

## Participants

**Lynn Mueller**, Chairman, CEO, and Co-Founder of SHARC Energy Systems ([SHRC](#) / INTWF)

**Nate Abercrombie**, [The Stock Podcast](#)

## Interview Transcript

**Nate:** Lynn Mueller, thank you so very much for coming on the IwtB podcast.

**Lynn:** Thanks.

**Nate:** Could you just give us a little bit about your background?

**Lynn:** Well I've spent the lifetime in the heat movement business. I was trained as a refrigeration mechanic here in Canada and it turns out, I really understood the technology of heat moving from one source to another. The second law of thermodynamics states that heat moves from warmer to colder. The first law states that energy can't be created or destroyed. It was a natural for me to go into the business. I've had a career where I spent about 30 years in the geothermal pup business. I was president and CEO of a company called Water Furnace. We were the world's largest manufacturer of geothermal heat pumps. I've been in the renewable energy business for a very long time and very passionate about it.

**Nate:** Yeah. Now geothermal is something that's really interesting. My dad, he built a pharmacy, he put a geothermal pump in. I know that I've got a neighbor over here who has a geothermal pump in their house. They just seem like really interesting sources of heat and cooling but I never full understood exactly how all of that worked. To have you on here and to be able to talk about just the technology and the science behind it is going to be great. Could you just talk a little bit about your company now? What, first of all, the name of your company is SHARC Energy, but I also see that it's SHARC International so do you refer to it as SHARC Energy or SHARC International?

**Lynn:** Our parent company, the public company, is Shark International Systems and we operate worldwide as SHARC Energy Systems.

**Nate:** Okay.

**Lynn:** Eight years ago I had thoughts of retiring, Nate and that lasted three days. It turns out my wife wasn't quite ready for me to retire either. She was suggesting that perhaps I found a new occupation because I was driving her crazy. I had been thinking for some time because I have four children and a whopping big hot water bill all the time. I knew what my hot water bill was because I heated my house with a heat pump. I was throwing away about \$1,200 a year worth of hot water. In my inquisitive mind I thought, where does it go and why can't I get that back somehow? That really became the impotence for starting SHARC Energy is to recover that \$1,200 I was throwing away every year. Then I thought of every home in the world is doing that, that is a tremendous amount of energy. It just goes down the sewer line. In cities the sewers are a common artery to every city. It's the one system that's unique to every city and

all of that energy ends up going down the sewer lines. About the same time I was really thinking about it the [Department of Energy](#) in the US did a study that showed about \$40B worth of energy goes down the drains residentially in the US every year. I thought, from a business point let's develop a system to get that back. That was really the impotence of SHARC Energy was my own hot water bill.

**Nate:** Yeah. Yeah so before we get to the actual technology, why'd you call it SHARC? Does SHARC stand for something?

**Lynn:** SHARC stands for sewage heat recovery. When we were messing around trying to come up with a name, we just put the acronym SHARC down and then we just modified it a little bit. It's turned out to be a pretty cool name for us, very recognizable around the world.

**Nate:** Yeah, yeah. Could you explain the technology that you've developed and just walk us through how it works?

**Lynn:** Yep, so if you can imagine Nate that all of that water that you're using for your showers, your laundry, your dishwasher, all of that hot water goes down the drain but it's mixed with the other biological byproducts of living, which people just want to see the stuff go down the drain and go away. They don't want anything to do with it, but there's a lot of water, but there's a lot of solids go down the drain with it, so paper and you know one thing or another goes down the drain every day. One of the gentlemen at your wife's office told me that there's about .3% of solids in all of that water that goes down the drains. That little bit of solids will plug any heat exchanger in the world very quickly so I had to invent a way to clean that warm water that goes down the drain so we could put it through a conventional heat pump or heat exchanger system to extract the heat. The invention that SHARC holds is the ability to clean large amounts of sewage water so we can pass it through an efficient heat exchanger.

**Nate:** Okay yeah, which is really interesting and really differentiated about your product is that you do have a screening, a filtering system that I guess big engineering firms just haven't been able to figure out yet.

**Lynn:** Yeah.

**Nate:** Could you talk just a little bit about ...

**Lynn:** What we were able to devise ... What's really neat about SHARC one thing Nate, is that we're a bunch of people that have kind of lived the business. We're plumbers, we're refrigeration guys. We're hands on people that have dealt with the problems. It became sort of an exercise that's taken eight years and \$10M to perfect the ability to screen that sewage. Ours is just a flow through filter and we've devised a way to keep that filter clean. It's basically a flow through filter and as I showed the group there the other day pictures of a screen that had 2,500 gallons a minute flowing through it for four months. It was absolutely shiny clean. I think that's what got the engineers attention is that we really have perfected that screening method. It took a lot of tries to perfect it. Over the years we've been selling systems and they haven't all been perfect. Part of my mission was to go back. We've retrofitted every system we've ever done to the current standard, which is amazing. We have 20 systems working in the world and they

all have the newest technology in them. We were developing a system, but my commitment was also to make sure that every system worked perfectly.

**Nate:** Okay yeah. That's impressive and that's also admirable that you went back and actually retrofitted those other systems. What does ... You're taking heat out of the sewage, the waste water stream. You're taking the heat out of the wastewater stream and then you're doing what with it? You have a heat exchanger and then the heat exchanger then does what? Are you generating electricity? Are you ... Please just help me understand what is it that your systems?

**Lynn:** What we do Nate is we move heat. What boilers and gas fired appliances do is they create high grade or medium grade heat and they just take cold water and they warm it up to 180 degrees or 150 degrees or whatever. They continually do that with a new source. We move heat, so it's much more efficient to move heat than it is to make heat. Our systems operate traditionally from somewhere around 350% to 600% efficient. That means for every dollar you spend to move the heat you get 3.5 to \$6 worth of heat moved and you don't have to burn any fuel to do that. What makes our system so efficient is that we don't transform heat into anything like electricity or anything, we just use it to heat buildings and also cool buildings. Part of the efficiency is not creating it into another product. We're super efficient heating and cooling and our system doesn't care whether the building is in air conditioning or the building needs heat because heat just transfers from warmer to cold air. If the building needs heat it removes heat from the sewer system, if it needs to get rid of heat in the air conditioning mode it just puts it back into the sewer system. Amazing simple technology.

**Nate:** It is primarily a heating and a cooling system?

**Lynn:** Yep, absolutely. We don't produce electricity, we don't do anything else. We use electricity to run the system but we're super efficient with the use of that electricity, and that's really what makes us fit in with the buildings and gets phenomenal pay backs and simplicity.

**Nate:** Yeah, and I'd love to touch on where this is applicable but going back to what I was saying about my wife telling me about the project here in Denver. Why is sewer water or waste water, why is it hot? Why is it warmer than your average ... Why is it above lukewarm or is it lukewarm? What is the temperature of sewage water and why is it?

**Lynn:** Yeah you know around the world sewage temperature doesn't change much. It's usually between about 65 degrees Fahrenheit and 75 degrees Fahrenheit. You know, I've been all over the world looking at sewage systems and the common thing is water enters usually somewhere between 35 and 50 degrees of fresh potable water. It leaves the system at around 70 degrees or 75 degrees and go into the sewer at that temperature. You've got millions and millions of gallons of sewage warmed up 20 degrees and that's the value proposition for us. In the world every year there's 200 trillion gallons of sewage water goes through systems and it's all been heated 20 degrees. Our value proposition is to get that 20 degrees back on that 200 trillion gallons a year.

**Nate:** Yeah. Wow. Okay so where is the technology applicable? Could you also just sort of highlight the different systems that you currently manufacture? Is it useful for homes as well as large buildings or what's the scale that we're talking about here?

**Lynn:** When I started Nate, I thought we would do like every apartment building in the world would be a customer for us and just worry about their hot water for their building. Then they realized that there's bigger fish to fry basically and Vancouver put in a system here with our SHARC system where we heat five million square feet of apartments in the Olympic Village when we had the Olympics here. I've developed products now that fit everything from a single family home to an apartment building to massive systems like the one that they're going to use there in Denver. We have a SHARC unit, which does the bigger industrial one mega watt and up sort of systems. We have the Piranha unit that will do a single apartment building and we have a Mako unit that will do a house. We want to be in everybody's mechanical room from a single home to half the city.

**Nate:** Yeah okay. I'm curious about how much of a building ... Is there a lot of studying and analysis and consulting that needs to be done in order to figure out whether or not ... Let's say that you have two customers and one customer has a 10,000 square foot industrial warehouse and another customer has a 20,000 square foot commercial building. Assuming that, and I don't know if one would need a SHARC and one would need a Piranha, but assuming both just needed the Piranha unit, can you scale that unit up or down or are there opportunities ... Do you then take whatever the building isn't using and you're giving that back to someone else or how does that work?

**Lynn:** Yeah so first of all, we probably wouldn't do either of the buildings you're talking about because we need the water flow from human life, you know from people living in there. It's more of a residential product than a commercial one.

**Nate:** Okay.

**Lynn:** Unless you can tap into the sewer system. What we started out to do was try to get to every multifamily residential building over 25 units. If you've got 25 units in your building a small Piranha will easily make up all of the hot water needs for your building just by capturing the waste that's leaving the heat out of the waste that's leaving. You can scale up from that to we have a building here in Vancouver with 1,050 apartments and we recover all the heat from 1,050 apartments and that saves about 700 tons of carbon a year that would have from the natural gas to produce that amount of hot water. They virtually offset all the cars in the parking lot and the parking garage with their hot water recovery system.

**Nate:** Wow. Are there different sizes of the Piranha unit? Okay.

**Lynn:** Yep so there's four different sizes of Piranhas but they can also be duplexed together. In that 1,050 unit building we have two Piranhas and a small SHARC system. A lot of people in there, about 2,000 people every day that are showering and doing laundry and stuff and we recover all of the heat that's leaving that building and put it back into the hot water system.

**Nate:** Okay.

**Lynn:** The really great thing about it is it's the same heat every day. They use it, you recapture it and you use it again. The same heat is recycled every day. It never leaves the building, just fresh water comes in but the energy never leaves the building, which is totally amazing to me.

**Nate:** You also mentioned unless you tap into the sewer system, the city sewer system. Let's just say that I am an industrial client with a warehouse where people aren't really using the restroom that much. If they wanted to have this system could you go to the city and talk to them about tapping into the sewer line?

**Lynn:** A perfect example of that is a university we converted in Scotland, it's called Borders College in Galashiels, Scotland. It's a 5,500 student university but there was a four foot sewer line that ran 100 feet from the edge of their property. They went to Scottish Water Corporation that owned the sewer line and asked if they could tap into that as an energy source. They were very excited to do it and we've been able to offset 95% of the natural gas usage of that university just by tapping into that sewer line.

**Nate:** Oh my gosh.

**Lynn:** We installed a SHARC system there about a 750 kilowatt an hour system there. It heats that entire university now.

**Nate:** Wow.

**Lynn:** It's a bit of a civil work to do the tie in, but not a daunting task either because you dig a hole, put a tank in basically and then you pump out of that take. It's a very benign addition to the sewer system.

**Nate:** Yeah. I think I'm just now wrapping my head around what you said earlier about the just how amazing it is where you're keeping energy in one place. What you're saying is 95% of the natural gas consumption is offset by essentially just trapping the energy. Once the energy is in the building in the sense that an apartment complex last month was consuming natural gas to heat and cool their house, I guess not natural gas to cool the house but from an electricity standpoint. Once that energy is inside the house you essentially capture it, it is not going anywhere. It's recycled. That is phenomenally amazing. That is really crazy.

**Lynn:** Isn't that amazing when you think about it that you just use the same energy every day?

**Nate:** Yeah.

**Lynn:** You know, why not? You can't wear it out and it's there every day. The beauty of it is too is that the load always matches the source because if you're using hot water you need to make more but that hot water is coming down the drain so you can take the energy out of it and put it back in the new stuff. It perfectly matches the mode.

**Nate:** Yeah, and so do you have to retrofit ... Let's just say I am the owner of a big apartment complex and I've been using natural gas to heat all of my units and I have electricity from the grid that I'm using to cool

all the units and it was built 10 years ago. Do you have to go in and retrofit some of the infrastructure within the apartment complex or is it as simple as just running a hose through every unit?

**Lynn:** No. There's a couple prerequisites you would need and first thing you would need is a central hot water system. You need to have a central hot water delivery system. Then the retrofit part becomes quite easy because you tap into the leaving sewer line, which is usually somewhere around the parking level one level. Then you basically just interrupt that flow into a tank and then just kind of flows through there and you take the heat out of it before it leaves. It's actually quite a simple retrofit. In British Columbia here where our head office is in Vancouver, the local hydro utility has put a rebate in of 50% of the installed cost of our system to reduce the use of natural gas for hot water production.

**Nate:** Wow.

**Lynn:** We'll do hundreds of retrofits. We're just kicking off a million ton challenge we call it here to reduce carbon emissions by a million times using our equipment with our local utility. It's achievable. It only takes 50 systems to reduce a million tons of carbon in our province here. We're really excited about our affiliation with BC Hydro and our new million ton challenge program.

**Nate:** Yeah yeah. That's really interesting. Could you talk about just sort of the timeline? Again, going back to the analogy where I own the apartment complex let's just say that I heard this podcast and I reach out to your company and I say hey look, I'm interested in this. From that point until and I've decided I want to do this after you've told me the savings and the reduction of carbon emissions and I want to do it. What is sort of the average time between me reaching out to you and the system being installed?

**Lynn:** Short. It can be anywhere from a couple of days to you know depending on we'll have to engage an engineer to do the drawings basically so it can be anywhere from a week to a month to get a system put in. But it's not a major engineering challenge to put them in. We do it all the time. Yeah, very very quick turnaround.

**Nate:** Wow.

**Lynn:** It's very simple to install. It's a plumbing installation basically.

**Nate:** Wow. Okay. What's the useful life of a unit?

**Lynn:** We like to think it's somewhere around 25 to 40 years, 25 years probably on the Piranha system and about 40 years on a SHARC system. One of the things that I think caught the engineer's attention is we're so confident in our equipment that we will do a fixed agreement for service and maintenance on the system for the life of it.

**Nate:** Wow. That does demonstrate an enormous amount of confidence.

**Lynn:** We're a bunch of old plumbers and stuff here and this stuff is built incredibly well. It's all stainless, it's as high of quality as we can possibly get. Every machine in the world at some point is going to break down, we just made ours super simple to service.

**Nate:** Could you walk us through the business model? What is the SHARC business model? Do you own the systems or do you sell them direct or is there some sort of to your point a fixed price sort of like a PPA? It's renewable energy, right so I still have to use renewable energy terms. So, a power purchase agreement? How do you structure your sales with your customers? Just walking us through the business model.

**Lynn:** You bet. You know Nate, when you starting an industry, which we did, eight years ago when we started nobody had ever really heard of sewage heat recover or ever really considered it. We had to be sort of everything to everybody. All of the business models you're talking about we sort of offer. We own, operate and maintain, we sell systems, we lease systems. We have financing available for anybody that wants a system we can finance it. We kind of had to be everything to everybody to start the industry and as a company we're really just refining the best way to go to market. We're now starting to partner with people that are much better at being contractors than us. We're really really good at building very reliable equipment, and that's really where we want to stay as being manufacturers but we're branching out in other ways with our company to offer long term own, operate and maintain, value added, energy savings models. We can really do everything but we're really really good at building equipment.

**Nate:** Yeah okay. You are fully integrated, you do everything from manufacturer to the install to maintaining?

**Lynn:** Yeah absolutely. We sell through a network of certified representatives and the number one criteria you have to meet is that you're capable of servicing the equipment. We won't sell a system unless it can be properly serviced. Because they don't require much service, but they require regular professional serve. If they're maintained properly they just work forever.

**Nate:** Yeah.

**Lynn:** If they're not maintained properly they're like your car. If you don't change the oil and stuff it doesn't work for long.

**Nate:** Yeah.

**Lynn:** One of the things that also differentiates us from most companies is that we've invested very heavily in making it a smart machine. We won an innovation award in California a couple years back that the first prize was two years of office space and use of the students in the Microsoft Innovation hub in Mountain View, California. What I learned there was it isn't so much the machine that makes it valuable, it's how you operate and the data you stream you get from it. We've developed an amazing intelligent machine that actually diagnoses itself, gives you real time read outs on efficiency. If the machine senses there's a problem, the machine itself emails the service people to come and check it. It also learns how the building operates, adapts to what the building needs rather than just continually pumping out a bunch



of hot water it doesn't need. It also integrates well with the utilities so that you can schedule run time off of peak hours. We like to think we have the simplest machine in the world that's also the smartest.

**Nate:** Yeah. You mentioned Scotland, you just mentioned California and Vancouver so you're in Canada, the United States. What other areas around the world do you currently operate and where do you see?

**Lynn:** We have an office in Melbourne, Australia.

**Nate:** Okay.

**Lynn:** We operate in England, Scotland, Australia, Canada, US. We just installed our first system in China. My motivation for that is I'm pretty old, I'm 65 years old and I don't have 20 years to spread this technology around the world so I'm doing it at breakneck pace. It's been amazing. The source is always six feet below your feet. I always like to see if the oil executives knew that there's a trillion dollars worth of energy six feet below the surface would they continue to drill down miles to find gas and fracture the world and one thing or another? There's a trillion dollars they can reach down and touch but they don't want for some reason?

**Nate:** Yeah. Wow. What about pricing and costs? Could just maybe talk a little bit about anything you can share about pricing? I'm sure maybe just talking about specific how much a SHARC unit maybe isn't something that is perfectly appropriate but I would like to just if you could share anything about the cost of the unit that would be helpful.

**Lynn:** Sure. Yeah you know my goal is to have a fantastic payback so that the buying decision is very simple. Usually with energy prices like they are here and around the world we can get a four to five year payback very easily on the system because of our super efficiency of the operation. For a megawatt of energy if you look at a windmill or you look at solar or something, you're usually looking somewhere in the \$1M per megawatt range. We're about half of that as a rule, we're about \$0.5M per megawatt and that's for a SHARC. For a little system going into an apartment like a Piranha we're usually somewhere in the \$50K range. Very, very affordable. Quick payback and it'll last for 25 to 40 years. Our payback is very simple. The household unit, the Mako unit is going to be somewhere around \$3,000 to \$4,000 and have a three year payback for your home but it's going to be more than just a hot water tank. It recovers all that energy, it's smart, it's going to be built that could be compatible with your solar grids in your home. Every new home in the future will have a solar grid and we want to be compatible with that. It's going to also have enhanced storage capacity so what looks like a 60 gallon hot water tank can actually store 300 gallons of hot water in capacity. When I was setting out to design that system I didn't want to be even close to what anybody else was doing. I want to carve our own path and be different. I think we're going to turn the hot water world on it's ear when we launch that in the next year.

**Nate:** Wow. Okay. I'm just curious whether or not I don't know if you had a chance to sort of think about the math behind the cost per KW or per megawatt. What is the levelized cost of ...?



**Lynn:** We sort of recover heat of about a third of what it would cost you now. If gas is \$10 we would be three or four maybe. We tend to recover much more cost effectively than most systems. We don't really produce it, we're just moving it. We usually move heat at about a third of what it would cost to replace.

**Nate:** Wow. Okay. What about the costs for your customers? What are kind of the annual maintenance cost for taking care of a unit?

**Lynn:** Yep you know on a half a million dollar SHARC that would do a megawatt of heat recovery. Our maintenance cost per year fixed it somewhere around 1% of the cost of the equipment so \$5,000 a year basically.

**Nate:** Wow. Okay.

**Lynn:** That sort of came about from a bunch of old plumbers and stuff designing it to be serviceable because with our SHARC system basically all the moving parts are replaced every year and it's like a replaceable plug. You take the thing apart, in an hour you can replace all the parts in the system. You basically take it apart, put the new part on, put it back together and it's working, send the old part back to be rebuilt and be used at the next.

**Nate:** Yeah.

**Lynn:** Super simple, super simple service. Then you're going to have pumps and stuff that have normal life expectancies that will be replaced, but the SHARC itself is really absolutely bulletproof.

**Nate:** Wow. Okay so you already talked about the four year payback period. I would be interested to hear maybe just an example in winning a project award with a customer that you currently have that might just highlight kind of the win win situation. It was a win for you in the sense that you got the project and you got to make a sale but at the same time it was a big win for one of your customers who got to reduce their energy bills, they got to reduce their carbon footprint. I mean, you mentioned 95% displacement of natural gas at the university in Scotland. Can you think of an example from a previous project?

**Lynn:** I've got a project that everybody in the world can probably relate to. In Washington D.C. the Washington Sewer Authority decided they were going to build a new 170,000 square foot office, administration building. They tasked Smith JR Group to the design with some new technology, but it had to be the lowest operating and life cycle cost of any system. They compared standard systems, they compared geothermal, they compared solar and SHARC was selected as the lowest life cycle cost. It's operating there now doing all the heating and cooling for 170,000 square feet in Washington D.C. and has been vetted through one of the largest engineering firms in the world to be the lowest life cycle cost for that building. They saved 35% on their cooling cost, 85% on their heating costs and they also saved 5 million gallons of water a year that would have been used by the cooling towers. They've completely eliminated the use of natural gas in the building, there's no boilers, there's no natural gas in the building.

**Nate:** Wow.

**Lynn:** An amazing building and they've done lots of blogs on it and we've been around the world talking about that building. Right across from the National Ballpark Stadium and just down the street from the White House is the greenest building in North America.

**Nate:** Wow. I didn't realize that.

**Lynn:** Yeah. I'll send you the link to it, but it's amazing. What a building. The funny thing is after 10 months of operation SHARC has had zero down time and the building is always running on cooling, even in this cold weather there's enough people load and computer load and stuff that the recycled heat within the building meets all their heating needs and they're still dumping some cooling.

**Nate:** Wow. Dumping it. What do they dump it to? Do they put it? Do they sell it to someone else?

**Lynn:** The heat goes into the sewer water.

**Nate:** Oh okay.

**Lynn:** They use the sewer water as a heat sync to get rid of their air conditioning need. They don't need a cooling tower, which saves a tremendous amount of fresh water, to the tune of five million gallons a year.

**Nate:** Wow. Okay. Who are your typical customers? I mean, you mentioned residential but you just mentioned this building which sounds to be maybe it's a governmental customer. Who is your average customer?

**Lynn:** You know, we're still trying to find that out. Every day is a wonderful experience in here because we get calls from every sector around the world every day. Our most popular customer right now would be municipalities, sort of people that are investing in carbon reduction and city of Vancouver, city of Seattle, those kind of people are buying huge systems, Denver. They're probably our biggest customers right now but I got a call from Switzerland the other day that somebody had seen our video called the power of wastewater and they analyzed in Switzerland that there's a thousand opportunities to install SHARC systems in Switzerland. Well, it's a size of a postage stamp, you know. The opportunities continue to amaze me on a daily basis.

**Nate:** Yeah.

**Lynn:** It's every apartment building. In Vancouver you can't build a new building unless you reduce your carbon footprint by 70%.

**Nate:** Wow.

**Lynn:** Every building in Vancouver is a potential customer. I'm really proud of what we do here at SHARC for a lot of reasons, but for creating an industry is really amazing.

**Nate:** Yeah, yeah. It's super helpful and it helps answer a lot of the questions. I don't know if you want to talk about the market opportunity. You mentioned the trillions of gallons of waster water. I'm curious what you think on a dollar basis is the total addressable market for SHARC Energy.

**Lynn:** I'd like to think we could get it all but you know I think to build this company to a \$100M company over the next five years is very achievable. We had about a 600% growth in revenues 2018 over 2017. We expect to have a similar growth this year. I think as we ramp up there's challenges but I really believe in the next five years there's \$100M opportunity for SHARC. That's my goal as a senior elder statesman in the energy business I think SHARC is really unlimited. When you think of one little country could have a thousand systems what that could mean to our business. We're busy ramping up in a lot of ways here but the opportunity is enormous.

**Nate:** Yeah. You mentioned the \$100M a year type of revenue profile. I think I recall seeing in your investor slide deck that you're manufacturing capabilities are roughly at a \$100M revenue run rate, is that correct?

**Lynn:** Exactly. I think we can meet that demand right now but you know as we go forward we're getting more and more interest from large entities around the world. I think that you may see some great developments with SHARC in the next while. Collaborations we collaborate with a lot of large utilities like Vattenfall and NG and Scottish Water and Thames Water. For a smallish company we have some amazing collaborations.

**Nate:** Yeah, yeah. I don't know if you'd be willing to talk about it, but the margin profile of kind of what you've already accomplished and kind of ignoring the retrofit what you had to to make sure that the system works and is 100% reliable. What are sort of the margins that you're thinking about as being very achievable maybe once you hit that hundred million dollar revenue run rate?

**Lynn:** You know I don't think it's any secret that as manufacturers you like to have multi digit margins. I think we've been able to maintain higher than industry standard margins because we're sort of a unique animal. I think we can continue to maximize that as we build more, our cost of production goes down and the value proposition goes up. I think we'll have higher, much higher, than average industry margins.

**Nate:** Yeah okay. No, that's super helpful. I would like to talk just a little bit more about the financials, but I'm curious about the competitive landscape. Do you have any direct competitors? Is there someone else out there that's building the waste water heat transfer systems like you are?

**Lynn:** Yeah there's a few, mostly in Europe right now. There's a very large company in Germany that makes equipment for sewage treatment plants. You can kind of adapt some of that equipment to do what you need for heat recovery but it's kind of open. I guess I'll back up. What I should have said at the very start is the number one question I get is if I'm using the sewage system do I have to smell it? You know if you're going to put in a system the size of the one in Denver and you've got an open system that's taking out the solids you smell it. I don't care what you do it, you're going to smell a bit of an odor. Our system though is completely hermetically sealed so our competitor uses an open system, ours is completely sealed and I can take you to any one of the mechanical rooms we've done work in and you do not smell

sewage. The number one comment is wow, don't smell anything. That's our competitive advantage is no smell, completely sealed and we sell a complete package that we guarantee will operate. It took us eight years and ten million dollars to get a system that works. When there's a great system available why build a new one? We guarantee it, we warranty it, we service it. The whole package.

**Nate:** Yeah. There's no other company like yours that manufacturers the complete system and to the level of ...

**Lynn:** No.

**Nate:** Okay. Okay. What about technologies that maybe aren't direct competitors but indirect competitors? Maybe they're doing something else. Maybe I'm talking about rooftop solar in this regard, but I'm curious who you think your indirect competitors are.

**Lynn:** Oh yeah. I think every other energy source, including conventional energy is a competitor. That's why I'm so pleased that we don't need rebates to make our systems sell. We don't need any incentive from government to sell our systems, they stand on their own on savings and life cycle. When I was in the geothermal heat pump business we sort of lived from one subsidy to the next. When subsidies were in business was great, when they weren't people didn't buy them. That's what I like about this system is it's absolutely amazing efficiency. We're competitive straight up with other sources.

**Nate:** Yeah. Okay.

**Lynn:** The source is there everyday. One thing we've learned from all the data and stuff that we've collected is that people's sanitary habits don't change much day to day. People get up 6:30 in the morning and they have their shower, they do it every day, they use the same amount. It's unbelievably predictable that your energy source is going to be there.

**Nate:** Yeah. Thank you for that. I would like to touch on financials and just how you're thinking about the evaluation of the business before this comes to a close. As I was looking at your financials I saw that there was some revenue lumpiness over the past few years. You just described the outlook. I'm curious if you wouldn't mind just providing a little bit of an explanation as to why the revenue profile over the past several years was lumpy.

**Lynn:** That's really the emergence from being an R&D company.

**Nate:** Yeah.

**Lynn:** We just took on \$20M worth of projects in Scotland that were really more R&D projects than commercial ventures. We had the prove how systems worked up to this point. We're not doing anymore R&D now, we know our systems work perfectly. We're becoming really just a commercial venture now. You won't see that lumpiness in revenue. Here in Vancouver we had to spend almost a million dollars to install a system just to prove it worked. Now we're going to sell that system and we don't need to do that. You won't see that. You'll see this year we're going to close out with about a 600% gain over 2017

and we'll probably do somewhere between I don't know six and ten million next year in revenues and then continue to grow from there. I think the R&D side of is over. We're now fully commercial, fully operational around the world and got the offices set up. We're just doing a little convertible adventure right now for about four million to really prepare for cash needs for the next immediate future, for the next year or so. Then I think we'll become an income generating company as opposed to where we've been in the past. It takes awhile to grow an industry and to grow a company. We're on the down slope of all those costs and now we're going to start to capitalize on the opportunities.

**Nate:** Yeah. You mentioned \$6-\$10M this year. How much of that ... I know in your investor deck you have 43 projects in the pipeline through 2020. Is that back end loaded or right now you're just still ramping up and maybe there's fewer projects from that 43 that's in 2019?

**Lynn:** Yeah we did that less based on a certain degree of certainness that those projects would come in. Those projects we felt had an over 80% chance of being turned into actual projects in the next two years. There's hundreds, literally hundreds of prospects that are in our CRM here. The 43 we're very certain are going to come in so we want to be conservative because someday I look at it and oh my gosh this business is huge and then other days I look at the complexity of getting all them in. We tend to be very conservative and hopefully surprised to the good all the time. We want to build a solid business and continue to operate on an amazing growth trajectory.

**Nate:** What some of the portfolio managers that I used to work for were very big fans of recurring revenue streams. I know that you do have a reoccurring revenue stream component to the business model. Could you maybe quantify that amount or at least proportionately and just talk about how you're thinking about the reoccurring revenue stream going forward?

**Lynn:** Yep we have most of the recurring revenue streams we have are from heat sales, carbon savings. In Europe we have what's called a renewable heat incentive that pays us for carbon savings. When we own, operate and maintain we have a 20 year cash flow based on a project. To give sort of general numbers for that so if it's a \$5M project we will probably recover somewhere in the \$100K a year for the next 20 years on that project just from some residuals.

**Nate:** Wow.

**Lynn:** Once the project pays for itself in four or five years the residual income kicks in and then it's super attractive. It's not a huge amount of money per project but as the projects mount it adds up pretty quickly and it's really just free cash. Those are nice and then we have a great residual income from the service and then ongoing leases et cetera. We expect to be almost like a utility model in a lot of ways with that residual income.

**Nate:** Okay that's super helpful. You mentioned that your funding needs were taken ... Well actually, I would like to ask and I know this question might be a little bit difficult to answer given the fact that you are growing, and if you're rapidly growing it's very hard to say what run rate revenues need to be in order to be cash flow positive. But could you sort of help listeners understand where you are relative to that target?

**Lynn:** Yeah we expect to be cash flow positive near the end of 2019. That's kind of our goal to be minimum revenues somewhere in the \$7-\$8M range to really keep us cash flow positive. As we reduce our cost to manufacturing hopefully that helps going forward too. We don't see any major expenditures required to get to that \$100M target.

**Nate:** Yeah.

**Lynn:** We'll be able to keep pretty fixed costs. We'll have to add some human resources to get there, but not a lot, not a big plan, not a big capital expenditures. Our burn rate is somewhere just a little over \$300K a month around the world. I think we'll easily bust through that profitability number by the end of this year and then continue on. I'm a huge fan of being able to dividend shareholders at some point in time. That's really my overall goal is to get into that point where we can start to become a dividend-ing company in the next five to seven years.

**Nate:** Yeah, that's helpful. That was one of my questions just about how you're thinking about excess cash flow and what you would do with it so I appreciate that. You know, we've talked a lot about the tail winds for your company, the industry. What are some of the head winds that you're seeing and some of the things that maybe just concern relative to your growth profile?

**Lynn:** Yeah I think an acquisition of good people is always the number one thing for us. To meet that I've been around business a long time and I wanted to have a sustainable company that was truly sustainable inside and out. We brought in some measures here that other companies probably wouldn't consider. One of our most treasured assets is our employees so we like to hire a bunch of young engineers and really help them really blossom into what they can be. We do little things like when all of our people here are having children we want to remove the worry about educating their children so we accrue money for the university education of all of our employees children. We help them acquire their first homes. We help them with their medical situation. In Canada we have obviously universal medical care but we allow for naturopaths and we like to pay for advanced education. We like to invest heavily in our greatest resource, which is our brilliant people that work for us. We think by removing things they worry about they can focus more on the company and be more productive. It's a win for us, a win for them and our greatest resource is that intellectual property that we develop with our people and getting more people and keeping them is really key for us.

**Nate:** Gosh, Lynn. Are you hiring?

**Lynn:** All the time. We think that this world is worth saving. I have three daughters, two granddaughters and also one of my highest priority items is to promote females in the workplace. Not only because every woman I've ever met is way smarter than me but I just think we as a company can stand for so much more than just being a big old energy company. I want to make this world a better place for my daughters and my granddaughters and their kids. It's just a passion of mine to be in the environmental business and be a sustainable company for everybody.

**Nate:** Yeah definitely. I'm in the same boat by the way. I've got two daughter and my wife, and they're all smarter than me, even my five year old, or six year old now. Clearly they are smarter than me.

**Lynn:** SHARC actually likes to be involved in the community too so every Sunday night I go down and we prepare a meal on the street in downtown Vancouver for the hopeless people. I was fortunate enough to meet this incredible young lady named Eudora that organized a group called Gorilla Kitchens and SHARC now helps sponsor that and we feed about 500 people every Sunday night. I go down every Sunday night and help do my little part to make the meal and serve it. I'm a big believer in walking the walk and talking the talk. We do it in the worst weather when they need it the most and I'm out in the rain. It's tremendously gratifying to me because I see so many good people down there that could be me, you know?

**Nate:** Yeah.

**Lynn:** We like to support our people and anybody else we can help. It's been a dream come true. I love coming into work every day. It's never drudgery for me to come in here. I'm excited every day to see our people and see what they're doing.

**Nate:** That's great, and that's very admirable. I guess just one last thing that I would like to ask. I don't know if you mentioned the funny story, you mentioned your daughter. I'm not sure if you do have a funny story about an investor meeting. I don't know how often you meet with ... I mean, you're very small in terms of market cap and you're a very big shareholder. I'm just curious whether or not you meet with investors very much and if you do, what's one a funny sort of memorable story or question maybe that you can recall from one of those meetings.

**Lynn:** Well you know I meet with them all the time. I flew 160,000 miles last year meeting investors and meeting potential investors. Most people the number one question is why are you in that domain? My answer is because you throw away \$1,200 a year and I just want to get it back. Why would you want to be in the sewer business? That's where the energy is. There's a trillion dollars thrown away there a year and I just want to get it back.

**Nate:** Yeah, no that's great. I think it's somebody that nobody understands or realizes. It's hard for them to comprehend. I think that most people just don't even understand how their air conditioner works, how you're actually pulling in.

**Lynn:** Yeah yeah exactly.

**Nate:** You're exchanging the heat.

**Lynn:** With the super efficiency we're getting if you throw \$5 down, for \$1 I can get that back. It's a good value proposition.

**Nate:** Yeah. One last question, five years from now do you think that you're going to be a standalone company or do you think somebody is going to come in and acquire you?

**Lynn:** That's a good question. I hope we are. If we're not, I hope we carry on the values of the company.



**Nate:** Yeah.

**Lynn:** I've worked for some giant companies, carriers of the world and stuff. I don't want to lose the human aspect. As long as I can I'm going to keep it SHARC. I'm 65 years old. My dream is not to go sit on the beach somewhere, I'd rather die on my way to work one day. My goal is to keep it private. I also am a realist that I owe a duty to shareholders to maximize their investment and I'll do what's best for the company. I personally believe being private for five more years just builds this incredible value. In my mind we're one of the most undervalued stocks in the world.

**Nate:** Yeah.

**Lynn:** We're nowhere near the value we can be if we sold to somebody. I want to build that up. [Water furnace](#) went from this crazy idea of drilling holes in the ground to get heat to eventually selling and going private again at \$30.30 a share. SHARC is a better idea than that. That kind of gives you an idea of where I think we should be.

**Nate:** Wow. Lynn Mueller, thank you so very much for coming on to the podcast. I guess I should thank my wife as well for highlighting this really fascinating and really interesting and compelling story. But to you personally, I can't say thanks enough. It's just been a pleasure speaking to you and learning about your business.

**Lynn:** Well thank you. It's been a pleasure talking to you and I think anybody that talks to me to gets an idea of how passionate I am about this business. I'm thrilled to have had the opportunity and to have met your wife. Thanks we appreciate your support sir. Let's hope we get a chance to chat again soon.

**Nate:** Alright take care.

**Lynn:** Super. Thanks Nate.

**Nate:** Thank you Lynn, I really do appreciate it. Bye bye.

**Lynn:** Bye.

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