**In twenty-fifteen Tesla launched their legendary Powerwall to great fanfare. It wasn’t the only battery energy storage system that you could buy, but it was well packaged and very well marketed and for the most part it did exactly what it claimed to do, which was to offer homeowners a degree of flexibility and independence from the grid, often in combination with a domestic solar PV array. Today, in April, twenty-twenty three, around two hundred and fifty thousand households around the world have a Tesla Powerwall installed.**

**So, it’s not surprising that, just as they have done in the electric vehicle world, other manufacturers have looked at Tesla’s success and thought “I’d like a piece of that action”. But of course, you need an angle, don’t you? If you just try to rip off Tesla’s design and technology then you’ll probably fail. You have to offer the customer something uniquely different and hopefully better if you’re going to wrestle market dominance away from a company headed by one of the world’s most eccentric and quirky showmen.**

**Well…now, journalists in the science and technology community are wondering whether that moment may have arrived with the launch of the Amptricity battery, which claims to be using solid state cell chemistry and have all sorts of benefits and advantages over its competitors. So, let’s take the cover plate off and see what’s going on inside one of these contraptions, shall we?**

**Hello and welcome to Just Have a Think,**

**Not another video about bloody solid state batteries Dave? We’ve been listening to you YouTube types droning on about these things for years now, and no-one’s managed to properly nail one at scale yet, have they?**

**Well, no, not really, that’s true. At least not one large enough to power a house anyway.**

**Which is precisely why this new Amptricity Domestic Battery Storage system seems to have raised some eyebrows in the tech press.**

**So, who are these folks then, and why have they apparently suddenly materialised out of the ether with a gamechanging cell chemistry design that no-one else seems to have been able to produce despite many years of research and development?**

**Well, Amptricity was founded in Florida in twenty-twenty and operated in stealth mode until November twenty-twenty-two, when they first announced their claimed industry breakthrough.**

**Amptricity reckon their battery technology is at production ready status and they’re taking pre-orders right now at their website. In fact they say the first deliveries will actually be happening in quarter one of twenty-twenty-three, which has just ended. But they also say that their first factory will be built by twenty-twenty-four, so it’s not clear where the initial production run is actually being made. Nevertheless, Amptricity clearly have big plans. They reckon they’re on track to manufacture and deliver as much as four gigawatt-hours-worth of domestic batteries in the next thirty months. That’s enough for four hundred thousand homes, which the sharp eared among you will have already worked out is about fifty percent more units than the total number of Tesla Powerwalls shipped since twenty-fifteen. So, you know…nothing if not ambitious!! And they’re not finished there either. The plan is to ramp up to sixteen-gigawatt-hours-worth of production at manufacturing facilities that they’re currently looking at in various US states.**

**The company also say they have one-megawatt-hour demo units available right now for commercial customers to come and have a look at.**

**The company certainly has ONE of the ingredients that made Tesla so successful – a charismatic and delightfully over-confident alpha male CEO. He’s called Damir Perge (pronounced ‘Purgay’) and, my goodness, he certainly doesn’t lack motivation! Take a listen to this little snippet from a recent conversation with Mitch Radcliffe over at the superb Earth-nine-one-one podcast…** [**https://earth911.com/?s=amptricity**](https://earth911.com/?s=amptricity)

**At “it’s a box that will take energy in and give it to you when you want it. And then the holy grail is that we can discharge it over 8 hours.”**

**At “because of our solid-state solution today, people can be completely off the grid.” [] “It’s, this is the holy grail, it’s absolutely the holy grail for someone that wants to be off the grid.”**

**So…the holy grail eh? Them’s big claims Mr Perge!!**

**Now of course the ability to be ‘off the grid’ as Mr Perge describes it, has absolutely nothing whatsoever to do with whether or not your batteries are solid state or otherwise. You could theoretically go off grid with lead acid leisure batteries if you really wanted to. I wouldn’t recommend it, but I bet some of you good folks out there have already done it, and you can tell us all about it in the comments section below if you like.**

**So, where’s the unique selling point here, really?**

**Well, we had a look at the difference between solid state lithium-ion batteries and normal liquid or gel batteries in a video back in November, and I guess it’s worth a quick recap here…**

**In theory, solid state batteries are a far better solution to the problem of storing as much energy as possible, for as long as possible, with total safety but also instant deliverability.**

**A solid electrolyte takes up far less space than the liquid version found in existing lithium-ion batteries. That makes the whole thing much more compact, with a much higher energy density –potentially as much as three times that of a standard lithium-ion battery. Solid-state batteries can work at very high rates of power as well. Research suggests that they may be capable of recharging up to six times faster than current technologies and achieve far more charging cycles during their useful working life. And because they don’t have a volatile and highly flammable liquid electrolyte, they don’t have the potential for thermal runaway which, while very rare, is nevertheless a factor that needs to be closely monitored and managed with traditional lithium-ion batteries.**

**Amptricity tell us they combine their solid-state polymer electrolyte with different chemistries for the cathode, depending on the application, with the highest energy density configuration having been tested at the Chinese National Two-O-One Institute as having a gravimetric energy density of more than three hundred and seventy-seven watt hours per kilogram. Now that’s an impressive statistic. It beats any existing lithium-ion battery available on the market today hands down. Which means maybe we’re onto something here. So, let’s take a closer look at their own data sheets.**

**According the Amptricity website, that claimed three-hundred- and seventy-seven-watt hours per kilogram comes from this option, which is a very small nickel, manganese, cobalt or NMC battery cell designed for some very specific applications and definitely not the cell chemistry they will be using in their domestic energy storage units. For those devices, Amptricity, quite understandably, revert to lithium-iron phosphate chemistry, which means they don’t use any of the somewhat troublesome and now very expensive materials like cobalt and nickel. But that cell has a rated energy density of just a hundred-and-eighty-watt hours per kilogram, which is really nothing special, and about on par with all the other NON-solid state lithium iron phosphate batteries already available on the market. By comparison, Tesla currently use their own twenty-one-seventy cells for the Powerwall 2 model, which have a cell-level energy density close to three hundred-watt hours per kilogram.**

**Amptricity are not yet marketing their product in Europe so we can only really do a PRICE comparison in US dollars. So, the Tesla Powerwall, not including installation, costs ten thousand five hundred dollars in the US, for a thirteen-point-five kilowatt-hour battery. The Amptricity unit, not including installation, costs just short of twenty thousand dollars for a twelve-kilowatt-hour battery. So, on the face of it we have a product here with no published technical data on its claimed solid-state technology and a performance rating that is no better than a bog-standard lithium-iron phosphate battery.**

**So, what else can Amptricity offer us then? Well, if I’m understanding their CEO correctly, the virtues he really wants to sell you on are safety and longevity.**

**So, safety then. Well, we’ve touched on this several times in videos in the past, and I’ll admit that I am as guilty as the next YouTuber of showing dramatic images of unsuspecting members of the youth setting their trousers on fire, or slightly sad Tesla owners watching their prize assets go up in flames. And it is technically true to say that any damage causing a short circuit, including the growth of those pesky dendrites that we’ve looked at before, or any over-heating or badly managed over charging, can cause thermal runaway that can result in fires or even explosions. But there are literally billions of lithium-ion batteries in mobile phones, electronic devices and electric vehicles all over the planet, and the reality is if you buy a properly manufactured lithium-ion battery pre-fitted with an appropriate battery management system or BMS, and you use the correct charger, and not some ropey piece of wire that you bought down at ‘Honest Harry’s Mobile Phone Emporium’, then, unless you choose to smash it with a hammer and a hole punch, the chances of a unexpected conflagration really are vanishingly small.**

**But hang on Dave, Mr Perge would no doubt say, you’re not comparing apples with apples here, because Amptricity claim their battery is good for eleven thousand charge cycles, and they provide a twenty-five-year warranty compared to only 10 years for the Tesla Powerwall. So, they argue that over an entire life-cycle you’re actually getting better value for money with the Amptricity option. They also say they’ll come and collect your battery at the end of that quarter century, strip out all the metals, and recycle the solid electrolyte polymer into a second life use as a fertiliser component. If that’s true, then that really is a positive benefit. Whether or not you as a consumer feel a twenty-five-year promise is enough to sway you towards this apparent holy grail gamechanger instead of an existing competitor is a decision I will have to leave to you. I’ll be very interested in your views though, so as always, I’ll be down in the comments section below this video for a while and I look forward to hearing what you have to say.**

**That’s it for this week though. Thanks, as always to the channel’s fantastic Patreon supporters, who keep me on the straight and narrow and help keep ads and sponsorship messages out of these videos. And an extra special thank-you to the folks whose names are scrolling up the screen beside me here, all of whom celebrate an anniversary of Patreon membership in April.**

**You can join them and get excusive content from me and the chance to choose future video topics by jumping over to Patreon dot com forward slash just have a think and of course you can hugely support the channel absolutely for free by subscribing and hitting that like button. We’re getting close to the half million subscriber mark right now, so if you can help us get over that milestone then your support really would be massively appreciated.**

**As always, thanks very much for watching, have a great week, and remember to just have a think. See you next week,**