

The logo for RethinkX, featuring the word "Rethink" in a dark blue serif font and "X" in a red sans-serif font, with a red double-slash symbol between them.

RethinkX

Disruption, Implications, and Choices

Rethinking Humanity

2020–2030 Action Plan

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RethinkX 2020–2030 Action Plan

In order to create an extraordinary future for humanity, an Age of Freedom that is fairer, healthier, more robust and prosperous than any that have gone before, rather than continue on our current path towards collapse, investors and decision-makers across government, business, and civil society must start taking action today.

Their efforts should focus on ensuring that a new, creation-based production system emerges before the old extraction-based system collapses. At the same time, they must begin to create the conditions in which a new Organizing System can emerge, one that is able to understand and manage the new production system (see *Rethinking Humanity*, available on rethinkx.com, for more detail).

As successive, predictable shocks destabilize our civilization, the knee-jerk response of greater centralization in decision-making and resource allocation will give nation states, previously gridlocked by polarization, the power and ability to take decisive action. With power, of course, comes great responsibility. It is imperative that this power is not used to prop up the old system but to accelerate the new.

With this in mind, here is some high-level guidance together with specific examples of interventions decision-makers and investors can make.

High Level

- » **Recognize where we are** and the threats to our system. There is no going back, no return to ‘normal’. We are at a rupture point and the old rules no longer apply. Actions taken in a stable system can have the opposite effect when the system is out of equilibrium.
- » **Be prepared for regular shocks** throughout the 2020s. Examples include financial and real estate crises, pandemics, social unrest, state failure, environmental catastrophes, and mass migration. They will compound the destabilization caused by the rapid transformation of our production system brought about by technological disruption to every sector of the economy.
- » **Pay attention to the cascading impacts of sector disruptions.** Every major sector of the economy will be disrupted during the 2020s. The implications of these disruptions for other sectors will be just as impactful as the initial disruptions themselves. For example, the disruption of transportation (see [Rethinking Transportation 2020–2030](#)) will drive the market price of oil down to around \$25 as soon as 2021, which will cause whole segments of the oil industry to collapse (including oil sands, deepwater oil, and shale/tight oil) with knock-on effects across their value chains (refineries, pipelines, shipping, engineering, construction, and steel). Since oil is the largest tradable commodity in the world, credit markets will be hit as the industry is unable to service its debt, or even goes bankrupt. Since oil is tied to the dollar, the world’s reserve currency’s hegemony will be undermined, with potential implications for interest rates (which affect, for example, real estate, construction, concrete, and car sales) and U.S. geopolitical power. Equally, the disruption of transportation will also drive the resale value of internal combustion engine (ICE) cars, trucks, buses, and vans down to zero or even negative territory.¹ A single percentage point decline in resale value could cost car manufacturers hundreds of millions of dollars. A collapse in resale value could cause liquidity problems, which again would have implications for jobs and credit markets. Likewise, disruption to information and communications could dramatically reduce the need for physical presence and hence transportation, which will be further impacted by the order-of-magnitude drop in shipping goods and resources (oil, coal, cars, and food), with knock-on effects for roads, trucks, rail, and shipping.
- » **Balance the need for rapid change with measures to increase social, economic, and political stability** (see below). This will be a critical challenge.
- » **Create a vision and a clear plan** to mitigate adverse outcomes, such as job losses, instability, and uncertainty.
- » **Communicate them clearly** in order to create broad social support.
- » **Realize that this is a race to the top.** Those that get left behind will be trapped in the legacy industrial system as it enters a death spiral of decreasing demand and investment and increasing costs. Those that lead will be in a position to set the new global rules of engagement.
- » **Devolve power to cities, regions, and states.** Encourage self-organization, management of local production, and flexibility in planning, investing, and governance.
- » **Value robustness and resiliency.** For example, one hundred million homes, commercial buildings, warehouses, and factories generating and storing electric energy is a far more robust and resilient system than a few power plants and a centralized, 20th century grid. Equally, distributed, local food production through precision fermentation (PF) is far more robust and resilient than a centralized system that fails to deliver food during times of crisis. Robustness and resilience must be priced in when building new infrastructure.

- » **Rethink old concepts like efficiency and economies of scale**, which come at the price of vulnerability and single points of failure. Just as the internet created an information network that has proved capable of withstanding and absorbing shocks (such as Covid-19), the creation-based production system architecture will enable local production, storage, and distribution that are impervious to shocks. For essential needs such as food, energy, and transportation, aim for robust and resilient, local self-sufficiency, not vulnerable, just-in-time, global supply chains.
- » **Recognize that we already have the tools we need.** We need no technological breakthroughs. This is largely about execution, and hence capital investments. Scale-up will deliver predictable and exponential improvements in costs and capabilities over time as the new system rapidly outcompetes the old, meaning that market forces will be a tailwind and not the headwind predicted by mainstream analysis.
- » **Do not give credence to incumbents' linear forecasts** that fail to account for the complexity that drives non-linear improvements in cost and adoption of new technologies. Incumbent industries, captured government agencies, and the mainstream analysts they consult have different incentives to the rest of society. Before putting taxpayer, ratepayer, or pension money at risk, take the time to assess mainstream forecasters' predictions from 10 or 15 years ago versus the reality today. Hold them accountable for their predictions, which have been wrong and continue to be wrong by orders of magnitude.

Accelerate the New System of Production

Governments should focus on accelerating the roll-out of new infrastructure and value chains in the foundational sectors – information, energy, transportation, food, and materials. Other sectors will benefit greatly from these investments. In tandem, governments must stop investing in building new capacity in old infrastructure, which will result in the lock-in of uncompetitive systems, stranded assets, and trillions of dollars of losses. The focus should be on:

Information: 5G, broadband, small satellite networks, unmanned aerial vehicle (UAV), and other forms of modern information networks.

Energy: Solar, wind, and batteries.

Transport: Batteries, fleet-charging networks, support for autonomous vehicles (AVs)/micro-mobility, and integration and conversion of rail and public transit with transport-as-a-service (TaaS).

Food: Distributed, localized, PF production hubs.

Materials: Building production capacity for organic materials through PF. These modern materials will help accelerate roll-out across the other foundational sectors.

The Rules

Create frameworks to incentivize the scale-up of the new system through rules and regulation, legislation, law, tax, subsidy regimes, and investment incentives.

- » **Governments should prioritize deployment of existing foundational sector technologies, not basic research and development.** We already have the technologies that will disrupt food, energy, and transportation. Government investment in R&D in these technologies brought them to this point but businesses can and should make the necessary investments to push solar PV, batteries, electric vehicles (EVs), AVs, and PF to economic viability and disruption of legacy industries. Government support should focus on removing obstacles that stand in the way of widespread deployment.
- » **Governments should enable well-regulated markets but should not participate in or distort industries.** For example, today the U.S. government stockpiles 1.4 billion pounds of cheese that it pushes in the form of school lunches and the Supplemental Nutrition Assistance Program.
 - > **Governments should exit the energy business** – they should not own electric power generation, transmission, pipelines, and mines.
- » **Remove barriers to the new system, including unnecessary red tape, regulations, and laws.** For example, end onerous municipal, state, or federal requirements for distributed solar installations. Users must be connected within 24 hours of building a distributed solar/battery installation. In urban planning, end minimum parking requirements (off and on-street), exclusionary zoning laws, onerous housing density requirements, requirements for converting existing parking and garage space to housing, office, and shops, and be ready to close unnecessary streets and plan for their redevelopment into parks, higher-density housing, affordable housing, businesses, on-demand workspace, and mobile retail.
- » **Stop all subsidies (direct and indirect) to legacy sectors.**
- » **Remove regulatory support for legacy systems.** For example, gas connectivity should not be required for new residential and commercial buildings. Parking requirements should not be required for new-build residential or commercial projects. Allow builders to build parking according to consumer needs, not government requirements.

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- » **Design open, fair, transparent, and competitive markets** that remove barriers to new entrants and reduce the ability for monopolies to form. For example, grant the right to individuals and businesses to produce, store, and trade electricity. Remove restrictions on decentralized power generation.
 - » **Create universal standards for new product approval, connectivity, and access.** For example, provide easy, instant connectivity to the new electricity grid (resembling how internet service providers can join the net without needing permission from the center). Create open platforms and standards for the provision of TaaS. Create standards and remove barriers for EV connectivity to the grid (V2G).
 - > Update and streamline evaluation processes using computer simulation. For example, to understand the impact of food products and their ingredients on human health.
 - » **Use tax and subsidy to accelerate the transition.** For example, accelerated depreciation allowances on new infrastructure.
 - > Price negative externalities by taxing the most damaging and unhealthy products to reflect their broader costs to society, including zoonotic viruses.
 - » **Use regulations to support the new system.** For example, as a minimum, require all new buildings in urban areas to be electric-only (i.e. no gas or petrol allowed for space heating or even cooking). Better still, require all new buildings to have solar, battery storage, and electric V2G connections, and the ability to add more solar and batteries like Lego. Require all roof replacement projects to include solar generation.
 - > Establish independent regulatory bodies where necessary. For example, to develop policies and oversee modern food technologies and their products, especially given the lobbying power of the conventional food industry and potential conflicts of interest between the old and new industries.
 - » **Accelerate scale-up of the new system** through direct investment and investment incentives. For example, fast track development of AV technology.
 - » **Set and signal clear intentions to provide clarity and certainty** to investors, businesses, and consumers through targets for adoption of new technologies and restrictions on old. For example, signpost a ban on gasoline or diesel vehicle sales from 2025 and the use of such vehicles from 2030. Signal plans to ban diesel generators in urban and suburban areas by 2025. Provide incentives to swap old diesel generators for battery storage ('battery storage for clunkers').
 - » **Adapt metrics and taxation to fit the new system.** For example, for transportation, move taxes and fees for TaaS to a cents-per-mile basis to replace gasoline tax and annual vehicle fees. Keep gasoline taxes for ICE vehicles as the industry winds down. Do not tax solar self-generation or energy storage, only tax sales to the grid or third parties.
 - » **Adapt subsidies to fit the new system.** For transportation, consider a zero-emission-miles (ZEM) not zero-emissions-vehicle (ZEV) incentive. Incentives for purchasing vehicles (ZEV) encourage inefficient use of more vehicles that impose up to 10x more costs on society through inefficient resource utilization and externalizing costs (for example materials, traffic, and parking space needs).²
 - » **Support the creation of open-source, transparent, collaborative networks** – preferably international – to accelerate the pace of development.
 - » **Develop new models for community ownership of platforms and networks** (energy, information, and transportation). Private ownership and competition should be focused on ideas (information) and elements of the value chain that sit on top of the networks and platform (e.g. production, distribution, and retail).
 - » **Adapt intellectual property (IP) regimes.** IP rights that are in place to create incentives for investment in certain sectors can also limit technological progress and create unnecessary costs to consumers. For example, imposing a pharmaceutical-style IP regime on food would increase costs dramatically, slow the development of the market, and prevent an open-source food production system from emerging. Time-limited IP rights should be granted only when in the public interest, where investment in development would not otherwise happen.
 - > Allow companies to patent production methods but not biological entities, life, or genes – IP regimes should be process-focused rather than output-focused. This will encourage innovators to adopt and develop the technology and encourage the development of open-source platforms and molecular, cellular, and biological system databases.
 - » **Give individuals control and ownership of data rights.** Information is at the center of each disruption – consumer data on energy use, transport, personalized nutrition, and healthcare, for example, have value. Ensuring individual ownership and control of private data will provide economic benefits to consumers that are currently being extracted by third parties. It will also provide benefits like privacy and security. Treating user data like IP should be considered – individuals would own all personal data and have the right to license it to anyone on their own terms. That is, 'legal agreements', whereby companies like Facebook, Google, and Amazon, compel users to give up rights to their data

in exchange for access to apps, should be illegal. Just like IP licensing agreements, individuals should have the right to license data on a per-use, time-limited basis. They should also be able to exclude usage. Companies should bid for the right to use individual data like they bid for people’s labor. Individuals should have the right to offer their data and IP under terms they find favorable.

- » **Create rules to ensure open access to data and interfaces when in the public interest.** For example, 3D High Definition mapping and traffic flow data for transportation of energy, goods, and people should be openly accessible.
- » **Design energy, transport, and production networks based on scale-free network design.** For example, transition the centralized, one-way electric power grid to a networked, multi-way grid. This is like the transition of the centralized, one-way newspaper, radio, or broadcast TV information flow to an internet-based model where everyone can generate, store, and share or trade content. Aim for an energy network that resembles the internet.
- » **Build adaptability into infrastructure.** For example, ensure that new-build solar, wind, and battery capacity built around the centralized electric power grid is adaptable to the fully decentralized energy system that will emerge. Equally, encourage standards to ensure that a charging network for privately-owned electric vehicles is ready for the emergence of shared autonomous fleets.
- » **Regulatory requirements should aim for flexible, distributed, localized, robust production networks.** For example, road use should be flexible, so that both lanes and parking can be assigned to the most appropriate use (e.g. bicycles, scooters, delivery robots, robo-taxis, and high-occupancy vehicles) in real time. Plan for road usage fees to be based on social goals as well as the cost of infrastructure – for example, tax empty vehicle miles, congested road usage, and heavier vehicles at a higher rate than high-occupancy (e.g. buses) and light vehicles (e.g. bikes and scooters). Plan for flexibility in pricing and integrating real-time pricing information into mapping software so that vehicles can optimize driving routes in real time. Plan for the impact of disruptions on related sectors – for example integrating TaaS fleets with transit, rail, and micro-mobility solutions.
- » **Balance safety with the need for rapid transition in regulatory-approval processes.** There is inevitably conflict between approving new technologies (e.g. AVs or PF foods) and public safety. Regulatory approval processes can impose costs and delays on new technologies. Decisions here need careful consideration of the full costs and wider benefits of transition, not a narrow focus on direct impacts. Many barriers to adoption can be removed without any trade off.
- » **Use rules around insurance to accelerate the transition.** For example, no-fault insurance for AV technology would mean that insurers pay the injured party regardless of fault, where the owner of the vehicle is the insured party. In other words, use the same insurance system for human and autonomous drivers. Resist the pressure to subsidize human-driven vehicles when it becomes clear they are measurably more dangerous than autonomous vehicles.
 - > Allow transportation companies to self-insure. This will provide incentives for them to develop safer transportation technology.
 - > Governments should not insure outdated legacy systems, such as fossil fuel or nuclear energy projects.
- » **Governments should be aware of the role they can play in shaping public opinion** and resisting the inevitable push back from incumbent interests that are at risk from disruption.
 - > **Increase transparency.** For example, modernize food labeling to better communicate health benefits, health risks, and environmental impacts to consumers. Labeling laws should have clear meanings. The word ‘natural’, for example, does not have a clear legal meaning today and can be used by food marketers to mislead consumers. Establish clear, official terms and definitions in conjunction with the food industry, both legacy and new, that government agencies use when referring to various products and their production methods that do not favor one industry over another.
 - > **Prioritize consumers’ right to know.** Instead of simplistic, static food labels, for example, consumers should be able to scan a QR code that shows details of the content of food they intend to purchase, including the source of all ingredients, manufacturing methods, heavy metal content, health impact to children and adults, and environmental impact. Data should include names of companies and GPS location of farms and factories for all ingredients, all of which are available in disparate databases today.
 - > Create standards for users to download food data to nutrition apps so they and their nutritionists can optimize individual health outcomes.
- » **Governments should lead by example in their own procurement programs.** For example, all government buildings should install solar and battery storage. Transportation, governments, public transportation agencies, public schools, and postal systems should procure using a TaaS model on a cost per-mile basis, not for purchasing vehicles (pulling steel).

Framework Box. The Standard Model of Disruption: A New Heuristic at the Limits of Physics and Biology

All sectors of the economy will be disrupted over the next decade and the pace of disruption is likely to accelerate in the 2030s. The Seba Technology Disruption Framework allows for the analysis of disruptions in fundamental sectors of the economy, but policymakers, investors, businesses, or civic leaders may have to make decisions that affect sectors they may not be intimately familiar with. Here is a heuristic to help.

» The building blocks of the new production system will be the bit (and later qbit), photon, electron, molecule, and DNA (or gene). These building blocks are available and plentiful everywhere and can be recombined in infinite ways to create new products and services at essentially zero cost. Information technology will dominate the system of production, but information needs to be embodied in matter and energy. Building blocks that are more powerful, lighter, and faster are superior to those that are less (or similarly) powerful, slower, and heavier. Bits and photons will disrupt electrons, which will disrupt atoms and molecules. Photons are more powerful but orders-of-magnitude lighter and faster than electrons, which are as powerful but orders-of-magnitude lighter and faster than atoms. Similarly, when creating molecules (food, materials, and medicines), manipulating DNA at the micro-organism level allows for the faster production of molecules, with a far lighter production infrastructure and higher degree of precision and accuracy than manipulating a macro-organism. The following are examples of a bits, photons, electrons, atoms, molecules, and DNA (BPEAMD) heuristic:

> For transportation: Electric vehicles (electrons) disrupt ICE vehicles (atoms). Any investments in the ICE vehicle value

chain including pipelines, refineries, and gas stations will be stranded.

- > For energy and transportation: Solar (photons) disrupts fossil fuels (atoms) and battery electric energy storage (electrons) disrupts centralized fossil fuels (atoms). Any investments in the fossil fuel value chain including pipelines, refineries, and gas stations will be stranded.
- > For transportation and infrastructure: Developing high-definition mapping and localization infrastructure will make existing roads dramatically more efficient, so there may be no need to build new roads (bits beat atoms). Autonomous vehicles will drive much of the day, so 90% of parking will be redundant (bits beat atoms).
- > For food, healthcare, and materials: Designing molecules (such as proteins and lipids) using Food-as-Software (bits) and producing them via a lighter, faster, local PF infrastructure using micro-organisms (DNA), beats macro-organisms (such as cows and pigs) that need vast amounts of land (atom), fossil fertilizer (atom), and factory farming (atom).

Consider prioritizing investments based on this new standard model of disruption. A heuristic should not replace in-depth sector analysis. But the blunt instruments of the industrial order will be disrupted quickly, enabled by far superior capabilities to manipulate matter, energy, and information with ever greater speed, scale, and precision. This process will accelerate as we achieve even higher technological capabilities closer to the limits of physics and biology.

Investment and Business

The new production system will see a vast reduction in the flow of physical goods and materials through the economy. This will dramatically reduce working capital requirements as physical flows are replaced by capital-free information flows. Likewise, development costs are plunging and, in many cases, could be largely open source. Thus, capital will mainly be required for the roll-out of physical assets (e.g. solar, batteries, and food and goods production centers), not for development and working capital. Financing the roll out of this new system will require major adaptations to our financial system.

» **Create new funding mechanisms that recognize changes in capital requirements.** The capital required will be a mix of debt and equity, with returns underpinned by the offtake of production. Creating new funding mechanisms and driving capital towards them to incentivize investment in the physical infrastructure and value chains required to scale up

the new system will be critical. Infrastructure-style financing mechanisms with separate layers of risk and return could be repurposed to provide funding at smaller scale.

» **Use pensions and savings to help build out the new system.** The fixed return profile of these investments (such as distributed power networks, food production centers, and TaaS) will closely match the liability profile of pension schemes (much more so than traditional pension portfolios) and are a good proxy for the ultimate needs for which pensions are designed to meet (such as food, housing, energy, and transportation). Consider changes to rules to drive pension assets and savings towards these products. This would provide a stepping stone towards distributed, participatory ownership (or a new social contract based on a 'right' to energy and other needs) and potentially avoid the fundamental restructuring of the pension systems in Western economies that is inevitable under the current system.

- » **Set up simple regulations for individuals to invest in new infrastructure.** Existing regulations (such as Investment Tax Credits) are geared to a system where big finance, corporations, and wealthy individuals invest big money in a few big projects. Society needs participatory finance where every individual can invest directly in smaller projects in their communities, cities, and regions.
 - > **Develop new legal mechanisms/asset classes** so individuals can invest in small (residential, commercial, and industrial) solar and battery projects and A-EVs, which are cash-generating assets. Preferably, these should be digital-only mechanisms with real-time reporting and fast and direct cash disbursement to investors, municipalities (taxes), and suppliers. To increase trust in these new mechanisms, consider requiring triple-entry accounting. This would minimize the likelihood of accounting fraud as well as legacy credit rating and auditing bias.
 - > **Make distributed solar, wind, and battery storage projects REIT-able.** This would make trillions of dollars managed by Real Estate Investment Trusts available to scale up the new distributed, robust, clean energy infrastructure.
 - > **Extend Master Limited Partnerships to solar, wind, and battery projects.** This would make hundreds of billions (potentially trillions) of dollars from public markets available to clean energy projects.
- » **Avoid investments in old system infrastructure that will become obsolete.** Capital investments in legacy systems will be stranded. These include investments in the value chain of fossil fuels (mining, pipelines, and refineries), ICE vehicles (supply chain, manufacturing, and distribution), and industrial agriculture (farms, processing plants, and machinery). For example, the UK government is planning to spend £100bn on a high-speed rail link that will be obsolete before it is finished (early 2030s) when it could, for example, repurpose two lanes of highway that will no longer be needed to run autonomous electric road trains for a fraction of the cost (the technology for this is already good enough).
 - > **Do not use taxpayers or ratepayer money to invest in legacy projects.** Over the foreseeable future, utilities will push for taxpayers to fund power plants (coal, natural gas, oil, and nuclear) under linear assumptions (such as high utilization rates for several decades). These capital investments are already stranded or will be over the next few years. Utilities should instead ask their shareholders to fund these legacy projects. If they are not good enough for shareholders, they are certainly not good enough for ratepayers.
- » **Do not make static, long-term investment assumptions.** Infrastructure investments in the 20th century were made under the assumption of long-term system equilibrium. Widescale disruption means this assumption no longer holds. We can no longer assume that a natural gas or coal power plant will be competitive in 10 or even five years. A 25-year NPV calculation will certainly be wrong. For example, you cannot assume a high plant-utilization rate in the future. As there is higher penetration of zero-marginal-cost solar, wind, and storage, legacy power plants will enter a vicious cycle as they are pushed into the role of peakers – the market for them will diminish dramatically so the price needed to sustain them will rise, decreasing the market further.
- » **Do not make resale value assumptions based on legacy trends.** For example, ICE vehicle lease agreements assume a certain resale value based on historic prices. This assumption can no longer be made. A more realistic assumption for any ICE vehicles sold today (with an average five-or-more-year lease) is that residual value will be zero or even negative. This will cause a collapse in the value of debt secured on these assets (including cars, equipment, and power infrastructure), which will in turn cause a death spiral for these industries as the cost of purchasing these new assets shoots up (lower residual value = higher monthly payments).
- » **Prioritize investments** based on the idea that everything (houses, vehicles, infrastructure, and people) will be connected to information networks. This means that everything should be thought of as a connected, smart device.
- » **Mitigate disincentives to investment in markets with deflating prices.** For example, guarantee recovery of investment for the installation of zero-marginal-cost technologies such as solar, wind, and storage.

Manage the Decline of the Old Production System

Ensure the influence of incumbent business is checked and the adverse consequences of the wind-down of these industries are mitigated.

- » **Remove direct and indirect incentives and support** through fiscal, regulatory, and legal frameworks. Resist bailouts of industries. For example, remove subsidies and protection currently given to fossil fuel and nuclear industries.
- » **Protect people, not businesses.** Allow unviable incumbent businesses to go bankrupt, but protect people through policies to retrain, financial and healthcare support, and access to social capital through the transition. Also create mobility to help people move to different locations with better job and quality-of-life opportunities.

- > Create debt-relief programs to help small businesses, individuals, and others within the value chain to exit their incumbent industries.
 - > Expand social safety-net programs to ensure that individuals affected by disruption can either retrain for or transition to other livelihoods, or retire with dignity.
 - > Anticipate that whole towns and regions will be disproportionately affected by disruption and enable programs to help local populations transition successfully to the new system. This includes providing educational, financial, healthcare, and social-capital support, as well as creating new employment opportunities.
- » **Salvage critical assets of incumbent businesses still required** while the new system is being built (such as power stations, mines, and farms). For example, temporarily, selectively, and minimally subsidize critical legacy fossil fuel-based generation capacity (as it becomes uneconomic) to bridge to the new system. No new fossil or nuclear is needed so resist the misleading push to subsidize natural gas or other energy sources to ‘bridge’ to the future.
 - » **Do not lock into long-term price contracts for legacy infrastructure.** For example, as centralized fossil fuel-based energy collapses, commit only to short-term offtake agreements if necessary to keep the lights on.
 - » **Remove or resist the fightback from incumbent industries** and mindsets in the form of phony science, lobbying (regulatory capture), and disingenuous demands to protect jobs and influence public opinion when they really seek to protect their own financial position.
 - » **Recognize that this process is deflationary** and that high levels of debt will cause industries to collapse fast, which will have impacts far beyond the industries themselves. Central banks, governments, and investors will need to plan for a long period of supply-side deflation in the foundational sectors, just as there has been deflation in information technologies.
 - » **Break up the monopoly utility model** in the same way telecom monopolies were broken up (which enabled the internet to break through). Large-scale generation, transmission, distribution, and retail should be separate companies in a given market. The electricity distribution company business model should be to maintain and upgrade poles and system stability (storage) and make money mostly on electricity trade transactions (like eBay or Uber). In an open, transparent, well-designed marketplace, companies will prioritize local generation because it will be cheaper.
 - » **Break up gas and electric power businesses** (transmission, pipelines, and retail). This will create competition between gas and electric power.

Enabling a New Organizing System

As we have seen, the creation-based system of production will not be adequately managed by our existing Organizing System. The challenge is to both patch up our existing system and do what we can to build robustness over the next decade so we delay its collapse as long as possible, while at the same time creating the conditions for its replacement to emerge. Given the emergent nature of the coevolutionary process of change, we cannot plan exactly what a successful Organizing System will look like, but we can create the conditions and understand the principles that will allow it to emerge.

Patching up the Old System

Ensuring social stability will be critical, a challenge made harder by profound changes to the workforce. Communicating a clear vision for the future (what it looks like and how we get there) will help create support and remove the incentive to look backwards for populist solutions. But more critical is a clear plan to mitigate the adverse consequences of change, which include job losses, increasing instability, and uncertainty. While RethinkX analysis suggests there will be in aggregate job creation during the roll-out phase of the new production system (particularly in building the electric power system), many of the jobs created will require different skills and be in different locations to those lost. Furthermore, as the expansion of the new production system slows, many of these jobs will disappear. This dynamic will allow us to bridge to the world of ‘rights’ and a new social contract but will contribute to instability. Choices can be made to create additional jobs both to mitigate negative impacts and to accelerate improvements in other areas. For example, the land freed from the disruption of animal farming could be reforested, helping to replace jobs lost in farming in the same areas.

- » **Subsidize universal access to information network connectivity, TaaS, and distributed electric power**, including the elderly, less able bodied, the poor, and those living in rural areas.
- » **Enable universal access to lifelong education.** America once innovated by creating the land-grant college program, which enabled the emergence of the state university system. In the 2020s, we will need a new universal, lifelong, decentralized, and participatory education-for-all system. To this end, begin the process of developing a new system of education that recognizes the full range of future needs and possibilities. Recognize short-term requirements (for example for engineers and coders) but realize that these needs will change rapidly. Allow experimentation with new non-traditional forms of delivery that could massively reduce cost and deliver a better service. Decouple quality of education from zip codes.

Enabling the New System

- » **Decentralize and experiment at the edge.** Allow states and cities far greater autonomy in decision-making, including areas such as immigration policy, taxation, currency, asset classes, ownership structures, intellectual property, representation and decision-making, education, public expenditures and investment, laws, and regulations.
- » **Ensure the center does not crush the edge.** The new Organizing System will represent an existential threat to incumbent interests, including nation states. Breakthrough will only be achieved if the center facilitates and embraces its own transformation and the eventual diminution of its own importance. While increased centralization to nation states is inevitable in the short-term, for us to succeed the center will need to diminish. Indeed this process is inevitable – as the new system emerges in a U.S. state or in Israel, Dubai, Singapore, Mumbai or elsewhere, the role of the federal government will shift profoundly. While its eventual role will depend on the Organizing Systems that emerge at the state or regional levels, the center is likely to become a collaborator not director, continually contributing to the network to create value.
- » **Put systems thinking at the center of all scenario-planning and decision-making.** While recognizing the shortcomings implicit in modeling future scenarios, be prepared to update assumptions and change course rapidly.
- » **Focus governance and decision-making on principles of resilience, adaptivity, flexibility, and agility.** Encourage novel approaches and embrace the lessons of experiment failure.
- » **Be aware that a new social contract will be required,** which might grant a right to needs (increasing over time as costs drop), while redefining concepts like work, reward, and purpose. A gradual transition will be required as society nears the end of the scale-up of the new system and jobs (as we define them today) disappear. Concepts like a universal basic income that, over time, will become rapidly more affordable, and the pension reforms discussed above, can help bridge the transition.
- » **Plan early for massive change to land use and the built environment.** The simultaneous disruption of the foundational sectors will create extraordinary new possibilities for towns and cities and well as farming regions.

Cities of far greater density and size will be feasible (manageable cities of 100m people will be possible by the early 2030s), as will far more distributed conurbations of almost limitless scale, as the cluster effect favoring cities diminishes and land is freed from food production and transportation. Furthermore, demands for land within and around cities will change as food production, goods manufacturing, and energy production decentralize and the transportation system radically changes in land-use requirements. There will be many competing interests for these areas and it is essential that regions begin to plan early, taking full account of all potential future uses.

- » **Develop rules of the network and govern at the point of connection.** As governance moves away from our current centralized, hierarchical structures, new structures will emerge at the level of the node (localized, self-sufficient community) and the network (far broader and ultimately global). Developing the rules of the network will be critical. This will not require global agreement, as the ‘best-fit’ Organizing System, wherever it emerges, is likely to spread rapidly as it outcompetes all others. Connection to the network will be vital to participate in any aspect of society and thus governing at the point of connection will be critical. Regions that hope to lead will need to focus on these network principles that will allow the new system of production to be managed and governed effectively.
- » **Develop verifiable and immutable methods to establish trust** across the network for all forms of institutions and human relationships.
- » **Develop principles for usage and control of AI and biotechnology.** Both AI and biotechnologies have the potential to create extraordinary opportunities for humanity, but as the cost and accessibility of both plummet, so the risks of rogue individuals or groups harnessing them for negative means rise. AI is likely to be integrated into decision-making across society, including in the allocation of scarce resources (market function) and policy decisions (democracy). Furthermore, AI will have a critical role across all aspects of the production and Organizing Systems, so creating clear principles that help mitigate the risks of adverse outcomes will be critical. A modern form of the Philadelphia convention, to decide on these principles and decide on what humanity should optimize for, might be needed.

Notes

- 1 Welch, D. & Naughton, K. (2020, April 13). Fear of an Impending Car-Price Collapse Grips Auto Industry. *Bloomberg*. Retrieved from [here](#).
- 2 More here: Seba, T. (2018, March 26). Zero emission miles: How to decarbonize road transport quickly and cheaply. RethinkX. Retrieved from [here](#).

The RethinkX Project

RethinkX is an independent think tank that analyzes and forecasts the speed and scale of technology-driven disruption and its implications across society. We produce impartial, data-driven analyses that identify pivotal choices to be made by investors, businesses, policymakers, and civic leaders.

Rethinking Humanity

We are on the cusp of the fastest, deepest, most consequential transformation of human civilization in history, a transformation every bit as significant as the move from foraging to cities and agriculture 10,000 years ago.

During the 2020s, key technologies will converge to completely disrupt the five foundational sectors that underpin the global economy, and with them every major industry in the world today. In information, energy, food, transportation, and materials, costs will fall by a 10x or more, while production processes an order of magnitude more efficient will use 90% fewer natural resources with 10x-100x less waste.

The knock-on effects for society will be as profound as the extraordinary possibilities that emerge. For the first time in history, we could overcome poverty easily. Access to all our basic needs could become a fundamental human right. But this is just one future outcome. The alternative could see our civilization collapse into a new dark age. Which path we take depends on the choices we make, starting today. The stakes could not be higher.

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Rethinking Humanity is seminal. Whether you run a company, a city, or a nation state, you need to understand the simple patterns that drive complexity, disruption, and change in human history. The future belongs to those societies who can both make the right technology choices and reorganize their governance and belief systems to capture the exponentially growing opportunities in front of us.

Jose Cordeiro, Director, Millenium Project;
ViceChair, HumanityPlus; Candidate for the
European Parliament

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Rethinking Humanity will be required reading for civic leaders, executives, and government officials.

Guido Jouret, Chief Digital
Officer at ABB

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It's not easy to blow my mind. But earlier this week, I sat down and read a research report by RethinkX. I've been picking up the pieces of my consciousness ever since.

The Motley Fool

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