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# SpaceX & The Age of Infrastructure

*The Largest IPO in American History Marks the Close of the Weightless Economy*

Tomorrow morning, when SpaceX opens for trading in what is expected to be the largest IPO in American history $75 billion/$1.8 trillion market cap), it will mark more than a milestone for Elon Musk or for the commercial space industry. It will mark the official close of one economic era and the opening of another.

We are entering the Age of Infrastructure.

Not infrastructure in the well-worn political sense — the pothole-and-bridge language of campaign season. Infrastructure in the civilizational sense: the physical, capital-intensive, decade-spanning foundations upon which everything else is built. Power plants and data centers. Transmission lines and semiconductor fabs. Launch systems and nuclear reactors. The unglamorous, irreplaceable substrate that determines who wins the next fifty years.

*SpaceX's IPO doesn't just price a rocket company. It prices a thesis.*

## 01 · THE AGE OF INNOCENCE IS OVER

To understand what is ending, it helps to reach for Edith Wharton.

In “The Age of Innocence”, her 1920 masterpiece of Gilded Age New York, Wharton's characters inhabit a world of convention and surface — a world of drawing rooms and dinner parties where the physical realities of life, the labor, the machinery, the brutish infrastructure of commerce, are not merely ignored but actively suppressed as vulgar. The novel's most devastating observation is delivered almost in passing: “In reality they all lived in a world where the things that happened were never spoken of.”

That sentence describes, with uncomfortable precision, the first twenty-five years of the 21st century's technology economy.

The great digital boom was built on a collective agreement not to speak of certain things. Not to speak of the fact that the most celebrated consumer technology products in American history — the iPhone, the devices that made Silicon Valley's titans — were manufactured at industrial scale in a totalitarian state that was using every dollar of that technology transfer to fund the most aggressive infrastructure buildout the modern world had ever seen. While Apple's supply chain partners were building the factories and ports and power plants of a rising military superpower with hegemonic aspirations, the American technology industry was booking the margins and calling it globalization. China was playing the Long Game from the beginning (the CCP’s foundational ordeal was the ‘Long March’). The west was playing a different game entirely — and calling it the future. Not to speak of the rare earth minerals extracted at enormous human cost to build the devices. Not to speak of the physical logistics networks — the ports, the trucks, the warehouses — that made same-day delivery feel like magic rather than infrastructure. The software layer’s ubiquitous apps were elegant, weightless, and culturally dominant. The physical layer was, in Wharton's formulation, the thing that happened but was never spoken of.

And undergirding the whole project was something close to Wharton's other famous line — the desperate wish of her trapped protagonist Newland Archer: “I want to be free; I want to wipe out all the past.” That was Silicon Valley's founding impulse in its purest form. Wipe out the asset-heavy past. Wipe out the factories and the pipelines and the power plants. Wipe out the capital expenditure cycles and the regulatory and zoning proceedings and the decade-long development timelines. Build something weightless. Build something that scales without friction, without steel, without the grimy, slow, expensive work of constructing things in the physical world.

For two decades, that impulse was rewarded beyond any reasonable expectation. Software ate the world precisely because it didn't need to build anything heavy. A company worth hundreds of billions could run on rented servers, a lease in San Francisco, and network effects. Investors loved it. Quarterly earnings loved it. And it made a generation of founders and venture capitalists fabulously wealthy by treating the physical world as someone else's problem.

## 02 · HOW THE WORLD REALLY WORKS

Someone was always paying attention to what was being ignored.

In 2022, the Czech-Canadian scientist Vaclav Smil published “How the World Really Works”, a book that reads today less like a provocation and more like a prophecy. Smil's argument was patient and relentless: the modern world runs on four materials — steel, cement, plastics, and ammonia — and on fossil fuels that underpin virtually every aspect of civilization. The digital economy did not transcend these dependencies. It deepened them. Every server requires steel and cement to house it. Every AI training run requires electricity generated mostly by burning something or splitting something. Every device requires materials dug from the earth and processed in furnaces.

Smil had no patience for what he called “techno-optimism” — the belief that software and ingenuity could substitute for the physical foundations of civilization. He was not anti-technology. He was anti-magical-thinking. And his core message was simple: you cannot wipe out the past. The physical world does not care about your platform economics. Gravity still works. Heat still dissipates. Electrons still need wires to travel through.

*Tech’s ‘Age of Innocence’ — the digital economy's long refusal to speak of the things that were actually happening — ended not with a philosophical awakening but with a power bill.*

When hyperscalers began building data centers at gigawatt scale and found that the grid wasn't there to serve them, the physical world reasserted itself with complete indifference to the preferences of the software industry. When AI training runs began consuming the electricity of small nations, the question of where that electricity came from became, suddenly and urgently, a capital markets question. When memory chips tripled in price because data center construction was consuming global supply, the abstraction layer cracked and the physical substrate showed through.

Smil had been right all along. The world really works in concrete and copper and thermal plants. It always did.

## 03 · THE ‘PHYSICAL STACK’

Several weeks ago, in the “Digital Power Weekly's” analysis of the SpaceX S-1, we made a specific argument that we want to return to now because the events of the past few weeks have validated it with unusual speed: the AI winners — and the generational wealth it is and will continue to create — will not reside primarily in the model layer. They will reside mostly in what SpaceX labeled the ‘physical stack’.

The S-1 told that story plainly for anyone reading it as a capital markets document rather than a space exploration narrative. Starlink's recurring revenue, the launch cadence economics, the vertical integration from propulsion to orbital infrastructure — what SpaceX has built is not a technology company in the software sense. It is an infrastructure company that happens to operate at the frontier of physics. The moat is physical. The returns are long-duration. The competition is measured in years and billions of dollars of capex, not in sprint cycles and A/B tests. That is precisely the template for the Age of Infrastructure now opening across every sector of the economy.

## 04 · THE NUMBERS DEMAND ATTENTION

SpaceX's IPO is the symbolic opening bell, but AI's Rocky Balboas and Apollo Creeds have been in training camp for several years. Anthropic and OpenAI have both filed or are preparing to file S-1s, signaling that the AI frontier is moving from venture-backed experimentation to public-market permanence valued in the trillions of dollars. The AI capex wave across hyperscalers — Microsoft, Google, Amazon, Meta — already runs into the hundreds of billions annually, with no deceleration in sight.

Then look east. China added more electricity generation capacity in the past four years than the United States has built in its entire history. In 2025 alone, China brought 543 gigawatts of new generation online — solar, wind, thermal, hydro, and nuclear — averaging over 400 GW per year since 2023. Beijing is now planning a $295 billion data center rollout over the next five years, with grid integration costs potentially pushing total investment to nearly $700 billion. As Goldman Sachs' Samantha Dart put it bluntly: “The US might face a bottleneck whereas China doesn't seem to be bottlenecked at all. Leadership in the AI race, which sits with the U.S. now, might over time shift to China.”

That is not a statement anyone in the Digital Power business should read lightly. China did not spend the last twenty years trying to wipe out the physical past. It built it, relentlessly, at a scale that now dwarfs every competitor. While Silicon Valley was celebrating the weightless economy, Beijing was pouring concrete.

## 05 · THE INTELLIGENCE LAYER IS ABOUT TO COMPOUND ITSELF

And if the infrastructure race weren't already vertigo-inducing, Anthropic published something last week that reframes the entire stakes of the competition. Researchers at the Anthropic Institute argued that AI systems may be approaching the capacity for recursive self-improvement — the ability to design and develop their own successors (tech-speak for AGI potential). Anthropic's own data is striking: Claude now writes more than 80% of the code merged into Anthropic's systems, up from low single digits before Claude Code launched in early 2025, and engineers are shipping roughly 8x as much code per quarter as the 2021–2025 baseline. Anthropic was careful to say recursive self-improvement has not happened and is not inevitable — but that it "could come sooner than most institutions are prepared for."

Think about what that means for infrastructure through Smil's lens. We are potentially building the physical layer — the data centers, the power plants, the transmission lines, the semiconductors — for an intelligence that will redesign itself. The capex required is not just massive. It is, in a meaningful sense, open-ended. And it is irreducibly physical. An AI that improves itself still runs on electrons. It still needs cooling. It still needs the grid. The Age of Innocence fantasy — that intelligence could float free of its physical substrate — dies here too.

## 06 · EVERYTHING OLD IS NEW AGAIN

Here is what gets missed in the day-to-day breathlessness about AI valuations, GPU allocations and the rising concerns over accelerating opposition: we have been here before. Not with AI specifically, but with the underlying social and political dynamic.

**Democracy's Bargaining:** Nearly a century ago, the early 1930s saw genuine unrest that worried elites about the stability of American democracy. The Bonus Army of 1932 — some 20,000 World War I veterans and their families who camped in Washington demanding early payment of their service bonus — was the most visible, ending when Douglas MacArthur's troops burned the encampment, a spectacle that helped doom Hoover. Beyond it: the 1932 Iowa "Farmers' Holiday" movement, where farmers blockaded roads, dumped milk, and in places physically halted foreclosure auctions and threatened a judge (the near-lynching of Judge Charles Bradley in Le Mars, Iowa, in 1933); the violent 1934 labor confrontations in Toledo (Auto-Lite), Minneapolis (Teamsters), and San Francisco (the West Coast longshore strike and general strike); hunger marches organized by Communist-led Unemployed Councils; and the rise of demagogic mass movements — Huey Long's "Share Our Wealth," Father Coughlin's radio populism, and Francis Townsend's pension crusade — that channeled discontent toward figures positioned as alternatives to the constitutional order. The 'bargain' with the American people in the New Deal's answer was co-optation and material relief: emergency jobs and cash through the FERA, CWA, WPA, and CCC absorbed the unemployed; the 1936 Adjusted Compensation Act finally paid the veterans' bonus; the AAA and farm-credit programs slowed the foreclosures driving rural revolt; the Wagner Act (1935) and Social Security channeled labor militancy and old-age desperation into legalized, institutional channels; and Roosevelt's rhetoric of inclusion gave the aggrieved a stake in the system rather than a reason to overturn it. The broad scholarly read is that the New Deal worked as a stabilizer precisely because it bought social peace — substituting federal guarantees for the grievances that had been pushing people toward the streets, the barricades, and the demagogues.

**$21-24 trillion in 2026 Dollars:** Then, in the 1940s, America made another generational bargain. The American mobilization for World War II demanded sacrifice on a scale the country has never repeated. More than 16 million Americans served in uniform, and roughly 405,000 died (1 million in today's population numbers); on the home front, civilians accepted rationing of gasoline, rubber, sugar, meat, coffee, and shoes, observed scrap drives and Victory Gardens, and poured savings into war bonds — some 85 million Americans bought bonds that financed roughly $185 billion of the war effort (equal to 18-20% of cumulative wartime GDP, or $21-24 trillion in today's dollars) a deliberate mechanism to absorb wartime wages and bind the public financially to the fight.

**"Arsenal of Democracy":** The industrial achievement behind the "Arsenal of Democracy" was staggering. Between 1941 and 1945, American factories produced about 300,000 aircraft (they only produced 3,000 in 1939), some 86,000–89,000 tanks, over 2.7 million machine guns, roughly 12.5 million rifles, 8,800 naval vessels, and around 2.7 million trucks. Henry Kaiser's shipyards drove the Liberty ship program from months-long build times down to a matter of days, completing one famous vessel in under five days as a publicity feat and turning out cargo ships faster than U-boats could sink them. Gross national product roughly doubled in nominal terms over the war, and manufacturing output surged as plants converted from consumer goods — Detroit's auto lines famously stopped making cars entirely and switched to aircraft, tanks, and engines.

**50% Increase in Electricity Output:** Underpinning all of it was electricity: federal hydroelectric investment, especially the Tennessee Valley Authority and the Bonneville and Grand Coulee dams on the Columbia, provided the cheap, abundant power that fed aluminum smelters for aircraft and, secretly, the Hanford plutonium works of the Manhattan Project. National electricity generation rose from roughly 180 billion kilowatt-hours in 1940 to about 270 billion by 1945 — a near-50% increase in five years — and the Grand Coulee–Bonneville system alone made the Pacific Northwest the aluminum capital of the wartime economy.

**Payback:** In return for those extraordinary sacrifices, Americans were given the GI Bill, the Interstate Highway System, the thirty-year fixed-rate mortgage, the expansion of homeownership as a democratic institution, and expansive labor laws. The political economy of the postwar boom was deliberately organized around ensuring that the prosperity those sacrifices built was broadly shared — not equally, for America in the postwar period remained deeply unequal, but broadly enough to generate the social legitimacy that made the wartime sacrifices worthwhile and sustained fresh waves of investment. The United States defeated the Axis not on courage alone but on installed physical capacity — steel, dams, turbines, and electrons — the same substrate that determines who wins today.

Just as happened in the 1930s-1940s—a period of great social and economic upheaval—the same 'bargaining' is happening right now as to how the burdens and benefits of AI will be shared.

When communities organize against data centers over higher electricity bills, they are not simply NIMBYs. They are the modern equivalent of the Bonus Marchers. If the AI buildout is benefiting from the grid built over a century with the hard-earned dollars of average ratepayers, and is now going to contribute higher power costs, constrained grid capacity, and disrupted labor forces, it is reasonable for ratepayers to ask what they get in return. The calls for "shared ownership" of AI — for sovereign wealth funds, public equity stakes, community benefit agreements — are not socialist fantasies. They are the predictable political response to a massive infrastructure buildout that doesn't yet have a clear answer for how its gains will be distributed—and therefore the path by which it secures the required broad-based support.

This too is a Wharton problem. "The Age of Innocence" ends when the things that were never spoken of in the novel can no longer be ignored — when the physical costs and the social costs of the system become impossible to suppress. Today, these 'costs' are all solvable problems. It was solved before by the New Deal and the Great Society. But it requires the people building and benefitting from the infrastructure to take the questions seriously.

## 07 · ON BUBBLES AND PROSPERITY

Yes, there will be a bubble. There may already be one forming. The memory chip market tells part of the story: RAM prices up 237% year-over-year, adding to the headline inflation above 4% for the first time since 2023, with Bloomberg Economics calculating the AI-driven memory squeeze will add 0.4 percentage points to headline CPI before it peaks. The AI buildout is, right now, inflationary. The disinflationary productivity dividend that Fed Chair Kevin Warsh and others are counting on is, in Wolfe Research chief economist Stephanie Roth's words, "still a ways out."

But here is the crucial distinction: capex bubbles and financial bubbles are different animals. The railroad mania of the 1800s wiped out most of its investors. It also laid the physical track that industrialized a continent. The fiber optic buildout of the late 1990s destroyed hundreds of billions in investor capital. It also created the physical backbone of the modern internet. The 2008 Global Financial Crisis is the instructive counterpoint: it produced no infrastructure at all. It grew out of pure financialization and asset inflation — mortgage-backed securities, collateralized debt obligations, and a housing bubble inflated by leverage rather than construction — and when it burst it destroyed trillions in household wealth while leaving behind nothing but foreclosed houses and a balance-sheet crater. That is the difference. A capex bubble overbuilds the physical world and bequeaths its excess to the future; a financial bubble merely re-prices paper claims on assets that already exist, and when it collapses there is no track in the ground, no fiber in the conduit, no turbine spinning — only the losses. From capex overreach comes infrastructure. From infrastructure comes the long, compounding prosperity that no one credits to the original overreach. The physical world doesn't care whether the financing was rational. The steel gets made. The lines get strung. The capacity gets built. And decades later, civilization runs on it.

*"Would you want to live in a world run by actuaries? We'd still be in caves." — Aswath Damodaran, NYU Stern*

NYU Stern professor Aswath Damodaran put it as well as anyone can when he appeared recently on the WSJ's "Take on the Week" podcast. Human advancement, he argued, depends on overreaching. And he asked the question worth sitting with: "would you want to live in a world run by actuaries? We'd still be in caves."

## 08 · THE AGE OF INFRASTRUCTURE, PLAYED WELL

What does navigating this era well actually look like?

It means power-first thinking. You cannot run a data center without electricity. You cannot run an AI economy without data centers. The constraint is physical, not algorithmic — exactly as Smil would insist — and every serious infrastructure investor should be building around that reality. The nuclear renaissance is real — public support has moved from 43% to 60% in five years — but new reactors take a decade to build. The interim answer is gas, existing nuclear uprates, BESS installations to enable broad-based demand response, and a furious race to interconnect. Behind-the-meter, campus-style development exists precisely because the grid wasn't built for this moment.

It means taking the social contract seriously. The communities hosting the data centers, the workers building them, the ratepayers funding the grid upgrades — they are participants in this infrastructure buildout whether they signed up for it or not. The Age of Infrastructure requires their sustained cooperation. That cooperation has a price, and pretending it doesn't is how you get regulatory backlash, permitting delays, and the political economy that turns a capex boom into a policy disaster.

And it means genuine patience — not the performance of long-term thinking while watching the next quarter's numbers, but the actual willingness to commit capital to assets that are amortized over decades. The railroads took forty years to pay off. The interstate highway system took thirty. The AI infrastructure cycle will be measured in decades, not quarters.

*We are watching the close of the weightless economy. The first 25 years of this century were weightless by design. The next 25 will have mass.*

SpaceX's first trading day is not just a market event. It is a marker. The ‘physical stack’ thesis — the one we identified in the S-1 weeks ago, the one animating trillions in capex from Starlink's orbital mesh to China's 543-gigawatt energy spree to the nuclear plants being licensed for the first time in a generation — is now public market canon.

The Age of Innocence is over. The Age of Infrastructure has begun. The world really works the way Smil said it did. And the people who build the physical foundations of the next fifty years will determine everything that runs on top of them.

The first 25 years of this century were weightless by design. The next 25 will have mass. SpaceX's opening bell is the moment the scale tips.

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