

Four Scenarios for the Future
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In my first video, I described what I thought were the possible trajectories for the future of civilization, which can basically be summarized as...

- achieving sustainability
- collapse from resource depletion
- salvation by advanced technology
- collapse from a large catastrophe

To put it another way, either civilization will find a way to manage its resources better, they will be depleted, it will find alternative resources, or it will become totally self-destructive. It is hard to see a future that does not fit into one of these four areas because the survival of any life-form really comes down to whether material needs can be met. Modern society grows continuously, using ever more energy and resources, most of which are finite, so it is self-evident that the current mode of living will not continue indefinitely.

People tend to view civilizations in terms of the kinds of governments or societies they have, but the question of resources is more fundamental. Most obviously, a modern civilization cannot exist without food, building materials, manufactured goods, and so on, but at a higher level, resource conditions, that is, the resources available and how they are distributed, can also determine how the civilization is organized. A very hierarchical society may result from limited resources or resources that are distributed very unevenly, as such implies an elite that monopolizes them. A more egalitarian society may result from abundant resources because the ease of acquiring them obviates the stratification that results from competition for access.

This video will provide four illustrations, each a potential way for one of the four scenarios to play out. These illustrations will largely focus on the United States, both to keep the video more concise and because that is the country I'm most familiar with, but they represent trends that probably could affect most of the world.

Sustainability

This scenario envisions industrial civilization making a transition to a more sustainable mode of operating. By the mid 21st century, the world was in big trouble. As petroleum became increasingly scarce and difficult to extract and refine, the price of a gallon of gasoline was a two-digit number practically everywhere, and in some places it was approaching the \$100 mark. Many areas suffered from food and water shortages as global warming caused crops to fail and reservoirs to dry up. Political and class divisions grew sharper than ever. Hundreds of millions faced the kind of poverty previously only seen in the most underdeveloped third-world countries. Militias were forming in rural areas, riots and looting breaking out in the cities, and even the most conservative prognosticators in the U.S. were envisioning total economic collapse and civil war. It was unclear if the presidential election of 2056 would even be held, and indeed, if the industrial age was finally coming to an end.

Leading up to the election, however, an enlightened and charismatic CEO announced a presidential run under a new third party. As with any outsider candidate, he was dismissed by the mainstream as having no chance of winning, but almost the entire population was completely sick of the Republicans and Democrats, both parties by then totally discredited after years of deep crisis. The CEO was also able to bring most of the rest of the super rich onboard with his campaign thanks to his captivating rhetoric and reputation as a brilliant entrepreneur. More and more, his ideas looked like a better option than walling themselves away in fortified gated communities or fleeing the country altogether. After the CEO won the election, the rich lobbied their flunkies in Congress to support his policies.

A string of previously unthinkable reforms were quickly enacted, amounting to a Second New Deal. The main points included:

- new taxes and incentives to encourage lower energy consumption
- diversification of the energy supply and the start of a serious transition away from fossil fuels
- tremendous publicly-funded research projects to find long-term solutions, including new energy sources and new synthetic materials
- subsidies for cities to expand mass transit, incentives for more compact zoning, and an expansion of the national passenger rail system on a scale akin to the development of the Interstates after World War II
- taxes on single-use products and requirements for more comprehensive recycling
- increased transparency and reduced complexity in the healthcare system with the end of lowering costs
- reforms of the financial sector toward stabilizing and strengthening the currency, reducing the role and prevalence of debt, and the curtailment of more abstract financial instruments
- massive projects to clean up polluted areas and reforest large swaths of the country
- breaking up agricultural conglomerates into smaller and more local farming enterprises
- incentives for local, domestic industry
- rolling back the overseas presence of the U.S. military to reduce government spending
- a serious curtailment of illegal immigration to stabilize population growth and improve social cohesion

A very different society started to emerge in the United States as consumerism, car culture, and suburbanization, all of which depended on the tremendous use of energy, faded away. Meanwhile, all the labor required to put the Second New Deal into practice put millions of people to work while freeing up gigatons of resources. As a result, the reforms produced tangible benefits that people could actually see in their daily lives and set the U.S. on the path toward a sustainable society. At the same time, conspiracy theories erupted in reaction to the radical changes taking place, resulting in a number of domestic terrorist attacks, but these were not enough to stop the growing wave. More and more people developed a lifestyle that more closely resembled that of Europe: living in smaller dwellings in walkable towns, working near one's home, and buying from local shops instead of big-box stores.

At the same time, for most people, there was less instant-gratification. Massive portions of fast food, routine long-distance trips, and the constant upgrading and replacing of consumer goods became rare luxuries and even started to be viewed as somewhat offensive. Life became less convenient as many tasks required more effort. People had more access to healthcare in general but less access to the most advanced and exotic treatments. Problems like drug use, obesity, and violence lessened as people had to be more physically active and had more opportunities and greater necessity to form closer connections

with their neighbors. While life may have been more difficult in some ways, living standards were still generally high, and many people had more satisfaction from life than they did before.

Resource Depletion

This scenario starts out the same as the previous one did, except society never managed to take action to save itself. As the situation deteriorated for millions of people, the government lost all credibility. Congress, the presidency, the courts, and state and local authorities all became increasingly impotent and irrelevant. People stopped obeying any laws they felt burdened them, and the government gradually lost the capacity to enforce them. Soon enough, there wouldn't be much left of it, the bureaucrats staying home as their paychecks stopped arriving, and finally even the politicians gave up as it became obvious they ruled over nothing. At the same time, employees at the large corporations stopped bothering to show up for work as they realized they were working for free.

As society unraveled, services and supply chains broke down. More and more visits to the store were met with bare shelves, while goods wound up stuck in the ports, what production there was wound down, and crops rotted in the fields. Prices of food and gas and other essential goods fluctuated wildly, trending upwards overall, when goods were available at all. Ultimately, fuel shortages cut off what was left of imports from China, and domestic manufacturing long since having been decimated, there were then shortages of basically everything. Brownouts became longer and more frequent. Mail delivery became increasingly irregular. The streets stopped getting plowed, and garbage started piling up on the roadsides. There were telephone and Internet outages, with local connections and access to remote servers constantly interrupted. The media became increasingly unhinged and erratic, soon providing no useful information, and entertainment only reminded people of the state of the world rather than distracting them from it.

People resorted to barter as hyperinflation wiped out the dollar, while precious metals became more precious than ever. There had been a lot of hype that cryptocurrencies would save the economy, but with the Internet and electric supply so unstable, their value imploded. Those who had the means hoarded food and supplies, and homes became islands rather than the units of a community as families tried to hold on to what they had left, but these hoards simply became the biggest targets for marauders.

Finally, there came a day when people got their final mail delivery. Another day was the last time the trash was picked up. On another, the phones went dead yet again, but this time they never came back. One morning, people woke up to find that there was no more centralized, organized, continent-spanning, high-tech society, and they were left alone in their communities to fend for themselves. The result was a massive die-off for lack of food, lack of clean water, lack of medicine, and massive violence as people killed each other for some bit of the scraps that remained. The last remnants of industrial capacity fell away, and a great deal of technology was lost. As the complex systems that sustained the manufacture of complex goods disintegrated, the knowledge of how to produce them atrophied due to disuse. Surviving communities had to figure out how to produce their own food, clothing, and shelter or die.

Gradually, a new social order emerged based on more basic technology and across much smaller regions. Without advanced communications and transportation, most of the nations of the world disintegrated into competing territories like the Roman Empire did at the dawn of the Middle Ages. A neo-feudalism developed as the organizing force in society. Those who had more money and more

foresight in the collapsing industrial civilization built fortified enclaves and held on to the final trappings of industrial technology. Perhaps some of these enclaves would retain modern luxuries like electric light or running water. Around these were sprawling farmlands where the former working class grew food for the rich while being allowed to keep a portion to keep themselves alive.

The biggest difference from previous feudalism would be the memory of the scientific discoveries of the industrial age. Even if there were no more tractors or agricultural chemicals, for instance, people retained some modern farming techniques. They still knew that germs caused diseases and how to at least slow their spread, such as through cleanliness and quarantines, but lacked the capacity to produce advanced measures to combat them, like vaccines and antibiotics. People also still knew about the scientific principles behind the weather and other natural phenomena, so religion and other supernatural beliefs did not play anywhere near as great a role as in Medieval times. By definition, feudalism entails a small landholding class and a large peasant class, but in the new version, the hierarchy was colored by the more individualist principles that existed under capitalism, so there was more social mobility, positions were not universally determined by birth, and there were fewer divisions based on gender compared to traditional feudalism.

Further into the future, historians, if there were any, would perhaps look back and say Americans were the biggest fools in human history. Perhaps they would say Americans had the most powerful and advanced civilization ever but threw it all away so they could drive around the suburbs and buy cheap goods from China. Eventually, maybe peasants would sit among the ruins of the highways and skyscrapers telling stories about the lost civilization where people could fly and build thinking machines and make light and water and fire appear on command, wondering how much of this was myth and how much was really true.

Exotic Technology

This scenario envisions the practical realities that seem to doom the current system being overcome. One way this might happen is by fusion energy turning out to be workable. The International Thermonuclear Experimental Reactor is currently scheduled to begin operating in 2025, so imagine that this goal is realized and that industrial civilization held together long enough for the technology to be rolled out commercially. In this world, petroleum came to be used much less for fuel, preserving it for other uses and reducing the effects of global warming. The abundance of energy also made it practical to artificially manufacture other scarce resources. However, none of this changed the realities of economics, and the various trends we see today continued on, like a growing rich-poor gap and the outsourcing of labor. As technology progressed further, the effects of such issues in fact accelerated.

Four additional advancements that perhaps contributed most to this were hypersonic passenger and cargo planes, low-latency satellite communications, holographic teleconferencing, and advanced telecommuting, which consisted of using virtual reality as the interface for robotic avatars. The result was it became as easy and practical to operate a business on the other side of the world as in one's own city. It also meant that even most service jobs could now be outsourced. Imagine, for instance, a robotic waiter or janitor in the United States being controlled by a worker in India or China. Instead of paying a waiter \$8 an hour in the U.S., the whole staff of a restaurant could be hired for that much. However, even many of those abused workers went on to lose their meager livelihoods as ever-advancing automation allowed the same work to be accomplished with fewer and fewer people. As AI developed to take over more human tasks, more and more of the working class could be disposed of. Eventually,

wages were driven so low in the United States that it wasn't much more expensive to hire domestic labor than to outsource, and the rich wanted to make sure it stayed that way.

The collapse of the economy for workers around the world also left the majority of consumers completely impoverished, but rather than the entire economy collapsing as a result, capitalism adapted as it always has. Businesses reduced production to match demand while raising prices dramatically to make up for the loss in revenue. Since most of the remaining consumers were wealthy anyway, they remained unphased, especially when they compared their ever-increasing living standards to the devastation all around them. In the U.S., shanty towns rapidly appeared and grew around cities like Los Angeles and Chicago, outpacing the ones around Mumbai and Mexico City. Thousands of cities and suburbs across the country turned into ghost towns due to the countless evictions and foreclosures, not to mention all those who fled the vicious gangs that replaced collapsing local governments. Finally, almost entirely priced out and excluded from essential goods, many people died of malnutrition, starvation, disease, and violence.

As the wealthy grew increasingly worried about the intentions of the millions of impoverished, angry, and desperate people all around them, any pretense of freedom and democracy quickly eroded away. It was easier to buy laws than ever before, and Congress no longer even pretended to represent the people. The Supreme Court, meanwhile, packed with only the most subservient flunkies, conveniently reinterpreted the Bill of Rights to mean the opposite of what it says. Finally, the President started being summoned to Wall St. every week for an audience with the heads of the Fortune 500 companies, where they made sure he was enforcing their interests.

Throughout the slums, there were hundreds of mass arrests and massacres of protesters, or anyone who looked like a protester, as people's resistance to their destruction became the excuse to destroy them. This eventually developed into forced birth control and sterilizations, and in the end, rumors of direct extermination trickled out of the slums, but the few crews lucky enough to find work demolishing them knew better than to ask where all the people went. Some brazen historians looking at what happened to the working class over the preceding decades called it a genocide, and most of them disappeared themselves under the new censorship laws that now defended the system. But as with the fate of the Native Americans, the workers were all dead by then, so the point was totally academic anyway.

It was all easy to get away with since the media would only report what favored the rich, as the rich literally owned all the media. Advancing technology also allowed them to establish a surveillance apparatus that would awe Mark Zuckerberg and exceed George Orwell's worst nightmares. Every interaction people had was recorded and analyzed by AI. There was no longer any such thing as an anonymous financial transaction. Facial recognition was ubiquitous except in the richest enclaves, upheld by the need for so-called "security" and "counter-terrorism." Despite the fears of past conspiracy theorists, there was no reason to bother putting microchips in everyone as they could be tracked just as well without them.

The population of the earth dwindled to some hundreds of millions, nearly all millionaires, billionaires, and slaves. The poorer rich people were gradually being crushed by the richer of the rich, winners in the biggest and bloodiest success story in evolutionary history, along with whatever fragments of the middle class had managed to hang on, mainly scientists and engineers whose expertise had been needed to expand corporate power. By that point, the narcissism of the capitalists had ignited a new space race, with the leadership of each aerospace company scrambling to be the first to set up a colony on a new

world or to send the first manned mission out of the solar system. Even with the dramatically reduced population, the new god-like lifestyles of the wealthy still took a toll on the earth's resources and environment, so it was decreed that humanity would inevitably need to spread into space. While it was still unclear if humans would ever make it, as the capitalists were now consuming themselves with the same vigor as they had everyone and everything else, before too long, the first interstellar mission got underway. Construction began in orbit on a fleet of massive, fusion-powered ships, the scope of the project creating the first trillionaire, and they floated above Earth poised to spread the virtues of capitalism to the universe, and to strip it of its limitless resources.

Total Destruction

Approaching the middle of the century, China was by most measures close to achieving superpower status, while the United States was close to losing it. Having spent the preceding decades gutting its own industry and shipping it off to its biggest rival, the U.S. threw over 200 years of struggle building the republic in the garbage so 800 people could become billionaires. It also continued to squander its remaining resources by building unsustainable suburban sprawl, highways, and vanity projects as economic inequality became more pronounced than ever. The decline caused increasingly erratic and ineffectual governments to be elected, while mass poverty and unemployment led to riots. Sometime after the federal budget deficit passed 50 trillion dollars, the dollar itself became a farce, completing the country's economic collapse.

Smelling death on its adversary and flushed with confidence at its own successes, China started more aggressively taking the initiative. It had fully occupied Hong Kong and the South China Sea years ago, and now it began final preparations for an invasion of Taiwan. Moreover, with the Middle East's economic dependence on China reaching a peak, the latter also demanded that the nations of the region sell their oil to it rather than the United States. This increased the mayhem in the U.S. to a new extreme as the resulting shortages made the 1970s oil crisis look like a joke.

An incident near Taiwan between the American and Chinese navies resulted in the sinking of a U.S. aircraft carrier, and both countries immediately went to their highest military alert statuses. Chinese early warning systems detected multiple ICBM launches from the United States and didn't realize the alert was the result of a computer error before launching a full retaliatory strike. The U.S. in turn launched its strategic missiles against China, several of which early warning systems in Russia miscalculated as being targeted at its far east regions, thus initiating a total nuclear strike against NATO. This cascaded into an all-out global exchange among all the nuclear powers as alliances tripped and military leaders feared being destroyed with all their ordinance still on the ground. The targeting of nuclear power plants and other radiological sites in the attacks resulted in over 100 simultaneous Chernobyls. Within hours, 300 million people had been incinerated and few large cities were still intact across the northern hemisphere.

In the cities, with almost all medical capacity destroyed, squads of soldiers were sent out to shoot the thousands of hopelessly burned and maimed. Billions more would die in the following years from radiation poisoning, disease, famine, and violence. The southern hemisphere remained mostly intact but degenerated into a similar kind of chaos due to radiological contamination, the devastation of the global environment, and the loss of major trading partners. Larger and wealthier countries in the south like Australia, New Zealand, Argentina, Brazil, and South Africa maintained something resembling

functioning societies, but these were just a fraction of what they used to be. Conditions got even worse, however, as nuclear winter set in, global warming no longer a concern.

Within a generation, most of the world resembled prehistoric times, except events were now playing out in an irradiated hellscape. Local warlords controlling bands of marauders sought to seize remaining resources for themselves. Wearing animal skins, they fought with rocks, sharpened sticks, and scavenged scraps of metal. Art, culture, technological advancement, and anything associated with civilization were basically gone, while oral tradition was mostly limited to which of the most contaminated areas to avoid. Some uncontacted tribes continued on as they had for tens of thousands of years, oblivious to what had taken place outside their hunting grounds, except for the unusual weather patterns.

In the long run, the war turned out to be good for nature. Devastated in the immediate aftermath, it came roaring back after a few thousand years, an inconsequential period on geological timescales. The benefit of the end of industrial civilization for the environment outweighed the radiological effects, and the few hundred thousand human hunter gatherers still alive at this point did not have much effect on nature. Meanwhile, new species developed to replace all the ones that were lost, and in the shorter term, life evolved to resist or maybe even make use of the radioactivity, which gradually decayed away anyway.

What's Actually Going to Happen?

I think the most likely future is that civilization will be destroyed either in a nuclear holocaust or by resource depletion. It's effectively a race between the two. Will the resources that underpin industrial civilization, and thus allow nuclear arsenals to be maintained, run out before someone tries to launch the weapons?

The reason nuclear destruction is one of the most likely outcomes of human history is that nuclear weapons exist, no country is taking sincere steps to get rid of them, and it wouldn't even take a very big exchange to devastate the world. Every day, the chances of a nuclear war are greater than zero, since nuclear weapons are sitting ready to launch, and so all it takes is the order. As a result, after a certain number of days, nuclear war becomes inevitable. I have no idea how to calculate the odds of nuclear war on a given day, or even if that could be calculated, but if we guess, for instance, that they're 1/50,000, that just means nuclear war will happen after 50,000 days. No single figure can be exact because the risk fluctuates, but looking at close calls like the Cuban Missile Crisis, and contemplating whatever number of close calls we don't know about, that's probably not an outrageous guess. Assuming my admittedly random figure is close, and counting from when nuclear weapons were first developed in 1945, a nuclear war will happen by the 2080s. Ironically, science, with its incredible promise and achievements is likely to turn out to be the most devastating failure ever, since it is what provided the means for the species to destroy itself.

It wasn't unthinkable to develop nuclear weapons, and it wasn't unthinkable to build up arsenals of thousands of bombs and keep them on a hair trigger, so why is it unthinkable to take that final step and launch? People were stupid enough to build all these weapons in the first place, so why wouldn't they be stupid enough to use them? What's the point of investing countless billions of dollars in something that's never going to be used? When a mass shooter murders a dozen people, it's a horrible, incomprehensible, cowardly atrocity. But every day, the President goes around with a card in his pocket

listing the codes that would let him extinguish millions while he hides in a bunker, and that's considered a legitimate national defense.

As far as resource depletion, it's not even a hypothetical scenario, it's in the process of happening now. Finite resources are being used up. So foreseeing our destruction is just a matter of extrapolating out the trends we already see and have been going on for a long time. The only question is whether we will last long enough for it to destroy us. Even if there were enough fossil fuels, for instance, to keep civilization operating and expanding for the next 10,000 years, we'd fry ourselves before we used them all anyway. People could in theory make massive changes to their lifestyles to prevent resource depletion and environmental devastation, but they're not doing it despite the dire threat, so perhaps it's just not in our makeup.

Civilizations have been destroyed by the depletion of resources in the past, such as on Easter Island, and it's far from clear that the global civilization would be immune. I do hesitate somewhat to make the comparison because the current civilization is so unprecedented. Humans never before had anything close to the level of technology they achieved since the Industrial Revolution, and it may be that this changed the rules of the game in a fundamental way. However, it can't change the fact that civilization needs energy and other resources.

What is clear is that no current means of generating power approaches the energy density of fossil fuels. Nuclear comes the closest, but not much seems to be happening as far as increasing nuclear generating capacity. We cannot yet know whether it's even possible to have an industrial civilization without fossil fuels because the only one that ever existed is almost totally dependent on them. You can have an electric car, and it does have advantages over gas-powered cars, but it's still most likely powered by coal, built in a factory run on fossil fuels, its raw materials mined and processed with fossil fuels, its plastics literally made out of fossil fuels. Realistically, the difference in energy density means that the infrastructure to replace fossil fuels would have to be much more expansive, even though the current infrastructure is itself enormous, and it's doubtful society has the will and the resources to build all that new infrastructure, since it can't even manage to properly maintain what already exists. Alternatively, we will have to radically alter our lifestyles to use less energy in a post-carbon world, and there definitely doesn't seem to be the will for that either. So it looks like nature will decide for us, that we will continue to live the way we do until global warming or the depletion of fossil fuels puts an end to it.

I think the least likely of the scenarios presented is that civilization will be saved by exotic technology. There is amazing progress being made in a number of areas. Fusion is a possibility. There are plant-based substitutes for various petrochemicals. Maybe asteroids could be mined for limitless resources, but at least with current technology, it would take way more resources to do this than would be gained. However, time is running out. The world is falling apart now. And even if some technology to solve all our problems did emerge, it would likely be used for destruction rather than for good, as already illustrated.

Similarly, hoping for some individual to come along and save us, as was illustrated in the first scenario, probably suffers from the same wishful thinking. If history is any guide, we're more likely to get some horrific dictator than a wise savior. And as already discussed, almost no one seems to be serious about transitioning to a sustainable mode of living. Other possible though extremely unlikely *deus ex*

machina scenarios include aliens making first contact and either helping us or destroying us, a comet hitting the earth, or an unprecedented revolution.

As far as the time frame for when we will have the answer for how things will play out, I have no idea. All I can say is if it happened within five years, I wouldn't be shocked, and if it hasn't happened by the end of the century, I would be. While most of the scenarios presented were not very optimistic, the future remains to be written, so it isn't hopeless. What historical trends seem to show is we can only rely on helping ourselves, that we need to try to make preparations for our own lives because society is not likely to be there for us, unless enough people wake up in time to change course.