire a drone because we are not receiving people in there. So that way you'd really kind of like increase the capacities, so that is the part of the commercialization vision down the road.

Ramona Schindelheim, WorkingNation editor-in-chief:

If the prototype works and Loh is confident it will, and they get approval from the FAA to fly it, this air taxi could be a game changer. This type of air taxi could, in theory, carry a person, but it wouldn't be for individual travel, more likely it would be used in search and rescue missions.

Benjamin Loh, Oklahoma State University associate professor:

Eventually we still want to develop something in between where we can carry heavy cargo as heavy as a man. And hopefully, let's say we want to turn into some sort of social rescue emergency drone that can carry a person or carry a person out from disaster area. At least a drone that develop, we have that capabilities. Everything is still possible with Choctaw Nation, with the 44,000 acre of land where they actually open up for all this testing.

Benjamin Loh, Oklahoma State University associate professor:

But then when it comes to actual implementation, let's say from a sub urban environment to Tulsa cities or Oklahoma cities, you still have that part where "Okay, where can we fly actually?", I mean, we cannot fly over people or something like that. It's like zoning problem, you can't just simply fly anywhere. And that, I believe, is heavily relying on the administration of FAA, to figure out what is the best way to operate. So basically the design and implementation is not a key here, but it's the operation, the logistics, and regulation are the kind of like a barrier to make this go off, a heavy lifting drone a reality the next five years.

Ramona Schindelheim, WorkingNation editor-in-chief:

Loh grew up in Malaysia and he came to Oklahoma State University in 2001. Now he's a promoter of Oklahoma as a technology hub.

Benjamin Loh, Oklahoma State University associate professor:

Personally, after being here for almost 20 years in Stillwater, Oklahoma, I think definitely there are a lot of benefits. First of all, thanks for the state of Oklahoma that have been encouraging technologies to come in Oklahoma. I mean, as you can tell, a lot of the people from California or Florida, they are all expensive. The land is definitely a big thing, flatland is good for flying stuff. I think that would be a first point.

Benjamin Loh, Oklahoma State University associate professor:

And then second thing is that I think that with the resources from all these universities, how many university do we have in Oklahoma? How many airplane aerospace company that are here, right? And when the US kind of like, I guess what 10, 15 years ago that become something that "Oh, how can we do

this?" And Oklahoma had been, definitely, be a good spot to kind of develop this. At one point, Oklahoma State University was being called the MIT of aerospace. So I think that really shows that Oklahoma do have that reputation along with the Oklahoma states and mechanical aerospace program that actually kind of shape all this reputation of "Hey, Oklahoma is a good place to get the talent support from the government, support from a local entity like Choctaw Nations". So, yeah, that makes Oklahoma a special place.

Ramona Schindelheim, WorkingNation editor-in-chief:

You've been listening to a special bonus episode of the five part series for the Work in Progress podcast, Destination Tulsa: Tech Hub in the Heartland. Destination Tulsa was written and produced by Larry Buhl. I'm Ramona Schindelheim, editor in chief of WorkingNation and host of the Work in Progress podcast.