

Voices: Greening the Gross Domestic Product

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Should a country's environment and resources - and pollution, failing infrastructure and depletion of resources - all be counted in its GDP? Credit: Stockphoto.com/Frank van den Bergh

When measured in terms of annual Gross Domestic Product, or GDP, the United States is the richest country in the world, followed at a distance by China and Japan, and then several European countries, including Germany, France and the United Kingdom. The GDP — the value of all final goods and services produced in a country during a given year — is a simple computation that allows a direct comparison of wealth between countries. But if you take into account a country's carbon dioxide emissions, its pollution, its depletion of ecological assets and/or its deteriorating infrastructure, would the total GDP remain the same? Probably not. Because these issues are not accounted for in the GDP indicator, using GDP to measure a country's true wealth is remarkably poor at best and highly damaging at worst.

In public debates, GDP-related issues are often posed as either/or situations — for example, issues in which policymakers feel pressure to choose either the economy or the environment. But this is a false choice; [policymakers should obviously choose both](#). Unfortunately, they're often not equipped to make that kind of holistic, forward-looking decision because they lack the economic tools to do so — they lack an indicator that incorporates economic robustness and environmental health into a single metric. Such an indicator, if it existed, might be called the Green GDP.

Measuring What We Strive For

Our economic measurements are exceedingly crude. Created before World War II by Simon Kuznets, a Nobel Prize-winning economist at the University of Pennsylvania, the current system of assessing national income and wealth was never meant to serve as a comprehensive measure of economic development. In fact, Kuznets stated before Congress in 1934 that “the welfare of a nation [can]

scarcely be inferred from a measure of national income.” GDP does not refer to natural resource depletion and fails to account for the costs of waste and pollution. Countries that overfish oceans or overuse their finite resources receive only positive gains in their GDP. Similarly, nations with eroding dams and levees, pot-holed roads and collapsing bridges receive scant warning from GDP accounting that their society might be in trouble. And if GDP is the ultimate indicator of what is desired for our economy, then [war](#), [hurricanes](#), [earthquakes](#), deforestation and even [divorce](#) are all key steps on the path toward prosperity.

Most would agree those aren't the signposts of the path to real prosperity. Therefore, if halting the loss of the polar ice caps, [decreasing carbon emissions](#) and [stabilizing weather patterns](#) are essential to our future success, then measuring a more accurate and environmentally inclusive GDP — the Green GDP — is more important now than ever. [The world economy is facing its greatest challenge](#) since the Great Depression of the 1930s, and governments worldwide are striving to promote GDP growth as an antidote. Meanwhile, the alarming trends of climate change and environmental degradation are simultaneously clamoring for our attention. Is it possible that we can accomplish both economic development and environmental protection?

We have to try. As economist and Nobel laureate Joseph Stiglitz stated in his book, “Making Globalization Work,” “what we measure is what we strive for.” So unless we begin to measure our progress on protecting the environment, we won't make the necessary strides.

To do so, from an economic perspective, first we need to figure out if it is possible to create a single indicator capable of reflecting both economic prosperity and the health of our ecological systems.

Creating a Single Measure

A Green GDP measure would require transitioning away from the current national income accounting system, where the price of final products and services is simply totaled — this kind of reporting is akin to companies reporting their revenues without revealing their expenses, making it impossible to deduce whether they were profitable or not. We need to move to a balance sheet system where natural capital and resource depletions are netted out (the way companies depreciate their assets), and pollution costs are negatively valued.

This is easier said than done, because introducing green accounting measures to GDP creates the challenge of dividing the natural environment into quantifiable units and giving each a market value. For economists, this is the familiar problem that occurs when dealing with public goods and negative externalities: Essentially, how do we price and count what Mother Nature delivers, and how can we do the same with the pollution and waste we produce in return? Theoretically, pricing either of these could help markets and policymakers formulate a more sustainable and conscientious use of resources. But how much are mountain streams or the carbon that floats above them really worth? [And who determines that cost or value?](#)

At the [Rio Earth Summit hosted by the United Nations Environment Programme and the World Bank in 1992](#), an international collection of experts on environmental and economic accounting agreed to create a program “to develop national systems of integrated environmental and economic accounting in all countries.” Unfortunately, they haven't gotten far. [Ten years later at the Johannesburg Summit in South Africa](#), their primary recommendation regarding environmental accounting was to conduct further research.

According to Peter Bartelmus, an economist at Columbia University in New York, the interim system and handbook drafted by the experts at that summit failed on two counts. First, it wasn't geared toward policymakers or the general public, who largely ignored it; instead, it was geared toward themselves — statisticians and national accountants. Second, several national accountants continued to reject dividing the planet into separate parts to be counted and priced. These critics viewed attempts to price natural resources and pollution as mere modeling, rather than “descriptive accounting” — meaning, in their view, that it is just as inaccurate to develop large mathematic formulas to estimate the number of trees in the world as it is impractical to physically go out and count each one.

The lack of agreement showed that there are still far too many challenges to solve before the world's global accountants will agree to place a dollar value on the planet, on both its resources and its growing pollutants. And because we haven't yet agreed on any desirable alternative, the world's policymakers and economists, by default, have settled on the wealth indicator that they know for certain is wrong, rather than develop a newer indicator that might be better.

Designing a Green Economic Indicator

Economists and national accountants tell us that creating a green economic indicator means putting a price on common goods such as the atmosphere, [the oceans](#) and other shared resources — and that means that those resources must be privatized. Although this approach makes sense intellectually, it's a tricky business commoditizing things like air and [water](#). Telling people that you're going to charge them for the air they breathe or the water that rains down on their roof is controversial, to say the least.

But at the same time, the advent of carbon markets is one step in that direction: In these carbon markets — which are voluntary today in the United States, but might become mandatory depending on the outcome of legislation under consideration in Congress — carbon emissions (and their environmental impact) are expected to be commoditized with a price somewhere between \$10 and \$100 per metric ton of emitted carbon dioxide.

And assessing such environmental externalities — the environmental impacts that occur external to markets — is gaining analytical heft: The National Academies of Sciences and Engineering recently completed a study on the hidden costs associated with energy production and use, concluding that the damage from [air pollution generated by coal-fired power plants](#) costs 3.2 cents per kilowatt-hour of power produced (that assessment doesn't even include the negative impacts of land disturbance for coal mining or the commensurate greenhouse gas emissions). The wholesale price for coal-fired electric power is often 2 to 4 cents per kilowatt-hour. To put that price into perspective, the damage done by air pollution from burning coal is worth about as much as the coal-fired power itself. The GDP includes the sales of coal-fired power in its tally (a positive contributor to GDP), but the damages associated with coal-fired power (which should be a negative contributor to GDP) are mostly left out.

One leading candidate for consolidating environmental and economic factors that must be condensed into a single Green GDP number or ranking is the Genuine Progress Indicator (GPI). A variant of the earlier Index of Sustainable Economic Welfare created through the pioneering work of ecological economist Herman Daly (now at the University of Maryland in College Park) and theologian John Cobb (emeritus faculty at the Claremont School of Theology in California) in the late 1980s, this alternative measure begins with normal GDP calculations before making a series of adjustments to correct for shortcomings in the well-known indicator.

As promoted by Redefining Progress, a sustainability think tank in Oakland, Calif., GPI calculates negative impacts to GDP based on pollution, resource depletion and long-term environmental damage.

It does this by extrapolating on the best time-series data available and by relying on seminal work from experts in their respective fields. These assumptions are often incomplete and hotly contested, but the GPI — and other Green GDP measures like it — reach an aggregate number by arguing that their estimates are the best that can be attained given the current scientific data and modeling available. With each new iteration, substantial changes are often made as new data and new methodologies are brought to bear.

GPI also makes subtractions to GDP based on the estimated costs of crime, losses in leisure time and even money borrowed from abroad. And not all adjustments are negative. The GPI adds the estimated value of housework and volunteering to the new indicator, which GDP ignores because no money changes hands. For example, although being a stay-at-home parent is a challenging and valuable job, the GDP currently assigns it zero value: GPI includes it. GPI also makes positive adjustments for a more well-educated society and adjusts for a more equal income distribution by adding more to GPI when the poor receive a larger portion of income.

Though there are a number of critiques of GPI relating to its theoretical foundations and methods of calculation, perhaps the most important critique of GPI, as noted by Redefining Progress itself, is that the indicator is arbitrary in what factors are included. For instance, though it includes an adjustment for income inequality and the loss of leisure time, GPI ignores directly addressing other social issues such as political freedom or the level of gender inequality in a society. In fact, delving deeply into questions such as these reveals fairly quickly the wide array of adjustments that can be made to GDP. It also begs the question of who should decide these things, and perhaps most important of all, what the chances are that they might one day be put to use. These are not simply rhetorical questions. In fact, in recent years, both China and the United States have tried to implement green adjustments to the GDP measure — and there are valuable lessons we can learn from these attempts.

Green GDP as Public Policy: China and the United States

The Chinese government was one of the first to estimate an environmental adjustment to its GDP. Over the past several decades, [China has undergone an enormous and rapid process of industrialization](#). With GDP growth at 9 percent in 2008, and in the double digits from 2003 to 2007, China's economic development has no historical equal. But it has not come without a price. In a country that has reportedly built two coal-fired power plants every week since 2007, pollution is the second leading cause of death. Sixteen of the 25 most polluted cities in the world are in China.

In acknowledgment of the environmental challenges his country faces, President Hu Jintao announced in March 2004 that China would embrace a more “scientific concept of development.” Called the Green GDP Project, the new GDP figure would subtract the estimated costs of pollution from the GDP and account for resource depletion. At the time, Chinese economists were estimating a wide range of possible environmental cost assessments, from less than 3 percent of annual GDP growth to well over 30 percent.

In September 2006, Chinese officials released the first report, announcing that environmental pollution accounted for 3.05 percent of GDP in 2004. At the same time, officials acknowledged that this newly created Green GDP indicator still required significant revision and that their “environmental damage” estimates of roughly 3 percent included only a portion of the total natural resource and pollution costs.

It was the first and last Green GDP estimate China produced. According to journalist Joseph Kahn of the New York Times, “the official explanation for discontinuing the Green GDP Project as an official government project was that the science behind it was immature.” The real explanation, Kahn said,

was politics. In a country where the ability to provide jobs and maintain social stability is an important consideration for the promotion and punishment of political officials, the intertwining of the environment and the economy into a single measure was met with significant political resistance.

Prior to China's attempt at greening the GDP, the United States took a stab at it. In 1993, the Bureau of Economic Analysis initiated a green accounting measure for the U.S. economy. Titled the "Integrated Environmental and Economic Accounts," it began with an analysis of the most easily measured commodities, such as coal, petroleum and other mineral resources. The results showed that mining activities in particular were counted too highly in national GDP estimates: In other words, by failing to consider the impacts and depleted assets induced by mining, that sector's benefits were overestimated.

Discovering this error in accountancy might have led some people to consider revising GDP calculations. Instead, in 1995, an amendment attached to the congressional appropriations bill prevented the bureau from rewriting its methodology behind GDP calculations. The legislative change remains in place today. Presumably, the coal industry and other mining interests do not mind keeping the status quo.

These case studies reveal two important lessons for policymakers. The first is that Green GDP measures can be modeled in a relatively short amount of time. The Chinese indicator was prepared and calculated in only two years. Similarly, the U.S. Bureau of Economic Analysis prepared an environmental and economic estimate (granted, of limited natural resource commodities) in only one year. So this can be done, and quickly.

The second lesson is that a Green GDP measure, even if crudely estimated, has the potential to draw a large amount of scrutiny on the methods for estimating how economies are growing. As the examples of China and the United States show, nearly any result from a green economic measure will meet with strong political opposition as crucial issues of growth and environmental protection are thrust into public view. However, both the prominence and convenience of reducing entire economies into one currency figure or quantity make such an indicator a powerful tool for anyone who wishes to discuss, measure or debate economic success.

Despite some hesitations to radically altering how we measure economic success, support for such a change is building in several areas around the world. Close to home, five U.S. states have now made some movement toward calculating a regional version of the GPI noted above. Maryland, Minnesota, Ohio, Utah and Vermont join the Canadian provinces of Nova Scotia and Alberta in an attempt to shift the focus of Green GDP to regional efforts. Canada itself is also taking strides in this regard through its creation of the Environment and Sustainable Development Indicators Initiative.

Additionally, in June 2007, the [Organization for Economic Co-operation and Development](#) reviewed the use of GDP as the prevalent economic measure at its world forum held in Istanbul, Turkey. Five months later, the European Union hosted a conference titled Beyond GDP. Then, at the start of 2008, French President Nicholas Sarkozy invited Stiglitz and Amartya Sen, a prominent Harvard University economist and Nobel laureate, to head the French Commission on the Measurement of Economic Performance and Social Progress. Sarkozy directed the commission to review GDP with respect to societal well-being, with particular focus on economic, environmental and social sustainability. After the commission released its final report last September, the French stand poised to help lead the world to reach consensus on Green GDP. But producing a report is one matter. The question remains whether the French, the Canadians and the growing number of U.S. states—unlike their American and Chinese predecessors—will have the political resolve to implement their findings.

Will It Change Anything?

Let's assume that one day the world does use a Green GDP measure. Would such calculations make a difference? For one answer, we need only look to Redefining Progress' GPI calculations for the United States. Though consensus on the merit of GPI has not been reached and numerous questions abound surrounding its metrics, the GPI measure offers a candid observation. GPI is predictably lower than GDP for every year it has been calculated since 1950. However, the startling part is the growing gap that emerges after 1970. As economic progress as measured by GDP soars, the adjusted indicator stabilizes, remaining relatively unchanged over the past 35 years of dynamic economic growth and development. As Stiglitz warned, the GPI lends support to the notion that as a nation and as a people, we aspire to what we are able to measure. Perhaps that is one reason our elected officials haven't felt enough pressure to make substantial climate and quality of life changes sooner.

In America specifically, the story GDP tells over the past five decades is one of a growing nation flexing new economic muscle with nearly every passing year. And it is this story, much like soaring house values and rising stock indexes, that gave us almost no warning of the recession from which we are now emerging. GPI, however, tells us that our estimated costs of pollution, resource depletion, deteriorating infrastructure — even our loss of leisure time and growing foreign debt — have all grown as the quantity of our financial transactions increased. Arguably, had a GPI-like measure replaced or even matched GDP in its near universal prominence among economists, politicians and journalists, then at the very least we may have had an economic indicator to support what several of us have suspected for a long time: We must pay attention to more in this world than the quantity of money that changes hands every year.