



# Solutions

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[Home](#) > Open-Market Sustainability

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## Open-Market Sustainability

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### In Brief:

America stands at a historic inflection point. The economic engine that carried our nation out of World War II, to then outperform the Soviets, is incapable of meeting the challenge of the twenty-first century. While the United States and some other Western economies are in the throes of a rare and disruptive debt crisis, the global economy is in the midst of three additional challenges: rapid economic inclusion, ecological depletion, and a resilience deficit. Though distinct, these four crises are inseparable in practical terms, forming a singular strategic test facing the United States. Simply put, the post-Cold War international economic system is fundamentally unsustainable.

The nature and scale of this challenge requires our economy to do the heavy lifting. And for the first time since the creation of the Cold War economic engine, domestic demographic trends and advances in housing, transportation, farming, and resource utilization make a strategic market reset possible. A massive pool of pent-up demand and an equally large reservoir of stranded capital can underwrite a three-part reset in the critical nodes of the U.S. economy: shifting from sprawl to smart growth, from industrial to regenerative agriculture, and from taxing income to taxing waste. This new economic engine is called “open-market sustainability.”

Based on preliminary estimates, a pivot toward open-market sustainability will immediately deliver the certainty investors need to put American labor and capital back to work in the productive economy. Built on the bedrock of demographic demand for a new American dream and a resource productivity revolution, it will put the nation on a path to achieve climate-stabilizing carbon reductions and align the American market with rising global demand. Instead of the halting multilateralism of climate change, open-market sustainability provides an opportunity to enhance our security by leading the transition to a sustainable—and prosperous—global economy.

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### Key Concepts:

- The United States faces an overarching strategic challenge—global unsustainability—comprised of four interlocking crises: deleveraging (the macro debt collapse); inclusion (the three billion people entering the global market, lowering wages, and increasing consumption); depletion (man-made climate change and ecosystem failure); and resilience (the vulnerability of our critical financial, industrial, and infrastructure networks to shock, disruption, and capture). Until we solve for the system, efforts at solving each individual crisis will fail, while U.S. security and prosperity erode precipitously.
  - America has a pathway for leading a transition to global sustainability marked by widespread economic success and a reduction in strategic threats and friction. Pent-up demand and stranded capital can underwrite the economic engine of open-market sustainability, shifting from sprawl to smart growth, from industrial to regenerative agriculture, and from taxing income to taxing waste.
  - Executing this market reset, in contrast with the austerity narrative, provides the U.S. government with an option that revives and harnesses the American market while reducing our long-term deficit. By adopting integrated policies for the built environment, agriculture, and taxation, we can build a new American Dream that meets demographic demand while launching a revolution in resource productivity that will position the United States to lead the larger, global transition to sustainability.
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The modern economy experiences two types of cyclical debt cycles: the short-term business cycle that produces the familiar oscillation between expansion and recession, bull and bear; and the long-term debt cycle that we are experiencing now. During the 75-year period of these cycles, the debt-to-income profile of the entire economy gradually builds up a stock of household, corporate, and government debt that income is insufficient to service. The credit reset from indebtedness to balance is called a deleveraging.

The present American deleveraging started in 2007–2008, as rolling mortgage defaults undermined a system of extraordinary household and financial-sector leverage, triggering a shift in debt from the financial sector to a debt-burdened federal sector, through fiscal and monetary bailouts. Household debt—from both consumer and mortgage sources—remains high at a time of high unemployment (8.6 percent at the time of writing). This, in turn, drives household-level austerity that reinforces a negative cycle of lowered demand, lowered employment, lowered asset values, and lowered government revenue. As this negative cycle grinds on, middle-class expectations are being dramatically lowered, with political implications being seen in the Tea Party and the Occupy Wall Street movements.

Today's deleveraging cannot be softened or expedited by monetary policy—the use of interest rates and open market purchases to prop up equity markets—if for no other reason than because the Federal Reserve's target funds rate is already zero and the Federal Reserve cannot politically take any more debt onto its books. This is not the normal business cycle. Deleveraging ends only when widespread demand and creditworthiness are restored. Classically, such conditions are brought about by a combination of six often painful adjustments: debt restructuring (to reduce the cost of servicing existing debt); increased money supply (to reduce the cost of new debt); redistribution of wealth (to convert unproductive liquidity into widespread demand through taxation); businesses cutting costs (e.g., layoffs and cutting capital investment); increases in risk and liquidity premiums (to reduce speculation and redirect investment to the productive economy); and, finally, by nominal interest rates being held under nominal growth rates (to reduce debt burdens).<sup>1</sup> While as much as half of the private-sector debt overhang has been alleviated, household debt and government debt are still in dangerous territory. The last deleveraging in the United States took ten years and World War II to unwind, while in Japan the 1990s deleveraging was known as the “lost decade.”

While efforts to reduce the debt dominate the discussion in the United States and now Europe, the overriding feature of the global economy is the rapid process of economic inclusion. Four billion people live outside the formal sector of the global economy—and they are coming in.<sup>2</sup> These are the people, present in nearly every economy, but mostly outside the developed West, who do not have adequate access to the basic tools for living in a market economy. They may not have a legally documented identity or title to the property in which they live or run their small business. They do not have access to credit, banks, insurance, and the courts. Instead, they live in a cash world, relying on friends, family, and fate to help them weather the numerous disruptive economic and political events that sweep through their world.

But in they come. The leading edge of that human wave is rural-urban migration, where 200,000 people leave the village every day for the city. China and India alone will need to build cities for 675 million people in just the next 20 years, according to current trends.<sup>3</sup> Based on income, total middle-class additions worldwide over the same time period may hit three billion.<sup>4</sup> As they arrive in cities, these people gain additional legal standing and climb the economic ladder, and then income and resource consumption spike—in China, new urban dwellers experience a 300 percent increase in income over their rural past.

As a result, in just the last decade, the twentieth-century trend of commodity price decreases has been undone, and pressure on resources, food, water, energy, basic materials, and land is unparalleled, with demand for these key resources set to increase by 40–60 percent.<sup>4</sup> International Monetary Fund commodity price indices have already risen dramatically, with significant strategic impact: rising oil prices triggered the mortgage default crisis in the United States; and rising food and energy prices are frustrating middle-class expectations globally, having directly contributed to the protests in Tahrir Square. China and India, needing to assure domestic stakeholders that supplies of basic materials will be available, have helped to lock in supply contracts using sovereign wealth, at a significant premium above current market prices.

With global population expected to peak at nine billion, the economic inclusion project is not only the defining feature of the global economy, it is also the driver of long-term strategic competition among the world's great powers. From one perspective, Asia is merely springing back to its historical share of global gross domestic product (GDP) after colonial occupation and the West's industrial head start.<sup>5</sup> At the same time, in today's large emerging economies—supporting both modern middle classes and in some cases billion-person reservoirs of unskilled, unconnected workers—competition with developed economies has become a race to the bottom. Able to opt out of free-trade rules, they do so, worsening the structural imbalance, famously in trade. With approximately 2.5 billion people in the formal, legal sector of a 7-billion-person economy, we are already experiencing massive dysfunction. With 3 billion more entering the middle class over the next 20 years and most of the global population increase happening within the excluded population, the pressures will only get worse.

Meanwhile, so heavy is our footprint, humans are now dominating the biological, chemical, and geological processes, prompting some scientists to declare we have entered a new era, which they call the Anthropocene.<sup>6</sup>

Those processes are determined by the earth's endowment of natural capital, the stock of the earth's ecosystems that produce an annual return of specific goods and services, like climate management, freshwater production, flood control, food and fiber provision, nutrient flows, fishery management, and clean air.<sup>7</sup> Humanity is overconsuming two-thirds of ecosystem goods and services, depleting our stock of natural capital, reducing the absolute return on these life-support functions for subsequent years while planetary demand for these services is set to increase.<sup>8</sup>

From an economic perspective, ecosystem depletion is driven by the failure of authorities and market participants to adequately price ecosystem services in the economy. In the absence of effective pricing, ecosystem services are valued as free or, in many cases, are subsidized by national governments. As a result, business models and development strategies around the world incorporate methods that in the aggregate are accelerating the depletion. This includes such practices as clear-cutting tropical rainforests; mountaintop removal mining; toxic releases of mercury, lead, and other heavy metals and carcinogens; eliminating wetlands and mangroves; depleting agricultural soils; nitrogen-charging of waterways; and overfishing.

The most well-documented ecosystem disruption is to the atmospheric carbon cycle. The Intergovernmental Panel on Climate Change<sup>9</sup> as well as the federal U.S. Global Change Research Program<sup>10</sup> have established that man-made emissions and agricultural practices are causing planetary warming that is having widespread and nonlinear effects on the earth's ecosystem. If this is unaddressed, the Massachusetts Institute of Technology estimates that global atmospheric carbon is on track for 866 parts per millions by 2100, a level that will result in catastrophic climate impacts on sea level, human settlements, and agricultural production. A recent series of reports from NOAA, the National Science Foundation, and the National Snow and Ice Center, however, reveal that observed permafrost methane releases due to Arctic warming are likely to trigger much more rapid, and disruptive, change.<sup>11</sup>

Currently, atmospheric carbon levels are approximately 378 parts per million, with global emissions from energy approximately 30 gigatons of carbon dioxide equivalent per year.<sup>12</sup> To stabilize the atmosphere, a carbon target of 350 parts per millions is required, translating to a reduction in carbon intensity per unit of GDP from 768 grams/dollar to six grams/dollar, requiring a quantum leap in how we power our market economy.

Today, financial systems, ecosystem services, industrial networks, resource supply chains, and even our food systems are prone to interruption and failure. As we head into a future defined by the above three drivers of risk, our deficit of resilience will act as a crisis multiplier and retard efforts at transition.

We have already seen plenty of evidence. Poor market oversight on Wall Street and corrupted regulators created systemic risk that turned collateralized securities into toxic assets, freezing commercial lending and triggering the Great Recession. Through single-source supply contracts and just-in-time manufacturing systems, a small gasket manufacturing plant destroyed in the 2011 Japanese tsunami shut down production facilities in the big six automakers in the United States, extending our unemployment from 8.9 to 9.1 percent. As this is written, flooding in Thailand is disrupting Apple's iPhone production lines. China was able to shut off supplies of rare-earth minerals to the United States, European Union, and Japan in 2010, and Russia has moved to extend and flex its considerable control over Eurasian gas and oil reserves and transit routes.

Here at home, industry and government have systematically underinvested in infrastructure, resulting in disasters like the BP oil spill, the Southwest and Northeast blackouts, and the collapse of the Interstate 35 Mississippi River bridge in Minneapolis—underscoring what is estimated to be more than \$2.2 trillion in arrears.<sup>13</sup>

## **Global Unsustainability**

None of these four issues—deleveraging, inclusion, depletion, and resilience—can be solved independently. The interconnections between the four are too strong. Domestic deleveraging requires demand, but that demand runs into the hard parameters imposed by the deep pools of low-cost labor coming on line in Asia, the lack of sufficient levels of resource efficiency, and the stretched and fragile pipes of the global supply chain. To address our infrastructure backlog requires more than just government stimulus; we need a similar deep source of private demand that can make such investments pay off over the long term. Carbon emissions need to be priced, yet cap-and-trade in the midst of a deleveraging will increase the burden of taxation on the middle class without creating a decisive framework for emissions reductions from vehicle miles traveled, housing, or agriculture.

Put another way, the global economic system and our own post-World War II economy are unsustainable. The present architecture of international trade and the structure of the major and minor markets that allocate resources and capital are incapable of addressing the great global challenge of the era. Here at home, the economy is on life support and failing fast. The brilliant Cold War economic engine—designed in the period from 1944 to 1956 to provide jobs and homes to returning World War II veterans, to overcome postwar resource shortages, to disperse American industry in the event of an all-out nuclear war with the Soviet Union, and to generate sufficient resources to maintain a global military enterprise—is now working against our strategic interests.

Committing the nation to address shared global challenges has earned the United States the title “leader of the free world.” And each time, we led by reshaping our economy to do the strategic heavy lifting. In World War II, we were the “arsenal of democracy.” In the Cold War, we “contained” the Soviet Union so we could defeat them in a longer-term contest of economic and political systems. Presidents Roosevelt, Truman, and Eisenhower demobilized the wartime economy to focus on the “American Dream,” using pent-up and manufactured demand for suburban housing to absorb excess labor and industrial capacity and to disperse the population in the event of nuclear war. To lead the transition to global sustainability, we will need to draw on the same fundamental formula—our economy must once again do the strategic heavy lifting.

### **Resetting the Market for Sustainability**

If our strategic imperative is to lead the transition to global sustainability, and the means is by letting our economy do the heavy lifting, the central question is how to align the American market economy to the task. To do this, this article proposes a set of policies under the rubric of open-market sustainability.

Open-market sustainability would establish a new economic engine for the United States by updating three master nodes of the American economy trapped by Cold War—era priorities: housing and transportation, agriculture, and the price of labor and resources. With these keystone sectors oriented toward the twenty-first century, an open-market—in which the government enforces a legal framework to ensure that the nation’s markets protect property rights, enforce contracts, and remain uncorrupted by distorting concentrations of power among buyers or sellers—will allocate resources and capital consistent with our long-term strategic requirements. Done well, decisive shifts in each of these pivotal sectors will position America for leadership of the larger transition to global sustainability.

Ultimately, this article seeks to articulate pragmatic policy options, not to develop new economic theory. America has great problems to solve in a very short time frame and we need to harness the economy to do the heavy lifting now. Accordingly, the following policy clusters are focused on solving our great strategic challenge, by illuminating the right combination of sticks and carrots to reset the American economy for a difficult new century.

#### ***Housing and Transportation: Give 'Em What They Want***

At the core of open-market sustainability is America’s best-kept economic secret: a deep source of pent-up private demand that, by demographic happenstance, is perfectly suited to power a new era of sustainable American prosperity.

American demographics, the built environment, and economic strategy were fused by the Cold War. America was going to contain the Soviets so that we could ultimately defeat them in a contest of economic and political systems in which subsidized suburban growth competed with the politburo’s central planning. It worked. The American citizen, secure in his or her future prospects, got married, bought a house, and started having children. In the late 1970s and early 1980s, those children, the baby boom generation, started having kids. Today, those two generations are roughly equal in size, in the neighborhood of 77–78 million people each, together making up half of the U.S. population.

The preferences of these two groups have now pivoted decisively away from the monochrome subdivisions that pervade the American landscape. For the boomers, crossing the symbolic age of 65 means multibedroom, large-lot homes in the distant suburbs, which do not offer the lifestyle this generation wants or needs at this stage. Large homes require too much maintenance and time; car-dependent suburbs become unlivable as driving becomes more difficult or unsafe. With savings and retirement uncertain, boomers need to work longer than their parents. The retirement dreams of their predecessors, whether the sun-baked community in Florida or the golf course home in Hilton Head, are either unaffordable or undesirable.

Millennials, the generation born between 1982 and 2000, were raised in the sterile, disconnected suburbs and have had enough. Seventy-seven percent of this younger generation says they will never go back. With diminished economic prospects, this generation feels it cannot afford to live in communities that require two and three cars to move the family around, which is fine, as they also do not aspire to become chained to the minivan for hours every day.

The peak of these two groups’ overlap in the home-buying market will be from 2014 to 2029. Millennials, starting their families, will be looking for starter houses. Boomers, looking to downsize from their larger single-family homes to something more manageable for a smaller household, will be looking for a similar product in similar places.

That demographic pattern is already being picked up in market surveys. In a consumer preference survey released in March 2011, the National Association of Realtors reports that 56 percent of homebuyers want their next home purchase to have the attributes of smart growth. That is, they want right-sized homes in a broader range of housing types (single-family, townhouse, live-work, condo, and apartment) and they want those homes in walkable, service-rich, transit-oriented, opportunity-dense neighborhoods. In percentage terms, this group is just under three times the volume of returning vets and their new spouses after World War II—more than eight times in absolute numbers. Backstopping that convergence is the U.S. Census Bureau’s estimate

that by 2050 we will add another 130 million people to our nation, which translates roughly to 50 million new households.

Real estate accounts for more than 30 percent of all asset classes and must be engaged to pull out of the deleveraging. Yet, despite the sizable demand for smart growth, only 2 percent of housing starts have the attributes of smart growth, and new homes are only 1 percent of the residential real estate market. Federal subsidies are the source of the bottleneck, reflecting the long-past logic of Cold War survival. Transportation dollars are required to fund highways, 80 percent of whose cost is paid by the federal government. Fannie Mae and Freddie Mac, though more conservative after the crash of 2008, are still underwriting mortgage products that force buyers to drive farther and farther away from city centers to qualify for a home loan.

But the problem is not just with federal policy. Counties on the suburban fringe often see suburban development as the path to increased tax revenue, unaware that after the wave passes through they will be left with a heavy infrastructure burden and a thin tax base. Ironically, after subprime mortgages and high gas prices triggered the Great Recession,<sup>14–16</sup> publicly traded homebuilders were able to go back to Wall Street investors with an argument that, even though home prices had gone down, agricultural land prices had dropped even further, increasing builders' profit margin.

While this massive pool of pent-up private demand sits virtually untapped, Wall Street is resting on an equally large reservoir of liquidity that is looking for "certainty" before investment. Uncertainty comes in many forms, from licensing and regulatory requirements, to the price of carbon, to taxation and market demand ambiguity. A decisive policy that sets a clear framework for investment can tap this pool of capital through a new era of right-sized mortgages, municipal bonds, and equity investment in the businesses building the next American Dream. The prize is larger than any federal stimulus: the Federal Reserve and market research firms estimate that, between corporate cash and institutional investors' money market funds, \$3.6 trillion is waiting for improved conditions for long-term investment.

We already know this will work. In the early 1990s, as part of its strategy of constraining sprawl and keeping its urban core vital, Portland, Oregon, built a \$100 million light-rail network. In the 11 years since the streetcar route was identified, real estate within two blocks of it has attracted more than \$3.5 billion of private investment. The Greater Salt Lake City metropolitan region, a region that voted 67 percent for McCain-Palin in 2008, is another good example. The state and various municipal governments, the chamber of commerce, and stakeholders from across the spectrum came together to figure out how the region was going to double in population while attracting outside investment without diminishing the quality of life. The region chose the most aggressive of the four scenarios they developed, minimizing vehicle miles traveled, preserving farm and wild lands, and saving \$5 billion in local government expenditures over 20 years.

## Housing and Transportation

### ***Mandate Regional Growth Blueprints***

- *Design the future.* Mandate and fund regional growth blueprint efforts requiring stakeholders in metropolitan and micropolitan statistical areas to coordinate land use, housing, transportation, agriculture, energy, water, health care, and education infrastructure planning processes across jurisdictions and agencies.
- *Get it done.* Blueprints must be complete in 18 months, updated every ten years.
- *Make it work.* Require metropolitan blueprints to reduce vehicle miles traveled by 50 percent by 2050, micropolitan and rural areas by 35 percent; and reduce energy transmission losses by 50 percent by 2050.
- *Total cost.* \$1.5 billion, with a 1:1 reduction in the mandated transportation bill. Net new cost: \$0.

### ***Fund the Twenty-First-Century Transportation Network***

- *Go multimodal.* Holding federal gas tax levels steady, unlock funding from the Eisenhower-era priority, highways, allowing federal dollars to support road, rail, bus, air, inland water, bicycle, and pedestrian transportation projects.
- *Focus on blueprint priorities.* Federal transportation dollars support local priorities within the new regional blueprints.
- *Reduce federal matching.* Reduce federal matching funds from 80 percent of major projects to 50 percent, encouraging market discipline and protecting against "bridges to nowhere."
- *Score applications.* Develop a transparent evaluation system to prioritize federal funding of regional blueprint priorities, privileging backbone infrastructure projects for entire regional areas that provide the best combination of mobility, efficiency, and affordability.
- *Total cost.* \$50 billion, with a 1:1 reduction in the surface transportation budget. Net new cost: \$0.

### ***Reset the Private Housing Market***

- *End the bailout.* Limit the cap on total federal “lifeline” support to Fannie Mae and Freddie Mac to \$200 billion, of which \$104 billion has already been spent. Treat any future lifeline support as ten-year.

### ***Farming: From Depletion to Regenerative Agriculture***

"The Nation behaves well if it treats the natural resources as assets which it must turn over to the next generation increased, and not impaired, in value."

—Theodore Roosevelt, 26th president of the United States<sup>17</sup>

The United States cannot become sustainable, nor can we induce global sustainability, without addressing the way we farm here at home. Part of the coming challenge is rising global demand; the International Monetary Fund’s food price index has risen 220 percent since 2000, as Asia’s economy creates more purchasing power seeking a more diverse diet. As another three billion people enter the global middle class over the next 20 years, we are going to have to put as much of the planet’s arable land under cultivation as possible—and do so while restoring our ecosystem, not depleting it. That is going to require a different kind of farming revolution, forging a regenerative agricultural system that meets increasing global demand and provides good jobs, all while restoring our soils, our waterways, and our atmosphere. Increasing global yield is still absolutely necessary, but no longer a sufficient metric of success.

We cannot make this change given the way American farms operate today. At present, the United States uses six calories of hydrocarbon energy to produce one calorie of food energy, meaning that food prices are tied dangerously to oil prices. The water we use for irrigation and the fertilizers we use on the land are also unsustainable. Total federal irrigation subsidies are approximately \$22 billion, while the giant Ogallala Aquifer that irrigates \$20 billion in agricultural products in the Great Plains is being drained at the rate of 18 Colorado Rivers each year—with recharge rates less than one-tenth of 1 percent of withdrawals. Fertilizer-intensive agriculture has led to rapid soil depletion, while nitrogen-rich farm effluent is poisoning our waterways, choking off spawning grounds, estuaries, and shellfisheries.

Depletion and waste on this scale indicate a major market failure. In this case, the failure is a function of policy: agricultural production in the United States is incredibly subsidized and the costs of ecological depletion are external to the market. A Canadian agricultural industry report published in November 2010 estimates that the total value of direct and indirect federal agricultural subsidies amounted to \$180 billion dollars in 2009, or over half of total U.S. farm revenue.<sup>18</sup> This massive government intervention in the farming sector is in part a product of the disproportionate weight given to farming states in the American political system, specifically the electoral college and the Senate. According to Dan Glickman, former U.S. agriculture secretary, the subsidies are “largely an income transfer program.”<sup>19</sup>

It is not just the ecosystem and markets that are affected by the subsidies. Ill-conceived subsidies are at the heart of America’s obesity problem and are undermining the family farm, depleting rural and maritime ecosystems, increasing our carbon emissions, and suppressing agricultural exports from developing nations.

The superiority of regenerative farming is now firmly established: organic agriculture outperforms and outearns conventional industrial farming. In September 2011, the Rodale Institute released the findings of its 30-year study of farming systems.<sup>20</sup> Organic techniques beat conventional methods in every category, most importantly in productivity and in profit per acre. Controlling for premium pricing (the Whole Foods effect), organic production brought in three times as much per acre per year. Equally important, organic production produced slightly better yields than standard industrial techniques. Organic farming is also regenerative, rebuilding soils and retaining 15–20 percent more water, in turn improving drought resistance. These regenerative techniques consume 45 percent less energy and emit 29 percent less carbon than conventional methods.

Combined with the successful development of full-scale biochar, the agricultural sector could sequester up to 20 percent of the carbon that flows through the farming cycle.<sup>21</sup> Biochar, similar to charcoal, is produced when agricultural waste is heated in a low-oxygen environment, locking the carbon in the waste into a stable form for centuries. In addition to sequestration, biochar rebuilds soil volume, nutrient composition, and water retention. Biochar production, however, also produces syngas, a biofuel, up to ten times more efficiently than corn ethanol production per kilojoule of net energy.<sup>22</sup>

A shift from a policy of federally subsidized farmland depletion to regenerative agriculture would allow America’s farming families to lead a prosperous life caring for the land. Farmers would once again be stewards of the soil, rebuilding fertility, sequestering carbon, and protecting our waterways, all while feeding the American people wholesome food. Indeed, such a program would likely bring more American farmers back to the land as less profitable, less efficient, capital-intensive industrial agriculture is

priced out of the market.

## Regenerative Agriculture

### Stop the Addiction

- *End perverse subsidies.* Conclude subsidy programs for irrigation (\$22 billion), the Commodity Credit Corporation (\$24 billion), export subsidies (\$26 billion), direct producer payments (\$10 billion), and the biomass energy tax incentive (\$5 billion). Total cost: \$0, with \$87 billion in savings.
- *Accelerate adoption.* Create a market-friendly, budget-neutral fee/bate (penalty/reward) program to reduce and sequester carbon emissions, to reduce water usage intensity, and to eliminate nutrient waste and leakage. Like the Japanese “Top-Runner” program, highest performing farms set the standard that all producers need to hit within five years. Businesses that outperform the standard get a rebate; those underperforming incur a fee. Total cost: \$0.

### Invest in the Future

- *Finance farm conversion.* With the first \$60 billion in subsidy savings, directly support the conversion of America’s farms from industrial to regenerative systems. Total cost: \$60 billion.
- *Innovate and test rural infrastructure designs.* America’s rural infrastructure is as degraded as the rest of the nation. Smart grids, high-speed freight rail, bulk river transport, and inland and coastal port updates are all necessary. Design transport networks to supply regional needs locally and then export surplus production. Total cost: \$10 billion.
- *Accelerate renewables.* End taxation of grid-connected solar, wind, geothermal, microhydro, and waste-energy cogeneration projects to diversify farm income. Total cost: \$0.
- *Educate innovators.* Increase federal funding to land-grant universities to localize sustainable agriculture production methods and to U.S. Department of Agriculture agricultural extension programs to educate growers about sustainable farming practices tailored to their growing region. Total cost: \$10 billion.
- *Finance the biochar revolution.* Expand and accelerate funding for biochar research and full-scale production. Total cost: \$7 billion.

## Tax Shift: From Taxing Income to Taxing Inefficiency

In 1942, in order to pay for the war effort, the U.S. government extended the income tax from a high-earner tax to a universal tax on income from labor. In 1950, national security advisors recommended to President Truman that the wartime income tax be continued, based on the experience gleaned in World War II, in which a productive, highly employed economy was able to generate considerable revenue for national defense. Today, more than 80 percent of the federal government’s revenue comes from individual income and social insurance taxes, while we subsidize resource consumption, yet another legacy of the inherently industrial strategic challenges of the twentieth century. Reversing the relative prices of labor and resources—taxing waste not wages—takes smart growth and regenerative agriculture to the next level, harnessing them to form an innovation juggernaut that can capture the resource productivity prize for the United States.

Though important 60 years ago, the universal income tax has created perverse incentives, most importantly, an incentive for businesses to conserve labor and waste resources. Under our present-day system of taxing work and subsidizing resource use, total per capita consumption of material in the United States rose by 23 percent from 1975 to 2000. Today, American material flows are 50 percent higher than the average of 15 European nations, and unemployment is chronically high. With 675 million people arriving in Asian cities and an additional 3 billion entering the global middle class over the next 20 years, commodity prices will only continue their steep rise, making resource efficiency the key driver of competitive advantage for businesses and nations alike.

When the relationship between tax and subsidies is as dysfunctional as it is today, the opportunity for a tax shift is clear. With minimal pricing of carbon (\$30 per metric ton of CO<sub>2</sub> equivalent) and unsubsidized water, the McKinsey Global Institute estimates that approximately \$3.3 trillion in resource productivity gains are waiting to be harvested by the private sector.<sup>4</sup> A sustainable tax shift would generate revenue for government operations from material, energy, and natural resource inefficiency—or waste—and reduce the percentage of revenue that comes from traditional sources, most especially individual income, payroll taxes, and business income from small- to medium-size enterprises. Needless to say, reducing the tax burden on hard-working Americans and job-producing small businesses would likely prove popular politically.

Under open-market sustainability, the approach is to shift the tax base to throughputs and away from income and payrolls. Former World Bank economist Herman Daly wrote, “Shifting the tax base onto throughput induces greater throughput efficiency, and internalizes, in a gross, blunt manner the externalities from depletion and pollution.”<sup>23</sup> Different from either a consumption or value-added tax, throughputs are those resources—oil, minerals, fertilizers, or renewable resources like forest products—that are essential material inputs to economic production but not the products themselves.

At a time of domestic recession and low-cost overseas labor competition, reducing the cost of working while supporting small businesses and the entrepreneurs who start them will simultaneously boost employment and innovation. With prices established for keystone resources, prices in the market will reflect our strategic necessity. With a phased and predictable introduction, such a shift will allow the marketplace time to work through which technologies are appropriate, while ensuring that the United States leads the way to a resource productivity revolution. Applied in the context of the simultaneous resets in housing, transportation, and agriculture, under the tax shift, families will be assured of higher-efficiency options to reduce their household footprint, workers will enjoy a strong job market, employees will experience the increase in take-home pay, and industry will be powered by a new engine of innovation and investment around resource productivity. Combined with long-needed tax simplification, the package is positioned to win popular and bipartisan support.

The tax shift described in the “Innovation Tax Shift” sidebar embraces this long-overdue opportunity, creating a predictable schedule of prices that will allow businesses to plan their own strategies to compete and win. Income taxes are ended for 79 percent of Americans, who also receive a break on payroll taxes, while the income cap on social security is lifted. Business income taxation is fixed to encourage the small entrepreneur, with no taxes on firms with less than \$5 million net business income and a flat tax on all other businesses thereafter. Taxing waste provides the first opportunity to price environmental costs in the economy, ending one of the greatest market failures in human history. Toxic releases, water withdrawals, carbon, forest services, and municipal waste all get a starting price that increases over time to push innovators while paying down the national debt.

## **Innovation Tax Shift**

### ***Reward Hard Work***

- *End the universal income tax.* Repeal individual income tax for 79 percent of earners making under \$100,000.
- *Reform social insurance taxes.* Reduce FICA taxes on earners making less than \$100,000 by 40 percent; end the cap on income above \$106,400.
- *Enact a 25-35-45 wealth tax.* End loopholes by taxing adjusted gross income. Then tax incomes of \$100,000–499,999 at 25 percent, \$500,000–\$2,000,000 at 35 percent, \$2,000,000+ at 45 percent.

### ***Help Businesses Succeed***

- *Reward entrepreneurs.* End taxation of businesses with less than \$5 million in net business income.
- *Go flat.* Repeal the graduated business tax and replace it with a flat tax of 35 percent on net business income over \$5 million.

### ***End Perverse Subsidies***

- *Be consistent.* End subsidies for fossil fuels, nuclear, “alternative energy,” and fossil water (groundwater that has been sealed in an aquifer for a long period of time).

### ***Internalize Ecosystem Costs***

- *Fix the market failure.* Phase in taxes on toxic releases, municipal waste, and carbon emissions. Set the starting carbon price at \$83, the price at which all carbon-abatement technologies become profitable. Federally price resource use for forest ecosystem services and nonresidential water draws.

### ***Leverage America’s Market Power***

- *Level the playing field.* Phase in a price on the embedded inefficiency in imported goods, equivalent to the increased prices set in the domestic U.S. market.



- *Use trade to promote sustainability.* Encourage all nations to exercise the World Trade Organization's Article XX to advance resource productivity. A cornerstone of the free-trade system overseen by the World Trade Organization, Article XX allows members to establish a price on imports "to protect human, animal or plant life or health," or to address threats "relating to the conservation of exhaustible natural resources if such measures are made effective in conjunction with restrictions on domestic production or consumption."<sup>24</sup>

## Potential Impact

Resetting the U.S. economic engine along the lines of open-market sustainability should have outsized positive impacts on jobs, national security, health, innovation, and the global ecosystem.

### **Jobs, Jobs, Jobs**

At the time of writing, approximately 14 million Americans are unemployed and another 11 million underemployed. Open-market sustainability, by resetting the market to build a demand-driven new American Dream, should return American unemployment rates to the 4.9 percent average of the boom period of the last market reset, from 1950 to 1968. The last time the United States enjoyed this level of unemployment was in April 2008. Using this calculation, we can anticipate an increase in 6.5 million jobs with the current U.S. population, and if we extrapolate to those marginally attached to the labor force, we can estimate a reduction in the underemployed by an additional 5 million.<sup>25</sup>

This level of job creation is conservative but consistent with other calculations of the level of jobs produced through macro policy changes. Economists Alan Blinder and Mark Zandi estimate that the \$1.8 trillion in fiscal response after the financial crisis of 2008 created 10 million jobs.<sup>26</sup> The Apollo Alliance's 2008 *New Apollo Program* report estimated that \$500 billion of new spending in the clean tech sector would yield 5 million high-wage jobs.<sup>27</sup>

Actual results will likely be stronger. The tax shift will begin to change the relationship between the price of labor and the price of resources, encouraging businesses to employ more of the former and less of the latter. Furthermore, the three components of the market reset—smart growth, regenerative agriculture, and the tax shift—together will activate considerably more private and foreign capital than the Apollo Alliance prescribes in federal largesse. There is \$3.6 trillion sitting on the sidelines of Wall Street waiting to be invested. If the market reset described here only activated half of that pool, or \$1.8 trillion, a straight-line estimate would give 10–18 million new jobs just from adopting smart growth. Further, the total income returned to taxpayers would amount to slightly more than \$1 trillion, implying another 5 million jobs created, given that the majority of these citizens will spend, not save, that savings.

### **Carbon**

For the purposes of this exercise, James Hansen's target of 350 parts per million of atmospheric carbon is the planetary goal. Hansen and his colleagues articulated the broad outline of what it will take to achieve this goal:

A practical global strategy almost surely requires a rising global price on CO<sub>2</sub> emissions and phase-out of coal use except for cases where the CO<sub>2</sub> is captured and sequestered. The carbon price should eliminate use of unconventional fossil fuels, unless, as is unlikely, the CO<sub>2</sub> can be captured. A reward system for improved agricultural and forestry practices that sequester carbon could remove the current CO<sub>2</sub> overshoot. With simultaneous policies to reduce non-CO<sub>2</sub> greenhouse gases, it appears still feasible to avert catastrophic climate change.<sup>28</sup>

Setting an effective price on carbon in the United States first requires executing a market reset that places both the built environment and the agricultural sector on more prosperous and sustainable footing. With the nation reoriented to exploit today's substantial pool of demand for smart growth, establishing a price on carbon and resource inefficiency generally can become a driver of prosperity and innovation, not a drag on GDP.

All three components of this strategy, however, will have substantial impacts on our carbon emissions, not just the advent of a carbon price. Smart growth will greatly reduce transportation and building emissions, which together account for 62 percent of U.S. emissions. The policies articulated here would require metropolitan regions to reduce vehicle miles traveled by 50 percent while incentivizing the construction of green buildings or deep renovation of existing buildings. While architects such as William McDonough and others demonstrated years ago the ability to produce zero-emitting residential and commercial buildings, the Leadership in Energy and Environmental Design (LEED) criteria have achieved high-end market acceptance of designs that reduce emissions by up to 39 percent. This would render an off-the-shelf reduction of 1.55 gigatons of annual emissions, or

approximately 27 percent of U.S. emissions.

Regenerative agriculture on its own, similarly, could reduce agricultural emissions by 29 percent over business as usual, according to the latest Rodale Institute findings.<sup>20</sup> Taking biochar to scale, however, has the potential to sequester a full 30 percent of total U.S. carbon emissions, while accelerating the restoration of soil volume, fertility, and water retention and reducing eutrophication of our waterways. Together, the total would be approximately 1.83 gigatons of CO<sub>2</sub> equivalent, or an additional 33 percent reduction in U.S. emissions.

The tax shift will do the rest, making markets work for America's long-term health. While smart growth and regenerative agriculture policies will act as "pulls" in the market—offering better products to consumers—new waste pricing, led by a carbon price, will act as a push. Pricing municipal waste, toxic releases, forest ecosystem services, and nonmunicipal water draws will reinforce the market reset, driving a new era of innovation for sustainability.

Specifically, the carbon tax would start in the first year with an \$83 per metric ton price on CO<sub>2</sub> equivalent and ratchet up \$15 each year. This starting price was chosen based on McKinsey Global Institute estimates that all carbon-abatement technologies will break even and allow for profitable reductions of the full 38 gigatons of carbon emissions.<sup>29</sup> At this rate, the average annual family car gas bill would increase \$416 and home electricity costs would go up \$537. These costs would then be offset with an elimination of income tax on households making less than \$100,000 and a nearly 40 percent reduction in the employee payroll tax for the same group. A family of four living on the median annual income of \$50,000 would see a net boost of over \$2,200 dollars, not to mention an improved employment outlook.

By 2030, carbon reductions attributable to the tax would come in at 3.9 gigatons below the business as usual carbon total for that year. Combined with smart growth and regenerative agriculture, we would be well on our way to ensure America's contribution to achieve 350 parts per million of atmospheric carbon. With a leveling price on imported goods, these domestic policies will signal to our trading partners the arrival of the postcarbon era and provide a powerful platform for a new era of American leadership.

## **Health**

One of the most exciting findings in recent years came from the Centers for Disease Control and Prevention (CDC). In a 2007 evaluation of smart growth, the CDC stated that individuals living in smart-growth communities would see a dramatic reduction in heart disease, obesity, social isolation, and asthma.<sup>30</sup> Part of this is due to the transition from a car-dependent lifestyle to a walking lifestyle. Furthermore, smart-growth policies, by creating walkable village centers, re-create the economic logic—foot traffic—for small grocers and outdoor markets, along with additional time to acquire and prepare fresh food. Not only would overall health improve, but health-care costs would go down considerably, reducing insurance premiums.

While the human and household impact is primary, the productivity lost to poor health is enormous. Total lost economic output from heart disease and diabetes alone amounts to \$385 billion dollars per year. In the scheme described here, hypertension would be reduced as diets improve and exercise increases. Mental disorders due to social isolation, especially critical with aging patients, would diminish as communities are reknit. Cancers, many of which are triggered by exposure to environmental carcinogens, would be reduced as toxic releases fall. Together, these three chronic diseases cost American businesses \$722 billion in lost output.

Smart growth presents a big opportunity for health-care cost containment in what is called team-based care coordination. Pioneered by the Cleveland Clinic, team-based care is an approach where a patient is served by a team of medical professionals who work in the same primary-care location. Recent experiments in the United States have shown that team-based coordination of primary care can reduce hospitalizations of the high-cost chronically-ill by as much as 40 percent.<sup>31</sup> Implementing this approach across the nation through primary-care facilities located in new walkable communities could save additional hundreds of billions of dollars for patients, insurers, and the federal government.

### **Super Committee Results**

If the complete policy package for open-market sustainability were to be implemented simultaneously and scored against the deficit-reduction "Super Committee" test, preliminary budget estimates (based on OMB,<sup>32</sup> IRS,<sup>33</sup> and Treasury Department<sup>34</sup> data) over the ten-year period, and assuming the mandatory \$400 billion in ten-year defense sector savings, it would yield the following deficit reduction: \$1.75 trillion.

## **Conclusion: Strategic Innovation**

The three core components of open-market sustainability—smart growth, regenerative agriculture, and a tax shift—individually represent significant gains to prosperity, well-being, and sustainability. Working together, however, they become the world's most powerful engine of innovation, aligning market prices with our global objectives.

Once these three strategies are firmly rooted, scheduled calibration through tax policy will drive ever-higher levels of resource productivity—productivity we need to achieve to hit our strategic objectives. By gradually increasing efficiency standards over a predictable schedule, tax policy, rather than stimulus or the mythical “invisible hand,” can drive resource productivity and launch a new era of materials science and manufacturing processes, along with the profitable business models that flow from them.

Harnessing our market democracy to drive innovation aligned with our strategic imperatives is what made America a leader among nations. In World War II, our assembly lines outproduced two continental empires—simultaneously. In the Cold War, the American Dream was the envy of the world. Our space program defined the future and changed how humanity understands itself. And we turned a requirement for communications that could survive nuclear war into the Internet and revolutionized human relations. Global unsustainability, the great challenge of the twenty-first century, requires only that we tap into this greatest of American traditions once again.

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