

Transnational Tensions

The era of American exceptionalism ends with population growth, economic growth, and capacity for innovation all stagnating. America's rivals have leapfrogged forward on global economic, technological, and political leadership and its former allies are estranged and distant. Persistent increases in the damages from extreme weather events place a further burden on Americans. Governments lack the resources to adapt to the escalating risk much less launch a transition to a future to get the climate crisis under control. Public mistrust in government is widespread, aided by malinformation, cuts to social programs, and the lack of vision for a return to prosperity.

Current Events

01/2050

Hindustan Times

India leapfrogs China on global innovative climate technologies

SCIENTIFIC AMERICAN

America invested billions in resilience, but the benefits are hard to find

The Herald-Dispatch

Leak reveals investors exploring reopening coal mines in Appalachia

The Washington Times

President's critics' weaponization of misinformation has no historic analogue

2024



2050

Population

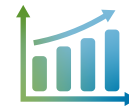
340
MILLION



355
MILLION

GDP

\$26
TRILLION



\$34
TRILLION

Climate Indicators

Avg. Disaster Declarations (#/year)

120
A YEAR



175
A YEAR

Disaster Losses (\$B/year)

100
BILLION



250
BILLION

Exposure to Coastal Flooding (M ppl/year)

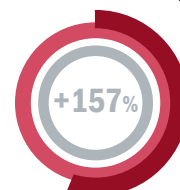
3.4
MILLION



5.0
MILLION

Average Heat Index >100° F (# days/year)

14
DAYS



36
DAYS

Avg. Annual Wildfire Area Burned (km2/year)

6,000



9,000

Climate

Reducing greenhouse gas emissions has not been a priority across the world, and the brunt of change is felt in the polar regions. Alaska has been warming faster than any other U.S. state such that temperatures in 2050 have now risen by 5 °C (9 °F). The effects of climate change are evident in Alaska, where milder winters and hotter summers are having devastating and life-changing consequences for indigenous communities. A pilot federal program to fund their relocation failed due to high costs and poor integration among federal, state, and local agencies. A result is the scattering and decline of indigenous culture as well as a collapse of broader trust between indigenous people across the country, their tribal nations, and all levels of government.

The rapid thawing of permafrost along coastlines and rivers is leading to erosion, flooding, and loss of fishery populations, resulting in devastating consequences for coastal indigenous communities. Furthermore, infrastructure located near thawing permafrost is becoming unstable. Buildings are shifting in their foundations, road networks are breaking, and collapsing pipes are resulting in communities not having running water or functioning sewage systems. Communities are concerned they will lose the Trans-Alaska Pipeline due to sinking foundations that rest on permafrost, potentially resulting in a large oil spill and further impacting rivers and wildlife habitat. Existing adaptation solutions are not keeping pace with the growing impacts, and the lack of investment in K-12 education as well as research and technology development means that innovative solutions have yet to be developed.

The failing infrastructure due to thawing permafrost is also disrupting resources of the North American Aerospace Defense Command and Alaska Command, as well as disrupting Air Force and Army readiness. In turn, homeland defense missions are threatened and civil support capabilities following a disaster are waning. The capacity for immediate disaster response is therefore shifting to local leaders and emergency management.

Meanwhile, in the contiguous U.S., a warming climate is causing shifts in the occurrence of hazardous convective weather. Environmental conditions favorable for severe thunderstorm development is most prevalent outside of the central and southern Great Plains (or “Tornado Alley”). In 2050, the Southeast U.S. is now experiencing double the number of severe thunderstorm related disasters, and supercells are also more likely to occur at nighttime versus during the afternoon. The timing of nighttime supercells presents growing risk communication and early warning challenges for community leaders and emergency managers, especially given the vulnerable individuals in this region and their higher likelihood of living in mobile homes.

During the spring season, a powerful derecho traversed across the Atlanta area, bringing high winds and several tornadoes that resulted in utility disruption (including blackouts lasting several weeks), property damage displacing many homeowners, and destruction at multiple local airports, including the Hartsfield-Jackson Atlanta International Airport. Response efforts have been hindered due to airport inoperability. Efforts to rebuild have been slow and challenging. Like in Alaska, impacted communities are facing a failure in effective disaster mitigation strategies and a failure in response

efforts due to poor integration among federal, state, and local agencies. Break downs in relationships and trust between these entities is further compounding operational coordination failures, with the federal government and SLTTs now functioning almost entirely in their silos.

Society

The election of President Rumson in 2048 ushered in a new era of American nationalism and isolationism. The President's campaign tapped directly into the zeitgeist of declining American competitiveness and international leadership and desperation of Americans for a solution to the stagnant economy, high unemployment, and erosion of American resilience and prosperity. The President's nascent reelection campaign has doubled down on the status quo, characterized by the campaign slogan "America, Second to None." Polls show the race is a toss-up, but pundits are nevertheless predicting record low turnout due to a general mood of cynicism regarding the ability of the federal government to produce an effective policy platform that can address the Nation's ills. The rampant use of misinformation leaves Americans frustrated and unsure of the policy directions of any candidate or party.

Progressive tightening of America's borders has slowed population growth, and a new stringent quota system has been placed on individuals seeking asylum or seen as being climate migrants. As a result, societal measures of diversity, equity, and inclusion have stagnated and the average age of an American continues to climb. The economic woes in rural America have accelerated migration of young people to cities, but opportunities are few and far between. In 2020, poverty rates stood at approximately 16, 15, and 9 percent for rural, urban, and suburban areas, and this has morphed to 26, 20, and 12 percent, respectively – reaching levels not seen in over a century. Cuts to spending on education, healthcare, and social security undermine American competitiveness and well-being for all but the elite. Progress in reducing the burden of chronic disease peaked in the mid-2030s and some ailments have resumed an upward trend. The measles epidemic of 2041 saw the disease reach numbers not seen since the 1970s.

The rise in nationalism, while promoted as a pro-America sentiment by right-wing organizations, is blamed for a rapid increase in racist rhetoric and incidents. In January 2045, the disruption of ceremonies on the mall in Washington, D.C. commemorating the 100th anniversary of the liberation of the Nazi concentration camps and ensuing riots triggered widespread global condemnation, but only muted public outrage. In a public statement, the Attorney General called the incident a "wake up call for America" and requested Congress to fund additional capacity at the Department of Justice, Federal Bureau of Investigation, and FEMA to respond to more frequent hate crimes and potential large-scale acts of domestic terrorism. The president subsequently asked for the AG's resignation, and senators are reluctant to break a filibuster in the face of broader public skepticism that meaningful change is forthcoming soon.

Economy

America's protectionist stance proves to be politically popular, but economically disastrous. The imposition of tariffs across multiple sectors of the economy does more harm than good. Businesses that have grown accustomed to free trade and global integration of financial markets and supply chains find themselves having to make costly adjustments to adapt to a more protectionist reality. The Nation's limited capacity for domestic manufacturing combined with high tariffs on imports drive up the costs of goods which erodes America's purchasing power.

An open letter to the President from the leadership of the Nation's largest banks, private equity firms, and hedge funds was broadly ignored in by the White House, despite the dramatic resignation of the Chair of the Council of Economic Advisors. The clear disconnect between Wall Street and the federal government led America's credit rating to take yet another hit, with the S&P downgrading it to "BBB with a negative outlook" in the Fall of 2049. This disconnect increased the cost to the Treasury of servicing the Nation's extensive debt and will undoubtedly lead to a reduction in spending as well as the workforce. States and municipalities reliant on these transfers and jobs are staring into a fiscal abyss, resulting in likely impacts to bond issues. Governors and mayors have begun planning austerity budgets to balance the books with the biggest cuts coming from public services, with arts, cultural, and environmental portfolios already slashed.

With banks struggling with billions in bad debt on their books, lending tightens across the board resulting in a credit crunch that affects everything from consumer spending to renewable energy deployment. There is hope that the Federal Reserve's shifts in monetary policy including lowering interest rates and an aggressive program of quantitative easing will help over the long-term, but the benefits have yet to materialize for consumers. Meanwhile, federal subsidies for renewable energy largely evaporated after 2035, causing utilities to extend permits for natural gas power plants many thought would have long since been retired. The lack of investment in American innovation and infrastructure leaves its economy struggling to keep up with its competitors – China, India, and Nigeria. With Americans struggling with financial hardship and international tensions emerging on multiple fronts, tourism slows dramatically, hitting small businesses in America's bigger cities particularly hard.

To rescue the budget, Congress passed spending reforms that cut benefits from Medicare and Social Security. These cuts disproportionately impacted the aging population and increased the vulnerability of older Americans, with much of their retirement wealth already evaporated by the volatility in the stock market and corresponding interest rate increases. At the same time, repetitive flooding in the Southern Mississippi River Valley causes Congress to follow the lead of private insurers and shrink those areas of the country eligible to participate in public insurance programs and fails to advance legislation that would fund the relocation of repetitive loss communities. The Congressional Black Caucus (CBC) responded by issuing a press release declaring the White House has "declared war on poor people".

Technology

In 2041, the state of Florida could not get the vehicles they needed to perform preventative upkeep of the coastline because of a failed bond issue and a lack of the appropriate satellite navigation components and processing chips to coordinate with the autonomous sand dredgers. Just two years later, thousands of homes along the coast flooded and were deemed permanently uninhabitable.

Despite substantial free market investment, domestic technology firms struggle to make as much progress in artificial intelligence and quantum computing as government-sponsored researchers in the Middle East and Asia. The U.S. military and CISA have become aware of a forthcoming breakthrough that if used by an adversary will cause a rapid crumbling of U.S. cyber defenses. Stockpiled chips, radios, and other critical items not incorporating the latest technologies are now feared worthless and vulnerable to a supply chain attack. This total lack of preparation would have been inconceivable even a decade earlier and emergency managers are bracing for the possibility of simultaneous and devastating cyber-attacks.

The public is so inured to fake images generated by artificial intelligence that, when a particularly bad hurricane hit the East Coast, flooding roads and railways and leaving thousands of people stranded on rooftops, a significant portion of the country simply did not believe it happened despite some news organizations showing videos of the disaster on repeat. In addition, emergency managers had difficulty establishing situational awareness amongst all these public reports after their secure networks went offline. Debates about the realities of the hurricane held up funding for disaster relief. According to a recent report from a prominent think tank, this led to over 1,000 additional deaths.

Because the dark web has proliferated, leaks of personal or medical information is now commonplace. Combined with a spate of high-profile deepfake videos of prominent officials saying racist things immediately following evacuation orders, public trust in government during an emergency is seriously eroded. This culture of distrust leads groups of people to completely miss preparedness information without extensive direct and targeted outreach.

Geopolitics

Middle Eastern and Asian countries' artificial intelligence edge gives them the ability to surveil any person, monitor any system, and manipulate any market where its 8G systems, featuring space linkages and dynamic bandwidth capabilities have been deployed. Most countries have adopted their competing technical standards, and the U.S. and its allies are forced to make do with increasingly inferior equipment and connectivity. The Nordics, however, have had some success in developing resistant cryptographic algorithms, but so much existing intellectual property and private information can have its public-key encryptions attacked, allowing for individual-scale phishing to be a quaint reminder of the past. For example, the economic and diplomatic damage from society-wide attacks enabled by a hacked and leaked DHS biometric immigration database and caused a massive geopolitical row.

There is little agreement in a polarized world that failed to come to a consensus on taking climate action. The ensuing challenges of mitigation and adaption have rendered agreement on almost anything a fool's errand. Nation-states, increasingly riddled with domestic issues and encouraged by the major powers to fight in proxy wars, have stoked regional conflict to distract their politically polarized populaces. This has led to severe environmental degradation that spans borders, but leaders are unable to summon outside emergency relief from their neighbors for their own pride or the supporting nation's fear of becoming embroiled in conflict. The U.S., trying to prop up regimes that protect its exclusive access to resources – particularly oil and gas in the Caribbean as well as rare earth materials in South America – regularly deploys aid workers across the Americas, pulling upon its own emergency stockpiles. Food and water are used as negotiation tools in disputes at the expense of broader development goals, in defiance of long-held international norms with FEMA officials and their contractors caught in the middle delivering the aid alongside foreign militaries in the region.

Bibliography

Population data is derived from:

- Samir, K.C. and W. Lutz, 2017: The human core of the shared socioeconomic pathways: Population scenarios by age, sex and level of education for all countries to 2100. *Global Environmental Change*, **42**, 181-192, doi:<https://doi.org/10.1016/j.gloenvcha.2014.06.004>.
- Riahi, K. et al., 2017: The Shared Socioeconomic Pathways and their energy, land use, and greenhouse gas emissions implications: An overview. *Global Environmental Change*, **42**, 153-168, doi:<https://doi.org/10.1016/j.gloenvcha.2016.05.009>.

GDP data is derived from:

- Hewitt, R. J., R. Cremades, D. V. Kovalevsky and K. Hasselmann, 2021: Beyond shared socioeconomic pathways (SSPs) and representative concentration pathways (RCPs): climate policy implementation scenarios for Europe, the US and China. *Climate Policy*, **21**(4), 434-454, doi:[10.1080/14693062.2020.1852068](https://doi.org/10.1080/14693062.2020.1852068).
- Dellink, R., J. Chateau, E. Lanzi and B. Magné, 2017: Long-term economic growth projections in the Shared Socioeconomic Pathways. *Global Environmental Change*, **42**, 200-214, doi:<https://doi.org/10.1016/j.gloenvcha.2015.06.004>.
- Riahi, K. et al., 2017: The Shared Socioeconomic Pathways and their energy, land use, and greenhouse gas emissions implications: An overview. *Global Environmental Change*, **42**, 153-168, doi:<https://doi.org/10.1016/j.gloenvcha.2016.05.009>.

Climate Indicators:

- Disaster Declarations are extrapolated from historical data, excluding outlier years of 2011 and 2020, with adjustments to maintain consistency with underlying scenario. Data available at <https://www.fema.gov/openfema-data-page/fema-web-disaster-declarations-v1>.
- Disaster Losses are extrapolated from historical billion-dollar disaster time series, excluding outlier years of 2005 and 2017. Data available at <https://www.ncei.noaa.gov/access/billions/time-series>.
- Exposure to Coastal Flooding metrics are based on Hauer, M.E., Hardy, D., Kulp, S.A. et al. Assessing population exposure to coastal flooding due to sea level rise. *Nat Commun* **12**, 6900 (2021). <https://doi.org/10.1038/s41467-021-27260-1>.
- Heat Index metrics are based on Dahl, K., Licker, R., Abatzoglou, J.T. and Declet-Barreto, J., 2019. Increased frequency of and population exposure to extreme heat index days in the United States during the 21st century. *Environmental Research Communications*, **1**(7), p.075002. <https://iopscience.iop.org/article/10.1088/2515-7620/ab27cf>.

- Wildfire Acres Burned metrics are based on Abatzoglou, J.T., Battisti, D.S., Williams, A.P. et al. Projected increases in western US forest fire despite growing fuel constraints. *Commun Earth Environ* 2, 227 (2021). <https://doi.org/10.1038/s43247-021-00299-0>
<https://www.nature.com/articles/s43247-021-00299-0#citeas>.

Scenario Narrative:

- For more information on rate of warming in Alaska, see: <https://www.climate.gov/news-features/understanding-climate/new-report-highlights-alaska%E2%80%99s-last-five-years-dramatic-climate> or <https://nca2014.globalchange.gov/report/regions/alaska#intro-section>.
- For more information on climate and severe thunderstorms, see: https://journals.ametsoc.org/view/journals/clim/30/24/jcli-d-16-0885.1.xml?tab_body=pdf
- For more information on supercells, see: <https://www.nature.com/articles/s41612-018-0048-2>, <https://link.springer.com/article/10.1007/s10584-017-1905-4>, or <https://journals.ametsoc.org/view/journals/bams/104/1/BAMS-D-22-0027.1.xml>