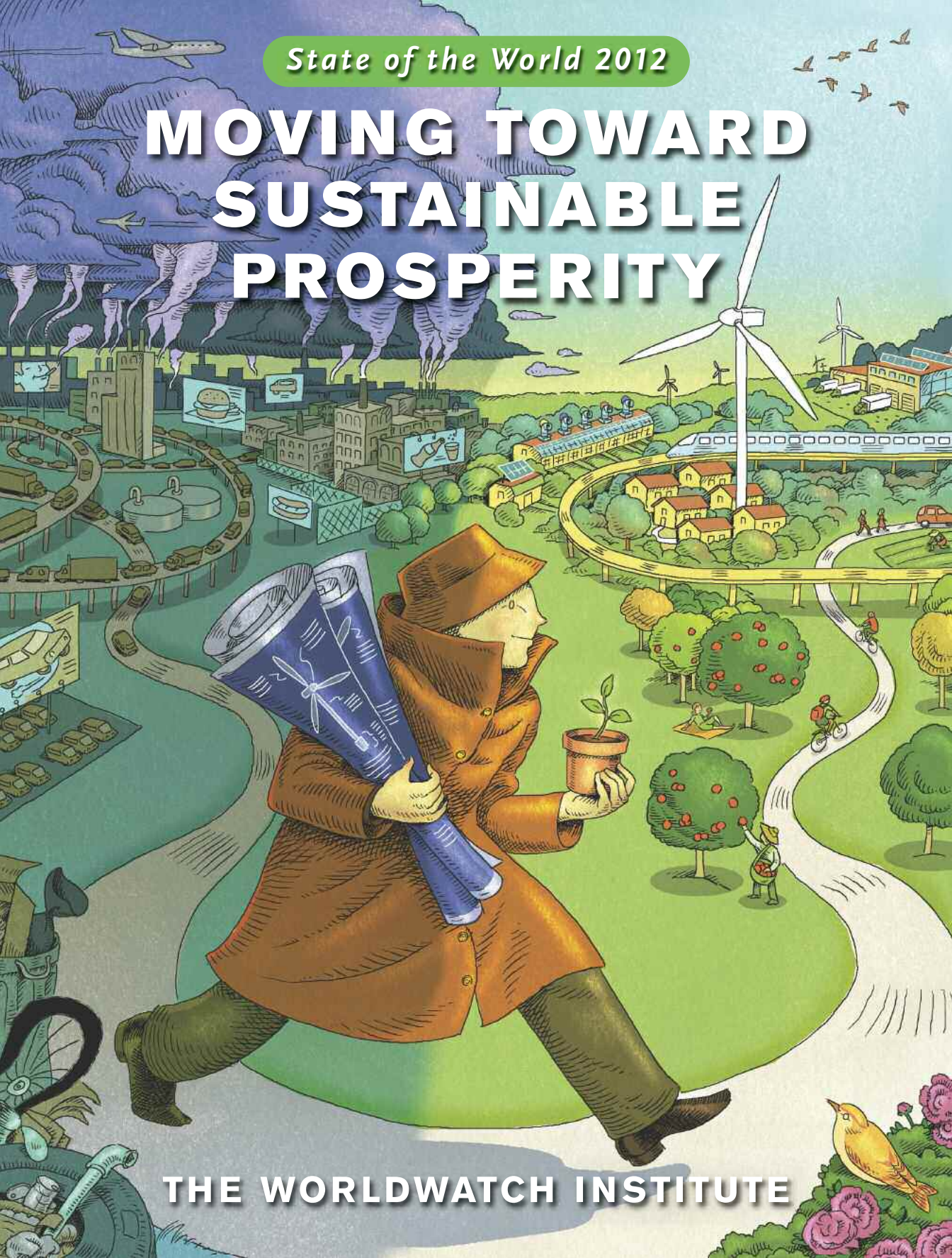


State of the World 2012

MOVING TOWARD SUSTAINABLE PROSPERITY



THE WORLDWATCH INSTITUTE

Making the Green Economy Work for Everybody

Michael Renner

In June 2012, Rio de Janeiro will host the United Nations Conference on Sustainable Development, more commonly referred to as Rio 2012 or Rio+20. The meeting marks the twentieth anniversary of the U.N. Conference on Environment and Development in 1992, also held in Rio. That landmark gathering adopted the Framework Convention on Climate Change and opened the Convention on Biological Diversity for signature. The conference was itself a milestone in the evolution of international environmental diplomacy, taking place two decades after the 1972 Stockholm Conference on the Human Environment.

On one level Rio 2012 marks a continuity of efforts to rally governments and civil society around the ever more urgent goal of reconciling human development with the limits of Earth's ecosystems. In 1992, the end of the cold war and rising environmental awareness seemed to open new horizons for global cooperation. The years since then have in many ways been a sobering experience, with sustainability aspirations often running headlong into discomfiting political realities, orthodox economic thinking, and the staying power of materials-intensive lifestyles.

Among the obstacles to moving toward a more sustainable world order, writes Tom Bigg of the International Institute for Environment and Development (IIED), are “the interests of powerful constituencies that defend their turf and can manipulate the political system to stymie change; the hierarchy of policy and politics in almost every country which places environmental issues towards the bottom and economic growth and military security at the top; and the difficulty of achieving strong global regimes to effect change at a time when multilateralism is on the retreat.”¹

Environmental governance has largely taken a backseat to the pursuit of corporate-driven economic globalization—a process that has been marked by deregulation and privatization and thus a relative weakening of national political institutions. Comprehensive intergovernmental agreement on strategies for sustainability remains elusive. Despite multiplying numbers of solemn declarations, plans, and goals, no nation is even close to evolving toward a sustainable economy. The growth model that has emerged since the start of the Industrial Revolution, rooted in structures, behaviors, and activities that are patently unsustainable, is still seen as the ticket to ensuring the “good life”—

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driven in no small measure by massive advertising. Western industrial countries hold fast to this model even in the face of rising consumer debt, while people elsewhere aspire to it.²

The Rio 2012 conference presents a much-needed opportunity to take stock of progress toward sustainability and development goals—and to create a new take on what prosperity means in the twenty-first century. Success will require not just official summitry but also imaginative initiatives to “lead from below” and qualitatively new relationships among governments, civil society, corporations, and the media.

A Complex Crisis

Humanity is confronting a severe and complex crisis. Mounting ecosystem stress and resource pressures are accompanied by growing socio-economic problems. The global economy is struggling to get out of a severe recession that was triggered by the implosion of highly speculative financial instruments but more broadly is the result of bursting economic bubbles and unsustainable consumer credit. The economic crisis is sharpening social inequities in the form of insecure employment and growing rich-poor gaps within and among countries.

All this has led to a growing crisis of legitimacy of economic and political systems, as massive bank bailouts stand in sharp contrast to austerity and curtailment of spending for the public benefit. The de facto appeasement of a run-amok financial system has blocked the emergence of a vision of how the real economy could be both rescued and made sustainable. Growing numbers of people sense that their interests are not represented in legislative and policymaking processes whose outcomes are increasingly influenced by money. Over the years, this has led to declining voter participation in elections and to political apathy.³

On the other hand, and more recently, disenchantment with the status quo has spawned

rapidly multiplying bottom-up protests now known as the “Occupy Movement.” Before Occupy Wall Street was born, the “Indignados” (or Outraged) had camped out at the Puerta del Sol square in Madrid, and protesters took over public squares in Chile and Israel. The new movement derives some inspiration from the Arab Spring in the Middle East, suggesting a commonality of concerns across economic and political systems. The movement spread like wildfire. By mid-October 2011, Occupy protests had taken place in more than 900 cities around the world; by late December, there were activities in more than 2,700 locations.⁴

These protests have largely focused on social and economic concerns. But on the sidelines of the 17th Conference of the Parties (COP17) to the U.N. treaty on climate change that took place in Durban, South Africa, in December 2011, protesters made a connection to the fundamental issues of environmental sustainability. Organizers of Occupy COP17 argued that “the very same people responsible for the global financial crisis are poised to seize control of our atmosphere, land, forests, mountains and waterways.” From Madrid to Manhattan to Durban, these actions are driven by deep frustration with the failure of governments and international conferences to address the fundamental problems that threaten human well-being and survival.⁵

In the two decades since the 1992 Earth Summit, pressures on the planet’s natural resources and ecological systems have increased markedly as the material throughput of the economy keeps expanding. Not surprisingly, the bulk of human consumption is concentrated in cities. Urban areas account for half of the world’s population but 75 percent of its energy consumption and carbon emissions.⁶

Ecological stress is evident in many ways—from species loss, water scarcity, carbon buildup, and nitrogen displacement to coral reef die-offs, fisheries depletion, deforestation,

and wetlands losses. The planet's capacity to absorb waste and pollutants is increasingly taxed. Some 52 percent of commercial fish stocks are fully exploited, about 20 percent are overexploited, and 8 percent are depleted. Water is becoming scarce, and the supply is expected to satisfy only 60 percent of world demand 20 years from now. Although agricultural yields have increased, this has happened at the cost of declining soil quality, land degradation, and deforestation.⁷

A 2009 study of "planetary boundaries" showed that nine critical environmental thresholds had been crossed or were on track to be crossed, threatening to destabilize ecological functions on which economies, societies, and indeed all life on Earth critically depend. Humanity has been acting as if fresh resources were always waiting to be discovered, as if ecological systems were irrelevant to human existence, as if an Earth 2.0 were waiting in the wings in case we finally succeed in trashing this planet. There are isolated examples in human history of civilizations that outstripped their resource base, crashed, and vanished. But never before has this happened on a planetary scale; humanity is crossing into totally uncharted territory.⁸

While the impacts will be felt everywhere and especially in the poorest quarters, it is the actions of a minority that have gotten us to the edge of the precipice. According to the World Bank, people in the world's middle and upper classes more than doubled their levels of consumption between 1960 and 2004, compared with a 60 percent increase for those on the lower rungs of the income ladder. The global consumer class, about a billion people or so, mostly lives in western industrial countries, but the last two decades have witnessed the emergence of growing numbers of high consumers in countries like China, India, Brazil, South Africa, and Indonesia. Another 1–2 billion people globally aspire to the consumer life and may be able to acquire some of its trap-

pings. But the remainder of humanity—including the "bottom of the pyramid," the most destitute—have little hope of ever achieving such a life. The global economy is not designed for their benefit.⁹

Over the last decade, countries outside the Organisation for Economic Co-operation and Development (OECD) have increased their share of the world economy. From 40 percent of global gross domestic product (GDP) on a purchasing-power parity basis in 2000, their share has risen to 49 percent in 2010 and could grow to 57 percent by 2030. And economic expansion in countries like China, India, and Brazil has improved the economic lot of many people. According to OECD statistics, the number of poor people worldwide declined by 120 million in the 1990s and by nearly 300 million in the first half of the 2000s. And according to a World Bank analysis, the share of China's population earning less than \$1.25 a day (in 2005 prices) dropped from 84 percent in 1981 to 16 percent in 2005. In Brazil the figures went from 17 percent in 1981 to 8 percent in 2005, and in India, from 60 to 42 percent.¹⁰

But it would be a mistake to regard the steady expansion of the global consumption-intensive industrial economy as a surefire path toward overcoming poverty and social marginalization. The OECD notes: "The contribution of growth to poverty reduction varies tremendously from country to country, largely due to distributional differences within them. In many cases, growth has been accompanied by increased inequality." From 1993 to 2005 Brazil reduced poverty more than India did, even though its growth was much lower (1 percent versus 5 percent annually). This is because inequality has fallen in Brazil with the assistance of welfare programs like Bolsa Familia, but it has risen in China and India.¹¹

Globalization has gone hand in hand with increased volatility and turbulence—and with great vulnerability for those unable to com-

pete. The economic crisis that broke into the open in 2008 caused the ranks of the unemployed to swell from 177 million in 2007 to an estimated 205 million in 2010, with “little hope for this figure to revert to pre-crisis levels in the near term,” the International Labour Organization (ILO) notes. Fears about “jobless growth” are borne out by an ILO analysis noting that the recovery of global GDP growth in 2010 was not paralleled by a comparable jobs recovery. And global emissions of carbon dioxide from fossil fuel burning rose by half a billion tons in 2010—the largest annual increase since the start of the Industrial Revolution. It is difficult to avoid the conclusion that the economy no longer works for either people or the planet.¹²

Even among those with a job, at least 1.5 billion persons worldwide—roughly half the workforce—are in highly vulnerable employment situations. The conditions they face—often referred to as “informality”—include inadequate or highly variable earnings, low-productivity work, temporary or insecure employment, and poor workplace conditions, especially in terms of occupational health and safety. Informal-sector workers typically earn about half as much as people in the formal sector.¹³

Rising numbers of people in industrial economies face precarious employment conditions as well. In the United States, wage stagnation and growing income inequality have been prominent phenomena since the late 1970s. Even though U.S. labor productivity expanded 80 percent between 1979 and 2009, average hourly compensation for workers rose just 8 percent, with most of the gains realized by the top earners. The number of Americans living below the official poverty line, about 46 million in 2010, is the highest in the 52 years since government statistics have been published on this topic. In Germany, long a high-wage country, the low-wage sector grew to more than 20 percent of

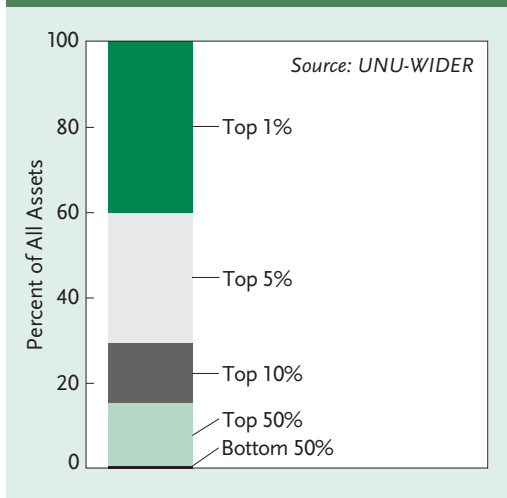
all employees as of 2008. In Japan, one third of the country’s labor force is part-time and contract workers who lack job security. More than 10 million Japanese workers earn less than the official poverty line.¹⁴

There is a paradox. Wages are under pressure and employment is uncertain for many, yet consumerism remains alive and well. Materials-intensive lifestyles are financed not just by taking on additional jobs but also by going deeply into debt. The ILO explains that “in advanced economies, stagnant wages created fertile ground for debt-led spending growth—which is clearly unsustainable.” In the United States in particular, high consumption was enabled by leveraging exaggerated housing values during the years of the real estate bubble.¹⁵

Worldwide, an extremely unequal distribution of wealth has emerged, with consequences for who has an effective voice in matters of economics and politics—and thus in how countries address the fundamental issues of sustainability and equity that confront humanity. A 2008 study by the UN University’s World Institute for Development Economics Research (UNU-WIDER) offers data for the year 2000. (Data gaps and lags render a more up-to-date reckoning difficult.) The richest 1 percent of adults owned 40 percent of global assets. (See Figure 1–1.) For the top 5 percent, the share rises to 71 percent, and the top 10 percent controlled 85 percent of global wealth. By contrast, the bottom half of humanity together had barely even 1 percent of all wealth. The average member of the top 1 percent therefore was almost 2,000 times richer than the average person from the poorer half of humanity.¹⁶

It is unlikely that the last decade has brought a turn toward greater equality. Undoubtedly the regional distribution of wealth has undergone some shifts with the rise of countries like China, India, and Brazil. They now have a larger number of very wealthy individuals than in years past, and there is a rising middle

Figure 1–1. Ownership of Economic Assets Worldwide, 2000



class. But from a global perspective, these developments have not undone the observations from 2000 because, as the UNU-WIDER study documents, domestic wealth inequality is high in most countries.¹⁷

National data indeed suggest that inequality has been on the rise in many countries in recent years. In 2007, the richest 1 percent of Germans controlled 23 percent of the wealth in the country and the top 10 percent had 61 percent (up from 44 percent in 1998). The bottom 70 percent had just 9 percent. And in India, the top 1 percent had 16 percent of wealth in 2006; the top 10 percent had 53 percent. The bottom half of the population in India shared just 8 percent of the nation's wealth. In the United States, the share of wealth held by the top 5 percent increased from 59 percent in 1989 to 65 percent in 2009. The bottom 40 percent saw their net wealth fall from an already tiny 0.2 percent to a negative 0.8 percent. In fact, in 2009 almost a quarter of U.S. households had a zero or negative net worth, as consumer and mortgage debts cancelled or surpassed assets.¹⁸

Green Growth and Degrowth

In times of economic crisis, environmental needs are quickly relegated to the status of a luxury. The conventional impulse is to “prime the pump” to get the economic engine moving again by whatever means necessary. Yet there is growing acceptance that the goals of environment and development are not necessarily in conflict. They can—and they need to—be reconciled. When governments reacted to the outbreak of the global economic crisis in late 2008, they did devote small portions of their economic stimulus efforts to a variety of “green” programs. Worldwide, an estimated 15 percent of stimulus funds went to support renewable energy and other low-carbon energy technologies, energy efficiency in buildings, low-carbon vehicles, and water and waste management efforts.¹⁹

In the face of crisis, new concepts such as a Global Green New Deal were developed. In the United Kingdom, the New Economics Foundation published a pioneering report on the topic, and the U.N. Environment Programme (UNEP) became a prominent advocate. UNEP also commissioned landmark reports on green jobs and the green economy.²⁰

While the term “green economy” has gained currency, its meaning is still up for interpretation among governments, corporations, and civil society groups. UNEP defines a green economy quite broadly as one that results in “improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy is low carbon, resource efficient, and socially inclusive.” UNEP argues that “the greening of economies need not be a drag on growth. On the contrary, the greening of economies has the potential to be a new engine of growth, a net generator of decent jobs, and a vital strategy to eliminate persistent poverty.”²¹

The extent to which a green economy and

economic growth are compatible is open to question, however. Developing technologies that are more resource-efficient and low-carbon is undoubtedly important and can help address some of the environmental problems humanity faces. But efficiency also makes consumption cheaper and may simply stimulate greater demand—a consequence that economists call the “rebound effect.” Making a difference in the quest for sustainability will require an absolute decoupling of economic performance and materials use. (See Box 1–1.)²²

The transition to a green economy is as much about social, political, and cultural change as it is about developing new technologies.

Mark Halle of the International Institute for Sustainable Development argues that a green economy “is not merely a redecoration of the traditional economy with green trimming, but a form of economic organization and priority-setting substantially different from the one that has dominated economic thinking in the richer countries for the past several decades.”²³

Because circumstances and needs vary so widely, industrial, emerging, and developing countries have different conceptions of what exactly a green economy entails—and how to get there. In fact, some observers in emerging and developing economies worry that green economy prescriptions could be used to justify

Box 1–1. The Role of Decoupling in a Green Economy

Decoupling human well-being from resource consumption is at the heart of the green economy. Typically, this is measured in terms of energy or materials use per dollar of gross domestic product. From 1981 to 2010, global energy intensity decreased by about 20 percent—or 0.8 percent each year. But this does not necessarily mean that growth in physical throughput and environmental impacts comes to an end. Indeed, during the same period world primary energy consumption expanded by 82 percent, from 6.6 billion tons of oil equivalent to 12 billion tons. Thus even an impressive rate of relative decoupling does not necessarily lead to an absolute decoupling.

This is also true for material throughputs. So the absence of even relative decoupling in the extraction of key metals like iron ore, bauxite, copper, and nickel is striking. Their consumption is rising faster than world GDP. If one day absolute decoupling of GDP from throughput becomes a reality globally, it will reinforce the logic of limiting throughput, providing evidence that environmentally costly resource use is no longer essential for generating wealth.

All this will need to change in the future. Fortunately there are signs that some countries may have already started down this decoupling path. Recent statistics show that in at least the United Kingdom absolute decoupling might have started a decade ago. In 2009, the country’s total material requirement was 81 percent of its 2001 value.

If the idea of a green economy is to be taken seriously, the clear conclusion is that the world, starting with the most advanced countries, must engage in a discussion about a transition to “prosperity without growth.” Making this possible requires a change in economic and social structures so that an economy without growth does not equal an unstable economy. One source of instability is clear: the wealthiest 20 percent of the world’s population account for nearly 77 percent of total private consumption. Acceptance and implementation of prosperity without growth therefore requires a radical change—an immediate struggle against international and societal inequalities.

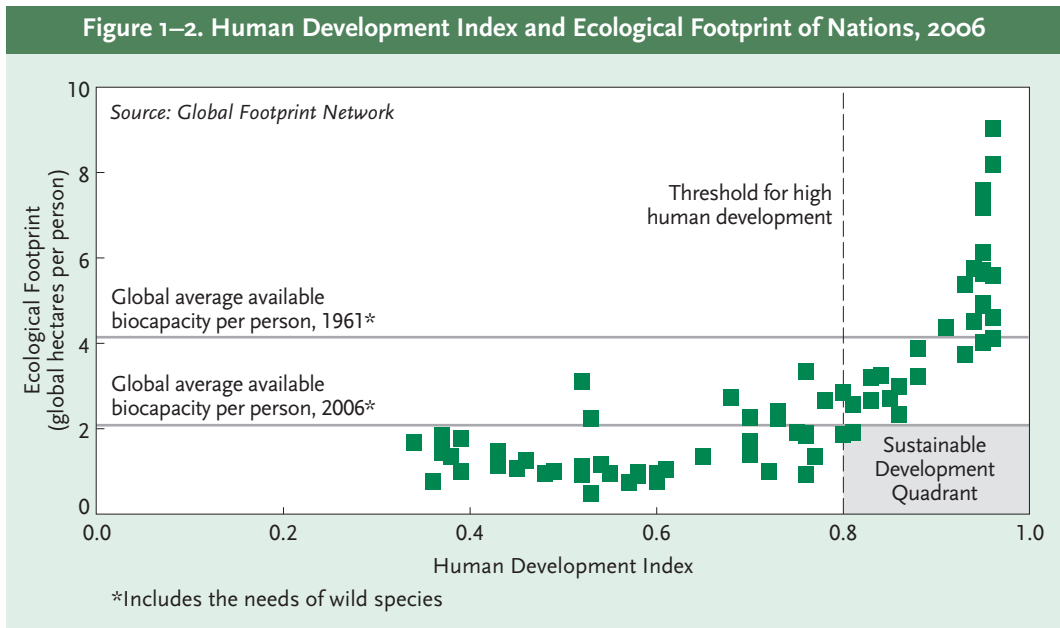
—José Eli da Veiga
University of São Paulo
Source: See endnote 22.

measures that block their developmental aspirations. A statement on behalf of the G77 nations cautions that a green economy “should not lead to conditionalities, parameters or standards which might generate unjustified or unilateral restrictions in the areas of trade, financing [official development assistance] or other forms of international assistance, leading to a ‘green protectionism.’” A key challenge at the Rio 2012 conference is to address these worries, detailing the ways in which people in different parts of the world can derive benefit from a greener economy and committing to greater fairness in the distribution of resources and wealth.²⁴

Figure 1–2, which brings together human development and ecological footprint information, shows that most countries are on either one or the other extreme of the spectrum: high development achieved on an unsustainable basis or low footprint at the cost of human deprivation. Only a smattering of countries come close to the “sustainable development quadrant.”²⁵

A green economy needs to be an appealing prospect. The aspiration is for “sustainable prosperity” for all—the result of a process of sustainable development that allows all human beings to live with their basic needs met, with their dignity acknowledged, and with abundant opportunity to pursue lives of satisfaction and happiness, all without risk of denying others in the present and the future the ability to do the same.

The world’s consumer class needs to reduce its overconsumption—adjusting its focus from the accumulation of mostly short-lived, flimsy products that enter the waste stream at increasing speeds. Reducing its claim on resources would provide the ecological space needed to allow poor people to escape the deprivations of underconsumption. And considering that overconsumption has led to an obesity epidemic, social isolation, air pollution, traffic, and many other social ills, reducing consumption could have significant positive impacts on the well-being of the consumer class as well. Improving the lot of the world’s poor would



not have to come at the cost of a massive increase in carbon emissions. The *2011 Human Development Report* notes that providing everyone with at least basic modern energy services would increase emissions only 0.8 percent by 2030.²⁶

The notion of a steady-state economy was examined by economist Herman Daly as early as 1973. Since then, many other studies and proposals have looked at how human well-being and happiness can be achieved without ever-increasing material throughput, be it in the form of making products more durable and repairable or work-time reductions and better sharing of work in line with greater productivity. With the passage of time, steady-state alone may no longer suffice. Some analysts argue that in order to live within the limits of Earth's capacity, the rich people of this planet need to undergo degrowth. (See Chapter 2.)²⁷

Although the industrial countries bear major responsibility, Saleemul Huq of IIED argues that emerging economies may ultimately hold the key to a green economy. Undergoing massive economic growth, the emerging countries are starting to join the materialism of the old industrial countries. But they are not yet fully locked into a fossil-fuel-dependent economy and can leapfrog to technologies, structures, and lifestyles that are consistent with a low-materials "good life." Huq cautions that they will only do so if this is seen as a positive, pro-development opportunity rather than a burden urged on them. The Center on International Cooperation at New York University points out that emerging economies are not only "laboratories of the future" but also models that poorer developing countries might want to emulate.²⁸

Developing countries have a major stake in the move toward a green economy. Already they confront the repercussions of the "brown economy" in the form of climatic upheaval. On average, natural resources and ecosystem ser-

vices provide about a quarter of the GDP in the poorest countries. In India, the poorest tenth of the population derives 57 percent of its GDP from ecosystem services through farming, animal husbandry, forestry, and fisheries. A continuation of current economic practices puts the natural assets on which the livelihoods, and lives, of hundreds of millions of poor people depend at increasing risk from climate change and other repercussions of ecological breakdown. More-sustainable and equitable provision of housing, transportation, energy, and sanitation could bring major benefits with regard to poverty reduction and healthier, safer lives.²⁹

Establishing waste management and recycling operations that raise sanitary standards, for example, and providing clean drinking water and improved sanitation would substantially improve health and the quality of life, and it would generate much-needed employment. Decentralized provision of clean energy, including mini-grids and off-grid applications, can bring jobs and facilitate local business development.³⁰

Growth of basic energy services, low-tech transportation networks, ecologically designed sanitation systems, and basic improved housing offer a double benefit: not only improving the daily lives of billions of people but also significantly reducing their ecological impacts. And these changes do not have to come at the expense of sufficient employment. To the contrary, they can contribute to more satisfying, meaningful livelihoods.

Green Jobs

One problem with the current economy is that it relies too much on limited and polluting resources such as fossil fuels and too little on an abundant resource—people. While greater labor productivity has undoubtedly been an engine of progress over time, its single-minded pursuit is turning into a curse.

From here on, progress requires a greater focus on energy, materials, and water productivity instead. Employment at adequate incomes is key to making an economy work for people, and therefore the transition to a green economy requires particular attention to good-quality jobs that contribute to preserving or restoring environmental quality.

For now, green jobs are still primarily found in a relatively small number of countries that lead in green R&D and investment, have adopted innovative pro-environmental public policies, and are able to build on strong scientific and manufacturing bases as well as on educated and skilled workforces. Countries like Japan, Germany, China, or Brazil already have the bulk of employment in renewable energy, energy and materials efficiency, and related fields. But growing numbers of countries are claiming a share of the green economy. And employment in installing, operating, or maintaining equipment like solar panels, wind turbines, insulation materials, rail vehicles, or efficient industrial equipment will be more widely spread than jobs in green manufacturing.

A sustainable economy requires social solidarity and equity between and within countries and cannot be built on “green for a few” policies—with benefits for only some countries, some companies, or some workers. Instead, there is a need for a “green for all” strategy, with new approaches in energy provision, transportation, housing, and waste management that combine technical and structural change with social empowerment.

Energy. Energy use pervades virtually every human activity on Earth, and the heavy reliance on fossil fuels is a major culprit behind urban air pollution and climate change. In 2010, oil, gas, and coal accounted for 87 percent of commercial primary energy use. Renewables (including hydropower) contributed 8 percent, and nuclear energy, 5 percent. But many people in developing countries contend with

energy poverty—suffering from inadequate access to energy in general and relying on traditional, polluting biomass (firewood, charcoal, manure, and crop residues).³¹

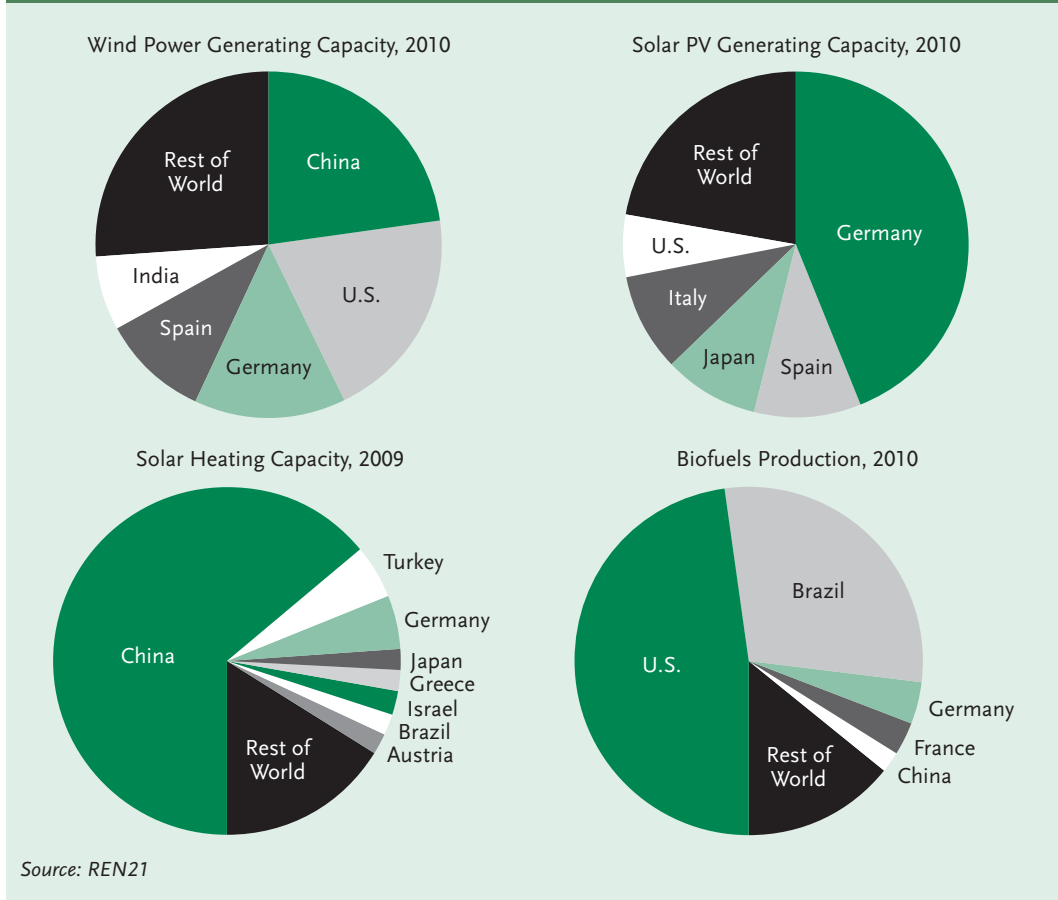
A green and equitable energy transition will require richer individuals to both switch from fossil fuels and reduce their energy demand via greater efficiency and conservation efforts, whereas the poor will require more, and cleaner, energy. Both dimensions of this transition offer employment opportunities. On the whole, the energy sector is a relatively small employer, notwithstanding its catalytic effect on the entire economy. But renewables tend to be more jobs-intensive than the already highly automated, mature fossil fuel industry, and the pursuit of energy efficiency similarly offers greater job opportunities than increasing energy supply does.³²

Renewable energy is expanding fast. From just \$7 billion in 1995, global investments surged to \$243 billion in 2010, principally in wind energy (\$96 billion) and solar power (\$89 billion). In terms of total renewable power installed (excluding hydropower), the leaders are the United States, China, Germany, Spain, and India. (If hydropower is included, Canada and Brazil join the ranks.) Figure 1–3 provides details of installed capacity in wind power, solar photovoltaics (PV), and solar heating, as well as biofuels production.³³

In 2010, wind energy represented by far the largest chunk of renewable power generating capacity in the world, followed by biomass power and solar PV. The latter is picking up speed, with global capacity growing at an average annual rate of 49 percent between 2005 and 2010, compared with 27 percent each for wind power and concentrating solar power and 16 percent for solar hot water. Bioethanol production expanded 23 percent annually and biodiesel, 38 percent.³⁴

More than 100 countries are now developing wind power capacities. The leading wind turbine manufacturers are based in China,

Figure 1–3. Leading Countries in Renewable Energy, by Type, 2009/2010



Denmark, Germany, the United States, Spain, and India. By capacity installed, the global leaders are China, the United States, Germany, Spain, and India. As Spain’s Navarra region has demonstrated, the development of wind power can bring substantial local benefits. Navarra, which now derives two thirds of its electricity from renewables, managed to cut unemployment from a peak of 12.8 percent in 1993 to 4.8 percent in 2007—the result of an active industrial policy intended to build wind power capacity and a concerted worker training effort focused on this industry.³⁵

Companies based in China, Taiwan, the

United States, Germany, and Japan are the global leaders in manufacturing solar PV panels. But even in countries with no domestic solar manufacturing industry there are important job opportunities in sales, assembly and installations, and maintenance. Small solar PV systems already provide power to a few million households in developing countries, and solar cookers and solar portable lights offer a range of benefits. In Bangladesh, micro-credit schemes helped spread solar systems from 320,000 homes in 2009 to 1.1 million by August 2011.³⁶

Biofuels production is expanding, although

controversy continues to rage over food-versus-fuel issues and whether such fuels offer a net carbon benefit compared with fossil fuels. Ethanol and biodiesel together provided about 2.7 percent of worldwide road fuels in 2010. Brazil has by far the largest bioethanol industry. About half a million people work in sugarcane cultivation for biofuels use, and another 190,000 in processing the sugarcane into ethanol. Biogas is also growing in significance, with more than 44 million households worldwide relying for their lighting and cooking needs on community- or household-scale biogas digesters. China leads the world, but gasifiers for heat generation are also increasingly used in India and other countries.³⁷

Although data on employment are not systematically collected and gaps persist, the number of renewable energy jobs worldwide is undoubtedly rising fast. A rough estimate suggests at least 4.3 million direct and indirect (that is, supply chain) jobs, up from an estimate of 2.3 million in 2008. These estimates are incomplete and do not fully account for the jobs or livelihoods in connection with many rural energy projects.³⁸

Renewable energy employment is still smaller than fossil fuel employment. The extraction of oil, gas, and coal employs more than 10 million people, and the use of these energy sources in thermal and electricity plants adds several million more jobs. But given that renewable energy still accounts for a small share of total energy use, the number of people already working in this field is encouraging.³⁹

Transportation. The transportation sector, especially the close to 1 billion motor vehicles on the world's roads, accounts for more than half of global liquid fossil fuel consumption. Accounting for about a quarter of energy-related carbon dioxide emissions, with emissions rising faster than those of any other economic sector, transportation is an important contributor to climate change. Its other impacts include urban air pollution, accidents,

congestion, noise pollution, and obesity. Social dimensions deserve equal attention: where dependence on private automobiles is heavy and public transport options are sparse or non-existent, it can be expensive, and perhaps impossible, for people to secure access to jobs and livelihoods without cars. (See also Chapter 4.)⁴⁰

Efforts to reduce transportation's footprint have principally focused on technology—measures to boost vehicle fuel efficiency, switch to alternative fuels, and develop hybrid and electric vehicles. Although automobile fuel efficiency has been improving in recent years, truly efficient models still do not come close to even one tenth of total sales, and hybrid and electric vehicles presently account for less than 3 percent.⁴¹

A number of countries are putting their faith in the development of biofuels. Brazil is now producing almost exclusively “flex-fuel” vehicles that can run on any blend of gasoline and ethanol, and it is hoping to convert its entire fleet over the next 20 years or so. More than 80 countries, many of them poor, have decided to pursue a different alternative: vehicles running on natural gas (mostly compressed natural gas, or CNG), which burns more cleanly than gasoline. Pakistan, Iran, Argentina, Brazil, and India accounted for three quarters of the global CNG fleet of close to 13 million in 2010.⁴²

But such measures alone are inadequate in the face of growing numbers of vehicles and longer distances driven. Rich countries in particular need to reduce their heavy car dependence. Other countries, too, are already emulating or aspiring to build an automobile-centric system, often at the cost of badly polluted and congested cities. Especially in poor societies, public spending in support of car-centric transportation systems accentuates social disparities. Expenditures on roads crowd out other needed public infrastructure and marginalize those who cannot afford a car.

In both wealthy and poor countries, a reliable and affordable public transit system plays a critical role in achieving a greater degree of social equity. Poorly planned or designed transport systems and unnecessary sprawl can make access to jobs physically difficult and costly, especially for low-income households in both rich and poor countries, which have to allocate a disproportionate share of their meager incomes to cover transport expenses.

A more forward-looking policy seeks to achieve a better balance of transportation modes and thus to boost the share of public transit in cities and rail in intercity travel. By avoiding sprawl and limiting the distances that must be traveled by people and freight, options like public transit, biking, and walking become more feasible.

Such changes have implications for the transportation sector workforce. While no truly comprehensive studies have been undertaken on the employment implications of a far-reaching modal shift, some rough figures indicate the current situation. Direct employment in manufacturing motor vehicles runs to more than 8 million people worldwide, with multiples of this figure in the supply chain. By comparison, relatively few people are today employed in manufacturing rail vehicles—about half a million directly. Larger numbers of people work in operating public transportation systems: more than 7.6 million in urban mass transit and 7.1 million in freight and passenger railways.⁴³

There are some encouraging changes under way, all of which are translating into increased employment in operating public transportation systems. Ridership in urban transit and intercity rail is rising worldwide, as are investments in these transportation systems. Interest in high-speed rail is growing around the world. Japan, France, Spain, and China are at the forefront, but the number of countries running such trains is expected to grow from 14 in mid-2011 to 24 over the next few years. Bus

Rapid Transit systems on a broad scale were pioneered in Curitiba, Brazil, in 1974. Particularly since the 1990s, this concept is spreading to a growing numbers of cities. By 2005, an estimated 70 Bus Rapid Transit systems were in operation worldwide.⁴⁴

Buildings. Approximately one third of global energy end-use takes place within buildings, and nearly 60 percent of the world's electricity is consumed by residential and commercial buildings. Under business-as-usual assumptions, building energy demand is projected to increase by 60 percent by 2050. Yet this sector also offers enormous potential for significant energy savings and carbon emissions reductions through more-appropriate building materials and greater insulation in windows and roofing, as well as reliance on more-efficient heating and cooling systems, lighting, appliances, and equipment in buildings.⁴⁵

The construction industry also carries great importance as an employer. In most countries, it accounts for anywhere from 5 to 10 percent of all jobs, though often with strong seasonal variations. Worldwide, at least 111 million people find work in this sector. But given that the industry is highly fragmented and that many workers are in informal employment arrangements that evade capture in official statistics, the real figure is likely to be much higher.⁴⁶

The renovation and retrofitting of existing buildings tends to be of greater importance in industrial countries with a large existing building stock and low population growth rates. In developing countries, in contrast, greening new construction is very important, especially in China and India, where the economies are expanding fast and rural residents stream into cities in search of work. In the developing world, informal and often substandard housing is widespread; improving health and safety standards there is as much of an urgent task as greening the building stock is.

The share of the urban population living in

slums in the developing world declined from 39 percent in 2000 to 32 percent in 2010. But the absolute numbers of slum dwellers have grown along with expanding populations. In sub-Saharan Africa, more than 60 percent of the urban population lives in slums—double the rate in Asian developing countries and much higher than the 24 percent in Latin America. Poor households typically spend a disproportionate share of their incomes on energy, so providing more energy-efficient housing can be a tool in the fight against poverty. But poor households will need grants and subsidies to help them weatherize or otherwise upgrade their homes.⁴⁷

In principle, labor-intensive programs to improve the social and environmental aspects of housing and urban infrastructure could provide large numbers of green jobs—through new construction of buildings and retrofitting of existing ones and through production of insulation materials and efficient building components like windows, heating and cooling units, or appliances. Studies in a range of countries confirm that there is ample opportunity for greening existing construction work and generating additional employment and that more jobs are created than are lost in the energy-intensive industries that produce inputs like cement.⁴⁸

Recent years have seen a degree of progress in greening buildings, though it is difficult to arrive at any worldwide figures. Although standards such as the LEED program in the United States have been replicated in a number of countries, there is no agreed worldwide definition of what constitutes green buildings. Also, allowance has to be made for a wide variety of climatic and other circumstances that require differentiated sets of standards. In the United States, it is estimated that 10–12 percent of new commercial construction and 6–10 percent of new residential construction



Calderliver

The first LEED Platinum mixed-use multi-family building in Southern California.

is green—figures that indicate an enormous potential remains to be tapped.⁴⁹

Regulations and public policies can push the greening of buildings along. They include measures such as building codes, green procurement programs, appliance standards, energy- and water-efficiency requirements, mandatory audits, and the like. (See Chapter 10 for more on policies.)

In the European Union, the Energy Performance of Buildings Directive requires energy performance certificates to be presented to customers for building sales or leases. The European Commission thinks that by 2020, some 280,000–450,000 new jobs might be created, chiefly among energy auditors and certifiers, among inspectors of heating and air-conditioning systems, in the construction sector, and in industries that produce materials components and products needed to improve the performance of buildings. The insulation industry umbrella group Eurima provides more optimistic projections, estimating additional employment figures ranging from 274,000 to 856,000 jobs. And a study by the European Trade Union Congress and others estimated that up to 2.59 million jobs could be created by 2030.⁵⁰

Some of the stimulus funds that were passed in several countries to address the economic crisis have been directed toward green building purposes. It has been estimated that this sector's 13 percent share of Germany's stimulus package of more than \$100 billion will create some 25,000 manufacturing and construction jobs related to building retrofits. This builds on an earlier success story in Germany, where public funds for apartment and building retrofits triggered substantial additional private spending equivalent to \$26 billion. By 2008, some 280,000 units had been renovated and about 221,000 jobs either were created or were saved from elimination—at a time when the construction industry faced a recession and the prospect of widespread layoffs. The same could happen in the United States, where the Better Buildings Initiative could result in the creation of 114,000 jobs.⁵¹

Greening the building sector requires adequately trained workers and professionals, such as architects. Denmark, Brussels in Belgium, Singapore, and Thailand are among the governments that have developed training programs. Many developing countries still fall short of the necessary expertise. In India, for example, more than 80 percent of the construction sector workforce is unskilled workers.⁵²

Recycling. At the base of the brown economy is the large-scale extraction of natural resources. Mining of ores and minerals grew a staggering 27-fold during the twentieth century, outstripping the rate of economic growth. Now that easily exploited deposits have largely been exhausted, environmental impacts of mining are bound to worsen. Already, about three times more rock and other material needs to be removed now than a century ago in order to extract the same quantity of ore. A throwaway economy means that waste streams keep expanding along with mining. Worldwide, about 11 billion tons of solid waste were collected in 2010 (and an even larger, but unknown, quantity generated).⁵³

All too often, waste management translates into landfilling, incineration, and shipment to other countries, either legally or illicitly. These practices impose an environmental and health toll on adjacent communities. By contrast, recycling, reuse, and remanufacturing of products permit a reduction in logging and mining; they save substantial amounts of energy and water by replacing the processing of virgin materials with greater reliance on scrap materials; and they avoid air, water, and land contamination associated with waste disposal. More than 1 billion tons of metals, paper, rubber, plastics, glass, and other materials are recycled each year. But that is only one tenth the amount of waste collected.⁵⁴

Recycling is also good from an employment perspective. On a per-ton basis, sorting and processing of recyclables sustains 10 times as many jobs as landfilling or incineration do, and the manufacturing of new products from recycled materials or equipment employs even more people than sorting recyclables does. In industrial countries, recycling is a formal industry, often with a high degree of automation. In the United States, direct and indirect recycling employment runs to an estimated 1.4 million, and in the European Union, about 1.6 million.⁵⁵

In developing countries, much greater quantities of recyclable materials are recovered by informal waste pickers than by formal waste management companies. Urban areas in these countries often have inadequate waste collection or none at all. Wastes typically end up strewn in streets, fields, and streams, as well as in open dumps. Many of the people engaged in waste picking and recycling in these countries are part of the informal economy.⁵⁶

People who sift through uncontrolled dumpsites confront hazardous work conditions: they are exposed to a range of toxins and are vulnerable to intestinal, parasitic, and skin diseases. Earnings are often low and unstable. Moreover, municipal governments all too often

regard waste pickers as expendable nuisances, frequently either ignoring them in policymaking or even harassing and persecuting them.⁵⁷

An often-cited estimate puts the number of informal waste pickers at 1 percent of the urban population in developing countries. In absolute terms, a figure of 15 million people is sometimes mentioned in the literature. Mathematically, 1 percent today translates into a number as high as 26 million people. These numbers, however, are little more than educated guesses.⁵⁸

Forming local and national cooperatives, waste pickers are becoming more organized in fighting for legalization, improvements in their social status, and better bargaining positions vis-à-vis municipalities and powerful intermediaries. Brazil has the most advanced group. The Movimento Nacional dos Catadores de Materiais Recicláveis emerged from years of local organizing efforts that had their origins in Porto Alegre and São Paulo in the 1980s. During the past decade, national legislation offered growing support. Waste picking has been recognized as a legitimate occupation. In 2010, the National Policy of Solid Waste mandated that informal recyclers be included in municipal recycling programs. The comprehensive national poverty alleviation plan (Brasil Sem Miséria) launched in June 2011 offers training and infrastructure support to waste pickers, and aims to achieve their socioeconomic inclusion in 260 municipalities.⁵⁹

In various parts of the world, the last two decades have seen growing legal recognition of waste pickers as attitudes gradually change, strengthening of their organizations, integration into municipal waste management systems, and social inclusion. This has resulted in improvements in earnings and secured some social benefits. But Chris Bonner of Women in Informal Employment: Globalizing and Organizing cautions that “gains made by workers in the informal economy are often impermanent. There is a constant struggle not only to

improve their situation, but often to merely hold on to what they have won.”⁶⁰

The global economic crisis is affecting the demand and market price for recyclables and compelling more people to rely on waste picking in the face of a lack of formal-economy jobs. Among the challenges this brings are moves toward waste management privatization in ways that sideline the pickers and their organizations and the emergence of new waste streams—particularly e-waste—that expose waste pickers to new occupational and health risks and will require a greater degree of training (to understand how to safely dismantle electric and electronic waste products, for instance) as well as proper equipment.⁶¹

Promoting Green Jobs Globally

To improve knowledge of green jobs trends and developments, governments need to craft detailed definitions and sector-by-sector criteria (as the U.S. Bureau of Labor Statistics is currently doing). Internationally, it would make sense to establish green jobs standards and certifications so that national data are comparable. Industry surveys or input-output modeling (as the German environment ministry has done in the renewable energy sector for several years) can help generate regular annual data. Green jobs data need to be integrated into regular national economic statistics.

Skills shortages could hamper the emergence of a green economy. To avoid this, governments should support a range of training efforts. A national skills mapping exercise could be undertaken with the goal of establishing green skill profiles in each industry, identifying strengths and gaps in the existing skills base, and creating a plan for overcoming gaps (as the regional government of Navarra, Spain, has done). Governments can also set up or facilitate the creation of green training centers and can encourage private companies and educational institutions to incorporate green jobs skills into

courses, apprenticeships, and other workplace training. They should ensure gender balance and access by disadvantaged communities.

Green jobs are not necessarily or automatically “decent” jobs. Effective social dialogue between employers and workers, including collective bargaining arrangements, and broader public-private partnerships aiming for equitable outcomes are essential for decent work standards and social inclusion. Government action may be needed to establish and enforce decent wage standards and occupational health and safety rules. Governments may also need to pass social-inclusion legislation (as Brazil has done with regard to informal waste pickers).

To date, the emergence of green jobs has not come at the direct expense of jobs in polluting industries. Eventually, however, transitioning to a green economy does imply that such industries will shrink and perhaps disappear entirely. Governments should proactively create and fund “fair transition” programs for affected workers and communities, offering retraining and, if necessary, relocation assistance so people have an opportunity to find new livelihoods in the emerging green economy.

The nature of green jobs will vary according to economic sector and even to some extent country by country. Thus the specifics of the green jobs experience will naturally vary to some extent as well. Nonetheless, in order to facilitate the spread of green technologies and methods, it is important to share lessons—policy innovations and green roadmaps that have proved successful—as widely as possible. The United Nations can play a useful role in this context by establishing a UN Green Jobs Best Practices Unit (with inputs from UNEP and the ILO). Further a UN Green Jobs Coordinating Group could ensure policy cohesion among various agencies. An advisory council drawn from experts and stakeholders from business, labor, and civil society could help guide this work and analyze key developments, opportunities, and challenges.

A New Global Solidarity

A new global solidarity for sustainability must take root, ensuring that no one—no country, no community, no individual—is left behind. Unlike the conventional pattern of economic competition that produces—and indeed is expected to produce—winners and losers, the quest for a green economy needs to focus on win-win outcomes that render economic activities sustainable everywhere. There is already intense competition among manufacturers of green technologies and products, such as wind and solar energy, and government policies that reek of green mercantilism and protectionism. (See Box 1–2.)⁶²

It is essential that cooperative models be developed for shared green development. A simple slogan therefore would be “avoid losers.” Given shared environmental vulnerabilities on a small and increasingly crowded planet whose resources are being maxed out, there needs to be recognition that the winners will lose if the losers don’t win.

For the rich of this Earth, greening action looks of necessity different than it does for those who aspire to greater wealth and for those who contend with poverty. In relative terms, the poor have to win more in a green economy than the rich do, so as to reduce and eventually overcome the stark differences in claims to the planet’s remaining resources. Environmental sustainability is ultimately impossible without social equity. This requires that the rich reduce their draw on materials and goods in absolute terms.

Both environmental and social conditions have reached a state that requires a clean break with business-as-usual solutions. A key need is a rebalancing of public and private actions. Since the first Rio conference, in 1992, too much time and effort has gone into making market forces propel the greening of the economy. Market forces only work when they are properly regulated. Otherwise they tend

Box 1—2. Renewable Energy and Trade Disputes

U.S.-China Wind Subsidies. In September 2010, the United Steelworkers petitioned the Obama administration, asserting that the Chinese government provided millions of dollars in illegal subsidies to domestic turbine manufacturers that agreed to use key components made in China rather than imported parts. The union claimed this amounted to an unfair advantage and undermined U.S. companies' competitiveness in the Chinese market. The U.S. administration agreed to investigate the case and subsequently filed an official complaint with the World Trade Organization (WTO). After consultations, China in June 2011 agreed to halt its wind power subsidy program. Critics, however, argued that the steelworkers should push their own government to pursue more ambitious strategies, including adoption of a national renewable energy target. U.S.-China trade disputes could hinder future development of renewable energy technologies. The trade disagreement could also have been used to kick off a discussion on the need for WTO to legalize and regulate subsidies for alternative energy.

U.S.-China Solar Trade. In October 2011, seven U.S. solar panel manufacturers filed a complaint against the Chinese solar energy industry, accusing it of receiving illegal government subsidies and dumping completed panels in the United States under their marginal cost. The filing at the Department of Commerce and the International Trade Commission called for the U.S. government to impose high tariffs—more than 100 percent of the wholesale import price—on Chinese solar panels. In the first eight months of 2011, China exported \$1.6 billion worth of solar panels to the United States. The Chinese Development Bank provided \$30 billion in low-interest loans to solar manufacturers in 2010 alone, helping China

to claim the title of leading solar exporter. This helped push wholesale solar panel prices down from \$3.30 per watt of capacity in 2008 to \$1.20 in October 2011—a key factor in the much-discussed bankruptcy of U.S. manufacturer Solyndra. Chinese solar panel makers may move some of their operations to the United States in an effort to evade protectionist measures. The imposition of tariffs could also trigger Chinese retaliation: instead of purchasing raw materials for solar panel production from the United States, China could import them from German suppliers. Chinese officials claim that the steep tariffs would hamper the cooperative development of solar energy and undermine global support for clean energy.

Japan-Ontario FIT Dispute. In September 2010, Japan filed a complaint with WTO against Ontario's 2009 Feed-In Tariff (FIT), which offers renewable energy manufacturers a higher rate than conventional electricity suppliers receive for a 20-year period. The FIT is coupled with a domestic content requirement of 50 percent in 2010 and 60 percent in 2011. It has created 13,000 jobs and attracted \$20 billion in private-sector investment so far. Japanese companies not meeting the domestic content rule argue it is discriminatory and that FIT encourages import substitution subsidies that are illegal under WTO rules. The FIT has come under scrutiny from the North American Free Trade Agreement, and the European Union joined Japan's complaint, claiming FIT is in "clear breach of the WTO rules." The irony is that Japan passed its own FIT legislation in August 2011, a policy driven in part by the Japanese government's decision to reduce reliance on nuclear power in the wake of the Fukushima disaster.

— Miki Kobayashi
Source: See endnote 62.

toward excess, create “externalities,” and disregard social equity. The last 20 years have witnessed a certain abdication of public policymaking responsibility. It is time to rediscover this obligation. There is a need to recognize that “harnessing” the market requires more public policy, not less.

The policy suggestions that follow are not meant to be complete but rather suggestive—indicating the types of approaches that could help humanity achieve sustainability with equity.

A Network of Cooperative Green Innovation Centers. In order to spread green innovation as widely as possible, cooperative models are needed for green R&D and technology deployment. The *World Economic and Social Survey 2011*, for instance, refers to the successful experience of the Consultative Group on International Agricultural Research as an example of how to promote the rapid worldwide diffusion of new technologies via a network of publicly supported research institutions. This model could be adapted, and the *Survey* suggests that an international regime allow for “special and differential access to new technology based on the level of development” and that intellectual property rights be changed to accommodate the rapid diffusion of green innovation ideas.⁶³

Global Top Runner. One way to harness market forces for sustainability is through an approach Japan has taken with its Top Runner program, which was established in 1998 and has helped to make its economy one of the world’s most efficient. The program sets efficiency standards for a range of products that collectively account for more than 70 percent of residential electricity use. On a regular basis, products available in a given category are tested by advisory committees with members from academia, industry, consumers, local governments, and mass media to determine the most efficient model. That then becomes the new baseline for all manufacturers, driving a process

of continuous innovation and improvements. Adopting such an approach on a global level could promote leapfrogging for sustainability. This could have even more fascinating impacts if paired with a social top runner policy that counters a global race to the bottom of cheap wages.⁶⁴

Green Financing. Inefficient products all too often have the advantage of seeming cheap. Green products can be difficult to afford when they have high upfront costs (even though they save consumers money over the product’s lifetime). Reducing or eliminating this disadvantage is a key task in facilitating the transition to a green economy. This could be accomplished with the help of a public green financing program that offers preferential interest rates and loan terms for green products. Green financing would be even more effective if it were linked to a Top Runner approach—if the most efficient models also had the most attractive loan terms.

Durability, Repairability, Upgradability. Tax and subsidy policies do not differentiate products according to how well they are made. In fact, orthodox economics assumes that a product that does not last is preferable because it requires faster replacement and thus helps lead to greater economic activity. In a green economy, tax and subsidy policies should give preferential treatment to products that are durable, repairable, and upgradable.

Energy and Materials Productivity. Similarly, tax and subsidy policies, as well as other tools of public policy, could be structured to accord preference to companies that excel in improving the energy and materials productivity of their operations. This could be done somewhat like the Top Runner approach by setting standards in each manufacturing sector and evaluating performance on a regular basis.

Pricing for Sustainable Well-being. In the existing economy, consumers who buy larger quantities of a given product are often

rewarded with price discounts, which encourages consumption irrespective of need. In a green economy, a reverse system of pricing should be introduced. It would allow consumption of goods in quantities that are consonant with the satisfaction of basic needs and a decent life at low, affordable prices. But usage beyond a certain threshold would only be possible at steeply rising prices per unit, in order to discourage overconsumption. In different countries, the precise definition of such thresholds would naturally vary. Dakar in Senegal and Durban in South Africa have adopted very low tariffs for an initial amount of water consumption. The price for water usage above that level rises steeply. Such a tiered pricing system should be adapted for a broad array of products and services.⁶⁵

Reduced Work Hours. Today most people end up working long hours in an effort to earn enough to move with the crest of a never-ending consumption wave. Decent wages make this an easier process than if people feel they have to resort to debt. An economy and population that are less in thrall to consumerism might entertain an approach that seeks to translate increased productivity in the economy into reduced work hours rather than more consumption. Rich countries will need to undertake this transformation if they are to reduce their overall claim on the planet's resources and open up much-needed material and ecological space for the world's poor.

Economic Democracy. A large number of countries are run by at least nominally democratic processes, but there is no democracy in the economic sphere that determines so much of human life—the bulk of people's waking hours, their incomes, their careers and sense of self-worth. In the United States, for example,

corporations now have the same free speech rights as people, yet the vast majority of people have no control over corporations that often bestride the globe and trump the democratic process by dint of having become “too big to fail.” Companies that are bound more closely to the needs and interests of their own workforces and the communities they serve might play a more constructive role in creating a sustainable economy—less single-mindedly pursuing growth and profits at the expense of people and nature. There is limited experience with alternative, more participatory forms of running companies, such as the Mondragón Corporación Cooperativa (MCC) in the Basque region of Spain. While limits to corporate growth are likely a necessary element of a more sustainable economy, it does not mean that companies need to be local only. Worker-owned MCC is Spain's seventh largest company—with over 100,000 workers, annual sales of \$20 billion, and 65 plants overseas. One key to a different type of corporation is greater participation by stakeholders and less influence by shareholders. (See also Chapter 7.)⁶⁶

Transformational policies are needed if sustainable prosperity for all—present and future generations—is the goal. The alternative is a planetary triage that, to use the terminology popularized by the Occupy movement, may work for the 1 percent but not for the 99 percent. Policies need to reach far beyond technical fixes, limited changes in tax and subsidy policies, or other marginal efforts. The nature and rationale of the economic system will need to change in fundamental ways. From growing the economy at all costs, the central focus instead becomes an economy that permits ecological restoration and enables human well-being without materialism.

Chapter 1. Making the Green Economy Work for Everybody

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Chapter 2. The Path to Degrowth in Overdeveloped Countries

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