Sustainability & Resource Productivity Practice

How to make Green Growth the new normal

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Jeremy Oppenheim

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In the 20th century, the world built a spectacular engine for economic growth, which delivered incredible, if deeply uneven, prosperity. Four key factors drove this engine:

1. New technologies, especially those associated with the "second industrial revolution," from the 1920s to the 1960s, across much of the OECD;

2. Expanded labor inputs as a result of growth in the working-age population and higher female participation in the workforce;

3. Urbanization, which acts as an accelerator for technological modernization and productivity growth;

4. Increased use of resources: materials, water, land, energy and other forms of (largely unpriced) natural capital.

The first three factors are still in play. There is room to add new technology and many parts of the world economy have a huge "catch-up" opportunity. There is also still a population "growth dividend" in much of Africa, the Middle East and South/Southeast Asia—provided that education can be provided to the burgeoning populations of young people. (However, the developed countries and China are fighting the demographic headwinds of aging.) As for urbanization, the world as a whole is still in the middle of a long S curve, with brisk growth in many economies.

But the fourth factor—the use of natural resources—cannot last. And because of that, the 20th-century growth model will no longer work.

Over the next few decades, then, the world needs a resource revolution (see link).

There are three propositions:

First, the era of brown, resource-heavy growth is over.

Second, a new model of resource-efficient growth is emerging; in fact, it is already reshaping the global economy. There are material examples of what it takes to decouple growth from resource consumption; to drive renewable energy; and to boost agricultural productivity.

Third, while this new model of resource-efficient growth is going mainstream, it is not scaling up fast enough, relative to the erosion of natural capital and the risks to the planet.

Throughout history, great challenges have inspired great, transformative leadership. And what could be a greater challenge than building a model of economic growth that can deliver both widespread prosperity and good planetary stewardship? What follows is a roadmap that describes how to get to a more regenerative, more inclusive system of economic growth.

The 20th-century growth model

In 1900, the world used 35 exajoules of energy (the equivalent of the current annual electricity consumption of South Korea). By 2000, that had risen to 500 exajoules, and it could be 700 exajoules in 2030—requiring about 3,000 additional 1 gigawatt (GW) power-stations (one gigawatt can power as many as 1 million US homes).

That is just one example of the 20th-century dynamic: As the global economy expanded almost 20-fold, resource requirements also expanded anywhere between 600 to 2,000 percent, depending on the resource. Even as demand for resources expanded, supply expanded even more. How did this happen?

First, technology played a big role. The efficiency in exploration, production, transportation, and conversion technologies all improved by 1 to 2 percent year-on-year. Over 100 years, that makes a huge difference.

Second, there was a massive expansion in the extensive resource frontier. During the 20th century, the world doubled the amount of land under cultivation, largely at the expense of forests. Massive new oil-fields came onstream, especially in the Middle East but also in Alaska, the North Sea and Mexico. In the mining sector, the development of the Pilbara iron ore deposits in Australia and of copper reserves in Chile underpinned relatively low metals prices through the second half of the 20th century.

Third, resource production has been heavily subsidized—at a cost of between US$1 and US$3 trillion per annum (the bigger figure takes into account the depletion of natural capital). As a result, the world economy, and a relatively small number of economically advanced nations, in particular, began to depend on low resource prices for economic growth.

As McKinsey research has shown, although new resources keep being discovered, in many cases, they are also becoming increasingly expensive to extract. The marginal cost of production for many mining commodities could be three times higher in 2020 than it is today. While iron prices have fallen since the financial crisis, for example, they are still 5.5 times higher than they were in 2000.

Increased energy and mineral prices—including for the phosphates critical for agriculture—and more variable weather conditions are key factors higher food prices. For poor rural households, which typically spend more than two-thirds of their income on energy and food, higher prices can make the difference between the chance to save just a little, to send their kids to school for an extra year, to try out a new seed—or not to do so and stay at subsistence level. For the 50 million annual new entrants to the urban middle class, higher food and energy prices could knock them back to poverty.

High and volatile prices are only one challenge to the 20th century model. The other, deeper challenge is the scale and speed with which the world is eroding its natural capital. The risks are clear. With respect to climate, the earth is on track to hit CO_2 concentration levels of 600 to 700 parts per million (ppm), way above the 450 ppm climate safety threshold as defined by the Intergovernmental Panel on Climate Change. We are already seeing real change—most graphically in the Artic. Last year, the Arctic reached its lowest summer cover (4.3 million square kilometers) since formal records began.

There are other important environmental/natural capital challenges:

- **Over-fishing:** According to the Food and Agriculture Organization, some 25 percent of fish stocks are over-exploited and another 50 percent are fully exploited. A billion poor people depend on fish for protein.

- **Tropical forests are thinning:** Deforestation and drought could turn them from carbon sinks into carbon sources.

- **Soil erosion:** Land degradation affects more than 20 percent of the world's arable land.

- **Species extinction:** The current rate of extinction is at least 1,000 times higher than the natural rate, according to the International Union for Conservation of Nature. Only five other times has species extinction been this high—all during mass extinction events such as the die-off of the dinosaurs.

The transition economy

The global economy has never before had to manage a clash between what it takes, in terms of resource supply, to move the middle-class needle and what needs to be done to mitigate severe, potentially irreversible, environmental risks.

That said, the economic response to these pressures is under way. The world economy is, slowly but surely, turning green—just not fast enough.

First, there have been dramatic efficiency improvements in energy, aviation, water, and power. To give just one example, the energy required to produce a ton of steel has fallen by more than 30 percent over the past 25 years, while the CO_2 required for a kilowatt hour of European power production has fallen by 20 percent over the past 15 years. The efficiency of water use in agriculture is 50 percent better than it was in 1960, and while the average refrigerator in the US is 50 percent bigger than it was in 1980, it uses less than half as much energy. Over the same period, the average fuel economy of passenger cars has increased from about 20 miles per gallon to 30.

Second, the world is on the cusp of a massive wave of clean-tech innovation. Solar-power costs are falling dramatically (one-fifth of what they were in 2000) and investment in renewables is rising sharply, to around US$250 billion in 2012. Agriculture is about to experience a new "green revolution"—with new seeds, microbial fertilizers, bio-pesticides, soil regeneration technologies and the expanded use of genetically modified organisms (GMOs).

Batteries are also plunging in price. Today, they cost more than US$500 per KWh. In 10 years' time, they are expected to cost half that. More controversially, there is the emergence of what the International Energy Agency calls the "golden age of gas," owing to rapid advances in horizontal drilling and hydraulic fracturing. The benefit of this development, as evidenced by declining US greenhouse gas emissions, is that gas can displace the use of coal in power systems. The downside (in addition to local environmental risk), is that cheap gas will delay the transition away from a fossil-fuel-reliant economy.

Third, by the mid-2020s, there could be a dozen or more US$100-plus billion global markets, scaling up around the combination of resource productivity and clean tech.

These markets, ranging from energy storage to agricultural production systems, have the potential to grow disruptively, fundamentally changing how daily life. The building efficiency market, such as smart windows and passive heating/cooling systems, is likely to be worth well more than US$100 billion a year by 2020, while the low-carbon power market (combining renewable energy with smart grids) is set to be worth more than US$1 trillion by 2025. In almost every sector, there are new business models emerging that use far less waste throughout the product life-cycle.

Leading the new growth model

To steward the planet's natural capital, while lifting billions out of poverty and securing the well-being of the new middle class, a much faster transition from the 20th century model is required.

The good news is that such changes have occurred before. Labor productivity was transformed throughout the 20th century; a similar revolution in the resource area is required. How to do so is not a mystery—far from it. There are three essentials:

First and foremost, in order to mobilize the US$3 trillion a year that will be needed to build a resource-efficient growth model, investing in the markets of the future needs to be seen as possessing superior risk-return characteristics.

Second, the rate of technology development and deployment must increase. By necessity, this will often involve a high degree of publicprivate collaboration, since resource systems are capital-intensive and typically subject to significant regulation.

Third, policies need to send strong, consistent signals about resource productivity, including the value of natural capital, so that resource productivity is rewarded.

There are inspiring examples of what leadership can deliver. Consider how Germany helped to create the global market for solar; or how Mexico transformed its domestic appliance market by encouraging households to get rid of their inefficient fridges. There are many such examples, and they all follow a remarkably similar pattern:

- They mobilize capital from some hybrid combination of public and private sources. Even in the UK, which has deep capital markets, the government has set up its own environmental investment bank, precisely to address imperfections in how these markets assess the risk of investments in resource productivity.
- They use public-private risk-sharing models to support the deployment of technology. This has proved worthwhile in the power, heavy industry and building sectors, and could also work in agriculture.
- They provide the right incentives, whether through pricing arrangements or tax regimes, that allow for rapid depreciation of capital. This is especially beneficial for capital-intensive renewable energy and energy-efficiency plays.

Much of the innovation and deployment will come—must come—from "new growth" economies . Countries that are going through rapid economic growth tend to be open to new ideas. In addition, they are still relatively free to shape their physical infrastructure and they have a different set of technological opportunities.

Different roads, same destination

Sticking to the 20th century model of growth will mean not meeting many important economic, social and environmental goals.

The essential ingredients to the new growth model are known and achieveable; and the technological capacity to build a different model exists. The real challenge is on the institutional front. There is work for everyone.

Investors need to take the lead in defining the risks associated with the 20th century model of development. They should push for new accounting standards that provide greater transparency on these risks; and put more emphasis on resource productivity benchmarks when analyzing corporate performance.

Corporate leaders and entrepreneurs need to devise business models that encourage deploying cleaner technologies at scale. They should commit to becoming resource-productivity champions—driving this agenda all through the supply chain.

Policy-makers need to get the market incentives right. To function properly, resource markets need an integrated approach to the prices, tax policies and regulations that shape investor, operational and end-user behavior.

New-growth economies need to take advantage of their astonishing opportunity to mobilize the best capital, entrepreneurs, and technology from around the world to build a better growth engine.

Old-growth economies need to make a much deeper connection between economic renewal and the resource productivity opportunity. In Europe, McKinsey estimates suggests there is a resource productivity prize worth up to 5 percent of GDP—much of which could feed back into increased demand for services and hence new job creation.

No doubt the process of replacing the 20th-century growth model will be messy, but the risks of failure and the rewards of success are too great for incrementalism. The next generation is owed a fighting chance to build a world in which green growth is the new, shared norm.

Jeremy Oppenheim is a director in McKinsey's London office who specializes in sustainability and leads McKinsey's Sustainability & Resource Productivity Practice