

## Low Carbon Growth

### Key Messages

- Future greenhouse gas emissions will increase in Tanzania. With planned development, they are predicted to double between 2005 and 2030. The current development pathway will also 'lock-in' the country to a higher emission pathway, reducing future carbon finance opportunities.
- This study assesses the potential for an alternative low carbon pathway in Tanzania and finds low carbon development is strongly in the country's self interest.
- It finds a large number of 'no regrets' options, which have net economic benefits to the economy and so enhance economic growth, as well as providing access to carbon credits, improving energy security and reducing air pollution and other environmental impacts.
- The study has outlined a number of recommendations and future priorities, the most important of which is that Tanzania should prepare a national climate strategy, get ready, and act now.

### **Rising Tanzanian emissions will reduce opportunities and increase impacts**

□ Tanzania currently has very low emissions of Greenhouse Gas (GHG) emissions, in total and per capita. The published inventory for 1994 puts per capita emissions at 1.3 tCO<sub>2</sub>e (all GHGs) and 0.1 tCO<sub>2</sub> (CO<sub>2</sub> only). This is extremely low by international standards.

□ However, if land use changes and forestry (including deforestation) are included, the per capita emission estimates rise to 2.67 (all GHGs) and 1.65 (CO<sub>2</sub> only).

□ The key emitting sectors are forestry, due to deforestation, and agriculture, primarily from livestock (CH<sub>4</sub> from enteric fermentation) and soils (N<sub>2</sub>O from fertilisers, animal manure, etc). These two sectors accounted for 93% of emissions in 1994 (forests 70%, agriculture 23%).

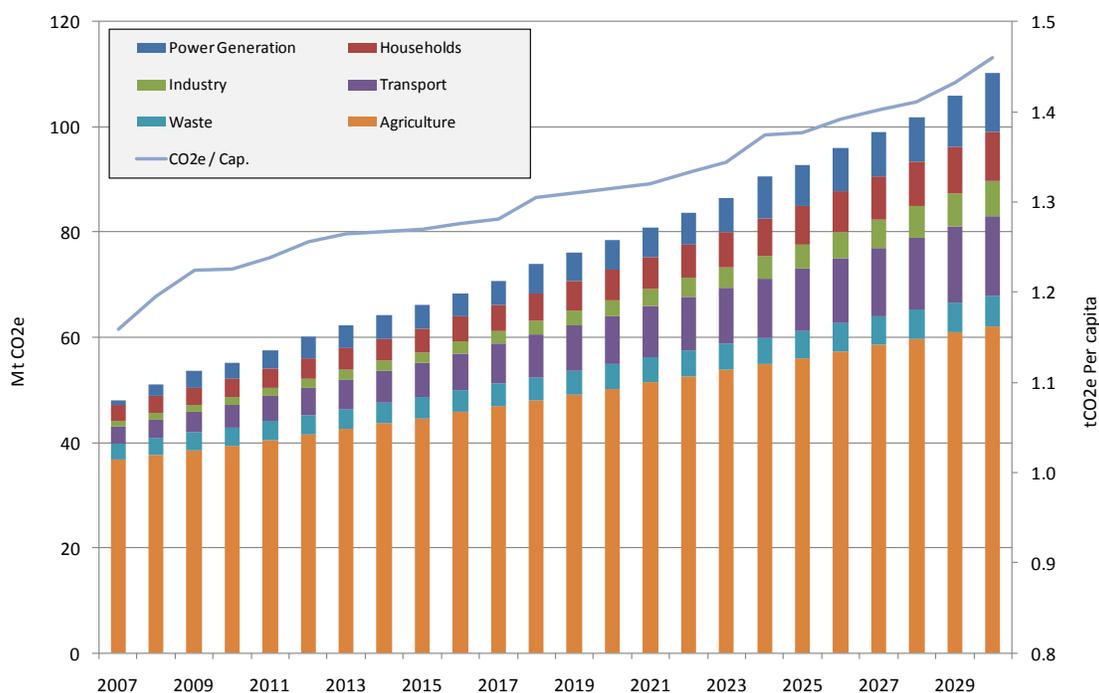
□ However, the emission of Greenhouse Gas emissions in Tanzania will increase under the planned current development baseline.

□ This study estimates that they will double between 2005 and 2030 under the current projected baseline, driven by the transport and agriculture sectors. The increases are shown in the figure below. Per capita emissions are set to increase to 1.5 tCO<sub>2</sub>e and 0.5 tCO<sub>2</sub> (CO<sub>2</sub> only).

□ Moreover, many of the current development plans, such as greater coal and gas use across the economy, and the baseline development in some sectors such as transport, will 'lock-in' the country into a higher emission pathway, reducing the potential for future carbon financing opportunities.

□ Indeed, fossil-fuel based emissions are set to increase by 7 times by 2030. These increases in fossil fuel use will also lead to other economic, social and environmental costs such as increased congestion, greater fuel imports and higher air pollution.

□ Growing demand for energy (biomass and charcoal) will further risk the sustainability of forests.



*Projected GHG emission projections for Tanzania (excl. LUCF), MtCO<sub>2</sub>e, 2007-2030 (Total and Per Capita)*

**Low Carbon Development is in Tanzania's self interest**

□ Tanzania has already introduced many low carbon options, for example in the electricity sector. However, these are already included in the estimates above and do not offset the increases in GHG emissions. The study has considered an alternative low carbon pathway for Tanzania, which delivers the same growth levels but reduces emissions.

□ For electricity, this includes the use of alternatives to fossil based generation, including renewables for large-scale generation and the decentralised electricity for rural populations. For households, it includes more efficient use of biomass in addition to higher consumption of other lower carbon fuels, such as renewable electricity and LPG.

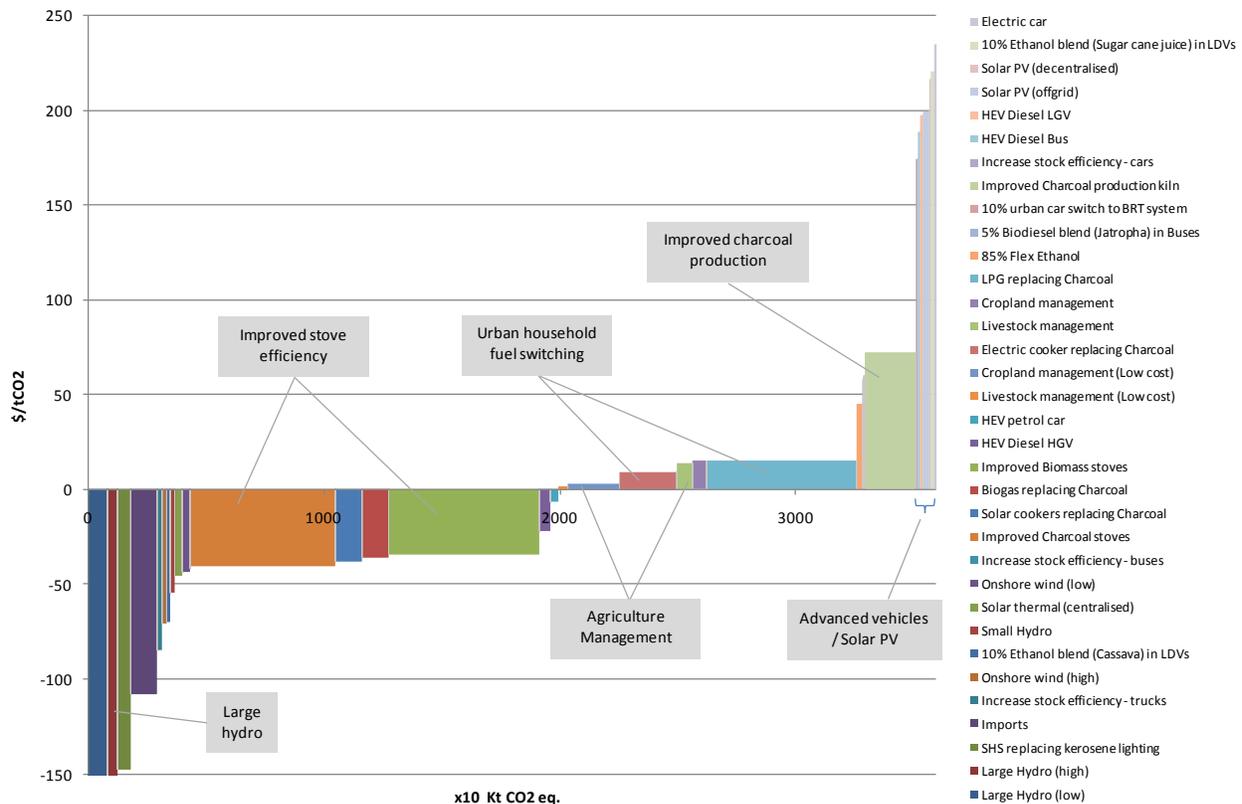
□ For the transport sector, it includes improvements in vehicle efficiency, use of biofuels and effective public transport systems. For agriculture, it includes various options to address the emission growth that would occur from agricultural intensification.

□ Many of these options are 'no regrets' opportunities, i.e. they have positive economic effects and their benefits outweigh their costs. An example is energy efficiency which saves the individual or company money (e.g. from reduced fuel costs) compared to the current baseline. There are also many low cost options that would enhance economic growth, as well as allowing further access to international carbon credits.

□ These options are shown below, in a marginal abatement cost curve. This shows the cost of emission abatement (left hand axis, in \$/tCO<sub>2</sub>) for increasing total amounts of emissions reduced across the economy (from left to right). Options below the zero line are no regret options, i.e. those that produce cost savings.

□ These options also have wider economic benefits from greater energy security and diversity, reduced air pollution, and reduced environmental impacts.

□ In addition, the forestry sector represents an immediate opportunity, and Tanzania is well-positioned as a UN-REDD country.



Marginal cost curve for Tanzania (2030) – showing the large number of no regret options.

### **Accessing finance and delivering actions will not happen on it's own**

- Carbon finance will be critical in helping Tanzania to follow the low carbon development path above. Realising these opportunities will involve challenges and require political will, robust implementation, and social acceptance.
- There are technical, economic and institutional barriers that need to be addressed, such as upfront costs, technology access and cultural preference.
- Accessing funds will require the development of effective mechanisms, institutions and governance structures.

### **There are also feedbacks and links with climate change itself**

- The impacts of climate change will impact on the baseline development pathway, and on low carbon options. There is a need to link low

carbon and climate resilient growth, considering synergies and conflicts.

- Increases in temperature from climate change will increase cooling needs, which will increase energy demand and increase emissions, unless alternatives are sought. Furthermore, changes in future temperature and rainfall could affect the electricity sector, given the high proportion of hydro power, as well as affecting coal use because of cooling water requirements. Wider energy diversification is therefore needed to build resilience.

- Changes in future climate will affect agro-ecological zones and could impact on forests, reducing the potential for REDD. The consideration of climate change impacts on forests is a REDD priority. Early steps include increased monitoring of climate change, to reduce existing stresses and to develop adaptation measures such as forest buffer zones and increased connectivity.

Strategies	Recommended Actions
Low-Carbon Growth (LCG)	<ul style="list-style-type: none"> <li>• Full analysis of baseline projections, low carbon options, costs and potential for prioritisation and development of strategy for mechanisms.</li> <li>• Develop national strategies to mainstream LCG in planning. Build into long-term vision (e.g. Vision 2025), including potential effects from international action.</li> <li>• Facilitate carbon finance opportunities in voluntary and compliance carbon markets (VCM, CDM) and in REDD</li> <li>• Prioritize forestry, agriculture, transport and electricity generation low carbon measures, considering short-term opportunities but also longer-term areas where potential 'lock-in'.</li> <li>• Look for synergistic adaptation – low carbon project opportunities, e.g. agro-forestry and sustainable land-use</li> </ul>
Climate resilience	<ul style="list-style-type: none"> <li>• Climate risk screening of low carbon growth pathways</li> <li>• Consideration of energy demand (cooling) and supply (hydro, fossil stations) effects from climate change, with associated adaptation (diversity, demand management).</li> <li>• Analysis of potential impacts of climate change on forestry (REDD) and introduction of monitoring and move towards early adaptation..</li> </ul>

### **Getting Ready to Act**

□ The study concludes there are significant economic benefits for Tanzania in following a low carbon development path, as well as large environmental and social benefits. Such a pathway is strongly in the country's self interest, and would provide extra investment from carbon finance. It would produce real economic, environmental and social benefits, enhance energy security, reduce fuel imports, and improve air quality and natural resources.

□ A key recommendation is for Tanzania to get ready and act now. Specific actions include.

□ Improving the estimates to give a more comprehensive analysis of projections and opportunities, analysis of costs (including an investment and financial flow analysis (by sector) and to match these against potential finance.

□ To develop a national climate strategy that links national policy to sectoral objectives and targets, with effective mechanisms for implementation, monitoring, reporting and verification for low carbon growth and adaptation. To build capacity, with mechanisms, institutions and governance systems to allow Tanzania to access funds.

□ To encourage the shift to low carbon pathways, with greater Government, business and civil society action, and to avoid locking in Tanzania to a high emission path.

□ To widen this analysis to develop a longer term strategy up to and beyond 2030, which also considers international aspects (supply chains, tourism), co-operative regional (East African) responses, and a policy shift, to low carbon development / climate resilient growth, including an update of national policy and Vision documents to examine the potential effects and opportunities of climate change.

### **Background and contacts**

The development partners group, with support from UK Government (DFID), have funded this study (*Economics of Climate Change in the United Republic of Tanzania*). It considers the impacts and economics costs of climate change, the costs and benefits of adaptation and low carbon growth. The work is led by the Global Climate Adaptation Partnership, working with international and local partners. For information, contact Paul Watkiss or Tom Downing (info@ClimateAdaptation.cc).

