

Re: HyWatts Q&A - August 22

[@0:15](#) - **Alex Ivanenko (HyWatts)**

Hello, hello. What do you mean?

[@0:17](#) - **Group 2**

I like to say I'm how are you?

[@0:20](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Good. How are doing today or tonight? Rather?

[@0:23](#) - **Group 2**

Yeah, been very well. Thank you. Hi, Alex.

[@0:27](#) - **Alex L**

Hi. Hi, everyone.

[@0:31](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Hello.

[@0:32](#) - **Alex L**

Thanks for giving some more of your time, guys, and I'm very appreciative and mindful of the delay and you've got far more important things to be doing today, so thank you.

[@0:48](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Our pleasure. Happy to hop on and help provide more answers.

[@0:53](#) - Alex Ivanenko (HyWatts)

Right.

[@0:54](#) - Alex L

Thanks, Sam. So, Alex, from my side, Sam from my side, there's four buckets of questions. And that's all I've got.

I'll try not to too many others. But yeah, I'd just be good to get a sense of your responses to those.

guess I've already taken myself a bit in a sort of piecemeal where I've been traveling a bit. And so now from a better place to actually come to an assessment having got up the curve from totally zero on hydrogen.

So yeah, if you want to just use that as the agenda or take it in other directions, that's fine.

[@1:36](#) - Alex Ivanenko (HyWatts)

OK, so another opportunity understandable. So let's also lead that conversation if you don't. So before we will have you to provide your own answers on your questions, before it starts.

So because the first question may be confused us, especially the numbers where we did not understand whether you take the number in your

in the phrase, your acceleration operating plan derived a variety of quiet numbers from you to 20. We checked all materials we shared with you and we were able to identify where you take that number.

So perhaps it's a, I'm gonna understand the question. Absolutely, and we will elaborate on that right now. On the second, just to want it to be sure that you are seeing a quiet Excel file.

And see if you can help us to understand where did you take that number?

[@2:29](#) - Alex L

So it will help.

[@2:30](#) - Alex Ivanenko (HyWatts)

Because we want to take or something like that.

[@2:33](#) - Alex L

No, no, look, I didn't mean it to, I certainly didn't mean it to kind of pin you on a number at all.

But, and I have not spent time trying to kind of audit whether I'm understanding your sheet or not correctly, whether it's the client numbers or not.

But I, I'm here in the QA operating plan and file that you kind of shared. a few weeks ago.

I had a couple of attacks.

[@3:02](#) - Alex Ivanenko (HyWatts)

I just wanted to call it a fight, right? So because if something is, I just wanted to help you and myself.

[@3:10](#) - Alex L

Have you got access to the operating plan Jan 2024 file that I imagine got thousands of versions, but that was a file you shared two examples.

Alex, do you want to show your Exactly.

[@3:28](#) - Alex Ivanenko (HyWatts)

I'm just, that was, I'm trying to walk.

[@3:31](#) - Sam Ruben (he/him) - HyWatts, Inc.

I think Alex is about, so I think we, because we were just trying to find it.

SCREEN SHARING: Alex started screen sharing - [WATCH](#)

[@3:36](#) - Alex Ivanenko (HyWatts)

Yeah, no. This one, right?

[@3:41](#) - Alex L

Yeah, if you unhide, unhide the screen, sorry, unhide it, click on, click on the base tabs and there's a couple of, I was being a bit naughty.

I, unhide a couple of tabs. I haven't gone through this line by line and I was just trying to get a sense of whether I could find some materials that were of interest relating to my points.

So you can ignore that I mentioned it but I mean you ask a question so row 63 levelized cost years one two three.

I don't even know if there's numbers you also theirs and what this speech this tab relates to but it just struck me as being a number that I was trying to get a sense of hence why I mentioned it.

So we can ignore it because it should probably as a distraction.

[@4:58](#) - Alex Ivanenko (HyWatts)

Right so this is a very old So we did build that in the beginning. So that is why we hide it.

let's say by the way, good question. So we need to remove it from the file. in general, so I would like to say that numbers here, so because we updated our efficiency level and et cetera, but in general, the numbers and flow calculation and logic behind that is true.

So because this is like a model, like I would say ideal case and et cetera, because it was before customer as a business level pipeline.

So now we're moving to another, this is a spreadsheet, right? Let me share another screen.

[@5:41](#) - Alex L

And if it's quick, Alex, I'm happy just to kind of take a verbal response. If it's helpful, you think, to share this spreadsheet, that's cool.

[@5:54](#) - Alex Ivanenko (HyWatts)

But equally, I'm happy to just say, oh boy. So we have two types of the project, right? So the first project is the type of board that has to be close to the charging station specifically where we are on hydrogen as an energy storage immediately.

So we don't have the intention to sell that hydrogen. But at the same time in our portfolio and if you see an hour presentation now it's like that, something like a high level figures from for customers, right, so we use for reference to both hydrogen people in \$7 per kilogram without subsidies.

But this is a small scale, actually in hydrogen manufacturing economy this is a really small scale project. So in our portfolio that is why that number is not attractive and not actually meaning the goal of hydrogen department of energy, right?

So but don't forget that numbers, it's a generated hydrogen on site and compressed already, so it's a system level price which is a very attractive.

But at the same time we have a project in our portfolio. which is we're not actively promoting. It's a repowering pinfall, where the customer is going to repower the pinfall and to have additional 200 megawatts power if he wanted to utilize for hydrogen manufacturing.

So of course, the product is about like almost a half billion dollars, but once again, they're not actually promoting that project to our investors, because you know, it's a huge project for startup.

That is why we are like working in like a sales sales board, and in that project, the cost of hydrogen, if we use our reversible new cell, will be bound to any half dollars per kilogram.

And I would like to decide that this is cost of molecular. It's a cost of molecular, which is already compressed and stored in the tanks.

I actually, because the part of energy and other manufacturer of hydrogen, they show you only cost of molecular, which is not compressed and not stored.

make sense. So that is why our actual price per hydrogen, if on really scale of the project, will be about about one dollar.

So before compression and without storing including storage capacity in the price.

[@8:19](#) - Alex L

Thank you. Can you just now go through? So you said two and a half and he said one and that was for the maybe the large scale project and I'm thinking there's another number for the plant in a box.

[@8:36](#) - Alex Ivanenko (HyWatts)

Can you just repeat that?

[@8:38](#) - Alex L

Can you just repeat that?

[@8:39](#) - Alex Ivanenko (HyWatts)

So for the box existing customers for hydrogen electric vehicles charging station. So the of the power level of conversables if you sell is about four megawatts.

Four megawatts. So it's a maximum. So I mean a maximum wishes that we're working on. about the gradient. So it means that the cost of this level will be 3.7 dollars per kilogram, substitute.

it means it's included compression and storage. course, it's in that price. It's important to understand. So when we are talking about much bigger, like a utility-scale storage solution, like with the price taking, we are working on the power level is 175 megawatt.

It's 20 times like, oh, it's a five time. Now, 4 to 175 megawatt. So it's 20 times more than the 40 times more than the four charging stations.

And this level, power level, 175 megawatt. So the cost of price is going to be about 2 dollars, including

the cost of the market itself, it will be about \$1, \$1, \$1.5 per capita.

[@10:09](#) - Alex L

Why are 1.5 pre-compression?

[@10:13](#) - Alex Ivanenko (HyWatts)

Okay.

[@10:16](#) - **Alex L**

Well, if you can do that, and from the limited education I've been giving myself, you're breaking ground.

[@10:28](#) - **Alex Ivanenko (HyWatts)**

Correct.

[@10:29](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

But, you know, we're not moving it, because that's where hydrogen gets really, really expensive, is once you start having to move around.

[@10:44](#) - **Alex L**

You're the ones with the interesting knowledge, so you care. All right.

[@10:49](#) - **Alex Ivanenko (HyWatts)**

this is our actually backup strategy. So, we're not actively moving to like hydrogen, molecular, right? So, market. The reason is that a lot of

People just available and people don't understand exactly what's going on in the market, cetera, et cetera. That is why we started to work focused on markets where we can't bring a lot of benefits, right?

So right now, from customers. That is why Cryogen is an energy storage, mutual power, one of the networks of specifically charge stations, which is, we'll provide, we definitely have a lot of benefits compared to other technologies and easily have customers to work with us rather than using other technologies.

And we, at the moment, I was, we don't consider ourselves as a part of Cryogen and Cryogen Generation and transportation industry.

In future, yes, as soon as the product will be validated, because once again, right now, the market is a big complicated, big startup and say, hey, we have wanted to be Cryogen manufacturing, right?

So because a lot of companies already do that. And like, but we might show the stage that compared to others.

So that is why we identify our niche focused. and where we will do and build and validate our technology person, of course, the natural real available to the security scale storage is based on our water market strategy plan.

[@12:12](#) - **Alex L**

To understand, you're going after the partner box storage as your first product, but clearly you're solving for utility scale hydrogen at the target that's set for 2030 or even 2050 of one buck, a kilogram.

So, actually, you might solve the whole industry, but you're not going after that right now. Is that fair? Is summary?

[@12:39](#) - **Alex Ivanenko (HyWatts)**

Yeah, but of course, that should be not the same. So, expect it to be much better, but we'll expect it.

[@12:47](#) - **Alex L**

That's everyone else, that's everyone else.

[@12:50](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

think what you're kind of getting at is one of the deploy a high-temperature PAM electrolysis. is a major breakthrough, and there's going to be a market for those electrolyzers, even without the reversibility.

That's what we don't talk about that much, because we talked about it previously, we're like, oh, that's going to be the everyone to see the story thing.

But that's that is one of the realities. It's not our focus, but it is one of the realities underlying what we're doing.

[@13:21](#) - **Alex L**

Yeah, I, I flagged this with a couple of friends who work in and around the hydrogen space, and basically both of them said if it can be solved, then it's going to be big news.

[@13:36](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

So, and maybe we should talk about that, the electrolyzer part a bit more, but since we've been focused on the storage and everything, we have, we haven't been, you highlight something that's in a whole other market segment that's going to be a significant opportunity there.

Once, once we get the everything locked in there with the other polymer and all that, yeah.

[@14:00](#) - **Alex L**

Thanks Sam. Okay so I'll sort of shut up again so I think I've got a clear sense of those numbers so that addresses the cost per kg in I think and that okay so it's just probably to finish off I guess the sub point of question one yeah it's it's solar to H2 exactly so it's the H2 and then just to I guess that the last bit back to electricity is really where you start comparing yourself to lithium right but but how is that the system level yeah how should I think about the sort of store back to electricity what is that cost per kg I don't know what the equivalent is for lithium but it's not it's not going to be yeah that's why we don't think about it in cost per kg it's really

[@15:00](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

about what's your cost per kilowatt hour? Because that's where you're able to get the comparison to the lithium is with the comparison of the end cost of electricity.

[@15:09](#) - **Alex L**

And your deck says it's half, that point.

[@15:12](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

And it's significantly smaller, particularly once you get into those larger capacity use cases. Yeah, Alex, do you want to bring up that slide with the other colored dots?

SCREEN SHARING: Alex started screen sharing - [WATCH](#)

think it can be helpful for kind of highlighting. Because we recognize there are situations with lithium and other technologies are going to be better, particularly below one megawatt hour of storage.

But once you get above that, they get pretty expensive pretty quickly. And that's where our system really starts to shine, is that those higher capacities and longer durations?

[@15:51](#) - **Alex L**

Yeah, interesting. And just so I haven't seen that.

[@16:00](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Yeah, I think that we have put the slide together since we, uh, we, we talk differently and we can, we can share an election.

[@16:06](#) - **Alex Ivanenko (HyWatts)**

We can share this updated deck, I think, uh, the deck is updated in our, uh, no.

[@16:11](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

All right. Yeah. So if you go to the notion page, this should, this should be there. And we have both this and then Alex, you want to show the next one, uh, would show kind of the comparison in terms of capex of the storage per kilowatt hour.

[@16:25](#) - **Alex L**

And this is just the storage of the system, not including the solar. Okay. This is great. For, for ignorant people like me, um, just the apples to apples was.

[@16:36](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Exactly.

[@16:37](#) - **Alex L**

realized. Yeah.

[@16:39](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

And then we realized that about a couple of weeks ago that that was missing. And so we, uh, they put this here.

Well, that, that, uh, it wasn't, I, I've seen it. It was the key. Um, yeah, it wasn't as clear.

had other, we had some like business model stuff. was trying to simplify it to make it as just pure comparison as possible.

[@16:59](#) - **Alex L**

Yeah. Okay, well, take a look at that with great interest. Thank you. Okay, so look, think point one is, and, okay, so how about round trip efficiency?

it's compressed, it's not liquefy, which is, I guess, given efficiency perspective, but I did note in the patents and the innovation element, you were, there was a comment around, I guess, capturing waste steam, maybe you're going to have a better throughput, actually, I about the heat turned right by the system to increase the efficiency of the compression.

Yeah, all that and no doubt there's other elements to what you're innovating. So do you have a sense of, because I, you know, one of the criticisms of hydrogen and capturing it is around that round trip efficiency.

do you have a sense of anomaly?

[@18:00](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

but or not at this stage we do and I'm going to let Alex take you through that first I do want to highlight that while round trip efficiency is inevitably the question we get it's not the right trick and that's based on what our customers care less about round trip efficiency they care about what is that cost of energy at the end of yeah um so yes compared to my end system we're significantly lower efficiency but because we can deliver the power levels for multiple days at a lower apex and a lower cost per kilowatt hour that's what matters to our customers yeah so so I mean the Roger it's a good question and Alex can talk about it because we are better than standard systems from those parts but um that's not it's not really the right right metric I usually like to you know like provide an example so do you have a herd of our gravity storage so gravity storage

@19:00 - Alex Ivanenko (HyWatts)

concrete blocks from the proficiency even better than the little batteries. The problem is that is why we use that fly to show that depends on the storage size, you have to identify right tools and specifically for the product, specifically for your needs.

So it means that for instance, just an example, now gravity storage is much better than the battery, but don't forget that you don't integrate gravity storage in your form, right?

use the return battery, why? Because it's a constant effective, their size and etc. So gravity is very like an acceptable and really low course, but it's bigger one-scale storage, right?

but if you're working on like a 10 to 300, 300, millowatt hours is exactly the storage in each charge station in the world areas, a case you don't need to integrate your original battery because actually you have to type a, you will start paying a lot of money for companies because for developers, it is who's working on everything on that market, it's a world of the price.

and sunset. So that is why we identify like as the first effort of the market, right? with markets, huge charging station because we have a lot of competitors, congregate percent, yes, low batteries, low batteries, batteries, cetera, cetera.

But we will win them because of course, because of we've, because of a price per kilowatt hour, which is a two main parameters, which is important for customers.

They, I'd be honest with you, sorry, I didn't know what this is good. I can do this by the So here we are.

That is good. So it depends and depends on the, uh, depends on the project. So they, my customers even don't ask me about the competition, because they are asking to put on them.

What is the cost per kilowatt hour you can guarantee? what is the policy? That's it. And we are better than others based on these particular markets and that, of course, so we wanted to go utility scales, that data centers, but we can do that right now.

because I would go to low to the level compared to others and the requirements from data center markets and community scale to provide much higher to the level.

That is why our strategy start with a charge of station market, get validation, and move further to the next step.

[@21:17](#) - **Alex L**

please leave that market. Thanks. Can I ask a sort of stupid question, but just to clarify, the reason why I get it, it's about sort of end cost, and if you're cheaper than that, largely the main issue.

But if you, you're deriving your initial power from solar or wind or whatever it is, so presumably that is cheaper.

So I guess by looking at round trip efficiency, I'm trying to understand whether you can disrupt your initial energy source, because clearly, if you're a 30% efficient on a hundred,

[@22:00](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

a percent sailor like you would always use sailor for your primary power obviously we're dealing with storage here so that's you know that's important yeah so got it yeah so our intent isn't to use the hydrogen as a primary power source so we're not looking to potentially not for the small thing no because like because if we're doing that then it's more about how we we're talking about shipping hydrogen at that point if we're not using solar I guess I'm talking about the the full-scale utility plant that's doing it up do you think you're thinking about more utility scale use case got it I think so because that's where you're actually competing on a you know calling it one dollar kg I recognize the boxing is more about storage and I appreciate it yeah and utility scale is storage as well because that's basically taking largely earth field energy and then

and to the grid. So in that case, it's still going to be that utilized cost of storage and energy that's critical, even at utility scale.

Because if they lose some of the energy, but are able to deliver as much energy they need reliably and constant level to their customers at a lower cost, that makes a difference.

mean, a great example is a project that Energy Vault is doing with Pacific Gas Electric, which is the major utility here in Northern California.

They're actually doing a project in Calistoga, which is a community up in Napa. So just north of Bien, we're not involved in this project, but we are in conversations with both sides of it, because they're interested in what we're doing and how it can support future implementations of this type of system.

But yeah, they're using liquefied hydrogen to provide 48 hours. of backup power for the entire city of 8,000 people.

So, hydrants are even, even though it's really expensive to move around hydrants, mean, talking about like 20 to 30s of like, oh, remember the number they're using for their hydrogen?

[@24:14](#) - **Alex Ivanenko (HyWatts)**

like 35 kilogram or something? Yeah, yeah, of course.

[@24:18](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

It makes sense for them to use hydrogen.

[@24:20](#) - **Alex Ivanenko (HyWatts)**

Right.

[@24:22](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

With current hydrogen, which is at a lower a lower range of missions. And so, with once our system, like, with our system, it makes that a no-brainer for that.

That's what they're really excited about it.

[@24:34](#) - **Alex L**

So, I will not ask another round of proficiency question after my last question. So, if I'm to understand the full round trip of the three segway, know, solar, H2, electricity is cool at 30, 40%.

Presumably, I won't pin you on a number, but presumably, if your innovation is actually effective along, in the way that you hope.

that should be incremental, maybe material improvement. Is that a sort of fair assumption?

[@25:06](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Yeah, and Alex, we're currently at about that 40% number, if I remember correctly. We're basically on the upper bounds of best in class right now.

[@25:16](#) - **Alex Ivanenko (HyWatts)**

Well, 100%. So 40% on our figures, Alex, so we should re-staff this book like a cell level or sound level.

We are talking about like a system level. But we already included all positive energy expenses on compression, on heating, et cetera, et cetera, cetera.

So in that market, lot of these are outstanding because people provide like a very, very restricted numbers. would say it's meeting numbers, but on like a half system level, you know, about our approach, because we are all talking to more government organizations that will work with real customers or real cases.

We are talking and announcing like a system level figures.

[@25:59](#) - **Alex L**

Got it. That 40 is where you think you'll end up.

[@26:03](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Yeah, we're right around 40 at system level. So, and Alex, what's the number for without the parasitic loads? But it will be about 50, So, if we're trying to do an apple pops, Maris, into what a lot of companies talk about in terms of rounder efficiency, we're significantly better.

We're over a few percent, which is not including those parasitic loads, because most others don't in there when they share that number.

[@26:30](#) - Alex L

So, I don't know what paracetyl loads is, but the other question is, you haven't actually got the high temperature PAM operating.

[@26:39](#) - Sam Ruben (he/him) - HyWatts, Inc.

Now, have the HTPAM full cell end of this year, and we did just get \$200,000 from the Department of to accelerate the HTPAM electrolyzer development, and that's allowed us to bring in additional teammates.

And so, we shouldn't have that next, I think, first half of next year.

[@26:58](#) - Alex L

But it is the 40 percent. including where you think sounds like you've already got 40 or 40% will be the entire system level so including the compression including all the other energy uses within the system itself but if we're just looking at the stack and not counting all that then we're then we're our model going roughly about 55% round trip efficiency which is significantly better and that's and it's that really that more stack level is what most companies use when they talk about round trip efficiency yeah so sorry to be significantly better than you are on hydrogen yeah sorry thanks i'm sorry i'm not being clear but the 40% is is where you think you're going to once the paint the paint technology is in the product in the reversal fuel cell high temperature you're going to be at 40 today it's you know you're testing it and you're getting it to what i'm trying to like the question

Is it going to be 40 in five years time or even a year's time with your new innovations or is it actually going to be 40 to 50?

[@28:10](#) - Sam Ruben (he/him) - HyWatts, Inc.

It's possible it could be higher.

[@28:13](#) - **Alex L**

Okay, so before he's a base case for where you're going to get our model.

[@28:17](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

That's what our model is currently showing. There's a, yeah, I mean, particularly as compression, like if there's advances in technology outside of our core, like compression and other things, all of a sudden that makes our, that that that much better.

Alex, if you want to.

[@28:33](#) - **Alex Ivanenko (HyWatts)**

So just wanted to add here, uh, five sevens here, uh, because, you know, we depends on the project requirement.

So right now, once again, we're solving the fundamental problem of the source before the storage. So if our customer will have another, uh, task, like go high around the deficiency, course, it will be a different solution.

What we are offering right now, different, different engineering approach. In our models, we, including, like, everything, which is technologies available, right?

first, we're using standard, standard compressors or standard fans, which is, we don't need to be designed. Is it available in the market?

Of course, it's giving you 40%. And is it why we use standard? Because we wanted to, like, be on the cheap, much lower cost as much as we can.

But we can design new fans, which is, it will be much better. And of course, but that will cost a lot, but right around the proficiency.

These are like, you know, balance you have to buy it here. So what exactly is the product for the market?

For the market, the product, okay. So there is one on the proficiency.

[@29:44](#) - **Alex L**

Is that possible for this particular market segment, right?

[@29:48](#) - **Alex Ivanenko (HyWatts)**

But the cost is more than one. But the fundamental problem, at least, you have to solve around the proficiency problem.

Okay, no problem. I will do three turbines and et cetera. But the system was a little bit. How to build a dollar, right?

Because you have to strike time from design, you have to design from the single components of the seat. Depends on the task, you know.

[@30:11](#) - **Alex L**

I have no limitations on what you can achieve.

[@30:15](#) - **Alex Ivanenko (HyWatts)**

So, instead, thank you. So, have limitations. the physics physics, you can break through physics, right? So, anyway, but I mean, of course, we can go higher, we can go higher, so, but not up to 100%.

When they have a little b, not 100% or 90,% of our, which is never. So, just for your life, right?

But this is a very portable, arbitrage market, we doesn't do both of them. We digress.

[@30:45](#) - **Alex L**

Got it. Thank you. we did talk about last time, but on the assumption that, that what has been done differently, appears,

is to be quite linked to the patents that you are filing and frankly hasn't been done before in Sam's words.

So I don't need, I guess what would be good is just to get a sense of how much confidence you have in what you are in the technology, the two bits of technology that you're developing.

Is it 70, 80% plus? Could even be 90, 200 or is it you know still kind of trying to figure it out?

[@31:38](#) - **Alex Ivanenko (HyWatts)**

Alex, I think you were taking this one. Oh yeah, exactly, yeah. I know that you wanted to say.

[@31:44](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Sorry, I shouldn't have been made that far.

[@31:46](#) - **Alex Ivanenko (HyWatts)**

So okay, so even in mind I will be questioned about like a team of abilities to solve conventional size, right?

Because this is open the bottom like a previous question about confidence. So once again, The team was very well-produced in culture, few sub-technologies.

This is not our first time when we do yield a few subs in our life, right? So the idea, because we did have the high-point, the big power, so we started from lack of growth crunch, right?

So a beautiful lack of growth type of the system, which I hope you will see, because right now it's managed by others.

But you will see the aircraft very, very soon, right? As the system is a main component and et cetera.

So that is why we understand exactly what we have, what steps have to be done to build a commercial full-scale brand, 100%.

Moreover, so understanding, because we made some mistakes already before. We eliminated mistakes during the development stage. That is why our plan, development plan, is like a group we attracted for customers, investors, because it's really like a short period of time to create the product.

Why? Because we already done that, right? Because developing for the view cell is almost the same approach. If you know and understand the specific view cell you are working on, high temperature memory, we understand that well.

So we are a lot of people, steps. So that is why for us building the product for Crash, it's easy.

The multiporta stuff, what we did already before engineering stage, we validated our approaches on the mental level. So it's with small coupons, where we were the data interface layer and etc.

And the console, that actually helps us to submit a few per first-party application, right? But of course, we have risks.

So to scale from this coupons level to bigger scale. So again, we are supported by the department of managers.

It's typically for that grant for each other side. So we will build like a full-scale cell based on the grant and the technology product.

So based on your ideas, gain a link to the question, which is that I just mentioned about like what's the goal we are trying to solve, right?

So around the deficiency or topics that depend on that, we already build the model, which is like a physics based model, all parameters.

And so it's a huge spreadsheet. If you want, I can try to show you, but I don't want to become you boring at the end of Thursday and they get paid.

But this is a big story and including all parameters. And based on that, the jobs of the ability and efficiency, right?

So what is the actually the risk of the technology? Of course, I will be a bit as usual. So we don't see the risk on material side, like I've been in general and engineering side.

So because once again, coverage periods, we have some risks or material side because one of in no one before the scaling that interface layer for this group was too big of bigger stuff.

So that is why my risk estimate will be about like 18, 90% of risk that we will deliver that product, but again, 80% means that we will be able to do that.

And efficiency once again, this is like a simple maths. we already counted all parts. So we do believe that it will be once we are right in our demonstration figures.

So we will be very, very close to that number. So it will be gained between 90% 100% of risk here.

not like achieve that number. Is it clear?

[@35:46](#) - **Alex L**

Thank you. So in terms of the first sub question, will it be as reliable and as efficient as two independent components?

You're saying, Yes, with a 90 cent plus confidence that it will be in the same kind of level of efficiency and durability.

Is that right?

[@36:08](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Yeah, I mean, and even of it is that we're simplifying the system, and a simpler system inevitably has lower points of opportunity for failure points, and fewer things that are going to going to break down.

So that's part of it as well.

[@36:25](#) - **Alex Ivanenko (HyWatts)**

Let me show you.

SCREEN SHARING: Alex started screen sharing - [WATCH](#)

[@36:29](#) - **Alex L**

Sorry, just Sam on that part. So I agree, like, simpler is always better. One of my hydrogen friends flagged where you're combining components, that it might seem simpler, but equally, right, but also, yeah, and also sometimes machines work better in one direction rather than the other, which comes the point around efficiency working in both directions. But I intuitively, I'd take your point like simpler, better, great.

[@37:05](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

But I wanted to ask it again, because you know, of those concerns.

[@37:11](#) - **Alex Ivanenko (HyWatts)**

Yeah, I did that for all the right questions. Sorry for that. So let me go through the configuration. And once again, they look combining two devices in one device.

So we actually, we said that, but actually, we're using the device, which is absolutely new, you can iterate in both worlds.

So it's not the same technology, right? So this is not like a generic of words, where we put a few stuff, technical, few stuff, technical use cell and the actual wise with the one box, we're introducing can you sell where you can do those kind of compasses.

So that's why you're in comparison about that, to have separate devices, we can do the one box, the time, give you different expectations.

are talking about it beats like a complete individual involves the of the problem. Alright, and I also wanted to emphasize and show you why we believe that after that few slides you will see why we believe that the approach single unit much more efficient because we change temperature of the chemical reaction etc.

So this is a classic system configuration if you wanted to use hydrogen as an energy storage medium. So let's show up either plus balance of plant right so and low temperature low temperature if you sell to cover hydrogen back to electricity and then it's balance of plant.

So when you move to high temperature reversible you sell so which is a it's a introduced to new cell where you can do both of the chemical process and it's because of high temperature you don't need to use human divide and heat exchanger on because any inlet air the problem of any air can move down the elliptical reaction.

So which is up like a just. to understand wet rate of 180 degrees Celsius and even you will deploy our system in Saudi Arabia so it will be like, I don't know, 60 degrees Celsius outside but any weight will cool down the electrochemical reaction.

If low temperature, previous picture, so the temperature of electrochemical reaction is 70 degrees Celsius. So it means that Saudi Arabia, it will not cool down the electrochemical at all.

Even the UK, 30 degrees Celsius will create a lot of problems. So that is why you have to build huge, huge heat exchanger, humidifier and et cetera to provide a stable operation of fuel cell.

Make sense?

[@39:42](#) - Alex L

Yes.

[@39:44](#) - Alex Ivanenko (HyWatts)

And in fact, talking about electrolytes of water preparation, standard electrolytes require purified water, distilled water. So which is a huge, like it's additional manufacture to clean it, to produce distilled water on site.

which is again cost a lot of money and provide a huge headache for this type of, this electrolyzer plant operation.

So in our case, because we are on a high temperature 180 degrees Celsius, water becomes like reparate our electrolytes in move.

So water, we will boil water, again, we still call it light heat and et cetera, because 180 degrees Celsius.

And my natural water is steam move, it's by default, it is still. So that is why we can use like a standard portable water.

we had a few projects with department of the benefits, and the one of the benefits they are captured, that we can use human liquid biological liquids, you know, which is that when you're in the field.

[@41:00](#) - Sam Ruben (he/him) - HyWatts, Inc.

And we can generate clean water, we can use it to create drinking water, energy, and hydrogen, one of the things they really like.

[@41:07](#) - Alex Ivanenko (HyWatts)

And as you will see, of course, it's simplified everything because I mean, I just showed you the fewest components of the classic system.

When you eliminate that, the water condition of humidifier, bunch of heat exchangers, that's exactly the number which how we use complexity, of course.

And of course, when we are like above the vision of why we're so confident, because, yeah, we see that system will be simplified.

And of course, because of high temperature, once again, don't combine any two devices in one. So it's a completely new product, which is a little introduction of the market by high ones, where we can do both of the mechanical process.

[@41:48](#) - **Alex L**

Yeah. Okay, thank you. Last bit was switching. So presumably, energy is energy, don't really care where it comes from.

[@41:57](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Yeah, we're true energy agnostic at the end of the day. For example, the Winston Airport project, we're going to use Wind because it's seven.

It's lot more sense. Yeah. The reason we focus on solar for the power plant in the box, generally, is that that's usually going to be the most effective and lowest cost solution.

But obviously, there are places where solar doesn't make sense. Wind does. There's going to be places where maybe you're dealing with intermittent hydro or, like, so it really doesn't matter.

We're like chronic plastic, if you will.

[@42:31](#) - **Alex L**

And if nuclear fusion and fission comes through in some blooming time, presumably, I don't haven't looked into it. But if there is some quantum breakthrough, I don't know enough about it.

But unless it's in your pocket and usable the whole time, presumably storage is still going to be a thing.

[@42:53](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Storage will still be a thing. And really, most of those systems are going to be modeled on the old school.

both centralized production and distribution model. So even then, there's still gonna be a need for distributed storage and generation to ensure reliability, particularly in the face of increasingly severe weather and increasing number of fires that threaten that infrastructure given the realities of climate crisis.

[@43:18](#) - **Alex L**

Yeah. Gates, that's obviously this is a super interesting area and I really enjoy getting into it. And thank you so much for your very valuable time.

I won't keep burning it. It's easy, it was only on your side.

[@43:38](#) - **Group 2**

No, just to say thank you. And it seems like there's been a few updates to the notion side. So if there's anything in particular, we should draw our teaching to just let us know.

[@43:49](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

Yeah, think that's the main one. don't know that too much other things have been updated. think we will be putting up a updated one pager sometime in the near future, but that would be all information that's already in the deck anyway.

[@43:59](#) - **Group 2**

I'm here.

[@44:01](#) - **Alex L**

I don't know if we've heard about that but last week we signed one more of the lives of two my own project who is also building a job in comp work and utility trucks so we're right

down discussing the feasibility study commercial feasibility study driven so we expect to convert it into that design that will be by the end of September so so this will be the third feasibility study for the company's question is that good good direction for us and I think you might ask you like one more question about what is the what is the stage where we are together right now so your process yeah thanks I was going to come back so I am in a good position so thank you very much for this course super helpful and I am going to propose to one particular client so I'll dust that down

this week but say and give them a bit of time to just get their heads around this totally exciting thing energy area so if there's a deadline let me know but I'm gonna share a very short memo with one client in particular and you know I can push them for answers any questions or final decisions in a day or two but I'll probably give them most the next week so you know early September so in a car you know we can set money in let's say two weeks time depending on me your end that's you know what we're like I won't say days but a week or two being able to close if you've got so the answers I am going to put this forward unless CZ's had completely different perspectives from me but I'm gonna put it forward

And yeah, I see in the safe is pretty why combinator standard, but if it is, maybe okay, it's standard fine.

So yeah, so a couple of weeks, all day.

[@46:13](#) - **Alex Ivanenko (HyWatts)**

can you remind me because I remember that we discussed last time at the check size, usual 25k, it's the same number or is it fine?

[@46:20](#) - **Alex L**

Yeah, so I'll do, yeah, maybe exchange rate is bouncing around. I think, yeah, usually 25k English, so I see 30 and a bit dollars.

So cool at 30, but you know, it might be bit more. If that still works for you.

[@46:42](#) - **Alex Ivanenko (HyWatts)**

Well, I must think because we have 200k available, and in parallel with a few additional customers, investors, sorry. And just to work with that, we have enough spots or we have to extend our options, cetera.

So we now are in our pipeline and we put Like a potential check site for 25.

[@47:02](#) - Alex L

So let's do this. 30, \$30.

[@47:05](#) - Alex Ivanenko (HyWatts)

30, okay. Yeah, 100% of course. So.

[@47:12](#) - Sam Ruben (he/him) - HyWatts, Inc.

Yeah, no, just really appreciate the time and interest. The great questions. And if there's ever a need, obviously, we can hop on the call with some of your hydrogen folks.

They have additional questions.

[@47:24](#) - Alex Ivanenko (HyWatts)

It's easier. But.

[@47:27](#) - Alex L

Thank you. No, I think it's super exciting. And I look forward to not educating them, but. Advocating what you're achieving, because, you know, I really like 20, 20, peak hydrogen and obviously people have cooled a bit.

But what you're doing, if you achieve half what you're doing, then it's clearly going to break, break, break ground, which is needed.

ACTION ITEM: Send \$30k payment upon receiving invoice - [WATCH](#)

ACTION ITEM: Share feasibility study results for third project with Winston Airport by end of September - [WATCH](#)

But thank you. Yeah. So thanks again. So I'll come back to you. I think we're in good shape. So, you know, 90% confidence that we'll, we'll get this.

[@48:00](#) - **Alex Ivanenko (HyWatts)**

down. Okay. Thank you guys.

[@48:03](#) - **Sam Ruben (he/him) - HyWatts, Inc.**

a great evening.

[@48:05](#) - **Alex L**

Thanks so much.