**Now you know me folks, when I’m not banging on about the collapsing Arctic or catastrophic climate-driven tipping points that could represent an existential crisis to the entire human species, I do like to talk about all the lovely technologies that some people think might actually get us out of our current global predicament.**

**I imagine that must seem like a slightly jarring juxtaposition to some of you. Whether you’re someone who believes we’re doomed whatever we do and that the human species is a virus that will inevitably consume it’s host and therefore destroy itself, or you’re a technology optimist who has absolute faith that human ingenuity will overcome this latest existential wrinkle just like it has done so many times throughout the history of our existence.**

**I cover both ends of that tricky spectrum here on the Just Have a Think channel precisely BECAUSE they exist, and because it’s entirely possible that the future of humankind might lie somewhere in between those two extreme views. In other words, while our situation IS extremely perilous and technology ALONE is UNLIKELY to avert some of the worst ravages of our warming climate in the coming decades, it IS QUITE likely that it will go a long way towards mitigating SOME of them. And it therefore makes no sense at all, at least in my book, to simply write TECHNOLOGY off as a hopeless endeavour.**

**A large chunk of the current technological optimism appears to rest with battery energy storage, which is something you will, no doubt, have spotted if you’re a regular viewer of my videos!**

**And as that industry passes the one-terawatt hour milestone, the International Energy Agency has just published some new data showing the astonishing trajectory of travel for the sector.**

**And I just can’t resist a shiny new industry research paper!**

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

**If you’re watching this video at the time of publication, then we’ve just passed Q1 of twenty-twenty-five and Donald Trump has just imposed twenty-five percent tariffs on cars and automotive components not manufactured in the United States. So, the ten- billion-dollar joint venture between Ford Motors and the South Korean battery company SK ON to build a one hundred- and twenty-gigawatt hour per year battery making facility in Kentucky looks like a very shrewd bit of business by Ford CEO Jim Farley. Mr Farley is definitely someone who has seen the writing on the wall for some time and who has been very public about his enthusiastic support for the transition to electric vehicles. This new set of factories will eventually employ seven and a half thousand workers in one of the reddest states in the union. If only we had an automotive industry leader and electric vehicle advocate advising the President, things would be so diff…er…oh no…**

**Anyway, it looks like Mr Farley is definitely onto something.**

**This new bit of research from the International Energy Agency, or IEA, tells us that in 2024, global sales of electric cars jumped twenty-five percent, while sales of internal combustion engine cars were down about five percent year on year and some thirty percent lower than their twenty-seventeen peak.**

**Annual battery demand surpassed the historic milestone of one terawatt-hour and the psychologically important price barrier of a hundred dollars per kilowatt-hour has also now been well and truly breached.**

**A big driver of that has been the astonishing drop in the price of lithium – down more than eighty-five percent since twenty-twenty-two.**

**But as I’m sure you know, the battery industry has been making huge advances elsewhere as well, not just in expansion and efficiency but also in the types of chemistry used in the cells themselves.**

 **Global battery manufacturing capacity reached three terawatt hours in twenty-twenty-four, up from only about a hundred and fifty gigawatt hours back when I first started this channel in twenty-eighteen. That’s a pretty meteoric rise that appears to completely contradict the noisy naysayers who amazingly are still trying to delude themselves that electric vehicles are just a flash in the pan.**

**The IEA predicts that three terawatt hours-worth of capacity will triple in the next five years, as the rest of the developed world pulls out all the stops in a desperate attempt to catch up to China.**

**And speaking of China they do appear to be holding all the cards right now, if you’ll forgive the slightly evocative phrase.**

**According to the IEA, right now our friends in the People’s Republic produce more than three-quarters of all batteries sold globally. In twenty-twenty-four average prices dropped faster in that country than anywhere else in the world, falling by nearly thirty percent which has resulted in a good number of electric cars coming onto the Chinese market with a smaller price tag than their internal combustion engine counterparts. And that, my friends, is when market disruptions really start to move quickly isn’t it?**

**The IEA actually ascribes four main reasons for Chinese EV price advantages.**

**Firstly, over seventy percent of all the EV batteries ever produced have been made in China. That means Chinese battery makers have more experience and technical know-how than any other country. CATL and BYD are now the undisputed world champions of the sector, which bring us to reason number two. Supply chain integration, or vertical integration as some call it. That development has given those behemoths control of every aspect of supply and production and even distribution, with BYD buying their own fleet of freight ships.**

**Perhaps surprisingly there has also been close technical co-operation between leading firms, all of which means much faster innovation combined with lower manufacturing costs.**

**Reason number three has been a mass Chinese move away from Nickel-Manganese-Cobalt, or NMC, cell chemistry toward lithium-ion phosphate or LFP. LFP batteries are not quite as energy dense as NMC, but thanks to years of research and development in Chinese laboratories, they are now more than capable of propelling an electric vehicle to sixty miles an hour in six or seven seconds and on up to motorway cruising speeds with no difficulty whatsoever. They’re also about thirty percent cheaper than NMC technology, and because they don’t contain any cobalt, they’re addressing a perceived issue of traditional lithium-ion batteries, which is the cobalt mining industry in the Democratic Republic of Congo.**

**As a result, the IEA tells us that LFP batteries now cover almost half the global EV market after more than tripling their share within the past five years.**

**And reason number four is good old fashioned straightforward market competition, which OH MY GOODNESS is fierce in China.**

**For an ostensibly communist nation they haven’t half got the hang of capitalism in a hurry, haven’t they?**

**There are now nearly a hundred different electric battery and vehicle producers there and they’re all slashing their margins to the bone to try and gain a bit of market traction. For many of them, even after shipping costs and swingeing tariffs by the European Union, and the USA, selling into those territories represents an opportunity to undercut the well-established western automotive brands and still achieve higher profits than they get back home.**

**That could change in the future, says the IEA, but only with some big brave investment decisions by western carmakers, perhaps in partnership with industry leading battery makers from China and South Korea, as Mr Farley at Ford has now demonstrated with his ten billion-dollar Kentucky venture, and not with attempts to start small and scale up, as we saw recently with the demise of Northvolt in Sweden. That ship has well and truly sailed. Economy of scale right from the outset appears to be the imperative now, driving down the price of products for the average car buyer. That harsh reality has, sadly, led to many battery producers in Europe postponing or cancelling expansion plans because of uncertainty about future profitability.**

**Despite all that though, the IEA reckons there is hope for the beleaguered and apparently bewildered European car industry if strong domestic demand can be driven by competitive, well-made vehicles backed up by much clearer directional legislation from central governments and the EU. Any attempts at mollycoddling the fossil fuel brigade by maintaining their subsidies and only implementing limp wristed incentives that don’t properly encourage people to switch to electric vehicles will spell almost certain failure and leave the door wide open for Chinese EV domination in the coming years.**

**Meanwhile over in the States battery manufacturing capacity has doubled since twenty-twenty-two, largely thanks to the implementation of tax credits that came with the Inflation Reduction Act that Donald Trump is currently attempting to dismantle.**

**By the end of twenty-twenty-four it stood at two-hundred gigawatt-hours, with another SEVEN-hundred-gigawatt-hours currently under construction, forty percent of which is being undertaken by established battery makers in partnership with automakers.**

**Elsewhere in the world, Southeast Asia and Morocco are emerging as potential production hubs for batteries and their components. Indonesia boasts fifty percent of all the world’s mined nickel, and Morocco has the largest reserves of phosphate and an already well-established car manufacturing industry enjoying free trade agreements with the European Union and the United States. Well, until recently anyway!**

**So, I think what the IEA is trying to tell us, as if we didn’t know already, is that battery energy storage, both for mobile and stationary applications, is very definitely NOT a flash in the pan. It is here to stay, and it is accelerating at break-neck speed.**

**As long as no country does anything stupid to jeopardize increasingly encouraging levels of global co-opera…shu..oh no**

**You know I get moments where I just briefly forget…and then, you know, it just… all comes flooding back.**

**It’s not stopping though, whatever any given country, however powerful, tries to do to turn back the clocks to a rose tinted past when big strong oil barons ruled a world order driven by old boys networks of backhanders and market manipulation while the rest of us knew our place and didn’t complain.**

**Those days are over. Even the once all conquering Tesla Motors is now seriously under threat from Chinese agility and technological superiority, if this recent article is anything to go by. And although Tesla is getting a bit of a biffing at the moment for reasons you don’t need me to spell out here, it would be a shame to see it fall by the wayside simply as a result of its own stupidity, or at least the stupidity of its boss anyway, because it was arguably Tesla Motors that originally made the most courageous first moves to disruptive what was an ultra-conservative automotive market more than a decade ago. Without that company’s vision back then, it’s extremely unlikely the global battery market, or the global EV market for that matter, would have come as far as it has. But that progress has now been made, and an unstoppable force has now been unleashed that even the most aggressive tariffs and wishful thinking will not stop.**

**Jim Farley’s got the right idea. He’s seen what’s coming and his actions might just save the Ford Motor company in the medium to long term. The challenge for the rest of the western automotive industry is to take similarly bold steps forward before they get swept away by better, faster, stronger and cheaper competitors.**

**You will no doubt have your view on this one, and you may well be itching to express that view right now, so as always, the place to leave your thoughts is in the comments section below.**

**That’s it for this week though.**

**Thanks, as always to the amazing folks over at Patreon, who help me keep this channels content completely independent and free of ads and sponsorship messages. And an extra special thank you to the folks whose names are scrolling up the screen beside me here, all of whom celebrated an anniversary of Patreon support in March. If you find these videos useful and interesting and you feel you could support the work I do here each week at Just Have a Think then jump over to Patreon dot com forward slash just have a think to find out how you can join the team and have a look at all the exclusive perks you can get there, including additional Patreon-only videos and monthly content polls.**

**And of course, you can really hugely support the channel completely for free simply by hitting the subscribe button on YouTube and clicking on all notifications to help us get noticed by the YouTube algorithm so that you get to see more videos like this each week. That’s just a couple of clicks away, either down there or on that icon there.**

**Most important of all though, thanks very much for watching! Have a great week, and remember to just have a think.**

**See you next week.**