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# Building a Sustainable and Desirable Economy-in-Society-in-Nature

*Robert Costanza, Gar Alperovitz, Herman Daly, Joshua Farley, Carol Franco, Tim Jackson, Ida Kubiszewski, Juliet Schor, and Peter Victor*

**Robert Costanza** is a visiting fellow in the Crawford School of Public Policy, Australian National University. **Gar Alperovitz** is Lionel R. Bauman Professor of Political Economy at the University of Maryland. **Herman Daly** is professor emeritus in the School of Public Policy at the University of Maryland. **Joshua Farley** is an associate professor in the Department of Community Development & Applied Economics and Public Administration at the University of Vermont. **Carol Franco** is a project administrator at the Woods Hole Research Center. **Tim Jackson** is a professor of sustainable development at the University of Surrey, United Kingdom. **Ida Kubiszewski** is a visiting fellow in the Crawford School of Public Policy, Australian National University. **Juliet Schor** is a professor of sociology at Boston College. **Peter Victor** is a professor in the Faculty of Environmental Studies at York University.

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The current mainstream model of the global economy is based on a number of assumptions about the way the world works, what the economy is, and what the economy is for. (See Table 11–1.) These assumptions arose in an earlier period, when the world was relatively empty of humans and their artifacts. Built capital was the limiting factor, while natural capital was abundant. It made sense not to worry too much about environmental “externalities,” since they could be assumed to be relatively small and ultimately solvable. It also made sense to focus on the growth of the market economy, as measured by gross domestic product (GDP), as a primary means to improve human welfare. And it made sense to think of the economy as only marketed goods and services and to think of the goal as increasing the amount of these that were produced and consumed.<sup>1</sup>

Now, however, we live in a radically different world—one that is relatively full of humans and their built capital infrastructure. We need to reconceptualize what the economy is and what it is for. We have to first remember that the goal of any economy should be to sustainably improve human well-being and quality of life and that material consumption and GDP are merely means to that end. We have to recognize, as both ancient wisdom and new psychological research tell us, that too much of a focus on material consumption can actually reduce human well-being. We have to understand better what really does contribute to sustainable human well-being and recognize the substantial contributions of natural and social capital, which are now the limiting factors to improving well-being in many countries. We have to be able to distinguish between real poverty, in terms of low quality of life, and low monetary income. Ultimately we have to create a new model of the economy that acknowledges this new “full-world” context and vision.<sup>2</sup>

Some people argue that relatively minor adjustments to the current

**Table 11–1. Basic Characteristics of Current Economic Model, Green Economy Model, and Ecological Economics Model**

	<b>Current Economic Model</b>	<b>Green Economy Model</b>	<b>Ecological Economics Model</b>
<b>Primary policy goal</b>	<b>More:</b> Economic growth in the conventional sense, as measured by GDP. The assumption is that growth will ultimately allow the solution of all other problems. More is always better.	<b>More but with lower environmental impact:</b> GDP growth decoupled from carbon and from other material and energy impacts.	<b>Better:</b> Focus must shift from merely growth to “development” in the real sense of improvement in sustainable human well-being, recognizing that growth has significant negative by-products.
<b>Primary measure of progress</b>	GDP	Still GDP, but recognizing impacts on natural capital.	Index of Sustainable Economic Welfare, Genuine Progress Indicator, or other improved measures of real welfare.
<b>Scale/carrying capacity/role of environment</b>	Not an issue, since markets are assumed to be able to overcome any resource limits via new technology, and substitutes for resources are always available.	Recognized, but assumed to be solvable via decoupling.	A primary concern as a determinant of ecological sustainability. Natural capital and ecosystem services are not infinitely substitutable, and real limits exist.
<b>Distribution/poverty</b>	Given lip service, but relegated to “politics” and a “trickle-down” policy; a rising tide lifts all boats.	Recognized as important, assumes greening the economy will reduce poverty via enhanced agriculture and employment in green sectors.	A primary concern, since it directly affects quality of life and social capital and is often exacerbated by growth: a too rapidly rising tide only lifts yachts, while swamping small boats.
<b>Economic efficiency/allocation</b>	The primary concern, but generally including only marketed goods and services (GDP) and market institutions.	Recognized to include natural capital and the need to incorporate its value into market incentives.	A primary concern, but including both market and nonmarket goods and services and the effects. Emphasis on the need to incorporate the value of natural and social capital to achieve true allocative efficiency.
<b>Property rights</b>	Emphasis on private property and conventional markets.	Recognition of the need for instruments beyond the market.	Emphasis on a balance of property rights regimes appropriate to the nature and scale of the system, and a linking of rights with responsibilities. Includes larger role for common-property institutions.
<b>Role of government</b>	Government intervention to be minimized and replaced with private and market institutions.	Recognition of the need for government intervention to internalize natural capital.	Government plays a central role, including new functions as referee, facilitator, and broker in a new suite of common-asset institutions.
<b>Principles of governance</b>	Laissez-faire market capitalism.	Recognition of the need for government.	Lisbon principles of sustainable governance.

Source: See endnote 1.

economic model will produce the desired results. For example, they maintain that by adequately pricing the depletion of natural capital (such as putting a price on carbon emissions) we can address many of the problems of the current economy while still allowing growth to continue. This approach can be called the “green economy” model. Some of the areas of intervention promoted by its advocates, such as investing in natural capital, are necessary and should be pursued. But they are not sufficient to achieve sustainable human well-being. We need a more fundamental change, a change of our goals and paradigm.<sup>3</sup>

Both the shortcomings and the critics of the current model are abundant—and many of them are described in this book. A coherent and viable alternative is sorely needed. This chapter aims to sketch a framework for a new model of the economy based on the worldview and following principles of ecological economics:<sup>4</sup>

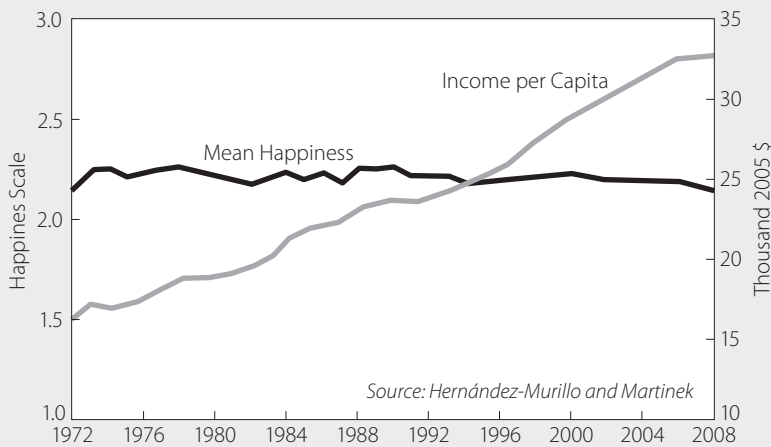
- Our material economy is embedded in society, which is embedded in our ecological life-support system, and we cannot understand or manage our economy without understanding the whole interconnected system.
- Growth and development are not always linked, and true development must be defined in terms of the improvement of sustainable human well-being, not merely improvement in material consumption.
- A balance of four basic types of assets is necessary for sustainable human well-being: built, human, social, and natural capital (financial capital is merely a marker for real capital and must be managed as such).
- Growth in material consumption is ultimately unsustainable because of fundamental planetary boundaries, and such growth is or eventually becomes counterproductive (uneconomic) in that it has negative effects on well-being and on social and natural capital.

There is a substantial and growing body of new research on what actually contributes to human well-being and quality of life. Although there is still much ongoing debate, this new science clearly demonstrates the limits of conventional economic income and consumption’s contribution to well-being. For example, economist Richard Easterlin has shown that well-being tends to correlate well with health, level of education, and marital status and shows sharply diminishing returns to income beyond a fairly low threshold. Economist Richard Layard argues that current economic policies are not improving well-being and happiness and that “happiness should become the goal of policy, and the progress of national happiness should be measured and analyzed as closely as the growth of GNP (gross national product).”<sup>5</sup>

In fact, if we want to assess the “real” economy—all the things that contribute to real, sustainable, human well-being—as opposed to only the “market” economy, we have to measure and include the nonmarketed

contributions to human well-being from nature, from family, friends, and other social relationships at many scales, and from health and education. Doing so often yields a very different picture of the state of well-being than may be implied by growth in per capita GDP. Surveys, for instance, have found people's life satisfaction to be relatively flat in the United States (see Figure 11–1) and many other industrial countries since about 1975, in spite of a near doubling in per capita income.<sup>6</sup>

**Figure 11–1. Happiness and Real Income in the United States, 1972–2008\***



\* Mean happiness is the average reply from respondents to the U.S. General Social Survey when asked, "Taken all together, how would you say things are these days? Would you say that you are not too happy [1], pretty happy [2], or very happy [3]?"

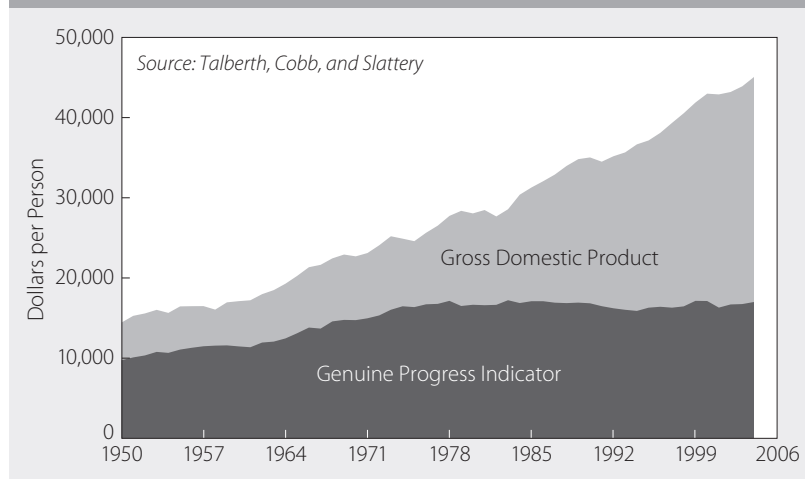
A second approach is an aggregate measure of the real economy that has been developed as an alternative to GDP, called the Index of Sustainable Economic Well-Being, or a variation called the Genuine Progress Indicator (GPI). The GPI attempts to correct for the many shortcomings of GDP as a measure of true human well-being. For example, GDP is not just limited—measuring only marketed economic activity or gross income—it also counts all activity as positive. It does not separate desirable, well-being-enhancing activity from undesirable, well-being-reducing activity. An oil spill increases GDP because someone has to clean it up, but it obviously detracts from society's well-being. From the perspective of GDP, more crime, sickness, war, pollution, fires, storms, and pestilence are all potentially good things because they can increase marketed activity in the economy.<sup>7</sup>

GDP also leaves out many things that actually do enhance well-being but that are outside the market, such as the unpaid work of parents caring

for their children at home or the nonmarketed work of natural capital in providing clean air and water, food, natural resources, and other ecosystem services. And GDP takes no account of the distribution of income among individuals, even though it is well known that an additional dollar of income produces more well-being if a person is poor rather than rich.

The GPI addresses these problems by separating the positive from the negative components of marketed economic activity, adding in estimates of the value of nonmarketed goods and services provided by natural, human, and social capital and adjusting for income-distribution effects. Comparing GDP and GPI for the United States, Figure 11–2 shows that while GDP has steadily increased since 1950, with the occasional dip or recession, the GPI peaked in about 1975 and has been flat or gradually decreasing ever since. The United States and several other industrial countries are now in a period of what might be called uneconomic growth, in which further growth in marketed economic activity (GDP) is actually reducing well-being, on balance, rather than enhancing it.<sup>8</sup>

**Figure 11–2. Gross Domestic Product and Genuine Progress Indicator, United States, 1950–2004**



A new model of the economy consistent with our new full-world context would be based clearly on the goal of sustainable human well-being. It would use measures of progress that openly acknowledge this goal (for example, GPI instead of GDP). It would acknowledge the importance of ecological sustainability, social fairness, and real economic efficiency.

One way to interrelate the goals of the new economy is by combining planetary boundaries as the “environmental ceiling” with basic human needs as the “social foundation.” This creates an environmentally sustainable,

socially desirable and just space within which humanity can thrive. (See Chapter 3.)<sup>9</sup>

## A Framework for a New Economy

A report prepared for the United Nations Rio+20 Conference described in detail what a new economy-in-society-in-nature might look like. A number of other groups—for example, the Great Transition initiative and the Future We Want—have performed similar exercises. All are meant to reflect the essential broad features of a better, more-sustainable world, but it is unlikely that any particular one of these will emerge wholly intact from efforts to reach that goal. For that reason, and because of space limitations, those visions will not be described here. This chapter instead lays out the changes in policy, governance, and institutional design that are needed in order to achieve any of these sustainable and desirable futures.<sup>10</sup>

The key to achieving sustainable governance in the new, full-world context is an integrated approach—across disciplines, stakeholder groups, and generations—whereby policymaking is an iterative experiment acknowledging uncertainty, rather than a static “answer.” Within this paradigm, six core principles—known as the Lisbon principles following a 1997 conference in Lisbon and originally developed for sustainable governance of the oceans—embody the essential criteria for sustainable governance and the use of common natural and social capital assets:<sup>11</sup>

- *Responsibility.* Access to common asset resources carries attendant responsibilities to use them in an ecologically sustainable, economically efficient, and socially fair manner. Individual and corporate responsibilities and incentives should be aligned with each other and with broad social and ecological goals.
- *Scale-matching.* Problems of managing natural and social capital assets are rarely confined to a single scale. Decisionmaking should be assigned to institutional levels that maximize ecological input, ensure the flow of information between institutional levels, take ownership and actors into account, and internalize social costs and benefits. Appropriate scales of governance will be those that have the most relevant information, can respond quickly and efficiently, and are able to integrate across scale boundaries.
- *Precaution.* In the face of uncertainty about potentially irreversible impacts on natural and social capital assets, decisions concerning their use should err on the side of caution. The burden of proof should shift to those whose activities potentially damage natural and social capital.
- *Adaptive management.* Given that some level of uncertainty always exists in common asset management, decisionmakers should continuously gather and integrate appropriate ecological, social, and economic information with the goal of adaptive improvement.

- *Full-cost allocation.* All of the internal and external costs and benefits, including social and ecological, of alternative decisions concerning the use of natural and social capital should be identified and allocated, to the extent possible. When appropriate, markets should be adjusted to reflect full costs.
- *Participation.* All stakeholders should be engaged in the formulation and implementation of decisions concerning natural and social capital assets. Full stakeholder awareness and participation contributes to credible, accepted rules that identify and assign the corresponding responsibilities appropriately.

This section describes examples of worldviews, institutions and institutional instruments, and technologies that can help the world move toward the new economic paradigm.<sup>12</sup>

**Respecting Ecological Limits.** Once society has accepted the worldview that the economic system is sustained and contained by our finite global ecosystem, it becomes obvious that we must respect ecological limits. This requires that we understand precisely what these limits entail and where economic activity currently stands in relation to them.

A key category of ecological limit is dangerous waste emissions, including nuclear waste, particulates, toxic chemicals, heavy metals, greenhouse gases (GHGs), and excess nutrients. The poster child for dangerous wastes is greenhouse gases, as excessive stocks of them in the atmosphere are disrupting the climate. Since most of the energy currently used for economic production comes from fossil fuels, economic activity inevitably generates flows of GHGs into the atmosphere. Ecosystem processes such as plant growth, soil formation, and dissolution of carbon dioxide (CO<sub>2</sub>) in the ocean can sequester CO<sub>2</sub> from the atmosphere. But when flows into the atmosphere exceed flows out of the atmosphere, atmospheric stocks accumulate. This represents a critical ecological threshold, and exceeding it risks runaway climate change with disastrous consequences. At a minimum, then, for any type of waste where accumulated stocks are the main problem, emissions must be reduced below absorption capacity.

Current atmospheric CO<sub>2</sub> stocks are well over 390 parts per million, and there is already clear evidence of global climate change in current weather patterns. Moreover, the oceans are beginning to acidify as they sequester more CO<sub>2</sub>. Acidification threatens the numerous forms of oceanic life that form carbon-based shells or skeletons, such as mollusks, corals, and diatoms. In short, the weight of evidence suggests that we have already exceeded the critical ecological threshold for atmospheric GHG stocks. (See Chapter 2.) This means that we must reduce flows by more than 80 percent or increase sequestration until atmospheric stocks are reduced to acceptable levels. If we accept that all individuals are entitled to an equal share of CO<sub>2</sub>



absorption capacity, then the wealthy nations need to reduce net emissions by 95 percent or more.<sup>13</sup>

Another category of ecological limit entails renewable-resource stocks, flows, and services. All economic production requires the transformation of raw materials provided by nature, including renewable resources (for example, trees). To a large extent, society can choose the rate at which it harvests these raw materials—that is, cuts down trees. Whenever extraction rates of renewable resources exceed their regeneration rates, however, stocks decline. Eventually, the stock of trees (the forest) will no longer be able to regenerate. So the first rule for renewable-resource stocks is that extraction rates must not exceed regeneration rates, thus maintaining the stocks to provide appropriate levels of raw materials at an acceptable cost.

But a forest is not just a warehouse of trees; it is an ecosystem that generates critical services, including life support for its inhabitants. These services are diminished when the structure is depleted or its configuration is changed. So another rule guiding resource extraction and land use conversion is that they must not threaten the capacity of the ecosystem stock or fund to provide essential services. Our limited understanding of ecosystem structure and function and the dynamic nature of ecological and economic systems mean that this precise point may be difficult to determine. However, it is increasingly obvious that the extraction of many resources to drive growth has already gone far beyond this point. Rates of resource extraction must therefore be reduced to below regeneration rates in order to restore ecosystem funds to desirable levels.

***Protecting Capabilities for Flourishing.*** In a zero-growth or contracting economy, working-time policies that enable equitable sharing of the available work are essential to achieve economic stability and to protect people's jobs and livelihoods. Reduced working hours can also increase people's ability to flourish by improving the work/life balance, and there is evidence that working fewer hours can reduce consumption-related environmental impacts. Specific policies should include greater choice for employees about working time; measures to combat discrimination against part-time work as regards grading, promotion, training, security of employment, rate of pay, health insurance, and so on; and better incentives to employees (and flexibility for employers) for family time, parental leave, and sabbatical breaks.<sup>14</sup>

Systemic social inequality can likewise undermine the capacity to flourish. It expresses itself in many forms besides income inequality, such as life expectancy, poverty, malnourishment, and infant mortality. Inequality can also drive other social problems (such as overconsumption), increase anxiety, undermine social capital, and expose lower-income households to higher morbidity and lower life satisfaction.<sup>15</sup>

The degree of inequality varies widely from one sector or country to another. In the U.S. civil service, military, and university sectors, for example, income inequality ranges within a factor of 15 or 20 between the highest and lowest paying jobs. Corporate America has a range of 500 or more. Many industrial nations are below 25.<sup>16</sup>

A sense of community—which is necessary for democracy—is hard to maintain across such vast income differences. The main justification for such differences has been that they stimulate growth, which will one day filter down, making everyone rich. But in today’s full world, with its steady-state or contracting economy, this is unrealistic. And without aggregate growth, poverty reduction requires redistribution.

Fair limits to the range of inequality need to be determined—that is, a minimum and a maximum income. Studies have shown that most adults would be willing to give up personal gain in return for reducing inequality they see as unfair. Redistributive mechanisms and policies could include revising income tax structures, improving access to high-quality education, introducing anti-discrimination legislation, implementing anti-crime measures and improving the local environment in deprived areas, and addressing the impact of immigration on urban and rural poverty. New forms of cooperative ownership (as in the Mondragón model) or public ownership, as is common in many European nations, can also help lower internal pay ratios.<sup>17</sup>

The dominance of markets and property rights in allocating resources also can impair communities’ capacity to flourish. Private property rights are established when resources can be made “excludable”—that is, when one person or group can use a resource while denying access to others. But many resources essential to human welfare are “non-excludable,” meaning that it is difficult or impossible to exclude others from access to them. Examples include oceanic fisheries, timber from unprotected forests, and numerous ecosystem services, including waste absorption capacity for unregulated pollutants.

Absent property rights, resources are “open access”—anyone may use them, whether or not they pay. However, individual owners of property rights are likely to overexploit or underprovide the resource, imposing costs on others, which is unsustainable, unjust, and inefficient. Private property rights also favor the conversion of ecosystem stocks into market products regardless of the difference in contributions that ecosystems and market products have to human welfare. The incentives are to privatize benefits and socialize costs.

One solution to these problems, at least for some resources, is common ownership. A commons sector, separate from the public or private sector, can hold property rights to resources created by nature or society as a whole

and manage them for the equal benefit of all citizens, present and future. Contrary to wide belief, the misleadingly labeled “tragedy of the commons” results from no ownership or open access to resources, not common ownership. Abundant research shows that resources owned in common can be effectively managed through collective institutions that assure cooperative compliance with established rules.<sup>18</sup>

Finally, flourishing communities will be supported and maintained by the social capital built by a strong democracy. A strong democracy is most easily understood at the level of community governance, where all citizens are free (and expected) to participate in all political decisions affecting the community. Broad participation requires the removal of distorting influences like special interest lobbying and funding of political campaigns. The process itself helps to satisfy myriad human needs, such as enhancing people’s understanding of relevant issues, affirming their sense of belonging and commitment to the community, offering opportunity for expression and cooperation, and strengthening the sense of rights and responsibilities. Historical examples (though participation was restricted to elites) include the town meetings of New England and the system of ancient Athenians.<sup>19</sup>

***Building a Sustainable Macroeconomy.*** The central focus of macroeconomic policies is typically to maximize economic growth; lesser goals include price stabilization and full employment. If society instead adopts the central economic goal of sustainable human well-being, macroeconomic policy will change radically. The goals will be to create an economy that offers meaningful employment to all and that balances investments across the four types of capital to maximize well-being. Such an approach would lead to fundamentally different macroeconomic policies and rules.

A key leverage point is the current monetary system, which is inherently unsustainable. Most of the money supply is a result of what is known as fractional reserve banking. (See Box 11–1.) Banks are required by law to retain a percentage of every deposit they receive; the rest they loan at interest. However, loans are then deposited in other banks, which in turn can lend out all but the reserve requirement. The net result is that the new money issued by banks, plus the initial deposit, will be equal to the initial deposit divided by the fractional reserve. For example, if a government credits \$1 million to a bank and the fractional reserve requirement is 10 percent, banks can create \$9 million in new money, for a total money supply of \$10 million. In this way, most money is today created as interest-bearing debt. Total debt in the United States—adding together consumers, businesses, and the government—is about \$50 trillion. This is the source of the national money supply.<sup>20</sup>

There are several serious problems with this system. First, it is highly destabilizing. When the economy is booming, banks will be eager to loan money and investors will be eager to borrow, which leads to a rapid increase

### Box 11–1. The Social Costs of the U.S. Banking System

In recent decades the United States has seen the eclipse of banking regulations, leading to a radical concentration of money power in too-big-to-fail banks and Wall Street generally. In 1994, the five largest U.S. banks held 12 percent of total U.S. deposits. By 2009 they held nearly 40 percent. The country's 20 largest banks control almost 60 percent of bank assets. Market concentration is even higher in other banking-type businesses, such as credit cards, debt and equity underwriting, and derivatives trading. Many of America's earlier leaders warned against such concentration of power in the hands of a financial elite. As Thomas Greco notes in *The End of Money and the Future of Civilization*, "Thomas Jefferson said, 'I sincerely believe . . . that banking establishments are more dangerous than standing armies.'"

Today banks are required to hold deposits that are only a small fraction—less than 10 percent—of the loans they make. Anyone who takes on debt is creating new money. Banks do not actually lend money; they create promises to supply money they do not possess. Mary Mellor has summed up the resulting situation: "The most important outcome of the dominance of bank issued money is that the supply of money is largely in private hands determined by commercial decisions, while the state retains responsibility for managing and supporting the system, as has become clear through the [2008] financial crisis." In the United States, the Federal Reserve can powerfully influence the supply and hence the price of money, but private banks decide how much to lend and where to lend it. The capital allocation process has become far removed from institutions that serve the public interest and is instead dominated by institutions and individuals seeking only to maximize profits.

The evidence is already abundant that today's system of money and finance cannot deliver a fair and sustaining economy. Its transformation is an integral, essential aspect of the overall transition to a new economy. Otto Scharmer of the Massachusetts Institute of Technology explains why: "Today we have a system that accumulates an oversupply of money and capital in areas that produce high financial and low environmental and social returns, while at the same time we have an undersupply of money and capital in areas that serve important societal and community investment needs (high social and low financial returns, such as the education of children in low-income communities)." Among other urgently needed reforms, economist Herman Daly has recommended returning the power to create money to government by abandoning today's fractional-reserve banking and moving to a 100 percent reserve requirement on demand deposits. Banks would lend time deposits, and the depositor would not have access to the money for the period of the deposit. The lending bank would have to count on new and renewing short-term time deposits or on long-term time deposits. These requirements would eliminate the bank's ability to create new money. As needed, government would create new money instead. As Daly explains, "This would put control of the money supply and seigniorage (profit made by the issuer of fiat money) in hands of the government rather than private banks, which would no longer be able to live the alchemist's dream by creating money out of nothing and lending it at interest."

—James Gustave Speth

Professor of Law, Vermont Law School

Source: See endnote 20.

in money supply. This stimulates further growth, encouraging more lending and borrowing, in a positive feedback loop. A booming economy stimulates firms and households to take on more debt relative to the income flows they use to repay the loans. This means that any slowdown in the economy makes it very difficult for borrowers to meet their debt obligations. Eventually some borrowers are forced to default. Widespread default eventually creates a self-reinforcing downward economic spiral, leading to recession or worse.

Second, the current system steadily transfers resources to the financial sector. Borrowers must always pay back more than they borrowed. At 5.5 percent interest, homeowners will be forced to pay back twice what they borrowed on a 30-year mortgage. Conservatively speaking, interest on the \$50 trillion total debt (in 2009) of the United States must be at least \$2.5 trillion a year, one sixth of national output.<sup>21</sup>

Third, the banking system will only create money to finance market activities that can generate the revenue required to repay the debt plus interest. Since the banking system currently creates far more money than the government, this system prioritizes investments in market goods over public goods, regardless of the relative rates of return to human well-being.

Fourth, and most important, the system is ecologically unsustainable. Debt, which is a claim on future production, grows exponentially, obeying the abstract laws of mathematics. Future production, in contrast, confronts ecological limits and cannot possibly keep pace. Interest rates exceed economic growth rates even in good times. Eventually, the exponentially increasing debt must exceed the value of current real wealth and potential future wealth, and the system collapses.

To address this problem, the public sector must reclaim the power to create money, a constitutional right in the United States and most other countries, and at the same time take away from the banks the right to do so by gradually moving toward 100-percent fractional-reserve requirements.

A second key lever for macroeconomic reform is tax policy. Conventional economists generally look at taxes as a necessary but significant drag on economic growth. However, taxes are an effective tool for internalizing negative externalities into market prices and for improving income distribution.

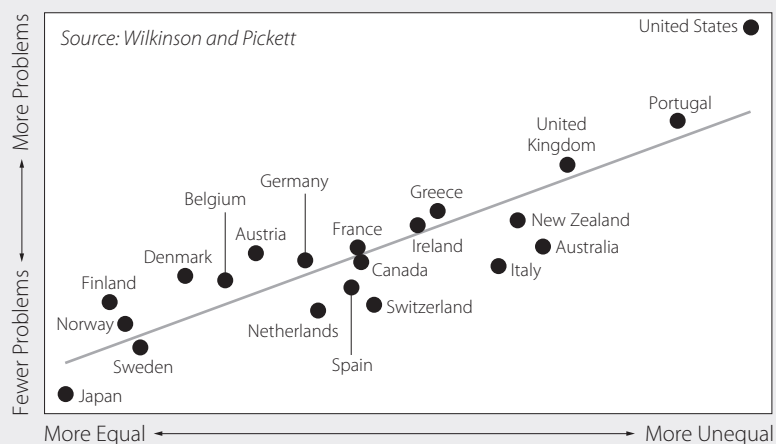
A shift in the burden of taxation from value added (economic “goods,” such as income earned by labor and capital) to throughput flow (ecological “bads,” such as resource extraction and pollution) is critical for shifting toward sustainability. Such a reform would internalize external costs, thus increasing efficiency. Taxing the origin and narrowest point in the throughput flow—for example, oil wells rather than sources of CO<sub>2</sub> emissions—induces more-efficient resource use in production as well as consumption and facilitates monitoring and collection. Such taxes could be introduced in a revenue-neutral way, for example by phasing in resource severance taxes while phasing out regressive taxes such as those on payrolls or sales.<sup>22</sup>

Taxes should also be used to capture unearned income (rent, in economic parlance). Green taxes are a form of rent capture, since they charge for the private use of resources created by nature. But there are many other sources of unearned income in society. For example, if a government builds a light rail or subway system—more-sustainable alternatives to private cars—adjacent land values typically skyrocket, providing a windfall profit for

landowners. New technologies also increase the value of land, due to its role as an essential input into all production. Because the supply of land is fixed, any increase in demand results in an increase in price. Landowners therefore automatically grow wealthier independent of any investments in the land. High taxes on land values (but not on improvements, such as buildings) allow the public sector to capture this unearned income. Public ownership through land trusts and other means also allows for public capture of the unearned income and eliminates any reward from land speculation, thus stabilizing the economy.<sup>23</sup>

Tax policy can also be used to reduce income inequality. (See Figure 11–3.) Taxing the highest incomes at high marginal rates has been shown to significantly reduce income inequality. There is also a strong correlation between tax rates and social justice. (See Figure 11–4.) High tax rates that contribute to income equality appear to be closely related to human well-being. This suggests that tax rates should be highly progressive, perhaps asymptotically approaching 100 percent on marginal income. The measure of tax justice should not be how much is taxed away but rather how much income remains after taxes. For example, hedge fund manager John Paulson earned \$4.9 billion in 2010. If Paulson had to pay a flat tax of 99 percent, he would still retain nearly \$1 million per week in income.<sup>24</sup>

**Figure 11–3. Relationship between Income Inequality and Social Problems Score in Selected Industrial Countries**



Other policies for achieving financial and fiscal prudence will almost certainly be required as well. Our relentless pursuit of debt-driven growth has contributed to the global economic crisis. A new era of financial and fiscal prudence needs to increase the regulation of national and international

**Figure 11–4. Relationship between Tax Revenue as a Percent of GDP and Index of Social Justice in Selected Industrial Countries**



financial markets; incentivize domestic savings, for example through secure (green) national or community-based bonds; outlaw unscrupulous and destabilizing market practices (such as “short selling,” in which borrowed securities are sold with the intention of repurchasing them later at a lower price); and provide greater protection against consumer debt. Governments must pass laws that restrict the size of financial sector institutions, eliminating any that impose systemic risks for the economy.<sup>25</sup>

Finally, as indicated earlier, we need to improve macroeconomic accounting, replacing or supplementing GDP as the prime economic indicator. GDP does, however, belong as an indicator of economic efficiency. The more efficient we are, the less economic activity, raw materials, energy, and work are required to provide satisfying lives. When GDP rises faster than life satisfaction, efficiency declines. The goal should be to minimize GDP, subject to maintaining a high and sustainable quality of life.

### Is a Sustainable Civilization Possible?

The brief sketch presented here of a sustainable and desirable “ecological economy,” along with some of the policies required to achieve it, begs the important question of whether these policies taken together are consistent and whether they are sufficient to achieve the goals articulated. Can we have

a global economy that is not growing in material terms but that is sustainable and provides a high quality of life for most, if not all, people? Several lines of evidence suggest that the answer is yes.

The first comes from history. Achieving long-lasting zero- or low-growth desirable societies has been difficult—but not unheard of. While many societies have collapsed in the past and many of them were not what would be called “desirable,” there have been a few successful historical cases in which decline did not occur, as these examples indicate:<sup>26</sup>

- Tikopia Islanders have maintained a sustainable food supply and non-increasing population with a bottom-up social organization.
- New Guinea features a silviculture system that is more than 7,000 years old with an extremely democratic, bottom-up decisionmaking structure.
- Japan’s top-down forest and population policies in the Tokugawa era arose as a response to an environmental and population crisis, bringing an era of stable population, peace, and prosperity.

A second line of evidence comes from the many groups and communities around the world that are involved in building a new economic vision and testing solutions. Here are a few examples:

- Transition Initiative movement ([www.transitionnetwork.org](http://www.transitionnetwork.org))
- Global EcoVillage Network ([gen.ecovillage.org](http://gen.ecovillage.org))
- Co-Housing Network ([www.cohousing.org/](http://www.cohousing.org/))
- Wiser Earth ([www.wiserearth.org](http://www.wiserearth.org))
- Sustainable Cities International ([www.sustainablecities.net](http://www.sustainablecities.net))
- Center for a New American Dream ([www.newdream.org](http://www.newdream.org))
- Democracy Collaborative ([www.community-wealth.org](http://www.community-wealth.org))
- Portland, Oregon, Bureau of Planning and Sustainability ([www.portlandonline.com/bps/](http://www.portlandonline.com/bps/))

All these examples to some extent embody the vision, worldview, and policies elaborated in this chapter. Their experiences collectively provide evidence that the policies are feasible at a smaller scale. The challenge is to scale up some of these models to society as a whole. Several cities, states, regions, and countries have made significant progress along that path, including Portland in Oregon; Stockholm and Malmö in Sweden; London; the states of Vermont, Washington, and Oregon in the United States; Germany; Sweden; Iceland; Denmark; Costa Rica; and Bhutan.<sup>27</sup>

A third line of evidence for the feasibility of this vision is based on integrated modeling studies that suggest a sustainable, non-growing economy is both possible and desirable. These include studies using such well-established models as World3, the subject of *The Limits to Growth* in 1972 and other more recent books, and the Global Unified Metamodel of the BiOsphere (GUMBO).<sup>28</sup>

A recent addition to this suite of modeling tools is LowGrow, a model



of the Canadian economy that has been used to assess the possibility of constructing an economy that is not growing in GDP terms but that is stable, with high employment, low carbon emissions, and a high quality of life. LowGrow was explicitly constructed as a fairly conventional macroeconomic model calibrated for the Canadian economy, with added features to simulate the effects on natural and social capital.<sup>29</sup>

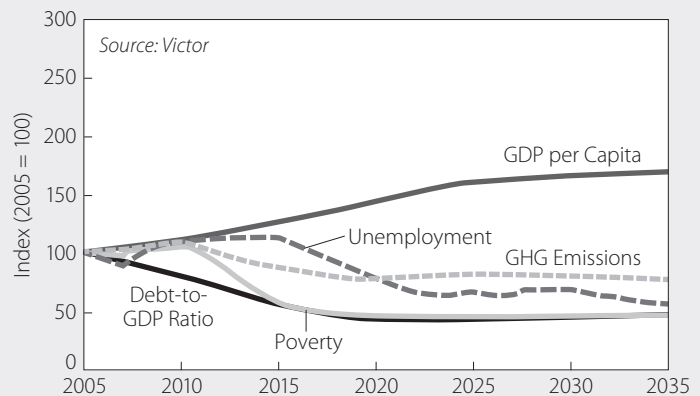
LowGrow includes features that are particularly relevant for exploring a low-/no-growth economy, such as emissions of carbon dioxide and other greenhouse gases, a carbon tax, a forestry submodel, and provisions for redistributing incomes. It measures poverty using the Human Poverty Index of the United Nations. LowGrow allows additional funds to be spent on health care and on programs for reducing adult illiteracy and estimates their impacts on longevity and adult literacy.

A wide range of low- and no-growth scenarios can be examined with LowGrow, and some (including the one shown in Figure 11–5) offer considerable promise. Compared with the business-as-usual scenario, in this scenario GDP per capita grows more slowly, leveling off around 2028, at which time the rate of unemployment is 5.7 percent. The unemployment rate declines to 4 percent by 2035. By 2020 the poverty index declines from 10.7 to an internationally unprecedented level of 4.9, where it remains, and the debt-to-GDP ratio declines to about 30 percent and is maintained at that level to 2035. GHG emissions are 41 percent lower at the start of 2035 than in 2010.<sup>30</sup>

These results are obtained by slower growth in overall government expenditures, net investment, and productivity; a positive net trade balance; cessation of growth in population; a reduced workweek; a revenue-neutral carbon tax; and increased government investment in public goods, on anti-poverty programs, adult literacy programs, and health care. In addition, there are more public goods and fewer status goods through changes in taxation and marketing; there are limits on throughput and the use of space through better land use planning and habitat protection and ecological fiscal reform; and fiscal and trade policies strengthen local economies.

No model results can be taken as definitive, since models are only as good as the assumptions that go into them. But what World3, GUMBO, and

**Figure 11–5. A Low-/No-Growth Scenario**



LowGrow have provided is some evidence for the consistency and feasibility of these policies, taken together, to produce an economy that is not growing in GDP terms but that is sustainable and desirable.

This chapter offers a vision of the structure of an “ecological economics” option and how to achieve it—an economy that can provide nearly full employment and a high quality of life for everyone into the indefinite future while staying within the safe environmental operating space for humanity on Earth. The policies laid out here are mutually supportive and the resulting system is feasible. Due to their privileged position, industrial countries have a special responsibility for achieving these goals. Yet this is not a utopian fantasy; to the contrary, it is business as usual that is the utopian fantasy. Humanity will have to create something different and better—or risk collapse into something far worse.

31. Bhopal from “Yes Men Hoax on BBC Reminds World of Dow Chemical’s Refusal to Take Responsibility for Bhopal Disaster,” *Democracy Now*, 6 December 2004; Andy Bichlbaum, “Chevron Ad Campaign Derailed” (blog), *The Yes Men*, 19 October 2010; “Chevron’s \$80 Million Ad Campaign Gets Flushed” (blog), *The Yes Men*, 19 October 2010.
32. Box 10–3 from Wolfgang Sachs, ed., *The Development Dictionary* (London: Zed Books, 2010).
33. Tompkins and Chouinard quotes from *180° South*, Magnolia Pictures, 2010.

## Chapter 11. Building a Sustainable and Desirable Economy-in-Society-in-Nature

1. This chapter is adapted from a report commissioned by the United Nations for the 2012 Rio+20 Conference as part of the Sustainable Development in the 21st century project; see R. Costanza et al., *Building a Sustainable and Desirable Economy-in-Society-in-Nature* (New York: United Nations Division for Sustainable Development, 2012). Table 11–1 from R. Costanza et al., “The Value of the World’s Ecosystem Services and Natural Capital,” *Nature*, 15 May 1997, pp. 253–60.
2. New research from T. Kasser, *The High Price of Materialism* (Cambridge, MA: The MIT Press, 2002).
3. R. A. Easterlin, “Explaining Happiness,” *Proceedings of the National Academy of Sciences*, 16 September 2003, pp. 11,176–83; R. Layard, *Happiness: Lessons from a New Science* (New York: Penguin Press, 2005).
4. Costanza et al., “Value of the World’s Ecosystem Services and Natural Capital,” op. cit. note 1; R. Costanza, *Ecological Economics: The Science and Management of Sustainability* (New York: Columbia University Press, 1991); H. E. Daly and J. Farley, *Ecological Economics: Principles and Applications* (Washington, DC: Island Press, 2004).
5. Easterlin, op. cit. note 3; Layard, op. cit. note 3.
6. Figure 11–1 from R. Hernández-Murillo and C. J. Martinek, “The Dismal Science Tackles Happiness Data,” *The Regional Economist*, January 2010, pp. 14–15.
7. R. Costanza et al., *Beyond GDP: The Need for New Measures of Progress* (Boston, MA: The Pardee Papers, 2009); P. A. Lawn, “A Theoretical Foundation to Support the Index of Sustainable Economic Welfare (ISEW), Genuine Progress Indicator (GPI), and Other Related Indexes,” *Ecological Economics*, February 2003, pp. 105–18.
8. Figure 11–2 from J. Talberth, C. Cobb, and N. Slattery, *The Genuine Progress Indicator 2006: A Tool for Sustainable Development* (Oakland, CA: Redefining Progress, 2007).
9. K. Raworth, *A Safe and Just Space for Humanity: Can We Live within the Doughnut?* (Oxford: Oxfam International, 2012).
10. Costanza et al., *Building a Sustainable and Desirable Economy-in-Society-in-Nature*, op. cit. note 1; Great Transition initiative, at [www.gtinitiative.org](http://www.gtinitiative.org); The Future We Want, at [www.futurewewant.org](http://www.futurewewant.org).
11. R. Costanza et al., “Principles for Sustainable Governance of the Oceans,” *Science*, 10 July 1998, pp. 198–99.
12. R. Beddow et al., “Overcoming Systemic Roadblocks to Sustainability: The Evolutionary Redesign of Worldviews, Institutions, and Technologies,” *Proceedings of the National Academy of Sciences*, 24 February 2009, pp. 2,483–89.
13. R. Costanza, W. J. Mitsch, and J. W. Day, Jr., “A New Vision for New Orleans and the Mississippi Delta: Applying Ecological Economics and Ecological Engineering,” *Frontiers in Ecology and the Environment*, November 2006, pp. 465–72; Intergovernmental Panel on Climate Change, *Fourth Assessment Report of the Intergovernmental Panel on Climate Change* (Cambridge, U.K.: Cambridge University Press, 2007).
14. J. B. Schor, “Sustainable Consumption and Worktime Reduction,” *Journal of Industrial Ecology*, January 2005, pp. 37–50; A. Durning, *How Much Is Enough?* (New York: W. W. Norton & Company, 1992); T. Jackson, *Prosperity without Growth: Economics for a Finite Planet* (London: Earthscan/James & James, 2009).
15. D. Acemoglu and J. Robinson, “Foundations of Societal Inequality,” *Science*, 30 October 2009, pp. 678–79; Jackson, op. cit. note 14.
16. H. E. Daly, “From a Failed-Growth Economy to a Steady-State Economy,” *Solutions*, February 2010, pp. 37–43.

17. Ibid.; studies on giving up personal gain from I. Almås et al., “Fairness and the Development of Inequality Acceptance,” *Science*, 28 May 2010, pp. 1,176–78, and from E. Fehr and A. Falk, “Psychological Foundations of Incentives,” *European Economic Review*, vol. 46 (2002), pp. 687–724; Jackson, op. cit. note 14.
18. G. Hardin, “The Tragedy of the Commons,” *Science*, 13 December 1968, pp. 1,243–48; E. Ostrom, *Governing the Commons: The Evolution of Institutions for Collective Action* (Cambridge, U.K.: Cambridge University Press, 1990); D. Pell, in F. Berkes, ed., *Common Property Resources: Ecology and Community-Based Sustainable Development* (London: Belhaven Press, 1989); D. Feeny et al., “The Tragedy of the Commons: Twenty-two Years Later,” *Human Ecology*, vol. 18, no. 1 (1990), pp. 1–19.
19. J. Farley and R. Costanza, “Envisioning Shared Goals for Humanity: A Detailed, Shared Vision of a Sustainable and Desirable USA in 2100,” *Ecological Economics*, vol. 43, no. 2–3 (2002), pp. 245–59; T. Prugh, R. Costanza, and H. E. Daly, *The Local Politics of Global Sustainability* (Washington, DC: Island Press, 2000).
20. Box 11–1 is adapted from James Gustave Speth, *America the Possible: Manifesto for a New Economy* (New Haven, CT: Yale University Press, 2012) and is based on the following: banks’ control of deposits and assets from David Korten, *How to Liberate America from Wall Street Rule* (Washington, DC: New Economy Working Group, July 2011); Thomas H. Greco, Jr., *The End of Money and the Future of Civilization* (White River Junction, VT: Chelsea Green, 2009), p. 35; Mary Mellor, “Could the Money System Be the Basis of a Sufficiency Economy?” *Real World Economics Review*, no. 54 (2010), p. 79; Otto Scharmer, “Seven Acupuncture Points for Shifting Capitalism to Create a Regenerative Ecosystem Economy,” Roundtable on Transforming Capitalism to Create a Regenerative Economy, MIT, Cambridge, MA, 8–9 June and 21 September 2009, p. 19; Herman E. Daly, “Moving from a Failed Growth Economy to a Steady State Economy,” unpublished manuscript, forthcoming in volume from Palgrave Publishers; Daly, op. cit. note 16, p. 37.
21. Total debt from “Z.1 Statistical Release,” Board of Governors of the Federal Reserve System, at [www.federalreserve.gov/datadownload/Download.aspx?rel=Z1&series=654245a7abac051cc4a9060c911e1fa4&filetype=csv&label=include&layout=seriescolumn&from=01/01/1945&to=12/31/2010](http://www.federalreserve.gov/datadownload/Download.aspx?rel=Z1&series=654245a7abac051cc4a9060c911e1fa4&filetype=csv&label=include&layout=seriescolumn&from=01/01/1945&to=12/31/2010).
22. Daly, op. cit. note 16; H. E. Daly, *Ecological Economics and Sustainable Development, Selected Essays of Herman Daly* (Northampton, MA: Edward Elgar Publishing, 2008).
23. M. Gaffney, “The Hidden Taxable Capacity of Land: Enough and to Spare,” *International Journal of Social Economics*, vol. 36, no. 4 (2009), pp. 328–411.
24. Figure 11–3 from R. G. Wilkinson and K. Pickett, *The Spirit Level: Why Greater Equality Makes Societies Stronger* (New York: Bloomsbury Press, 2009); data for Figure 11–4 from Organisation for Economic Co-operation and Development and from Wilkinson and Pickett, op. cit. this note; Paulson from M. Goldstein, “Paulson, at \$4.9 Billion, Tops Hedge Fund Earner List,” *Reuters*, 1 April 2011.
25. Jackson, op. cit. note 14.
26. R. Costanza et al., “Sustainability or Collapse: What Can We Learn from Integrating the History of Humans and the Rest of Nature?” *Ambio*, November 2007, pp. 522–27; J. Diamond, *Guns, Germs, and Steel: The Fates of Human Societies* (New York: W. W. Norton & Company, 2005); H. Weiss and R. S. Bradley, “What Drives Societal Collapse?” *Science*, 26 January 2001, pp. 609–10.
27. See, for example, C. Rolfsdotter-Jansson, “Malmo, Sweden,” *Solutions*, January 2010, pp. 65–68, and S. M. Kristinsdottir, “Energy Solutions in Iceland,” *Solutions*, May 2010, pp. 52–55.
28. D. H. Meadows et al., *The Limits to Growth* (New York: Universe Books, 1972); R. Boumans et al., “Modeling the Dynamics of the Integrated Earth System and the Value of Global Ecosystem Services Using the GUMBO Model,” *Ecological Economics*, June 2002, pp. 529–60.
29. P. A. Victor and G. Rosenbluth, “Managing without Growth,” *Ecological Economics*, March 2007, pp. 492–504; P. A. Victor, *Managing without Growth: Slower by Design, Not Disaster* (Northampton, MA: Edward Elgar Publishing, 2008).
30. Figure 11–5 from Victor, op. cit. note 29.

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