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Who are we? We are one of the largest solar contractors in the province of Manitoba. You know, I would say we've been around for about 10 years now and going strong and continue to grow so,



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located on Aaron Street in Winnipeg,



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but we service all of Manitoba, Saskatchewan, Northwest Ontario, and we do a fair bit of work in Nunavut as well. So what we do? We design supply install photovoltaic systems that power homes and commercial buildings and communities. Our mission to promote the use of clean energy through electrification and provide resilient power solutions to our clients. So this kind of this is a common misconception for a lot of people who are just getting into solar power. Most of what we do, and I think Ty is going to talk about something different afterwards, but most of what we do does not include batteries. It is not about cutting the power to the building. It's about augmenting and supplementing your power with solar energy, so offsetting some of your existing, you know, building energy with, you know, electrons less traveled. So it'll be, you know, electrons coming from your roof into your building, as opposed to coming from the utility into your building. And that, that transition between the two is seamless. So, you know, when there isn't enough power happening on the roof, it comes from the utility. So that's the that's mainly the type of stuff that we do. We do some battery stuff, but not, not related to buildings at all. So this is a little bit of an illustration, you know, sort of a simplified illustration of how that utility, interactive system works. And then we'll get into the nuts and bolts of why it, you know, could be a good opportunity for for you and your home or business. So, so what can a solar investment do for my home or business. So traditionally, when we're, you know, selling this to customers, there's always the sustainability act or sustainability factor for us. You know, in Manitoba, it gets difficult to make a case for solar being more sustainable than hydro power. They're both sustainable sources of energy. So if you're offsetting, you know, your power, you know, for us in Manitoba, we typically are making a financial case for this to our customers. So there are scenarios where it can be a little bit different, like in large commercial buildings, where you're trying to offset a certain where you have to hit energy targets, then you know,

you can go, Okay, well, I've done everything that we need to do with our H back systems and lighting systems, and we're still not there. What? What can we do? You know, we can add, like, building integrated photovoltaics, or we can add a rooftop solar array and augment the power a little bit, just to get you to that, you know, target that you're trying to achieve. But for the most part, you know, when we're selling these to our customers, we're selling it based on what it's going to do for them financially. So, so here's a little diagram, essentially showing, you know what you're doing here. You're buying a solar panel system. You know, at this point in the price rate hike with Manitoba Hydro, as it's going up over the years. When you amortize the cost, your capital expense that you pay for the system, you know, say you pay 10,000 for the system, and the system's gonna last you 30 years. You get to a average cost of power over the next 25 years. So you end up in that like, you know, five to six cents range per kilowatt hour. A lot of times. We equate this to like, pre purchasing all your fuel for your vehicle for 20 years in advance at a lower price. Certainly, there's, you know, it's not as simple of a calculation as that. But the point is, you're pre paying for all your electrons off the roof of your system, and then you're, you know, advertising that cost over 25 years. Traditionally, it's been difficult to make, you know, with the cost of capital, it's been a difficult case to make, just because, if you're saving two cents, but you're paying for it all up front, then there's a cost of, you know, a large capital expense like that. Nowadays, though, with the cost of the systems coming down and some really creative financing programs, really great financing programs, in fact, and some some other tax credits and rebates. You know that capital cost has come down to the point where it's become feasible in a lot of cases. And again, of course, promoting sustainability. You know this, this works a lot better outside of Manitoba than in Manitoba. But you know, even, even the optics of having a solar system on a building, for a lot of companies, that's enough. So a lot of companies will put these up just, just because they want the optics that. They're doing something to promote green energy. So one of the benefits here we got this, this amazing rebate from efficiency Manitoba, who I saw some other representatives on the call here today. This, this actually is an old slide that they provided me. This system cap is no longer 50 kilowatts, and this Max has been lifted as well, so you can get some pretty substantial rebates from efficiency Manitoba. So that's that's one thing that's really helping with the commercial and residential sales of solar panels in Manitoba right now. Another big part here that's just come into effect recently is the clean technology investment tax credit. So that is up to a 30% tax credit for refundable tax credit for for any tax paying entity. So essentially, you can get 30% off this the solar install. So you know, 50 cents a lot, and then 30% off. We're talking about discounts that are in and around that 50% of the system mark. So you know, when you're looking at that capital, capital investment now that's been cut in half the number, you know that that number that you're investing starts to look a lot more attractive when you're talking about paying, you know, three cents a kilowatt hour for the power off the roof, rather than paying, you know, seven or eight cents for the next 25 years. So so it starts to become a more feasible financial investment. So I've got a slide here and this, this next, next example is, is sort of a financial example. You're not going to see an example like this in the real world. I will tell you this would be, you know, an ideal roof mount 45 degree tilt, perfectly facing south, no obstructions. You know, like this, this, this system doesn't exist. In most cases, there will be, you know, obstructions, angles to the roof. You know, other issues that come up. But you know, as far as a, you know, best case scenario you could have for a 50 kilowatt system, you know, \$110,000 top line cost of 30% refundable tax credit, \$25,000 rebate. And there is also an accelerated capital, capital cost allowance for businesses. So that means you can write 100% of the system off in year one. So assuming, again, making some assumptions, that you're paying 26% in taxes for a federal for a corporation, you know your potential cost after rebates and tax savings would be in and around, \$35,000 with an annual savings of roughly \$6,000 so you can see, you know, obviously this, this example, isn't, you know, isn't going to be a real world one. This is more ideal, and the numbers won't quite get to this mark. But, you know, there is a

business case to be made now for solar panels in Manitoba, where in the past, there really has not been. So you know, when you're talking about a few years return on investment businesses start to look at that. So then we get to some obstacles for growing the solar market in Manitoba. So some of our barriers, one of the big ones is Manitoba Hydro, and due to no fault of their own, you know, we have low rates here, which, you know, in that rate triangle that I showed you, it makes that delta a little bit smaller than it should be. And you know, if, if, if you were paying, you know, 15 or 16 cents a kilowatt hour, then paying, you know, four or five cents, buying your power in advance, would seem a lot more favorable. So the other thing Manitoba Hydro, you know, again, they're mainly concerned with stability and peak demand. And because solar power is producing its power primarily in the summer and in daylight, and they really Manitoba Hydro as a winter peak. And utility, you know, they see their peak in in the evening in the winter, it really doesn't align. And so they don't really look at solar as something that will assist them in meeting their customers peak demand. And therefore they kind of devalue the power that that they're devalued the energy a little bit more. So they're not really willing to look at it. And, you know, any discussions that we've had with them for utility scale projects, they're not overly eager to, you know, provide, you know, a good power purchase agreement on that. So that is a bit of a barrier. And it's, you know, I think it's just that Manitoba Hydros interests and and our interests, you know, as a solar industry, you know, don't, don't align 100% so

 09:41

next we got government policy. Again, I mentioned the rebates and tax credits that are now in effect. These things are ever changing. So it is a roller coaster for the solar industry in Canada and the US. It's there's always changes, either from the utility or from the government. And. Back just on either policy rebates that take our industry from, you know, really, really high demand to, you know, the next day no demand. You know, we had one of these recently with the greener Homes program, which, you know, they said, Oh, well, you know, we got all this money, and it's going to go on until 2028, and then, and then they said, Oh, in December this year, they said, Oh, well, we ran out of money early, so we're going to end it in March. And then, you know, so we had this giant rush of customers come, oh, we need solar panels. We need solar panels. And then it dropped, and it stopped. And so we're now in a bit of a lull until they announce a new program. And that's sort of what our industry has done, you know, for the past, at least since I've been in it for the past 10 years. So something a little more stable, like these investment tax credits are actually quite good. And if we could get these implemented in the residential sector, that would be a lot better. Because really, to change the tax code is a lot more difficult than it is to just implement a rebate, you know. And those actually require, you know, legislation to change. So if we could get a few things enshrined in tax code, and they have this in the United States, then we would get a more stable market for the solar industry. But it looks like we're going to have some stuff on the commercial side, the residential side likely won't see that. So we're

 11:16

kind of an off grid is kind of where we've morphed our company into we're asked to

 11:23

work on bussing, a myth of solar



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panels having no major role in management energy mix. We're going to go a little bit different than Daniel, but everything you said is very accurate. Was what we found with any grid tie. But again, we don't really do that, so a little bit about us. We specialize in modular, off grid power



11:45

and water solutions, and it's kind of morphed



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into solar design and installation, mainly off grid in in remote, remote corners of Canada, and a lot in northern Manitoba, heavy vehicle EV



12:00

conversions.



12:01

Some people might know about the tundra buggies at Churchill. Those were built, designed at our shop. And in the picture there, you see the big, big white unit that some of us are standing in front of. That's a that's



12:16

a kitchen, a commercial kitchen that's actually part of



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the tundra buggy Lodge, which is out on the shore of the Hudson Bay, and that's actually a commercial kitchen that supplies



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power



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to the rest of the lodge by a diesel electric hybrid with about 4000 pounds of lithium batteries on board there, which is cut the fuel consumption on the lodge to about a third, which is significant when we're in a remote location where



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fuel has to be hauled over the



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tundra, where there is polar bears everywhere.



12:56

Next slide here, so a little bit of where we are going to argue this point is the the actual natural factors which are part of Manitoba energy. So Manitoba is one of the best provinces in terms of the natural factors. It includes the maximum amount of energy that the system can produce? We find that the natural reason why the solar system is good for Manitoba is that when it is sunny, it's usually either very cold or very hot, and somewhat supplements where there are extreme temperature



13:39

changes in



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in Manitoba,




13:44


when it's cold, it's usually Sunny, and a large amount of manpower is actually needed by electric heat, a disproportionate compared to some other provinces. And when it's very hot, we think, you know, air conditioning, fridges, freezers all fighting the heat of the Sun and solar in some cases, directly





14:05


offsets some of those surges,


 14:09
not all of them, like Daniel spoke to but it is


 14:11
directly, directly related to refrigeration.


 14:16
In some ways.


 14:22
There's a quick case study. I just wanted to you know, just this has to do with Manitoba as well. I don't know if anybody's heard of York factory. It's an African historic site up on the it's up past Gillum. It's actually up the East River. Very interesting part of Manitoba history and North America's history. We've put an off grid system into there, and

 14:44
just a couple of things related

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to that, which, which

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are significant

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in terms of real world number numbers. So

 14:56
York factory has, that's the building in the picture there. That's the the old. A trading post. Basically, there's nothing left except that building now and then. Kind of where this picture is taken from the staff. That's kind of the staff and some indigenous knowledge keepers stay there. Some people that work on the building restoration specialist, they're there for approximately 14 weeks a year now, starting in June to September. Before we started adding

solar to the staff house, they would run approximately 300 hours of diesel generator. It's 10 kilowatt diesel generator there. We've slowly added some solar based on budgets, federal government budgets, and that to to the staff house, and directly, directly related there was,



15:47

they've calculated, you know, they





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used to be 300 hours of diesel. Now they're at approximately 30. And that's 300 liters of fuel. Is more easier for them to track is in that capacity, they had to sling it in with helicopters, which, from yellow, is a 30 minute flight each way. So about an hour and a half and no passengers are able to be on that flight. So you know, a barrel of fuel coming in is another \$3,000 in fuel cost, basically your helicopter cost. That was at the nine week season with three person occupancy, and now that summer, summer season extended to 14 weeks, six person occupancy. Now they're approximately down to 50 liters in that 14 weeks, which is now able to be brought in by by boats. There's boats that bring in tourists, and this is like two dairy towns a year that they're now down to, which is, which is significant. And I think that's where it fits into this, this Manitoba energy grid that you know, your factory is so close to all the the famous Manitoba Hydro dams that are, you know, they're very close by. This is really the mouth of the Nelson and it's just obviously way too costly to bring electricity. So solar really offsets the fuel cost in in that location. And they have, you know, they've now put up a shop with with chop saws, skill saws. There's more fridges, more freezers. Obviously, you know, there's surges at the at the beginning and end of the day. I'll kind of go a little bit there. That's the stat post. That's the the picture on the left there shows the East facing roof with some solar panels. Like I said, these are added on, you know, usually a couple years apart. So now we have a East facing which is covering our morning sun, and that's when the, you know, the toasters and coffee makers. So you don't so it limits the size of battery bank you need. You don't need a massive one to try and capture everything in the middle of the day, the solar on the east side is capturing our morning sun to cover our morning surges. The picture on the right is the latest one, and that's the extra two kilowatts that's south facing, which has made a huge difference in no runtime at night. So it may not cover our our daytime use as it's not a huge surge around noon. There's no air conditioning on the site, but it allows the system to stock right back up to make it through the night for the fridges, freezers, wastewater system, water system, that kind of thing. This is the West siding, the West Side. More solar there, and then there's water tanks there. Again, it's in a tidal plane, right? So there's, there's water tanks, those, those steel tanks, or water tanks of Parks Canada put there to basically fill up with, with water at low tide. So they're not bringing in brackish or salt water. Wastewater system is in a little, a little white building on the bottom. So they're having really good, really good, real world numbers that we can track on this site. One other just a quick point before I finish up here the there's Polaris makes a electric ATV, the Polaris Ranger. EV, and in some of these locations in Wellington, Churchill, there's another one up in Inuvik, in houses territories. But we've, we've installed solar on the roofs of these and it's basically, you know, it, it allows them to have an EV in these locations and not rely on their their little micro grid when they're off. So this can go, it extends a significant range extender, but it's also fueling itself. So wherever you park it, if it's parked for the night or the day or a week, it's always charging if there's, if there's sun out, and it doubles as a is a rain shelter and


and it's just another vehicle that's, you know, it's. Is it not, not necessarily it's an EV that's not adding to the Manitoba grid. So that, in that case, dollar is really helping the grid in that way, by not adding another EV to charge. So that's kind of some of the findings on our on our off grid


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presentation. So


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that is it for me.

 20:26
Thank you so much. That's excellent information. So we've got some questions coming to us already in the chat. So to start off, we have one that is, what is the role of passive solar play in controlling the indoor climate in the buildings for which you advise people by passive solar meant the sun coming through the windows?

 20:53
Oh, yeah, that's a tough question first. Well, I mean, I would say I'm an expert in solar when they become electrons, not when they're still the sun. So I think that's probably something that one of the HVAC guys on the call would be probably more equipped to answer. We don't typically advise on that, like we're not involved in, like the design of the buildings and where the windows are placed, or any of that. You know, we're really more concerned with turning that those solars into electrons that you can use for energy. But yeah, there's certainly, I mean, I know from the little experience that I do have that there is certainly a big place for passive solar and sustainable buildings in all buildings. In fact, even in my own home, you open up the blinds and all of a sudden it's five degrees warmer in your living room, right? So yeah, there's certainly something to be said for that, but wouldn't be my area.

 21:47
Okay, so we had a little bit of, is there anything you wanted to add to that? Ty,

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no, no, that's the only thing

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I would say, in terms of, like solar, like I, for example, on my roof, I find that it's, it definitely

makes the attic cooler, is there's basically an air gap in between your panels and your roof, and it's saving your shingle because they don't see the sun anymore.

 22:07

Good points. Good points. Okay, so kilowatts saved in Manitoba are sold to the US, or does Saskatchewan? So do people accept that generating more kilowatts actually does have a positive greenhouse gas story?

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And who you talk to, I guess, you know, we certainly tried to make that point. But, I mean, I you know, I believe there's even time when we're buying power from the US, you know, evening. And you know, there are times when your home is actually powered by coal, likely. And you know, I think it's hard to like, it would be hard to track that enough to be able to make a proper and I think if there's a comment down a little further about the accounting, and it's it'd be just very difficult to account for those so, I mean, you can say it, but whether the person you know believes or takes that to heart is, is another story. But yeah, I mean, the point was made that is good for the planet, which certainly would be good for the planet.

 23:06

Okay, anything else that you wanted to add?

 23:11

No, I agree. There's a really good it used to be kind of a black eye for solar is when they when the panels were at end of life, not producing as much as a new one, and recycling solar panels making leaps and bounds. Right now, there's all kinds of new technologies and and factories popping up that recycling panel, which is good to

 23:35

see. Yes, let's think about the whole life cycle of things. Okay, so a question here that just ended up to me. So it's that, do you see any demand for solar water preheating in Manitoba at all?

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I think solar thermal is very interesting. And like those, you know, vacuum tube solar, it's not something we do again, but, but I think there is a case for them. You know, I would you use them to heat water? I mean, I don't know if you would do it in Manitoba, whether the gain would make it worthwhile. I but there's, there's definitely some use case for the for the technology,



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yeah, and in our case, we have, we actually do that quite a bit, because, again, heating water takes such a large amount of power we have. We have diversion loads, basically. So once the batteries are full in an off grid system, any like, if the batteries are full by doing what's the point in wasting the rest of your solar? So that diverts that solar directly into basically a water battery at that point, so it diverts, it's a divergent load, directly to the water tank here.



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Hey, great. So how much do you see battery technology changing lately? So how is that affecting the capacity, the longevity,



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in terms of lithium ion, which is. Which is the main one we deal with in our in our EV business, just a quick example, in the same footprint, because we build battery packs in a



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physical size.



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Within, I would say, four years, our lithium ion battery packs have been the same size, doubled in capacity, in terms of kilowatt hours, and half in cost. So I think, and that's that's almost every couple of years, it's doing that so very interesting to see. And they're getting safer all the time in terms of lithium. I think the lead acid and AGMs have really kind of leveled off in terms of their advancement. You know, they're, they're quite an older technology now, which is just a proven technology. So we still put them in a lot of locations that are, you know, seasonal. So, like lithium is more of a likes to be used where an AGM can go to sleep for nine months and not worry about it.



26:05

That would that's some



26:07

points on batteries from my side.



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Yeah, I would say the one thing with with batteries, like the technology, is moving really fast with lithium batteries and the battery management systems, the one thing that's moving a lot slower is, is the electrical code and the rules around it, and that's presenting a lot of challenges. Like for Ty, if he's installing in a location where, you know, he's not connecting to a grid, and he's not, you know, in a residence, he's not necessarily going to see the struggle that we see where we're trying to, you know, install some lithium batteries. Like, as a matter of fact, we have some in our shop in the back installed. And you know, the difficulty with which it you the difficulty of getting those installed and passed based on the rules that are currently in place is significant. So, you know, we had one installation in the City of Winnipeg that took 910, months for permitting just to go through the code deviation requests and meet all the requirements that were required. And some of this stuff is getting built into the 2024, code that's coming out right right away, so that we're not going to go need to go through those same processes. But it's still quite a difficult thing to be able to install these batteries. So



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yes, yes, I've heard some challenges that the codes been presenting for you folks. So the greener homes Grant was harder for low income homes because of the need for front load the payments. So the rebates would come months after the expense. Do you think programs that support solar should be focused or should be trying to address energy poverty or focus on just adoption?



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That's a question that might make me unpopular. Yeah. I



27:54

mean, I think they maybe need to set some some high end boundaries, like, we should we be giving grants out to people that make \$300,000 a year? Maybe not, but like, I also don't think we should be giving grants and loans to people who are making \$20,000 a year. Like, there's no point in saddling somebody with a system that they can't afford to maintain. You know, if something goes wrong, then they've got a loan payment in a non functioning system like that doesn't make sense either, you know. So I think we need to target, you know, maybe on the, you know, lower middle class to, you know, middle class as opposed to, you're right right now, like the way the Loan and Grant were structured, you needed to have, you know, \$30,000 sitting around to pay the bill and then get reimbursed later with a loan, which doesn't make a lot of sense. So there are certainly some problems with the way they did it, and I think the next version will address some of those problems. My hope is that it doesn't just entice a bunch of people who really, you know, shouldn't be installing solar like we often will get requests from like a retiree, inner 60, late 60s, early 70s, on a fixed income, who wants to install solar, and you're like, Well, you know for the little bit that it's going to save you. Do you really want to be saddled with a 30 year loan that's tied to your property like that? Doesn't make any sense

either, right? So, I mean, we got to be mindful of both, both aspects, like, we don't necessarily want to give grants to the Ultra Rich to do solar, but we also don't want to straddle or settle, you know, poor folks with loans they can't afford for stuff they can't afford to maintain. So

 29:36

Okay, so next comment is solar totally makes sense, especially if we start thinking about managing climate risk. Are any of your clients thinking about resilience yet?

 29:50

Yeah, oh yeah, yeah. Everybody wants to install batteries, you know, like a lot of the times, and I'll be honest right now, just with the difficulty of installing batteries a lot of times. You know, this probably is, won't be popular on this call, but a lot of the times, we suggest a natural gas generator instead of a battery, just because of, you know, cost and reliability and the ability to get it installed, you know, efficiently, right? So, but we do have those customers, and a number of them who say they don't want any more greenhouse gas emitting things on their property. And you know, solar is certainly a good option for that. For true resiliency and backup with solar, you would need, especially to do it in winter months. You would need to have pretty deep pockets, as Ty can probably attest. I mean, what are the batteries on that house cost there? Just as a as an example,

 30:46

yeah, no. Without, you know, you

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get 100,000 probably no. At the New York

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factory, there's,

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there's 248 banks. They're just probably six grand apiece, which isn't bad, but, but again, that's not, that's not winter time. It's not that's,

 31:06

yeah, I mean, the way, the way that I typically would have it phrased to the customers, like when they insist that they want to go on with batteries, is that, you know, you would tell them

the price of the battery, and tell them the price of the energy that they're going to be able to store in that battery. And when you do those numbers, you go, Okay, well, for \$7,000 you can store \$2.20 worth of electricity, you know, you do the math, right? Like that's, yeah, it's not a very efficient right now, it's not a very efficient way, you know, especially if you want to live, you know, like when you're talking about resiliency, do you want to be able to cook when the power goes out like you certainly can't do that for a reasonable penny. I mean, the last backup system that we installed was an extra of \$60,000 for the customers.



31:54

Okay, so Ty spoke about diversion loads. Daniel can a grid tied setup. Also divert to water heating or storage loads in lieu of batteries.



32:06

Don't know about the water heating. I'm sure there's something. There's all sorts of things. But yeah, we can do hybrid systems, and a lot of times, what we'll do now is we'll set customers up, if they're insistent that they're going to want backup, we'll set them up with a hybrid system, or at least make it like hybrid capable. So it's just a matter of installing an inverter that's capable of working, and Ty would probably work with a lot of these inverters that are capable of working both in grid tied and in islanding mode. So, you know it, you know? And we say, Okay, well, you don't want to spend the 60 grand now to put batteries in, but we'll, you know, spend an extra two grand, and then you're, you're ready to put batteries in in the future, and then you can do that, so then it would have the capability of doing both modes. Okay?