The Dow Chemical Company Advanced Manufacturing Plan for Kenya

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The Dow Chemical Company Advanced Manufacturing Plan for Kenya

WHAT IS THE ADVANCED MANUFACTURING PLAN FOR KENYA?

In 2011, Dow had annual sales of US$60 billion and employed approximately 52,000 people worldwide. The Company's more than 5,000 products are manufactured at 197 sites in 36 countries across the globe.

The Advanced Manufacturing Plan for Kenya (AMP-Kenya) sets out The Dow Chemical Company's views on a comprehensive suite of policies that broadly impact the Kenyan economy and manufacturing in particular. It is an integrated plan to build a sustainable and balanced economy and create an enabling environment for a robust manufacturing sector.

Through our long and vast experience in manufacturing around the globe, in both advanced and emerging economies, we understand the potency of having a national strategy with the right elements to encourage growth. With this unique perspective, we are taking the lead in offering our insights on how Kenya can continue to develop a prosperous, sustainable manufacturing sector. It is our view that by partnering with the private sector, government has a significant role to play through the development of manufacturing-focused public policy.

The enabling environment that encourages investment is created by advancing a policy agenda that prioritizes inputs and provides certainty for those looking to invest. Focused on generating sustainable growth and long-term prosperity, public policy can allow companies to tap Kenya's human talent to turn ideas into products and innovations that can help deliver solutions to some of the most pressing problems. Dow's AMP-Kenya is a framework for sustainable manufacturing growth focusing on value-added projects and processes and job creation in an energy- and resource-constrained environment.

WHY MANUFACTURING MATTERS

Since the global financial crisis hit in 2008, Kenya's economy, on a Gross Domestic Product (GDP) basis, has grown faster than many developed nations. Largely, this growth has been fuelled by the service sector, which represents roughly 65 percent of the economy. In 2011, while the global economy grew at 3.8 percent, Kenya's GDP saw 5 percent growth which is expected to continue through 2012. However, with an official unemployment rate hovering around 40 percent, Kenya's economic growth and dependence on services is not translating into sustainable job creation.

Kenya Vision 2030 sets forth a vision for a long-term development strategy that aims to create a "globally competitive and prosperous country with a high quality of life by 2030." This includes industrialisation of the country through a number of flagship projects aimed at generating at least 10 percent GDP growth per year. This is an ambitious goal and will require a focus on creating the base by which growth can be realized. Manufacturing is that foundation upon which sustained economic growth, coupled with job creation, depends. Nations that support manufacturing can thrive.

At its basic level, advanced manufacturing is applying innovative concepts, processes and technologies to the production of goods. It creates higher value-add products and in turn drives economic growth, job creation and the development of new markets across sectors. Advanced manufacturing has the job creation and economic growth potential that no other sector has. Data from advanced economies show that every manufacturing job created has a multiplier effect in the range of three to five jobs across the economy, this indirect and induced job creation potential of emerging economies is even greater with a potential of 10 jobs for every advanced manufacturing job created.

Strategic Priorities

Countries around the world are competing for the investments that businesses make and the jobs they create. National investment and incentive strategies that identify long-term opportunities and aggressively pursue them with manufacturing as their base will help generate sustainable growth and long-term prosperity. Kenya has the basic inputs to develop a successful manufacturing strategy, but there is a clear need for a comprehensive plan based on an identified set of strategic priorities. Looking forward, Kenya must evaluate its comparative advantages against a backdrop of the trends driving global challenges. This includes:

- **Agriculture:** Critical in the Kenyan economy, agriculture represents approximately 20 percent of Kenya's GDP and the majority of the country's exports. However, this sector has largely relied on low-value crops such as tea, coffee and flowers, which are highly vulnerable to weather conditions. With estimates showing that globally 2 billion people will join the middle class and demand more calories by 2030, food production will need to increase by nearly 70 percent. A strong focus on manufacturing can help to drive efficiencies and new products and technologies across the economy to push production costs down, increase yields and underpin a sustainable agriculture sector. Likewise, a more efficient and sustainable agricultural base can itself drive greater industrialisation, whereby agricultural infrastructure can double up for the purpose of manufacturing. Agriculture can form the basis of an industrial/manufacturing ecosystem.

- **Information and Communications Technology (ICT):** Since 2007, Kenya has pursued a strategy to attract investment related to ICT including liberalizing markets and investing in ICT infrastructure. Kenyans, particularly in urban centres, enjoy reliable mobile access and indeed rely on this technology infrastructure for everyday services, such as banking, at a higher level than many developed economies. This infrastructure gave Kenya the ability to leapfrog the traditional copper wire telephone technology, and now Kenya can claim to have some of the most advanced cell phone infrastructure in the world. However, the focus of this technology investment is fuelling service related growth in ICT without corresponding job creation. Prioritizing a strategy for aligning this technology platform with attracting innovation-based manufacturing could sustain the growth of the sector while putting people to work across the economy.

By identifying strategic priorities that align with Kenya's comparative advantages and pursuing them with a strong manufacturing strategy at its base, Kenya can set the foundation for long-term economic growth and development that will enable the creation of sustainable jobs and continued innovation.

WHAT CONSTITUTES ADVANCED MANUFACTURING POLICY

To build a sustainable and diversified economic base, developing a strategic view on what Kenya's advantages are and how best to exploit them through a partnership between government and industry is essential. Policymakers must pursue policies on a range of issues that both directly and indirectly enable the growth of the manufacturing sector.

As well as identifying strategic priorities, we believe Kenya must address the following policy themes that are crucial to the future of manufacturing:

- Infrastructure
- Energy
- Innovation & Skills Development
- Trade

Each of these areas presents its own challenge, but, nonetheless, a cohesive policy response is critical for creating an environment conducive to manufacturing investment.

Infrastructure

INTRODUCTION

Reliable infrastructure is a critical element for encouraging manufacturing investment and competing globally. Insufficient or poorly planned infrastructure reduces the flow of goods, raises costs and undermines business' ability to plan. In turn, this creates an environment of uncertainty and often a choice for international businesses to avoid investments. Currently Kenya ranks 103rd out of 144 countries for overall competitiveness of infrastructure by the World Economic Forum.

Companies like Dow spend a significant amount on the transportation of raw materials and finished goods. Transportation costs in Kenya are higher than they have to be. Lagging improvements of the transportation infrastructure to address population growth and changing manufacturing and consumption patterns, as well as variability in fuel costs, lead to inefficiencies in transporting goods. Infrastructure investments, in both transportation and energy, are critical for the acceleration of economic growth that Kenya aspires to under Vision 2030. Kenya deserves credit for investments to date that aim to make those goals a reality.

As part of our AMP-Kenya, we offer our views on infrastructure as it relates to manufacturing and the competitiveness of the country and region. First, we outline the critical role of transportation infrastructure and the need for seamless integration. Next, our views on energy infrastructure, particularly related to electricity, are given. However, while separate in this paper, the two are inherently linked and should be viewed as one comprehensive strategy.

INFRASTRUCTURE

Transportation Infrastructure

OVERVIEW

The flow of goods regionally and globally has increased in complexity over the recent decades. Ensuring efficient and sustainable movement of products is central to developing a growth economy with manufacturing at its core. Without such movement, manufacturers will look elsewhere to invest, taking the job-creation and value-additional potential with them.

Though Kenya has the beginnings of sufficient transportation infrastructure, there are key challenges that must be addressed to upgrade a system built for low levels of traffic. Anecdotal evidence indicates that transporting goods from East Asia to Kenya often takes less time than moving those same goods from the port city of Mombasa through Nairobi and Kisumu. A well-balanced, energy-efficient transportation infrastructure system will facilitate more efficient and cost-effective raw material and finished goods transport. An effective, integrated national transportation infrastructure will also reduce the amount of fossil fuel consumed for personal transportation, thereby reducing the demand on a non-renewable resource.

Manufacturers rely on marine transport for imports and exports, and any limitation on the ability to move freight via this mode will significantly impact supply chain operations. Adequate port capacity lowers costs and contributes significantly to attracting foreign investment.

Currently, Mombasa has the only commercial port in Kenya, which serves the entire region including Uganda, Rwanda, Burundi, and the DRC. Bottlenecks at the port have led to a delay of at least seven days to get cargo unloaded. For manufacturers reliant on just-in-time service or with security concerns, this is a tremendous impediment to economic growth. Recognizing this, the government has begun a US$2 billion expansion of the port anticipated to improve throughput growth 10 percent per year. Additionally, Kenya is planning another port in the city of Lamu, which will help ease some capacity restraints in Mombasa while also assisting economic development in that region.

Kenya is also making great strides in enhancing the road network throughout the country. More than US$700 million has been spent to upgrade existing roads and pave new ones. In addition, the Thika Super Highway, the first in the region, is scheduled to be completed this year.

An efficient, modern, and integrated freight rail system is imperative for ensuring the competitiveness of manufacturers. Kenya has a nearly 3000 km network of rail lines throughout the country, yet from the 1980s to today, freight capacity has dropped by more than 50 percent, according to the East African Community (EAC). Poor rail conditions mean more freight must travel over roads, increasing the already high burden of maintenance. According to Business Monitor International, the railway system has been at a near standstill for the last few years, and any improvement will require significant investment over numerous years.

WHAT MORE IS NEEDED

While the transportation infrastructure projects Kenya is undertaking require massive investments and will take some time to execute, the government is right to prioritize these investments. However, as the Kenyan Institute of Economic Affairs has pointed out, a key challenge is in ensuring these projects are continued despite a definite political transition in the coming year. Vision 2030, with buy-in across the political spectrum, makes continuity more likely. However, an infrastructure bank model would also help to not only complement the existing program but also assist in attracting private investment into these projects – removing yet another layer of politics.

Expanding the port in Mombasa is undoubtedly necessary and will increase the amount of goods that can move in and out of the country. However, until the processes that govern how goods and services are processed at the ports are streamlined, delays and bottlenecks will continue.

Additionally, until the freight rail system is prioritized, significant pressure will be placed on other modes of transportation, which will require significant maintenance budgets. Rail must become a focus of a national transportation strategy in order to achieve the goals outlined in Vision 2030.

RECOMMENDATIONS

- Continue prioritized investments in expanding the Mombasa port in order to increase capacity and modernize the operations.
- Increase capacity and streamline processes related to turning over cargo. Related to this, commission a study to quantify the professional shortfall and the need for appropriately trained staff related to port operations.
- Implement an infrastructure bank financing model in order to encourage more private investment in key infrastructure projects, while limiting the influence of politics.
- Prioritize the rehabilitation of the rail network throughout the country in order to enhance the efficiency of transporting goods and to relieve maintenance constraints on other modes.
- Ensure alignment of national infrastructure strategies with those in the EAC region.

Energy Infrastructure

OVERVIEW

Manufacturing requires access to reliable, efficient and cost-effective energy supplies. While the topic of a comprehensive energy strategy is covered in more detail in the next section, the content below outlines the state-of-play and the need to rapidly develop a reliable electricity infrastructure.

Peak electricity demand in Kenya is estimated to increase from 1300 MW to 15,000 MW by 2030. Some 70 percent of this demand increase is anticipated to come from the industrial sector. With current installed capacity at just over 1400 MW, new generation, transmission and distribution will be critical if the country is to continue on the path to industrialisation as outlined in Vision 2030.

Kenya has made significant commitments geared toward meeting these growing needs. Through the Energy Access Scale-Up program, Kenya will invest more than US$1 billion in transmission infrastructure by 2014. To move these plans forward, Kenya is working closely with development and private sector partners. Further, working with the World Bank, Kenya's Energy Sector Recovery Project, aimed at reducing losses across the transmission system, is on pace to meet or even exceed its targets. In total, the government is investing roughly US$7.2 billion in generation, transmission, and distribution projects. These projects and commitments are important to developing an advanced manufacturing sector.

As the Kenyan government and its neighbours are aware, regional electricity network integration is a positive for the region as a whole. The East African Community's Cross Border Electrification program is a step in the right direction, whereby valuable power is not lost in the long cable transmission and where end users are able to access power from its nearest transmission centre, regardless of borders.

Continued capacity improvements, enabled by a more aggressive and prioritized infrastructure development strategy, will be critical for meeting the power needs of an expanded economy.

WHAT MORE IS NEEDED

The Vision 2030 goal of providing a utility sector that is modern, customer-oriented, and technologically enabled in order to provide quality, reliable service is key to achieving economic success as outlined by the framework, particularly as it relates to the manufacturing sector. While there are many plans for achieving this goal, often they are fragmented or not aligned behind a single, cohesive national strategy.

Technological advances over the decades present Kenya with the opportunity to leapfrog the dependency on older, more polluting power generation technologies in favour of modern sustainable sources. According to the Kenya Institute for Public Policy Research & Analysis (KIPPRA), increasing generation from clean sources such as wind not only will help to install more grid capacity, but will also improve access to electricity and reduce costs of power. In part, this is due to the ability of wind and solar projects to be brought online as stand-alone projects in order to electrify rural communities. This, in turn, reduces the burden on expanding the grid throughout the majority of the country. Instead, strategies can focus on industrial centres, which are key to economic growth.

Further, there are numerous electrification schemes similar to the EAC Cross Border Electrification program with Uganda, Tanzania and Rwanda. However, they would be made stronger if they existed under one guiding strategy as they share common goals. This will help to make these programs more efficient and address the concerns related to industrialisation of the region. Kenya, as the economic hub in the EAC, should push for a more streamlined approach that seeks to expand cross-border agreements.

RECOMMENDATIONS

- Prioritize electricity infrastructure investments to ensure the greatest impact to industrial consumers while developing stand-alone clean energy projects for rural development.
- Ensure alignment of generation and transmission projects and strategies under one national plan in order to gain efficiencies. Beyond the goals outlined in Vision 2030, one strategy governing projects is necessary.
- Ensure alignment of energy infrastructure strategies with those in the EAC region.

Energy

INTRODUCTION

As the global population continues to grow and incomes rise, the demand for energy continues to increase dramatically, presenting various countries with key challenges around energy security and sustainability. Several countries around the world are re-evaluating or re-initiating dialogue on their energy policy. Every country, irrespective of its specific stage of development, should have a comprehensive energy strategy.

Energy inputs are particularly critical for the manufacturing process, serving as both fuel and feedstock. Adding value to raw energy inputs, the manufacturing sector produces modern materials and solutions for the world's most pressing challenges in areas like agricultural production, water filtration and renewable energy technologies.

Dow strongly believes that the future of energy is directly linked to a robust plan that includes an "all of the above" strategy, using a portfolio of solutions for renewable and non-renewable energy sources. From a manufacturing perspective, we believe energy policy must include four major pillars:

1. **Conserve** by aggressively pursuing energy efficiency and conservation
2. **Optimise,** increase and diversify domestic hydrocarbon resources
3. **Accelerate** development of clean and sustainable energy alternatives
4. **Transition** to a Sustainable Energy Future

ENERGY

Energy Efficiency & Conservation

OVERVIEW

Dow has a long history of leadership in energy efficiency and has been focused on conservation for decades. Dow's energy intensity, measured in Btu per pound of product, has improved more than 40 percent since 1990, and since that time, the Company has saved a cumulative $24 billion and 5,200 trillion Btu. *This is roughly equivalent to the annual energy consumption of nearly 20 million U.S. households.*

Often referred to as the low-hanging fruit of effective energy policy, enhancing energy efficiency is generally the most affordable and most available way to reduce energy demand and emissions that result from burning fossil fuels. With manufacturing, transportation and other commercial sectors being highly dependent on imported oil to meet energy requirements, and the vulnerability to global oil prices that comes with that, improving the country's efficient use of energy resources will also increase competitiveness. Using less fuel by employing more efficient methods can help to create a buffer as Kenya continues to work on capacity issues.

Manufacturing is highly energy-intensive, but there are real opportunities for manufacturing processes to become more efficient. Efficiency in manufacturing is not only the *environmentally* smart thing to do – it's *economically* smart. The Kenyan Association of Manufacturers (KAM) has found that the manufacturing sector wastes more than 30 percent of primary energy inputs. According to the Kenyan Ministry of Energy (MoE), this translates to an estimated US$31 million in savings per year through efficiency and conservation in the industrial sector.

The Kenyan government, with support from the manufacturing sector and organizations such as KAM, has been working to enhance energy efficiency for some time now. From 2001 to 2006, through a partnership with the Global Environment Facility (GEF) implemented through KAM, private enterprises were offered assistance in increasing efficient operations. The GEF-KAM Industrial Energy Efficiency Project helped to save an estimated US$36 million in energy costs and helped some industries reduce their energy consumption by 30 percent.

Further, through the GEF-KAM partnership, a Centre for Energy Efficiency and Conservation (CEEC) was established. Now operating with annual support from the MoE and Danish International Development Agency (DANIDA), the CEEC offers subsidized energy efficiency audits, trainings and certifications. It has been estimated that continued efforts through the CEEC could realize energy savings up 16,130 GWh. With this in mind, the government of Kenya is proposing to "transform the CEEC into a fully-fledged national public entity to continue promoting energy efficiency and conservation" as part of the National Energy Policy proposed by the MoE.

The Energy Act of 2006 empowers the MoE to "develop and manage a prudent national energy efficiency and conservation programme." Thus far, implementation of this particular section of the law has not seen much forward progress. Efficiency and conservation measures have been proven to yield the most substantial returns relative to investment. As such, an energy efficiency program must be the first step in a comprehensive and sustainable policy with a plan for implementation over the long-term.

WHAT MORE IS NEEDED

According to KAM, there are currently US$130 million worth of CEEC-related energy efficiency projects in the pipeline, yet the funding is not available. An accelerated focus on energy efficiency and prioritizing funding for an efficiency program should be a priority. Such a program will have the most immediate impact on both the energy costs of the impacted industries and the overall energy capacity of the country.

Capital limitations, high start-up costs or other financial situations can often prevent manufacturers (subject matter experts in particular) from adopting valuable energy efficiency measures. Broad government incentives, such as tax credits or grants, could help drive the commercialization and application of useful technologies that have only been deployed on a small scale.

The framework for developing a robust energy efficiency program is provided in the Energy Act of 2006. However, as highlighted by the MoE in the National Energy Policy draft, there is limited technical capacity and expertise in the field of energy management to implement the pertinent sections. Kenya can build enhanced capacity in this field through international partnerships and cooperative agreements with the GEF-KAM partnership serving as a model.

RECOMMENDATIONS

- Enact national targets for improved energy efficiency across all sectors.
- Promote the use of financial incentives, including enhanced funding for the Centre for Energy Efficiency and Conservation, to assist manufacturers of all sizes to implement energy efficiency measures.
- Establish a loan program to help finance industry retrofits and capital investments necessary to adopt energy- and cost-efficient technologies.
- Prioritize the implementation of international partnerships and cooperative agreements related to energy efficiency and conservation in order to build capacity and learn from best practices.

WHAT DOW IS DOING

Dow's innovations are leading to more energy-efficient products, cost-effective energy alternatives and less carbon-intensive raw materials and manufacturing processes. These solutions include solar shingles for builders and homeowners, higher efficiency building and appliance insulation materials, energy storage technology and innovations to put carbon to work.

ENERGY

Optimise Hydrocarbons

OVERVIEW

Hydrocarbons such as oil, naphtha, natural gas, ethane and coal not only are used as fuels to run commercial operations or utilities, but also serve as the raw materials to manufacture products critical to the global economy. These hydrocarbons are an essential component in the development of an advanced manufacturing sector. For example, when used as a chemical feedstock, natural gas creates additional value as much as eight times the value of the gas itself. This far exceeds the value generated by any other use of the resource.

According to analysis by Moody's, Kenya spent over US$4 billion on oil imports in 2011 – roughly 11 percent of its GDP. With no current commercial oil and gas production in Kenya, this makes the overall economy particularly vulnerable to rising global oil prices. However, estimates of potential domestic hydrocarbon reserves are promising. Based on seismic data, pockets of natural gas and approximately 700 million barrels of oil may exist in the Lamu Basin as well as significant finds onshore. While commercial production may be a long way off, proactive policy leveraging these resources for their greatest intrinsic value in manufacturing is needed to encourage investment.

In addition, the broader East African region shows tremendous potential for hydrocarbon development. For example, the U.S. Geological Survey estimates more than 250 trillion cubic feet (tcf) may lie offshore of Kenya, Tanzania and Mozambique. Uganda, is estimated to have between 1 and 2 billion barrels of oil located near Lake Albert. With a significantly underutilized refinery in Mombasa, which also happens to be the only refinery in the East Africa region currently, Kenya has the opportunity to assist the region in exploiting these resources while also providing the necessary raw materials to grow the Kenyan manufacturing sector. The sustainability of the sector, as well as the benefit it can bring to the Kenyan economy, will depend on the government's ability to resist the urge to export its resources to make quick gains in favour of using these resources to build its manufacturing base.

Infrastructure development will be a critical piece of this puzzle. The remoteness of the potential onshore reserves near Turkana, coupled with the lack of oil infrastructure, creates hurdles to delivering any commercial finds to market. However, a separate project to construct a pipeline from South Sudan's oil fields to Lamu in Kenya, which would go through Turkana, "could prove crucial to oil development in the region," according to the Economist Intelligence Unit. Similar pipelines across the region are currently under development or in the negotiation stages.

The proper policy environment could provide the foundation for the optimised use of hydrocarbon resources if and when domestic sources come online.

WHAT MORE IS NEEDED

Prioritizing the availability of hydrocarbon resources for value-added products should be a policy imperative for long-term economic growth and job creation in Kenya. A key part of the equation is the value returned to the state and the community when the resource is used for downstream value-added activities. Fossil fuel resources, be they used as a fuel or as feedstock for downstream processing, are an essential component in the development of advanced manufacturing industries.

Due to the size of Kenya and the remoteness of many of these reserves, there are significant hurdles that impede the most effective use of the resources to generate the optimal value for the country. Appropriate pipeline infrastructure is a minimum requirement to effectively and efficiently deliver adequate resources to the consumer.

The current draft of the National Energy Policy outlines significant aspirations for the development of pipeline infrastructure and refining capacity, particularly as related to the Lamu Port and Lamu-South Sudan-Ethiopia Transport Corridor (LAPSSET). However, little attention is given to the importance of similar pipeline projects as they relate to Uganda and Tanzania. Continued progress on these projects will be necessary to encourage manufacturing investments. Additionally, regional agreements on pipeline infrastructure should ensure resource availability for domestic manufacturing. Though commercial development is a longer-term prospect, creating the policy environment now that promotes the efficient utilization of estimated reserves will allow for more rapid investment and development of a manufacturing sector.

Finally, new data on potential oil and gas reserves provide a tremendous opportunity to strengthen Vision 2030 by including a greater emphasis on the role of both in developing a strong manufacturing base.

RECOMMENDATIONS

- Proactively develop policy that recognizes the use of hydrocarbon resources as a critical feedstock for industry. Assuring reliable access to hydrocarbons is crucial for developing an advanced manufacturing sector, increasing GDP and creating long-term, well paying jobs.
- Develop a comprehensive pipeline strategy to ensure a competitive market for oil and gas in the region and to support growth in domestic manufacturing.
- Ensure that the most recent update to the Vision 2030 includes specific reference to the importance of hydrocarbons for growing an advanced manufacturing sector and the economy overall.

WHAT DOW IS DOING

- Dow uses ethane – a minor component of natural gas – as feedstock for the production of a multitude of chemicals and plastics. This includes products that go into the development of renewable energy technologies like the DOW POWERHOUSE™ solar shingle. In the process, the company creates a “chain reaction,” stimulating local investment, creating high-paying jobs, attracting top scientists and engineers and strengthening the industrial and economic base of Kenya.
- As an energy solutions provider, Dow offers innovative chemistry and technologies for improved shale stabilization and well bore stability. In addition, Dow Biocides offers a wide range of products that will help meet the many different treatment conditions of water for oil and gas stimulation and in the antimicrobial protection of end-use oil, gas, and their derivatives.

ENERGY

Accelerate Renewables and Alternatives

OVERVIEW

Renewable energy options in the form of geothermal, wind and solar are an essential part of the energy mix going forward and Kenya has an abundance of all three. The key is to drive investment and innovation into those areas to help drive costs down. The government of Kenya is keenly aware of not only the potential renewables offer but also the challenges it currently faces in pushing more commercial scale deployment of renewable and alternative energy technologies.

Currently, Kenya is over-reliant on hydropower generation, which represents more than 50 percent of the energy mix. This poses a significant risk during dry years as has been recently experienced. Reduced water flows lead to curtailing of hydropower generation and severe energy shortages for the country. With Vision 2030 outlining the need to grow installed capacity from all sources from the current level of 1,531MW to 20,000MW by 2030, significant diversification of sources needs to take place, and renewables and other alternatives are critical for that transition.

Geothermal energy is clearly an area of focus in the country. With 13 percent of total capacity installed, the Ministry of Energy estimates an additional potential of 7,000 to 10,000MW of geothermal resources in the Rift Valley.

Wind already represents 13 percent of installed capacity with the goal to quadruple that capacity in the next year. On the other hand, solar is an area of high potential for Kenya that is significantly underutilized. As the MoE recognizes in the draft National Energy Policy, “the percentage of solar energy harnessed for commercial and domestic applications is insignificant relative to the potential.” With the exception of solar water heaters and other minor installations, solar photovoltaic energy does not register as any portion of Kenya’s installed capacity.

The government also recognizes the important role nuclear energy can play in a sustainable energy future. As part of Vision 2030, both the medium- and long-term plans highlight nuclear energy as a critical component of meeting the needs of increasing energy demands, with the first nuclear plant expected to be commissioned in the next decade. Ultimately, plans call for at least three more plants to be commissioned by 2030.

Finally, a solution that deserves greater attention is in the area of energy recovery from municipal waste. The technologies needed for recovering the inherent energy value of municipal waste have existed for some time and are widely used around the world. Energy recovery is recognized as a value-added end-of-life resource management option that should be expanded especially for products that contain high energy content such as plastics.

A diverse portfolio of renewable and alternative energy solutions will be critical to enabling a sustainable energy future and healthy advanced manufacturing growth, along with the economic growth that brings.

WHAT MORE IS NEEDED

With a goal to optimise energy security, environmental protection and economic sustainability, targets to drive the further development and installation of renewable energy technologies should reflect the need for integrated approaches. To be effective, targets should also reflect a need to drive the highest level of diversification in the energy mix.

Kenya's Least Cost Power Development Plan (LCPDP) currently identifies energy sources targeting geothermal, hydropower, wind, imports and other fossil sources. Though it is recognized in the long-term National Energy Policy goals, the LCPDP would benefit from recognizing the role solar energy can play.

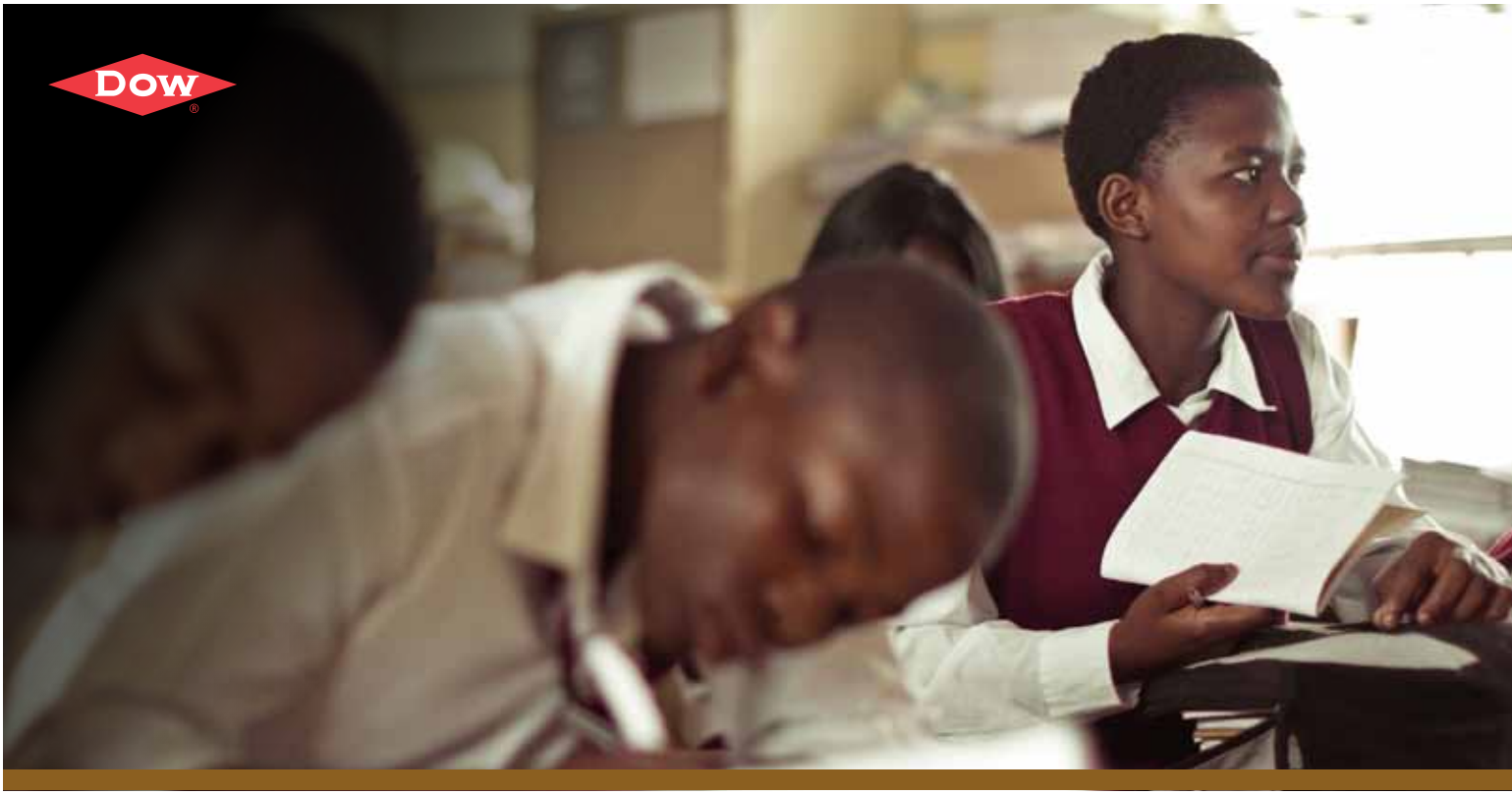
Finally, developing technical capacity around the use of energy recovery from municipal solid waste will help to redirect the flow of waste to the poorly managed dump sites around Kenya's main population centres. A greater acceptance that landfilling is not an environmentally acceptable resource management option for many materials, such as plastics, is important.

RECOMMENDATIONS

- Ensure the key role for solar as both an enabler of rural electrification and a key driver for adding capacity to the national grid.
- Continue market development strategies and national programs and incentives that foster continued development, commercialization and implementation at scale of clean energy solutions.
- Enhance the role of energy recovery from municipal solid waste in Kenya's energy policy and increase funding for capacity building in this area.

WHAT DOW IS DOING

- Dow has invested more than US$100 million to develop and manufacture the DOW POWERHOUSE™ Solar Shingle, a building integrated photovoltaic (BIPV) solution that could revolutionize the way we power homes and buildings.
- Dow formed Dow Kokam, a joint venture between Dow and TK Advanced Battery, LLC, to produce lithium-ion battery packs for hybrid and electric vehicles at its battery manufacturing facility in Midland, Michigan.
- The company is actively managing its greenhouse gas (GHG) footprint through aggressive 2015 goals targeted at energy efficiency and climate change mitigation and enhanced research programs.



Innovation & Skills Development

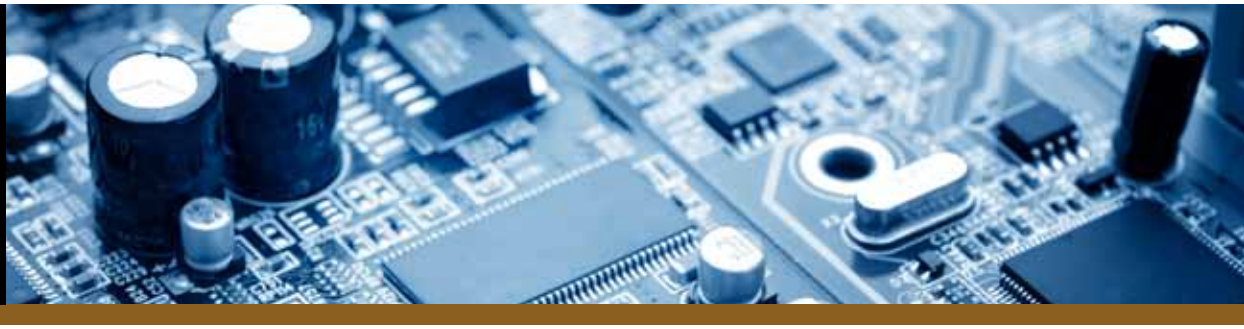
INTRODUCTION

Innovation is essential to a sustainable manufacturing sector and corollary to a robust advanced manufacturing base creating higher value-add products. Centres of innovation can become hubs of commerce, attracting talent, business investment and manufacturers with the know-how to commercialize skills as well as products. This creates a virtuous cycle of economic activity, a supply chain of sustainable jobs and a wealth of value-add products for both the domestic and global marketplace. In some cases, this will create entire new markets and industries, further diversifying and building resilience into an economy.

Innovation does not just exist in the lab, but also through experience and working in an integrated system. Unless significant attention is paid to the link between building a manufacturing base and the inherent link innovation has in that process, creating the roots of an industrialized economy will be increasingly challenging. Integrating processes beyond one company and looking at the benefits of creating networks and clusters across production chains are key aspects in enhancing Kenya to leapfrog the traditional trajectory to industrialisation.

Further, technological developments in the manufacturing sector are beginning to outpace workforce skills around the world. Demographic shifts, a gradual erosion of skills in some developed nations and a need for basic education in many emerging geographies combine to create a future skills shortage. In order to attract the level of manufacturing investment necessary to reach Vision 2030 goals, the talent must be there to fill the pipeline, and that must be across a specific focus in STEM (science, technology, engineering and math) fields.

The following sections seek to highlight our views on the important role innovation and the development and retention of skills has on the economic development of a country. Kenya has a strong foundation for developing innovative capacity, and the following recommendations outline our strong beliefs on what will have a meaningful impact on that development.



Developing Innovative Capacity

OVERVIEW

A key indicator of an innovation-focused country is the public investment in research and development (R&D). Historically, Kenya spends an average of approximately 0.4 percent of GDP on R&D. Though this spend is a good start, the relatively low level of investment in R&D has translated into underperforming rankings in indices such as the Legatum Prosperity Index, where Kenya ranked in the bottom third in terms of Entrepreneurship & Opportunity.

Kenya's Vision 2030 recognizes the critical role R&D plays in driving economic development and recognizes innovation as foundational to industrialisation and growth. Understanding the need to improve its investments in R&D, the medium-term plan (MTP) for Vision 2030 states, "to intensify innovation, the funding for basic and applied research at higher institutions of learning, as well as for research and development conducted in collaboration with industries, will be increased to Kschs. 37 billion…" This is significant and would increase the public R&D-spend-to-GDP ratio to just over 1.3 percent – notable progress.

As the Kenya Institute of Public Policy Research and Analysis has discussed, government policy must recognize the strategic importance of energy-related R&D in order to expand the energy mix. The Ministry of Energy has taken note of the role of energy R&D for meeting its goals outlined in the National Energy Policy. As such, the government has pledged to establish a National Energy Institute over the next couple years in order to jump-start innovation in this sector.

As organizations like the World Bank, International Monetary Fund (IMF) and the Organization for Economic Cooperation and Development (OECD) have pointed out, government incentives for R&D play an important role in promoting increased private-sector innovation and the development of strong manufacturing bases. At this stage, Kenya does not appear to offer a targeted tax exemption for research. While there is general language on tax concessions being introduced to promote "resource mobilization" in the Vision 2030 MTP, this appears geared toward encouraging private-sector funding for MTP implementation. A competitive R&D tax credit would be an effective tool for promoting innovative capacity.

WHAT MORE IS NEEDED

As Kenya focuses on developing a strong manufacturing sector, the link between innovation and manufacturing must be kept in mind. The Vision 2030 framework begins to build this foundation, but more can be done.

The main challenge is in making Kenya an attractive location for innovation to take root. Financial incentives are an important piece of this puzzle. As other countries' experience shows, R&D tax credits help fuel economic growth and productivity of the workforce.

Further, creating enhanced linkages between research institutions, industry and government development strategies will help to fill existing technological gaps. Collaborations like these, as well as innovation incubators, are beginning to form in Kenya. The iHub in Nairobi, focused on Information and Communication Technology innovation, has garnered international attention and received financial buy-in from technology investors. Additionally, the Ministry of Information, Communication and Technology is beginning a partnership with major technology firms to open research centres. Working with academia and other public and private sector partners, they will research innovative technologies to improve water and transportation infrastructure. These models for cooperative innovation should be replicated and expanded with a focus on emerging technologies and more efficient manufacturing processes.

RECOMMENDATIONS

- Ensure the goal of increasing R&D investment to over 1 percent of GDP is met as soon as possible with a longer term target of reaching 2 percent.
- Establish innovation hubs and incubators to facilitate research collaboration across sectors and to streamline investments in new technologies.
- Utilize the capacity that has been built up in the mobile communications sector to broaden into other sectors with a greater focus on a manufacturing base that will drive job creation.

Establishing Clusters

OVERVIEW

In an effort to enhance Kenya's competitiveness, the National Economic and Social Council (NESC) has been exploring the concept of clustering in order to create value through increased innovation and efficiency. Clusters increase access to technology, infrastructure, services and collaboration, and they offer an opportunity to market Kenya as an investor-focused hub.

As outlined in an NESC policy brief, a number of "unplanned clusters" have developed naturally due to proximity to the market and raw inputs. Using these as models, the NESC has recommended clustering as a critical strategy, and as such, the Competitiveness Subcommittee is currently drafting a policy framework to promote the concept.

One of the Flagship Projects for Vision 2030 implementation is related to the development of industrial and manufacturing zones, known as Special Economic Clusters (SEC). So far, three have been identified: a 2000 sq-km SEC in Mombasa, a 700 sq-km SEC in Lamu, and a 600 sq-km SEC in Kisumu. Each of these has been identified due to its location, creating an easier flow of goods. The Kisumu location has a particular focus on supporting cement, chemicals and metals industries.

The clustering concept currently being developed takes a sector-specific view. As outlined by the NESC, "a cluster is a sectoral concentration of enterprises that produce or sell a range of related or complementary products and thus face common challenges and opportunities." This is a notable beginning for the concept, yet room for even greater efficiency gains exists if a multi-sector approach is applied.

Additionally, "Centres for Specialization" are being established in order to build capacity in targeted sectors, including manufacturing. Focused on education, these Centres provide an opportunity to form linkages with industry and the civil-sector in order to develop skills and knowledge. However, Kenya should look to advance this model to accelerate technological advancement around Kenya's comparative advantages.

WHAT MORE IS NEEDED

Dow's ValuePark® concept offers investors long-term synergies through the use of integrated material flows and logistics, shared infrastructure and services, and reduced fixed assets and operating capital. Predominantly local products are delivered just in time, eliminating the investors' need for raw materials storage facilities. Dow's ValuePark located in Schkopau and Böhlen, Germany, also benefits from its location near excellent air, railway and road connections. Since its inauguration in 1998, 20 national and international companies have invested more than € 500 million and created more than 1000 jobs in the 150-hectare ValuePark.

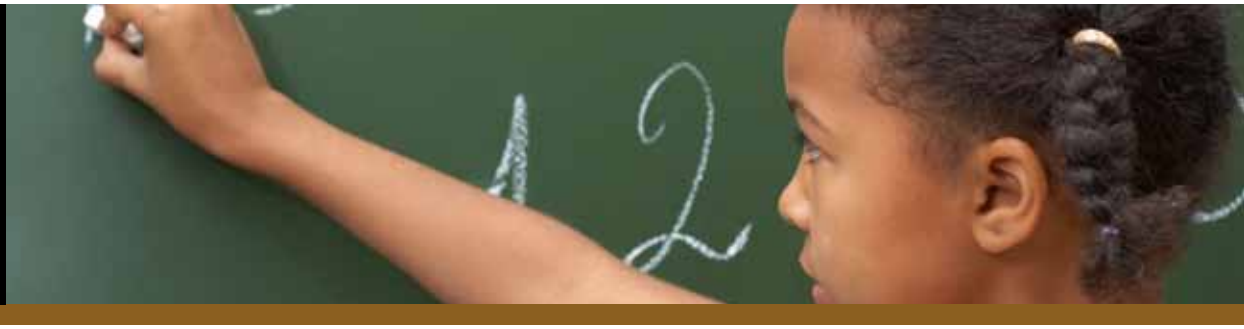
The NESC's view on clustering is a good starting point, but an advanced strategy for clustering, where partners across sectors are integrated, facilitates efficient use of resources and logistics and reduces operating costs. Government incentives for establishing advanced manufacturing centres (AMCs) would help in their establishment. The model for Kenya's Special Economic Zones (SEZ) could be informative in this regard.

Dow has tremendous experience in this regard. In 1998, Dow established the concept of a ValuePark® at our operations in Germany. Taking the industrial park concept and advancing it, the establishment of specialized companies in direct neighborhood to each other has created synergies between the investors and Dow. These companies represent a wide variety of sectors including chemicals and plastics, research, logistics and engineering. At the same time, ValueParks promote the economic development of the region. Efficiencies in infrastructure, access to markets and economic growth have proven this concept.

Also, by advancing the "Centres for Specialization" concept to a "Centres of Excellence" approach, Kenya can bring together industry, government, and academia to accelerate innovation in areas related to the country's comparative advantages. The Innovation Hub work already initiated via the Vision 2030 plan is a good beginning and has already inspired investment from Google. A broader focus with manufacturing at its core is necessary.

RECOMMENDATIONS

- Ensure that the goal of establishing clusters is realized and enhanced to take a multi-sector approach to each cluster.
- Establish "Centres of Excellence" that partner industry, government and academia to drive innovation in key industries, with a particular focus on advanced manufacturing technologies.
- Develop cost-sharing agreements to develop the "Centres of Excellence." Funding should ultimately be a mix of government, industry and academia, with the government portion coming first and being guaranteed for a minimum of three years.
- Examine establishing "free zones," which enable unencumbered foreign direct investment.



Education & Skills Training

OVERVIEW

To build an economy run by the best and the brightest, strategies to ensure the development of skills for the workforce to be well prepared for technology change are imperative. Global businesses invest where the talent exists, and Kenya must do all that it can to make sure the talent is cultivated here.

With a current official unemployment rate of around 40 percent, including particularly high youth unemployment, Kenya's Vision 2030 framework has identified a contributing factor to be the disconnect between the skills available and the skills demanded by industry. As the Vision has pointed out, "poor linkages between the labour market and training/research institutions has led to a skills mismatch and underdevelopment." If Kenya is going to achieve sustained economic growth with a value-adding, manufacturing sector at its core, closing this gap is essential.

Although Kenya can boast one of the more highly educated populations in Africa, not enough students are graduating with the skills in science, technology, engineering and math (STEM) fields that are necessary for high-tech jobs. Vision 2030 points out that, indeed, there has been a recent decline in students graduating with STEM-related degrees, and that this will likely create hurdles for long-term growth. In fact, with implementation of Vision 2030 largely dependent on building capacity in these fields, this is problematic. In addition, students that do graduate in those fields have tended to find more opportunity abroad, contributing to the high rate of brain drain in Kenya.

With aspirations of a highly qualified supply of teachers and modernized curriculum that matches the needs of the global marketplace and attracting investment, the government of Kenya understands the importance education and skills-development plays. However, current and future policies must do more to create an environment that enhances and funds programs that focus on STEM education while increasing partnerships between industry and academia to promote careers in advanced manufacturing and ensure a more skilled workforce.

WHAT MORE IS NEEDED

Improvements in education and a strategy that highlights the importance of STEM careers are imperative for establishing a sustainable manufacturing economy. The responsibility for creating this environment does not fall on any one single sector. Government, academia and industry need to intensify cooperation in programs to encourage STEM education at all levels to fill the talent pipeline.

In order to ensure an adequate supply of labour to grow the manufacturing sector, policy must also place an emphasis on workforce training and retraining including access to and incentives for workforce training. This includes a focus on mentoring, apprenticeship and vocational training.

RECOMMENDATIONS

- Establish a policy framework for recruiting and continued training of teachers in STEM-related disciplines.
- Develop public programs aimed at encouraging students to pursue careers in science and engineering.
- Create incentives and tax credits for companies that encourage continued training and education of employees.
- Foster a strong link between school students and STEM professionals via mentoring or internships to further students' understanding of 21st century STEM careers.

WHAT DOW IS DOING

Dow has a longstanding commitment to STEM education, which has been a key area of focus of Dow's charitable contributions connected to the Contributing to Community Success 2015 Sustainability Goal. Through partnerships with key universities and technical schools, Dow works to emphasize those skills that are vital to our continuing efforts across all specializations.

To increase public appreciation for chemistry, encourage students to pursue careers in science and generate enthusiasm for the creative future of chemistry to solve world challenges, Dow was a Global Partner for the United Nations International Year of Chemistry in 2011. Dow led in this international collaboration to engage more than 200 partners in all aspects of chemistry through events, educational lectures, exhibits and experiments across more than 40 countries.

Dow is the sole sponsor of the 2012 International Chemistry Olympiad, an event offering chemistry students the opportunity to compete and network with people from around the globe. More than 70 countries are expected to send teams of students.

Trade

INTRODUCTION

As Kenya works to implement Vision 2030 and accelerate economic development, an open trade and investment regime will be at the root of a growing manufacturing sector, opening up new markets for Kenyan-made products and creating opportunities for local investment. Trade liberalization provides opportunities for all countries, developed and developing, to increase their standard of living, expand consumer choice and improve access to education and job opportunities.

An advanced manufacturing economy is directly linked to access to markets. Driving investment and exports, the ability to tap into regional and global supply chains and sell products into larger markets beyond just domestic consumers is essential. Additionally, by providing a common set of rules among countries or regional groups, liberalized trade removes unnecessary complexity and barriers from the trade of goods.

Kenya should continue to lead in developing a progressive and open trade regime locally, regionally and across the African continent. Through the East African Community (a regional organization comprised of Kenya, Uganda, Tanzania, Rwanda and Burundi), Kenya is well positioned to take advantage of trade with these growing markets. In addition, as a regional trade bloc, the EAC has added negotiating power with broader global markets that Kenya can both drive and take advantage of.

Related to this, working to ensure a closely linked and efficient trade-related regulatory system with various trading blocs across the continent will create a more investor-friendly environment regionally, particularly in Kenya as the leading economy in the region – a bonus for the manufacturing sector as well as a boon to job creation and overall growth.

REGIONAL COOPERATION

Greater regional cooperation with Kenya's neighbours is an important component in maintaining and developing Kenya's position as a regional hub. It can be a catalyst for greater regional growth and economic prosperity, as well as create enhanced access to regional markets for Kenyan goods. By advocating greater cooperation among the various regional groups, Kenya can be a leader in creating greater efficiencies and attracting investment.

The Common Market for Eastern and Southern Africa (COMESA) is Kenya's leading export destination. Accounting for more than one-third of Kenyan exports, most trade has been in basic manufactured goods, which has helped enhance Kenya's manufacturing base. However, challenges still remain. As outlined by the Ministry of Trade, challenges to the free trade area include:

- Imposition of new measures or regulations that translate into non-tariff and/or technical barriers to trade
- Different interpretation of the rules of origin, particularly related to value addition
- Slow resolution of trade disputes
- Slow progress towards attaining full FTA status

In 2010, intra-EAC trade represented 53 percent of Kenyan exports within Africa and almost a quarter of total exports. In fact, among the EAC partners, trade grew from US$1.8 billion to more than US$3.5 billion between 2004 and 2009. Within the EAC, Kenya currently represents the most diversified exports including agricultural goods, chemicals, machinery and other manufactured goods.

With a strong template in COMESA and the EAC as a starting point, Kenya should take the lead in driving integration of the various trading blocs across the continent. In particular, negotiations to establish the COMESA-EAC-SADC tripartite free trade area, which began in 2008, should be prioritized. This will establish not just a larger market, but an economic space that is attractive for investment and advanced manufacturing. Estimates indicate that trade within the proposed free trade area could increase more than three-fold.

However, there is much progress to be made in order to fully realize the potential of such regional cooperation. As the Brookings Africa Growth Initiative has stated, Kenya has not yet fully taken advantage of the opportunities offered by these integrated markets, which is increasingly associated with problems related to institutional and regulatory barriers.

REGULATORY HARMONIZATION

Before effective regional cooperation can be fully realized and full implementation of the benefits of the EAC achieved, the harmonization of regulation across the bloc is crucial. The EAC must incorporate strong commitments by all partners that will lead to transparent and predictable regulatory and rulemaking procedures. Specifically, the agreement should develop and promote incorporation of regulatory coherence principles, which ensure all market participants are subject to the same regulatory scrutiny and control. Regulations should be based on sound science and risk assessment principles and incorporate industry consultation to ensure the best expertise for development of final regulations.

As tariff barriers have been reduced, the region has seen an increase in nontariff barriers in order to regulate trade. These barriers, though, increase costs for businesses and slow

the movement of goods within the region. These include lack of streamlined customs administration procedures, a lengthy process for obtaining rules of origin certificates (ROOs), and other onerous licensing and permitting requirements. In particular, ROOs should be easy to use, objective, transparent and predictable. They should work in concert with commercial realities and support importer-focused trade facilitation measures. Ultimately, all countries of COMESA and EAC would benefit from structured capacity-building in customs administration and dedicated efforts to remove corruption and ensure consistent and fair implementation for all importers/exporters.

Further, the proliferation of counterfeit goods in Kenya is a significant challenge for the Kenyan government and a drain on resources. Enhanced anti-counterfeit measures have the mutual benefits of protecting consumers by offering more assurances of quality and protecting the intellectual property of companies. Solid guidelines against counterfeit products, as well as enforcement of these guidelines, are an important step in ensuring the strength of Kenya's economy. These measures will contribute to a strengthened climate of intellectual property protection, encouraging more foreign direct investment.

RECOMMENDATIONS

- Enhance regional cooperation within COMESA and EAC, as well as among other trading blocs such as the Economic Community of West African States (ECOWAS). This includes prioritizing negotiations towards completing the COMESA-EAC-SADC tripartite free trade area.
- Incorporate regulatory coherence principles and commitments to develop a streamlined, coordinated regulatory system in support of better access for products and services to market.
- Enhance customs administration focus, including capacity-building measures to develop e-filing systems; promote draft regulations for comment; reduce corruption by streamlining implementation and enforcement; and develop harmonized rules of origin.
- Expand intellectual property enforcement measures to specifically target counterfeit goods, employing talents of the regulatory agencies to enforce their regulatory approval processes by denying counterfeit goods to market.
- Focus trade agreements on future markets and the exporting of high-value products, not just resources and agricultural products.

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