

# NS-172 - Ethiopia's National Railway Network and Addis Ababa Light Rail Transit (LRT) NAMA

## Ethiopia

### NAMA for Recognition

#### A Overview

A.1 Party	Ethiopia
A.2 Title of Mitigation Action	Ethiopia's National Railway Network and Addis Ababa Light Rail Transit (LRT) NAMA
A.3 Description of mitigation action	<p>Ethiopia has the ambition to develop its economy to make it more resilient to the impacts of climate change and pursue low carbon development. The Government of Ethiopia has adopted the Growth and Transformation Plan (GTP), which outlines the country's strategy to reach middle-income status before 2025. At the same time, the Government has issued the Climate-Resilient Green Economy (CRGE) strategy in 2011, which lays down the country's plan for a carbon neutral, green economy by 2025. Combining rapid economic growth while containing the environmental impact is a challenge that Ethiopia aims to realise through international partnerships, targeting both financial cooperation and capacity building.</p> <p>If Ethiopia were to pursue a conventional economic development path to achieve its ambitious development targets, the resulting negative environmental impacts would follow the fatal pattern observed all around the globe. Under current practices, greenhouse gas (GHG) emissions would more than double from 150 Mt CO<sub>2</sub>e in 2010 to 400 Mt CO<sub>2</sub>e 2030.</p> <p>The CRGE strategy describes a number of 'abatement levers' to drive the transition to a green economy. Transport has been identified as a key sector with a significant GHG abatement potential and vast sustainable development benefits.</p> <p>More specifically, construction of the Light Rail Transit (LRT) system in Addis Ababa and a modal shift of freight transport from road to an electric rail network powered through renewable energy (electricity in Ethiopia is almost entirely renewable, generated by hydropower, geothermal and wind power) are listed as the most beneficial interventions. A modal shift from road to rail will be a key pillar to transform Ethiopia's economy to a middle income country, and an affordable integration to its neighbouring countries will be achieved.</p> <p>This is key for a landlocked country like Ethiopia to achieve its export targets and to access lower cost imports.</p>

## Baseline scenario

While emissions from the transport sector currently only contribute 3% to Ethiopia's GHG emissions, they are expected to increase by 7-fold from around 5 Mt CO<sub>2</sub>e in 2010 to 40 Mt CO<sub>2</sub>e in 2030 when following a BAU scenario. Currently ~75% of the emissions come from road transport, particularly freight and construction vehicles, and to a lesser extent private passenger vehicles. Air transport also contributes a significant share (23% of transport-related emissions).

An annual growth rate ranging from 12.4%-- 13.7% in tonne-km of freight transported is estimated to create a baseline scenario up to 2030. This estimate was calculated using the elasticity of diesel imports to real GDP based on National Bank of Ethiopia's statistics and GDP growth rates as projected by the GTP and by EDRI/MOFED.

Passenger road transport emissions are driven by an old and inefficient fleet composed of 240,000 vehicles, with an average age of 15 years. The passenger fleet consumed 0.6 billion litres of imported fossil fuel in 2010. The increase in road passenger-km travelled was forecast at an annual growth rate of 8.3%--9.1%. This estimate was calculated using the elasticity of passenger-km to real GDP based on the Ministry of Transport's statistics for the past ten years and GDP growth rates as projected by the GTP and by EDRI/MOFED.

## NAMA scenario

Avoidance of emission can be achieved through modal shift of freight and passenger transport from road to rail.

The Ethiopian Railways Corporation (ERC) was therefore set up in 2007 with the mandate to construct railway infrastructure and provide passenger and freight rail transport services in Ethiopia. The envisaged infrastructure consists of two railway project components, namely the Addis Ababa Light Rail Transit (LRT) and the National Railway Network (NRN)

The first phase of the LRT project is planned to be 35 km long, its construction started in 2012 and is planned to be finalized in the beginning of the year 2015. The second phase of the LRT will be an extension of the first line of ~ 54.91 km, leading to a total length of 89 km.

The NRN, on its part, consists of eight corridors of varying lengths in diversified strategic routes that will be realised in two phases, covering over 5,000 km in distance.

- Route 1: Addis Ababa--Modjo--Awash--Dire Dawa--Dewanl (656 km)
- Route 2: Modjo--Shashemene--Arbaminch--Konso--Moyale Including Shashemene--Hawasa and Konso--Weyto (905 km)
- Route 3: Addis Ababa--Ijaji--Jimma--Guraferda--Dima including Jimma-- Bedele (direct to Boma with further extension to south Sudan) (740 km)
- Route 4: Ijaji--Nekemet--Assosa--Kumruk (460 km)
- Route 5: Awash--Kombolcha--Mekele--Shire (757 km)
- Route 6: Fenoteselam--Bahirdar--Wereta--Weldia--Semera--Elidar (734 km)
- Route 7: Wereta--Azezo--metema (244 km),
- Route 8: Adama--indeto--Gasera (248 km).

The initial financing of the three railway routes and the Addis Ababa LRT has been successfully secured. The operation of the routes will however see an exploitation shortfall due to debt financing repayments.

For the already financed route, large scale climate finance is targeted to be used to re-finance while for new lines, climate finance is envisioned to be incorporated in the initial financing model. In the absence of large-scale climate finance targeting infrastructure financing, ERC focuses on utilizing climate finance to finance activities supporting the sustainable operation of its railway.

A.4 Sector

<input type="checkbox"/> Energy supply	<input checked="" type="checkbox"/> Transport and its Infrastructure
<input type="checkbox"/> Residential and Commercial buildings	<input type="checkbox"/> Industry
<input type="checkbox"/> Agriculture	<input type="checkbox"/> Forestry
<input type="checkbox"/> Waste management	
<input type="checkbox"/> Other <input style="width: 150px;" type="text"/>	

A.5 Technology

<input type="checkbox"/> Bioenergy	<input type="checkbox"/> Cleaner fuels
<input type="checkbox"/> Energy Efficiency	<input type="checkbox"/> Geothermal
<input type="checkbox"/> Hydropower	<input type="checkbox"/> Solar Energy
<input type="checkbox"/> Wind Energy	<input type="checkbox"/> Ocean Energy
<input type="checkbox"/> Carbon Capture and Storage	<input type="checkbox"/> Low till / No till
<input type="checkbox"/> Land fill gas collection	
<input checked="" type="checkbox"/> Other <input style="width: 150px;" type="text" value="Railway"/>	

A.6 Type of action	<input type="checkbox"/> National/ Sectoral goal	<input checked="" type="checkbox"/> Project: Investment in machinery
	<input type="checkbox"/> Strategy	<input checked="" type="checkbox"/> Project: Investment in infrastructure
	<input checked="" type="checkbox"/> National/Sectoral policy or program	<input type="checkbox"/> Project : other
	<input type="checkbox"/> Other <input type="text"/>	
A.7 Greenhouse gases covered by the action	<input checked="" type="checkbox"/> CO2	<input type="checkbox"/> CH4
	<input type="checkbox"/> N2O	<input type="checkbox"/> HFCs
	<input type="checkbox"/> PFCs	<input type="checkbox"/> SF6
	<input type="checkbox"/> Other <input type="text"/>	

### B National Implementing Entity

B.1.0	Name	
B.1.1	Contact Person 1	Mr Shewangizaw Kifle
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B.1.5	Contact Person 2	
B.1.6	Address	
B.1.7	Phone	
B.1.8	Email	
B.1.9	Contact Person 3	
B.1.10	Address	
B.1.11	Phone	
B.1.12	Email	
B.1.13	Comments	-

### C Expected timeframe for the implementation of the mitigation action

C.1	Number of years for completion	9
C.2	Expected start year of implementation	2011

### D Currency

D.1	Used Currency	<input type="text" value="AED"/>
		Conversion to USD: 1

### E Cost

E.1.1	Estimated full cost of preparation	0
E.1.2	Comments on estimated full cost of preparation	-
E.2.1	Estimated full cost of implementation	
E.2.2	Comments on estimated full cost of implementation	<p>Based on per--km track cost estimates from the Ethiopian Railway Corporation, the total cost of the electric rail network to be USD 15.6 billion USD, while the Addis Ababa LRT is expected to cost 475 million USD for phase I and 761.53 million USD for phase II.</p> <p>The initial financing of the three railway routes and the Addis Ababa LRT has been successfully secured. The operation of the routes will however see an exploitation shortfall due to debt financing repayments.</p>

For the already financed route, large scale climate finance is targeted to be used to re-finance while for new lines, climate finance is envisioned to be incorporated in the initial financing model. In the absence of large-scale climate finance targeting infrastructure financing, ERC focuses on utilizing climate finance to finance activities supporting the sustainable operation of its railway.

E.3.1 Estimated incremental cost of implementation

E.3.2 Comments on estimated incremental cost of implementation -

#### F Estimated emission reductions

F.1 Amount

9

F.2 Unit

MtCO<sub>2</sub>e/yr

F.3 Additional information (e.g. if available, information on the methodological approach followed)

Boundary and scope: The emission reduction boundary covers only direct CO<sub>2</sub> emissions resulting from road transport of passengers and freight within Ethiopia. Baseline and NAMA scenario: The rail will be purely powered by electric energy, which in Ethiopia is almost entirely based on renewable energy (hydro power). Thus, the shift from road to rail will result in 0 project emissions. Road cargo was assumed to be transported by vehicles with the following 2010 fuel efficiencies: – 5-19 quintals: 40 litres per 100 tonne-km – 20-34 quintals: 8.3 litres per 100 tonne-km – 35-69 quintals: 6 litres per 100 tonne-km – 70+ quintals: 5.7 litres per 100 tonne-km. These rates of fuel efficiency were assumed to improve by 3.3% between 2010 and 2030 due to gradual improvement of the freight vehicle stock through imports. An annual growth rate ranging from 12.4%–13.7% in tonne-km of freight transported is estimated to create a baseline scenario up to 2030. This estimate was calculated using the elasticity of diesel imports to real GDP based on National Bank of Ethiopia’s statistics and GDP growth rates as projected by the GTP and by EDRI/MOFED. Passenger road transport emissions are driven by an old and inefficient fleet composed of 240,000 vehicles, with an average age of 15 years. The passenger fleet consumed 0.6 billion litres of imported fossil fuel in 2010. The increase in road passenger-km travelled was forecast at an annual growth rate of 8.3%–9.1%. This estimate was calculated using the elasticity of passenger-km to real GDP based on the Ministry of Transport’s statistics for the past ten years and GDP growth rates as projected by the GTP and by EDRI/MOFED. The electric rail network was assumed to transport 50% of dry and liquid cargo by 2030.

#### G Other indicators

G.1

Other indicators of implementation

-

#### H Other relevant information

H.1 Other relevant information including co-benefits for local sustainable development

Shifting transport from road to rail would not only decrease transport costs and improve the trade balance through reduced import of fossil fuels and reduced road maintenance (economic benefits), but

would also lower congestion, air pollution (NOx), noise and vibration pollution, traffic accidents and will increase employment, social equity and tax revenues. A major macro-economic benefit is the enhanced integration of Ethiopia with its East African neighbours as well as enhanced access to sea ports.

I Relevant National Policies strategies, plans and programmes and/or other mitigation action

I.1 Relevant

National Policies Ethiopia has taken on the ambition to capitalise on its rapid economic growth by investing in an economy that is more resilient to the impacts of climate change and pursue low carbon development. The Government of Ethiopia has adopted the **Growth and Transformation Plan (GTP)**, which outlines the country's strategy to reach middle-income status before 2025. At the same time, the Government has issued the **Climate-Resilient Green Economy (CRGE)** strategy in 2011, which lays down the country's plan to develop a carbon neutral, green economy by 2025. Provision of an affordable and efficient transport system will make a crucial contribution to economic growth, employment creation, social welfare and the expansion of the industrial sector. Estimated GDP growth of 8.5% in 2012 made Ethiopia one of Africa's best performing economies and the country is expected to continue to represent one of the world's fastest growing economies in the years to come.

I.2 Link to other NAMAs

Ethiopia Railways - Establishment of Climate Vulnerability Infrastructure Investment Framework NAM

J Attachments

J	Attachments	Title	Description
J.1	Attachment description		
J.2	File	<input type="text"/>	<input type="button" value="Browse..."/>