

**CHAPTER**

# 3

## **GREENING INDUSTRIALIZATION: RATIONALE AND CONCEPTS**



**A**frican countries need to industrialize to increase incomes, create employment, raise value-added activity and diversify their economies. Industry has traditionally been a central source of generating employment—in developed and developing countries. In Africa, though, high rates of economic growth over the past decade have not translated into the structural transformation of the economy required. Manufacturing, also, has not made the expected contribution to aggregate output, trade or gross domestic product growth (ECA, 2014). African income levels are the lowest in the world, with 34 African nations among the least developed countries.

As described in Chapter 1, high economic growth in recent years has been based largely on commodity trade, especially oil and other extractive industries. African countries remain marginal players in domestic and international markets for manufacturing, and they provide a negligible share of manufactured exports in world markets. Tellingly, manufacturing often has a lower share of gross domestic product (GDP) today than it was 30 years ago. Given the ubiquity of market failures, industrial policy interventions are needed to address these failures, as markets are unable to generate the kinds of structural transformation needed to achieve the leap from low- to high-productivity activities.

As seen in the Economic Report on Africa 2014 (ECA, 2014), African governments have paid too little attention to the role of public authorities in achieving such a structural transformation. Policies and institutions are needed to focus on increasing investment, building higher-productivity economies and bringing public and private actors together in coalitions. Priority areas for government investment are education, infrastructure and technology innovation, set within a long-term development plan that demonstrates a consistent, but flexible, approach. Nothing can replace strong,

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high-level political leadership to demonstrate stability in macro-economic policy and the vision needed to generate domestic and international investment. From this can develop joint ventures and alliances between domestic and foreign firms, alongside an approach that celebrates innovation and technology cooperation (ECA, 2013).

The action plan for Accelerated Industrial Development of Africa—launched in 2008—presents national, regional and continental priorities, including the following:

- ▶ Mobilizing resources for regional infrastructure and heavy industry.
- ▶ Rallying the African diaspora to draw on their science and technology skills.
- ▶ Allocating 1 per cent of gross domestic product to research and development (R&D).
- ▶ Establishing university chairs in innovation and technology transfer centres.
- ▶ Building greater South–South collaboration.
- ▶ Harmonizing business and investment law.

A development-oriented state is central to such an action plan—one that is committed to mobilizing all stakeholders and has the welfare of the people at heart (ECA, 2013).



## 3.1 AFRICA'S IMPERATIVE TO ADOPT GREEN GROWTH

African countries risk being trapped at the bottom of the economic ladder, with activity focused on little processing, scarce high-value activity and raw-material and commodity production. This means continued reliance on imports of high-value products and weak linkages with products from the knowledge economy, research and development and enhanced technology.

Debate over the best strategy to escape this trap is appropriate, given the contraction in global “policy space” that is limiting the industrial policy measures countries can use. Some people argue that African countries should focus their investment on areas of comparative strength—especially agriculture and commodities—because that is where their skills and enterprise lie (see, for example, Lin and Monga, 2010). Other observers,

### **Africa needs smart industrial policies led by government to enhance value-addition and industrial upgrading**

however, argue that such a strategy leaves Africa in a low-income trap; hence, other countries will always be ahead in skills, incomes, market power and technology. In that case, African producers would remain junior partners in global value chains, in which power and profit are concentrated at higher levels in the chain (see, for example, Chang, 2015). Consequently, writers such as Chang recommend a “smart” industrial policy

led by government that pushes the boundary of policy space, negotiates with lead firms in global value chains, identifies ways to create domestic linkages and invests in new activity areas in which the country can acquire comparative advantage gradually (Chang, 2015).

The global economic environment is more complex than such a binary strategy choice implies. Patents, value chains, economies of scale, global investment flows, transnational corporations and intellectual property rights all require that a country’s chosen path consider what other countries—geographically near and far—are pursuing. The country also must determine its relative ability to attract the kind of investment it wants from international and domestic sources.

Although Africa has a few globally competitive enterprises (as in mining equipment in South Africa), many of its industries and manufacturing firms operate with significant inefficiency and high resource use (Chapter 4). Those inefficiencies, however, imply big opportunities for gains because investing in new technology should bring major financial and resource savings. In addition, the choice between following a natural resource pathway and knowledge-intensive manufacturing is less stark in practice. Multiple synergies exist between the two sectors. Also, many opportunities are available for increasing knowledge intensity not just of the mining sector but of the firms feeding inputs into the resource sector and processing its outputs (see, for example, Morris, Kaplinsky and Kaplan, 2011).

Chapter 1 flagged that global growth is tailing off, with a widespread slowdown in emerging markets and concerns about low growth in Europe

and Japan. Commodity prices have been hit hard. Although the steep fall in oil prices since mid-2014 offers a windfall to oil importers and consumers, it also demonstrates the high-price volatility of primary commodity production. Building a more diverse economic structure makes sense for African countries. It potentially opens further opportunities for greater intra-African trade, in which manufactured products could play a larger role than in global trade. A regional approach to industrial policy also makes sense, alongside constructing the associated infrastructure—such as transport, water and energy—that lays the foundations for further growth.

In a world of uncertain market dynamics, one thing is certain. The future will be different from the past. As a consequence, countries need to build flexible and resilient economies. Although growth in the global economy will continue to reflect shifting patterns of investment, competition, and technology, shocks are also likely from bubbles in the financial and commodity sectors. Huge asymmetries exist in power, information and access to capital held by large investors, global corporations and major commodity brokers. Individually, African countries often are weaker parties in commercial negotiations, but they could gain greater leverage by working together.

Climate change will bring rising temperatures, increased risks of flood and drought, and greater shocks to agricultural systems. Following the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change in Paris (UNFCCC), the necessary directions for future growth and investment are clear. Global leaders have agreed that all economies must shift from unabated use of fossil fuels. They have also pledged “intended nationally determined contributions” designed to set the global economy on a new course “to keep a global temperature rise this century well below 2 degrees Celsius and to drive efforts to limit the temperature increase even

further to 1.5 degrees Celsius, above pre-industrial levels” (UNFCCC, 2015). African countries have a choice: Continue along a business as usual path, or seek to be among the leaders in designing the new global low-carbon economy (Denton, 2014). This post-Paris moment offers a time for critical reflection about where Africa’s strategic advantage lies.

For all these reasons—the needs to pursue structural transformation, to increase the knowledge intensity in production, to sustain global competitiveness on a dynamic basis and to mitigate the impacts of climate change—Africa needs to adopt a green growth strategy in which green industrialization looms large. Box 3.1 below outlines the main concepts and definitions surrounding Industrialization, Structural Transformation, Greening and their inter-linkages.

### GREENING INDUSTRIALIZATION: TRADE-OFFS OR WIN-WINS? SYNERGIES BETWEEN GROWTH, SUSTAINABILITY AND FAIRNESS

*The growth–environment trade-off.* A common assertion has been that greening the economy is a luxury that only richer countries can afford—that poor countries should develop first and clean up later (see, for example, Grossman, 1995). An equally common argument from neo-classical economists has been that social inclusion can be dealt with after the important business of economic growth has been achieved, through taxes and redistribution. In both cases, governments are urged to stand back and let the market economy operate without hindrance. This approach assumes that a hands-off approach to the environment will maximize growth and provide resources that more than compensate for the costs of environmental and social oversight. This trade-off is thus defined as the conflict between two desirable but incompatible objectives.

**BOX 3.1 KEY CONCEPTS AND DEFINITIONS**

**Industrialization** is the process during which a society or country transforms itself from a primarily agricultural society into one based on manufacturing goods and providing services. Individual manual labour often is replaced by mechanized production, and craftspeople are replaced by assembly lines. This transformation usually is accompanied by a set of other changes that enable industrialization, such as increased attention to skills development, accumulation of capital for investment and migration of people from rural to urban centres (and the loss of autonomy it brings). Although the terms *manufacturing* and *industry* often are used interchangeably, *industry* is defined as manufacturing, plus construction and utilities.

In the late 18th century in the United Kingdom, the first Industrial Revolution began with mechanizing the textile industry, based on harnessing water and coal power. Subsequent phases (see box figure 3.1) introduced the moving assembly line and the age of mass production. Further technological revolutions followed, including the digital age. Technology leaders are now exploring a set of techniques that could bring a radical shift in resource productivity and enable more sustainable production patterns based on biomimicry and nanotechnology.

Each phase or type of industrialization offers opportunities—and challenges—for sustainable and equitable growth. It affects not only how and where products are made and consumed but who gains the benefits. Substantial and unanticipated benefits from the new technology are likely. Examples of those benefits include the way banks, mobile phones and electronic identification cards have enhanced the capabilities of poor rural households to access information and services and thus improve their livelihoods.

**Structural transformation** is the reallocation of resources—especially through new investment—from lower- to higher-productivity activities, shifting typically from agriculture to industry and modern services and within each of these sectors from lower- to higher-productivity niches. It is closely linked to—and usually involves—industrialization and is associated with shifting people and resources into transforming and processing raw materials.

**Greening** describes a shift towards more resource-conserving activity, in which production and consumption patterns use fewer resources and create less waste over their life cycle. Typically, greening involves a combination of decoupling (main-

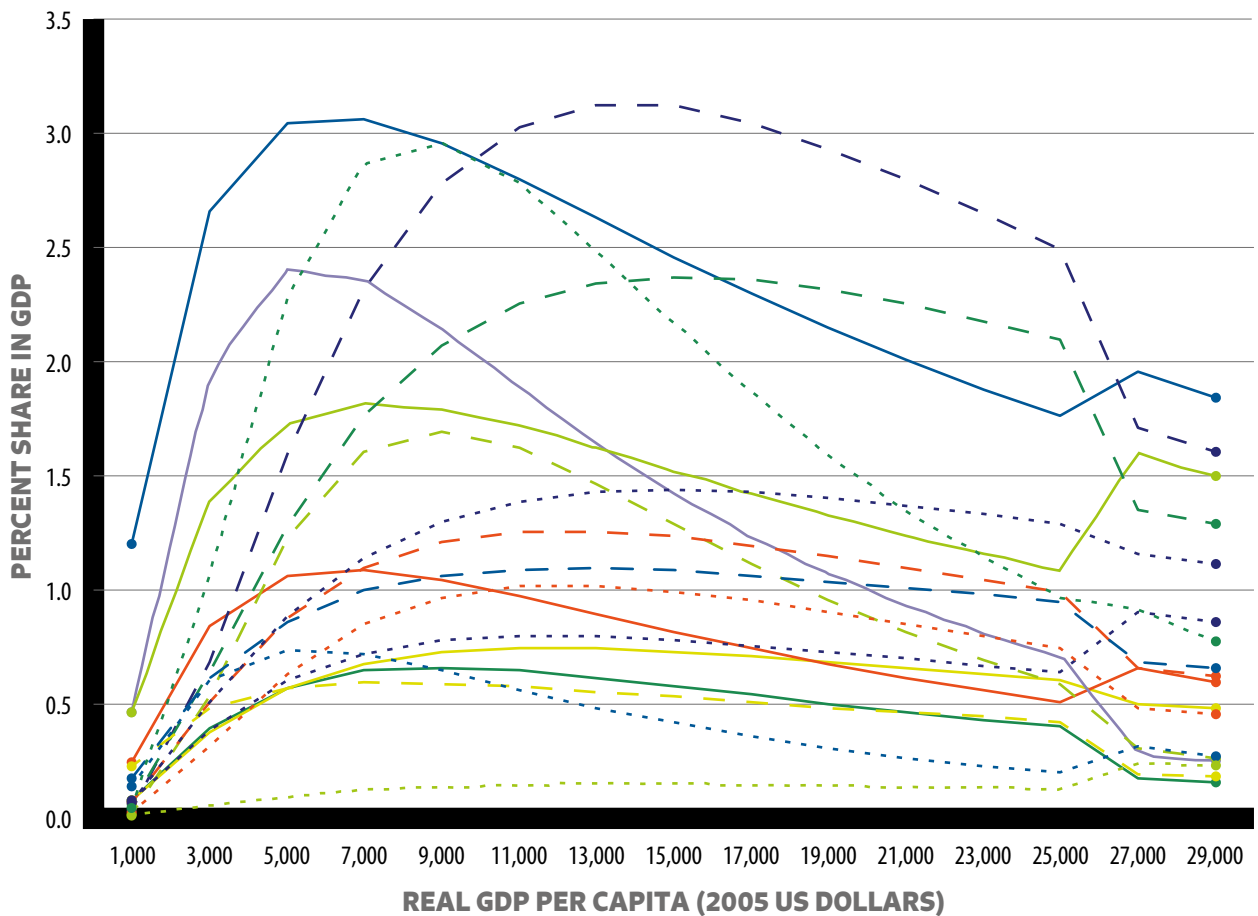
taining production while using lower input, especially water and carbon-based energy), avoiding environmentally harmful impacts (including effluent spillage and noxious gas emissions) and supporting a diverse and sustainable biosphere.

**Greening industrialization** ensures that the structural transformation process avoids stranded assets; copes with accelerated urbanization; reduces resource inputs and increases efficiency in the production process; cuts back on harmful waste emissions, such as chemical effluents and poisonous gases; strengthens infrastructure to reduce environmental impacts (such as pollution and extreme weather events); and maintains or improves the natural resource base, including providing associated environmental goods and services.

A green economy ensures that environmental goods and bads are properly costed into individual, enterprise and government decisions. Given that environmental assets often are poorly valued, with unclear property rights, they are subject to generating many externalities, leading to overuse and damage. Interventions are therefore needed to ensure that environmental asset values are properly accounted for—collectively—as “natural capital” (the living and non-living aspects of nature that produce value and benefits to people and that underpin all other capital in economies and societies). Many examples of market failure exist, in which reliance on prices and markets to allocate goods and services over people, space and time is likely to generate unwanted social and environmental damage. Greenhouse gas emissions are the most obvious example, but a range of other environmental goods and services—such as threats to clean air, forests, water, biodiversity and genetic resources—require public action to correct market failure (see “Environmental damage means we need to green the economy,” later in this chapter).

The United Nations Environment Programme’s definition of a green economy is far broader and has social—not just environmental—objectives. By its definition the green economy “results in improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities. In its simplest expression, a green economy can be thought of as one that is low carbon, resource efficient and socially inclusive” (UNEP, 2011). In this report we keep separate the social and environmental dimensions, as they do not necessarily overlap and each demands different kinds of intervention.

**BOX FIGURE 3.1 "NORMAL" PATTERNS OF INDUSTRIALIZATION**



- Food and beverages
- Textiles
- Wood products (excl. furniture)
- Printing and publishing
- Chemicals and chemical products
- Non-metallic mineral products
- Fabricated metal products
- Electrical machinery and apparatus
- Motor vehicles, trailers, semi-trailers
- Tobacco products
- Wearing apparel, fur
- Paper and paper products
- Coke, refined petroleum products, nuclear fuel
- Rubber and plastics products
- Basic metals
- Machinery and equipment n.e.c.
- Medical, precision and optical instruments
- Furniture; manufacturing n.e.c.

SOURCE: THE NATURAL EDGE PROJECT (2004).

**Sustainable development** is “a pattern of development that meets the needs of the present without compromising the ability of future generations to meet their own needs” (UN, 1987). Sustainable development promotes the idea that social, environmental and economic progress are attainable within the limits of Earth’s natural resources if greater attention is paid to people’s needs as opposed to their wants. Sustainable development approaches everything as connected through space, time and quality of life.

*Growth–environment synergies or win-wins.* Counter-posed to the trade-off argument is the idea of growth–environment synergies. According to this viewpoint, far from an environmental approach undermining the rate of growth, it makes a positive contribution to growth. For example, Perman and Stern (2003) show that the statistical basis for the growth–environment trade-off is not



robust because, in particular, it ignores the consequences that neglecting the environment today may have by actively undermining current and future growth. The trade-off argument also does not consider that regulation tends to be more effective in higher-income nations than in middle and low income countries. In the latter countries, tackling pollution after it has occurred is largely ineffective.

*Type of growth.* The growth–environment trade-off does not involve only the rate of growth but the type of growth and the distribution of the fruits of growth. Conventional calculations of GDP provide little insight into the qualitative dimensions of the rate of growth, thus complicating the arguments for and against the existence of the growth–environment trade-offs and synergies or win-wins.

*Time preferences.* It is important to ask: over what period should the growth–environment trade-off be considered? How long might environmentally destructive growth be worthwhile before the fruits of rapid growth can be used to clean up the mess? Alternatively, if win-win synergies exist between growth and the environment, how long might those synergies take to emerge? Also, if a short-term investment is needed to achieve medium- to long-term gains, what is a reasonable payback period?

For Africa the costs to incomes, growth and health from business as usual will be heavy because of the rapid rise in demand from increased consumption across the continent (Chapter 5). Reparation of environmental damage is difficult and expensive. For example, soil lost by erosion often ends up in dams, reducing energy and irrigation capacity, and digging out soil from the reservoir and transporting it back to the lands from which it had been washed would be a hugely expensive task.

The politics of achieving an inclusive and green industrialization cannot be ducked. The language of “trade-offs” may be used by those who will not benefit from such change. For example, a government may want to invest in an electrified railway line to carry freight to and from its port but face opposition from major politicians who have already invested in a fleet of trucks and for whom freight transport is a big earner.

Sections of the rest of this report revisit the extent to which growth–environment synergies or trade-offs prevail, the quality of growth involved, and the optimum periods within which policymakers should consider these issues.

## 3.2 PROMOTING INDUSTRIALIZATION IN AFRICA

The three previous *Economic Reports on Africa* have focused the spotlight on how African governments can promote industrialization through commodities, trade and dynamic policy (ECA, 2013, 2014, 2015). They emphasized that countries seeking to accelerate industrialization must adopt a strong developmental mind-set and enact far-sighted, coherent efforts to address market failures and promote restructuring.

In a fast-changing world, African countries risk falling further behind in the competitiveness stakes as a result of weak institutions, infrastructure deficits and limited skills and technological achievements. Successful government action involves systematic coordination between the private and public sectors while avoiding risks of “capture” by interest groups. Structural change will inevitably involve the disruption of established industries and activities, hence the importance of the state ensuring policy independence (Oqubay, 2015).

Structural transformation has traditionally been seen as achieved by an economy “marching through the sectors,” based on a snapshot of the economy at different levels of per capita income. On the basis of these data, the assumption is that all economies will move through a similar “normal pattern of industrialisation” (Kuznets, 1966; Syrquin and Chenery, 1989). An economy with an average GDP per capita of \$3,000, for example, can expect to have an industrial sector dominated by food and beverages, textiles and several “lesser” activities. An economy with eight times that GDP per capita can expect to host a much more diverse pattern, in which electrical machinery and vehicle manufacturing are major elements but food and beverages are still important.

This traditional approach has been widely used to target sectors in industrial policy (Lin and Monga, 2010). A government would seek, for example, to target a level of per capita income somewhat above its existing level, analyse the “normal” pattern of economic structure at this higher income level (figure 3.1), and then promote investment in those identified growth-opportunity sectors that were close to its existing industrial structure.

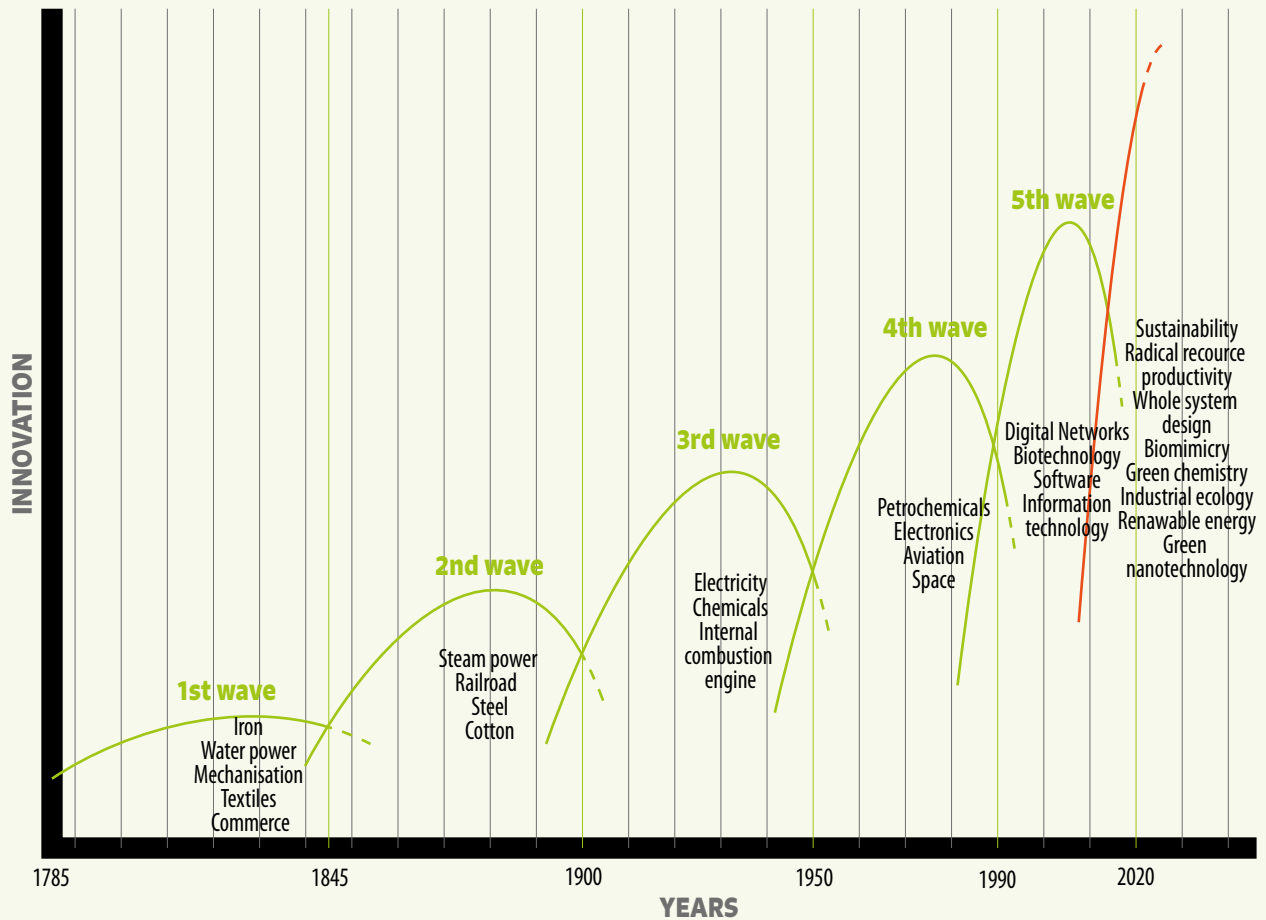
A similar approach might be used to target greening of the industrial sector through the decoupling of growth from resource use. The priority sectors would be identified on the basis of their overall environmental footprint, however, rather than their association with levels of per capita income. Figure 3.2 illustrates how this approach might be used to lower energy intensity by inducing policymakers to direct investment from the metals, chemicals and non-metallic mineral sectors towards low energy-intensive sectors. If water scarcity is the principal environmental challenge, a government might promote economic activity that minimizes water use by moving out of food, textiles and leather goods and into electronics, biotechnology and pharmaceuticals.

This traditional approach of “marching through the sectors” suffers, however, from five main limitations, suggesting that while helpful at one level, it can only be a partial guide for achieving a green and inclusive vision.

- ▶ The “fallacy of composition” refers to an action or policy that offers returns only if a limited number of countries adopt the same policy. If many (or all) economies do so, a dearth of production will ensue in the vacated sectors and an excess of production in the targeted sectors.



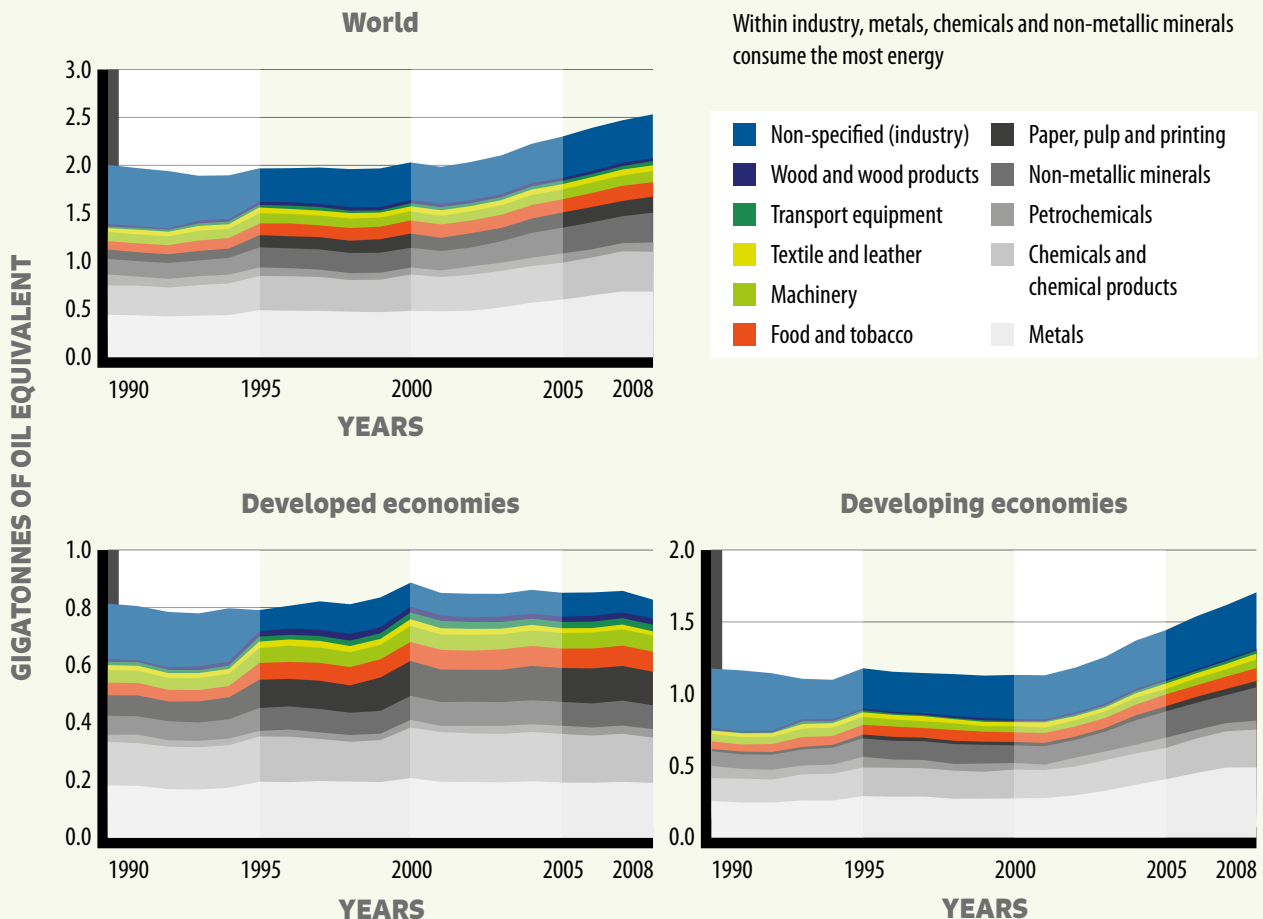
**FIGURE 3.1 WAVES OF INNOVATION AND STRUCTURAL TRANSFORMATION**



SOURCE: HARAGUCHI AND RESONJA (2010).

NOTE: GDP = GROSS DOMESTIC PRODUCT; N.E.C. = NOT ELSEWHERE CLASSIFIED.

- ▶ Even if a single economy acts alone to shift from environmentally damaging activity, without similar decisions in other economies, this move would not reduce the overall environmental impact—it would merely displace it. It is one of the weaknesses in the industrial economies’ lauding the reduction of their environmental impact because of a reduction in energy intensity in their economies. In many cases this measures only the footprint of their own production rather than that of their consumption, ignoring the displacement of energy-intensive links to low- and middle-income economies.
- ▶ Because environmental impacts have no respect for national boundaries, the greening economy may be unable to avoid the negative externalities generated in the non-green sectors they are vacating. For example, water use in one economy may have profound impacts on water access and livelihoods in adjacent economies (box 4.6: Impacts of competition for scarce water).

**FIGURE 3.2 INDUSTRIAL ENERGY CONSUMPTION, BY SECTOR, 1990–2008**

SOURCE: IEA (2010).

- ▶ Structural change may be as important within sectors as between sectors by, for example, introducing much more energy-efficient equipment to replace existing plants. This point is particularly relevant given the increasing spread of value chains as drivers of economic growth, nationally and globally.
- ▶ Some sectors are newly emerging and have little historical experience on which to draw in charting opportunities opened by new challenges. Newly industrializing economies have scope to leapfrog the structures of industrialized economies. An important emerging opportunity lies in producing capital goods and services for the green economy, as countries such as China and Germany have shown. Demand for green capital goods and services has a growth elasticity larger than 1 (that is, demand for these goods rises faster than the growth of the economy as a whole), so investment in this sector offers great potential.



### 3.3 CHANGING CONTEXT FOR INDUSTRIAL POLICY

Historically, *industrialization* and *structural transformation* have largely been synonymous. For many years, higher productivity, the wellspring of higher per capita incomes, has resulted from a structural transition out of agriculture into manufacturing and, within manufacturing, from low- to high-productivity sectors. In recent years, however, industrialization has become more complicated as elements of global industrial production have increasingly been undertaken in globally dispersed value chains. Achieving high and sustainable incomes by expanding manufacturing and industry is no longer a simple matter of moving out of agriculture into domestic manufacturing and then into services. The boundary between sectors has become much fuzzier, and achieving higher-productivity growth within sectors demands increasing differentiation of the capabilities required..

Industrial policy has a critical role to play in achieving green growth. Historically, advanced economies promoted their industrial transformation through active industrial policies that involved

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restrictive trade policies, active state support for domestic industry, and often state ownership of industry (Chang, 2015). After the wave of post-war decolonization, the majority of developing economies pursued a similar path of import-substituting industrial policy, involving a mix of trade protection, state investment and active industrial policies. Many entailed interventions in the macroeconomic environment (for example, competition policy and fiscal measures), horizontal policies that met market failures across a range of sectors (to promote skills development and build infrastructure), and policies to systematically promote specific sectors' development (Chang, 2015).

From the mid-1970s, however, that active industrial policy approach came under attack from two directions. First, many of the industrial entities established by import-substituting policies were marked by inefficiencies induced by lack of competition, low levels of scale and high rates of corruption, which led to growing balance-of-payments deficits, declining growth and rising debt. Second, the wave of neoliberalism that was surging through the advanced economies led to intense pressure on governments in Africa and elsewhere to sweep away their industrial policies. Proponents argued that the unleashing of market forces would allow industry to thrive in Africa and throughout the world. Support for this policy agenda was drawn from the export success of Asian economies, which was mistakenly characterized as driven almost entirely by market forces (Amsden, 1989; Chang, 2015; Wade, 1990).

The outcome for Africa did not meet the confident expectations of the neoliberal reformers. During the past 30 years in Africa, the abandonment of industrial policy has been linked to a decline in the

share of manufacturing in GDP in virtually all the continent's economies and a fall in Africa's share of global manufacturing value added. At the same time, many of the formerly dominant advanced economies have increasingly become victims of deindustrialization, as the Asian economies—which had long used active public industrial policies—increased their competitiveness (Chang, 2015). Industrial policy and development of productive capacity have thus become increasingly recognized as needed now and once again are high on the policy agenda—not just in developing nations but in rich countries as well.

## GLOBALIZATION AND THE RISE OF VALUE CHAINS

Many goods and services are now produced and distributed along global value chains, with different elements of the design, production and retail phases in (usually) widely separated locations. Differentiating “industrialization” from broader forms of “structural transformation” in the economy, therefore, is not easy. Many activities previously incorporated in manufacturing (for example, design and marketing) have now been outsourced to the service sector. Also, industry-related growth in the resource sector (including agriculture) cannot be easily distinguished from investments in services and agriculture. Following established practice, in this report we shall refer to this challenge of promoting higher-productivity growth as one of “industrialization,” in the full knowledge that the pattern of structural change in contemporary economies cannot be captured by the expansion of manufacturing only.

The new industrial policy agenda, however, is of a different character. Many instruments of traditional industrial policy, such as trade policy protection and state ownership, are inhibited by international agreements, such as World Trade Organization (WTO) agreements and Economic

Partnership Agreements. Instead, governments are increasingly focusing on promoting capabilities to enable their enterprises to compete in global value chains, promote technical and economic innovation (Mazzucato, 2013), develop new sectors (such as green industries), and diffuse new technologies (renewables, for example).

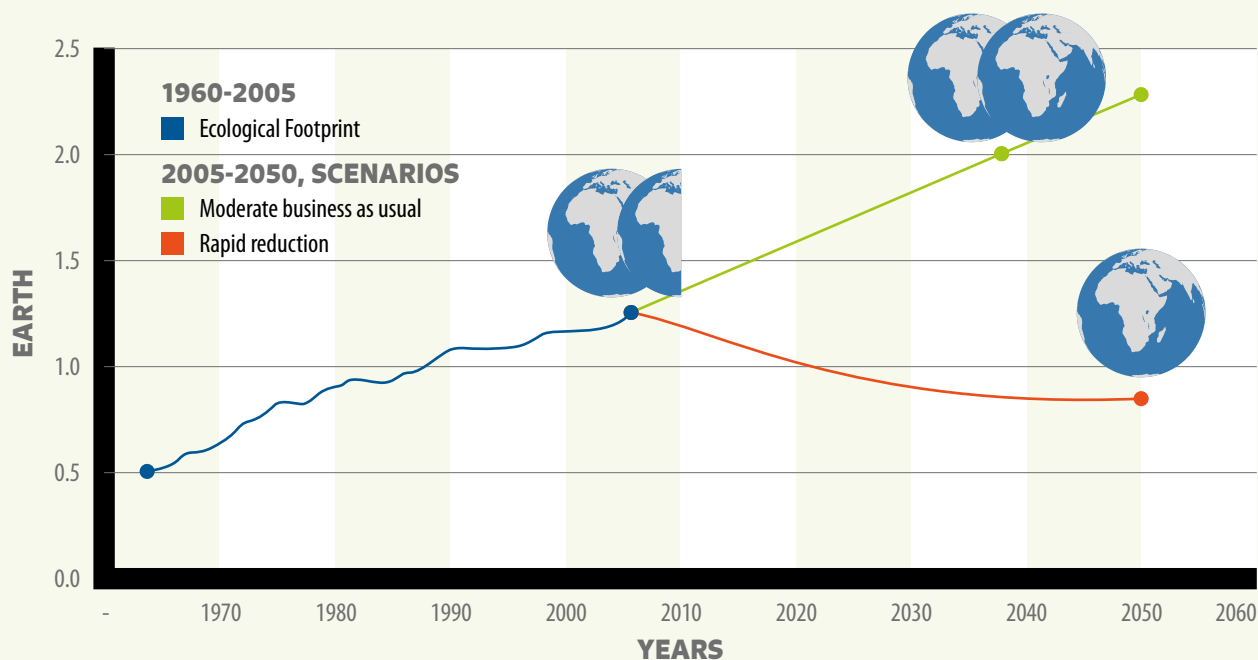
The complexity of the contemporary industrialization agenda is described in Chapter 4, particularly how it stems from, and is furthered by, extension of production in value chains.

## ENVIRONMENTAL DAMAGE MEANS WE NEED TO GREEN THE ECONOMY

“Greening” the economy was an idea first introduced by David Pearce, Anil Markandya, and Edward Barbier (1989). These economists argued that governments needed to intervene in the economy to address market imperfections. A burgeoning literature on environmental economics has since evolved, suggesting ways to value unpriced environmental goods and services, to design instruments for addressing externalities and to recognize the essential role of public action and investment in public goods.

The past few decades have seen unprecedented—and accelerating—human impacts on the global environment, as shown by the global “human footprint” since 1960 (figure 3.3). This demonstrates that since the early 1970s, humankind has been taking more from the planet's resources than is sustainable in the long term, and that levels of consumption are “over-shooting” the ecological boundaries. It also shows that continuing on the current pattern of growth (Business as Usual), we overshoot the resources of two planet earths by 2040. If we are to sustain prosperity on this single planet, we need to follow a rapid reduction in resource use to achieve “one planet living” by 2050 (Global Footprint Network, 2015).

**FIGURE 3.3 HOW MANY EARTHS DOES IT TAKE TO SUPPORT HUMANITY?**



SOURCE: GLOBAL FOOTPRINT NETWORK (2015).

Given the scale and spread of human activity, we are changing the nature of the Earth’s climate, its water and nitrogen systems, its ocean temperatures and chemistry, and its vitality and diversity of biological life. Scientists are now talking about the Earth having moved into a new geological era, called the Anthropocene, denoting an epoch in which humans (*Anthropos*) began to have an overwhelming impact on the earth’s biological and chemical systems. Given the uncertainty we face over tipping points and the consequences of our cumulative impact, we must establish safe operating limits for key parameters (Rockstrom et al., 2009; Steffen et al., 2015). The decision to keep global warming to less than 2 degrees Celsius, made at the 21st Conference of the Parties (COP21) at the United Nations Conference on Climate Change in 2015, is one such agreed boundary, and identifying other boundaries will have to follow.

The current thinking on policy to achieve a green transition is summarized by Stern (2015), who reminds us of the six reasons for governments to

address environmental market failures, especially regarding the climate:

- ▶ Greenhouse gases impose a negative externality because of the damage they inflict on others.
- ▶ Research, development and innovation are activities that are largely “public goods”; thus we will not likely see enough of them if they are left to the private sector.
- ▶ Capital markets are highly imperfect, short term and risk averse, and thus do not generate and allocate capital into the uncertain, long-term investments needed to address climate change.
- ▶ People operate with imperfect information about what others are likely to do, inducing coordination failure, which slows collective action.
- ▶ People also operate with imperfect information about the economic and technical oppor-

tunities open to them, especially in a time of rapid change. They benefit from access to information, training and learning platforms.

- ▶ Moving to a low-carbon economy generates multiple co-benefits, or positive externalities, but individuals are unlikely to harvest those benefits directly. Rather, as with improved air quality and better urban environments, the benefits cannot be appropriated and “sold” but benefit large numbers of people.

Governments must be involved in finding solutions to these market imperfections, and they must work with other actors—other governments, local and municipal governments, small and large businesses, civil society, R&D institutions—to achieve rapid, transformational change. Public policy must create credible, long-term signals for all agents to follow. Policy uncertainty holds back investment because those individuals with capital are not confident that their investment will bring returns. Given the scale of the green transformation required, the role of public action is especially critical. Small changes in prices will not be enough to achieve the scale of change required and will often have effects limited to individual sectors. Governments, then, need to understand how they can launch and sustain a holistic process of economic transformation, which greens the entire system, and drive the economy in a different manner from business as usual.

One key reason for the absence of environmental (and social) goods from the calculus of decision makers, whether government or business, is that those goods are not transacted in the marketplace and do not have a clear “price” at which they can be valued and included in the national accounts (UNEP, 2011). Consequently, the metrics we use to assess progress are limited to economic accounts, which ignore much of the informal sector and many environmental and social costs and benefits. Although many people have come to accept that GDP growth per capita is not a full measure of

increased well-being, the absence of easy, comparable alternatives means that GDP continues to be accepted as the default metric. A further drawback of using GDP per capita as a measure of progress in a given country is the need to take due account of the distribution of incomes, as discussed in the next section. The Human Development Index—now in its 25th year—is one alternative. Others include the Global Happiness Index, the Global Ecological Footprint and a range of environmental indices.

## WE MUST BUILD INCLUSION INTO THE GREEN ECONOMY

The need to promote more inclusive forms of economic growth—not just in Africa but in many other economies—is widely recognized. Commentary on the rise in inequality and exclusion over the past two decades has focused on incomes and assets, as well as on the jobless patterns of growth

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and capture of the political process by a small number of the very rich (Stiglitz, 2012). In many middle- and low-income countries, the majority of the population have been failed by the current



economic system—women and men who live and work in the informal economy, whose voices rarely count because they are poor—and the state provides little if any protection of their assets and property rights.

Africa is showing pervasive trends towards absolute and relative exclusion. Although African economies have grown at an unprecedentedly fast rate in recent years, the fruits of this growth have not been widely spread. The proportion of people living below the \$1.25-a-day poverty line fell from 56.5 per cent in 1990 to 48.4 per cent in 2010, but because of population growth during that period, the absolute number of people living in poverty grew from 350 million to 505 million. Efforts at the

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country level to reduce poverty vary, however, with some countries reducing poverty rates much faster—Burkina Faso, Ethiopia, Gambia, Malawi, Niger, Rwanda, Swaziland, and Uganda—than others.

Inequality has grown over the same period, although data are patchy. Differences in inequality between African countries are marked: Botswana, Comoros Islands, Namibia and South Africa, exhibit the most unequal incomes, and Egypt,

Ethiopia, Mali, and Niger the least. The growing gap between rich and poor is not unique to Africa, however, and has characterized growth in many other parts of the world (Piketty, 2014). The top 1 per cent of the global population is now estimated to own more than 50 per cent of total global wealth, with the bottom half owning less than 10 per cent (Credit Suisse, 2015).

Exclusion is not just a factor affecting incomes and wealth. It also affects quality of life, nature and determinants of livelihoods, and access to basic services such as water, health services and education. Access to formal employment in Africa is highly skewed and shows little sign of growth. Considering the proportion of people working outside agriculture, the informal economy is reckoned to account for 50–75 per cent of employment throughout the developing world. Within Africa, this differs significantly from South Africa at 33 per cent to Mali at more than 80 per cent (ILO, 2015). When agriculture is included, the informal sector constitutes the majority of working people in most of Africa, and much of it consists of small and medium-sized enterprises, often family run. Informal employment often means unsafe working conditions, with no protection over non-payment of wages, nor job protection. The informal sector only rarely offers social benefits, such as pensions, health insurance or sick pay. Often the most vulnerable groups—the poorest, migrants, women and children—work in the informal sector because of their limited formal qualifications.

For green growth and industrialization to really fulfil its promise, it also must focus on people—to tackle the poverty, inequality and exclusion that constrain growth and environmental sustainability, to realize women’s and men’s aspirations, to address the needs of different regions, and to gain broad political support. Without that broader support, neither the growth process as a whole nor specific stand-alone green-growth projects and investments will lead to real transformation.

## BUILDING RESILIENCE TO CLIMATE CHANGE IS CENTRAL TO GREEN AND INCLUSIVE INDUSTRIALIZATION

*Greening industrialization*, as seen, involves much more than focusing on a low-carbon agenda, although the post-Paris momentum and the availability of financial resources mean that de-carbonization is now a powerful, fundamental driver. As will be seen in chapters 4 and 5, the sustainable management of the continent's environmental capital assets—land and soils, water, natural resources and energy—is central to providing food, shelter, and decent work; generating incomes, jobs and livelihoods; and ensuring well-being, health and dignity for all. Climate change will affect Africa's economic and social prospects, however.

*Resilience* has become the widespread term used to capture the capacity of social, economic and environmental systems to maintain their functions in the face of new external stresses imposed by climate change. A principal feature of climate change is a shift in the pattern and variability of the global water cycle, bringing more intense rainfall and droughts. Increased climate resilience hence requires, above all, investment in managing water—whether storing water to address long periods of drought or capturing and diverting floodwaters to limit damage to infrastructure, housing, soils and vegetation. A climate-resilient economy will need to adapt, reorganize and evolve into configurations that improve the sustainability of the system, better preparing it for future climate change impacts.

*Greening and climate-resilient growth* overlap but are not identical. Economies can be green yet not climate resilient, as when a low-carbon energy source, such as hydroelectric power, is highly vulnerable to a wide variability in rainfall and river flow (as in Zambia; see box 4.6). Conversely, economies can be climate resilient yet not greening, as when

agricultural productivity is based on high levels of chemical fertilizer (whose manufacture relies on major fossil-fuel input and entails major emissions of the greenhouse gas nitrous oxide) to maintain yields variability in rainfall crises. Considerations of climate resilience might require a rethink of a country's irrigation options—for example, in Morocco, where investment has shifted into drip delivery of water for high-value fruit and vegetables and away from furrow irrigation of lower-value cereals and sugar.

*Inclusive and climate resilient* means building on an understanding of how climate-related shocks will not only exacerbate existing stresses faced by poor households but will also reinforce the underlying drivers of poverty. Repeated and long-term drought, for instance, will not only erode households' monetary income; it will also affect multidimensional indicators of poverty, including health, education and people's capability to participate in processes that are meaningful to them. Women and girls are among the most vulnerable to climate change impacts because they encounter multiple inequalities that hinder their ability to manage and recover from shocks and stresses. For instance, women tend to have lower incomes, fewer productive assets, greater responsibility for dependants and poorer access to education and climate-resilient livelihoods (Care International, 2010). With climate impacts set to worsen, the well-being of women and their dependants is under severe threat (Mearns and Norton, 2010).

Policy interventions must transform economic growth into climate-resilient and inclusive development to deliver poverty eradication and greater equity. A combination of social protection and climate-resilient investments can help to build the capability of poor and climate-vulnerable households to absorb or transfer risks (or both). Risk reduction through the preparation for and the recovery from climate-related disasters is part of building climate resilience.



### 3.4 GREENING INDUSTRIALIZATION AND INCLUSIVE GROWTH

Figure 3.4 presents the three public policy imperatives of industrialization, green growth and inclusive growth. As shown on the left-hand side, in most countries each of those goals has been pursued in isolation, with a different branch of government responsible for each area of policy design, implementation and funding. For example, the protection of industries such as cement manufacturing has been done with little thought either to the likely impacts on low-income groups or to environmental factors, such as pollution of water, energy and air. Equally, green growth can be pursued by a large company that practices sustainable timber production from a forest area, but it may exclude local people from access to and use of forest resources.

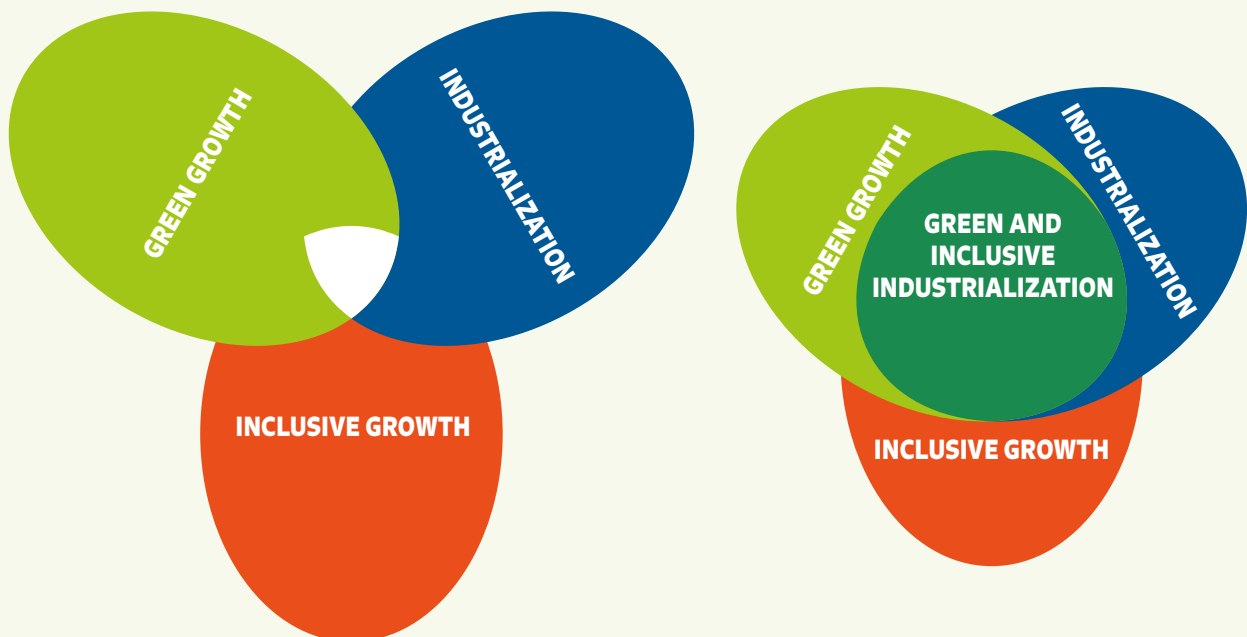
On the right-hand side of the figure, these three policy imperatives are brought together.

Overlapping them offers a timely opportunity—first, to identify the synergies between industrialization, growth and inclusion; and second, to take steps to align the three policy areas closely. Such synergies will help strengthen win-win outcomes and minimize trade-offs between each policy objective.

#### BRINGING TOGETHER INDUSTRIALIZATION, GREENING AND INCLUSION

The green and inclusive industrialization agenda offers a valuable pathway to combine sustainable economic growth, more inclusive incomes and an enhanced environment within a broader green economy strategy. As noted by Jeffrey Sachs “Unless we combine economic growth with social

**FIGURE 3.4 GREENING INDUSTRIALIZATION AND INCLUSIVE GROWTH**



inclusion and environmental sustainability, the economic gains are likely to be short-lived, as they will be followed by social instability and a rising frequency of environmental catastrophes” (2015, p. 27).

Greening of industry can be achieved through three routes: transitioning out of brown industries; greening existing industries by increasing resource productivity, cutting pollution, and managing chemicals more safely; and creating new green enterprise, such as producing green capital goods, generating renewable energy and providing environmental advisory services.

Much of this transition can be classified as “decoupling”—that is, achieving economic growth with lower levels of materials intensity (“relative decoupling”) or, better still, with a reduction in the overall use of materials (“absolute decoupling”). Decoupling can be achieved through a focus on increasing the efficiency of input use at the firm level and curbing environmental pollution from the production process. Equally, opportunities exist for systemic greening of production, including through the greening of value chains. (Africa’s experience with decoupling and greening will be discussed in greater detail in Chapter 4). The greening of value chains requires collaboration among multiple actors, including governments, the private sector, civil society organizations and a range of multilateral institutions.

## INCENTIVES FOR GREENING INDUSTRIALIZATION

The year 2015 was one of intense international diplomacy to build a more sustainable, fairer world. It witnessed many global processes and summits, including the Financing for Development meeting in June, agreement of the Sustainable Development Goals (SDGs) in September and the UNFCCC Conference of the Parties COP21 in

December (see Chapter 2). At issue throughout the year was the acknowledged need to construct a more resource-efficient, inclusive and low-carbon global economy that simultaneously generates widespread growth in jobs and well-being while managing resource scarcities, building resilience to climate impacts and putting the global economy on a pathway towards zero net carbon emissions by 2050. The Paris Accord in December at the UNFCCC provided a solid agreement for building a low-carbon global economy.

Although the need to reduce carbon emissions globally clearly exists, developed and developing economies start from different points on emissions per head and levels of income. Because many African economies have low levels of industrial development, their contribution to global warming through carbon emissions has been small to date. Despite this difference in approach, given the collective threat, all African countries have agreed on common but differentiated responsibilities to meet the challenge of climate change through the “intended nationally determined contributions” announced by every country in the run-up to the Paris climate summit. All African economies readily acknowledge the need to join this critically important global agenda, as evidenced by their endorsement of the Paris Accord and a range of initiatives, such as those on renewable energy (see Chapter 4).

**Greening of industry can be achieved through three routes: transitioning out of brown industries; greening existing industries... ; and creating new green enterprise,...**



Reducing carbon emissions to address the problem of global warming and climate change is one major incentive to move economies on to a greener industrialization trajectory, but other important factors also encourage such a shift:

- ▶ The green sector can be an important source of growth, providing the opportunity to increase GDP and to create productive employment (ILO, 2015).
- ▶ The green sector has the potential to improve Africa's trade balance sharply by reducing energy imports and earning foreign exchange through the export of green goods and services.
- ▶ Because many African economies share common environmental challenges, a shared green growth and industrialization agenda will promote regional integration, cooperation and the growth of continentwide innovation capabilities.
- ▶ African economies are relatively resource dependent. The processing of minerals, metals and energy resources is highly water and energy intensive and often produces harmful effluents. Hence, a resource-dependent growth path demands that more attention be paid to greater water and energy efficiencies plus pollution control.
- ▶ The green sector is relatively knowledge intensive, and its expansion can thus be an important source of structural transformation, productivity change and employment growth. Those types of growth are particularly important for Africa because, as seen in Chapter 1, behind the impressive growth experienced by many African economies, they still show little productivity growth and job creation.
- ▶ The greening of growth will improve the quality of development outcomes, particularly for health. Air pollution from diesel vehicles, coal- and oil-fired power stations,

smoky cooking fires and industrial emissions increase mortality from respiratory diseases and heart problems. Globally, an estimated 7 million people die prematurely from indoor and outdoor air pollution, including 750,000 in Africa (WHO, 2014). A shift from fossil fuels promises substantial health gains.<sup>1</sup>

- ▶ A degrading biophysical environment reduces economic growth and renders livelihoods more insecure and vulnerable to shock. Such risks are a major political threat to individual African economies, for the continent as a whole and for the wider region, as recently flagged at the EU-Africa Valletta Summit on Migration, held in Malta in November 2015. Populations forced off their land by poverty, climate change impacts and conflict generate political difficulties domestically and, when translated into mass migration, within the wider region.
- ▶ The poor rely most heavily on natural capital and the services provided by land, water and biodiversity (PEP, 2005), rendering them particularly vulnerable to pollution of key assets and pressure on critical resources, such as water, forests and biodiversity.

Thus, the pathway to green and inclusive industrialization must be shaped by three considerations. First, the green growth agenda cannot be reduced to minimizing carbon emissions. Although it is an important part of green growth, so too is the need to protect Africa's scarce and fragile water resources, to minimize pollution and to enhance the quality of developmental outcomes on the quality of employment and of economic inclusion. Second, although some trade-offs will always exist between short-term economic growth and green industrialization, multiple opportunities will also emerge for green growth to bring win-win outcomes. If properly framed, green industrialization can contribute to faster, more equitable and more sustainable patterns of growth (Chapter 5). Third, the green growth agenda is not a "five-year" chal-

lenge. Many of its steps involve long-term policy and resource commitments, carried through consistently. Most policies require cooperation across ministerial divisions and economic sectors. Strategic vision and leadership at the highest level are thus critical to inclusive green industrialization.

To be successful, governments have recourse to a range of possible policy measures, each with a specific consequence for distributional benefits. If inclusion is to be a key goal, consistent choices in policy design are needed to deliver pro-poor outcomes. If greening is to be more than policy rhetoric, a credible combination of regulations, fiscal measures and incentives are needed to provide private investment with clear and consistent messages about the government's intent to invest in a better environment and to curb environmental damage.

Crucially, alongside design of policy and institutions, governments must invest in the capacity to implement those policies. This will require a realistic assessment of what government can do best and where it needs to rely on private sector actors. It will also call for a learning approach to enable

**If properly framed, green industrialization can contribute to faster, more equitable and more sustainable patterns of growth.**

policy to be tweaked over time, in light of new information and changing circumstances. Public investment in education and basic infrastructure is critical, as is working within a regional and global context, to build most effectively on comparative advantage. Industrial policy must consider the right mix of production for domestic consumption and for exports to regional and global markets. This long-term vision for a given country must have a "starting point" that reflects the specific circumstances of an individual economy—including its resources, size and location—within the wider global context and the continuous evolution of international competition.



## 3.5 FROM POLICY TO PROCESS, PARTNERSHIPS AND LEARNING

This chapter has described the linkages between the green industrialization and inclusive growth agenda. Current policy debates recognize the growing strain on environmental resources as African economies grow and develop, and the need to generate better jobs and higher incomes for African citizens. Much of the impetus for green growth in other parts of the world has come from the need to cut greenhouse gas emissions. In the case of Africa, however, if growth is to be sustainable and inclusive, equal thought must be given to getting the best value from the agricultural sector and its associated environmental base—the minerals, oil and gas that have to date been more of a curse than a blessing, uncertain and poorly managed water supplies on which life depends, and the rapid growth in energy demand. Well-shaped green growth measures can offer good outcomes for all these challenges.

Such measures require the recognition that “policy” is no longer the monopoly of government. The neoliberal critique of industrial policy was based on the recognition of imperfect knowledge and corruption in government—state failure. In contrast, proponents of industrial policy argued that simultaneous patterns of imperfect knowledge exist in the private sector, complemented by a combination of short-termism and the failure of individual firms to promote systemic competitiveness in their value chains—private failure.

An important component of contemporary industrial policy thus seeks to promote collaboration between the private and public sectors, each recognizing its own weaknesses and strengths. In this way industrial policy is not made up of a series of documents, but instead is a process in which the key stakeholders—public, private and, in some cases, civil society—work together to achieve a structural transformation that promotes higher and more sustainable incomes. This process-oriented approach to industrial policy—recognizing the interdependence of the private and public realm and the significance of systemic efficiency— informs the green industrial policy agenda set out in Chapter 7, which is designed to achieve a win-win outcome to green growth in Africa.

Before identifying key policy agendas and suggesting roles for private and public actors in the pursuit of green and inclusive industrial growth, it is first necessary to understand the determinants of green industrialization and previous experiences with decoupling economic growth from environmental impacts (Chapter 4), the dangers of inaction for Africa’s ability to meet current and future needs (Chapter 5), and experience from across Africa in addressing the systemic nature of the green industrialization agenda (Chapter 6).

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## 3.7 ENDNOTES

- 1 Much better data collection is needed, however, to track changes in air quality and associated health outcomes. For example, of 1,600 cities worldwide with data on particulate matter, only 11 were African.