Zones as industrial policy: Lessons for U.S. policymakers from experiments in East Asia

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Introduction

In recent years, U.S. policymakers have forged an emerging new consensus around the economic, social, and security perils of offshored manufacturing capacity – and a renewed commitment to policy-driven reindustrialization. While these interests are motivated by different policy objectives, both Republican- and Democratic-controlled Congresses and administrations have deployed industrial policy to promote domestic production in strategic sectors. These measures include a mix of broad-based trade measures (e.g., tariffs), sector-specific incentives (e.g., semiconductor or battery manufacturing grants and tax credits), and place-based regional economic development programs (e.g., the NSF Engine and Tech Hub programs). There is also ongoing interest in steering strategic reindustrialization to American communities that have been hollowed by prior decades of offshoring and disinvestment.[1]

The not-so-subtle subtext behind many of these investments is Washington's anxiety over the rise of China as the world's preeminent industrial juggernaut in many of the growth sectors in the 21st century economy – and, increasingly, its transition into a high-tech research powerhouse that now rivals the American innovation engine.[2] This has challenged long-held assumptions that China's export-oriented growth model was built on a foundation of cheap labor and land, and would ultimately sputter before competing in high-quality or high-tech domains with the U.S., or with "East Asian miracle" democracies in the region, like South Korea and Taiwan.

The U.S.'s largest infrastructure and industrial policy investments of the past several decades—initiated through laws like the American Recovery and Reinvestment Act of 2009, the Infrastructure Investment and Jobs Act of 2021, the CHIPS and Science Act of 2022, and the Inflation Reduction Act of 2022—have yielded significant achievements. However, they have also revealed how U.S. industrial and building capacity has atrophied, with many programs struggling to deliver completed projects on expeditious timescales. Moreover, the emerging cross-partisan commitment to industrial policy in general has been complicated by domestic political whiplash over industrial policy's specific focus as applied to priority sectors of the economy (e.g., Trump reversal of clean energy efforts). There is robust debate about other causal dynamics, including "abundance" critiques of procedural sclerosis and NIMBYism, "everything bagel-ism," aging infrastructure, and high labor costs—not to mention a shortage of industrial knowhow and workforce. [3,4,5]

[1] For example, see: The White House. 2023. "Remarks by Heather Boushey on How President Biden's Invest in America Agenda has Laid the Foundation for Decades of Strong, Stable, and Sustained, Equitable Growth."
[2] Riggi, J. 2025. How China Is Outperforming the United States in Critical Technologies. Information Technology & Innovation Foundation.
[3] Klein, E. 2023. "The Problem With Everything-Bagel Liberalism." The New York Times.
[4] Owens, N. 2025. "US manufacturing is in 'pretty bad shape.' MIT hopes to change that." ManufacturingDive.
[5] Goodman, P. 2025. "18,000 Reasons It's So Hard to Build a Chip Factory in America." The New York Times.

As the U.S. tries to understand how it can more effectively reindustrialize, policymakers have signaled a renewed interest in what the U.S. might learn from the East Asian industrial development approach of the past half-century. East Asia has successfully cultivated many world-leading firms in strategic sectors, from Korean and Japanese cars and electronics to Taiwan's semiconductor industry to Chinese battery manufacturers. U.S. leaders are now exploring what they could emulate from the East Asian model: for instance, a January 2026 MOU and subsequent trade deal between the U.S. and Taiwan recruited Taiwanese support to help the U.S. build high-tech industry clusters.[6]

Indeed, geographic-based clustering has been a powerful tool in the East Asian development toolkit. These nations have frequently created dedicated geographies or "zones" imbued with a set of distinct physical, infrastructural, governance, and/or land use features that differentiate them from the surrounding jurisdiction. For instance, Special Economic Zones (SEZs), which are discussed in detail below, were perhaps the flagship industrial policy of China's "opening up" period under Deng Xiaopeng. Governments around the world continue to adopt zone- or cluster-based industrial policies inspired by the original SEZs. Zone-based industrial policies tend to channel resources into designated geographies, leveraging agglomeration,[7] input-output linkages, talent pools, and cheaper infrastructure and logistics costs to scale industry. Zones are often conceived with a general understanding of necessary inputs or investment barriers in desired industries – and imbued with the capacity to deliver those inputs and overcome those barriers. When there's a need to solve classic chicken-and-egg challenges of infrastructure coordination and agglomeration, zones can coordinate resources and firms in both time and space.

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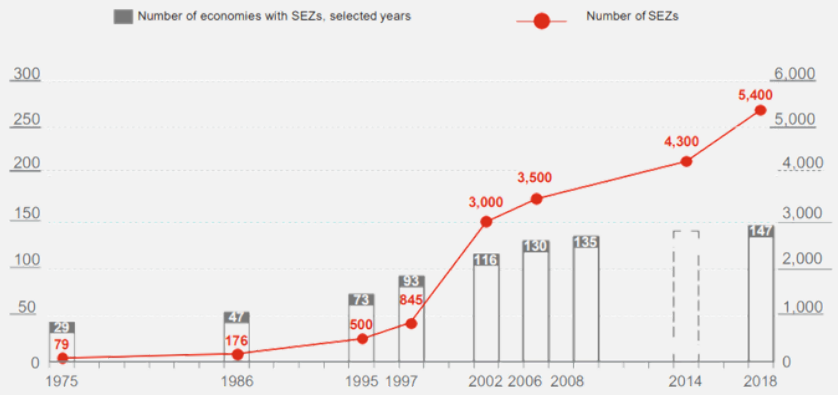
It is important to note that zone-based policies are not exclusively a product of China – a number of countries in Asia and beyond adopted industrial zone programs prior to China – nor do they require Chinese-style centralized governance. Industrial zone programs feature a wide range of governance structures, labor standards, and environmental outcomes.

[6] Office of the United States Trade Representative. 2026. "Fact Sheet on U.S.-Taiwan Agreement on Reciprocal Trade."
[7] For a discussion of the economic and geographic benefits of industrial agglomeration, see: Glaeser, E. 2010.. "Introduction." In Agglomeration Economics. The University of Chicago Press.

Figure 1: Historical trend in SEZs Globally (# countries and SEZs)



An entire branch of export-oriented international development has been dedicated to exporting the SEZ model around the world.[8] As of 2018, there were more than 5,000 special economic zones (broadly construed) in 147 countries.[9] Chart source: PWC.

Below, we offer brief case studies on three notable East Asian zone-based industrial policies:

- **China's Special Economic Zones**, the famous "opening up" policy that provided land reform, infrastructure investment, independent administrative authorities, and business attraction incentives to four flagship zones, including Shenzhen, but also promoted a migrant labor underclass and mixed environmental legacy.
- **Ulsan, South Korea's Eco-Industrial Park**, the master-planned industrial zone – home to global automotive, chemical, and shipbuilding giants – that was rechartered in 2003 with industrial symbiosis principles, specialized implementing authorities, and sustained infrastructure investment.
- **Taiwan's Hsinchu Science Park**, the global semiconductor capital that leveraged a special development entity, workforce development programs, tech transfer, and shared research infrastructure to foster Taiwan's Silicon Valley.

Each of these zones had distinct journeys and features; they demonstrate that there is no one path or existing set of assets necessary to build a geography into a globally competitive, high-tech manufacturing hub. However, there are several key themes that cut across the case studies. For American policymakers, these offer three key lessons for building successful industrial zones in a U.S. context:

[8] Arthur, C. 2017. "A tiny Irish town and China's rise to superpower status." United Nations Industrial Development Organization.
[9] Goussous, A., O. Schirmir, A. Sawaya, M. Basma. 2020. Re-birth of Special Economic Zones in the GCC. PWC.

1. **Prioritize shared ecosystem services and infrastructure that deliver key inputs to production**, not just business attraction incentives, in industrial zone programs.
2. **Design zones with a long-term commitment**, including an ability to adapt to meet shifting industry needs over time.
3. **Delegate clear, independent development authorities** to zone administrators, while aligning with U.S. democratic principles.

Case Studies

Case Study A: China's Special Economic Zones

Background

In 1978, Chinese President Deng Xiaopeng implemented a series of liberalizing reforms designed to open China up to the global market. Among those reforms was the designation of four pilot "Special Economic Zones" (SEZs). SEZs were geographically-confined sandboxes through which China would experiment with aspects of a market-oriented economy to achieve domestic growth objectives; the zones would attract foreign investment and enable Chinese firms to interact with the global price system for the first time.[10] The initial four pilots were located in the coastal cities of Shantou, Shenzhen, Xiamen, and Zhuhai, ensuring easy export of manufactured goods. The entire province of Hainan was added as the fifth SEZ in 1988.[11] While these remain the five official SEZs, China has since adopted a plethora of other place-based designations (e.g., open coastal cities, zero-carbon industrial parks, free trade zones) built on the legacy of SEZs.

The original SEZs were essential to China's rise as the world's preeminent industrial power. According to the World Bank, SEZs contribute roughly 22% of China's overall GDP and 60% of its exports.[12]

Key policy mechanisms

SEZs generally impart different rules for doing business than elsewhere in the country. Most often, these are more liberalizing rules. However, it would be an oversimplification to suggest that SEZs are merely deregulatory zones. One general definition offered by the World Bank suggests that SEZs include the following characteristics:

> *(a) it is a geographically delimited area, usually physically secured;*
> *(b) it has a single management or administration;*
> *(c) it offers benefits for investors physically within the zone; and*
> *(d) it has a separate customs area (duty-free benefits) and streamlined procedures*[13]

[10] Dorn, J. 2016. The Genesis and Evolution of China's Economic Liberalization. Free Market Institute. Powell OEF/Dorn (53).
[11] Roll, C. 2009. A Comparison of Hainan with Other Special Economic Zones. Rand Corporation. N-3295-NRCSTD.
[12] The World Bank. "China's Special Economic Zones."
[13] Zeng, D. 2015. Global Experiences with Special Economic Zones - With a Focus on China and Africa. The World Bank.

China's original four SEZs undertook a gradual, experimental approach to liberalizing the economy and attracting foreign direct investment (FDI). Four particular policy mechanisms stand out:

1. Public investment in physical infrastructure - logistics, land, and factory space.

   Prior to the SEZ program, urban land was owned by the state. In 1981, starting in Shenzhen SEZ, China made commercial and industrial land available to investors for up to 50-year leases. China would go on to establish a land auction system, implemented in the early 2000s.

   China recognized that factory space and infrastructure was an essential element to turning SEZs into world-class industrial hubs – particularly Shenzhen. The first four were intentionally sited in proximity to major waterways and Hong Kong, but the government made major new investments in urban infrastructure, telecommunications, logistics, and more. By just 1985, China had already spent more than 3 billion CNY on infrastructure in Shenzhen alone – equivalent to about $360 million at the time, or more than $1 billion today.[14]

Table 1. *Economic Development of Shenzhen SEZ from 1980 to 1985*

	Contracts Signed[a] (cumulative)	Foreign Capital 'Committed'[b] (cumulative)	Output Value	Chinese Investment in Infrastructure (cumulative)
1980	400	230	51	100
1981	1,000	1,200	200	250
1982	1,500	1,800	420	870
1983	2,500	2,800	750	1,750
1984	3,400	6,000	1,600	3,250

2. Delegated administrative and developmental authorities.

   SEZs offered an independent administrative structure, giving the SEZs unprecedented independence from the central government. Provincial Management Committees could establish new laws, incentives, and investments to attract companies and skilled workers to the zones, and some eventually developed "one-stop shop" models for

[14] Sklair, L. 1991. " Problems of Socialist Development: the Significance of Shenzhen Special Economic Zone for China's Open Door Development Strategy*." International Journal of Urban and Regional Research. Vol 15 (2).

administrative procedures.[15] Local leaders had the authority to sign off on larger foreign investments without state approval; in fact, SEZ leaders had more investment approval authority than officials in Beijing or Shanghai.[16] This model tended to generate competition between the SEZs,[17] which was often seen as productive, but – as discussed below – it was also prone to corruption.

The liberalization of administrative authorities enabled the creation of new, specialized development agencies to rapidly develop industrial parks and lands. The Shenzhen Development Company (SDC) held the overarching authority over Shenzhen's planning and infrastructure; meanwhile, Shenzhen's Municipal Industrial Development Service Company (IDSC) quickly became the largest holder of factory space in Shenzhen.[18] However, early on, these entities often competed with one another for deals with foreign firms or squabbled over overlapping responsibilities, highlighting the importance of clear delegation to new zone authorities or commissions.

3. Business attraction incentives.

The state provided a variety of favorable incentives for doing business in the zones. These were largely broad-based, rather than firm-specific, incentives, such as reduced taxes and waived customs duties. Notably, China employed a flat corporate income tax rate of 15% in SEZs, less than half of the standard in China at the time.[19]

4. Low-cost labor.

China also attempted to attract companies with flexible hiring and firing policies within the zones, a deregulatory measure that kept wage growth low among a growing migrant worker underclass.[20] Under China's hukou system, which classifies individuals' work status and benefits access, migrant workers who move to SEZs face unstable social and health benefits and limited paths to urban residency that would entitle them to more

[15] Zeng, D. 2012. China's Special Economic Zones and Industrial Clusters: Success and Challenges. Lincoln Institute of Land Policy.
[16] The Law Library of Congress, Global Legal Research Directorate.. China's Special Economic Zones. LL File No. 1997-2001.
[17] Zeng, D. 2015. Global Experiences with Special Economic Zones - With a Focus on China and Africa. The World Bank.
[18] The Law Library of Congress, Global Legal Research Directorate.. China's Special Economic Zones. LL File No. 1997-2001.
[19] The Law Library of Congress, Global Legal Research Directorate.. China's Special Economic Zones. LL File No. 1997-2001.
[20] Pratap, S. n.d. China's Capitalist Development and its Implications for Labour with Special Reference to the Shenzhen SEZ.

stability.[21] The hukou system and broader set of weak labor standards being employed as an "incentive" for foreign investment in SEZs is a common critique of China's model.

Outcomes

Comparing diverse development paths across Shenzhen, Zhuhai, and Shantou

Shenzhen is the poster child of Chinese SEZs given its radical transformation from a humble fishing village to the city of more than 17 million today – and perhaps the world's preeminent techno-industrial hub. Proximate to Hong Kong, it accounted for roughly half of the foreign direct investment across all of China in the first years of the SEZ experiment,[22] and pursued joint ventures that enabled rapid tech transfer from foreign firms. This allowed Shenzhen to move upstream of pure production into the innovation economy; since the 1990s, the city has hosted massive research and development (R&D) parks alongside manufacturers on the bleeding edge of robotics and automation.[23] Now, Shenzhen is the home of Chinese software and hard tech giants Huawei, Tencent, and BYD, earning it the moniker of China's "Silicon Valley." Early skepticism of Shenzhen's ability to attract high-tech manufacturing was clearly misplaced.[24]

> *Other coastal cities then demanded SEZ status, but initially the decision was taken to restrict the experiment to only four zones in areas where suitable pre-conditions gave a reasonable assurance of success. Also, only Shenzhen was mandated to establish a large-scale comprehensive zone, involving cross-the-board development of industrial and commercial enterprises, property development and tourism-related undertakings; other zones were limited in size and in objectives.*
>
> Leong & Pratap, 2011

Zhuhai has a smaller, yet diversified economy, featuring a mix of high-tech industry and tourism, benefitted by its proximity to Macao.[25] Early in its development, Zhuhai SEZ chose to prioritize sustainable development and avoid lower-end manufacturing with high pollution.[26] As a result, the city achieved slower economic growth than some of its peer cities in Guangdong province, like Shenzhen, but is widely considered to have better quality of life, which has proven to be an

[21] Morrison, W. 2016. China's Hukou System: Overview, Reform, and Economic Implications. Congressional Research Service. IF 10344.
[22] Wong, K. 1987. "China's Special Economic Zone Experiment: An Appraisal." Geografiska Annaler. Series B, Human Geography. Vol. 69 (1): 27-40.
[23] Sum, L. H. 2025. "A Comparative Analysis Of 4 Szes in China." Highlights in Business, Economics and Management. Vol. 59: 185-192.
[24] Wong, E. 1987. "Recent Developments in China's Special Economic Zones: Problems and Prognosis." The Developing Economies. Vol. XXV (1): 73-86.
[25] CRA Global Development. 2025. Special Economic Zones (SEZs): Lessons from China's Transformative Experience.
[26] Sum, L. H. 2025. "A Comparative Analysis Of 4 Szes in China." Highlights in Business, Economics and Management. Vol. 59: 185-192.

asset in attracting top talent.[27] Zhuhai has the second-highest per capita income (171,000 CNY to Shenzhen's 197,000 CNY) among the SEZs, and the lowest Gini coefficient (0.35, compared to Shenzhen's 0.38).[28] In 2014, Zhuhai bested Hong Kong to take the top spot in a ranking of China's most livable cities,[29] and it consistently ranks among the top 10.

Table 4 Socio-Economic Disparities (2023)

City	GDP per Capita (¥)	Gini Coefficient	HDI
Shenzhen	197,000	0.38	0.92
Xiamen	152,000	0.41	0.88
Zhuhai	171,000	0.35	0.85
Shantou	57,400	0.49	0.72

Shantou is, by most metrics, the least successful of the original four SEZ experiments. The low wages and high inequality seen in the table above are a feature of Shantou's slow – and at times negative – economic growth.[30] Prior to 1991, Shantou was the most populous of the four SEZs and had experienced double-digit GDP growth for several years running. However, throughout the 1990s, Shantou became known for corruption, tax evasion, and smuggling as various public and private actors took advantage of the city's preferential status. In response, the Chinese government cracked down.[31] In 2000, four state investigators were killed in a fire,[32] and the following year, four Shantou businessmen were executed for their role in a corruption ring.[33] The 1990s era of corruption ultimately led to a decline in foreign investment, and, ultimately, stagnant growth well into the early 2000s.

Environmental and social outcomes

China's SEZs have long been seen as a successful economic development model, driving significant foreign direct investment, industrial employment, and urbanization, including in highly rural areas. However, observers often cautioned that economic development was achieved through poor social, labor, and environmental standards – which often bore out in early data on inequality, wage suppression, limited social benefits, and pollution.

Yet, as China's role has shifted from a source of low-cost labor for Western firms to a green technology leader, there is growing evidence that SEZs have been able to leverage industrial agglomeration to raise wages, reduce emissions, and generate larger green technology spillovers

[27] *Ibid.*
[28] *Ibid.*
[29] Wall Street Journal. 2014. "Zhuhai Bests Hong Kong as China's Most Livable City."
[30] Cai, B. 2017. The Research on the Stagnant Development of Shantou Special Economic Zone Under Reform and Opening-Up Policy. University of Pennsylvania Scholarly Commons.
[31] Marquand, R. 2001. "In China - bonding gone bad?" Christian Science Monitor.
[32] Ma, J. 2000. "Graft investigators die in mystery fire at guesthouse." South China Morning Post.
[33] South China Morning Post. 2001. "Shantou four pay with their lives for record scam."

within the industrial ecosystem.[34,35,36,37] As noted above, Zhuhai and Shenzhen have some of the highest average wages in the nation. China's recent Five-Year Plans have prioritized both clean technologies as strategic sectors and reduced environmental impact as a metric for success, including by pivoting to a greater emphasis on eco-industrial parks.[38] Industrial zones have enabled more effective monitoring and management of pollution as China rolled out carbon and energy use regulations over time.[39]

Thus, the economic success of the first four SEZ experiments has enabled China to trend towards highly efficient and innovative hubs, such that zones established today have a good chance of "leapfrogging" the more resource-intensive and exploitative development phase seen in early SEZs.

[34] Liu, X., J. Zhang, T. Liu, X. Zhang. 2022. "Can the Special Economic Zones Promote the Green Technology Innovation of Enterprises? An Evidence From China." Frontiers in Environmental Science. Vol. 27.
[35] Chen, J., X. Long, S. Lin, 2022. "Special Economic Zone, Carbon Emissions and the Mechanism Role of Green Technology Vertical Spillover: Evidence from Chinese Cities." International Journal of Environmental Research and Public Health. Vol. 19 (18).
[36] *Ibid.*
[37] Dinh, T., W. Lu, K. Kuo, D. T. Nguyen. 2025. "Special economic zones and sustainable development: A study in provinces of China." Sustainable Futures. Vol. 10.
[38] Borzenko, O., N. Kuznietsova, A. Bilko. 2025. "China's special economic zones: from traditional labor-intensive industries to eco-industrial park development." Buketov Business Review. Vol. 30 (1).
[39] Chen, J., X. Long, S. Lin, 2022. "Special Economic Zone, Carbon Emissions and the Mechanism Role of Green Technology Vertical Spillover: Evidence from Chinese Cities." International Journal of Environmental Research and Public Health. Vol. 19 (18).

Case Study B: South Korea's Ulsan Eco-Industrial Park

Source: KICOX (via InvestKorea)

Background

The Ulsan Industrial Complex traces its origin to the 1960s. In the early 1960s, the Republic of Korea had emerged from war on its peninsula less than a decade earlier, and its per capita income was among the lowest in the world.[40] In 1961, the Korean military seized power in a coup and Major General Park Chung-hee became the country's leader.[41] One of Park's first acts was to place civilian experts in charge of national economic planning.[42] In 1962, the Park government enacted its first five-year plan to spur industrial development.[43] A core feature of this and subsequent five-year plans was the "systematic development of industrial parks" as growth engines.[44]

In 1962, Ulsan, a small fishing port in the southeast, was designated as Korea's first industrial park to become the center of the country's oil and chemicals industries.[45] This was motivated in part

[40] Miley, S. 2023. "Sustaining the economic miracle: South Korea to break global top ten by 2026."
[41] Graham, E. 2003. "The Miracle with a Dark Side: Korean Economic Development under Park Chung-hee." In Reforming Korea's Industrial Conglomerates.
[42] *Ibid*, p. 16.
[43] *Ibid*.
[44] Sakong, I., Y. Koh. 2026. "Forging a Nation: South Korea's Strategic Industrial Development (1960s-1980s)." K-Developedia.
[45] Jacobs, A. J. 2011. "Ulsan, South Korea: A Global and Nested 'Great' Industrial City." The Open Urban Studies Journal. Vol. 4: 8-20.

by the government's goal of reducing the country's reliance on imported chemicals and fertilizer.[46] Ulsan was selected for several reasons: its natural deep-water harbor suited large cargo vessels, its flat undeveloped coastal plain could accommodate large factory footprints without displacing dense urban populations, and existing road and rail connections to Busan could be extended.[47]

The complex rapidly grew after its designation. Firms that entered the Ulsan complex enjoyed several policy benefits, including tax exemptions and credits, low interest government loans, utility-rate subsidies, and tariff rebates on imported inputs for goods processed into exports.[48] In 1964, the state-owned Korea Petroleum Energy Corporation opened the country's first oil refinery at Ulsan.[49] Between 1966 and 1969, the Korean government began constructing a major petrochemical complex at Ulsan[50]—a precursor to further investments Korea would make in the complex during its later Heavy-Chemical Industry Drive.[51] Hyundai invested heavily in making Ulsan its manufacturing hub, opening an automobile manufacturing plant in 1968 and a shipyard in 1972.[52] A second industrial park in nearby Onsan was established in 1974 to absorb spillover demand, becoming the locus for non-ferrous metal smelting and additional petrochemicals.[53] Ulsan grew as a residential center as well, growing from roughly 252,000 in 1975 to over one million in 1997.[54]

Ulsan's rapid industrial growth, however, led to major environmental concerns. Ulsan became one of South Korea's most polluted cities, with air so toxic it forced several schools to move or close, provoking public backlash.[55] Environmental degradation threatened Ulsan's continued economic

[46] *Ibid.*, p. 12.
[47] See: InvestKorea. 2024. Location Report: Ulsan Mipo National Industrial Complex: A Champion of Korea's Industrial Development, Preparing for the Future. Some scholars have speculated that Ulsan's designation may also have been influenced in part by political factors. See: Yoo, H. 2014. The Formation and Historical Changes of Ulsan in the Twentieth Century : Industrial City, Company Town, and Workers City. SNU Open Repository and Archive. ("The industrialization of Ulsan was not the result of microscopic policy decision based on comparative advantage with its resources, but the result of macroscopic development plan by the government.")
[48] Jacobs, A. J. 2011. "Ulsan, South Korea: A Global and Nested 'Great' Industrial City." The Open Urban Studies Journal. Vol. 4: 8-20. p. 12
[49] InvestKorea. 2024. Location Report: Ulsan Mipo National Industrial Complex: A Champion of Korea's Industrial Development, Preparing for the Future.
[50] *Ibid*.
[51] Stern, J. 1995. Industrialization and the State: The Korean Heavy and Chemical Industry Drive. Harvard University Press. Cambridge, MA.
[52] InvestKorea. 2024. Location Report: Ulsan Mipo National Industrial Complex: A Champion of Korea's Industrial Development, Preparing for the Future.
[53] Namuwiki. "Onsan National Industrial Complex." (last visited May 25, 2026).
[54] Jacobs, A. J. 2011. "Ulsan, South Korea: A Global and Nested 'Great' Industrial City." The Open Urban Studies Journal. Vol. 4: 8-20.
[55] Kim, E. J. 2017. Greening Industrial Parks — A Case Study on South Korea's EcoIndustrial Park Program. Global Green Growth Institute.

viability: two-thirds of university graduates were unwilling to work in industrial complexes due to their pollution and negative image, making quality worker recruitment an acute challenge.[56] These pressures, combined with national environmental legislation, laid the groundwork for Ulsan's greening.[57]

In 2003, Korea formally launched its eco-industrial park (EIP) program and designated Ulsan as one of its sites.[58] EIPs aim to minimize waste and thereby achieve cost-saving synergies across multiple producers, such that one company can make use of the industrial byproducts of another.[59] Korea's program aimed to establish a "smart eco society where industrial complexes and local communities coexist."[60] A key mechanism for the program was industrial symbiosis: the systematic exchange of waste, heat, and byproducts among firms so that one firm's output becomes another's input.[61]

One example is the Ulsan Green Hydrogen Town. Ulsan produces approximately 820,000 tons of byproduct hydrogen per year—roughly 50 percent of Korea's national output—from its refineries and petrochemical facilities.[62] The Yuldong Combined Heat and Power Plant takes some of these hydrogen byproducts to produce electricity and heat for residential use in Ulsan's Hydrogen Town.[63] As of March 2026, Ulsan has built nearly 200 kilometers of underground hydrogen pipelines, 6 hydrogen refueling stations, and deployed over 3,600 hydrogen electric vehicles.[64]

Key Policy Mechanisms

The Korean government utilized several policy mechanisms to advance its economic development and sustainability goals at Ulsan, including:

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[56] *Ibid.*

[57] 1) Ibid; 2) Park, H., E. Rene, S. Choi, A. Chiu. 2008. "Strategies for sustainable development of industrial park in Ulsan, South Korea—From spontaneous evolution to systematic expansion of industrial symbiosis." Journal of Environmental Management. Vol. 87 (1): 1-13.

[58] Kim, E. J. 2017. Greening Industrial Parks — A Case Study on South Korea's EcoIndustrial Park Program. Global Green Growth Institute. p. 8.

[59] 1) Altenburg, T., & Assmann, C. (Eds.). (2017). Green Industrial Policy. Concept, Policies, Country Experiences. Geneva, Bonn: UN Environment. German Development Institute / Deutsches Institut für Entwicklungspolitk (DIE).; 2) United Nations Industrial Development Organization, World Bank Group, Deutsche Gesellschaft für Internationale Zusammenarbeit. 2021. An International Framework for Eco-Industrial Parks: Version 2.0.

[60] Kim, E. J. 2017. Greening Industrial Parks — A Case Study on South Korea's EcoIndustrial Park Program. Global Green Growth Institute. p. 7.

[61] Behera, S., J. Kim, S. Lee, S. Suh, H. Park. 2012. "Evolution of 'designed' industrial symbiosis networks in the Ulsan Eco-industrial Park: 'research and development into business' as the enabling framework." Journal of Cleaner Production. Vol. 29-30: 103-112.

[62] Korean Free Economic Zones. Ulsan Free Economic Zone. (last visited May 25, 2026).

[63] Fuel Cell Works. 2024. "Korea: Ulsan Unveils World's First Hydrogen Fuel Cell-Powered Apartment Complex."

[64] Invest Korea. Major Projects: Hydrogen City Development Project.

1. Designating one specialized implementing agency.

Korea centralized the management of Ulsan Industrial Park in one agency with strong credibility among constituent businesses. The Korea Industrial Complex Corporation (KICOX), an affiliate of the Ministry of Trade, Industry and Energy, serves as Ulsan's main planning, development, and management body.[65] Seeded in 1974 with KRW 100 billion (equivalent to about $250 million at the time, or $1.75 billion today) KICOX had special privileges including tax exemption, the right to appropriate land, and the right to borrow money from overseas.[66] Since then, it has managed Ulsan and Korea's 50 other state-run industrial complexes with a focus on export-oriented industrial development.[67] (KICOX now manages 60 percent of the country's companies, accounting for approximately 50 percent each of Korea's employment, production, and exports.[68]) When the EIP program struggled during its initial years, KICOX stepped in to take control and enhance the effectiveness and credibility of the program among industrial park companies.[69]

2. Engaging in long-term master planning.

Korea prioritized long-term industrial park development, rather than short-term tax incentives or ad hoc approaches. Korea's first five-year plan designated Ulsan as the anchor of national heavy industrialization and set explicit targets for petroleum refining, petrochemical, and automotive capacity—and successive plans sustained this commitment.[70] Decades later, the same planning logic governed Ulsan's green transition. The National Eco-Industrial Park (EIP) program was designed as a three-phase, fifteen-year initiative, with discrete goals, funding levels, and institutional responsibilities established for each phase.[71]

[65] KICOX was originally known as the established originally as the Korea Export Industrial Complexes Corporation under the Ministry of Commerce and Industry.
[66] Lee, M., Y. Shin, M. Kim. "The Plant-Level View of an Industrial Policy: The Korean Heavy Industry Drive of 1973." VOXEU and CEPR.
[67] Jee-yeon, S. 2014. "Industrial complexes crucial to growth." Korea Herald.
[68] Kechichian, E., M. H. Jeong. 2016. Mainstreaming Eco-Industrial Parks. World Bank Group and KICOX. p.18
[69] Kim, E. J. 2017. Greening Industrial Parks — A Case Study on South Korea's EcoIndustrial Park Program. Global Green Growth Institute. p. 2.
[70] Jacobs, A. J. 2011. "Ulsan, South Korea: A Global and Nested 'Great' Industrial City." The Open Urban Studies Journal. Vol. 4: 8-20.
[71] Kim, E. J. 2017. Greening Industrial Parks — A Case Study on South Korea's EcoIndustrial Park Program. Global Green Growth Institute.

3. Facilitating agglomeration within and among specific sectors.

The Ulsan Industrial Park focused on export-oriented industries with national security importance that could generate economies of scale.[72] Influenced by Japan's success in developing export-oriented heavy and chemical industries, the park accordingly specialized in boosting a few key flagship industries: petrochemical refining, automobile manufacturing, and shipbuilding.[73] Once the EIP program was established, agglomeration was also prioritized based on industrial symbiosis.[74]

4. Subsidizing and investing in public infrastructure.

Korea deployed government authority to stand up public infrastructure to enhance the attractiveness and effectiveness of industrial parks. Korea relied extensively on government authority to obtain and develop land in order to create its industrial parks.[75] The Korean government also used this tool to develop supportive infrastructure, building major traffic networks, public housing projects, multipurpose dams, and harbor facilities throughout the country—and around Ulsan.[76] The government also expanded and deepened the Ulsan Port as the industrial complex grew—an infrastructure asset that significantly benefited Ulsan's manufacturing industries and helped transform the complex into a major national growth driver and one of Asia's leading manufacturing export hubs.[77]

5. Incorporating workforce development programs.

The Ulsan Industrial Park included connected educational and training institutions. In Ulsan's early years, state-directed investment attracted workers from across rural Korea.[78] As the Hyundai complex at Ulsan grew, Hyundai introduced company-specific training programs as part of its "company-town" model.[79] Later in 2007, the Korean

[72] Lee, M., Y. Shin, M. Kim. "The Plant-Level View of an Industrial Policy: The Korean Heavy Industry Drive of 1973." VOXEU and CEPR.
[73] InvestKorea. 2024. Location Report: Ulsan Mipo National Industrial Complex: A Champion of Korea's Industrial Development, Preparing for the Future.
[74] Jee-yeon, S. 2014. "Industrial complexes crucial to growth." Korea Herald.
[75] K-Developedia. "Overview of Korea's Development Experience."
[76] MKE and KICOX. 2010. The Industrial Complex Cluster Program of Korea.
[77] 1) Ulsan Port Authority. "History." (last visited May 25, 2026); 2) Jacobs, A. J. 2011. "Ulsan, South Korea: A Global and Nested 'Great' Industrial City." The Open Urban Studies Journal. Vol. 4: 8-20. p. 12.
[78] Jacobs, A. J. 2011. "Ulsan, South Korea: A Global and Nested 'Great' Industrial City." The Open Urban Studies Journal. Vol. 4: 8-20. p. 11.
[79] Yoo, H. 2014. The Formation and Historical Changes of Ulsan in the Twentieth Century : Industrial City, Company Town, and Workers City. SNU Open Repository and Archive. p. 423-428.

government sponsored the Ulsan National Institute of Science and Technology (UNIST) to advance research partnerships that industrial symbiosis requires.[80]

Outcomes

Judging by both economic and sustainability metrics, the Ulsan Industrial Complex and its eco-park programs have been quite successful. As of 2022, the Ulsan Industrial Complex is South Korea's most productive industrial complex—contributing KRW 147.3 trillion worth of production annually, $59.3 billion in exports, and 100,000 jobs.[81] Ulsan hosts the world's largest automotive assembly complex; the largest dockyard and shipbuilder; and among its largest medium-sized container vessel producers, petrochemicals complexes, and oil refineries.[82] As of 2011, the complex accounted for approximately 16 percent of Korea's cargo tonnage, over 50 percent of crude oil imports, and nearly 50 percent each of automobile and shipbuilding exports.[83] As a result, Ulsan had the highest gross regional domestic product per capita of any Korean region in 2015.[84] At the same time, $14.8 million in eco-industrial park government investments at Ulsan have yielded $65 million in new annual revenues from byproduct sales and $78.1 million per year in energy and material savings.[85] By 2016, Ulsan's EIP was able to streamline the park's industrial energy use to reduce 665,000 tons of CO2 emissions and 4,000 tons of toxic gases, while reusing 79,000 tons of water and 40,000 tons of industrial byproducts and waste, each year.[86]

[80] Asia Research News. "Ulsan National Institute of Science and Technology (UNIST)." (last visited May 25, 2026).

[81] 1) InvestKorea. 2024. Location Report: Ulsan Mipo National Industrial Complex: A Champion of Korea's Industrial Development, Preparing for the Future.; 2) United Nations Industrial Development Organization, World Bank Group, Deutsche Gesellschaft für Internationale Zusammenarbeit. 2021. An International Framework for Eco-Industrial Parks: Version 2.0. p. 62.; 3) Jacobs, A. J. 2011. "Ulsan, South Korea: A Global and Nested 'Great' Industrial City." The Open Urban Studies Journal. Vol. 4: 8-20. p. 11.

[82] Jacobs, A. J. 2011. "Ulsan, South Korea: A Global and Nested 'Great' Industrial City." The Open Urban Studies Journal. Vol. 4: 8-20. p. 11.

[83] *Ibid*.

[84] See Kim, E. J. 2017. Greening Industrial Parks — A Case Study on South Korea's EcoIndustrial Park Program. p. 6.

[85] United Nations Industrial Development Organization, World Bank Group, Deutsche Gesellschaft für Internationale Zusammenarbeit. 2021. An International Framework for Eco-Industrial Parks: Version 2.0. P. 65.

[86] *Ibid.*, p. 66.

Case Study C: Taiwan

Background

In the 1970s, Taiwan grew concerned about the labor-intensiveness of its industrial base, and decided to lean into high-tech manufacturing. Having already developed a low-wage electronics industry performing commodity manufacturing and assembly for Western companies, Taiwan sought to move up the technological value-chain, with a focus on semiconductors.[87] Over the course of the next decade, the government made a series of strategic investments to agglomerate knowhow around Hsinchu in northern Taiwan. This effort was led by Minister of Economic Affairs Sun Yun-suan, who had trained as an engineer in the U.S. at the Tennessee Valley Authority, and saw it as a model for modernizing a poor agrarian region.[88] This culminated in the establishment of Hsinchu Science Park (HSP) on surplus army land in 1980, now considered among the most consequential high-tech industrial parks in the world.[89] Today, HSP is home to Taiwan Semiconductor Manufacturing Company (TSMC), United Microelectronics Corporation (UMC), MediaTek, and more, anchoring a design and manufacturing ecosystem that directly supplies more than half of the global semiconductor market and, by some estimates, produces 90%+ of the leading-edge logic chips powering the global AI boom.[90]

Map of the Hsinchu Science Park. Total scale of the complex is 6.5 square kilometers. Orange buildings are, generally, corporate factories or other industrial facilities. Green and light green plots are dedicated park lands or green spaces. Purple areas are educational/university facilities or research institutions. Near the top-left, indicated by a light purple triangular complex, is the National Synchrotron Radiation Research Center; in the top-right, in light purple, is the Industrial Technology Research Institute (ITRI).

[87] Tadepalli, K. 2026. "The Institute Behind Taiwan's Chip Dominance." Asterisk.
[88] *Ibid.*
[89] Mathews, J. A. 2012. Strategizing in industrial clusters and suprafirm structures; Collective efficiency, increasing returns and higher-order capabilities. Lund University. p. 141.
[90] Klingler-Vidra, R. 2026. How Taiwan came to dominate the global chip industry. King's College London.

Policy Mechanisms

1. Dedicated administrative structure for park development

The national government provided an initial ten-year, $500 million commitment (equivalent to more than $2 billion today) to develop the land around the Industrial Technology Research Institute (ITRI)---Taiwan's government-founded research and development lab— and two existing universities into an industrial hub.[91] That development process was overseen by the National Science and Technology Council while the day-to-day of park planning and operations was managed by specialized "park bureaus."[92] Bureaus have the authority to develop, sell, and lease land and factory space, though other private and government entities may do so as well. Park bureaus also offer industrial tenants "one-stop service" for government affairs (including environmental, safety, labor, and tax issues), comprehensive infrastructure (including water, gas, power supply, logistics, housing, and security), and education and workforce development programming.[93]

To this day, Hsinchu Science Park Bureau remains in charge of planning, land development, and operations within the park.[94]

2. Technology transfer

Foreign technology transfer into the research institutions that predated HSP – then technology transfer from those research institutions into champion firms that scaled up production within HSP – was a key element of the park's success. All of this was enabled by government-backed universities, demonstration facilities, and talent development pipelines.

Two leading research universities — National Tsing Hua University and National Chiao Tung University (today merged as National Yang Ming Chiao Tung University) — had been operating in Hsinchu since the 1950s, providing an available pool of scientific and engineering talent. In 1973, the Taiwanese government established ITRI and sited it in Hsinchu specifically to leverage the existing university talent base. ITRI's first major success was negotiating a foundational technology transfer agreement with the Radio

[91] Freeman Spogli Institute for International Studies. 2000. "Taiwan's Silicon Valley: The Evolution of Hsinchu Industrial Park." Event.
[92] National Science and Technology Council. 2018. Act for Establishment and Administration of Science Parks.
[93] 1) National Research Council. 2003. "Chapter: Panel 4: The Taiwanese Approach." In Securing the Future: Regional and National Programs to Support the Semiconductor Industry. Washington, DC: The National Academies Press. p. 157. 2) Fulco, M. 2019. "What are Taiwan's Science Parks?" Taiwan Business Topics.
[94] Hsinchu Science Park. "Park Bureau."

Corporation of America (RCA) in 1974, sending Taiwanese engineers to the United States to learn integrated circuit manufacturing. ITRI stood up a demonstration line three years later.[95]

When Hsinchu Science Park was inaugurated in December 1980, ITRI spun out UMC the same year as its first tenant, transferring the RCA-derived 4-inch wafer technology and an R&D team into the new firm. Then, from 1983 to 1986, ITRI made major investments in new very large scale integration (VLSI) capabilities for semiconductors, launched the global VLSI symposium, and built the first fabrication facility.[96,97] These firms also benefited from Taiwanese industrial policy using state-owned enterprises to provide domestic manufacturers with reliable access to key industrial inputs, including energy, metals, petrochemicals, and plastics.[98]

In 1985, Morris Chang became the head of ITRI, then TSMC became the second ITRI spinoff in 1987, with Chang at its helm. ITRI transferred the first VLSI equipment and fabrication plants to TSMC, setting up its rise to become the world's leading semiconductor foundry.[99] TSMC particularly benefited from its symbiosis with design firms co-located in the HSP.[100] One can draw a direct line from the national universities that predated the park, to ITRI's demonstration facility in 1977, to HSP's establishment in 1980, to TSMC's 8 operating fabs and R&D center within Hsinchu today. Today, TSMC accounts for 70 percent of the global foundry market and is one of the ten largest companies in the world by market cap.[101,102]

3. Publicly-funded and shared innovation infrastructure

The function of HSP was not simply to develop industrial lands, but also to close the loop between R&D and industrial leadership. When ITRI spun out UMC, it gifted the new company its publicly-built demonstration factory to produce chips.[103] Even after kickstarting firms like UMC and TSMC, Taiwan's government made ongoing

[95] Tadapelli, K. 2026. "The $16 million bet that created Taiwan's chip industry." Asterisk Magazine.
[96] VSLI, ITRI, and IEEE. "About VLSI-TSA and VLSI-DAT Symposia."
[97] ITRI. "Developing Semiconductors From Scratch: Taiwan's Semiconductor Industry Hall of Fame."
[98] Rigger, S. 2021. The Tiger Leading the Dragon: HowTaiwan Propelled China's Economic Rise. Bloomsbury.
[99] 1) Huang, L. 2024. "A Short History of Semiconductor Technology in Taiwan during the 1970s and the 1980s." University of Nottingham: Taiwan Research Hub. https://taiwaninsight.org/2024/05/10/a-short-history-of-semiconductor-technology-in-taiwan-during-the-1970s-and-the-1980s/; 2) ITRI. "Developing Semiconductors From Scratch: Taiwan's Semiconductor Industry Hall of Fame."
[100] Rigger, S. 2021. The Tiger Leading the Dragon: HowTaiwan Propelled China's Economic Rise. Bloomsbury. p. 93.
[101] Taipei Times. 2026. "TSMC nets nearly 70% of 2025 foundry market."
[102] Taipei Times. 2026. "TSMC doubles market cap, climbs to ninth in rankings."
[103] Tadepalli, K. 2026. "The Institute Behind Taiwan's Chip Dominance." Asterisk Magazine.

investments in not just physical infrastructure (i.e., roads and factories) but also in shared research and testing infrastructure.

The Taiwanese government funded the Taiwan Light Source (opened in 1994) and Taiwan Photon Source (opened in 2016),[104] which collectively make up the National Synchrotron Radiation Research Center in Hsinchu.[105] This made Hsinchu the only location in the world where a leading-edge semiconductor fab, top-tier research universities, and an advanced synchrotron light source operate within walking distance of one another. Synchrotron light sources produce X-ray beams bright enough to resolve atomic-scale structure in thin films, interfaces, and novel materials, providing a critical capability for semiconductor R&D as the industry pushes into increasingly advanced deposition technologies and novel device architectures. Geographic proximity tightens the iteration loop between fab process engineers and the characterization tools that validate new approaches. The relationship runs in both directions: the fabs gain a research capability that competing semiconductor regions cannot easily replicate, while the synchrotron and the universities gain industrial collaborators that surface new scientific questions, fund advanced beamline development, and pull frontier materials science toward problems with commercial relevance.

4. Duty-free imports and other tax exemptions

Companies that invest in Taiwan's Science Parks, including HSP, get relief on duties and commodity taxes associated with the import and purchase of manufacturing equipment – which both encourages foreign direct investment and ensures access to cutting-edge equipment within the park – as well as general business tax abatements.[106]

5. Workforce development

The Taiwanese government deliberately located HSP near the country's leading technical universities, providing proximate access to skilled engineers.[107] HSP provided high-quality housing, health, and educational services to attract both domestic and foreign talent, including the country's only bilingual secondary school.[108]

[104] Light Sources. "TLS and TPS at National Synchrotron Radiation Research Center (NSRRC)."
[105] NSTC. 2002. Act for Establishment of National Synchrotron Radiation Research Center.
[106] InvesTaiwan. "Incentives for Various Industrial Parks."
[107] Tadepalli, K. 2026. "The Institute Behind Taiwan's Chip Dominance." Asterisk Magazine.
[108] *Ibid*.

Taiwan also exempted university graduates who worked as researchers at ITRI from its general requirement of four years of military service.[109] This gave ITRI access to Taiwan's top engineering graduates, who it then sponsored for additional training and education at elite engineering PhD programs in the United States.[110] ITRI aimed for high levels of annual turnover, aiming to disperse its talent among Taiwanese firms.[111]

> "If not for the science parks that offer all the infrastructure and land, a lot of tech companies may not be possible today."
>
> Morris Chang, TSMC Founder

Outcomes

For policymakers studying industrial zones as a tool of economic development, Hsinchu offers a unique case study in how colocation can compound research, industrial innovation, and scientific infrastructure into a self-reinforcing competitive advantage. Silicon Valley (the model for Hsinchu's initial plans)[112] is perhaps the only true analogue, though Hsinchu has arguably surpassed Silicon Valley in ongoing manufacturing leadership.

The colocation of universities with industrially-zoned lands, coupled with a government institution (ITRI) charged with technology transfer, licensing, and talent development, created the agglomeration effects to allow industrial champions to form. As a result, HSP became an engine of continued research advancement, in which each generation of process advancement creates the next generation of research agenda, and each research advance compounds the industrial moat. This bidirectional coupling of scientific research and industrial innovation distinguishes Hsinchu from industrial parks that achieved initial success but eventually stagnated in the face of technological change.

HSP has since added five satellite campuses in northern Taiwan. It is home to 578 companies and 178,000 employees.[113] Tenant integrated circuit firms made $320 billion in revenue in 2022,

[109] *Ibid*.
[110] *Ibid*.
[111] *Ibid*.
[112] Hsinchu Science Park. "Park Overview."
[113] Hsinchu Science Park. "HSP Spotlight."

accounting for more than three-quarters of total revenue generated by all firms in the park.[114] At a 40-year celebration of the park in 2020, TSMC founder Morris Chang said, "If not for the science parks that offer all the infrastructure and land, a lot of tech companies may not be possible today."[115]

Hsinchu is now one of the wealthiest places in Taiwan, home to more than one million people. According to a 2026 profile in the New York Times: "Over the past six years, households near Hsinchu Science Park have reported some of the highest incomes in Taiwan. In one neighborhood, average household incomes exceeded $146,000 in 2023 — about five times Taiwan's average."[116] For better or worse, Hsinchu has come to echo Silicon Valley, generating wealth for its residents that far exceeds the rest of the nation. Taiwan's efforts to develop a semiconductor industry in Hsinchu proved so effective that the country now dominates global semiconductor production, prompting geopolitical attention and rival industrial policies from other countries seeking to reclaim production.[117]

Leveraging Designated Zones to Accelerate High-Tech Industries in the U.S.

All three East Asian case studies leverage designated geographic zones as a key feature of national industrial policies. Over the course of decades, each program achieved success in fostering clusters of high-tech and, in many cases, low-carbon industries. They also—particularly in the cases of Shenzhen and Ulsan—were powerful engines of regional economic development. Many offer promising ingredients for future industrial policy. It will be important for U.S. policymakers to identify contributors to the success of zones that are worth replicating, what shifts in the domestic policy toolkit will be necessary, and where certain aspects of American zones should be preserved.

Understanding the U.S. Context

The U.S. has its own history of place-based economic development programs, ranging from federal cluster programs to regional agencies (e.g., Appalachian Regional Commission) to an array of zone-based policies at the state-level.[118]

The most famous federal effort today that utilizes explicit geographic zones is the Opportunity Zones (OZs) program, which is in its second instantiation. Eligible OZs are census tracts that meet certain low-income indicators – thousands of communities across the nation meet these criteria

[114] Lim, L. 2024. "'Success breeds success': How a 1,400-hectare plot became the hub of the global chip industry—and the world economy." Fortune.
[115] Ting-Fang, C. 2020. "How a small Taiwanese city transformed the global chip industry." Nikkei Asia.
[116] Chien, A. C., M. Tobin. 2026. "Welcome to the Luxury City Built by Taiwan's A.I. Boom." The New York Times.
[117] See, for example, the CHIPS and Science Act.
[118] Higdon, J. 2026. "Contemporary zone-based industrial development models in the United States." Center for Public Enterprise.

– and the benefit of the designation is capital gains tax abatement for those who invest in the zone. The Opportunity Zones program has drawn billions of dollars investment (particularly for real estate) into targeted geographies,[119] but it is a sector-agnostic incentive and has not historically channeled that funding towards job creation or regional industrial strategies.[120]

Beyond Opportunity Zones, there are a number of contemporary place-based cluster programs, like NSF Engines and Tech Hubs, which have made significant progress inducing regional coordination around target sectors. However, it is important to note some differences between these programs and the dedicated industrial zone case studies we evaluate here. For one, the boundaries of some hubs reflect a given metro area or the existing service area of the public entities, universities, and non-profits organizing the consortium, rather than a specific set of industrial lands. Furthermore, these programs are rarely accompanied with mechanisms that deliver physical inputs (e.g., infrastructure, land) or procedural reforms (e.g., permitting) to address barriers to full-scale production in those specific places. In other words, there is not necessarily any difference in the operating conditions for a firm that locates a factory within a "hub," rather than outside it.

It is possible that the success of certain Tech Hubs and NSF Engines in cultivating regional innovation clusters could also make these same geographies high-impact locations for industrial zones to create a full-stack pipeline in one designated place – indeed, completing this innovation-to-production linkage was a key feature of Hsinchu Science Park.

Lessons for American Policymakers

Common policy elements emerge across the three East Asian case studies. On administrative structure: Shenzhen and Ulsan provided local autonomy for site and factory development, generally channeled through a single implementing entity. On supply chain clustering: Ulsan and Hsinchu prioritized agglomeration in specific industries anchored to existing tenants and assets (e.g., semiconductors, automotive). On infrastructure: All three provided extended, iterative investment in—or in some cases, public provision of—enabling infrastructure, whether that be logistical (e.g., Ulsan Port upgrades) or other enablers of the manufacturing and talent ecosystem (e.g., worker housing and upstream inputs in Hsinchu).

However, despite a similar toolkit and export-oriented development mindset, the zones are diversified. They have grown to different sizes and thrived in different strategic sectors. Ulsan and Zhuhai SEZ are distinct in prioritizing sustainable development, with clear impact on their development trajectories, though other zones have looked to improve environmental and social outcomes in recent years. China moved upstream from raw production into higher-value R&D; by contrast, Taiwan moved downstream from R&D into large-scale manufacturing. All three zones

[119] Coyne, D., C. Johnson. 2026. Use of the Opportunity Zone Tax Incentive through 2024: An Update. Office of Tax Analysis. Working Paper No. 128.
[120] Theodos, B., B. Meixell. 2025. "Opportunity Zones Need to Be Retooled to Achieve Impact." UrbanWire.

eventually completed the bidirectional link between innovation and production, albeit from different starting points.

Based on these case studies, we offer three main lessons for American policymakers.

First, prioritize shared infrastructure and place-based ecosystem services that directly deliver critical inputs, over traditional business attraction incentives.
Governments around the world long sought to cultivate regional economic development through tax credits and financial inducements. While often successful, these tools work best alongside policies that deliver essential inputs to production.

In fact, the three zone case studies here suggest these ecosystem services are central to the success of truly standout industrial hubs; they do not undermine the value of incentives in attracting individual firms, but they differentiate the globally successful, high-tech manufacturing ecosystems that stand the test of time. This echoes research by the economist Tim Bartik[121] showing that infrastructure and business services - such as incubators, skills training programs, or bridges and electric power capacity - tend to have significantly higher returns on public investment than cash subsidies.

In each of the designated zones or industrial parks, shared infrastructure investment was a key business attraction tool. This was reflected not only in public infrastructure investments into and around the zones, but also in the administrative authorities of the zones. Moreover, for the public sector, shared infrastructure is cost-effective: committing to build infrastructure in one place is cheaper than committing to do it in many places. Investments in place-based talent and workforce development programs, like those in Ulsan and Hsinchu, linked firms with skilled employees. To the extent more traditional tax or business incentives played a role – and they did in several cases, particularly in China's SEZs – they tended to be generalizable across the zone (e.g., tax exemptions for KICOX as the official development entity, or lower, but far from zero, corporate income taxes in China's SEZs).

Existing infrastructure or location advantage likely plays a key role in the success of special industrial zones. Previously a fishing village, Ulsan was initially industrialized due to its ample land, deepwater port, and rail connections to Busan; later, its designation as an eco-industrial park in 2003 was a reaction to its legacy of pollution. Hsinchu Science Park was built around existing research infrastructure that predated the geographic designation. For its liberalization project, China looked for proximity to global trade outlets, and the growth of its SEZs is closely bound with the trajectories of Hong Kong and Macau.

[121] Bartik, T. 2019. Making Sense of Incentives: Taming Business Incentives to Promote Prosperity. W.E. Upjohn Institute for Employment Research.

Second, zones require risk-taking and multi-year commitment – and commitment requires iteration.

Despite the importance of clear roles and procedures, policymakers must be willing to commit to zones for extended periods, then recommit and reinvest where needed. In the three zones highlighted here, policymakers had an understanding of the industries they sought to attract and the inputs they needed – for instance, the importance of port infrastructure in Ulsan or shared research facilities in Hsinchu– allowing them to appropriately calibrate the public cost undertaken to support those industries over time. This requires a desire to succeed and a risk tolerance that is not often rewarded in U.S. policy.

The East Asian zones covered here were chartered over extended periods of time, typically decades. They employed long-term development plans, but also a willingness to iterate on policy design. For instance, the original four pilot SEZs remain in place in China today – even scandal-prone Shantou – yet China has also initiated multiple waves of new development zones and industrial cluster programs. China did not treat any single tax break or regulatory reform as a silver bullet, or employ a "wait and see" approach; early concerns about the success of the zones were met with policy tweaks. Similarly, Ulsan's special industrial status dated back to the 1960s, but also resulted in heightened local pollution, so in 2003 South Korea recommitted and reinvested in the zone as part of its eco-industrial park push. Finally, in Hsinchu, the initial focus on R&D and tech transfer was followed by waves of investment in manufacturing scale-up and shared research infrastructure. Consistent throughout was a clarity of focus on industrial innovation and a skilled manufacturing workforce – real-world outcomes rather than specific incentives or tools.

U.S. politics reward those who write off the opposing party's investments as abject failures, and Congress and the judiciary tend to dislike empowering expert agencies with flexible tools. These dynamics make long-term, iterative industrial policy challenging. However, there is an increased awareness of the importance of risktaking and iteration in Washington. For instance, many energy and national security experts have bemoaned the impact of the Solyndra scandal on DOE's risk appetite in the 2010s, with both progressive and conservative groups reasserting the importance of a Loan Programs Office willing to take significant risks in the 2020s and beyond.[122,123] Former National Security Advisor Jake Sullivan echoed this in a recent Foreign Affairs op-ed advocating for a Strategic Investment Fund, saying that "today's geopolitical environment demands a different mindset" than the risk-averse culture after Solyndra.[124]

Third, delegate clear authorities and development roles to the zones – but adapt this governance model to the American political system.

[122] Mailoux, M. 2022. "Clean Energy Infrastructure Year Marches On." Clearpath.
[123] Khanna, S. 2026. Take More and Better Financial Risks. Roosevelt Institute.
[124] Sullivan, J. 2026. "How to Reindustrialize America: The Case for a Strategic Investment Fund." Foreign Affairs.

Efforts like the Korean industrial complex system or Chinese SEZ approach have been successful due to their clear set of roles and responsibilities for developing the zone, including the roles of both local and national entities and, typically, a dedicated zone administrator (e.g., the HSP Bureau or KICOX). These administrators often acted as a "one-stop" planning, development, and permitting authority.

The U.S. is less systematically and culturally likely to accommodate long-term, national planning along the lines of China's SEZs. Recent federal policy whiplash has undermined public trust, investment certainty, national-state-local coordination, and willingness to commit to multi-year programs. However, each level of the federalized American system is vested with significant industrial policy tools.[125] The key features of effective governance – namely the ability of zone administrators to act with speed and independence in service of a public mission – can be preserved in such a system with effective design that imbues the zone itself with the authority to address the needs of the investment it seeks to attract. This will require understanding of industrial business needs, thoughtful lawmaking to delegate to and empower zone development entities, and the political backing to deploy a diverse range of public resources.

American policymakers may wish to develop a hybrid approach whereby communities or regions self-nominate for zone status and pursue different combinations of investment targets, authorities, guardrails and benefits, or involvement of different levels of government. However, after such a democratic process, the zone should be administered independently with its own delegated authorities from federal, state, and/or local actors, subject to these embedded guardrails and ongoing oversight. The key would be to ensure various zones are designed to meet the challenges investment encounters and are flexible enough to address those challenges. That kind of public capacity is difficult to cultivate, but invaluable once it is.

Finally, American policymakers should remember that industrial zones were meant to replicate the world-leading clusters of industrial innovation that America developed in the 20th century. Many of the East Asian zones were implicitly or explicitly modeled on U.S. projects like Silicon Valley and the Tennessee Valley Authority. Industrial zones are thus fully compatible with the U.S. economic system, and are an opportunity to re-import a policy innovation we've successfully exported around the world.

[125] Yang, C., C. Lala, S. Bouchee, Y. Feygin, A. Arun. 2025. Reimagining economic development: a playbook for state economic development agencies. Center for Public Enterprise.