



The Voice of the Private Sector in Kenya

Climate Change and Your Business Briefing Note Series | April 2014

Climate Change and the Energy and Manufacturing Sector



Photo credit: Noelle O'Brien

The manufacturing sector is part of the climate change equation, both producing greenhouse gas emissions while being impacted by changes in temperature and precipitation. Climate change is beginning to influence action in the manufacturing sector, but for the most part, accounting for climate change is not common in business activities and decisions. The manufacturing sector is capital intensive, with many long-life fixed assets, long supply chains and significant water requirements, which are negatively impacted by floods, droughts and extreme weather events.¹

Kenya has one of the largest manufacturing sectors in Sub-Saharan Africa, serving the local market and exporting to the Eastern and Central African region. In 2010, Kenya's manufacturing sector was responsible for around 9.8 per cent of GDP, some 60 per cent of electricity consumption and about 10.2 per cent of greenhouse gas emissions.²

The sector is an important contributor to the national economy, accounting for

13 percent of employment in the formal sector.³

The manufacturing sector is mainly agro-processing (such as grain milling, beer production, and sugarcane crushing), and also includes paper production, textile and apparels, pharmaceutical and medical equipment, building construction, and chemical and chemical-related industries. The informal (Jua Kali) sector, which employs approximately 75 per cent of the country's workforce in the non-agriculture private sector and contributes to about 18 per cent of GDP, includes many small manufacturing businesses producing household goods, motor vehicle parts and farm implements.⁴

A reliable supply of electricity is a critical input for the manufacturing sector. A reliance on diesel plants to fill gaps in generation, especially during dry periods, has contributed to high electricity costs for manufacturers. Unreliable electricity generation and distribution in Kenya means that most manufacturing firms operate a standby or emergency power system, and many ce-

ment manufacturers plan to turn to coal as a reliable and cheap source of electricity, which will lead to increased greenhouse gas emissions. In 2013, the government introduced a roadmap to increase electricity generation capacity by 5,000 megawatts (MW) from the current 1,664 MW, overcoming such challenges as inadequate generation capacity and dependence on hydro for 50 per cent of capacity. The roadmap predicts a 2016 energy mix for electricity generation that is 40 per cent renewable (geothermal, hydro and wind).⁵

How Climate Change Impacts the Manufacturing Sector

Reducing environmental impacts and adapting to climate change makes good business sense. Adaptation strategies can increase resilience and help to protect your property and supply chains. You need to be aware of the effects of climate change, and begin to prepare assets and operations for the anticipated impacts. Indeed, some

Box 1: Kenya's Second Medium Term Plan (2013-2017)

The Second Medium Term Plan reports that the decline in rainfall as a result of climate change has resulted in a drop in water quantities leading to interruptions in electricity generation, especially given that most of the electric power is hydro-generated. The availability of agro-raw materials needed by industries is also adversely affected by recurring drought.

Government of Kenya, (2013), Second Medium Term Plan (2013-2017), page 58.

Kenyan firms have taken energy and water conservation measures, which address climate change adaptation and mitigation, although the primary incentive for these actions is cost savings.

Climate change will impact and pose risks for your manufacturing business and its supply chain. The following impacts were identified in Kenya's National Climate Change Action Plan (NCCAP):

- **Energy fluctuations or blackouts because of energy supply interruptions** – A large percentage of electricity is generated by hydropower, and lower annual rainfall has reduced the electricity generating capacity of hydroelectric power plants. The manufacturing sector is one of the biggest casualties of reduced generation capacity of hydropower dams because of droughts and reduced rainfall. For instance, the 1998–2000 droughts caused extended power cuts across the country, with lost industrial production due to inadequate power amounting to Ksh 110 billion.⁶
- **Greater resource scarcity (such as water and raw materials)** – Climate variability has contributed to reduced crop production that directly impacts the manufacturing sector. An example is the 2011 frost that affected tea production across the country and resulted in diminished turnover in processed tea. Some industries such as agro-processing are major consumers (and polluters) of water. Water resources are generally scarce and are likely to become more so with climate change.
- **Greater risk of plant, product and infrastructure damage and supply chain disruptions from extreme weather events (such as heat waves, floods, droughts, cyclones and storms)** – Rising temperatures are expected to strengthen coastal winds and storms, which will affect ship navigation and other port operations. Motor vehicle assembly, machinery, electronics and other industries that depend on export and import services are likely to be negatively affected. Adverse weather events will also impact local and regional trade. The eight-month 1997–1998 El-Niño rains caused damage of Ksh 62 billion to transportation infrastructure.⁷
- **Higher costs** – Such as higher insurance premiums due to increased costs associated with more frequent extreme weather events.⁸

A systematic risk analysis of the Kenyan manufacturing sector would help to provide information for your business planning (see Briefing Note #2 – Climate Proofing Your Business). An example is the

climate risk assessment of the energy scale up and rural electrification flagship programme undertaken as part of the NCCAP.⁹

Reducing Greenhouse Gas Emissions in the Manufacturing Sector

The manufacturing sector contributes to climate change through greenhouse gas emissions resulting from fossil fuel consumption and industrial processes that release these gases. Industrial fuel use and process emissions in the manufacturing sector were estimated to be equivalent to about 2.9 million tonnes of carbon dioxide equivalent or 5.8 per cent of total Kenyan greenhouse gas emissions in 2010. Priority areas for low-carbon development identified in the NCCAP – energy efficiency, improved charcoal production and co-generation in the agricultural sector – are identified in the wedge diagram in Figure 1.¹⁰

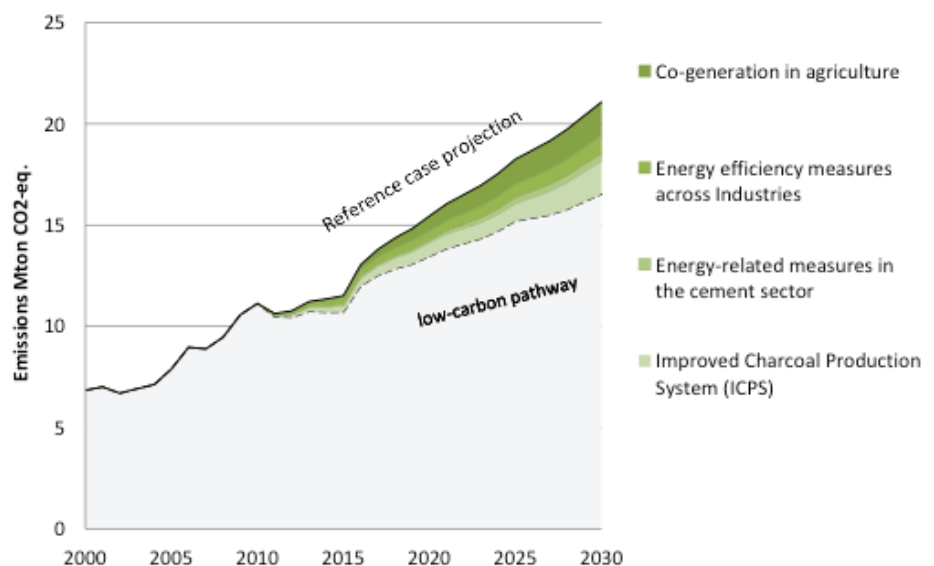
Your manufacturing business will need to consider ways to reduce greenhouse gas emissions, recognizing that this can be a good business decision that can lead to cost savings. Options to mitigate emissions are discussed below.

- Energy efficiency reduces electricity use and emissions, and improves your business's bottom line. Many manufacturing businesses have taken steps to improve efficiency and reduce their carbon footprint encouraged by the Kenya Association of Manufacturers'

(KAM) Centre for Energy Efficiency and Conservation. The Centre's energy audit programme helps companies assess energy consumption and identify energy saving opportunities. For example, Kenafic implemented energy efficiency actions that resulted in a 30 per cent reduction in overall energy consumption, with the costs of implementing the energy saving systems completely recovered in two years (see briefing note #10 for further details).

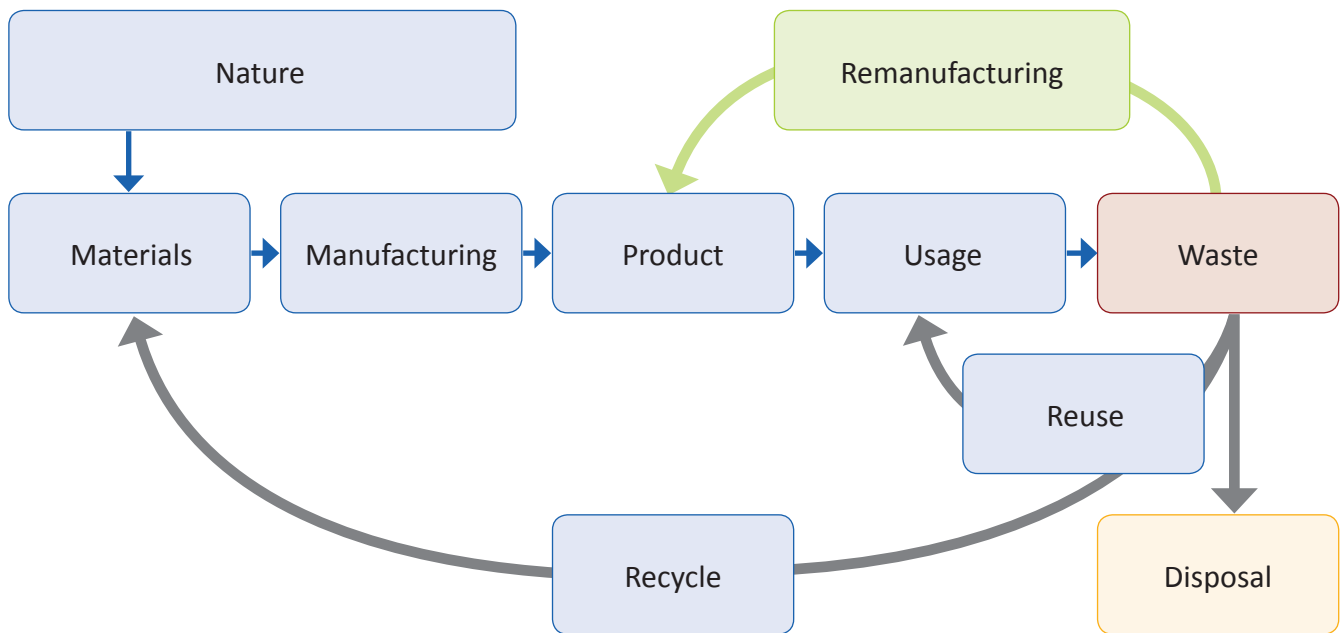
- **Remanufacturing** where products are remanufactured and repurposed from recovered, possibly already recycled ones. Remanufacturing and reconditioning tend to be labor-intensive activities that can create jobs and require relatively little capital investment. These efforts reduce the carbon emissions associated with the disposal and procurement of raw materials. Kenya remanufactures toner cartridges, automotive parts and food processing equipment, and refurbishes computers.¹¹
- **Industrial ecology** where one manufacturer's waste serves as another's feedstock or is used as an input to the production process. For example, Biojoule and Vegpro are establishing a waste digester in Naivasha that will use the offcuts and waste from vegetable and flower production to generate biogas, which in turn will be used to produce electricity.
- **Onsite renewable power generation** in the form of solar panels and wind

Figure 1: Low carbon mitigation options in the manufacturing sector



Source: Derived from the IISD/ECN mitigation chapter of Kenya's National Climate Change Action Plan. Note that the low-carbon development option related to charcoal production assumes 35 per cent of unsustainable biomass use.

Figure 2: Manufacturing, Remanufacturing, Recycling and Reuse



Source: Fiagbe Y.A.K. and Asafo-Adjaye, M.K. (2010), *Potential of Remanufacturing in Ghana*.

turbines is an obvious way to cut emissions related to electricity consumption. However, this practice often only represents small greenhouse gas-cutting potential for many manufacturers given the amount of electricity they use, and efficiency improvements can lead to greater cost savings and emission reductions.

- **A cleaner national energy mix** may result as Kenya ramps up efforts to meet the 5,000 MW goal. Independent Power Producers (IPPs), which account for about 22 per cent of the country's installed capacity from thermal, geothermal and bagasse are expected to play a significant role in increasing electricity generation. Renewable energy partnerships between businesses, governments and international financial institutions will be needed, and can play a critical role in transitioning to a greater use of geothermal, wind, hydropower, solar and biomass power.

Several opportunities exist to reduce manufacturing-related greenhouse gas emissions beyond instituting efficiency measures, from expanding recycling to considering how factories are powered and even where they are sited. **A good place to start is to know more about your manufacturing carbon emissions profile.** As part of its international obligations to report on greenhouse gas emissions, the government may eventually require direct annual reporting from manufacturing

facilities that produce more than 25,000 tonnes of carbon dioxide a year. Such data will enable manufacturers to compare their emissions to others in their particular segment of the industry to better identify reduction opportunities.

Climate Change and Your Manufacturing Business: What can you do?

- **Adapt your business to climate change.** This action depends on your location and the nature of your manufacturing facilities. Examples include:
 - Ensuring your buildings and infrastructure can cope with heavier downpours.
 - Incorporating expected climate impacts in planning and decision-making, such as siting of factories.
 - Undertaking a climate risk assessment to improve planning and decision-making. The assessment should look at:
 - ▶ Physical risks to manufacturing resources – such as accelerated deterioration of materials and equipment;
 - ▶ Infrastructure – such as impacts on roads, railways, ports and industrial infrastructure, which are fundamental to the manufacturing sector;

- ▶ Business and regulatory risks – such as changes in insurance coverage; and
- ▶ Market risks – such as changes in international competitiveness through energy and transportation costs.

Recognizing and understanding the impacts of climate variability is a first step and your assessment should look at both current and potential future risks. Your assessment should include economic valuation of the climate risks, which can help you to make the business case for investments to increase climate resilience. KEPSA can assist you by providing a list of publically available climate risk assessment tools (found in the report, Tools and Planning Instruments to Assess Climate Change Impacts).

- **Reduce greenhouse gas emissions in your business.** You can undertake low-carbon actions, such as:
 - Undertaking an energy audit of your manufacturing facilities and processes, and implementing those energy efficient actions with the shortest payback time.
 - If you are not prepared to undertake a full audit, taking first steps such as installing energy-efficient lighting by replacing incandescent lamps with compact fluorescent lamps or light emitting diodes (LEDs).

- Considering renewable energy sources to power your facilities.
- Maintaining equipment regularly to prevent efficiency losses and reduce heat losses or gains.
- Exploring ideas from staff – they may suggest useful energy-saving options.
- **Become a leader in sustainable manufacturing by creating a positive, climate-friendly image for Kenya.** Changing the way certain products are manufactured will go a long way

towards mitigating negative environmental impacts. Often re-designing a product or process can improve not only the product's life span, but also lead to a more efficient use of resources, easier recycling and less pollution. Take the opportunity to collaborate on sustainable initiatives with other businesses along your supply chain.

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