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MICHAEL MANDEL

PROGRESSIVE POLICY INSTITUTE

APRIL 2026

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INTRODUCTION

This policy paper illuminates China's successful advanced technology investment strategy, with the goal of drawing lessons for U.S. policymakers. In particular, we show that China's investment strategy is much more decentralized than is usually realized. The broad directions of science and technology investment policy are set in Beijing, but much of the execution and funding is undertaken by provincial and municipal officials. We explain the pluses and minuses of China's "local-facing" investment strategy, and what it means for American governors and mayors.

First, to provide a starting point, we document the persistent weakness in state and local investment spending in the United States. In the United States, state and local government investment spending has stalled out over the past two decades, rising by only 15% in real terms from 2005 to 2025.¹ Meanwhile, federal nondefense investment spending is up 87% over the same stretch, reflecting America's top-down approach to tech investment policy.

Second, we explain how China's local-facing investment strategy works, and why it has been successful. Unlike their U.S. counterparts, China's provincial and municipal governments are pouring enormous sums of money into supporting advanced technology industries such as semiconductors, electric vehicles, satellites, biotech, humanoid robots, and the manufacture of key aerospace materials such as carbon fiber. One example: In 2025, the municipal government of Shenzhen, China's third largest city, backed a 5 billion yuan fund that would invest in chip design and other advanced technologies.² That can be valued at somewhere between \$700 million and \$1.4 billion, depending on whether we use the official exchange rate of roughly 7 yuan to the dollar, or the purchasing power parity (PPP) rate of roughly 3.5 yuan to the dollar. In either case, it's a substantial investment of resources for one city and one industry.

This government decentralization is essential to explaining how China's government-led science and technology investment policy is able to push ahead on multiple technological frontiers simultaneously. Key advanced technology industries are being subsidized and supported by local policymakers who can move much faster and more flexibly than central government bureaucrats could. The result is the economic equivalent of a stampede — a barely controlled rush to add technological capacity without immediately worrying about profitability or the rapid buildup of debt.

Third, following on that insight, we show the downside of China's success: Provincial and municipal governments have taken on astronomical levels of debt, on a scale that exceeds the U.S. AI investment boom. International Monetary Fund (IMF) estimates suggest that municipal and provincial Chinese governments, plus their affiliated "local government finance vehicles" (LGFVs), borrowed 16 trillion renminbi in 2024 and 2025, much of that from Chinese banks and state-owned enterprises.³ That's the equivalent of adding more than \$2 trillion in debt in two years.

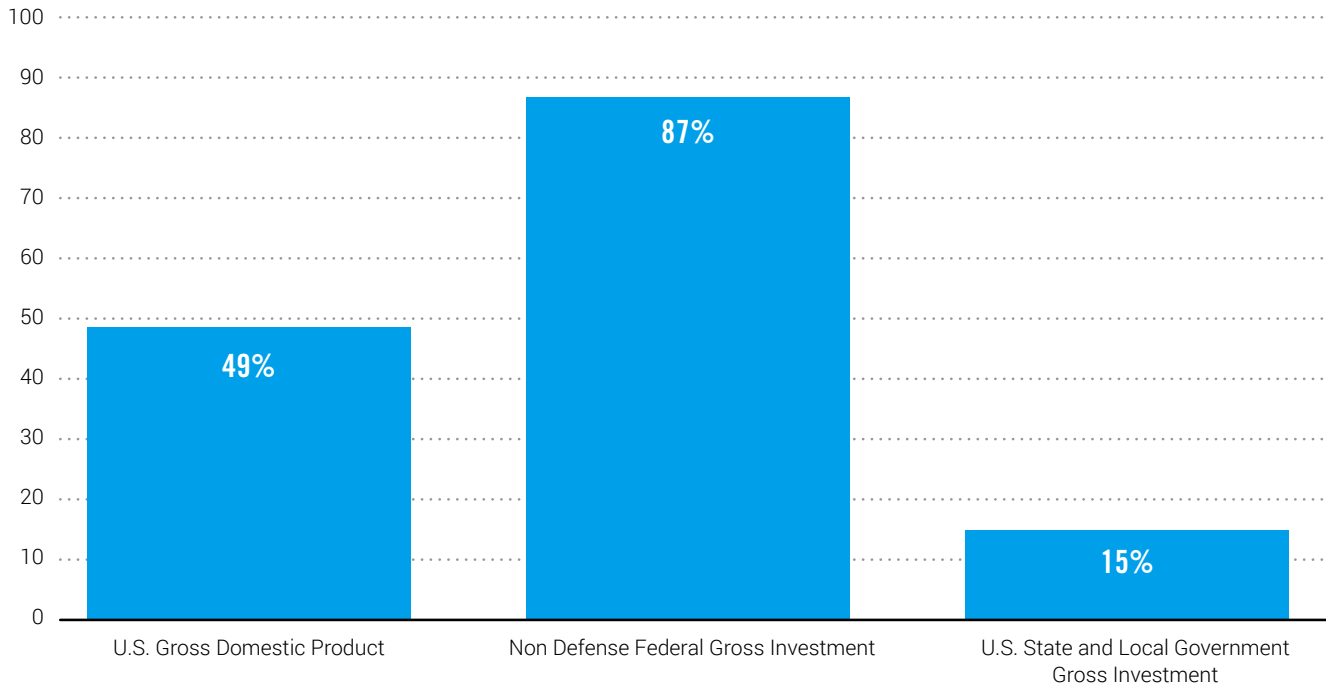
Fourth, we identify what the U.S. can learn from China's example. On the plus side, the success of the Chinese approach should encourage U.S. state and local governments to be more proactive in funding and supporting advanced technology industries. Key state and local

investments should include AI data centers, AI application development, worker training, and AI extension programs; space-related infrastructure and manufacturing, funded by new financing tools such as "space bonds" and support for new ventures in advanced biosciences, manufacturing, construction, and agriculture.

However, financially prudent risk-taking is the key to sustainable growth. Chinese provincial and municipal governments have taken on massive debts that may impair long-term growth and perhaps even trigger a financial crisis. U.S. states and cities should invest in their future while keeping their borrowing under control.

CONTEXT: THE CENTRALIZATION OF GOVERNMENT INVESTMENT IN THE UNITED STATES

To set the stage, we will briefly discuss the increased centralization of government investment in the United States. As noted above, from 2005 to 2025, annual federal nondefense investment rose by 87% in inflation-adjusted terms, compared to the 49% increase in real GDP.⁴ Meanwhile, from 2005 to 2025, investment by state and local governments rose by only 15% in real terms, far slower than the overall growth of the U.S. economy (Figure 1).

FIGURE 1: U.S. STATE AND LOCAL INVESTMENT LAGS: INFLATION-ADJUSTED PERCENTAGE CHANGE, 2005-2025

Data: Bureau of Economic Analysis

Here's another way of measuring the state and local investment shortfall. In 2005, state and local government investment, net of depreciation, was 1.0% of GDP. By 2025, state and local net investment had fallen to only 0.7% of GDP. State and local governments would have needed to boost investment spending by \$110 billion in 2025 to return net investment to its 2005 share of GDP.⁵

There are multiple reasons why state and local government investment has been lagging. Partly, federal grants for state and local capital investment have been basically flat in real terms since the mid-2000s. Moreover, the cost of infrastructure projects has been rising, and the permitting process has become more difficult.

But it's also true that U.S. state and local governments have become less willing to borrow for capital projects. Since 2009, state and local debt has fallen from 20% of GDP to less than 12%, near 50-year lows (Figure 2).⁶

The Biden Administration did try to implement "place-based" industrial policies, working through a variety of programs authorized by the American Rescue Plan Act, the Bipartisan Infrastructure Law, and the CHIPS and Science Act. But these efforts fell well short of the \$110 billion shortfall in state and local government investment spending.

A December 2024 Brookings analysis found "place-based industrial policies have directed nearly \$41 billion to regions since 2021."⁷ Most of that is associated with semiconductor

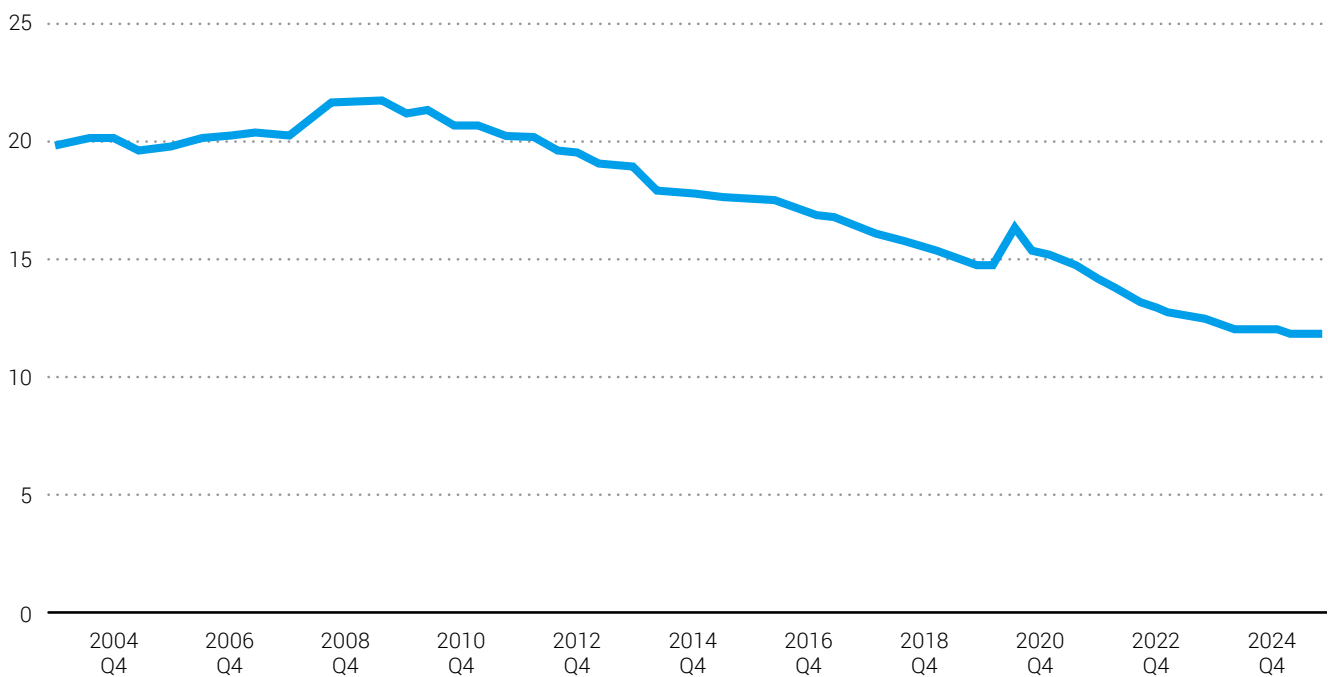
incentives. A broader initiative, the Tech Hubs program, established under the CHIPS and Science Act of 2022 as the Regional Technology and Innovation Hubs program, was authorized to receive \$10 billion over five years. As of January 2026, Congress has appropriated only \$1 billion to the program.⁸

To be sure, some funding is still in the pipeline. After a long and complicated process, construction under the Broadband Equity, Access and Deployment program (BEAD, passed in November 2021), was anticipated to begin in early 2026 in states such as Arizona.⁹

Importantly, we are seeing some signs of increased support for science and technology investment at the state and local level. In New York, Governor Kathy Hochul has spearheaded the Empire Artificial Intelligence (AI) Partnership, a research consortium aimed at advancing AI innovation, including a state-of-the-art artificial intelligence computing center, housed at SUNY's University at Buffalo. The state originally made a 10-year \$275 million investment in its 2025 fiscal year budget, and then added an additional \$90 million in FY 2026.¹⁰

However, U.S. state and local governments would need many more investments as large as or larger than Empire AI to keep up with the growth of the economy. Would that be worthwhile? In the next section, we'll explore China's experience.

FIGURE 2: U.S. STATE AND LOCAL DEBT (AS SHARE OF U.S. GDP)



Data: Federal Reserve Flow of Funds, Bureau of Economic Analysis

THE CHINESE CONTEXT: HOW PROVINCES AND MUNICIPALITIES ARE DRIVING CHINA'S TECHNOLOGY SURGE

While America's state and local government investment has been lagging, China's provincial and municipal governments have taken a leading role in driving the sorts of advanced technology industrial policy programs and associated capital spending that would be undertaken by the central government or private sector in other countries.

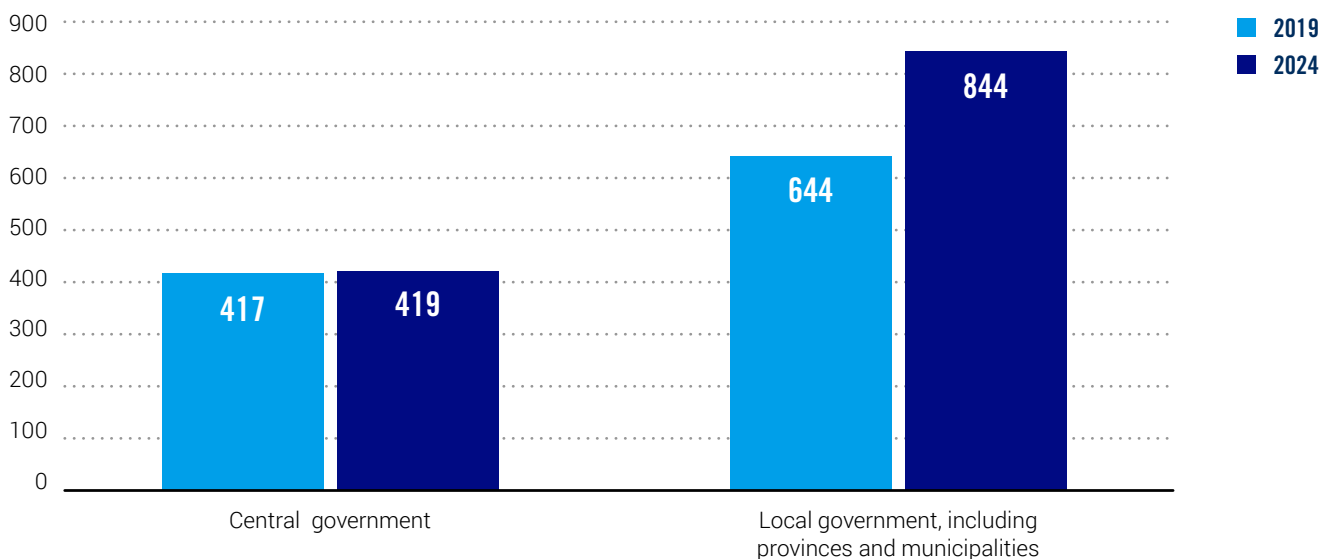
One indicator: According to data from the National Bureau of Statistics of China, provinces, municipalities, and other local government accounted for 844 billion yuan of spending on science and technology in 2024, roughly double the central government's spending on science and technology.¹¹ Moreover, local government spending on science and technology — including subsidies and grants for scientific research, new product development, and testing — is up

by 31% since 2019, compared to virtually no reported change in central government S&T spending.¹² (Figure 3).

Has the decentralized approach been effective? China's total factor productivity—a broad measure of economic efficiency—was up by 25% from 2013 to 2023, according to data from the latest revision of the authoritative Penn World Table (PWT), compared to a 5% total factor productivity gain for the United States over the same period, and a 3% gain for Germany.¹³

It's essential to emphasize the need for skepticism about official Chinese economic statistics. In particular, there's a long history of local Chinese governments reporting economic statistics that don't add up to the national total, or are manipulated to make local officials look better.¹⁴ However, some experts believe that the worst of the manipulations have been squeezed out of the data.

FIGURE 3: CHINESE GOVERNMENT SCIENCE AND TECHNOLOGY SPENDING IS FOCUSED AT THE LOCAL LEVEL (BILLIONS OF YUAN)



Data: China National Bureau of Statistics

Chinese local governments are putting a flood of cash and incentives into industries from semiconductors to electric vehicles to satellites to biotech to key aerospace materials such as carbon fiber. The money is being spent on industrial parks, factories, equipment, and R&D subsidies. Some local governments are even substantially subsidizing insurance bills for satellite launches. According to a May 2025 NBER paper, provincial, municipal, and other subnational governments account for 87% of the explicit industrial policies mentioned in public Chinese government documents, compared to only 13% for the central government.¹⁵

The upside is that China has made surprisingly rapid progress in cutting-edge industries such as electric vehicles and solar panels, and seems poised to do the same in other industries as well. The flood of Chinese local government money going into advanced technology has turned out to be an effective strategy to get a foothold in new industries. Moreover, because different cities and regions are competing with each other, there are incentives to move as quickly as possible.

The examples are endless. As noted earlier, the municipal government of Shenzhen, China's third largest city, is backing a new 5 billion yuan fund that will invest in chip design and other advanced technologies.¹⁶ That's on top of the Shenzhen municipal government's ownership of SiCarrier, a prominent chip equipment maker that was founded in 2021.¹⁷ Governments in Beijing, Shanghai, Hangzhou, and Hubei are committing billions more to local semiconductor manufacturing and R&D ventures.

Another long list of Chinese local governments, including Liuzhou and Hefei — located in the Guangxi region and Anhui province, respectively — have made massive investments in electric vehicle manufacturing, purchases, and charging stations.¹⁸ Over the past decade, for instance, Hefei has poured about \$25 billion of state capital into various struggling companies, including the EV maker Nio and the flat-panel display manufacturer BOE. By acting as an early investor and bearing the initial risk, according to one analysis, Hefei stimulated an estimated \$96 billion in follow-on investment and generated around \$9 billion in tax revenues.¹⁹

Henan, a traditional agricultural province, set up a 15 billion yuan new energy vehicle fund and established a provincial automobile-industry investment group with a registered capital of 3 billion yuan.²⁰ Local government money was used to buy newly issued shares in electric vehicle manufacturers and start-ups that needed cash. Officials also arranged loans with attractive interest rates from state-controlled banks to finance new factories.²¹ The result: Chinese companies such as BYD, the world's largest electric vehicle manufacturer, have received billions of yuan in direct and indirect subsidies. Xpeng Motors, a fast-growing EV startup which began operations in 2015, received at least 500 million yuan in funding from Guangdong Yuecai Investment Holdings Co., the Chinese province's investment arm, plus a variety of direct government grants and subsidies for construction and loan interest payments.²²

And then there is the big satellite push, just now hitting full stride. Cities and provinces such as Shanghai and Beijing are making large funding efforts to support satellite development,

manufacturing, and launches. For example, Shanghai Spacecom Satellite Technology (SSST) was initially founded with capital from Shanghai's municipal state asset management commission and Shanghai Alliance Investment, a state-owned venture capital firm, according to a 2025 report from the Asia Pacific Foundation of Canada.²³ SSST aims to have a global LEO internet network fully operational by 2030 with 15,000 satellites. To ensure that happens, the Shanghai municipal government announced in April 2025 an enormous package of subsidies, including satellite manufacturing subsidies, interest rate subsidies on loans, R&D subsidies, industrial park support, 50% subsidies for launch insurance, and even better apartments for essential "talent."²⁴

The list of Chinese municipal tech investments goes on and on. In August 2024, the Shanghai government pledged \$4 billion in subsidies for biomedicine companies conducting clinical trials in the city.²⁵ The city provides substantial subsidies and supportive policies, including free leasing of land and tax rebates, to attract life-science companies and research.

Weihai, a city of 2 million located in Shandong province, is making major investments to foster a hub for manufacturing high-quality carbon fiber, a critical material for aerospace and wind turbine blades.²⁶ Other municipalities, such as Jilin City, Jiangsu, and Liaoning, are offering R&D rebates and manufacturing and construction subsidies designed to create hotspots of carbon fiber production.

The resulting rapid increase in Chinese capacity, supported by subsidies, makes it very difficult for U.S.-based companies to get traction in

those advanced technologies. If the Chinese local investments in advanced technologies and R&D succeed, then China will have taken the commanding heights of the next-generation global economy.^{27, 28}

THE DOWNSIDES OF THE CHINESE APPROACH

The Chinese local-facing investment approach is definitely not a costless magic bullet. The downside is that local governments in China are borrowing extensively to fund S&T programs, adding to an enormous debt equal to 84% of GDP, either directly or through off-budget "local government financing vehicles" (LGFV).²⁹ By comparison, state and local government debt in the U.S. comes to about less than 12% of GDP (or 14% including industrial revenue bonds).

IMF estimates suggest that municipal and provincial Chinese governments, plus their affiliated "local government finance vehicles" (LGFVs), borrowed 16 trillion yuan in 2024 and 2025, much of that from Chinese banks and state-owned enterprises.³⁰ That's the equivalent of adding \$2 trillion in debt in two years. For example, Shenzhen's debt rose from 13 billion yuan in 2019 to 96 billion yuan in 2023 to 132 billion yuan in 2024.³¹ And it hasn't stopped. In the first seven months of 2025, China's local governments issued 60 percent more bonds compared with the prior year.³²

Many local Chinese governments and LGFVs are already under financial stress or on the verge of insolvency. One consulting firm estimated in 2023 that only one-fifth of LGFVs had "sufficient cash on hand to honor their short-term debt obligations and cover interest payments."³³

How did the debts get so large? In the aftermath of the global financial crisis, Chinese local governments massively supported housing and related infrastructure, often by buying land and transferring it to real estate developers and LGFVs. The result was huge public sector debts and millions of empty dwellings.³⁴

From this perspective, local government investments in advanced technology can be seen as a high-risk throw of the dice to cover past losses in real estate. One recent report found “China’s industrial policy ecosystem has led to profound waste, as local governments piled in with duplicative and inefficient projects.”³⁵ Xi Jinping has criticized local governments for supporting the same industries.³⁶ China’s producer price index, a measure of the prices of industrial goods sold by manufacturers, declined in 2025, suggesting continued excess capacity.³⁷ Almost a third of all industrial firms in China are operating at a loss.³⁸ A July 2025 article from the Economist proclaimed “China’s Local Governments Are Approaching a Fiscal Black Hole.”³⁹

LESSONS TO LEARN

What can we learn from this analysis? First, **China’s local-facing investment strategy provides mammoth subsidies for Chinese industry and exports.** As noted earlier, the IMF estimates that provincial and municipal governments, and their associated financing vehicles, borrowed an additional 16 trillion yuan in 2024 and 2025. Even if only half of that borrowing went into industrial support, that’s the equivalent of \$1 trillion in subsidies per year. It’s very difficult for American and European advanced technology sectors to compete against that level of local government support.

Second, **the resulting debt burden growth is likely unsustainable in the long run.** As a February 2026 IMF report notes, “China’s economy remains structurally over-reliant on investment.”⁴⁰ However, that opinion of the IMF economists — which they have held for years — is not shared by the Chinese government, which has been reluctant to pull back too hard on local government investment.

And that brings us to our third conclusion: **Competition between Chinese local governments has been a “key driver of innovation and growth,”** in the words of that same IMF report. This insight cannot be overemphasized. Innovation requires a combination of risk-taking and investment across many different initiatives simultaneously. In the United States, competing startups are typically funded by venture capital firms and by the venture capital arms of existing companies. NVIDIA’s initial financing, for example, came from venture capital firms Sequoia Capital and Sutter Hill Ventures. Nobody could have predicted that the graphics chip startup would grow into the most important maker of artificial intelligence chips.

Europe has never been able to make the venture capital model work very well.⁴¹ Neither has China. But China found a different route. The central government promoted a vision of innovation, and “local governments played a key role in translating the national vision into actionable directives, developing localized implementation plans and pilot projects, frequently with government funds”.⁴² From that perspective, the duplication of capacity across regions “is a feature, not a bug.”⁴³

The Chinese example has important lessons for U.S. policymakers. Governors and mayors are looking for opportunities to exert technology leadership, to speed up response times and increase competitiveness, while still maintaining fiscal prudence. For example, as the commercial space industry grows, some state and local governments are taking the opportunity to step up investments. For example, the Texas Space Commission was established in 2023 to promote innovation in the field of space operations and commercial aerospace opportunities, including the integration of space, aeronautics, and aviation industries into the Texas economy. As of early 2026, the Texas Space Commission has awarded \$150 million for 24 projects.⁴⁴

Other investments may be driven by space infrastructure bonds, which are a new type of tax-exempt private activity bond authorized by recent U.S. tax law changes that can be used to finance spaceports and related facilities. Unlike many other private activity bonds, those issued for spaceports are not subject to annual state volume caps, meaning there is no statutory limit on the amount that can be issued. Moreover, the financing can cover a wide range of facilities at or near launch and re-entry sites, including those for flight control, launch services, and the manufacturing, assembling, or repairing of spacecraft and cargo.⁴⁵

At the same time, governors are putting together a new "AI innovation toolbox," analogous to the economic development tools of the past.⁴⁶ Tax incentives, employed wisely, can be used to attract AI startups and data processing centers to boost state economies. Smart energy policy, including faster approval of new grid investments, demand side management, and long-term capacity commitments, can better

match electricity generation and transmission upgrades to AI, industrial, and transportation demand, and minimize the impact on retail rates. Governors can leverage their state's public and private universities to develop and attract AI-focused businesses. Worker training subsidies and AI-focused career technical education can ensure that existing workers are not left behind. AI "extension programs" can accelerate the adoption of AI by small businesses, making state industries such as manufacturing, agriculture, and construction more competitive, and creating more demand for AI-enabled workers.

The initial effort to support drone manufacturing has been at the federal level. In July 2025, Republican Sens. Ted Cruz and John Cornyn of Texas, and Tom Cotton and John Boozman of Arkansas introduced the "SkyFoundry Act of 2025," designed to establish a government-run small UAS production facility at the Red River Army Depot in Texas. Rep. Pat Harrigan, R-N.C., submitted companion legislation in September 2025.

But to maintain competitiveness with the Chinese, it's important for drone and other aerospace manufacturing and applications to be supported at the state level as well. For example, Utah has put \$3 million into developing an Advanced Air Mobility (AAM) program to integrate electric air taxis for cargo and passengers, aiming for operations by the 2034 Winter Olympics. The initiative is focusing on phased implementation from drone delivery to passenger services.⁴⁷

U.S. state and local investment has lagged behind for too many years. It's time for far-sighted governors and mayors to take advantage of new technologies and new opportunities, rather than wait for Washington.

ABOUT THE AUTHOR

Michael Mandel is Vice President and Chief Economist of the Progressive Policy Institute.

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PROGRESSIVE POLICY INSTITUTE
1919 M Street NW,
Suite 300,
Washington, DC 20036

Tel 202.525.3926
Fax 202.525.3941

info@ppionline.org
progressivepolicy.org