

Green climate compatible urban industrial development in Ethiopia

Strategy and projects for the Kombolcha-
Mek'ele Industrial Corridor

FINAL REPORT

Final Report

September 2017



**Ethiopian Development
Research Institute**

Contents

Acknowledgments	4
Abbreviations and Acronyms	5
Executive Summary	6
Pathway shift 1: Institutional Innovation.....	7
Pathway shift 2: Strengthened Policies	7
Pathway shift 3: Catalytic Investments	8
1. Introduction	11
Background.....	11
Objectives	12
Report Structure.....	13
2. Green urban-industrial development in Ethiopia	14
Setting the scene.....	14
The National Policy and Spatial Context.....	20
From National to Local: the missing links	24
Kombolcha – Mek’ele Corridor Profile.....	25
Approach and Method to prioritise green development	34
3. Towards a green industrial transformation pathway	36
Translating lessons learned into paradigm shift	36
Strategic Intent: Implementing Paradigm Shift Pathways.....	38
Pathway shift I: Institutional Innovation - New Ways of Working.....	39
Pathway Shift II: Incentives through policy and regulatory reform.....	41
Changing incentives to allow sustainable industrial cities to develop.....	41
Creating Sustainable Cities: Implementing Change.....	44
Pathway Shift III: Catalytic Investment (Projects).....	45
Financing Options	47
4. Next Steps	51
Annex 1 – Summary statistics for Mek’ele – Kombolcha	52
Annex 2 – Financing options for catalytic investment projects	53
Financing mechanisms.....	53

List of Figures

Figure 0-1 Stylised climate compatible CO ₂ emissions trajectory for Ethiopia	6
Figure 2-1: water availability and drought risk along the Kombolcha-Mek'ele Corridor.....	17
Figure 2-2: Ethiopian Growth Strategy: NUSDP target urban – industrial clusters	25
Figure 2-3: Economic characteristics of the Mek'ele and Dessie-Kombolcha clusters (and associated towns)	26
Figure 2-4. Map of Kombolcha showing the Kombolcha IPDC Industrial Park, and major transport links.	27
Figure 2-5: Mek'ele City Industrial Estate, Mek'ele	28
Figure 2-6. Map of Mek'ele showing IPDC Park, and major transport links.	29
Figure 2-7: Developing New Paradigm Pathways: Project Identification and Validation.....	34
Figure 2-8: Strategic objectives used for initial screening of projects.....	35
Figure 2-9: The virtuous spiral of Development	35
Figure 3-1: An understanding of 'paradigm shift' towards a Climate Resilient Green Economy.....	36
Figure 3-2: Stylised climate compatible CO ₂ emissions trajectory for Ethiopia.....	39
Figure 3-3: Institutional Innovation: Possible K-M Corridor Collaborative Partnership	40

List of Tables

Table 2-1: Selected example benchmarks for the K-M Corridor	19
Table 2-2: Mek'ele-Kombolcha Growth Corridor: Opportunities and Constraints to green urban-industrial development. The table was formulated in discussion with stakeholders in both cities who set out local opportunities and constraints to help identify catalytic investment projects along the corridor.	30
Table 3-1: Improving the policy and regulatory environments.....	42
Table 3-2: Implementing and greening existing policies and regulations	44
Table 3-3: Average participants scoring of project proposal against selected criteria	46
Table 3-4: Summary of the Three High Priority Projects.....	47
Table 5: Development financing available to Ethiopia.....	55
Table 6: Climate financing available to Ethiopia.....	56

List of Evidence Boxes

Evidence Box 1: The Kombolcha - Meke'ele Corridor	15
Evidence Box 2: Lessons learned from Ethiopia's first Funding Proposal submitted to the GCF.	23
Evidence Box 3: Water Pricing – getting it right.....	42

List of Maps

Map 1: The Urban clusters of Ethiopia and the Kombolcha-Mek'ele Corridor Area	10
---	----

Acknowledgments

The study was produced by the Climate and Development Knowledge Network (CDKN), with project partners including PwC, IPE Global Triple Line and the Ethiopian Development Research Institute (EDRI). The project is funded by the UK Department for International Development (DFID) embassy in Ethiopia, as one work stream to support the Climate Resilient Green Economy (CRGE) Facility. The project team has benefitted from extensive consultation with institutions and individuals who met and advised the project team, and would like to thank them for their valuable inputs.

The Ethiopian federal government agencies:

- Prime Minister's Office
- the Ministry of Finance and Economic Cooperation (MOFEC)
- Ministry of Industry (MoI)
- Ministry of Urban Development and Housing (MUDHo)
- Ministry of Environment, Forest and Climate Change (MEFCC)
- Ministry of Water, Irrigation and Electricity (MoWIE)
- Climate Resilient Green Economy (CRGE) Facility
- Ethiopian Investment Commission (EIC)
- Industrial Parks Development Corporation, (IPDC)
- Ethiopian Rail Corporation (ERC).

Mek'ele city and Tigray regional authorities:

- Tigray Regional State Small and Medium Manufacturing Industries Development Agency
- Tigray Regional State Urban Development, Trade and Industry Bureau
- Tigray Regional State Industrial Parks Development Corporation
- Tigray Region Investment Office
- Tigray Region Chamber of Sectorial Associations
- Mek'ele City Mayor's Office
- Mek'ele City Urban Plan Preparation Office
- Mek'ele Industrial Park Project Office
- Velocity Apparel (Vogue International Agencies owned) Industrial Park
- DBL Industries PLC Industrial Park

Kombolcha city Amhara National Regional State (ANRS) authorities:

- ANRS Plan Commission
- ANRS Trade and Industry Bureau
- ANRS Bureau of Urban Development, Housing and Construction
- ANRS Rural Road Construction and Transport Bureau
- ANRS Investment Commission
- ANRS Environmental Protection Authority,
- Kombolcha City Mayor's Office
- Kombolcha City Administration Urban Land Work Process, Urban Plan Implementation, Beautification and Green Development Works Process, Trade, Industry and Market Development Office, Infrastructure, Housing and Construction Work Process
- Kombolcha City Water and Sewerage Service
- Kombolcha Agriculture Office
- Kombolcha Industrial Park Project Office
- Kombolcha Dry Port Authority
- Awash – Kombolcha – Hara Gebeya Railway Project Office.

Abbreviations and Acronyms

CA	Cities Alliance
CPI	City Prosperity Index
CSA	Central Statistical Agency of Ethiopia
ECSPG	Ethiopian Cities Sustainable Development Goal
ERCA	Ethiopian Revenue and Customs Agency
ETB	Ethiopian Birr
EU	European Union
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GHG	Greenhouse Gases
GNI	Gross National Income
GoE	Government of Ethiopia
GTP	Growth and Transformation Plan
GVA	Gross Value Added
ICT	Information Communication Technologies
IHDP	Integrated Housing Development Programme
LAS	Land Allocated to Streets
LFS	Labour Force Survey
LMIC	Lower Middle Income Country
MEL	Monitoring, Evaluation and Learning
MIC	Middle Income Country
MIS	Management Information System
MSE	Micro and Small Enterprise
MoFEC	Ministry of Finance and Economic Cooperation
MUDHo	Ministry of Urban Development and Housing
NUDSP	National Urban Development Spatial Plan
O&M	Operation and Maintenance
SDG	Sustainable Development Goal
SEZ	Special Economic Zone
SOE	State Owned Enterprise
ULG	Urban Local Government
UN	United Nations

Executive Summary

Ethiopia's commitment to green growth

Eager to become a lower middle income country (LMIC) before the end of 2025 the Government of Ethiopia has prioritised economic growth and transformation. The Government of Ethiopia (GoE) is also intent on developing the economy in a manner which is 'green'; namely, climate change impact resilient and environmentally sustainable. Disregarding the imperative to go green has resulted in severe environmental damage characterising the economy of many other countries seeking to attain Middle Income Country (MIC) status, and has contributed to global harm.

Ethiopia's opportunity to be 'best in class'

Industrialisation is seen by GoE as the way to achieve LMIC status. Industrialisation is being promoted in Ethiopia by attracting foreign direct investment (FDI), and encouraging the development of local supply chains. GoE recognises that strong 'green' credentials are necessary in order to attract FDI, and to sustainably develop domestic industries. Ethiopia is on a track to be Africa's 'best in class' green industrialisation practitioner. Being best in class means ensuring that individual businesses are green. It is also means that the encompassing urban-industrial ecosystem must be green. One cannot happen without the other.

Building liveable and resilient cities

A key aim of this project is to lay the foundations for the development of an effective green urban-industrial ecosystem, using the transport corridor between Kombolcha and Mek'ele to illustrate how this can be achieved. Mek'ele and Kombolcha-Dessie are each designated as urban growth 'clusters' within the National Urban Development Spatial Plan (NUDSP, 2017). They are linked by major road and rail transport infrastructure. This project describes how supporting development in each cluster, and in towns along the corridor (hereafter referred to as "K-M Corridor"), can build a green urban-industrial ecosystem and maximise green growth potential. This will involve the development of liveable and resilient cities in the clusters as well as along the corridor linking them, and to catalyse progressive change towards green urban industrialisation across the country. In order to achieve this goal nationally a paradigm shift in Ethiopia is required; one which generates systemic change towards low-carbon and climate resilient development that is beyond a limited number of project or programme investments. More specifically, the project seeks to:

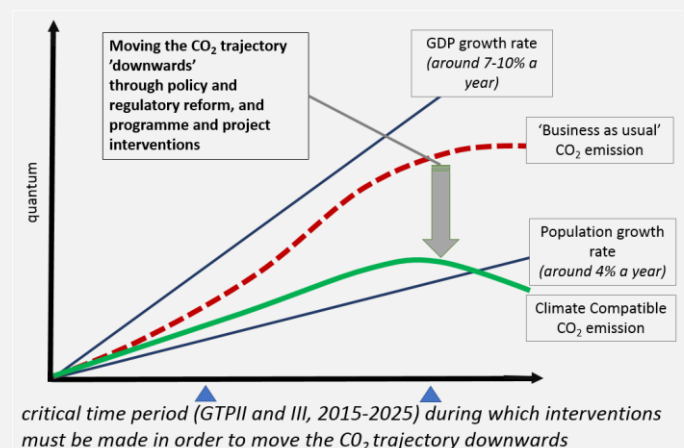
- Devise **policy and regulatory measures** that promote green urban-industrial development in the K-M Corridor;
- Demonstrate how to **strengthen the institutions** responsible for governing the Corridor in a manner which will enhance their ability to promote green development;
- Identify **three high priority green urban-industrial projects** within the K-M Corridor as demonstrators.

The three projects are taken to proof of concept level; ready for feasibility assessment and the evaluation of funding options. Lessons then learnt through their implementation will help those responsible for the delivery of green urban-industrial development throughout the country. Most importantly, the design of the projects has highlighted the need to *effectively implement* and 'green' many of the national policy and regulatory reforms previously advocated or adopted. These reforms, the three K-M Corridor projects, and other similar projects across the country, will change the trajectory of CO₂ emissions and will lay solid foundations on which can be built liveable, resilient green industrial cities generating decent productive employment opportunities for the majority.

But Green Growth is not guaranteed

In its Nationally Determined Contribution (NDC), Ethiopia states its intention to limit its greenhouse gas emissions to 145 Mt CO_{2e} or lower by 2030 (effectively a cut in emissions by 5 Mt from 2010 baseline). But under a business as usual scenario economic growth is projected to increase in CO₂ emissions from 150 Mt in 2010 to over 400 Mt CO₂ in 2030. Moreover, the World Bank has estimated that Ethiopia risks achieving only half of its total potential GDP in 25 years if additional measures are not taken to promote green growth. Further efforts are required to improve policies, strengthen institutions and introduce incentives that lead to 'green' development; in effect a paradigm shift is needed. The next phase of industrial growth in Ethiopia must place greater emphasis on the enabling environment to get more out of existing and planned investments. This means not just building more assets, but ensuring that existing assets are better managed and thus stimulate lasting change in institutional and economic performance. **Figure 1** depicts a stylised climate compatible CO₂ emissions trajectory for Ethiopia.

Figure 0-1 Stylised climate compatible CO₂ emissions trajectory for Ethiopia



Create Paradigm Shift Pathways

Ethiopia needs to *do things differently* in order to secure green growth. GoE knows this; but the paradigm shift that has already begun needs strengthening by focusing on six main goals (See Figure 2):

1. **Emphasis on the enabling environment**, as well as capital investment and project delivery;
2. **Build effective institutions**, that work well and are adequately financed, and encourage collaborative working practices;
3. **Create incentives that develop pathways towards target objectives** with Climate Resilient Green Economy (CRGE) elevated and embedded across all levels of decision making linking the national planning process to local communities;
4. **Strengthen implementation capacity**; upgrade skill-sets through training; empower local-city level government to act; getting the right people doing the right jobs and enabling implementers to act;
5. **Learn by doing, then scale-up**; follow an incremental approach to build capacity and capability, learn and apply lessons; gradually and steadily build strength, capabilities and competences in city administrations /implementing agencies;
6. **Be proactive, but flexible**; often too much is done too quickly, and sometimes in an *ad hoc* and reactive manner. Take time to consider options and be flexible in response to changing circumstances and opportunities;

This project recommends three pathway shifts that must be achieved:

Pathway shift 1: Institutional Innovation

To promote collaboration/coordination among Federal, Regional, City and local institutions, this project recommends establishing a **Kombolcha and Mek’ele Corridor advisory group** – Figure 3. By focussing on a trans-regional set-up, stakeholders along the corridor can identify and address issues in common and promote cross-learning. For example, water management involving the water basins that traverse the corridor area and beyond, and transportation issues which connect the two cities and the various towns in the corridor area. Furthermore, as the industrial economy expands, geographical and social connections become denser and more interconnected. The role of the federal government remains crucial to address trans-regional challenges but ‘corridor thinking’ with national and local stakeholders can be critical to implementation success.

Pathway shift 2: Strengthened Policies

To secure a new green industrialisation pathway, the GoE will need to **improve continuously the policy and regulatory frameworks**, including reworking the planning process to support implementation of cross sector initiatives at the relevant local level (for example structure plans, local development plans). Resource pricing needs to be reformed to avoid subsidising the consumption of environmental goods (and ‘bads’).

Figure 2: Green Growth Paradigm Shift: key enablers

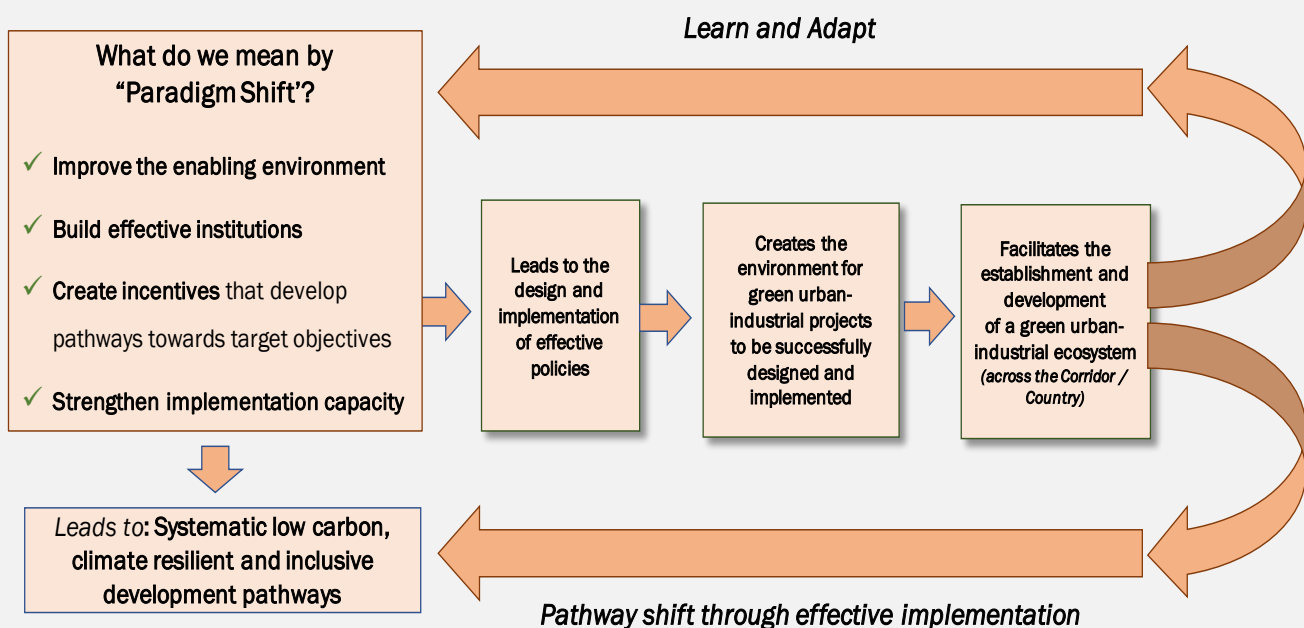
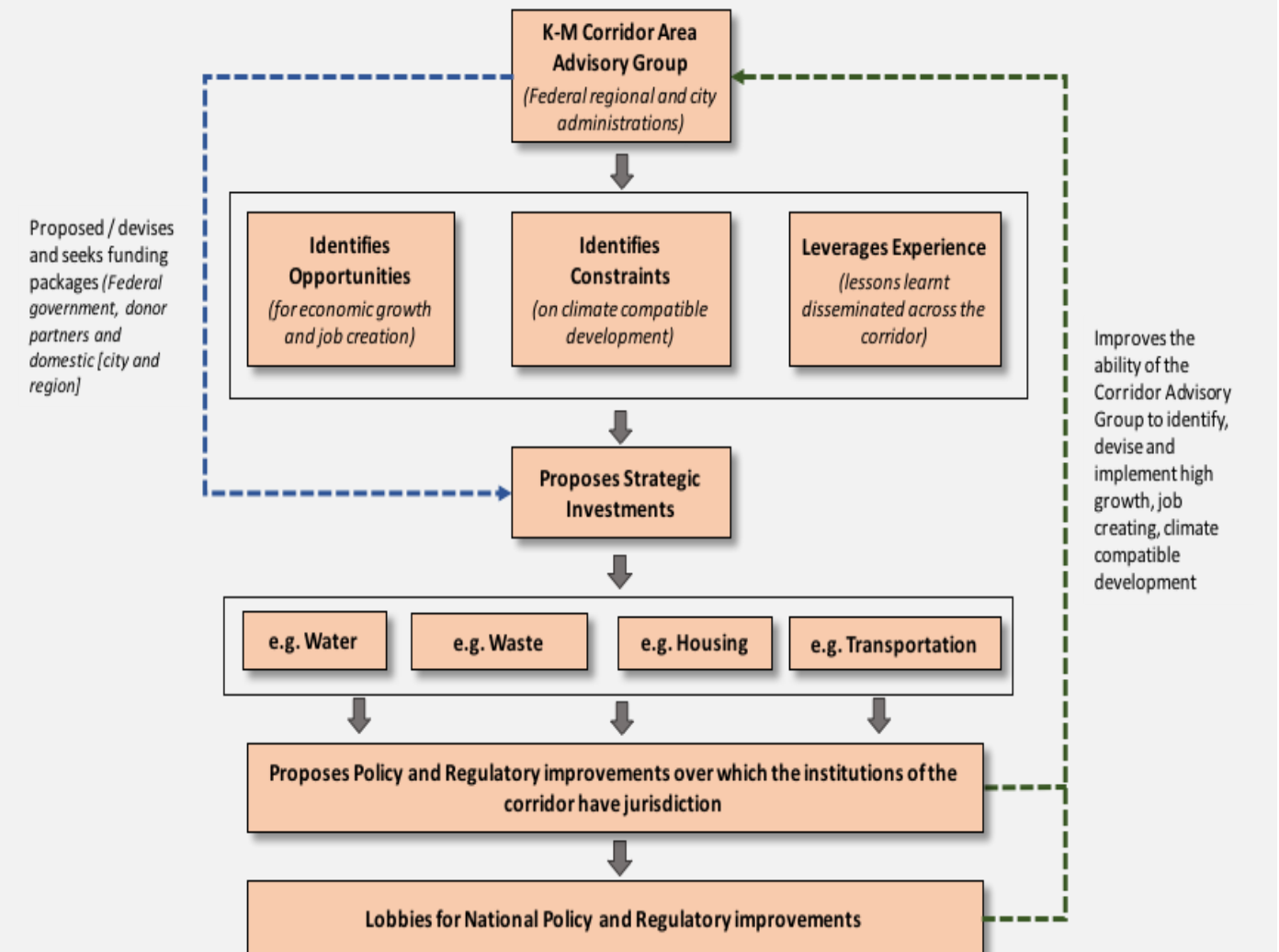


Figure 3: Thinking and Working Together Differently



This also includes increasing capacity to enforce resource use regulations and pollution control, and removing market and regulatory barriers to new climate friendly technologies; updating standards and codes that restrict technology choices that are green and climate change compatible. Importantly, many of the policies advocated through the National Urban Development Spatial Plan (NUDSP) and the draft Climate Resilience Strategy, which are appropriate for a country such as Ethiopia seeking to urbanise and industrialise, **need to be implemented**. The urban cluster development plans proposed by the NUDSP, for example, should be prepared, embedding green growth, and extended to key corridor areas across Ethiopia.

Pathway shift 3: Catalytic Investments

The third component needed to accelerate the paradigm shift is a **set of priority projects designed to catalyse green industrialisation – starting as local projects but scalable and replicable**. The projects for the K-M Corridor cover three interdependent sectors that are nested within the “sustainable cities” and natural resources envelopes currently being considered by the GoE as part of future climate/development financing discussions:

- **Sustainable Cities Initiative** – Housing, waste management, and water projects
- **Natural Resources Initiative** – Regional, and water resource management project

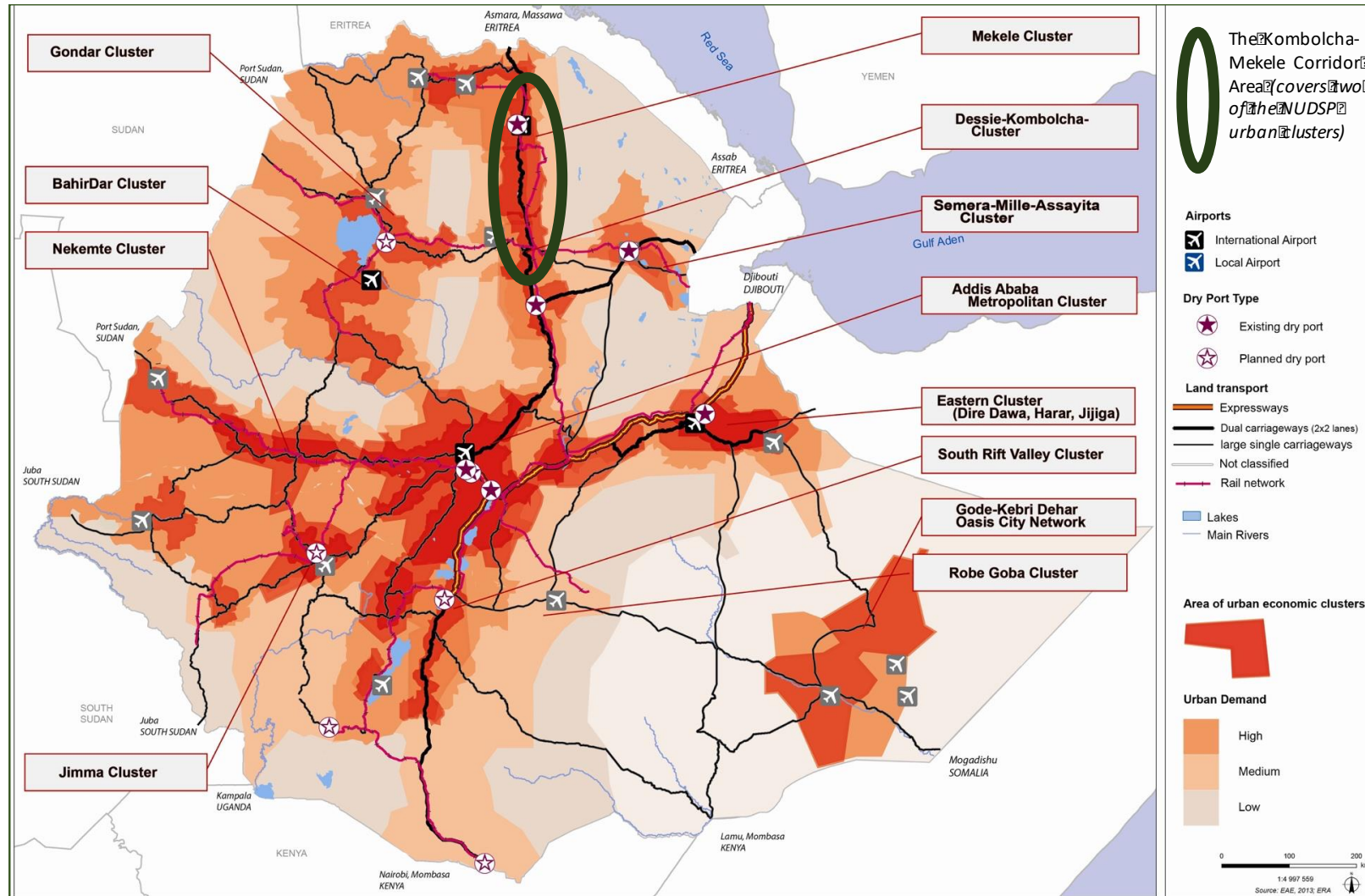
The table below is a summary of the three catalytic investment projects for the K-M Corridor together with an outline of the expected outcomes and impacts.

The Three Investment projects for the Kombolcha- Mek'ele Corridor

Project Area	Project Rationale	Corridor Response : The Project	Key Benefits and National Opportunities
Housing	<ul style="list-style-type: none"> • Acute shortage of affordable housing; e.g., deficit of 6,500 – 12,000 affordable housing units in Mek'ele. • Predominance of informal housing; 50% of urban housing is informal in nature. • Housing sector delivers poor quality accommodation; unsustainable housing choices characterizes current housing supply • Need for higher quality housing which is associated with lower energy use, and protection from flooding and other climate change impacts 	<ul style="list-style-type: none"> • Green building design competition to deliver up to 2,000 green houses, together with institutional strengthening and training. The green houses are to be built in two sites to demonstrate alternative building techniques and materials and incentivize innovation and entrepreneurship in the housing sector • <u>Estimated Costs:</u> <ul style="list-style-type: none"> ○ The competition: between US\$0.75-1 million; includes prototypes ○ Building 4,000 green houses: between US\$ \$8-10 million • In broader terms - Corridor wide coordinated planning for urban growth – accommodating around +4.5% p.a. increase in urban residents via new affordable green build. Align CRGE, urban, housing, and construction strategies; build knowledge base and capacity of city and regional governments on housing issues, and coordinate industrial investment with housing delivery. Strengthen city planning and implementation capacity. 	<ul style="list-style-type: none"> • Encourage green housing across the country - Review and update housing policy objectives; urban planning and building codes to be changed to allow and encourage green housing • Job creation: Encourage changes in the construction supply chain that accelerate the growth of green jobs. Forward and backward linkages creates employment along construction industry supply chains • Improved public health: Decent, well-designed housing improves public health. Secure tenure is strongly related to health; where those who own their own homes and have security of tenure, are usually in better health. • GHG Emissions reduction: Switching from cement to a locally available building materials would cut emissions from production and transport. Significant potential exists to explore off-grid energy solutions to provide lighting and power
Waste	<ul style="list-style-type: none"> • Significant quantities of waste are not collected and remaining untreated. <ul style="list-style-type: none"> ○ 25 – 75% urban population's waste is not collected ○ c.25,000 tonnes CO₂ produced per annum in Mek'ele only from organic waste ○ Industrial wastes are also being generated in Mek'ele and Kombolcha, but are considered as a separate challenge; integrated solutions to domestic and industrial waste not considered. • Current focus is only on final disposal; materials recovery is an afterthought, and recycling minimal; much of the intrinsic value in waste is being lost 	<ul style="list-style-type: none"> • Building materials recovery and waste-to-energy facilities for the Corridor, together with institutional strengthening and training • <u>Estimated Cost</u> of around US\$50 million CAPEX and OPEX US\$65 - \$US200/tonne of waste; covers: <ul style="list-style-type: none"> ○ Materials recovery facility ○ Waste-to-energy plant (IP) ○ Clean Development Mechanism (CDM) • Co-sharing between cities of public private bodies of CAPEX costs of waste management facility • In broader terms - Opportunities for composting to be identified; coordination across public, private, and community sector to be established; and training and raising awareness to be undertaken (e.g. undertake public awareness campaigns on waste reduction, separation and recycling; undertake training to IP tenants on materials recovery and waste treatment) 	<ul style="list-style-type: none"> • Waste minimization - Opportunity to refocus national waste strategy towards waste minimization and materials recovery. Also opportunity to reduce city authority expenditure on final disposal, minimize municipal and industrial wastes to landfill and promote the closing of resource loops • Job creation: opportunity to develop new secondary markets for recovered materials which can reduce material costs/imports. Encourage Jobs /opportunities for green jobs. – 6 FTE per 1000 pop. Value addition – latent recycling potential. High labour intensity, low-skilled jobs in the waste management sector, potential to create employment opportunities, particularly for youth or women • GHG emissions reduction -Tackle 75% GHG emissions from cities through waste minimization. GHG abatement - 1 tonne of organic waste diverted from landfill = 0.868 tonnes/CO₂e avoided @ c. US\$78/tonne • Improved public health: Proper SWM management can reduce the levels of dust and particulates in the air, which poses significant public health risks
Water resources	<ul style="list-style-type: none"> • Water scarcity and stress increasing; including accelerated depletion of groundwater • High cost of water - Increase cost of water supply; increased cost to industry, but the poor pay disproportionately more for their water and there is inappropriate water pricing with low/no cost-recovery • Poor coverage: Inadequate service coverage and unregulated water use by industries 	<ul style="list-style-type: none"> • Investment in water saving and reuse technologies for the Corridor and institutional strengthening and training • <u>Estimated Cost</u> around US\$10 million to cover the following interventions: <ul style="list-style-type: none"> ○ Water resources mapping & management strategy/plan ○ Water utility management and improvement plan ○ Non-residential metering, monitoring and cost recovery ○ Water conservation and demand management ○ Investment in technologies for re-using and recycling grey water for irrigation, construction and other non-potable uses. • In broader terms - Coordination across public, private, and community sector to be established; training and raising awareness to be undertaken. Water pricing reform to be explored. Quality standards for water recycling and reuse to be set. Incentives for water reuse and technology upgrades designed 	<ul style="list-style-type: none"> • Better planning and management of water resources -develop new approaches, methods and tools for water resource management; better information to inform planning and investment decisions; introduce incentives for water reuse and technology upgrades • Investment savings and productivity gains - Reduce water supply investment; improved water supply improves public health - reduces water borne illnesses which in turn releases labour availability for other activities; increased availability of water will improve output in urban agriculture and livestock production, which in turn leads to enhanced food security and improved livelihoods of communities. • GHG and pollution reductions: Reusing and recycling water reduces the need for energy to pump water from deep aquifers using diesel-based CO₂ generating water pumping systems ; improved industrial wastewater management (zero-waste discharge, grey water recycling systems, discharge fees) and sanitation systems prevent pollution

Map 1: The Urban clusters of Ethiopia and the Kombolcha-Mek'ele Corridor Area

Source : NUDSP (2017) MUDHo



1. Introduction

Background

Ethiopia is one of the poorest countries in the world in terms of GDP per capita, but it is also one of the fastest growing economies, with more than 10% annual GDP growth on average since 2004. This period of growth began the three-year Sustainable Development Poverty Reduction Programme (SDPRP), which covered 2002-2005, and was the first phase of the Poverty Reduction Strategy Program (PRSP). This was followed by the five-year Plan for Accelerated and Sustained Development to End Poverty (PASDEP) for the period 2005-2010. Under the SDPRP and the PASDEP, the agricultural sector was identified as the key driver of growth supported by the Agricultural Development Led Industrialization (ADLI) strategy. Other pillars of the SDPRP and the PASDEP were formulated based on the Millennium Development Goals (MDGs), but notably did not address explicitly industrialisation or urbanisation.

The PASDEP was succeeded by the first Growth and Transformation Plan (GTP I) in 2010, which did highlight the importance of industrialisation in the third of seven pillars titled “Creating favourable conditions for industry to play a key role in the economy”. Building on the economic success of the earlier plans, the second five-year Growth and Transformation Plan (GTP II) was launched in 2015¹. The GTP II sets out the development priorities over 2015– 2020, including the following:

- **Promoting the growth of the manufacturing sector** as part of a broader structural transformation process, and to move towards higher productivity and value added sectors
- **Managing rapid urbanisation** effectively, including the adequate provision of infrastructure and services, and support for the creation of urban jobs.
- **Fostering low-carbon and climate resilient development**, as set out in the Climate Resilient Green Economy strategy (CRGE)².

The overarching goal of GTP II and GTP III, which will follow, is the realization of Ethiopia’s vision to become a lower middle income country by 2025. Specific GTP II output targets include: 11% annual increase in GDP; 18% increase in the size of the industrial sector; 24% increase in the size of the manufacturing sector; 29% annual increase in export revenues; and for manufacturing to account for 40% of export earnings by 2025. If GTP II targets are met, the country’s economy and, in particular, its industrial sector will need to grow quickly. Growth, however, is not guaranteed to be climate compatible – namely, resilient to the impacts of climate change and environmentally sustainable. Climate resilient or ‘green’ industrialisation is not a given. Indeed, under a business as usual scenario, growth is projected to increase CO₂ emissions from 150 Mt in 2010 to over 400 Mt CO₂ in 2030³.

¹ GTP I spanned the years 2009/10 to 2014/15, and GTP II from 2015/16 to 2019/20.

² Ethiopia’s Climate Resilient Green Economy (CRGE), Government of Ethiopia, 2011. It should be noted that Ethiopia ratified the Paris Climate Change Agreement in April 2017.

³ The climate change and energy research monograph: Ethiopia Pegasys Institute for UNOPS and Cities Alliance, June 2016. Furthermore, the CRGE indicates that the growth of the industrial sector is likely to be associated with high carbon emissions, with an annual projected emission increase of more than 15%. However, Ethiopia Nationally Determined Contribution to the UNFCCC is for an overall reduction in emissions to 145mt CO₂e by 2030, an ambitious target reflected in the CRGE Strategy.

Green industrialisation

Defining green industrialisation has been driven by a recognition of the role industrial development is likely to play in the economic growth agenda of developing countries. Expanding job opportunities, improving living standards, reducing poverty, and delivering goods and services should result from an expansion of the industrial sector. However, there is also a need to manage resources and protect the natural environment which provide opportunities for securing sustainable development (UNIDO 2011)⁴; and making the link between sustainable economic growth and the natural resources and ecosystem services on which that growth relies.

In the context of a changing climate, bringing about structural; economic change through industrialisation becomes a particular challenge for developing countries and their governments who must respond by ‘developing plans to adapt their economies and infrastructure to future changes in climate and weather patterns’ (Bowen, Duffy, and Fankhauser 2016)⁵. Where industrialisation has yet to take off, there are significant opportunities to adopting greener pathways to growth. Green industrialisation then reflects the importance of having to have policies, plans, and programmes in place that yield sustainable and inclusive growth whilst safeguarding natural resources, and crucially to secure “patterns of production, and [to] build system-wide infrastructure in order to ensure secure supplies of water, food and energy” (Vereinte Nationen 2016)⁶.

Moreover, it has been estimated by the Ethiopia’s Climate-Resilient Green Economy Climate Resilience Strategy: Water and Energy (2015) Ministry of Water, Irrigation, and Energy. that if steps are not taken towards climate compatibility, climate variability could reduce Ethiopia’s GDP growth by up to 10% per year. As a worst-case scenario, Ethiopia risks achieving only half of its total potential GDP in 25 years because of climate change⁷. Thus, a key developmental objective for Ethiopia is to devise a package of measures (from policy to investment) the implementation of which can move the carbon emissions trajectory downwards and towards a level where climate compatible development can be secured.

There is a clear but time-bound opportunity for Ethiopia to achieve the ‘triple win’, namely economic growth leading to Lower Middle Income Country (LMIC) status, carbon neutrality and resilience to climate change. Measures being taken by the Government of Ethiopia range from high-level development strategies (such as CRGE), to specific initiatives to attract ‘green’ Foreign Direct Investment (FDI) into industrial parks, and subsequently to green domestic supply chains. Further efforts, however, are required if the triple win is to be reached by 2025. GTPIII which will guide development between 2020 –and 2025 will then provide a vehicle for greening industrial development further.

Objectives

The Climate and Development Knowledge Network (CDKN) is providing assistance to the Ethiopian CRGE facility. This study, delivered by PwC, IPE Global Triple Line (IPE) and the Ethiopian Development Research Institute (EDRI), aims to support climate compatible (green) urban-industrial development in Ethiopia⁸.

The key objective of this study is to identify climate compatible and catalytic projects (within the industrial parks, their urban environments as well as along the corridor) which the respective towns or ministries can take forward towards implementation. To organise these efforts the study sought to devise a green (urban)-industrial framework for the corridor area stretching between and including the cities of Kombolcha and Mek’ele in northern Ethiopia. More specifically, the study aims to:

⁴ UNIDO. 2011. ‘UNIDO: Green Industry Policies for Supporting Green Industry’.

⁵ Bowen, Alex, Chris Duffy, and Sam Fankhauser. 2016. “Green Growth”and the New Industrial Revolution’. <http://www.greengrowthknowledge.org/sites/default/files/downloads/resource/Bowen-et-al-2016.pdf>.

⁶ Vereinte Nationen, ed. 2016. Greening Africa’s Industrialization. Economic Report on Africa 2016. Addis Ababa: Economic Commission for Africa.

⁷ Ethiopia Rising: Aspiring to Become a Carbon Neutral Middle Income Manufacturing Hub by 2025. Speech by World Bank Group President Jim Yong Kim, Addis Abba, July 14th 2015. www.worldbank.org/en/news/speech/2015/07/14/ethiopia

⁸ Climate compatible development is defined by CDKN as development that ‘minimises the harm caused by climate impacts, while maximising the many human development opportunities presented by a low CO₂ emission, more resilient, future’. Source: CDKN, Defining climate compatible development. Policy Brief November 2010.

- **Identify policy and regulatory constraints** to green urban-industrial development in the Kombolcha and Mek'ele corridor area;
- **Propose ways to strengthen the institutions responsible for governing the corridor** in a manner which will enhance their ability to promote green development;
- **Identify three priority green industrial projects within the corridor area**, and assess their technical and economic viability that will inform financing and implementation strategies that can be adopted by the Government of Ethiopia.

The project seeks to enable a structural shift in the economy of the **Kombolcha-Mek'ele Corridor** and its cities towards manufacturing, supported by sustainable urban management and expansion that capitalises on the benefits of agglomeration, whilst maximising resource use efficiency, ensuring environmental safeguarding and promoting climate compatibility. Lessons learnt through the implementation of the recommended investment projects can help those responsible for the design and delivery of climate compatible 'green' urban-industrial development throughout the country. Therefore, this study should be viewed as **creating pathways which can be replicated in other industrial corridors and their cities and towns in Ethiopia**, so supporting the over-arching development aim of the Government of Ethiopia, namely, attaining the 'triple win' of achieving lower middle income country (LMIC) status, carbon neutrality and climate change impact resilience by 2025.

Report Structure

Following this introductory chapter, the rest of this report is structured as follows:

- **Chapter 2** : highlights how prevailing policies and regulations currently frame green urban-industrialisation in Ethiopia; and describes the development trajectory along the Kombolcha and Mek'ele corridor including climate change vulnerabilities and exposure to climate impacts risks
- **Chapter 3** : presents the climate compatible development strategy for the Kombolcha and Mek'ele corridor, recognising a need for a 'paradigm shift' in the approach to development. A description of the three 'high priority' climate compatible projects is presented, with a summary assessment of their technical and economic viability that will inform financing and implementation strategies for the Government of Ethiopia
- **Chapter 4** : is a closing statement summarising the importance of the strategy and the associated projects and outlining the ways in which replication can be achieved, including recommended 'next steps'.
- **Annex 1** : supporting background material.

2. *Green urban-industrial development in Ethiopia*

Setting the scene

Ambition and reality in Ethiopia

Eager to become a lower middle income country (LMIC) before the end of 2025 the Government has prioritised economic growth and transformation. This priority is associated with a focus on industrialisation; a programme of investments in major infrastructure works; and a national urban development strategy which seeks to ensure that cities and towns evolve in a way that underpins and accelerates economic growth. The urgency that the Government of Ethiopia attaches to achieving these goals is clearly reflected in policy statements, development strategies, and the speeches of Ministers.

The Government is also intent on developing the economy in a manner which is climate compatible; the goal of the country's Climate Resilience Green Economy (CRGE) strategy. Indeed, the Government of Ethiopia aims to achieve the *Triple Win* of LMIC status, carbon neutrality and climate change impact resilience by 2025. More specifically, the intent of the Government is to promote industrialisation by attracting FDI and promoting the development of local supply chains in a manner which explicitly recognises that climate compatible and 'green industrialisation' credentials have become important aspects of the competition for FDI supplying global markets and operating in global supply chains.

In practice, however, ensuring climate compatible industrialisation and development may prove to be more difficult than expected - precisely because the country is attempting to forge ahead as fast as possible. Associated with efforts to accelerate the rate of economic growth has been a rush into project formulation and implementation, and investment. Sometimes investment decisions are made without a comprehensive assessment of the risks involved, safeguards required and any possible unintended and adverse impacts that may be generated. The identification of sites for industrial parks development is a good case in point. In Kombolcha for instance, the main criteria for selecting the site of the future industrial park was its accessibility and connectivity to major transport infrastructure (i.e. railway terminals, truck roads, airport), with limited consideration given to issues such as land use compatibility. The industrial park is not included in the city's existing structural plan, which has made it difficult to plan and manage the surrounding area and has led to conflict over land use. Further, according to the Kombolcha Water and Sewerage Authority, the chosen site is located within the Authority's 100-meter projection perimeter from its borehole wells constructed to secure water supply to the city for the coming 20 years. Despite efforts have been made to assess the likely impact of the site selection, there are still concerns that the construction and operation of the industrial park may contaminate the boreholes and thereby pollute groundwater.

Institutional and administrative capacity and capability constraints, particularly at regional and city levels, and national funding limitations, have compounded problems associated with a 'dash for growth', while at the same time leading to delays implementing some of the required development programmes.

Most importantly, the policy and regulatory frameworks required to ensure project and investment viability, sustainability and long-term success, are embryonic and need developing and strengthening. Where comprehensive frameworks are in place, they must be embedded in the way public sector institutions and private sector firms and organisations operate in order to realise their full potential. In Ethiopia, Strategies and policies devised at the centralised federal level of government can fail to find traction at regional, city and local level, often because of capacity and capability constraints at the lower levels of government and funding limitations. But getting the policy and regulatory frameworks 'right' is a crucial step to developing an economy in a manner which delivers growth and wealth, and which is also climate compatible, increases climate change impact resilience, and moves the carbon emissions trajectory of the country in the right direction. Devising and implementing these frameworks avoids many of the problems associated with a rush into project formulation and implementation, and the generation of

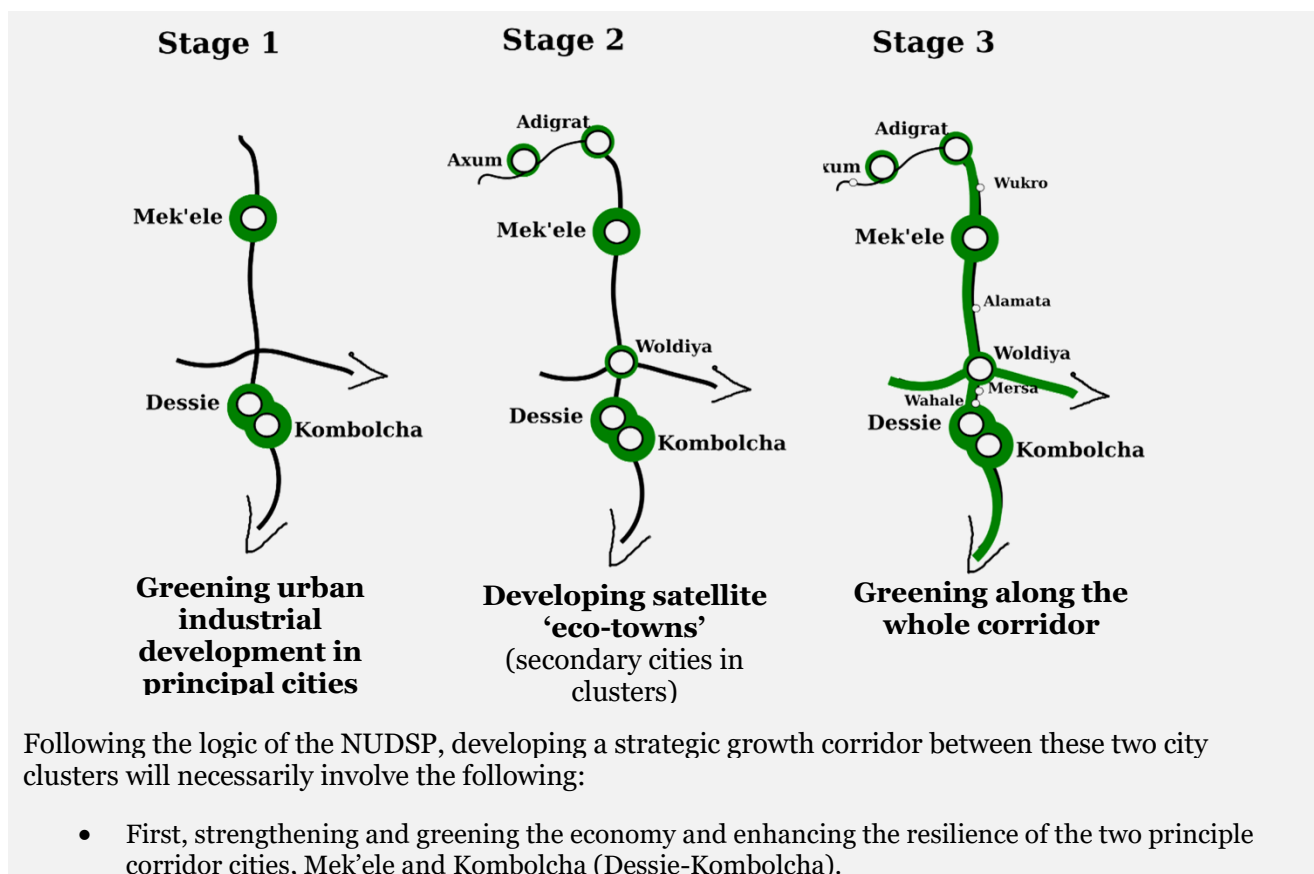
unintended and adverse consequences such as the rise of carbon emissions and other negative environmental and social externalities.

The possible difficulties that can be associated with a dash for growth are clearly apparent in the industrialisation strategy of the Government a key and instrumental component of which is the industrial parks programme. These parks, those run by the Federal Government Industrial Parks Development Corporation (IPDC), together with the more numerous regional, city and private industrial estate areas, have the potential to catalyse growth in cities, promote structural economic change, and create a significant number of jobs. They also, however, increase demand on, and competition for, infrastructure and resources such as power, water and transport, and, if poorly or inadequately managed, can place huge strains on an urbanising economy including air and water pollution, traffic congestion and shortages of housing and other basic social services. In Mek'ele, as a result of inadequate discussion or co-ordination with the host town, the local stakeholders have identified a risk of competition for water, where the demands of those operating on the industrial parks come into conflict with the demands of residents.

It is increasingly clear that for industrial parks to be successful they need to be economically integrated with their host or adjacent cities, and effectively connected with their respective urban hinterlands which often provide many of the raw materials required for production, and are the location of existing and hoped-for future domestic suppliers and labour force. Industrial parks must be planned and managed in a way which does not increase competition for local resource but improves resource productivity and actively promotes the move to climate compatible development.

Indeed, Ethiopia is intent on developing industrial parks in ways that focuses on environmental sustainability from the start. Nevertheless, given the long-life span of many types of urban and industrial investments, a number of decisions over the next five years will shape Ethiopia's urban and industrial future. Poorly and inadequately managed urban-industrial development will jeopardise if not compromise the attainment of Ethiopia's vision of low carbon and climate resilient development as expressed in the CRGE and GTPII. It is vital that a strategic climate compatible industrial-urban investment framework is created for each urban cluster and major transportation corridor area in Ethiopia.

Evidence Box 1: The Kombolcha - Mek'ele Corridor



- Secondly, development initiatives that support secondary towns and cities within these two clusters should be prioritised, recognising that towns within these clusters already host significant industrial and urban development e.g. textile plant located at Axum to the north west of Mek'ele; or play a strategic role in terms of facilitating exports e.g. transport infrastructure centred around Woldiya.
- Thirdly, smaller towns located along the transport corridor linking the two clusters should be supported in order to benefit from/contribute to the production of goods and services in each cluster.

Climate and Environmental Risk: Ethiopia Exposure

Ethiopia is one of the most climate vulnerable country in the world. The country is ranked as the 10th most vulnerable country in the world to extreme weather.⁹ More specifically, Ethiopia is currently ranked 5th out of 184 countries for drought risk; the 34th out of 162 for flood risk; and the 5th out of 152 for landslide risk. The country has experienced noticeable climatic changes. The average temperature has increased markedly, by 0.2°C to 0.3°C per decade over the last 40-50 years. The number of 'hot days' and 'hot nights' has increased by around 20% and 38% respectively between 1960 and 2003. Persistent droughts and unpredictable rainfalls are common phenomenon in Ethiopia.¹⁰

Severe droughts and an increase in quantity and irregularity of precipitation are adversely affecting the country. Increased floods, droughts and storm significantly impact agriculture activities and related agro-processing industrial activities. Figure 2-1 illustrates current water availability and drought risk across the country and the Kombolcha-Mek'ele corridor and Figure 2-2 the drought constraints on urbanisation. Whilst the corridor has medium water availability and drought risk, water stress due to highly seasonable variability in water supply is already an issue in Mek'ele, causing high water insecurity. Water risks are expected to significantly increase as a result of industrial activity in industrial towns, with particularly high water impacts in textile production and agro-processing of coffee.

The imperative of green urban-industrial development in Ethiopia

Current trends indicate that development in most African economies is unlikely to generate sufficient decent and productive jobs to accommodate the expected significant population increases. The African Development Bank maintains that for nearly all African economies growth is not leading to structural change, and more often than not is associated with the expansion of low productivity-low return activities in the informal sector, which are often undertaken in degraded, deteriorating and life threatening environmental conditions¹¹.

Many countries across Africa now recognise the crucial importance of simultaneously promoting structural change, *and* avoiding the mistakes made in the past; particularly the importance of avoiding the corrosive negative environmental externalities experienced elsewhere across the globe that have blighted national economic growth and the life chances of individuals. Indeed, green urban-industrialisation is starting to be a key development priority of many African countries, required to avoid both national damage and global harm, and to ensure that development delivers decent and productive jobs in a climate compatible and, hence, sustainable manner.

There is an increasing number of examples of green urban-industrial development. Table 2-1 presents a selection of domestic and international benchmarks of successful examples of green urban-industrial development¹². The case studies illustrate elements of successful green urban-industrial development, which were incorporated in early design and planning as it was recognised that industrial activities are often embedded within urban areas. Measures to improve environmental performance and integrate industrial and urban planning include the provision of green spaces, integrating waste and water collection systems, appropriate resource pricing, the introduction of circular economy practices and energy efficiency standards, and developing connected infrastructure across the corridor.

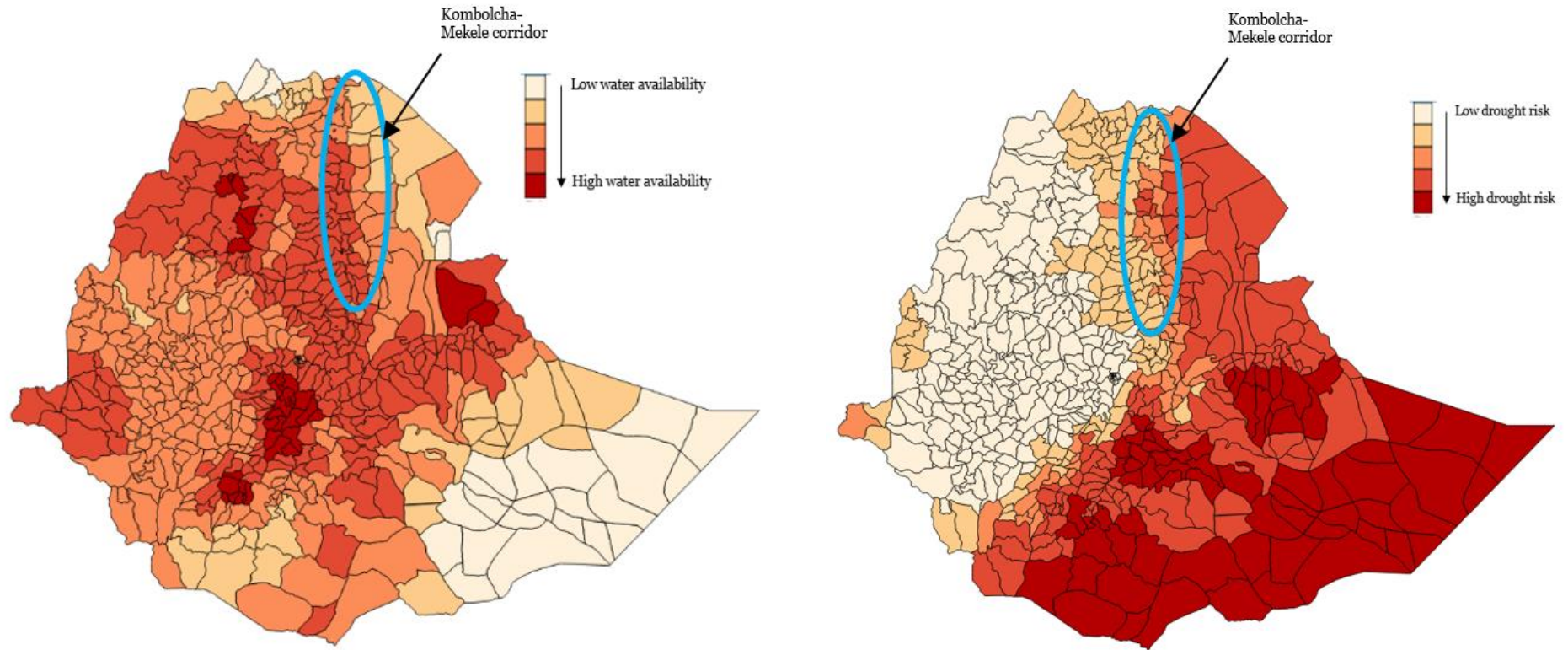
⁹ Maplecroft, 2014 'Climate Change and Environmental Risk Atlas. <http://maplecroft.com/themes/cc/>

¹⁰ Ethiopian Development Research Institute, Global Green Growth Institute, and New Climate Economy. 2015. 'Unlocking the Power Ethiopia's Cities: A Report by Ethiopia's New Climate Economy Partnership'.

¹¹ See Enabling Growth: Perspectives and Challenges: A Presentation of the African Development Bank, at the Borderless Alliance Conference 2014, Lagos, Nigeria, February 2014. Unpublished.

¹² See: Ethiopian New Climate Economy Partnership, 2017 (forthcoming publication). Supporting Industry, Urbanisation and Green Growth in Ethiopia.

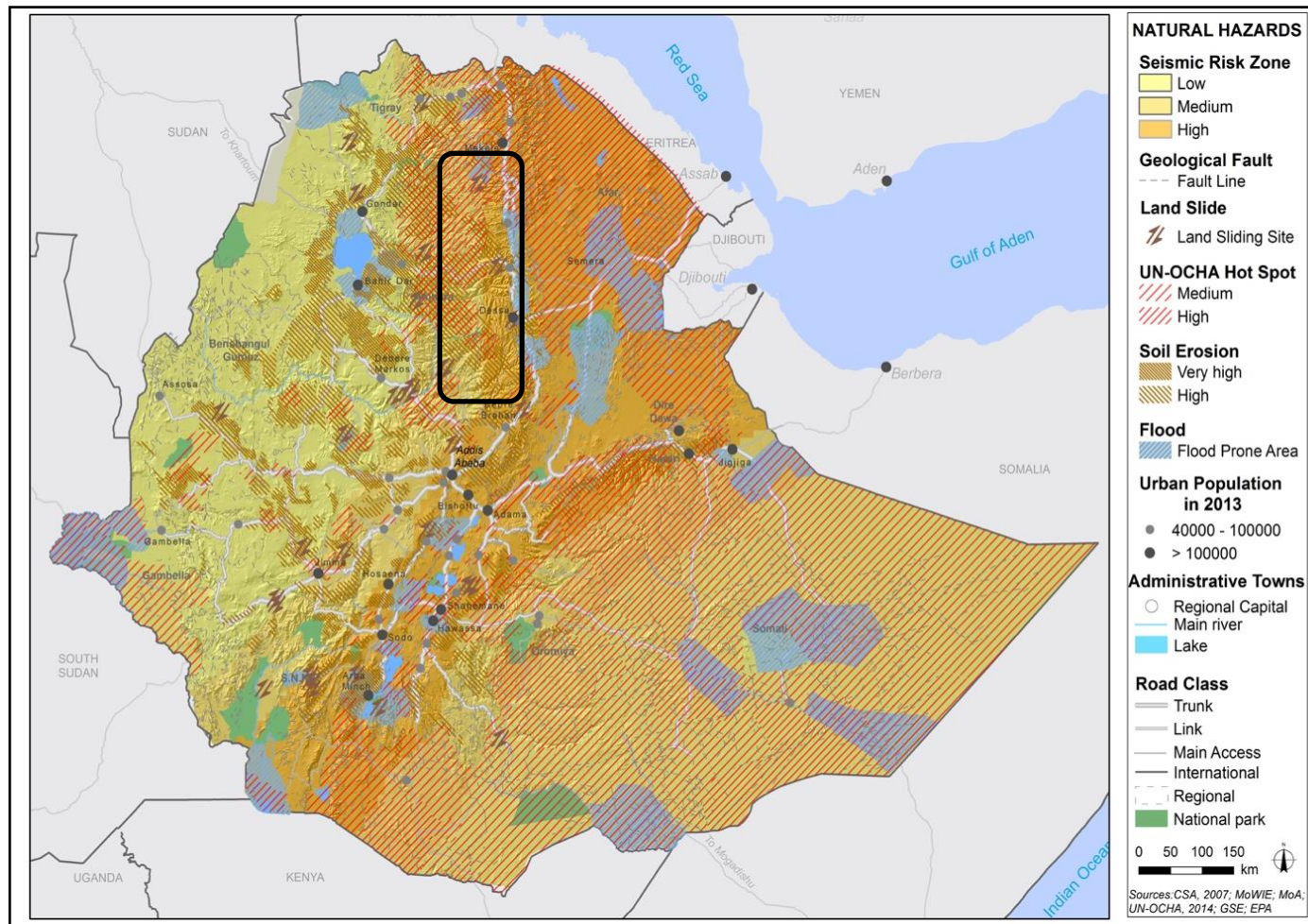
Figure 2-1: water availability and drought risk along the Kombolcha-Mek'ele Corridor



Source: Ethiopian Development Research Institute, Global Green Growth Institute, and New Climate Economy. 2015. 'Unlocking the Power Ethiopia's Cities: A Report by Ethiopia's New Climate Economy Partnership'.

Figure 2-2: Drought constraints on urbanisation: Various seismic, geological, and hydraulic risks.

Mek'ele – Kombolcha is prone to a number of interconnected risks. Drought conditions, over grazing, and vegetation clearance (particularly for fuelwood consumption) expose the soil which as a consequence is eroded through wind and rain thus reducing the land's carrying capacity to support vegetative growth. These conditions combine to invoke critical levels of food insecurity for a large number of Ethiopians across the corridor and its hinterland.



Source: National Urban Development Spatial Plan, Environment Report. FDRE (2015)

Table 2-1: Selected example benchmarks for the K-M Corridor

	Location	Operation date	Sector	Examples of green urban-industrial development
Green industrial parks	Hawassa, Ethiopia	2016	Textile and apparel	<ul style="list-style-type: none"> Policy of zero liquid discharge and recycling of 85% of sewerage disposal Hydropower main energy source
	Kalundborg, Denmark	1972	Pharmaceuticals, Power supply to local town	<ul style="list-style-type: none"> Circular economy linkages between industry and urban areas: e.g. local homes heated with excess heat from the power plant; from fish farm sold as fertiliser
	Sino-Swiss Zhenjiang Ecological IP (SSZEIP)	2015	Clean tech and high-tech products	<ul style="list-style-type: none"> Regional high-speed rail services to three major business centers: Nanjing, Shanghai, the Yangze River Delta business area Innovation hub for clean tech industries
City-level green urban-industrial development	Songdo, South Korea	2009	ICT and Bio-medicine	<ul style="list-style-type: none"> Green space 40% of land area On site cycling lanes, charging stations for electric vehicles Underground waste collection system
	Modjo Leather City, Ethiopia	2018 (TBC)	Tannery and Leather, Shoes, Shoe accessories	<ul style="list-style-type: none"> Green buffer zone between residential and industrial areas Common waste water treatment plant serving leather city to reduce environmental impacts
	Masdar, Abu Dhabi	2006	Services: Consulting, Training and Education	<ul style="list-style-type: none"> Passive low energy design and cooling of buildings Passive microclimate control strategies creating a year-round walkable city Car-free development 90% water recovery and solar thermal absorption for cooling
	Suzhou Industrial Park, China and Singapore	1997		<ul style="list-style-type: none"> First IP to pilot circular economy and eco-industrial park programmes: environmental infrastructure sharing mechanism and waste-to-energy recycling system Co-ordinated urban-industrial integration: IP incorporated into urban planning, enabling strategic design of infrastructure, transport and public utilities
Green growth corridors	Maputo Development Corridor, Mozambique & South Africa ¹³	1994	Mining, aluminium-based manufacturing	<ul style="list-style-type: none"> Rehabilitation of primary infrastructure along the corridor: road, rail, port and border posts Integration of regional markets and economies Policies that ensure a holistic, environmentally sustainable approach to development
	Wuxi New District, China	1992	Biomedicine, ICT, Airport Logistics, Culture Industry	<ul style="list-style-type: none"> Includes an innovation demonstration zone, innovation park, eco-industrial demonstration park. Incentivises and penalises manufacturers based on environmental performance City to City Climate Partnership with Dusseldorf
	Iskandar, Malaysia	2006	Electronics, Petro Chemicals, Oil and gas, Food and Agro-Processing, Logistics, Tourism	<ul style="list-style-type: none"> Recycling and upcycling programmes with universities, improved and enhanced public transportation, including Bus Rapid Transit. Increased use of renewable energy. Green Accord Initiative Award which awards business organisations that contribute to sustainable design
	Chennai-Bengaluru Industrial Corridor, India	2035	ICT, automobiles, machinery, food processing, pharmaceuticals, textiles, apparels.	<ul style="list-style-type: none"> High Speed Rail to be established along the corridor Smart cities to be created along the industrial corridor

¹³ Coffey International Development. (2015). *Development Corridors*. [online] Available at: https://assets.publishing.service.gov.uk/media/57a08995e5274a31e000016a/Topic_Guide_Development_Corridors.pdf [Accessed 15 Jun. 2017].

The National Policy and Spatial Context

The over-arching Government of Ethiopia (GoE) policy documents guiding the Corridor's green industrialisation growth ambitions are:

- **The Growth and Transformation Plan II (GTPII)**, recognises the role sustainable urban development plays in the growth and transformation agenda, in particular the need to guide and manage rapid urbanization to 'unlock the potential for industrialisation, economic growth and structural transformation'(FDRE 2016).
- **The Climate Resilient Green Economy Strategy (2011)** provides a high-level blueprint for the Federal Government setting out the means by which Ethiopia can decarbonise its economy, create jobs, and future proof its economy to climate change. The strategy recognises that green economy initiatives in the industrial sector, represent an opportunity to create an industrial base that is more sustainable than the ones that have evolved from the industrial revolution in Europe and the US. In addition, it suggests that urban development that successfully leapfrogs traditional forms of development of metropolitan cities and their associated problems could be an important element of sustainability.
- In terms of urban policy, the two framing initiatives are the **Ethiopian Cities Sustainable Prosperity Goals** (formerly the Ethiopian Cities Sustainable Prosperity Initiative or ECSPI) and the **National Urban Development Spatial Plan** (NUDSP) which also shape what and how green industrialisation can be integrated into the urbanisation process in a sustainable way.

The National Urban Development Spatial Plan sets out a development pathway focused around 10 urban – industrial clusters - see Figure 3.1. The Mek'ele and Dessie-Kombolcha urban clusters are projected to support increasingly larger urban populations within these primary urban agglomerations and along the transport corridors linking the two clusters. Industrial development is expected to expand in and around these urban clusters through investment in regional industrial parks located in close proximity to Mek'ele and Kombolcha. The industrial parks, IPDC, city/regional and private industrials parks and facilities, are designed to offer a concentrated and serviced base for manufacturing located on good transport links serving domestic and importantly, international markets via access to the port at Djibouti.

The 'corridor approach'

The 'corridor approach' to regional economic development is one that is currently advocated by the World Bank and other donors such as DFID as part of an integrated spatial development strategy (see World Bank 2009 World Development Report, *Reshaping Economic Geography*). In the corridor approach, urban growth clusters are initially connected by transportation infrastructures upon which economic corridors can be developed: economic corridors being integrated networks of infrastructure – including transport, communication, utilities and housing – within a geographical area designed to stimulate economic growth. The corridor approach thus views regional transport routes not only as a means of transporting goods and services, but as a tool for stimulating social and economic development in the areas surrounding the route. Economic corridors accomplish this principally by promoting integrated management of resources, infrastructure and services between institutions, starting with those in the two growth clusters that anchor the corridor. For example, creating industrial and distribution facilities in conjunction with shared transport infrastructure.

'Hard' capital investment in, and integration of, infrastructure and services, must also be accompanied by 'soft' regulatory reforms and capacity building. For example, investment in capital assets such as utilities is ineffective without the necessary capacity building to manage and maintain them, or reform of tariff structures to promote efficient use and cost recovery. There must also be coordination of national and regional policy. A regional strategy to promote investment in a particular sector will not be successful unless it is aligned with the overall national growth strategy, or if it targets a sector in which a neighbouring region has a comparative advantage.

In the context of the Mek'ele-Kombolcha corridor there has already been significant investment in capital infrastructure with the aim of creating growth clusters in Mek'ele and Kombolcha-Dessie, primarily the Mek'ele and Kombolcha industrial parks. Further, the construction of the North-South corridor of the railway network, which will link Mek'ele and Kombolcha-Dessie to the main line at Awash and to the port of Tadjoura in Djibouti via Hara Gebeya, is creating a major transport link between the two growth clusters. Thus, the conditions exist to implement the corridor approach described above in order to stimulate economic growth in the region.

The primary benefit is likely to arise from the adoption of an integrated approach to transport planning in order to maximise the utilisation, and consequently the utility, of the rail investment: in order to be cost-effective for manufacturers, there must be a regular rail freight service; but in order for the rail company to provide a cost-effective regular service there must first be sufficient demand from users. To achieve this will require coordination of efforts: at the federal level – to create incentives to switch to rail freight to increase demand, or subsidies to the rail company to increase supply, in the early stages; at the city / regional level – for example to increase the efficiency of rail transport by improving access between industrial parks and freight terminals; and between regional governments – maximising utilisation of the railway will be beneficial for both regions and so it is important for them to coordinate and collaborate in their efforts.

Further benefits of the corridor approach will arise from shared management of scarce resources that traverse administrative boundaries, such as groundwater sources, as well as the neighbouring regional governments adopting complementary rather than competing inward investment strategies, based on the comparative advantages of the two primary growth clusters. Greater cooperation between regional governments will also promote knowledge transfer and the sharing of best practice solutions to address common challenges such as affordable housing and waste management. The final benefit of adopting a corridor approach arises from an enhanced ability to attract investment – both private inward investment and from donors – due to the current recognition of the policy in international development discourse and the ability to pool resources and capacity to leverage capital to deliver infrastructure and services.

Progress in Climate Resilient Green Economy policy framework in Ethiopia

At present Ethiopia is a low CO₂ emission producer. However, the current high rate of economic growth could change this. The current GTP II projects that the country's industrial sector will grow quickly. In 2025, agriculture could contribute 29%, industry 32% and services 39% of the GDP for a population of around 116 million inhabitants and a GDP per capita of 1,271 USD (compared to 378 USD/capita in 2010¹⁴). Currently the key policy framework for climate resilient development in Ethiopia is the Climate Resilient Green Economy-CRGE policy statement of 2011. The key coordinating entities are the CRGE Unit and Facility in the Ministry of Finance and Economic Development (MOFED) focusing on finance, funds and donor relations, and the Ministry of Environment, Forest and Climate Change (MEFCC) focused on inter-ministerial coordination and overall implementation, and well as its own line responsibilities. Within MEFCC, under the State Minister, is the GHG Directorate that houses the national capacity for GHG inventories, and emissions data related to targets and reporting on GHG mitigation. This Directorate oversaw the Preparation of Ethiopia's Second National Communication-SNC, which was formally submitted to the UNFCCC in 2015. It is currently preparing a Biannual Update Report-BUR as well as the Third National Communication-TNC, which may be available in 2019 or 2020. The Directorate has GHG emissions information on a sector-by-sector basis and occasionally has emissions reduction information on specific projects. It does training on emissions inventory and tracking GHG emissions reductions with relevant Ministries/sectors and with all Regions.

¹⁴ Recent World Bank estimates suggests Ethiopia is currently around US\$660 GNI (2016) World Bank Development Indicators <http://data.worldbank.org/country/ethiopia>

Recent Perspectives on green urban – industrial development

Recent work by the EDRI, and the Global Green Growth Institute (GGGI), and the New Climate Economy (NCE) report *Green Urban-Industrial Development in Ethiopia: A review and policy implications* (2017), provide a good starting point for understanding what is required to promote green urban-industrial development, which include:

- **decoupling “economic growth from emissions and natural resource depletion”** - e.g. reducing emissions from cement production, transport emissions related to inputs/outputs;
- **“improving the efficiency of production**, thereby reducing the use or production of inputs and outputs with negative environmental impacts;”
- **“explicitly linking Ethiopia’s economic and spatial strategies”** or “what urbanisation means for the economic geography of Ethiopia” (Ethiopian Development Research Institute and Global Green Growth Institute 2015). For example, ensuring that spatial plans (Structure Plans, City Master Plans etc.) and economic development plans or sector strategies are developed in tandem. This to include developing strategic plans for growth corridors linked to targeted economic functions; and
- **promoting cities as “centres of job creation and industrialization** by expanding urban infrastructure and social services.”

Ethiopia prepared its statement on Intended Nationally Determined Contributions (INDC) in 2015 and has indicated that this same document stands as its first National Determined Contributions (NDC) statement with national targets for GHG emissions reduction and adaptation action. Ethiopia ratified the Paris Climate Change Agreement in April 2017. Ethiopia has also prepared its National Adaptation Plan (NAP) as a Lesser Developed Country – and its release is pending in 2017. Ethiopia’s integration of the CRGE and linked strategies into its development framework is found in its Growth and Transformation Plan GTP- II. Ethiopia has prepared successful funding submissions to the GEF with reference to the Least Developed Country Fund (LCFD), the Adaptation Fund, among others. Ethiopia’s MOFEC is an accredited entity with the Green Climate Fund and is pursuing proposals with the GCF. Recent feedback provided by the GCF¹⁵ is likely to shape how future projects and applications are being considered (see Evidence Box 1).

Ethiopia is in the midst of negotiating with multilateral development banks, led by the World Bank for funding through the Pilot Program in Climate Resilience (PPCR), part of the Strategic Climate Fund (SCF) of the Climate Investment Funds (CIF).¹⁶ A key challenge is the availability of data on GHG abatement and avoidance potential at the project-level. The capability to do this by Ethiopian government’s Ministries is still a challenge, though a few specific studies have been undertaken with some success. Baseline data on GHG emissions is scarce, making it hard to propose action against targets and baselines.

¹⁵ A recent application for GCF funding was returned for revision: i) increase concessionality of the proposal through reducing the size of the grant; ii) strengthen the climate change argument of the proposal; iii) Strengthen Regulatory and Policy reform components so to ensure sustainability and country ownership

¹⁶ A list of additional climate funding initiatives can be found at Annex 1 of this report.

Evidence Box 2: Lessons learned from Ethiopia's first Funding Proposal submitted to the GCF.¹⁷

Extracts from the GCF report entitled "Consideration of funding proposals –Addendum XIII Assessment of the Independent Technical Advisory Panel" Document: GCF/B.16/07/Add.13; dated 17 March 2017.

- **Projects should be highly logical and have a sharp focus:** The more focused the project, the better. If a project proposes a highly diverse set of interventions along with an extensive list of activities and impacts, it will be hard to obtain the focus needed to achieve its impact. If proposing disperse activities to improve the adaptive capacity of communities to climate change, they should be undertaken with a cause–effect relationship, priorities should be established and impacts should be aggregated.
- A project's logical framework and theory of change should present some cause-effect logic; it should be possible to assess concrete expected results.
- Project monitoring and evaluation arrangements are crucial and the maintenance / sustainability of all the activities after project completion need to be ensured.
- The **paradigm shift** proposed in a project should be specific and refer to the GCF's definition of paradigm shift – which involve: i) innovation, or ii) potential for scaling-up and replication, or iii) potential for knowledge and learning or iv) contributions to the creation of an enabling environment and/or v) contributions to the regulatory framework and policies.
- When proposing technologies and infrastructural solutions, it is important to provide the specific type of technologies and to aggregate interventions
- When proposing to scale-up a project be very clear about how it is scalable – i.e., how it can be up-scaled, remembering that scalability is sought by the GCF.
- When proposing to support learning and transfer knowledge be very clear about learning activities and outputs, and propose financial resources to achieve these outputs.
- Ensure coherent linkage between project outputs so that co-benefits can be obtained; if long term coordination is needed to see sustainable benefits, indicate how this will be provided.
- Make sure studies back up all planned outputs and outcomes.
- If gender outcomes are proposed, ensure gender is mainstreamed.
- Present an integral socio-economic analysis that enables the project proponents to prioritize interventions in a holistic manner.
- Be sure to provide evidence of lessons learned and how new investments will build on previous interventions
- A project is sustainable if it does not depends on the availability of new grant resources to be maintain once completed.
- Do not allow a big portion of the project's financial resources for governance to be allocated to paying several layers of employees at the national, woreda and kebele levels; a project is more effective if funds are transferred to expected targeted communities.

The Technical Advisory Panel proposed a way forward for the project:

- As water is a crucial dimension of the project but not an area of focus, the project should be revised to focus on water infrastructure and management interventions. Water-related adaptation is of critical importance in the geographic area of the project. Therefore, water-related activities should be prioritized and a hydrological study carried out to justify interventions, including the management and maintenance of the aquifer and the long-term sustainability of water basins under climate change scenarios.

¹⁷ Note: The GCF Submission was called "Responding to the increasing risk of drought: building gender-responsive resilience of the most vulnerable communities"; size US\$100 million. the project aimed to develop an integral assistance for 1.2 million people (over 50 per cent being women) of the most vulnerable population of Ethiopia in 22 "woredas" (regions) by improving their access to water and food, promoting alternative livelihoods, empowering women, improving health and well-being, improving their access to climate information, improving the resilience of ecosystems and the availability of ecosystem services, and introducing improved and climate-smart technologies e.g. using irrigation and improved inputs, as well as improving the ability of farmers to access appropriate finance and training; to supply water for drinking purposes with solar pump systems; promoting livelihood diversification and protection to secure the long-term sustainability of landscape ecosystems; and increase cross-linkages among the various thematic activities and to develop appropriate governance mechanisms to reinforce project sustainability and to extract valuable lessons that would help to replicate the project in other woredas.

The project was also encouraged to:

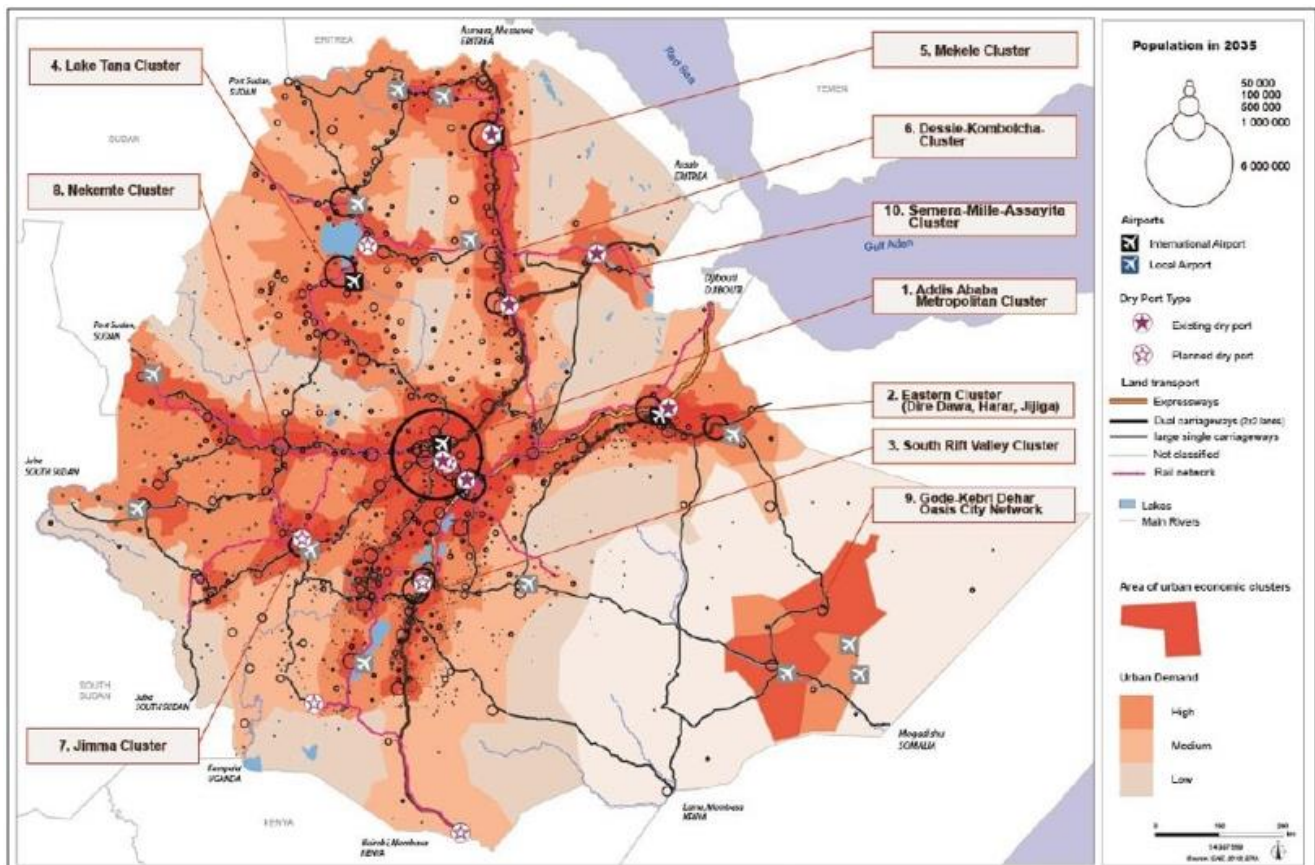
- Prioritize technologies and solutions that will help rural communities to adapt to climate change by examining economies of scale and developing market studies that prove socioeconomic viability;
- Elaborate on the regeneration of ecosystems through forest and soil conservation activities, with innovative solutions that could include payment for ecosystem services, REDD-plus schemes or other solutions that involve the rural communities;
- Elaborate on the management, maintenance and appropriation of the climate information system;
- Develop a knowledge-sharing strategy at the national, woreda and kebele levels;
- Develop a sustainability strategy, including sources of co-financing, options for monitoring and maintenance of the selected activities and overall sustainability dimensions of the different activities; and
- Elaborate on the availability of national institutions to support and build capacity to undertake the different interventions of the project

From National to Local: the missing links

A key observation of the policy and planning process in Ethiopia is that local plans (i.e. physical plans, master plans) often become outdate quickly with long gaps between plan preparation and approval processes. In addition, there also tends to be:

- A disconnect between national industrialisation policy and urban planning process;
- A lack of coordination between sector planning – the development of sector specific plans reflects silo-working;
- Ineffective local development plans – land-use plans which do not reflect resource constraints, particularly with regards to the supply of water, energy and the availability of food.

In Kombolcha, a significant number of zoning changes have been introduced since the preparation and approval of the City's Structural Plan in 2010, resulting in the plan being obsolete a few years after its implementation. Further, where plans are in place, local capacity to implement policies may be resource constrained: technically and fiscally. Both Mek'ele and Kombolcha have Structure Plans in place and have made some progress on formulating City Development Plans to guide urban development. The development of industrial parks is not adequately aligned with spatial plans at the national level (i.e. National urban development spatial plan) or the local level (i.e. structure plans). Further, integration of the industrial parks with their surrounding environment through the provision of key services such as housing and urban transport is lacking. Little consideration has been given to reflecting CRGE policies throughout local plans; and in any case, the more recent national urban planning policies having only recently been adopted by Government of Ethiopia are yet to be reflected in local policy that guides urban and industrial development.

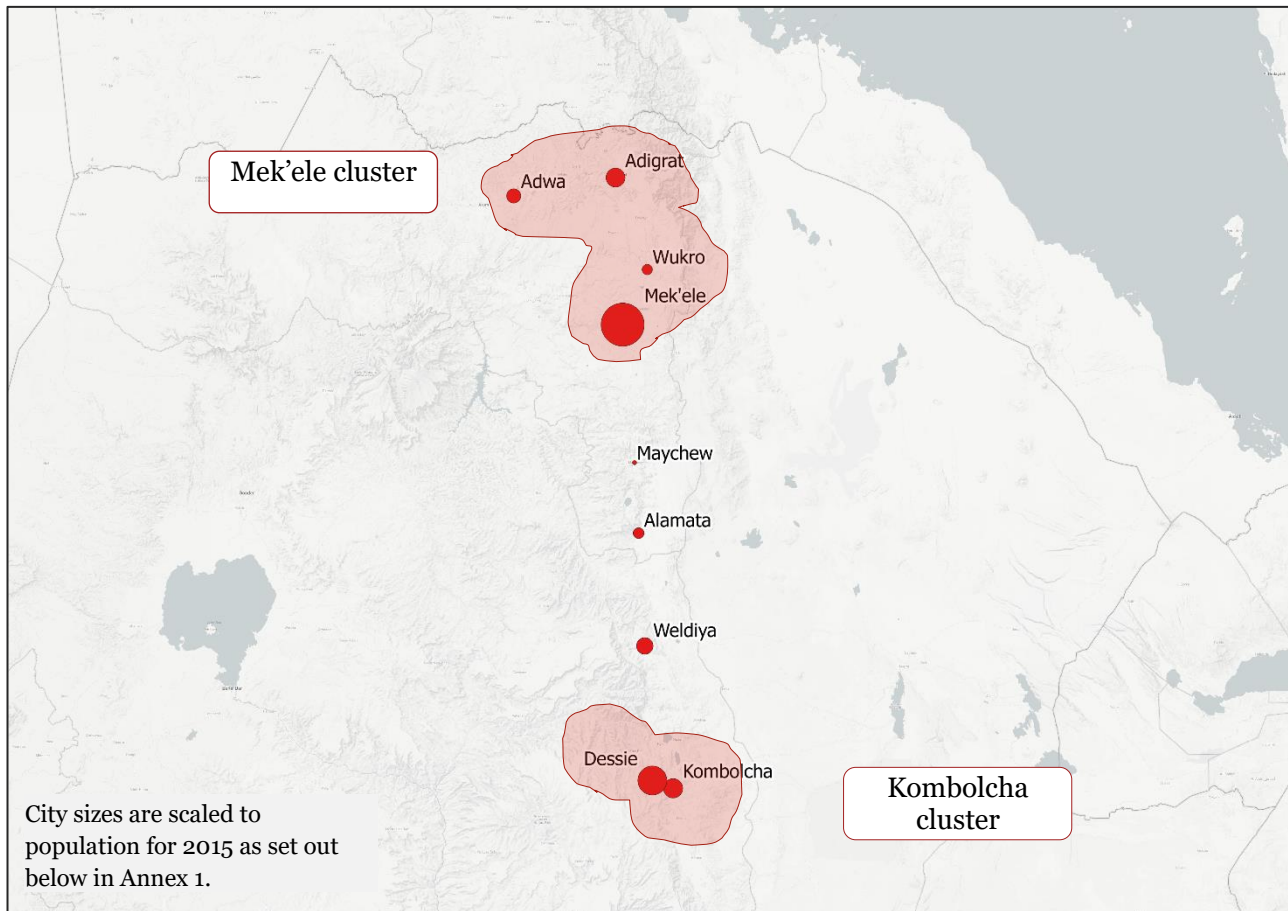
Figure 2-2: Ethiopian Growth Strategy: NUSDP target urban – industrial clusters

Source: Ministry of Urban Development and Housing. 2015. 'National Urban Development Spatial Plan: Final Report'.

Kombolcha – Mek'ele Corridor Profile

The Kombolcha – Mek'ele growth corridor is recognised in the National Urban Development Spatial Plan as two distinct clusters at either end of the major transport corridor (road, rail). Urban growth along the corridor is proceeding at pace, driven in part by investment in industrial development in Mek'ele and Kombolcha. Although a point of departure for this study, the concept of an economic growth corridor has yet to take shape fully. Initial linkages have formed through transport connections, with economic linkages becoming more important as towns along the corridor grow. Projected urban population growth is rapid both within each urban cluster and in towns elsewhere along the corridor. A recent situation analysis of service provision along the corridor suggests that investment in basic services are not keeping pace with urban growth. The economic characteristics of the clusters are summarised in Figure 2-3. Critically, the opportunities and constraints facing the corridor and the respective anchor cities are summarised in Table 2-2. Additional summary data for the corridor can be found in the Annex.

Figure 2-3: Economic characteristics of the Mek’ele and Dessie-Kombolcha clusters (and associated towns)



Mek’ele cluster	Kombolcha – Dessie cluster
<p>Population 337,773</p> <ul style="list-style-type: none"> Industrial base: Emerging industrial and manufacturing base, linked to hinterland: cement; garments; tanning/leather; agro-processing (emerging); IPDC park; Improving infrastructure/connections: <ul style="list-style-type: none"> road/rail – adjacent urban clusters + port in Djibouti/Tadjourah; and International airport. High urbanisation - attracts labour from region and beyond to support diversification. Urban infrastructure needs significant upgrading to match industrial growth requirements 	<p>Population 93,382 (+172,657, Dessie)</p> <p>Strategic location – 480 km from port of Djibouti</p> <ul style="list-style-type: none"> Emerging industrial base in Kombolcha: steel; textiles; brewery; IPDC park; Regional transports and logistics hub – cross roads of several road/rail routes; and Significant investment opportunities in services, education/skills, and cultural amenities.

Kombolcha profile

Kombolcha, located in South Wollo Zone of Amhara National Regional State (ANRS), is one of the growing industrial centres of Ethiopia. The city is roughly equidistant from some of the country’s largest urban centres, i.e. Addis Ababa (377 km), Mek’ele (400 km) and Bahir Dar (505 km). Administratively, Kombolcha has the status of City Administration and is divided into 12 kebeles including urban (6) and rural (6 kebeles). In 2017, Kombolcha Wereda’s population was estimated to be 137,493, out of which 76.21% live in Kombolcha town (104,792), with the remaining of the population (32,696) living in

surrounding rural kebeles. The total surface area is 123.15 Km² (8.66 Km² for Kombolcha town). According to the National Urban Development Spatial Plan (NUDSP), Kombolcha's population is projected to more than double in the next 20 years, reaching 334,274 in 2035.

Aggregate city product was estimated at 1,242.13 billion Birr at 2003 prices.¹⁸ While neighbouring Dessie specializes in trade and business, Kombolcha's economy is mainly driven by trade and industry with a growing presence of manufacturing (especially textile and steel) and agro-processing. Kombolcha is strategically located at the junction of the Addis Ababa – Kombolcha – Dessie – Mek'ele trunk road (Highway 5) and the Kombolcha – Bati – Mille road which provides direct access to the port of Djibouti which is only 533 km away. The city thus acts as an important transport node between the country's economic centre, i.e. Addis Ababa, and its main sea outlet. The city's connectivity is expected to significantly improve, with the construction of the 390-km long Awash – Kombolcha – Hara Gebeya standard gauge railway line, scheduled to open by 2018. Kombolcha has been designated by the federal and regional governments as an industrial hub. In 2016, IPDC launched the construction of a 700-hectare Industrial Park in Kombolcha which will be built in 6 phases. As part of phase 1 of the project, 11 factory sheds have been built on 75 hectares and inaugurated on July 8th, 2017. The Kombolcha Industrial Park is expected to create 15,000 jobs under phase 1, mainly in textile and garments industries, and up to 80,000 when at full capacity.

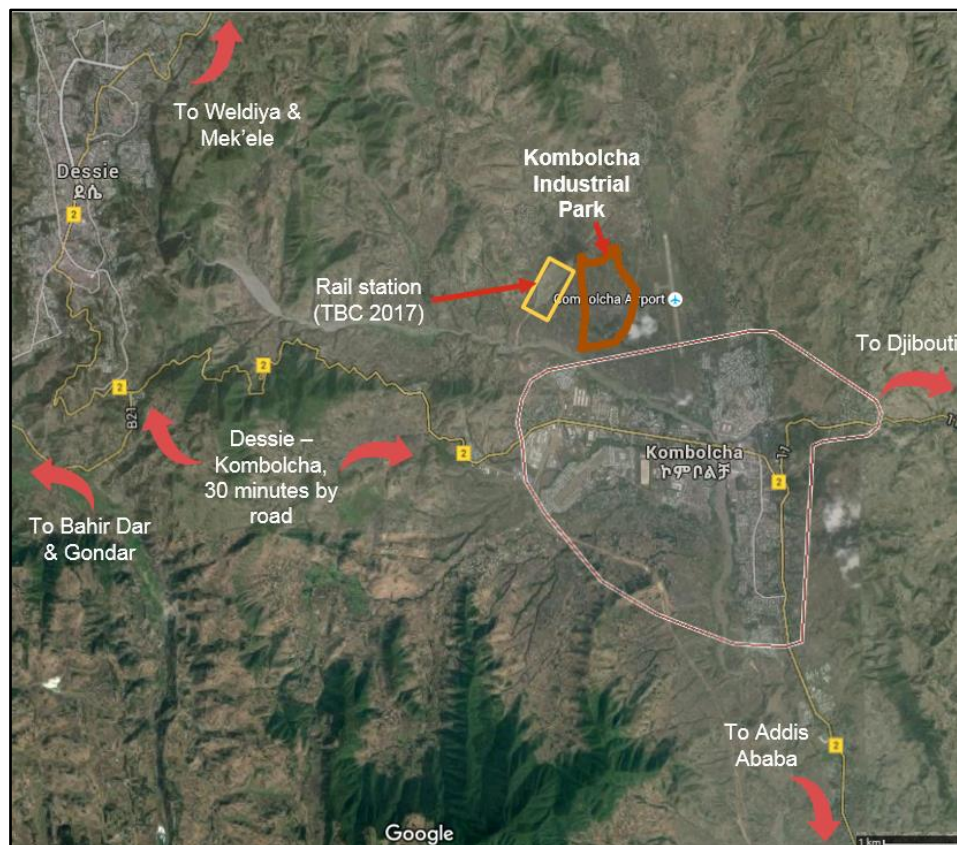


Figure 2-4. Map of Kombolcha showing the Kombolcha IPDC Industrial Park, and major transport links.

Mek'ele profile

Mek'ele is the capital of Tigray, the northernmost region of Ethiopia. The city is located 780 km away from the capital Addis Ababa. A historic market town, Mek'ele is currently serving as a political, industrial, education and culture hub in the region and the country as a whole. In 2016, Mek'ele was estimated to

¹⁸ State of Ethiopian Cities report, Ministry of Urban Development and Housing and Ethiopian Civil Service University (2015). Prices at Ethiopian Fiscal Year, 2003 e.g. 2010.

have a population of 369,570¹⁹ with a surface area of 55.km². According to the NUDSP, the city's population is projected to treble to around 1 million by 2037. In 2013, Mek'ele's GDP was estimated to be 4.47 billion Ethiopian Birr²⁰, making it the third largest in terms of GDP after Addis Ababa and Bahir Dar. The city is the location of a number of large industries (cement, textile and garments, agro-processing) and its industrial base is further being strengthened, with the construction of three industrial parks, out of which two are private owned (DBL and Velocity) and one is being developed by IPDC.

Only the Velocity industrial park in currently operational. All of the industrial parks are geared towards leather, garment and textile production. It is anticipated that the IPDC Mek'ele Industrial Park will be developed on 1,000 hectares in different phases. Currently about 238 hectare of land is ready to be developed, of which the first phase development on 75 hectares is on the verge of finalization (80% overall completion and 98% of the sheds development finalized at the time of our visit in May 2017). MIP is planned to accommodate around 20,000m² in its 15 sheds (6 sheds each with 11,000m², 5 sheds each with 5,500 m² and 4 sheds each with 3,000m²).

'Velocity Apparel Companies PLC' is an apparel manufacturing plant in the Vogue International Agencies industrial park in Mek'ele. The Vogue International IP developed a total of 100 hectares and has two large sheds (one with 60,000 m² and the other with 40,000 m² built-up area) dedicated for garment production (3 million Jeans and shorts/annum at the moment) for export.

DBL Industries is a Bangladesh based firm which came to Ethiopia in 2015 is developing a further industrial park. Located at 14 kilometres distance from the city centre the IP has been established to support the textile and garment sector. DBL is developing its IP in Mek'ele on 78 hectares in two phases. The first phase is currently underway with a total investment capital of USD 104 million to develop five factories.

Figure 2-5: Mek'ele City Industrial Estate, Mek'ele



¹⁹ Mek'ele City Statistical Abstract, 2016

²⁰ State of Ethiopian Cities Report, 2015

Figure 2-6. Map of Mek'ele showing IPDC Park, and major transport links.

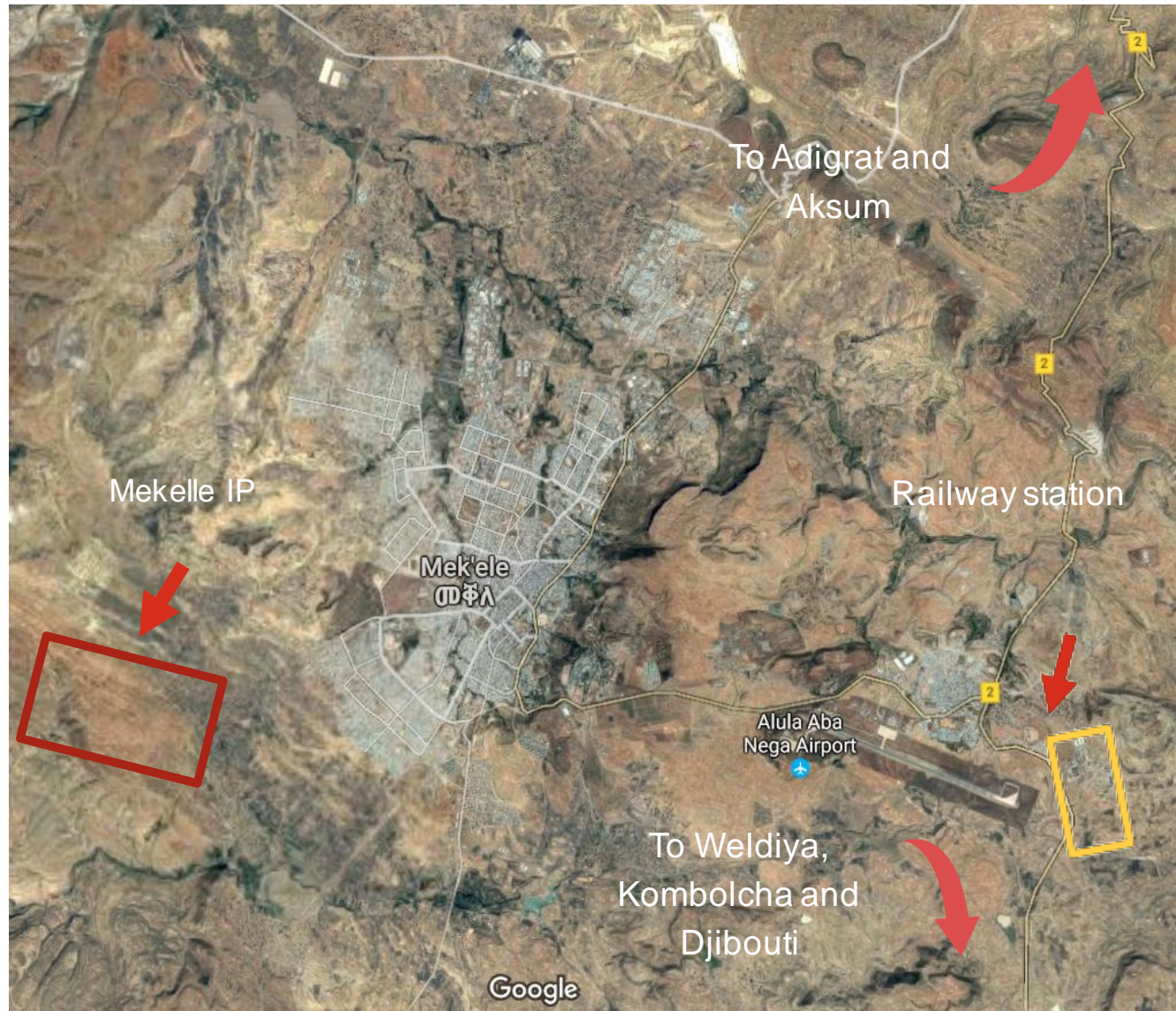


Table 2-2: Mek’ele-Kombolcha Growth Corridor: Opportunities and Constraints to green urban-industrial development. The table was formulated in discussion with stakeholders in both cities who set out local opportunities and constraints to help identify catalytic investment projects along the corridor.

	promotes economic growth through structural transformation	promotes increased resilience to climate change	GHG emissions reductions/avoidance	reduced environmental pollution/risk	increased resource use efficiency	social inclusion and development
Opportunities	<p>Attracting investment – Strategic location with good connective infrastructure (trunk roads, dry port, airport, standard gauge railway). Mek’ele is the political, economic and cultural centre of Tigray region which attracts significant investment e.g. increased FDI flow in recent years; plus c.1920 investors have taken licenses in the City in the past 3-5 years registering c.25 billion Birr and c.100K jobs.</p>	<p>Urban greenery mainstreamed - protected forests surrounding Kombolcha provide carbon sink potential. In Mek’ele, green coverage in the city is planned to have at least 30% of land coverage. These initiatives retain vegetative cover which protects underlying soil from drought and flood.</p>	<p>International/regional rail link – links Mek’ele and Kombolcha; potentially facilitating modal shift away from carbon intensive forms of transport e.g. cars, HGVs. The opportunity here is to work with IPDC, EIC and industry to promote the rail service offer and encourage a modal shift towards rail. This also requires good local links to connect factories to rail terminals with special truck routes.</p>	<p>New waste treatment technologies: Introduction of Zero Liquid Discharge (ZLD) waste water treatment technology at the KIP</p>	<p>Wastewater re-use – Treated wastewater from industries is being re-used in part by farmers for irrigation/ livestock watering. Opportunity here for greater and better managed use of wastewater for other uses.</p>	<p>Large number of active organisations in socio-cultural development perspective (NGOS, CBOs, Office of labor & social affair (OoLSA) etc.). These organisations help coordinate social development initiatives alongside the state.</p>
	<p>Rapidly growing working age population provides labour force –annual population growth rate of 4.6%. For example, up to 3.2 million inhabitants living in South Wollo Zone</p>	<p>Expanding climate resilient infrastructure - construction of 45 KMs cobble stone roads having side ditch drains, walk ways & curve stones proposed over next 3 years</p>				

	promotes economic growth through structural transformation	promotes increased resilience to climate change	GHG emissions reductions/avoidance	reduced environmental pollution/risk	increased resource use efficiency	social inclusion and development
	Capacity and capability of government - dedicated and strong political leadership to drive change/transformation - own sources revenue has been growing annually by an average of 27% since 2012.	Public participation in green development - 'Idirs' (type of social institution), local development committees led by the community in neighbourhood working on greenery; larger institutions working on rehabilitation of barren mountain ridges.	Biomass/ alternative energy initiatives (cement production) – replacing coal for sesame husk as a fuel for cement kilns; carbon 'neutral' fuel from local agri-supply chain estimated to represent c. 100,000 tonnes of CO ₂ /annum (40% fuel replacement).	Cement production pollution control - Meseob Cement plant good practice in containing its dust waste can be replicated to other emitters – additional 80 million Birr investment in dust pollution control.		Financial literacy – trend towards greater financial literacy at the household level e.g. savings levels have increased in Mek'ele to some 142,500 individuals representing savings of 1.3 billion Birr in 2016. This is more than money in circulation and loan extended the same year.
Constraints	Land scarcity: lack of serviced land for industrial and housing development.	Limited green and open space coverage in the city. Urban plans do not always promote increasing access to green spaces such that new development does not also deliver increased coverage of green open spaces or street trees which would provide localized resilience to heat, drought, and flooding.	Increase in HGVs and Bajaj three-wheelers leading to congestion and environmental pollution	Lack of adequate solid waste, sanitation, and drainage infrastructure - waste water generated from condominium houses, the prison house, toilets, etc.). Polluted ecosystems, including pollution of Borkena River. Poor management of solid waste also increases the risk of flooding.	Land-use planning and delivery – spatial plans for are not updated regularly, often do not reflect the economic geography of Ethiopia. In addition, there is limited capacity of the city administration to prepare <i>serviced land</i> and make compensation.	Lack of affordable housing for residents – formal housing backlog at the moment is 45,000 out of which 11,000 plot delivered out of the planned 20,000 in this year; existing housing lacks basic services.
	Traffic congestion across the city – congestion occurs despite a mainly paved road network and frequent intercity bus services, (Mek'ele); shared routes for commuter and HGV traffic; lack of investment in road infrastructure.		Usage of biomass for energy – the majority of households (76% of households in Mek'ele depend on the traditional sources of energy for cooking- wood, dung, gas; limited effort to introduce cheap and green energy alternatives.			
	Poor infrastructure resilience: only one road providing access to	Flood risk (Mek'ele) High exposure to flooding, erosion and landslide hazards.	Degradation of existing forests and conversion of			

promotes economic growth through structural transformation	promotes increased resilience to climate change	GHG emissions reductions/avoidance	reduced environmental pollution/risk	increased resource use efficiency	social inclusion and development
Kombolcha.	Inadequate provision of decent housing – self-build provides inadequate protection against extreme weather and flooding	green, open spaces for industrial and residential uses			Homes lacking improved sanitation - lack of protection against water borne diseases
<p>Lack of plan-led urbanization leading to increasing issues of land use incompatibility.</p> <p>Doing business constrained by inactive or ineffective local governance - bureaucratic red tapes in availing different services to industries (land, infrastructure, customs, etc.)</p> <p>Lack of reliable power - frequent power interruption due to poor quality of power distribution coupled with power shortage – c.46% of households encounter power interruption at least twice in a week</p>	<p>Negative perception of city green spaces - many consider urban forest located within their vicinity as a place for sexual violence or hiding place for criminals</p> <p>Loss of forest cover on hills around Mek'ele – Denuded of trees from overreliance on wood for fuel results in soil erosion; land degradation; poor air quality locally (dust)</p>	Increased demand for carbon intensive energy use - economic growth induced energy use leading to use of non-green energy sources e.g. coal usage at Mesobo Cement plant (Ethiopia's principal cement factory) leading to rapid rise in CO2 concentrations	<p>Inadequate solid waste management system - waste from households and industry is improperly managed – non-sanitary landfill site, households burning waste; low public awareness of pollution</p> <p>Localised air pollution: Emissions from cement plant; crushers around Mek'ele, MSEs around Medeber area burning tires, Ayder hospital, manufacturing industries (gypsum, terazo, beverages factories)</p>	<p>Water supply shortage – water supply outstripped by demand; mismanagement causes loss of supply – 16% Non-Revenue Water (water losses through theft, poor maintenance or other utility-led losses) ; trend of ground water levels falling; cost recovery to be improved c.30% of users are not billed; 25% do not pay.</p>	<p>High prevalence rate of school dropouts increased number of destitute and vulnerable children, disabled persons, old people and other groups.</p> <p>Insufficient action taken to provide sustainable livelihoods for farmers displaced from land for development.</p> <p>High prevalence of unemployment c. 18% - higher in female population (25%) than male (11%)</p>

promotes economic growth through structural transformation	promotes increased resilience to climate change	GHG emissions reductions/avoidance	reduced environmental pollution/risk	increased resource use efficiency	social inclusion and development	
	<p>SME capacity - limited capacity of local industries to green production, grasp opportunities to strengthen forward and backward linkages; weak capacity to 'green' economic activities.</p>	<p>Urban development encroachments on reserved environmental protection zones - observed in Quiha, Semen and Hadnet sub-cities of Mek'ele City</p>		<p>Noise pollution – increasing levels from vehicles, three wheel tricycles etc.</p>		<p>High incidence of poverty - poverty incidence in Mek'ele City is 38%, which is higher than the target 20% at the end of GTP-1</p>

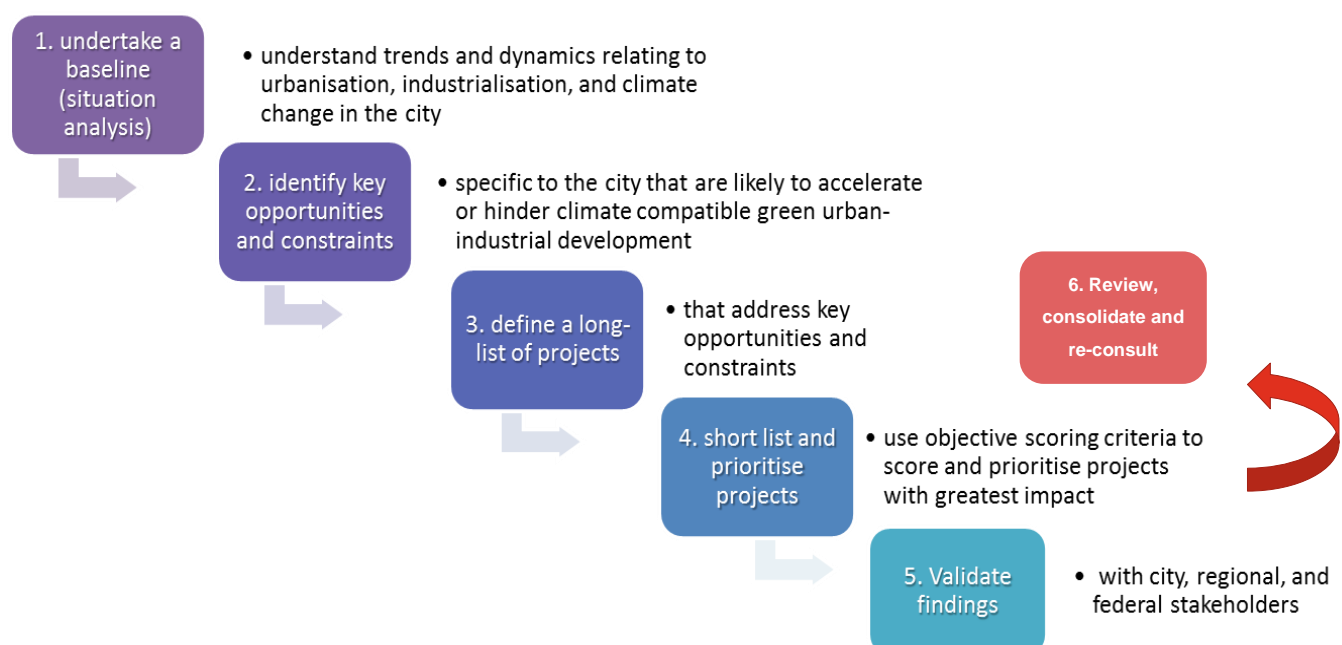
Source: Based on IPE diagnostics assessment and tested in national and local workshops

Approach and Method to prioritise green development

The approach to prioritising green development has been to focus on **enabling a structural shift in the city economy towards manufacturing, supported by sustainable urban management that capitalises on the benefits of agglomeration, whilst maximising resource use efficiency and environmental safeguarding**. The process we followed is illustrated in Figure 2-7, which has a number of key features that are replicable for follow-on reform initiatives and further project development namely

- **Stakeholder participation** - Federal, regional and local stakeholders were central to the diagnostic process, identifying opportunities and constraints, and shortlisting priority projects. The process was itself contributed to stakeholder capacity building in screening, selecting and prioritising projects.
- **Identifying evidence** - Creating simple diagnostic tools and best available evidence to assist in analysis and setting of priorities through collaborative processes
- **Co-ordinating and integrating policies** - Linking national goals to local development priorities

Figure 2-7: Developing New Paradigm Pathways: Project Identification and Validation



The collaborative screening, selecting and project prioritisation exercise above provides an initial short-list of projects that fit with a transformational approach to development.²¹ Projects are transformational in that they fit within a broader package of reforms that define pathways of change - incrementally but steadily leading to green development in line with **four CRGE criteria: feasibility in the local context, effect on economic growth, abatement and avoidance, cost effectiveness** (used previously in the CRGE Strategy). These were expanded into 6 'dimensions' used to screen projects against national development objectives and climate financing requirements (see Figure 2-8):

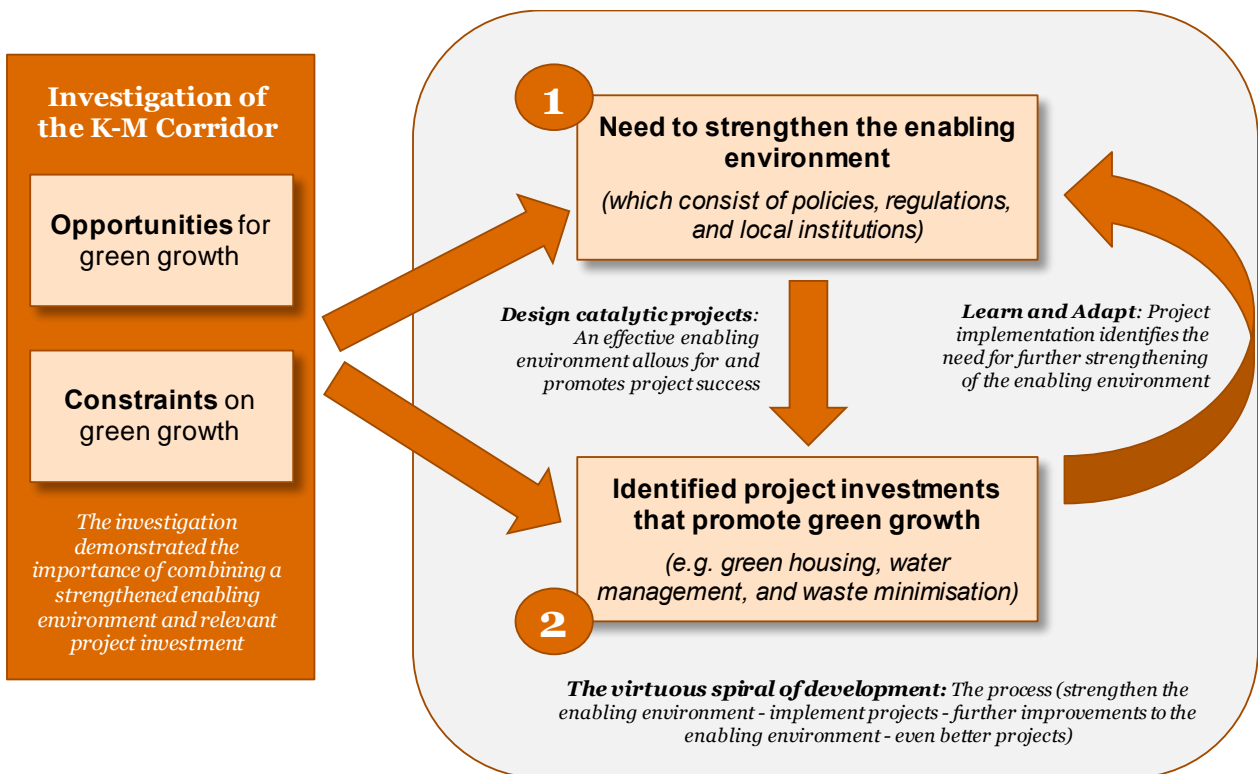
²¹ A longer list of projects was produced in collaboration with stakeholders in both Mek'ele and Kombolcha. Projects were shortlisted through a series of participatory workshops at city and Federal level to arrive at the three project presented in this report. The full long-list, criteria for short-listing and evaluations are given in the accompanying 'CDKN Project Feasibility Studies Report'.

Figure 2-8: Strategic objectives used for initial screening of projects.



The investigation of the opportunities and constraints on green climate compatible development along the corridor clearly indicated that for the identified ‘green’ urban-industrial projects to be successful the encompassing enabling environment had to be strengthened. A virtuous spiral of development is anticipated as implementation of the projects provides significant opportunities to learn and adapt, namely to further improve the enabling environment which further increases the probability that implemented projects will be successful (see Figure 2-9)

Figure 2-9: The virtuous spiral of Development



The project identification and validation process (described above Fig 2-7) and the feedback from local, regional and federal stakeholders resulted in the shortlisting of three priority areas/ sectors - Green housing; water management; and, waste management – for the study area (Kombolcha-Mek’ele corridor).

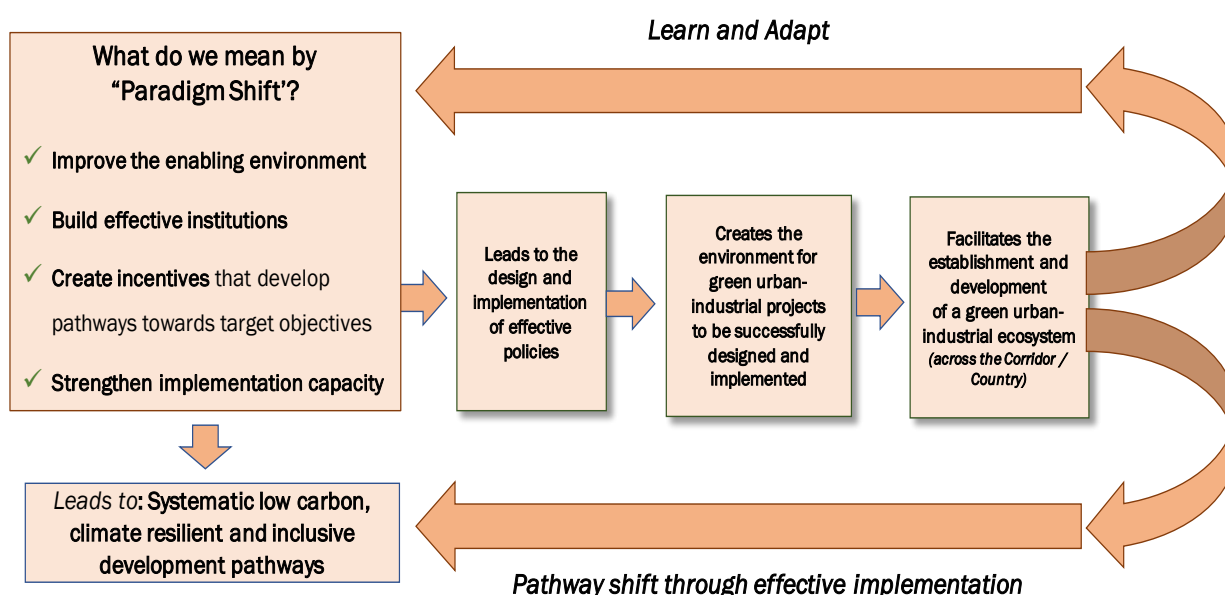
3. Towards a green industrial transformation pathway

Translating lessons learned into paradigm shift

Six Good Things to Do: Implement Powerful but Simple Reforms

1. **Place emphasis on enabling environment improvements**, as well as capital investment and project delivery. These are required for capital investment to be effective and have the potential to deliver greatest impact in terms of value for money;
2. **Build effective institutions** and systems, and encourage more collaborative working practices across all levels of government;
3. **Create incentives that build pathways towards target objectives** with CRGE elevated and embedded across all levels of decision-making;
4. **Strengthen implementation capacity**. This is critical; inadequate implementation capacity and capability needs urgent attention at regional and city levels;
5. **Learn by doing, then scale-up**– follow an incremental approach, building capacity and capability as you go; learn lessons; apply the lessons; build strength, capabilities and competences;²²
6. **Be proactive but flexible** – a clear risk for Ethiopia is that the ‘one-size fits all’ approach, sometimes results in policy decisions being made an *ad hoc* make-shift and reactive manner. As well as starting small and then being able to grow effectively and efficiently, taking time to consider options and be flexible in response to changing circumstances is very likely to underpin successful long-term development initiatives.

Figure 3-1: An understanding of ‘paradigm shift’ towards a Climate Resilient Green Economy



²² Chinese Industrialisation policy, the ‘open door policy’, began with just four SEZs, and built slowly, experimenting and learning through experience.

Ethiopia has embarked on an ambitious and purposeful structural transformation focused on rapid industrialisation:

“We have to focus on economic performance ... We do it because the ultimate goal of any nation aspiring to develop, aspiring to catch up, is to improve the livelihoods of the people.”²³

The drive for economic growth underpins Ethiopia’s vision to become a middle-income country by 2025. Consequently the focus on growth and job creation is prominent in the national policy discourse relative to building a climate resilient green economy – and, indeed, much has been achieved, with Ethiopia posting impressive GDP growth rates. Looking ahead, however, Ethiopia needs to build on the lessons learned elsewhere (e.g. China) and at home and seek to continuously improve the quality of growth (e.g. nature of jobs and environmental performance of growth) and evolve towards green industrialisation. This study has considered these issues in the context of Kombolcha and Mek’ele, and attempts to highlight the key areas that are more broadly applicable across Ethiopia. Specific details on the Kombolcha and Mek’ele context are summarised here and presented in more detail in the pre-feasibility studies which accompanies this report.

Evidence emerging out of recent reviews of Ethiopia’s growth record provide guides to adjusting policy development, institutional arrangements and incentives shaping investment and resource allocation.²⁴ In broad terms, the next phase of green urban-industrial growth should place greater emphasis on the enabling environment relative to more project specific interventions, getting more out of investment (not just more assets but better managed assets with a particular emphasis on Operations and Maintenance (O&M) and returns) and stimulating lasting change in institutional performance. In developing the green urban industrialisation framework, it is proposed that CRGE is elevated in importance and forms one of the anchors of decision-making at all levels. The basic lessons, while not exhaustive, emerging from experience to date in implementing CRGE are listed below:

- **Clear and Common Objectives Informing Policy, Planning and Investment Decisions:** CRGE objectives need to be embedded into urban – green industrial growth targets and investment criteria up front and at all levels;
- **Institutions – Promoting New Ways of Collaborative Working:** There is a need to dramatically strengthen vertical and horizontal institutional alignment and co-ordination around policy development, integrated planning (especially at city cluster level) and in setting the parameters determining investment. Industrialisation plans and urban plans need to be better integrated: Ethiopia is in the process of creating liveable industrial cities not simply industrial estates alongside urban areas.
- **Incentives to ensure efficient and sustainable resource use:** There is a pressing need for policy guidance on resource pricing, tariff structures and levels that better align to long term sustainable use of resources. Electricity and water pricing are low; in the Mek’ele area water is a key constraint to growth but pricing does not reflect this. Good and proven international practice around the polluter pays principle are not mainstream in Ethiopia with consequent damage to important environmental services and risks to growth and public health. Complementing the pricing reforms there needs to be greater investment in monitoring and enforcement systems related to commercial and industrial waste stream – especially around resource use (e.g. water in water stressed areas) and liquid effluent discharges.

²³ Arkebe Oqubay, as cited in the Financial Times 04 July 2017, p. 9.

²⁴ See Stephen Danyo, Asferachew Abate, Mohammed Bekhechi, Gunnar Köhlin, Haileselassie Medhin, Alemu Mekonnen, Anna Wikman, Amare Fente, Tsegaye Ginbo, Betelhem Negede, Haleluya Tesfaye (2017). **Realizing Ethiopia’s Green Transformation: Country Environmental Analysis**, Transformation CEA Series, Environment and Natural Resources Global Practice. Washington, DC: World Bank. © 2017 (as yet unpublished). This study was prepared by a multi-disciplinary, multi-agency team led by the *Ethiopia Environment and Natural Resources Global Practice* of the World Bank, with involvement from global practices responsible for energy, social protection, transport, urban, and agriculture; the *Ethiopia Development Research Institute’s Environment and Climate Research Center*, and the *Ministry of Environment, Forest and Climate Change, Federal Democratic Republic of Ethiopia* with involvement from other Ethiopian ministries.

- **Information and knowledge – Opening up the technology frontier and policy landscape to new ideas:** Increase awareness of, and access to, climate compatible technologies and policy instruments should be a core part of developing Ethiopia’s green industrialisation strategy, looking for opportunities to leapfrog and secure late-comer advantages. Plugging basic information gaps will also be necessary to inform policy decisions. This project has identified strong needs for investments in a number of areas (in housing, water, waste and transport) but the lack of comprehensive information has limited more detailed assessment of some of these gaps.
- **Investment – Taking a more integrated approach to building green industrial clusters:**
 - Infrastructure bottlenecks constraining urban productivity need to be identified and business models developed to overcome these constraints if the full benefits of green industrial growth are to be realised.
 - Package investments with CRGE at the centre – this suggests reviewing existing ways in which IPs and cities are planned and managed, and greening of transport and logistics connecting the corridors and markets..
 - Revise and restructure industrial park planning parameters to foster greater integration with host communities.

Finally, the research undertaken as part of this assignment has consistently led to one clear conclusion: **there is a need to bridge the gap between policy (Federal) direction and local capacity to effectively implement.** Policy, planning, strategy and resourcing assumptions need to be linked to implementation requirements / on the ground realities. More direct engagement and support is needed at local delivery level if national goals and outcomes are to be achieved. At the same time, it would be sensible to explore how incremental approaches of improvement can be systematically taken forward in contrast to more ambitious ‘all things everywhere at the same time’: this is controversial but worth assessing.

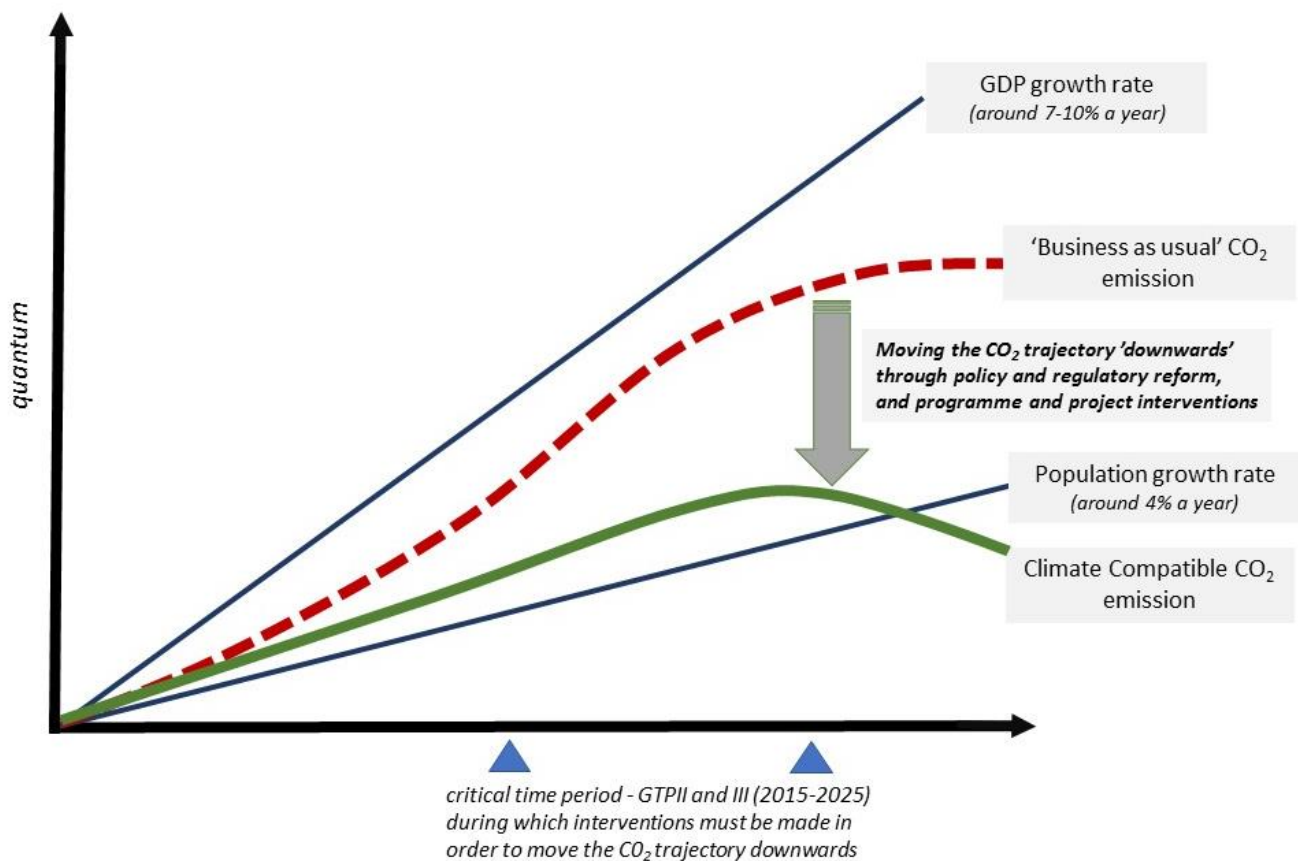
Strategic Intent: Implementing Paradigm Shift Pathways

Ethiopia’s ambition to achieve sustained LMIC status by 2025 is at risk due to climate change and environmental risks. As noted in Chapters 1 and 2, it has been estimated by the World Bank that if steps are not taken towards climate resilience, climate variability could reduce Ethiopia’s GDP growth by up to 10% per year.²⁵ A fundamental developmental objective for Ethiopia is to devise a paradigm shift pathway made up of a set of measures the implementation of which can move the carbon emissions trajectory downwards and breaking the link between nominal GDP growth and CO₂ – see Figure 2.2. The project aims to contribute towards this paradigm shift through the introduction of a number of key measures. The measures proposed in this study will contribute to fundamentally shifting the enabling environment driving the *quality of growth* in Ethiopia, using the Kombolcha – Mek’ele Corridor as a starting point but designed to scale and replicate at national level. The measures are designed within the context of the specific challenges / risks to green industrial development in the Corridor, including low carbon transport modal choices connecting the Corridor clusters, and include:

- **Institutional innovation** - building effective institutions to implement, monitor and enforce policies and regulations - through capacity and capability building
- **Changing incentives** - policy and regulatory reforms that change the incentives structures which govern or significantly influence the behaviour of firms, communities and individuals; and
- **Catalytic investment projects** - the design and implementation of specific projects which will take forward reforms and promote the decarbonisation of the economy, and the development of green industrialisation and low carbon connectivity / access technologies and services.

²⁵ Ethiopia Rising: Aspiring to Become a Carbon Neutral Middle Income Manufacturing Hub by 2025. Speech by World Bank Group President Jim Yong Kim, Addis Abba, July 14th 2015. www.worldbank.org/en/news/speech/2015/07/14/ethiopia

Figure 3-2: Stylised climate compatible CO₂ emissions trajectory for Ethiopia



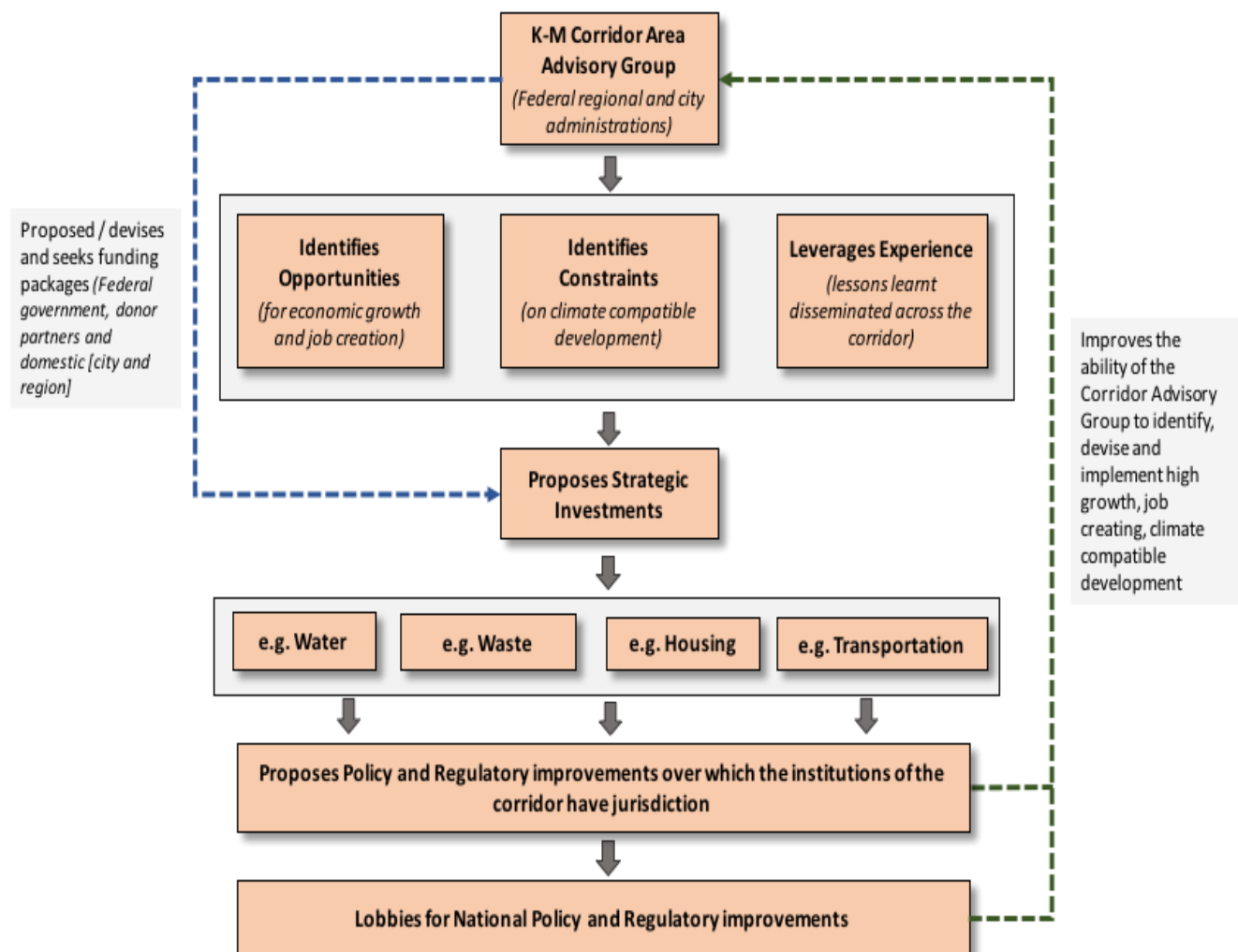
Source: IPE (2017)

Pathway shift I: Institutional Innovation - New Ways of Working

To promote horizontal and vertical collaboration and coordination among Federal, Regional and local institutions it is recommended that **a Kombolcha and Mek'ele corridor area advisory group or committee is established** (see Figure 4-1.). The group would consist of cross-sector senior representatives of the two cities (local governments and other stakeholders) and their respective regional governments, with representatives of relevant Federal Government ministries in attendance. Initial analysis suggests that existing governance structures may not be suitable given both an existing lack of institutional integration both horizontally and vertically and, the transboundary nature of development and climate compatibility issues along growth corridors.

The advisory group is recommended in order that the various communities of the corridor area can address issues in common, for example water management involving a water basin that traverses the entire corridor area and beyond, and transportation issues which connect the two cities and the various towns in the corridor area. Furthermore, as the economy expands and the product space becomes more sophisticated, geographical and social connections become denser. The modern economy is an interconnected economy, and requires joint working, in this case 'corridor thinking', in order to address issues in common. Planning for job creating, climate compatible development, making sure that industrialisation and urbanisation deliver growth and development in a climate compatible manner, is most certainly an issue of the commons.

Figure 3-3: Institutional Innovation: Possible K-M Corridor Collaborative Partnership



The function of the corridor advisory group would be to identify pan-corridor opportunities to promote growth and create jobs in a manner which is climate compatible – always encouraging low or de-carbonised economic investment, supporting the development of the climate compatible ‘green’ branding of the fast-evolving industrial economy, and implementing ‘green’ solutions to the problems associated with urban expansion. In addition to the priority projects identified below, one particular strategic focus for the advisory group is to ensure “greening of transport and logistics services” connecting the corridor cities and towns, and linking the corridor to export markets: a critical challenge / opportunity is to promote and guide freight movements (especially containers) towards rail and reduce truck-miles. The shift to rail requires collaboration and co-ordination among multiple stakeholders shaping transport modal choices, and importantly, working with IPDC, EIC and industrial investors to ensure competitive and climate compatible green transport options are encouraged and realised.²⁶

The overall aim of the advisory group will be to promote the building of industrial cities in the Corridor that are *liveable* and *resilient*, and connected through green transport services. Attitudinal and behavioural changes may be required of those representing the institutions responsible for the development of the corridor, which are likely to be predicated on capacity and capability improvements. The economic value and imperative of directly promoting and managing development in climate

²⁶ This will require, among other things, ensuring green transport options can compete on price, time, frequency and reliability parameters, and there are efficient linkages between IPs (and factories) and inland terminals / logistics facilities. Shifting from road to rail on freight movements should be a strategic priority of the corridor growth strategy.

compatible manner must be clear to those responsible for the development and management of the corridor. The changes envisaged are to be designed to strengthen the *adaptive capacity* of the Corridor, and significantly reduce its exposure to climate risks.

Pathway Shift II: Incentives through policy and regulatory reform

Changing incentives to allow sustainable industrial cities to develop

Critical to securing a new green industrialisation pathway is continuing to reform and improve the policy and regulatory frameworks guiding growth and structural change in the economy. A fundamental shift is needed in how national objectives, targets and strategies are translated into on-the-ground realities: this entails the need for reworking planning processes to ensure the *effective implementation of holistic cross sector integration* at the relevant local level (structure plan, local development plans). This requires developing and investing in revised national guidance backed-up by the financial, technical and human resources needed to prepare and implement plans. This itself requires new institutional co-ordination and decision-making processes, as noted in the section above. Complementing the planning process innovations, there is an urgent need to revisit the incentives guiding investment (public and private) and real resource use and externalities. To date, there have been a number of incentives put in place to attract investment in new industries – through subsidies of important environmental resources that compromise sustainability – and weak sanctions / penalties for negative externalities such as polluting; together which have perverse outcomes of either reduced access and supply or encouraging environmental damage. For example:

- Resource pricing and subsidising consumption of environmental goods (see Evidence Box 3)
 - “cheapest power in the world” (Financial Times, 4 July 2017)
 - cheap or low cost access to water supply (commercial and residential consumers)
 - no systematic polluter pays principle or below cost recovery of environmental services
- Limited capacity to enforce of resource use and pollution control regulation
 - damage to the quality of environmental assets such as water supply (e.g. in Kombolcha – Dessie cluster)
 - uncertainty over the full extent of water extraction and use in water stressed areas (e.g. Mek’ele industrial and commercial demand)
- Lack of market and regulatory incentives to promote new climate friendly technologies or approaches
 - standards and codes (e.g. building codes and planning regulations) have not been updated to encourage the promotion of climate-friendly technologies
 - focus on priority sectors and investors attraction have limited considerations on local resource constraints. For example, there are limited considerations of its water scarcity challenge when directing investors to industrial parks in Mek’ele.

Together these price and regulatory signals combine to distort investment and technology away from more desirable resource saving and climate compatible technologies. Table 3-1 below begins to outline some initial low cost policy and regulatory reforms that can have a profound impact on possible paradigm shifts across three potential target project sectors.

Evidence Box 3: Water Pricing – getting it right

Water pricing can allow for: (i) *demand management* (reduce demand, increase incentives to save), providing water without such an environmental cost, encourage efficiency innovation, and manage water conflict (investing in good governance mechanisms to ensure the sustainable supply of water); (ii) *financial viability*, maintaining infrastructure and personnel, metering, and maintaining quality and quantity.²⁷

Social impacts of water pricing

Many of the social impacts from water-related issues stem from inadequate management of water. Water and sanitation services are usually channelled to upper and middle class neighbourhoods, whilst lower-income neighbourhoods have to depend on unreliable and unsafe water supplies, which are often dependent upon informal private water vendors who charge comparatively higher prices than the public rate for water supplies. For instance, in Mek'ele it is estimated that 20 liters of water supplied from the pipe system will be charged around 0.7 ETB while a 20-liter jerrycan will typically cost around 10 ETB, resulting in the poor paying more for water.

In addition, water sources in poorer neighbourhoods (e.g. standpipes or hydrants) may allow for local monopolies, as households within the area are unwilling or unable to travel beyond their closest source²⁸. Water pricing is often used as a policy instrument to allocate water efficiently, bridging the gap between rising demand and limited availability. Water policy plays a financial role as a mechanism for recovering investment and maintenance cost of the water system, as well as an economic role to signal the scarcity value and to guide allocation decisions. For poorer urban dwellers, water pricing can have a large impact given the relative cost of such a basic household necessity takes up such a large proportion of the household income²⁹.

Improving the implementation of water pricing policies




- Ethiopia has policies targeting full cost recovery in water pricing, however implementation has been a challenge due to data availability (for more accurate cost modelling) and local resistance.
- More analysis and information gathering can help determine the level and structure of water tariffs that could be supported locally, how necessary subsidies are, and what type of subsidies would be required;
- This basic data and assessment is lacking in both Kombolcha and Mek'ele. More micro level data on water consumption patterns, household incomes and expenditure is required as a prerequisite in order to create sound policy formation in the water sector.
- There is a need for an integrated water resource management framework which are trans-regional to reflect different levels of water challenges. This will facilitate an enabling environment that is able to pass policies, review and put into place strategies for sustainable water resource management, etc., as well as institutional frameworks to put into practice these policies.

Table 3-1: Improving the policy and regulatory environments

²⁷ Groom, B. 2009. 'International Experience in Economic Instruments Water Resource Management for Environmental Protection: A Report for the Asian Development Bank and the Ministry of Environmental Protection of the Peoples Republic of China'. Asian Development Bank.

²⁸ Olmstead, S. 2010. 'The Economics of Managing Scarce Water Resources'. *Review of Environmental Economics and Policy* 4 (2): 179–98. doi:10.1093/reqp/req004.

²⁹ OECD. 2009. 'Managing Water for All: An OECD Perspective on Pricing and Financing'. <http://www.oecd.org/env/resources/managingwaterforallanoecdperspectiveonpricingandfinancing.htm>.

Sector	Policy reform	Regulation	Incentives
<p>Housing</p> 	<p>Develop new technologies and business models for mass housing delivery to support green industrialisation and liveable cities</p>	<p>Revise building codes to enhance environmental performance, enable new skills, technologies and materials to be used on housing design and construction; or more flexible application of plot size/density requirements – building permits.</p> <p>Improve awareness of new building technology / materials - both consumers and the construction sector</p>	<p>Review pricing of materials to ensure that climate compatibility is built into wholesale / retail prices e.g. that externalities such as embodied energy in cement production (CO₂e) is priced into the cost of use.</p>
<p>Water Resources / Supply</p> 	<p>Update water resource governance, management and systems</p> <p>Fully integrate water resource management into regional / city planning, reflecting the transboundary nature of water resources</p> <p>Review national industrial development and integrate into national water resources management planning</p> <p>Mandate demand side management / conservations measures as part of IP planning – especially in water stressed regions</p>	<p>Incorporate water resource management guidelines into Integrate water resource management</p> <p>Encourage demand side management / conservations measures as part of water resource management</p>	<p>Review water pricing policy regime</p> <p>Implement greater monitoring and enforcement of water use – including industrial and commercial</p>
<p>Waste Management</p> 	<p>Develop national guidelines for waste management and resource recovery</p>	<p>Establish waste management standards and reuse / recycling / material recovery targets</p> <p>Ensure all IPs have full integrated waste management systems in place and these are monitored</p>	<p>Implement polluter pays principle</p> <p>Strengthen enforcement practices at city level</p> <p>Create pricing / tax incentive to encourage waste minimisation and material recovery</p>

Creating Sustainable Cities: Implementing Change

The aim of the Ethiopian Cities Sustainable Prosperity Goals (ECSPG) (formerly the Ethiopian Cities Sustainable Prosperity Initiative (ECSPI)) is for the urban sector of the country to be efficiently and effectively planned and managed so that urban development accelerates economic growth while simultaneously supporting social inclusion and climate change impact resilience. The ECSPG directly seeks to improve adaption to and mitigation of climate change impacts by improving the urban built environment, and related infrastructure and services. The ECSPG is an ambitious and transformational agenda, one which faces a number of challenges including the need to overcome infrastructure and service deficits, the lack of affordable housing, and inadequate transportation infrastructure. These challenges are significant, especially so given the rapid increase in the population of urban areas expected over the coming years.

If the goal of the ESCPG is attained, however Ethiopia will be far along the pathway towards the *Triple Win*, namely achieving lower middle income country (LMIC) status, carbon neutrality and climate compatible development by the target date of 2025. Many of the policy changes and innovations recommended through the ECSPG and related policy initiatives such as the National Urban Development Spatial plan (NUDSP) have yet to be implemented and others have not been altered to take into account 'green' requirements. If these policies are implemented and green there would be a significant improvement in the over-arching policy and regulatory environments promoting green development (See Table 3-2)

Table 3-2: Implementing and greening existing policies and regulations

Important MUDHo / NUDSP / sustainable cities policies	Nature and objective of policy initiative	Current risks to green urban industrialization	Measures to overcome risks and green policy initiatives
Development of urban clusters (12 identified in the NUDSP; see Map 1 in this report)	<ul style="list-style-type: none"> Co-ordinated planning across each cluster Economic and spatial development plans for each cluster to be prepared and implemented Highlight and promote benefit capture for local population of major projects (e.g. SEZ/IPs) Transportation / mobility plans for each cluster prepared and implemented Establish urban cluster councils, UCC (coordinating body) 	<ul style="list-style-type: none"> Development plans do not take into account priority need to promote green urban-industrialization Economic growth assessments and promotion not directly linked to actions to address shortage of affordable housing Co-ordination also required along main transportation routes / corridors – as well as UCC Corridor councils, CCs, may be required To date none of the recommended cluster development plans have been prepared 	<ul style="list-style-type: none"> Connection between NUDSP and sustainable cities initiatives to be highlighted Green growth initiatives to be prioritized. Key transportation corridors identified (based on economic potential criteria) and planning across relevant urban clusters then promoted Prepare selected urban cluster plans within coming 12 months, taking into account the above K-M Corridor advisory group / council test-case for the establishment of similar councils elsewhere in Ethiopia
Establish Urban Development Agencies (UDAs)	The promotion and use of PPP to provide and maintain urban services (thereby increase provision and overcoming service deficits)	Provision and maintenance of urban service does not focus on resource minimization, reuse and recycling but solely on the financial viability of the PPP	When established, remit and terms of reference of UDA to explicitly take into account need to promote green urban-industrialization
Establish Land Development Agency (LDA)	The promotion of efficiency in urban land markets; simplify lease conditions, replace or improve auction system, and increase cost recovery in urban land allocation	Land market improvements do not focus on need to promote green urban-industrialization	When established, remit and terms of reference of LDA to explicitly take into account need to promote green urban-industrialization
Establish a National Urban Development Fund (NUDF)	NUDF to finance and accelerate the provision of urban infrastructure and services	Accelerated provision may be resource use intensity and not guided by green development principles	When established, remit and terms of reference of NUDF to explicitly take into account need to promote green urban-industrialization
Prepare revised city structure and strategic plans, adapted to city size	Comprehensive city structure and strategic plans needed as towns and cities rapidly expand (and some become industrialized)	<ul style="list-style-type: none"> City plans land use don't take into account need to increase resource use efficiency and the priority to promote green growth Building codes 'trap' construction sector into provision of housing in manner 	<ul style="list-style-type: none"> Changes required to way city plans are prepared. Relevant manuals to include instructions as to how green growth issues are to be addressed CRGE (written in 2010) to be revised with emphasis on measures than can be taken to

Important MUDHo / NUDSP / sustainable cities policies	Nature and objective of policy initiative	Current risks to green urban industrialization	Measures to overcome risks and green policy initiatives
		which is not green and climate compatible	operationalize green urban-industrialization • Change of building codes required
Full cost recovery for urban services to be introduced	Gradually introduce cost recovery pricing, adapted to affordability by households, and linked with increased municipal control over service charge rate setting	The move towards cost-recovery does not cover industrial areas adjacent to the area over which an urban administration has jurisdiction	The move towards cost-recovery covers industrial areas adjacent to the area over which an urban administration has jurisdiction
Establish a Federal Urban Development Agency (FUDA) and setup a federal knowledge and experience platform	FUDA charged with assisting NUDSP implementation, monitoring and evaluating progress, and identifying lessons to be learnt as NUDP implemented	FUDA and related knowledge learning and experience sharing platform don't take into account need to increase resource use efficiency and the priority to promote green growth	FUDA and related knowledge learning and experience sharing platform to take into account need to increase resource use efficiency and the priority to promote green urban-industrial growth
Strengthen and specialize municipal staff in urban planning and management roles	Allow transfer and secondments of staff between regional and municipal authorities, increase skills levels and develop municipal employee career plans which retain technical staff and skills continuity	Staff not skilled in measures to take to promote green growth; staff experience in green growth not disseminated / shared	Selected staff to be skilled in measures to take to promote green growth; staff experience in green growth to be disseminated / shared (via e.g. federal and/or UCC/CC knowledge and experience platform)

Source: NUDSP (2016, MUDHo) and Climate Resilience Strategy: Urban Development and Housing (Draft report, April 2017, MUDHo).

Pathway Shift III: Catalytic Investment (Projects)

To support a pathway shift there is a need for physical interventions and investments, projects designed to *initiate* change along green industrialisation and connectivity / access pathways.

As part of this study we have identified the key opportunities and constraints for the two cities Mek'ele and Kombolcha and transport corridor linking them. Based on the opportunities and constraints identified, a set of projects and interventions has been identified through extensive discussion at the local, city-level. These projects are briefly conceptualised and presented to regional and city stakeholders in both Kombolcha and Mek'ele. The participants scored the projects against a set of criteria underpinned by the CRGE objectives, as shown in Table 3-3.

Each of projects identified is expected to deliver positive outcomes, and contribute towards a pipeline for future implementation. For example, a number of transport-related projects were identified, which will be essential to deliver change within the towns, and linking the corridor to national and international markets. However, some degree of prioritisation is necessary to work within resource and implementation capacity constraints. The top projects identified within the cities were further validated and shortlisted through further consultation.

This process has led to the identification of three priority projects: green housing; water resource management; and waste management. Both housing and waste management are applicable in both Mek'ele and Kombolcha, and water resource management is a high priority in Mek'ele, with some applicability to Kombolcha. These projects are considered by stakeholders to be replicable and scalable within these towns, along the corridor and in other areas within Ethiopia. Within this study the three projects are further conceptualised in terms of actions required and their potential scale of benefits and costs. These are summarised in Table 3-4 and further elaborated in the Project Pre-Feasibility Reports included as Annexes to this report.

The projects cover three interdependent sectors that are broadly nested within the “sustainable cities” and natural resources envelopes currently being considered by the GoE as part of future climate and / or development financing discussion with potential international investors:

- **Sustainable Cities Initiative** - Housing / Waste management /Water
- **Natural Resources Initiative** - Regional / water basin water resource management

nex 2 Table 3-3: Average participants scoring of project proposal against selected criteria

Name of project	Economic Growth			Resilience to CC			GH Gs	Env. pollution		Resource use efficiency				Social inclusion		Total Score
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
Mek'ele																
Housing development	1	1	2	1	1	1	1	2	1	1	1	2	NA	2	2	19
Sewerage system project	2	0	2	2	2	2	2	1	NA	1	0	0	0	NA	2	16
Water supply project	2	NA	2	1	1	NA	0	0	NA	2	NA	1	1	2	NA	12
Solid waste management project	0	NA	2	1	1	NA	1	1	2	NA	NA	NA	2	1	NA	11
Alternative energy source for households project	NA	2	1	NA	NA	1	2	2	NA	NA	2	NA	NA	NA	NA	10
Reforestation project	NA	NA	1	2	NA	NA	NA	2	2	NA	NA	NA	NA	1	NA	8
Asphalt road	2	NA	1	1	0	0	NA	NA	NA	NA	NA	NA	NA	0	2	6
Transport improvement	0	NA	1	NA	NA	NA	2	1	NA	NA	NA	1	NA	0	NA	5
Cobblestone Road	NA	NA	1	1	0	0	NA	NA	NA	NA	NA	NA	NA	0	NA	2
Textile and garment oriented skill development training	1	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	NA	NA	2
Agro-forestry project	1	NA	1	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	NA	NA	2
Kombolcha																
Affordable and climate compatible housing	1	1	2	1	1	1	1	2	1	1	1	2	NA	2	2	19
Watershed management and urban greening	1	NA	2	2	2	2	2	NA	1	1	NA	0	NA	NA	NA	13
Integrated and Sustainable Solid Waste Management	0	NA	2	1	1	NA	1	1	2	NA	NA	NA	2	1	NA	11
Green street project	1	NA	1	1	2	NA	2	2	1	NA	NA	1	NA	NA	NA	11
Local Development Plan	1	NA	NA	1	2	1	0	NA	NA	NA	NA	2	NA	NA	2	9
Bypass road project and/or bridge	2	NA	1	2	-1	0	-1	1	NA	NA	NA	1	NA	NA	NA	5

Key: Criteria and scoring

Policy Objective	Criteria	Sub Theme
Economic growth and structural change	1	Export growth
	2	Contribution to productivity (Access to low carbon power supply)
	3	Job creation
Increased resilience to climate change	4	Extreme weather events
	5	Urban greening
	6	Protected land (Forests)/protection of biodiversity
GHG emissions reductions	7	Carbon emissions
Reduced environmental pollution	8	Air quality
	9	Improved waste management
Increased resource use efficiency	10	Balancing water demands
	11	Energy efficiency
	12	Land use efficiency
	13	Closing resource loops
Social inclusion and development	14	Access to improved services (Sanitation + Electricity)
	15	Access to housing

strong positive

largely positive

no contribution

largely contrary

strong deterrent

no direct impact/impact hard to quantify

2	
1	
0	
-1	
-2	
NA	

Financing Options

There are a range of financing sources for the projects and these are outlined in the attached tables – further details are provided in extended project descriptions provided as separate Annexes to this report. To varying degrees the projects are amenable to material cash flows derived from user-fees or other charging instruments – especially in the case of industrial and commercial services. Further project detailing is required to firm up estimates of CAPEX (based on project scale and timing and phasing of project interventions) and OPEX³⁰, and based on these the types of financing options available. In all three projects, the case for developing these is compelling: new forms of housing delivery are needed, water resources in the Corridor are not being managed well and forecast demand is expected to stress current sources; there is no adequate waste disposal system in place in Mek'ele and much more needs to be done to meet future needs.

The analysis suggests there are untapped revenue sources across each of the project sectors. For example, the through the under-pricing of services e.g. water; limited or no recovery of materials from waste streams; under-developed flows of financing from the bottom-of-the housing pyramid. A fundamental difference in the approach to financing investments and improvements in infrastructure provision will be brought about through tapping revenue sources like user-fees or land/development taxes, to off-set the reliance on loans, grants, or other forms of development finance. (**Annex 2** includes a fuller discussion of the broad financing options as well as guides on future opportunities to access climate financing). Based on discussions with MOFEC/CRGE, it is understood the GoE will review projects included as part of this study and take a view on which project (s) would be included as part of a future GCF financing proposal and which would be considered for other forms of climate and / or development financing.

Table 3-4: Summary of the Three High Priority Projects

³⁰ Funds devoted to CAPEX or capital expenditure acquire, upgrade or fix physical assets such as plants, equipment or other property. Examples include, the construction of a road, factory building or electricity distribution networks. OPEX or operational expenditure reflects the cost of normal business operations for example wages, licensing fees, small repairs and routine maintenance, insurance or property taxes.

The Housing Project

OBJECTIVE: Investment in a green building design competition to deliver up to 2,000 green houses in two sites to demonstrate alternative building techniques and materials and incentivize innovation and entrepreneurship

Project Rationale

Housing demand met by building low cost - poor quality housing, which does not taking into account (a) rapid urban and industrial development and (b) the adverse impacts on climate resilience and energy intensity of current housing and street design and build. The way in which housing is currently delivered is likely to lead to:

- Urban infrastructure that locks Ethiopia into a pathway of unsustainable development
- Deterioration of urban environmental and public health; and
- Poor quality, unsustainable housing choices.

Project Dimensions

Strategic Intent	Institutions	Incentives	Investment
<ul style="list-style-type: none"> • To strengthen urban resilience by building livable and affordable housing at scale and curtailing the expansion of informal vulnerable settlements • To Reduce Greenhouse Gas (GHG) emissions in sector; significant potential for national reductions in GHG over 20 years (25mn units) • To reform policy and regulatory environment to provide incentives for developing alternative green building materials, techniques and housing types 	<ul style="list-style-type: none"> • Lead: Ministry of Urban Development and Housing (MUDHo) • Align Climate Resilience Green Economy (CRGE), urban, housing, and construction strategies; build knowledge base and capacity of city and regional governments on housing issues • Integrate / coordinate industrial investment with housing delivery • Local: Strengthen city planning and implementation capacity 	<ul style="list-style-type: none"> • Review and update housing policy objectives; urban planning and building codes to allow and encourage green housing via new standards introduced • Modernize cement production and/or use less cement • Create incentives to use local materials and to promote local employment opportunities in the housing construction sector 	<p>TOTAL around \$10 m</p> <ul style="list-style-type: none"> • \$.75 - 1 million – competition / awareness / prototypes • \$8- 10 million – Phase 1 Market Launch • Potential sources of funds: <ul style="list-style-type: none"> ○ Green Climate Fund, ○ Private sector, ○ Development Finance Institutions (DFIs) <p>Ministry of Finance and Economy (MOFEC) responsible for overall financial management of the project - Works in close partnership with MUDHo to ensure the sustainability of the project</p>

Climate Financing checklist: Systems designed for new housing, water and SWM projects have “**physical assets strengthened or constructed to withstand conditions from climate variability and climate change**” including heat stress, increased storm and rainfall intensity, reduced water availability.

Project Outcomes and Impacts

Job creation:

- Potential to create broad based wealth creation and employment opportunities.
- Forward and backward linkages creates employment elsewhere along construction industry supply chains

Improved public health:

- Decent, well-designed housing improves public health
- Housing with improved access to Water and Sanitation (WASH) reduces poverty and increases gender equity amongst the urban poor.
- Access to clean cooking facilities reduces exposure to toxic smoke from traditional cooking
- Proximity to green and open spaces which is incorporated into the design of modern housing – promotes recreation
- Secure tenure is strongly related to health; where those who own their own homes and have security of tenure, are usually in better health.

GHG Emissions reduction:

- Cement the predominant material used in housing construction is Ethiopia’s single largest source of emissions (50% of CO2 equivalent)
- Up to 1 million tonnes (1.25 million tonnes of CO2 equivalent) is imported annually from as far away Turkey and Ukraine. Switching to a locally available building material would also cut emissions from transport
- Reducing operational emissions in housing represents the greatest lever to GHG abatement. Significant potential exists to explore off-grid energy solutions to provide lighting and power; reducing the energy demand of buildings through the use of energy efficient appliances for lighting cooking, hot water; and/or building orientation to maximise natural cooling and ventilation and avoid passive solar gain

Adaptation/enhancing resilience:

- Protecting sensitive land by prioritising brownfield over greenfield housing and optimising densities to minimise land take;
- Maximising green, open spaces, use of street trees and vegetation; to enhance biodiversity;
- Housing integrated with the landscape to provide managed water drainage systems that protect landscapes during flood events

Pollution abatement:

- Zero-waste discharge, grey water recycling systems and improved sanitation systems to prevent pollution of land and groundwater
- Codes of conduct and operating procedures that provide incentives for the construction industry to safely dispose of building waste
- Incorporating clean cooking technology into housing design to prevent localised air pollution and destruction of forests for fuelwood

The Water resources project

OBJECTIVE: Improving water resource management in Mek'ele to ensure long term water resilience in the face of growing urbanization, industrialization and climate change pressures

Project Rationale

There are significant water shortages in the Corridor Area. Furthermore, the current delivery of water is characterised by:

- Inappropriate water pricing with low/no cost-recovery, which results in a water utility characterised by low efficiency
- Inadequate service coverage
- The poor pay disproportionately more for their water
- Unregulated water use by industries

Project Dimensions

Strategic Intent	Institutions	Incentives	Investment
<ul style="list-style-type: none"> • Strengthen adaptation to water scarcity and Climate Change risk • Improve water efficiency and allocation within resource constraints • Resilience: access to safe water for expanding cities • Risk: Avoid productivity barriers and expensive supply options • Developing a greater understanding of ground water availability recharge, and management • Increased awareness and community participation in water conservation strategies 	<ul style="list-style-type: none"> • Lead: Ministry of Water, Irrigation and Electricity (MoWIE) with MUDHo support • National: New management systems and tools to assist strategic planning • Local: Align industrial and urban expansion with water resource constraints • Develop joint water governance structures – e.g. planning and implementation across administrative boundaries Build environmental regulation and enforcement capacity of Regional and City Government • Strengthen the capacity and effectiveness of the water utility 	<ul style="list-style-type: none"> • Enhance regulatory and policy environment to promote integrated, climate-resilient water resources management: • Water pricing reform (water use tariffs and wastewater discharge tariffs) • Regulatory and financial incentives for water reuse and conservation • Establish quality standards for water recycling and reuse • Incentives for water reuse and technology upgrades 	<p>Total \$10m</p> <ul style="list-style-type: none"> • Water resources mapping & management strategy/plan • Water utility management and improvement plan • Non-residential metering, monitoring and cost recovery • Water conservation and demand management awareness • Investment in technologies for re-using and recycling grey water for irrigation, construction and other non-potable uses. • Household level: explore and introduce water saving technology options at household level

Climate Financing checklist - Water resources project should show “**potential for externalities in the form of expected improvements in areas such as...water supply**”

Project Outcomes and Impacts

Investment expansion/job creation: By balancing demand for water and improving water-use efficiency, relative volumes of water available for productive use should increase. As an input to production, improving access to water should encourage investment expansion and support job creation in the industrial sector.

Productivity gains: Improved water supply reduces stunting and diarrhoea, which in turn releases labour availability for other activities

Improved public health: Improved access to clean water supply through better maintenance and repairs of water supply facilities will result in reduction in water-borne diseases (dysentery, cholera and others).

Gender benefits: Evidence suggests that households spend 670 hours/year on average on water collection, mainly undertaken by women and girls. Improving access to more resilient water supply reduces time spent collecting water, changes women's workload, reduces harassment and abuse, and increases time available for other activities, such as education, family and social/community interactions.

Improved livelihoods of communities: By increasing the availability of water, the project will improve output in urban agriculture and livestock production, which in turn leads to enhanced food security and improved livelihoods of communities.

GHG reductions: Reusing and recycling water on site or nearby reduces the need to energy to pump water from deep aquifers using for example diesel-based water pumping systems – reductions in CO₂ that might be typically produced in the distribution of water.

Reduced soil and water pollution: improved industrial wastewater management (zero-waste discharge, grey water recycling systems, discharge fees) and sanitation systems to prevent pollution of land and water bodies

Resource-use efficiency: investing in water saving technology or processes leads to efficient use of water, thereby reducing the volume of water used. Further, wastewater can be re-used for irrigating non-agricultural land (i.e. urban greenery, roadsides, etc.) or to replace drinking water used for toilet flushing or construction sites. Pricing water appropriately should contribute further to resource-use efficiency.

The Waste Project

OBJECTIVE: City-wide resource re-use and waste minimisation project

Project Rationale

The growing quantity of municipal waste generated in cities and the increase in the composition of waste exerts significant pressure on municipalities who struggle to keep pace. Industrial wastes are also being generated in cities such as Mek'ele and Kombolcha, but are being considered as separate challenges rather than an integrated issue with municipal wastes. Materials recovery is an afterthought – much of the intrinsic value in waste is being lost, to all but a handful of market players

Project Dimensions

Strategic Intent	Institutions	Incentives	Investment
<ul style="list-style-type: none"> • Refocus waste strategy towards reducing, reusing/recycling and recovering waste across the entire waste value chain. • Reduce city authority expenditure on final disposal by minimising municipal and industrial wastes to landfill • Promoting the closing of resource loops through a circular economy approach • Harness symbiosis between IPs and host cities • Tackle 75% emissions from cities through waste minimization 	<ul style="list-style-type: none"> • Lead: Ministry of Urban Development and Housing/ with Ministry of Environment Forestry and Climate Change; and Industrial Parks Development Corporation • National: Circular economy strategy to minimize waste and maximize materials use efficiency • Local: Connect and coordinate public and private sector waste players (self-subsidies) 	<ul style="list-style-type: none"> • Reform of tariff structures to improve cost recovery mechanisms and incentivise materials recovery and recycling • Undertake public awareness campaigns on waste reduction, separation and recycling • Undertake training to IP tenants on materials recovery and waste treatment • Promote reduce imports, close resource loops, lower input costs and offset energy costs 	<p>Total around \$50m</p> <ul style="list-style-type: none"> • Estimated CAPEX: \$US50 million • Estimated OPEX: US\$65 - \$US200/tonne of waste • Materials recovery facility • Waste-to-energy plant (IP) • Climate financing – GCF, GEF

Climate Financing checklist – Solid Waste Management directly contributes substantially to “**improvement in waste management contributing to emission reductions**”

Project Outcomes and Impacts

Job creation: The waste sector in developing countries remains a labour intensive trade. UN-HABITAT estimates that urban solid waste management services provides employment for up to 6 workers per 1,000 population

New markets: New secondary markets for recovered materials can reduce material costs/imports. A study in Addis Ababa, Ethiopia, calculated that plans for a new plastic recycling factory, could meet 9.6% of the city's annual plastic resin requirements.

Livelihoods for youth and women: High labour intensity, low-skilled jobs in the waste management sector, potential to create employment opportunities, particularly for youth or women. For example, existing waste collection services in Mek'ele are carried out by a number of Micro and Small Enterprises (MSEs) operating in different parts of the city. The MSEs are staffed with 37 employees out of which 26 are female

Improved public health/reduced risk: Proper SWM management can help reduce the level of dust and particulates in the air, which poses significant health risks to residents of the city. 'Open burning' is frequently practiced during the informal management of solid waste, whereby waste is burnt in the street or in landfills. Removing waste can reduce risks of block drains and cause stagnation of water, or the contamination of water bodies used for consumption, cooking and cleaning

Waste-to-energy: Improvements in recent technologies allow the capture of energy produced in incineration to generate electricity, although the process also releases CO₂ and other pollutants

Emissions avoidance from composting: Composting offers a way to avoid emissions from the decomposition of organic waste. In addition, organic fertiliser is produced which can enhance soil health and productivity

Reduced pollution: By reducing waste at source and improving landfill management, air pollution can be significant reduced. Improving the efficiency of solid waste collection could reduce air emissions from waste collection and transfer vehicles. Increased recycling also reduced the pollution associated with the production of new materials.

Reduced leachate: Minimizing landfilled waste will contribute to a reduction of leachate production that will prevent soil and surface and groundwater pollution. The increasing use of compost helps to reduce the amount of chemical fertilizers used, so minimizing soil pollution.

Reduced incidence of flooding: Flooding and poor sanitation, as a result of poor SWM practices, as their primary development concerns, during a University study on the Physical and Environmental Analysis of the city and its surrounding water resources. The high proportion of organic waste in the city's waste composition, poses clear risks to blocked water channels and an increased level of flooding.

4. *Next Steps*

The findings of the study, the proposed package of interventions and catalytic investments (the projects) were shared and discussed at the 26 July 2017 Workshop in Addis Abba. Overall the participants *endorsed the proposed interventions and catalytic projects*, with some modifications and a recognition of the need to provide further details during the next phase of the project. CDKN is proposing to prepare a briefing note on lessons learned through the project execution and to use these to guide future green urban industrial development programme interventions.

MOFEC / CRGE will take ownership of moving the project forward supported by EDRI and CDKN (Ethiopia). The actions emerging out of the project to date are:

- **Investment Proposals**
 - Refine the three proposed investment proposals in terms of improving the detailed specifications, implementation plans and financing options. This will build on the pre-feasibility studies which accompanies this report as annexes.
 - Identify funding to undertake full feasibility studies for each of the three projects, suitable to a range of funding sources and modalities.
 - Pursue opportunities for funding, for example through the GCF by submitting Concept Notes and getting feedback from the GCF.
- **Deepen Consultation and Ownership**
 - Given the multi-stakeholder nature of this project, further consultation with the Government of Ethiopia is needed in the short-term to secure buy-in to the project concepts, particularly from the proposed lead Ministries – Urban Development and Housing, MoWIE, Industry, IPDC, EIC and MOFEC through its CRGE facility – as well as city administrations and regional governments.
 - The level of interest in the project (follow-on interventions / investments) among potential development partners should be tested including major donors involved in the housing, solid waste and water sectors (DFID, World Bank, AFD, AfDB, UNICEF, JICA).
- **Define a “quick start” reform package (run in parallel with the investment proposals)**
 - Prepare a Reform Briefing Paper / Roadmap
 - Federal Stakeholder Workshop to initiate discussion / actions to move the reform package forward
- **Advisory Group Readiness Assessment [MOFEC/CRGE leadership]**
 - Organise Corridor Stakeholder Workshop to initiate collaborative working and institutional options to move the corridor green growth initiative forward
 - Develop Advisory Group Mission Statement and Terms of Reference (target outcome of the workshop)

Annex 1 – Summary statistics for Mek'ele – Kombolcha

Table 1.1 Current and future population projections of major cities located along the Kombolcha - Mek'ele corridor

City / Year	2007	2013	2015	2020	2025	2030	2035	3037
Mek'ele	215,914	98,620	337,773	455,057	602,581	775,199	629,720	1,023,497
Kombolcha	58,667	81,477	93,382	130,972	182,189	249,342	334,274	378,106
Dessie	20,095	155,412	172,657	224,425	290,131	370,844	465,833	514,739
Weldiya	46,139	65,733	76,190	109,833	156,880	220,066	302,040	344,542
Alamata	33,214	44,074	49,017	63,443	80,984	100,886	122,237	128,761
Maychew	23,419	31,801	35,702	47,252	61,561	78,076	95,922	101,546
Wukro	30,210	41,846	47,362	63,903	84,735	109,138	135,700	144,277
Adigrat	57,588	79,967	90,599	122,532	162,832	210,130	261,660	278,347
Adwa	40,500	56,120	63,527	85,743	113,731	146,527	182,228	193,761

Source: Ministry of Urban Development and Housing. 2015. 'National Urban Development Spatial Plan: Final Report'.

Table 1.2: Constraints on urban productivity –service provision

	Mek'ele	Kombolcha
Paved Roads	43.6%	82.9%
Water (no household connection)	7.2%	8.5%
Sanitation³¹	37.8%	23%
Electricity³²	7.2%	8.5%
Physical conditions of housing³³	17%	83%
Overcrowding (housing)	60.4%	44.4%

Source: Ministry of Urban Development and Housing, and Ethiopian Civil Service University. 2015. 'State of Ethiopian Cities Report'.

³¹ Proportion of households with no toilet

³² Proportion of households with no electricity

³³ Proportion of houses with mud and wood walls.

Annex 2 – Financing options for catalytic investment projects

Financing mechanisms

A range of funding sources and financing mechanisms are being explored to identify the appropriate types and mix of financing for the projects. These include public and donor funding, including climate finance, as well as private sources, whether direct financing or by financial institutions. The sources of financing are reflected in project assessments below and where possible, the potential revenue models which is specific to project type.

Public funding

For projects funded directly by the Federal Government of Ethiopia, there are a number of mechanisms in which the GoE can fund the investments required. This could include enhanced municipal revenues, environmental taxes, PPP arrangements.

Municipal finance

Municipal tax bases remain weak, despite urban local governments having Urban Local Governments (ULGs) having responsibility for delivering a wide range of services. In addition, Many cities lacking control over rate-setting (rates are set at the regional level). Only 3 percent of revenue collection currently takes place at municipal level, while Urban Local Governments (ULGs) own revenues constitute the primary (close to 60 percent) source of finance for urban infrastructure in Ethiopia. Federal and regional transfers (mainly in the form of block grants) only cover salaries and recurrent expenditures and are grossly insufficient to fully fund urban infrastructure and services.³⁴ Further, user fee charges are low and do not cover operational and capital costs. ULGs are also restricted from accessing capital on commercial

Box 1: Enhancing municipal revenue collection

Cities and ULGs could leverage additional financing for climate resilient urban infrastructure if critical municipal finance reforms aimed at enhancing own revenue generation are introduced. Possible solutions include: giving greater autonomy for ULGs to set rates and tariffs, gradually pricing services to achieve cost recovery, automatic inflation adjustments for municipal fees and charges, allowing local government to keep state revenues generated in excess of targets as an incentive for increased revenue collection at the local level, etc.

financial markets.

Environmental taxes

With policy and regulatory reform, the introduction of more stringent environmental taxes may be desirable both as a disincentive to polluting the environment and as a revenue stream. The imposition of tipping fees at dumpsites make a good example. Pricing of tipping fees could be set to incentivise better waste management practices e.g. transporting waste to a materials recovery facility as opposed to direct to landfill. Pricing of the tax should be set such that it reduces pollution whilst improving social welfare, and raises government revenues – good in theory, more difficult in practice.³⁵ Other example of relevant environmental taxes include: water abstraction charges; sewerage and effluent charges.

³⁴ Ethiopian Urbanization Review (World Bank, 2015)

³⁵ The tax should "reflect the value of the social cost of the marginal unit at the efficient level of pollution." This requires 'accurately valuing the social cost. (Groom 2009)

Leveraging private investment

Public-private partnerships (PPP)

In determining an equitable allocation for infrastructure costs, the Government of Ethiopia may look at attracting private sector contributions, via smart PPP frameworks. The GoE has prior experience in using PPP models, for example in the financing of the Addis Ababa Light Rail Transit (LRT). A range of models, including: business led models, PPP, MoU partnerships, municipal entities and public sector led models exist. Use of PPPs may form part of the mix of funding and delivery options though the legal feasibility, time sensitivity, degree of public control, the outlay of public cash, land value creation, pre-development costs and the business models risk-return profile would need to be considered in each case – with appropriate technical support if appropriate. Additional considerations would determine costs that various key stakeholders would likely sustain and how less conventional actors could be mobilized to take-on risk and provide financing to key utility solutions.

For large infrastructure projects that are tied to ongoing service delivery, the PPP may be structured in such a way that the capital investment is transferred to a public entity after a pre-determined period for continued operation. This will typically be after the private-entity has received a desired rate of return on its investment.

Development financing

There are various development partners currently operating in the urban sector (reflecting Ethiopia's priorities towards greening industrialisation and urbanisation). Development partners provide funding in different forms: capital investment (through concessional loans and grants - **CI**); budget support (**BS**); and more commonly, through technical assistance (**TA**) e.g. specialist advice on project preparation; institutional change management; policy and regulatory reform assistance. A summary table is provided below which describes projects and programmes by the most active donors and sector. Projects have been designed with existing programmes in mind so as to provide complementarity.

Table 5: Development financing available to Ethiopia

Donors /Sectors	Housing Development	Solid Waste Management	Water Resources Management
The World Bank/IDA	- Affordable Housing Market Assessment (TA) – ongoing (TA)	- Second Urban Local Government Development Project (US\$ 380 million, ongoing) (CI/TA)	- Second Water Supply and Sanitation Project (US\$ 320 million) (CI/TA)
African Development Bank			- OOWNP programme (ongoing) - Four Towns Water and Sanitation Improvement programme (on-going); - Integrated water supply and sanitation programme for 10 towns (proposed) - Study on the potential for PPP in water supply schemes;
Department for International Development (DFID)	- Ethiopian Investment Advisory Facility (£33,524,999) TA		- Water, Sanitation and Hygiene (One WASH) Programme (£102,410,900)
GIZ	- Energising Development (EnDev) Ethiopia (2010-2019; 30 million EUR) - University Capacity Building Programme (2005-2015, 414 million EUR) - Grand Low Cost Housing Programme in Addis Ababa (2003-2007, 50 million EUR)		
Agence Francaise de Development (AFD)	- Support to the Ashegoda wind farm in Mek'ele	- Construction of landfill site at Sendafa - Reppie Waste-to-Energy Facility	- Water supply and waste treatment in secondary cities
JICA			- Improvement of Access to and Maintenance/ Management of Safe Water ; groundwater Resource Assessment in the Middle Awash River Basin and Jerer Valley and Shebele Sub-basin

Climate Financing

In addition to more traditional sources of development finance, a summary table of key climate change related funds are given below. Key criteria and modalities are given with commentary on goodness of fit for Ethiopia's CRGE strategy. Individual project objectives are assessed against fit with climate financing.

Table 6: Climate financing available to Ethiopia

Climate finance source	Brief description	Key criteria or eligibility	Readiness and challenges
Green Climate Fund (GCF)	\$10b pledged to support developing countries on climate change challenges	<ul style="list-style-type: none"> - Impact potential - Paradigm shift potential - Sustainable development potential - Based on needs of the recipient - Strong country ownership - Efficiency and effectiveness 	<ul style="list-style-type: none"> - Integration with other projects can provide a larger total impact; - Evidence needed of capacity to meet targets for MtCO₂e reduced or avoided with MRV system - Needs clear evidence of how project will reduce exposure to climate risks, and complementary with broader strategies and targets
Global Environment Facility (GEF)	Fund to support developing countries on environmental objectives	<ul style="list-style-type: none"> - Has to address one or more of the GEF focal area strategies (Biodiversity, International Waters, Land Degradation, Chemicals and Waste, and Climate Change Mitigation) - Financing only for the agreed incremental costs on measures to achieve global environmental benefits - Funding through four modalities: full-sized projects, medium-sized projects, enabling activities and programmatic approaches 	<ul style="list-style-type: none"> - GEF projects are not large - full-size project is more than \$2million - Good for establishing credibility for new ideas, piloting; less so for mainstreaming - Ethiopia currently implementing portfolio of GEF funded projects - Allows multiple projects in program approach
Pilot Program for Climate Resilience, Climate Investment Funds (PPCR)	\$1.2 billion funding window for climate change adaptation and resilience building.	<ul style="list-style-type: none"> - Contributes directly to achieving objectives of the national strategic plan for climate resilience/CRGE - Adaptation focused - Use of hydro-met information in planning - Grant and loan mix 	<ul style="list-style-type: none"> - PPCR is designing multi donor multi-sector investment facility with pipeline of projects. - Early inclusion of project in discussions is crucial - PPCR currently working to design projects for GCF eligibility - Show compliance with all WB safeguards - PPCR is new in Ethiopia
Clean Development Mechanism (CDM)	Emission-reduction projects in developing countries which can earn saleable certified emission reduction (CER) credits	<ul style="list-style-type: none"> - Certified emissions reduction (CER) credits must be produced for sale; - Sources must have a positive economic rate of return and be a profitable enterprise (revenue from CERs should be surplus profit not essential revenue to make business profitable) - Emission reductions must be shown to be additional to baseline 	<ul style="list-style-type: none"> - CDM is complicated; new for Ethiopia; - Readiness effort large for small amount of anticipated revenue; - Low likelihood of carrying out MRV regularly for CER validation³⁶.

³⁶ See UNDP assessment of challenges:

http://www.undp.org/content/undp/en/home/ourwork/environmentandenergy/strategic_themes/climate_change/carbon_finance/CDM/ethiopia_opportunities.html

This document is an output from a project funded by the UK Department for International Development (DFID) and the Netherlands Directorate-General for International Cooperation (DGIS) for the benefit of developing countries. However, the views expressed and information contained in it are not necessarily those of or endorsed by DFID or DGIS, who can accept no responsibility for such views or information or for any reliance placed on them.

This publication has been prepared for general guidance on matters of interest only, and does not constitute professional advice. You should not act upon the information contained in this publication without obtaining specific professional advice. No representation or warranty (express or implied) is given as to the accuracy or completeness of the information contained in this publication, and, to the extent permitted by law, the entities managing the delivery of the Climate and Development Knowledge Network* do not accept or assume any liability, responsibility or duty of care for any consequences of you or anyone else acting, or refraining to act, in reliance on the information contained in this publication or for any decision based on it.

© 2017, All rights reserved