The Great Simplification

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[00:00:00] **Nate Hagens:** Most humans think in words, and this is a big problem for our future. When I say a sentence like there is a gold-plated hindenberg blimp with a giant, Vladimir Putin face on it, floating over London and lasers come out of Vladimir Putin's eyes, and destroy any restaurant that serves curry. You can imagine that in your minds, and of course it's fanciful and non believable, but humans can transfer millions of possibilities via our words and our mouths that can exist in the real world.

[00:00:47] The challenge is that there are some sentences that sound very plausible, like battery operated, filters. In the ocean that take energy and oxygen from the seawater so we can breathe underwater or that we can build technology that will allow global human culture at today's scale or larger, have net zero emissions by 2050 relative to the 41 billion tons of emissions this year.

[00:01:19] So what ends up happening? Is these things sound good, but there is a difference between three categories. What can't happen, what won't happen, and what might happen. And unfortunately, most of the things in our public discourse about the future are in the what can't happen and what won't happen. Category, when we need to be focusing on the what might happen category, and that's what I'd like to discuss today.

[00:02:01] So first of all, what can't happen, there's two subcategories of what can't happen. One is there are physical laws of the universe. There are physics and chemistry and, thermodynamics. If we have a wooden block that is one foot by two foot, we know for absolute certain the physical laws of the universe will not allow us to carve a four foot man or dwarf out of it, or a six foot wide wooden car.

[00:02:31] Now we could carve a two foot duck or a two foot wide, shoes or a bunch of small spoons. Those are possible, but there are other things that cannot happen. The second category of cannot happen is path dependence, which is those historical things that have happened that don't allow other things in the future.

[00:02:56] for instance, looking forward. If there is a global thermonuclear war, there will be radiation in the future. If tree fogs go extinct, there will be no tree frogs, in the future. So this is, a path Dependency is contingent on the past, and this also precludes, what can't happen. what won't happen is a different category.

[00:03:23] What won't happen is stringing together aggregate probabilities of, unlikely things. For instance, it is not impossible to make a 500 foot cheese statue of a mouse. We actually have the technology to make such a thing. But there are a bunch of propositions, that are not impossible based on the laws of reality, but which are effectively impossible based on the considerations of aggregate probability, like a 500 foot, mouse made out of cheese because.

[00:04:04] There would be dozens or even hundreds of necessary steps like permitting and scaffolding and cheese stability. And you have to multiply all these possibilities, or probabilities of happening, and ultimately, the answer of them all being true is effectively zero. So this is what won't happen. it is a, less, restraining category than what can't happen.

[00:04:34] But effectively it's not going to happen. We have many things in our society that are effectively these 500 foot cheese, mice. for today. For today, I'm just gonna start with one, which is the, concept which is still heavily funded and heavily believed. And advocated around the world that we will reduce zero emissions by the year 2050 by getting rid of all fossil fuels in our energy system and by reducing and pulling air out, CO2 out of the air, and sequestering it.

[00:05:11] So that net, that will be zero. So in the same way that there are hurdles to the creation of a 500 foot cheese mouse, there is a large gauntlet of hurdles between today and net zero by 2050. So let's for the moment assume that we have the technology to have a hundred percent renewable energy economy.

[00:05:41] at something like today's scale or larger, those of you who have followed my work for the last 15 years know that I don't think this is possible, for many, reasons, but for today's exercise talking about aggregate probability and what this pretends for, the bottlenecks of human and planetary futures, let's just assume that it is possible.

[00:06:05] That it is technically possible to do the technology that was result in net zero by 2050. Let's say that there's a 20% chance that this is feasible. Okay, 20%. That's a lot, but, and the central point of today's, frankly, is that is a. Terris bu everything else being equal in the world. And we are decidedly at a Terris bu not moment with all the other things in the world.

[00:06:40] And so what we have to do is stack all of these hurdles together and multiply the aggregate probability of them happening or not happening to look at the true odds of something manifesting in a decade or three from now. So the first, hurdle would be the technology itself. Right now we have, carbon, CCS, which is around 10,000 tons of CO2 removal per year, versus the 40 billion tons that we emit.

[00:07:15] We are growing, fossil fuel use twice as fast globally, in aggregate scale as we're growing renewables. there are limitations to copper. there are many other limits to what if we scaled, what happens. So, so there's a, limit on, the tech. There's a limit on the metabolism of our current structure.

[00:07:47] we are not replacing fossil fuels, with renewables. We are adding, in fact, there has been no green revolution. Only a green addition. and, so how can we have net zero if the whole economic structure of the world is geared towards. GDP and profits and growth and profits and growth are tethered to energy.

[00:08:13] There is no, way for the system while it's operating to allow for a shrinkage of one thing and a growth of the other when it's so central to our economies. I. So those are a couple hurdles, but now let's get into the more serious ones. We have a major financial overshoot right now. when Trump recently, pulled out of, support for Ukraine, Germany decided to boost, their.

[00:08:44] spending on defense, but the markets precluded large spending amounts because German tenure notes, the boons, the yields were hitting multiple year highs. So we are at a place right now where debt is becoming a huge load stone for physical and biophysical plans in the world, even in the United States.

[00:09:10] I think the plan now with tariffs and everything else, is to re industrialize the United States and near shore a lot of, industrial capacity, which is a laudable

goal. The problem is that only works with a weak dollar. and if we have a weak dollar, the entire petrodollar, debt-based system in the world collapses.

[00:09:35] So we can't, we can't have, a very weak dollar and keep the global, us oil debt, machine going. So the interest rates also are central to, renewable energy and, long duration energy investments and interest rates are now going up because people are expecting that governments are going to have to borrow or print a lot more money.

[00:10:04] At the core of the logic of the great simplification has always been this financial Wiley, coyote bend not break moment, and I think we're much closer to it now, so that's another hurdle. then there's some new hurdles that I didn't realize, I didn't think about, but we need to have governance and open society and democracy, in order to get to something like, net zero.

[00:10:32] And right now there are red lines that are being crossed in the United States and elsewhere in the world where. Maybe there will be authoritarian, decisions made in the future that, are more based on energy security than any energy, low carbon, but it's the governance and the democracy, which is now an open question.

[00:10:56] I. Related to that is the incompetence and potential dominoes of, we got a little taste with the Pete Hegseth, doing messages on signal. But there are so many things in the government that if we don't have. concrete, deep support and expertise on that. It's the, for want of a nail. A horse was lost for want of a horse.

[00:11:26] The kingdom was lost. There's a complexity risk, from incompetence. We also have to navigate that hurdle. Then there's artificial intelligence, which is something also wasn't on my radar screen. what are the chances that, we head towards a SI, artificial super intelligence or artificial general intelligence and the machines gradually take over.

[00:11:50] they're not gonna be optimizing for net zero. and they're not gonna be optimizing for humans. So this is another, hurdle in the way there's war and global supply chains. it's early April when I'm recording this. we have many aircraft carriers. moving to the Middle East. I expect a possible conflagration with Iran.

[00:12:18] You never know. Those things don't go as planned and the strait of Horus gets shut down, or all these drones, are, now able to cross borders undetected and what's happening with the United States, pulling back from the global policemen. Many other countries may decide they now need nuclear war, weapons like Japan or Taiwan.

[00:12:40] Or Spain or someone else in Europe. So that is another, huge wild card on war and the impact of global supply chains. Another hurdle is the social contract. and I think, you know, with what's going on with, Tesla boycotts and all these things in the United States, bubbling right under the surface is polarization and the new right and the progressive left, and all kinds of constituencies that do not talk to each other anymore, and that has to remain stable for.

[00:13:18] For example, a net zero outcome, to arise. And then of course we have nature as a constraint. we are headed for a warmer world. some people are less concerned about that than others, but even on the root to, net zero. Decarbonization is gonna require a huge rematerialization. And those materials are gonna come from areas in the world that are already experiencing poverty, civil strife, and higher wet bulb temperatures.

[00:13:48] And so nature is also going to increasingly be, constraint. So if you stack up all of these, the odds of this thing remaining benign, the odds of net zero starting at 20%. Multiplied by the aggregate probability of all the categories that I just mentioned, and there are more categories, is effectively zero.

[00:14:12] So it could happen, but it won't happen. So what does this all mean? and first of all, I. there is something called Bayesian, inference or Bayesian probabilities, which takes the, the prior expectation of what you used to believe and then weights it by the conditional probability, of an event.

[00:14:34] And I don't want to get into the math of that, but. Some of these events I just mentioned are conditional upon each other. They're not fully independent. a financial, debt collapse would also impact supply chains and competence and, things like that. But let's just for the moment assume that they're independent and multiply them by each other.

[00:14:58] But on the topic of Bayesian priors, I've changed my priors. Especially on AI and the governance and open society. I have thought for a long time that facts and civic discourse about facts and biophysical reality matters. And if we don't live in a system that allows for facts and civic discourse are values to be, demonstrated and, actualized.

[00:15:28] I've changed my priors on that. It used to be maybe 5% chance of that happening, and now it's moved up to 50%. So some of my priors on the, thresholds, the aggregate probability hurdles that I've just mentioned have changed quite substantially in the last six months. So what does this all mean? The book that my colleague DJ and I white, DJ White and I wrote a few years ago, is called The Bottlenecks of the 21st Century.

[00:15:58] a bottleneck is a, in biology that something narrows into a bottle. I. And, shrinks. And then after that, things make it through the bottleneck. We will have bottlenecks in the 21st century of species, of ecosystems, of values, of population, of all kinds of things. What can't happen and what won't happen are outside the walls of the bottle.

[00:16:29] What might happen are inside the walls, over the bottle. and as energy supply becomes smaller and more expensive over time, that is gonna ripple through all the things in our economies and the bottle, the walls of the bottle are going to shrink, and it is up to us. What things of value do we want to propel through the bottlenecks of the 21st century?

[00:16:59] But the first question is to realize that there are walls to the bottle, because most of our social discourse and the things that we talk about in the news are things that can't happen or won't happen. The laws of aggregate probability suggest otherwise. So given these aggregate hurdles, here are a few questions that I am, grappling with and maybe you could consider, do you change your own priors or are they static?

[00:17:32] when new information, in the world, happens, do we change our existing prior probabilities? I do quite often. and they're changing now. Do you change your priors? If so, and how do you change them? Another question is, you know, this analysis used net zero by 2050, as an easily debunk example.

[00:18:00] What other cultural expectations and beliefs might change with this sort of, gauntlet of aggregate probability, logic. And, does this sort of aggregate probability, singularity math change the urgency or plans, of any projects you might have? So in conclusion, even if on paper net zero by 2050 is technically achievable, the real world odds are close to zero.

[00:18:31] The path is not blocked by one giant wall. It's a maze of interlocking barriers, physical limits, financial constraints, social fragmentation, political instability, and ecological feedbacks. These aren't isolated problems. They multiply and amplify each other. And from a systems perspective, what we might call a Bayesian view, if we are nerdy, the more conditions that you stack, the lower the chance that they all come true and align.

[00:19:08] This doesn't mean we should give up. It means we shift focus and we replace lofty goals that are often shaped by ideology and public relations. We replace them with, grounded actions that are shaped by reality, by physics, by ecology, and by. Individual and aggregate human behavior, which is why this platform, the great simplification exists.

[00:19:36] The question isn't how to solve climate change. It's how to live wisely in a world where the old solutions no longer apply. I'll talk to you next week. Thank you.