**If you were living in America at the start of twenty-twenty-five then you will no doubt have witnessed some pretty extreme weather events**

**Large swathes of California have been on fire, largely as a result of heavy rains the previous year causing high levels of vegetation that then became parched by drought conditions to become tinder dry fuel, combined with ever increasing atmospheric temperatures and unusually high winds of over a hundred miles an hour.**

**All of which, according to** [**atmospheric scientists**](https://www.worldweatherattribution.org/climate-change-increased-the-likelihood-of-wildfire-disaster-in-highly-exposed-los-angeles-area/)**, is becoming increasingly likely as our climate rapidly changes.**

**Elsewhere in the US, the good old Polar Vortex that we’ve looked at several times on the channel over the years, performed one of its most extreme party tricks and brought an arctic freeze across the country as far south as Florida, a bit like the big freeze that hit Texas a few years back and knocked out it’s ridiculously isolated electricity grid.**

**Now we could waste time debating whether or not these events really are becoming more likely as a result of human induced climate change, (they are) OR we could have a think about how countries like the USA will have to make their infrastructure more robust and resilient to cope with demonstrably more impactful scenarios.**

**One of the most obvious limitations in the USA is the rather disjointed three grid system, and especially the lack of flexibility and cooperation demonstrated by ERCOT in Texas, as I mentioned earlier.**

**As renewable energy sources like wind and solar continue to grow, despite suggestions to the contrary by the new administration, the national US grid will require a major overhaul, not just in its physical infrastructure, but perhaps in its psychological make up as well, if you know what I mean.**

**And are there any best practice examples that US operators could learn from? Well, there is one that springs to mind. And I bet you can guess where it is!**

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

**Well, its China isn’t it, obviously!**

**We had a look at China’s first moves towards a national Supergrid a few years back on the channel when we featured the one-million-volt direct current transmission line being constructed from Xinjiang in the west all the way to the densely populated urban centres on the East coast.**

**Back then the COVID pandemic was just coming to the end of its global rampage and countries all over the world were responding in different ways.**

**Most western democracies had implemented huge stimulus handout packages to big businesses to allow them to effectively shut up shop for a few months without going bust.**

**Meanwhile, China’s President Xi decided on a different route – he saw an opportunity to go full steam ahead with no fewer than seven critical national infrastructure projects. And how has the Peoples Republic been getting on with these initiatives in the ensuing years?**

**Well, as of 2024, the 5G network has grown rapidly to four point one-nine MILLION operational base stations across the country, with plans to get to four-point-five million in the twenty-twenty-five.**

**The China Environment for Network Innovations, or CENI rolled out an optical fibre-based network achieving zero packet loss with delays of less than 20 microseconds, enabling Artificial Intelligence to enhance capabilities in manufacturing, healthcare, and transportation. And unless you live in a cave you will no doubt have spotted an AI market disruptor called Deep Seek that has been causing some ripples of discomfort in the Silicon Valley establishment too.**

**Those advances have been supported by significant investments in the construction of super-efficient data centres to cope with massive growth in demand for cloud services and big data analytics.**

**How about electric vehicles? Well, EVs made up almost fifty percent of new Chinese car sales last year, and in that same period the country added well over four million new Electric Vehicle charging points, representing a twenty-five percent increase on the previous year. The country now has on average one charging point for every two-point-seven EVs.**

**But China also continues to lead in high-speed rail development, with ongoing projects to enhance connectivity between major cities, like for example the floating MAGLEV train, which will revolutionize the country’s rapid transit capabilities when it comes on line in a few years’ time. Xi Jinping didn’t even need to state renewables as one of the country’s critical infrastructure initiatives back in twenty-twenty because wind, solar and hydropower were already racing ahead anyway. Here’s a nice stat for you.**

**In December twenty-twenty-four, just in a single month, when we were all sleeping off the excesses of the holiday period. China installed sixty-six gigawatts worth of new solar PV panels. That’s not far off the entire UK electricity grid capacity. In a single month.**

**Which brings us nicely to the thorny issue of national electricity grid upgrades.**

**Back in the COVID days, the Chinese government commissioned no fewer than fourteen new ultra-high voltage or UHV projects worth about twenty-seven billion dollars, most of which, by the way, were to be built using European equipment built by companies like ABB and Siemens. By April twenty-twenty-four, the country had thirty-eight operational UHV lines, eighteen of which were mid-distance cables carrying alternating current and twenty of which were long-distance high voltage direct current, or HVDC lines.**

**I mention all this not because I’m some kind of pinko commie propaganda shill for the People’s Republic, far from it. We all know about China’s autocratic political system, and here in the West we’ve all been made very well aware of the many accusations of oppression and human rights abuses. So, I’m not suggesting we’ve got some kind of paragon of virtue here. But the simple fact remains that China IS getting on with twenty-first century upgrades at an eye watering pace, and we western types can either expend all our energy whinging about how unfair it all is, or we can get on with some serious catch up work.**

**Back in twenty-seventeen, a private, not for profit US organization called the Climate Institute published a comprehensive report in conjunction with the National Oceanic and Atmospheric Administration or NOAA. It was simply titled ‘The North American Supergrid’ and it set out in intricate detail how such a thing could be economically achieved.**

**The level of analysis goes way beyond what I can shoe-horn into a short video, but as always, I’ve left a link in the description section to the full publication so you can delve into it at your leisure.**

**It was pretty radical though.**

**Essentially what it proposed was a so-called nodal HVDC network, to be built out mostly underground, extending across the lower forty -eight states, effectively creating a national electricity market and providing a resilient backbone to the existing infrastructure. That would make renewable energy competitive with fossil fuel-generated energy in ‘level playing field’ open markets without altering how electricity is currently used in people’s homes or businesses. And of course, being mostly underground, it would be far better protected from many of the extreme weather events we looked at just now.**

**The report’s authors reckoned that about two-thirds of the proposed HVDC cable links could be placed underground along existing rights of way, which would sweep away many of the time consuming and costly permitting issues that bedevil so many US infrastructure projects.**

**Upgrading the grid would create hundreds of thousands, perhaps even as many as a million or so, highly skilled jobs over the estimated thirty-odd years it would take to complete the work. And although underground cabling is way more expensive than overground pylons, probably three times the cost, the ability to move renewable energy sources further away from demand centres to regions where natural resources like sun, wind and water were most abundant and then transmit those electrons through long distance HVDC cables would result in huge efficiency gains and potentially reduce power sector greenhouse gas emissions by as much as eighty percent.**

**Recent research by industry analysts Rystad Energy suggests that limiting global warming to one point eight degrees Celsius above pre-industrial levels would require more than three TRILLION US dollars of global grid infrastructure investments just by twenty-thirty.**

**BUT, according to the U.S. Department of Energy, the build out of energy efficient systems like the American Supergrid would mean that for every dollar spent in investment, longer term energy cost savings of between a dollar sixty and a dollar eighty could be achieved.**

**One of the key improvements so desperately needed by existing grids is to ramp up the efficiency of the transmitting cables themselves. We looked at superconducting cables in a video last year. They can potentially transmit ten times as much power as the tired old cables in the existing grid and use far less copper and aluminium.**

**I’ve left a link in the description section to that video, or if you see an icon appear up there then you can click on that to jump directly over and take a look.**

**All sounds like a jolly good plan, doesn’t it?**

**So why are we already eight years down the line from that original report with barely any progress in evidence?**

**Well, according to the Seattle-based non-profit organisation, Investigate West, in twenty eighteen the first Trump administration deprioritized grid modernization efforts in an attempt to boost the coal industry. In twenty-twenty, Congress published this report, which concluded that the existing U.S. transmission infrastructure was so old and hopelessly fragmented, that the integration of advanced systems like a super grid would mean navigating complex federal, state, and local regulations, and would require an unprecedented level of investment and cooperation between the various existing regional grid operators. It was, they concluded, therefore unlikely to be practically achievable in the real world.**

**Because, as we all know, things that haven’t yet been achieved are by definition unachievable aren’t they!?!**

**“One giant leap for mankind”**

**The Inflation Reduction Act of twenty-twenty-two significantly bolstered efforts to modernize and enhance the U.S. power grid by expanding tax credits for renewable energy projects and allocating substantial funding to upgrade transmission infrastructure. But in January twenty-twenty-five President Trump signed executive orders halting much of that funding, leading to the suspension of grants, loans, and financial assistance programs. That action has introduced uncertainty into the clean energy sector, potentially delaying or hindering projects intended to enhance the power grid's resilience and capacity.**

**The new administration’s alternative master plan is called "Unleashing American Energy". It’s another executive order, this time aimed squarely at supporting more fossil fuel production and reducing support for renewable energy initiatives, calling for the elimination of projects deemed to be ‘burdensome to domestic energy development’.**

**There are lots of legal challenges to those orders, but I wouldn’t hold your breath if I were you.**

**So, while America’s political pendulum continues to swing wildly from one side to the other and practical, affordable energy future-proofing continues to suffer as a result, the rest of the world is racing towards the kind of integrated networks set out by American researchers almost a decade ago.**

**Now, I am of course braced for some robust feedback on this one. So, what’s your view? Is an American Supergrid just a bunch of pie in the sky or a crucial game changer hamstrung by a backward-looking President sitting firmly in the pocket of incumbent fossil fuel operators? I’ll be interested to see what the consensus looks like. I always like to hear from people who actually work in the industries I talk about too, so if that’s you then it’d be great to get your perspective as well. Whatever your opinion though, the place to leave your thoughts, as always, is in the comments section below.**

**That’s it for this week though. Thanks, as always to the amazing folks over at Patreon, who make this channel possible and enable me to keep ads and sponsorship messages out of your way. 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 January**

**If you feel you’d like to get involved with that 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 free membership. And if you enjoyed this video then you really can hugely support me by hitting the subscribe button on YouTube and clicking on all notifications. It won’t cost you a penny to do that and it’s just a simple click 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.**