



Mozambique

mobilizing extractive
resources for development



Mozambique: Extractives for Prosperity, Volume II

Capstone Report:

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Contents

Table of Contents

Acknowledgements.....	3
Contents	5
Abbreviations	9
Executive Summary.....	11
Introduction.....	19
A Note on Priorities.....	22
1 The Economic and Commercial Implications of Natural Gas and Coal.....	24
1.1 The Mozambican Economy.....	24
1.2 Natural Gas Exploration and Development.....	27
1.2.1 Liquefied Natural Gas	29
1.2.2 Financing Liquefied Natural Gas Development.....	40
1.3 Coal.....	44
1.3.1 Coal Development in Tete Province.....	44
1.3.2 Global Coal Market Development	44
1.4 Creating Economic Linkages	48
1.4.1 Creating an Enabling Environment for SMEs	49
1.4.2 Infrastructure.....	51
1.4.3 Education	51
2 Translating Extractive Industry Prosperity to Mozambique’s Communities	59
2.1 Introduction	60
2.2 Local Content	61
2.2.1 Employment.....	62
2.2.2 Procurement.....	65
2.3 Building human capital and business capacity as a foundation for local content.....	68
2.3.1 Socio-Economic Overview in Mozambique.....	68
2.3.2 Socio-Economic Overview in Tete and Cabo Delgado	70
2.3.3 Strategic Social Investment for a Brighter Future.....	70
2.3.4 Areas of Concern.....	72
2.3.5 Conclusion.....	74
3 The Need for Inclusive Infrastructure.....	76
3.1 Infrastructure Endowment	77
3.2 Foreign Investment to Develop Railways for All	80
3.3 Roads that Fight Inequality	85
3.4 Addressing the Paradox of Electricity	88
4 Protecting Mozambique’s Environment.....	94

4.1	Background on Mozambique’s Ecology	94
4.1.1	Water	95
4.1.2	Fisheries	97
4.1.3	Climate change	97
4.1.4	General Environmental Considerations and Recommendations	98
4.1.5	Mining and Natural Gas	100
4.2	Mining in Mozambique, Environment and Health.....	101
4.2.1	Large Scale Mining and the Environment	101
4.2.2	Practices to Integrate Environmental Rehabilitation into Planning.....	102
4.2.3	Artisanal Mining in Mozambique.....	103
4.2.4	Preventative Measures for Environmental Impacts	106
4.2.5	Gender Issues with Artisanal Mining and Health.....	108
4.3	Environmental Concerns in the Offshore Extractive Industry	109
4.3.1	Environmental Effect of Offshore Geologic Seismic Surveying.....	109
4.3.2	Importance of FPSO regulation.....	110
4.3.3	Good Governance in Managing the Offshore Gas Industry	112
4.4	Recommendations for the Regulations on Offshore Natural Gas Exploration	113
4.4.1	Countries of Reference for Offshore Extractive Industry Development.....	114
4.4.2	Environmental Impact Procedures Need to Be Improved	115
4.4.3	Biodiversity Offsets	117
5	Ensuring Social Equity in Extractive Industries-Based Development.....	123
5.1	Resettlement Resulting from Extractive Activities	124
5.1.1	Establish early, inclusive, free, and transparent consultation processes and ensure community participation in all stages of the resettlement process.....	125
5.1.2	Level the playing field by building the capacity of communities to participate in negotiations	127
5.1.3	Ensure fair and holistic compensation, improved livelihoods and standard of living, and poverty reduction strategies.....	128
5.1.4	Minimize negative environmental impacts in resettlement.....	130
5.1.5	Constitute an inclusive and legitimate post-resettlement committee that overlooks agreement compliance, progress and accountability	130
5.2	Gender considerations in extractive industry operations.....	132
6	The Need for Upgraded Mining Laws	141
6.1	The Current Legislative Framework	141
6.1.1	Licensing	141
6.2	The Case for a New Mining Law.....	142
6.2.1	Policy Recommendations to Clarify, Strengthen and Modernize the Existing Mining Legislation	142
7	Gas and Petroleum Laws	156
7.1	Overview of the current Framework	156
7.1.1	Laws and Regulations	156
7.1.2	The Model Contract	158
7.2	What works best, legislation or contract?	159
7.2.1	Balancing Confidentiality and Freedom of Information	160
7.3	Important Developments in the Legal Framework.....	161

7.3.1	Clarifying, Modernizing, and Strengthening the Gas and Petroleum Legislation ...	161
7.3.2	Reforming the Fiscal Regime for Gas and Petroleum	169
7.3.3	International Investment Protection and Arbitration.....	172
8	The Case for Strong and Reliable Institutions.....	178
8.1	Overview- Mozambique’s Institutional Landscape.....	178
8.2	Strengthening Checks and Balances.....	180
8.2.1	Establish clear division of decision-making powers across multiple ministries/agencies.	180
8.2.2	Strengthen the oversight and implementation role of Parliament	182
8.2.3	Strengthening the auditing role of the Administrative Court and Ministry of Finance.....	183
8.3	Increase transparency initiatives that ensure independence of policy and decision-making from outside influences	185
8.3.1	Conflicts of Interest.....	185
8.3.2	Central Public Ethics Commission and Ethics Commission	187
8.3.3	Declaration of Assets	190
8.3.4	Implement strict penalties for ethical breaches	191
8.3.5	Obtain approval or ratification for key nominations from the National Assembly	191
8.3.6	Protect appointees	192
8.3.7	Protect whistleblowers and encourage them to come forward.....	193
8.3.8	Develop Private Sector Transparency Regulations	194
8.4	Strengthen oil watchdog agencies enforcement powers.....	195
8.4.1	Give agencies broader investigation powers.....	195
8.4.2	Give agencies the power to impose sanctions or suspend operations.....	195
8.5	Conduct capacity building in key institutions.....	196
8.5.1	Encourage donors to redirect aid to build capacity and promote transparency....	196
8.5.2	Focus capacity building on key institutions	197
8.5.3	Professionalizing the Civil Service	199
8.5.4	Reversing the Brain Drain and Increasing Expert Administrators.....	199
8.6	Increase transparency in all institutions and over all gas and mining activities	201
8.6.1	Bolstering Extractive Industry Transparency Standards	201
8.6.2	Transparency through E-Governance and Information and Communication Technology	201
9	Managing Wealth: The Sovereign Wealth Fund	211
9.1	A Sovereign Wealth Fund for Mozambique	211
9.1.1	Dutch Disease	212
9.1.2	Managing Expectations.....	213
9.1.3	Saving for Future Generations	214
9.1.4	Tapping into International Financial Markets.....	215
9.1.5	The Santiago Principles and the Linaburg-Maduel Transparency Index.....	216
9.2	Resource Fund Typology	217
9.2.1	Budget Support.....	217
9.2.2	The Stabilization Fund.....	218
9.2.3	The Development Fund	219
9.2.4	The Savings Fund	220
9.3	Status Quo in Mozambique	222

9.4 The Sovereign Wealth Trust Fund	222
9.4.1 A Sovereign Wealth Trust Fund for Mozambique.....	224
9.5 A Sovereign Wealth Trust Fund Structure for Mozambique	225
9.5.1 The Budget Account.....	227
9.5.2 The Stabilization Account	227
9.5.3 The Development Account	228
9.5.4 The Savings Account	229
9.6 Management Structure for Mozambique’s Sovereign Wealth Trust Fund	229
9.6.1 Trustees	229
9.6.2 Management	230
9.6.3 Audits.....	230
9.6.4 Oversight.....	230
9.6.5 Legal Adjustment	232
Summary of Recommendations	236
Bibliography	261
Appendices	277
Appendix 1: Law	277
Appendix 1A: Existing Mining Contracts under the Mining Law	277
Appendix 1B: Key Petroleum and Gas Laws and Policies	279
Appendix 1C: Existing Gas and Petroleum Contracts under the Petroleum Law 2001	282
Appendix 1D: Fiscal Tools for Mining and Hydrocarbon Revenue	285
Appendix 2: Sovereign Wealth Fund	287
Appendix 2A: Abu Dhabi Investment Authority’s Manager Selection Process	287
Appendix 2B: Generally Accepted Principles and Practices (“GAPP”) – Santiago Principles	288
Appendix 2C: The Linaburg-Maduell Transparency Index.....	291
Appendix 3: Development Indicators	293
Appendix 3A: Economic Indicators.....	294
Appendix 3B: Social Indicators	296
Appendix 3C: Governance Indicators	303
Appendix 3D: Business Environment Indicators.....	309
Appendix 3E: Natural Resource Management Indicators	316

Abbreviations

ADIA	Abu Dhabi Investment Authority
AICD	Africa Infrastructure Country Diagnostic
ANE	Administração Nacional de Estradas
ARTC	Australian Rail Track Corporation
ASM	Artisanal and Small-scale Mining
AT	Administrative Tribunal
BAGC	Beira Agricultural Growth Corridor
BBOP	Biodiversity and Business Offset Program
BSEE	Bureau of Safety and Environment Enforcement
BTU (MMBtu)	British Thermal Unit (Million BTUs)
CCEP	Central Public Ethics Commission
CEDAW	Convention on the Elimination of all Forms of Discrimination Against Women
CEP	Central Ethics Commission
CESUL	Projeto Regional de Transporte de Energia Centro-Sul
CFM	Caminhos de Ferro de Moçambique
CLIN	Corredor Logístico Integrado do Norte
CoM	Council of Ministers
CONDES	National Council for Sustainable Development
CRC	Convention of the Rights of the Child
CRVP	Commission for Receipt and Verification
DMP	Government of Western Australia Department of Mines and Petroleum
DNAC	National Directorate for Conservation Areas
DNM	The National Director of Mines
DOI	Department of Interior
EDM	Electricidade de Moçambique
EFC	Estrada de Ferro Carajás
EFVM	Estrada de Ferro Vitória a Minas
EIA	Environmental Impact Assessments
EITI	Extractive Industry Transparency Initiative
EMIS	Environmental Management and Information Systems
ENH	Empresa Nacional de Hidrocarbonetos (National Hydrocarbon Company)
EPCC	Exploration and Production Concession Contract
ESI	Estimated Sustainable Income
eSISTAFE	electronic State Financial Administration System
EU	European Union
FDI	Foreign Direct Investment
FPSO	Floating Production Storage and Offloading Vessels
FUNAE	Fundo de Energia
GAP	The World Bank's Gender Action Plan
GAPP	Generally Accepted Principals and Practices
GCCC	Central Office for Combating Corruption
GCPV	Central Victim Protection Office
GDP	Gross Domestic Product
GGFR	Global Gas Flaring Reduction partnership
GTL	Gas-to-Liquids
G 19	Group of 19 Partners for Program Aid
HCB	Hidroeletrica de Cahora Bassa
HDI	Human Development Index

HVCC	Hunter Valley Coal Chain
ICCPR	International Covenant on Civil and Political Rights
ICSID	International Centre for the Settlement of Investment Disputes
ICT	Information and Communication Technology
IEA	International Energy Agency
IFAD	International Fund for Agricultural Development
IFC	International Finance Corporation
IGF	Inspector-General of Finance
IIED	The International Institute for Environment and Development
ILO	International Labor Organization
IMF	International Monetary Fund
INP	Instituto Nacional de Petroleo (National Petroleum Institute)
IOC	International Oil Company
IPEC	International Programme on the Elimination of Child Labour
IRR	Internal Rate of Return
IUCN	International Union for the Conservation of Nature
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
MCE	Maputaland Centre of Endemism
MDGs	Millennium Development Goals
MICOA	Ministry of Coordination of Environmental Affairs of Mozambique
MINAG	Ministry of Agriculture
MIREM	Ministry of Mineral Resources of Mozambique
MML	Minas Moatize Limitada
Model EPCC	Model Exploration and Production Concession Contract
MoF	Ministry of Finance
MP	Members of Parliament or National Assembly Deputies
Mtpa	Million-tons-per-annum
NBSAP	National Biodiversity Strategies and Action Plans
NEMP	National Environmental Management Plan
ODAMOZ	Overseas Development Assistance (Database) for Mozambique
ODI	Overseas Development Institute
OECD	Organization for Economic Cooperation and Development
OHCHR	UN Office of the High Commissioner for Human Rights
PAH	Polycyclic, aromatic and hydrocarbons
PARP	Republic of Mozambique Poverty Reduction Action Plan 2011-2014
PCI	Pulverized Coal Injection
PFCC	Petroleum Fund Consultative Council
POM	President of the Republic of Mozambique
PSSA	Particular Sensitive Sea Areas
PSC	Production Sharing Contract
SASOL	South Africa Synthetic Oil Liquid
SAIEA	Southern African Institute for Environmental Assessment
SEA	Strategic Environment Assessment
SIDA	Swedish International Development Cooperation Agency
SME	Small-and-Medium-sized Enterprise
SOE	State-Owned Enterprise
SPA	Sales and Purchase Agreement
SWF	Sovereign Wealth Fund
Tcf	Trillion cubic feet
UNCLOS	United Nations Convention On the Law of the Sea
WHO	The World Health Organization
WWF	World Wildlife Fund

Executive Summary

The development of Mozambique's significant mineral and hydrocarbon reserves has the potential to generate substantial wealth and prosperity for the country. The magnitude of possible benefits for Mozambique has powerful implications for one of the poorest nations in the world. It is up to the Government, and the people of Mozambique, to decide when, where, and, most importantly, how to utilize their reserves over the next few decades. Fundamentally, Mozambique is confronted with several challenges to transform its abundant extractive resource wealth – residing primarily in the country's inland coal deposits and its deep-water natural gas basins – into sustained, long-term economic development. This is a task of significant but not insurmountable complexity, encompassing a range of political, economic, and social dimensions. It will require collaborative and coordinated efforts by a variety of different stakeholders, some with conflicting objectives and priorities. It is thus incumbent upon Mozambique's leadership to manage this transition with purpose and develop and implement an industrial strategy that mobilizes the country's extractive resource development in a manner that achieves a prosperous outcome for its people.

Expectations of stakeholders are high, and this will not be an easy undertaking for the Government and people of Mozambique. Over the last five decades, numerous countries across the developing world have failed to benefit from their natural resource wealth. In fact, pervasive evidence suggests that resource-rich developing states tend to have lower economic growth rates and poorer development outcomes compared to states lacking such resources. Due to these paradoxical trends, collectively referred to as the resource curse, there is a renewed international focus on resource-rich, low-income countries like Mozambique.

This report provides a comprehensive review of the critical economic, political, legal, social, and environmental variables that will affect and be affected by the rapid development of Mozambique's extractive resources. Each section proposes methodical and practical recommendations for the country's policymakers, which – if implemented – will enhance the current institutional framework governing the activities of the extractive sector. Ultimately, this report attempts to provide the Government of Mozambique with a policy framework that promotes the sustainable development of the country's economy, society, and environment, and aims to help the country avoid the perils of the resource curse. These issues are described in greater detail in the summaries of each section of the report that follow.

Economic and Commercial

Mozambique stands to gain significant revenue from exploiting the economic and commercial potential of its natural gas and coal reserves. The country's offshore natural gas discoveries are among the largest finds in the world in over a decade, while its coal reserves are beginning to be exported to international markets. If it is able to successfully commercialize its extractive resources, Mozambique will become a highly competitive player on the global energy scene.

In addition to promoting economic growth, the Government's overall economic objective is to reduce persistently high rates of poverty. Currently eight out of ten Mozambicans continue to live on less than \$2 per day. In the years ahead, natural resource revenues will comprise an increasing share of the country's GDP, a trend that exposes Mozambique to several challenges in maintaining financial and social stability. Despite ongoing reforms, the country's overall capacity to absorb windfall revenues from the development of extractive resources remains

limited. Yet, with sound fiscal management, these hurdles can be overcome. There are a number of measures the Government can take to better prepare itself for the windfall. Prior to exploring such measures, however, it is first important to understand key implications of the resource curse and how it threatens Mozambique.

Generally, there are two underlying features of the resource curse that afflict countries: “Dutch Disease” and revenue volatility. Dutch Disease refers to the destabilizing impact of increased foreign exchange that inevitably follows a sharp rise in natural resource exports. A huge increase in natural resource revenues typically causes the real exchange rate to appreciate. The change in real exchange rate results in economic destabilization by reducing the international competitiveness of a country’s non-extractive resource exports (e.g. agricultural and manufacturing) and may also reduce employment in these sectors. These economic outcomes tend to adversely affect the labor force of a developing country, where undereducated workers often struggle to transition from traditionally low-skilled sectors of the economy to more knowledge-based and service-oriented industries.

Revenue volatility is another important facet of the resource curse. The disruptive effects of revenue volatility in a resource-based economy predominantly arise from fluctuations in global commodity prices. This volatility can be detrimental to growing economies and frequently results in imprudent fiscal policies. Often, governments borrow against the value of their newfound resources and spend windfalls on immediate consumption, at the expense of long-term investments that can hinder future growth opportunities for the country.

The resource curse commonly takes hold in developing nations that lack the institutional capacity necessary to manage huge resource revenues. To minimize the impacts of Dutch Disease and revenue volatility, a state must have sound institutions in place. Institutions are also necessary to manage complex public-private revenue-sharing partnerships that are typical of extractive industries. A sovereign wealth fund is one option that states can utilize to manage large inflows of resource revenue, stabilize pressures on the exchange rate, and reduce the influences of price and revenue volatility. The implementation of this fund (explained further below) is one of the central recommendations of this report. Above all, a sovereign wealth fund allows Mozambique to invest in infrastructure and socioeconomic development over the long-term, thus ensuring that the country will still see benefits of its extractive resources long after the reserves have been depleted.

Linkages and Local Content

Mozambique’s national resource wealth is not limited to revenue generation for the state but can and must flow to benefit local Mozambicans. Conventional understanding about how the local population benefits from extractive resources is typically limited to the industry’s provision of employment and a few philanthropic projects. However, extractive industries tend to have a minimal impact on the labor market. The capital intense nature of extractive industries stems from industry demand for fewer, more highly skilled workers compared to the labor-intensive, low-skilled workforce sectors – such as agriculture or manufacturing. Low prevalence of human capital in Mozambique further limits employment opportunities for Mozambicans in the extractive sector – leading to unfulfilled expectations in communities and promotes social unrest. This section provides examples and recommendations of how the Government, extractive companies, and stakeholders can increase employment opportunities for Mozambicans in the extractives sector and economic linkages between the extractive industries and Mozambique’s local businesses, especially in regions of extractive operations.

Prosperity driven by the growing extractive industry can be translated to communities in Mozambique through cultivating local content – including local recruitment, training, and purchasing local goods and services. Though not a “silver bullet” to prosperity, local content can contribute to the fulfillment of expectations that mineral and hydrocarbon production will help improve the lives of Mozambicans. Local content is also critical to the extractive industry’s operational sustainability by generating a social license to operate within a given community. Smooth, sustainable operations also benefit the state by supporting steady revenue flows and general social stability.

Given local human capital and the capacity of Mozambique’s private sector are currently very limited, it is critical that both the government and extractive companies initiate early and consistent engagement with communities and the local private sector in regard to both the type of employment and business opportunities that will be available. Additional management of expectations through transparent communication of the expected timeline of these opportunities is also necessary. To achieve optimal local content goals, the government must also invest deliberately in the provision of poverty-reducing public goods, including quality education, literacy, and healthcare, which in turn serve to improve human capital in the long-run. These efforts require significant strategic social investment by stakeholders to build the capacity of local communities and enable individuals and businesses to compete and access income-generating opportunities in the newly established extractive industry value chain. Without investment in the development of Mozambique’s human capital and building capacity of the local business sector, Mozambique’s ability to fully access and realize the potential benefits of its vast natural resource wealth will remain retarded. Finally, this section also discusses the need to develop and implement a strategic plan that mitigates inward migration, local food price inflation, and constraints on community resources affecting areas impacted by extractive industry operations in Mozambique that could be source of social instability.

Infrastructure

Marked rates of underdevelopment in Mozambique are closely tied to the country’s shortage of infrastructure, which has largely failed to respond to social and economic development needs. Although recent public, private, and donor investment in developing Mozambique’s infrastructure has focused much more on facilitating the trade derived from megaprojects, it might also represent an unparalleled opportunity to build a system that fosters inclusive social development. The Government has the option to take advantage of the international community’s willingness to invest and orient economic resources to address infrastructure-related impediments of development.

Ensuring inclusiveness, through both connection and universal access to roads, railways, and electricity, must be at the heart of this endeavor. Railways, in particular, must guarantee access for general freight and passengers, as well as for mining companies. With respect to Mozambique’s roads, an upgrade and significant extension of the network would decrease transportation costs for all parties. This, in turn, would help mitigate the country’s high rates of poverty and inequality, permitting both the mining provinces and the rest of the country to benefit from extractive industry operations. Special attention must be paid to use of roads as connectors between impoverished yet potentially productive areas and the Beira, Nacala and future Macuse corridors. Finally, despite the current efforts of the Government to bring the grid to every district, only a small percentage of Mozambicans have reliable access to electricity. The potential for clean production must be developed to provide electricity access beyond district centers, and to help reduce Mozambique’s reliance on unsustainable energy sources.

Environment

Protecting the country's ecology is critical to Mozambique's vitality and will require investment and attention to environmental governance that keeps pace with resource extraction. First, to mitigate environmental risks inherent in resource development, research into fisheries and terrestrial ecosystems is necessary to create a baseline for conservation priorities, since much of Mozambique's ecology is not well researched. The existing Environmental Impact Assessment review period is also too short for the increasing volume of assessments and the current limited capacity of the Government and civil society. Such assessments for large extraction projects and their corresponding infrastructure development should be made available to the public with a longer, more adequate review period than the current 45 days. In line with the country's existing environmental law, specific requirements and guidance on biodiversity offsets must be drafted and enforced to ensure that all small and large-scale extractive resource projects account for environmental impacts from the beginning of the project.

Mozambique's current environmental legislation should be reinforced with more detailed guidance. Exemplary laws from other countries, such as Norway, can be utilized for legal reference until a robust new set of laws can be established. With ongoing active exploration of the natural gas, Mozambique should dictate when and where seismic surveys are conducted in order to protect the delicate biodiversity surrounding the nation's corals and fisheries. In addition, the government must create an environmental emergency plan so that, should accidents occur, the various government ministries have an aligned mitigation strategy that facilitates rapid response. Additional funding, training, and resources allocated to environmental ministries are also necessary to expand their capacity to study the nation's ecology, properly implement protective legislation, and adequately monitor mining and natural gas exploration and production. Additionally, the growing artisanal mining sector needs strategic Government support to organize associations, as well as train, guide, and monitor expansion to ensure the safety and prosperity of Mozambicans. In this way, small-scale mining could become a means to reduce poverty as opposed to creating conflict and environmental degradation. All of these governance strategies will need to be implemented quickly and should utilize revenues from the extractive industry to guarantee that Mozambique's dynamic ecology continues to be a source of pride and the pillar of a growing tourism industry.

Resettlement

Resource exploration, mineral concessions, and infrastructure development have all exponentially increased the resettlement of communities in Mozambique, especially in remote areas. Although the country has the extraordinary opportunity to strategically translate its mineral assets into long-term sustainable development, extractive operations can only be fully successful if the investments are embedded in stable and prosperous communities. One of the country's top objectives should be to leverage the recent boom in extracting natural resources to improve the living conditions of Mozambicans and to ensure a prosperous environment in which companies can diligently operate.

If Mozambique follows five basic resettlement principles, the rights of Mozambicans and compliance with the international conventions and agreements that the nation has pledged to support will be ensured. First, projects that require resettlement must conduct early, inclusive and transparent consultations to give communities the opportunity to make decisions on issues directly affecting their lives. Early consultation also helps build critical buy-in from impacted populations. Second, it is key to provide communities with the tools and information to diligently participate in negotiations that reach fair agreements. Third, compensation, that

includes improved livelihoods and standard of living is key to translating resource extraction into prosperity for individuals affected by resettlement. Fourth, resettlement processes entail negative environmental impacts that must be diligently addressed as they highly impact the health conditions and access to other resources (water, soil, etc.) of the surrounding communities. Lastly, an inclusive and legitimate post-resettlement committee must oversee agreement compliance, progress, and accountability. Such a committee also recognizes that communities are dynamic and future agreements will have an established channel for discussion. A well-structured and well-managed resettlement process, jointly agreed upon by communities and companies, can help to ensure that extractive operations and other projects that require resettlement enjoy greater community buy-in and promote sustainable development.

Mozambique must also ensure that women are not left out of opportunities to participate in and benefit from the country's development through the extractive industries. The Government bears a duty to ensure women's equal access to socio-economic opportunities, reduce disruptions to their standards of living and improve livelihoods. In the context of mining operations, Mozambique can meet these challenges by implementing its existing laws and Constitutional provisions which guarantee the equal rights of men and women, along with amending existing mining legislation to address issues on resettlement, consultation and compensation.

Such arrangements also stand to benefit from local resources (including human capital), thereby reducing the likelihood of conflict. The resettlement process in Mozambique is ongoing, and there are a number of ways that the Government can promote mutually beneficial resettlement agreements leaving all parties affected better off and fairly attended.

Legal Framework

From a legal perspective, Mozambique must aim to reform and update the legislative, institutional, and contractual frameworks associated with extractive industries in order to maximize the gains from and minimize the costs of extractive resource development. In this context, Mozambique is currently reviewing its legal and fiscal frameworks for oil and gas exploration and production, to take into account developments in the industry and new gas discoveries. Recent drafts of the petroleum legislation contain several important additions that address infrastructure, revenue sharing, oversight, and environmental protection. However, the law needs further strengthening to ensure that new and existing projects are carried out in a safe, fair, and efficient manner. Vague references to "good industry practice" should be replaced with clear and transparent obligations. Deals should be standardized and their key terms should be set in legislation to improve transparency and competitiveness. Companies must be assured fair and open access to facilities to promote competition and increase efficiency. Penalties must be clear and significant to deter bad behavior. Environmental protections should take into account that companies are often in the best position to monitor, prevent, and mitigate environmental and health risks. The Government must also preserve its ability to reform and improve its legislation over time - especially in relation to the environmental, social, and health impacts of extractives.

The fiscal regime should draw on a range of different tools to generate a fair share of revenue for Mozambique. While opinions may differ on what is "fair", Government revenue should amount to at least one third of the profits for mining and 65% of the profits for oil and gas over the lifetime of a project. As the industry becomes more established, and business conditions improve, this share should increase substantially for future projects. The regime needs to balance up-front income with long-term objectives - taking into account the legitimate interests

of investors, the capacity of public agencies to administer the regime, and the interests of future generations of Mozambicans.

There is also a critical need for existing mining legislation to be examined and amended, in order to better reflect the growth of the sector and to protect the interests of the Mozambican people, particularly with respect to environmental, health, social, fiscal and contract transparency considerations. Accordingly, provisions of the current Mining Law of 2002 should be amended in these distinct areas, giving mining activities a modern and adequate regulatory basis to ensure greater competitiveness, guaranteeing the protection of rights and defining the duties and obligations of holders of mining titles. While the Mining Law of 2002 is undergoing revisions and is expected to be passed by Parliament in the coming months, this section sets forth policy recommendations which illustrate some of the gaps and challenges present in Mozambique's mining legislation. Reforms in the mining laws offer an important opportunity for the country to further develop its economy, and importantly, to promote equity, reduce poverty, and meet its development goals through a forward-looking approach. The recommendations in this section are offered to strengthen, clarify and update existing mining legislation, and provide guidance on how mining activities can be conducted in a manner, which prioritizes and improves the social and economic well being of the Mozambican people.

Governance

The Government must adopt a transparent and uniform policy framework and fiscal regime to effectively administer the process of extractive industry development vis-à-vis government costs and revenues. To this end, Mozambique should create an accountable and transparent framework of governance to manage its extractive assets. There must be checks and balances built into the institutional structures of the Government. This will create accountability, separate responsibilities to minimize conflicts of interest, expand powers for specific agencies to fulfill their roles, and allow for agencies to manage extractive resource development accordingly. Mozambique must also focus on anti-corruption measures to improve its governance. Some useful tools include the anti-corruption law as well as other Information and Communication Technology platforms that can help bolster the country's systems of oversight. Above all, transparency must become a fundamental part of the extractive industry's contractual process, to ensure that all parties are getting their fair share of revenue.

Sovereign Wealth Fund

Sound revenue management is key to the sustainable development of Mozambique's economy. The financial impact of natural gas and coal exportation can have detrimental effects for the country. As mentioned above, problems arise from real exchange rate appreciation, which puts other export industries out of business, and from fluctuation in commodity prices, which is destabilizing for the domestic economy. Establishing a sovereign wealth trust fund in a traditional financial center will help Mozambique absorb the coming windfall and promote growth and development in the country in five key ways. First, it effectively shelters the domestic economy from the commodity sector, so that volatility in oil, gas or coal prices do not have such a disruptive effect on the country's budget planning from one year to the next. Second, by channeling revenues into specific development programs, the fund can help the government to focus and plan for expansion of infrastructure, education, healthcare and public services. Third, the fund can help to ensure that government revenue from extractive resources become an ongoing source of income for decades to come, and provide intergenerational equity. Fourth, and crucially, a sovereign wealth fund can insulate Mozambique's currency, helping to ensure that investment in the extractives industry does not have negative impacts on other

sectors of the economy. Finally, the trust will legally enshrine the purpose of the fund and thus insulate Mozambique's fund from sovereign debt and facilitate the country's access to international financial markets due to improved legal standards.

Mozambique Moving Forward

Mozambique is embarking on potentially one of the most defining opportunities of the nation's history. Despite the impoverished state of much of the country, Mozambique is endowed with significant hydrocarbon and mineral resource wealth in an era that is experiencing innovation, awareness, and collaboration at an unprecedented rate. The nascent development of Mozambique's large-scale hydrocarbon and mineral reserves is a point of strength and opportunity for structured and deliberate leadership to shape the future of Mozambique into a prosperous regional authority with the capacity to be a source of strength and guidance beyond its borders.

There is universal familiarity with the potential outcomes that lie ahead for Mozambique. The nation's limited human capital and restricted absorption capacity of the local public and private sectors to adapt and manage the rapid changes underway exemplifies the necessity for Mozambique to engage actively, early, and transparently to realize the opportunities at hand. However the continuum that flows between a resource blessing of prosperity and a resource curse is process of significant complexity. Multi-directional relationships between the economics, social, environmental, political and legal aspects of natural resource development requires clear frameworks and implementation of transparent objective that will benefit the nation now and for future generations. The areas this report examines identifies the current and potential weakness that could derail Mozambique's intention to pursue a path of sustainable development that is supported by revenues and income generating potential of the growing explorations and production of Mozambique's natural resources. Each section also includes recommendations that address the challenges and opportunities specific to the changing environment of Mozambique's natural resource extraction.



Photo: Gorongosa National Park
Mozambique
Piotr Nasrecki

Introduction

On the south-eastern coast of Africa, Mozambique is a country of extraordinary natural beauty and cultural diversity. While its natural riches have been known to the world for centuries, it is only recently that the discovery of extensive gas reserves and coal deposits have drawn the attention of foreign investors.

As one of the least developed countries in the world, Mozambique faces significant challenges to bring these resources safely and sustainably to market, and to manage the resulting funds. In the aftermath of independence and a devastating civil war, the country has made significant progress to build social stability and begin to lift its people out of poverty. However, much work remains – and while extractive resources offer opportunities for prosperity and growth, the influence of multinational corporations, donors and international organizations (each with different interests) has complicated an already complex environment.

This project has reviewed Mozambique's unique economic, legal, institutional, environmental, and social context to assess the potential impact of the extractive industry (both positive and negative). Through consultation, research and interviews, the team has drawn on the knowledge within Mozambique, as well as on the experiences of other countries, to formulate a number of specific and implementable recommendations that will help Mozambique to mitigate the risks and maximize the benefits of extractive industry development. Our team's particular focus has been to harness the existing strengths and potential within Mozambique civil society and government, and to prioritize key areas of reform.

The Capstone team began work in November 2012, and carried out desk research from Columbia University in New York for several months. In March 2013, eleven team members

traveled to Mozambique. While most of our time was spent in Maputo conducting interviews with stakeholders, companies, donors, NGOs and Government agencies, two team members traveled to Pemba to research the new natural gas developments in that region. We were privileged to have the assistance and insight of dozens of committed people during this period. Although our visit was brief, we were able to conduct over 40 meetings addressing the broad scope of issues covered in this report. On our return to New York, further research supplemented our interview material.

The resulting report is divided into nine sections, each with a particular focus. However, many of the issues overlap – and these themes are addressed from several angles. Key themes that emerge throughout the report are the importance of education, the need for engagement and consultation with local communities, and the opportunity for Mozambique to learn from and improve upon international experience.

Section 1 provides an overview of Mozambique’s Economic and Commercial context, and introduces some of the key considerations for the development of extractive industries. In addition to outlining the prospects for Mozambican gas on the world market, this section discusses the important issues of contracting and financing LNG production. The local and global commercial prospects of coal production are also discussed.

Next, we address the importance of creating linkages between foreign enterprises that invest in Mozambique’s extractive industry, and local companies. In particular, the section highlights that small and medium-sized enterprises need support, regulation, infrastructure, and training to improve their efficiency, and to engage in commercial relationships with international investors. By encouraging “linkages”, Mozambique can ensure that foreign companies are more integrated and more efficient, and that the benefits of extractive industry can flow directly to the communities where they operate.

Section 2 expands on this idea, exploring the benefits and practicalities of “local content” requirements. Employment of local residents, procurement from local suppliers, and other forms of local input can increase efficiency for companies and generate “social license to operate.” This section provides an overview of Mozambique’s socio-economic context and a close-up view of two regions that are greatly impacted by coal and natural gas development – Tete and Cabo Delgado, respectively. Finally, the section addresses areas of risk and strategies for mitigation, including inward migration and inflation.

Section 3 provides a snapshot of Mozambique’s infrastructure with a focus on roads, railways, and energy. It assesses the potential impact of expansion by extractives companies and presents an argument for inclusive infrastructure – infrastructure that is accessible and affordable for local people, and for other enterprises.

Section 4 highlights the multiple, complex environmental concerns that extractives development raises. Natural gas exploration and production and coal mining both present threats to the environment, to livelihoods, and to health, including marine life, water quality, air quality, land, and biodiversity. The section presents a number of recommendations for legal and institutional changes that will help to preserve Mozambique’s unique ecology and landscape, and to protect the health of its people.

Section 5 presents an analysis of the impacts of resettling communities to make way for

extractive resource projects. The section highlights the importance of an early, open, and inclusive consultation process, founded on free and informed consent. Recommendations focus on improving resettlement practices, including compensation and protecting livelihoods, and identify the particular safeguards that are needed uphold the rights of women.

Section 6 moves to the legal framework for mining in Mozambique. It outlines the current legislative provisions and licensing process, and provides detailed recommendations on how these laws can be strengthened and improved. Environment, resettlement, fiscal and transparency issues are all considered.

Section 7 assesses the existing gas and petroleum laws, and discusses options for reform in light of the most recent draft amendments. It presents an analysis of the “gaps” in the law and touches on the particular issue of foreign investment and arbitration.

Section 8 presents the case for strong and reliable institutions to govern extractives industry in Mozambique. It outlines the progress that Mozambique has already made towards transparency, and recommends general and entity-specific policy changes. Capacity building and e-governance are also discussed.

Section 9 proposes a sovereign wealth fund for Mozambique, with a structure that will help to ensure that extractive industry revenues are a blessing, and not a curse, for the country. The section outlines how a sovereign wealth fund can help to manage Dutch disease and inflation, presents options for managing and investing the resources, and identifies the various funds which could be created to direct revenues into the Government budget, stabilization, development and savings, development.

The report concludes with a summary of the Recommendations, and a Bibliography of sources.

The Appendices are intended to provide additional detail and context for interested readers. They include resources that have been collated by the authors from a range of different sources, for ease of reference. Appendix 1 sets out a number of tables with additional detail about the legal framework and contracts for mining, gas and petroleum, including some advantages and disadvantages of the different types of fiscal tools used by governments to collect revenue from extractive operations. Appendix 2 includes resources for Sovereign Wealth Fund governance, including international comparisons, details of the *Santiago Principles* and the Linaburg-Maduell Transparency Index. Finally, Appendix 3 includes relevant development indicators for Mozambique, along with comparison countries for reference. The tables incorporate economic, commercial, social and governance indicators, and serve as a “snapshot” of Mozambique’s current development.

A Note on Priorities

This report sets out 105 distinct recommendations for Mozambique, covering economic, infrastructure, social, legal, environmental, governance, and financial issues. The recommendations, which are summarized at the conclusion of the report, should provide guidance and provoke discussion among government, civil society, donors, and the business community. However, it is unrealistic to expect that Mozambique will be able to address all these issues immediately and simultaneously. The people of Mozambique must decide what issues are most pressing and most important for themselves.

This section is intended to give an outline of what the Capstone project team identified as the key priorities for change in the short and medium term.

Get the legal framework right to ensure a balance of rights and responsibilities

Mozambique's legal framework for oil, gas and mining needs drastic changes to address the challenges that lie ahead. It is essential that the new laws set out clear and detailed obligations for companies and for the government about responsible environmental and social practices. Where gaps remain, the laws should refer to the rules of jurisdictions with robust laws, such as Norway and Australia. The fiscal regime must also be clear, transparent, and standardized for all projects – not negotiated on a case-by-case basis. Closely related to the law is the importance of institution-building to enable implementation. Mozambique's ministries and government agencies must have the support, the training, the power, and the resources to effectively negotiate concession contracts, regulate, monitor, and enforce the legal framework.

See: Section 6: The Need for Upgraded Mining Laws, Section 7: Gas and Petroleum Laws, Section 8: The Case for Strong and Reliable Institutions, and Section 4: Protecting Mozambique's Environment.

Carefully manage the revenues from extractive industries for the benefit of all Mozambicans

Oil, gas and mining have immense economic potential – but that potential will only be realized if projects are taxed appropriately, and revenues are managed carefully. Once a fiscal regime is in place, the revenues from all projects should be paid into a resource fund that is designed to suit Mozambique's situation. A Sovereign Wealth Trust Fund would provide a structure that is clear and straightforward, with enough flexibility to allow for different stages of development. First, extractives revenues could contribute to initial budget funding (in lieu of donor funding), and could be used to help stabilize the economy. As the fund grows, investments in infrastructure and special development projects could follow. Ultimately, the fund could also incorporate a savings fund that generates wealth for decades to come.

See: Section 1: The Economic and Commercial Implications of Natural Gas and Coal, and Section 9: Managing Wealth: The Sovereign Wealth Fund.

Provide economic opportunities by making infrastructure inclusive and accessible

Infrastructure development will be an essential component for Mozambique to turn its resources into commodities. However, infrastructure that serves only large commercial enterprises can exacerbate inequality. The government must plan carefully to ensure that the money invested in infrastructure has as many flow-on benefits as possible – this means

engaging with small enterprises and with the public to ensure access to reliable transport and electricity networks.

See: *Section 3: The Need for Inclusive Infrastructure.*

Protect and empower local populations to preserve stability

Mozambique must immediately address the disruptive impact of current and future resettlement projects to ensure that local populations do not lose out when extractive projects take place in their region. Over time, these disruptions can violate fundamental human rights, entrench poverty, cause social unrest, and make it impossible for businesses to operate efficiently and safely. By encouraging local content and local linkages, Mozambique can help to ensure that foreign investment is more efficient and contributes to real, sustainable benefits to the community.

See: *Section 2: Translating Extractive Industry Prosperity to Mozambique’s Communities and Section 5: Ensuring Social Equity in Extractive Industries-Based Development.*

Education is critical to sustainable growth and a better quality of life

Although it is not a dedicated topic in this report, education and capacity-building is a common theme in our analysis. Training and education will help Mozambique’s lawmakers, officials, civil society, business people, and all citizens to make good decisions about managing extractive resources. The revenues from those resources, in turn, should be invested in improving the quality and accessibility all levels of education – from primary through to specialist tertiary education.

See: *Section 2: Translating Extractive Industry Prosperity to Mozambique’s Communities, Section 4: Protecting Mozambique’s Environment, and Section 8: The Case for Strong and Reliable Institutions.*

Foster and protect Mozambique’s other “comparative advantages”

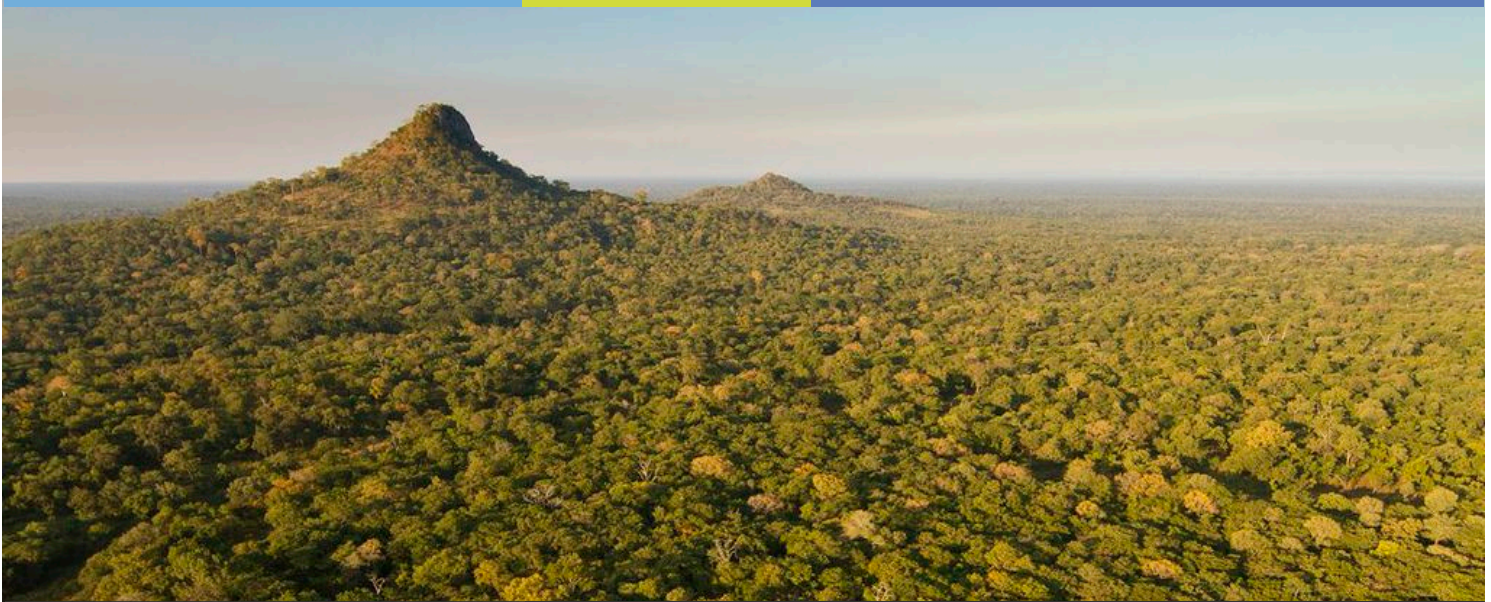
Once the coal has been mined, and the gas extracted, Mozambique will need to depend on its people, its land, and its waters for continued economic growth. Among others, Mozambique has the potential to develop a vibrant agricultural sector, and a world-class tourism industry. But both of these sectors could be seriously threatened if extractive developments are not well planned or well regulated. Loss of arable land to mining, pollution or contamination of water, disruption of habitats, and the physical scars of extractive industries will directly impact this economic potential. It is possible for these industries to coexist – but only if strong and enforced laws protect the environment and the people of Mozambique.

See: *Section 4: Protecting Mozambique’s Environment, and Section 5: Ensuring Social Equity in Extractive Industries-Based Development.*



Mozambique

mobilizing extractive
resources for development



Section 3

The Need for Inclusive Infrastructure

Photo: Gorongosa National Park
Mozambique
Piotr Nasrecki

3 The Need for Inclusive Infrastructure

Striking rates of underdevelopment in Mozambique are necessarily correlated to infrastructure. Indeed, Mozambique's 185th position in the HDI ranking might reveal neglect in implementing infrastructure that is responsive to the social and development needs of the country.¹⁶¹ Certainly, despite the improvement of development indicators in recent years, 54% of Mozambicans still live under the income poverty threshold¹⁶². Yet many individuals living even *above* the income poverty line also lack basic infrastructure services. This is illustrated by the UNDP's multidimensional poverty index, at the 75% rate.¹⁶³

UN-HABITAT has conducted extensive research on the impact that infrastructure has on poverty, and social and economic development.

INFRASTRUCTURE FOR ECONOMIC DEVELOPMENT AND POVERTY REDUCTION IN AFRICA
UN-HABITAT The Global Urban Economic Dialogue, 2011

Infrastructure matters for social and economic development:

At the Macro Level

There is extensive research showing that the quantity and quality of infrastructure positively affects national income growth. The same shows that if all African countries upgraded their stocks at the levels of the continent's best performer – Mauritius – national GDPs would increase by 2.2% annually, on average.

At the Micro Level

Road implementation leads to decreases in poverty because it generates income by reducing access times. Indeed, rural roads connect otherwise isolated communities with schools, health facilities and economic clusters, while they link consumers, suppliers and markets, boosting the potential for agriculture production beyond subsistence. The provision of water and sanitation infrastructure is correlated with higher levels of health, which in turn reduce schooling and job absenteeism, contributing to improve the education and production levels, respectively. Likewise, having access to grid or renewable-source electricity reduces the need for burning charcoal and wood and therefore, the likelihood of contracting respiratory diseases. Besides, the availability of reliable electricity permits health centers to deliver a higher-quality healthcare, while it provides an opportunity for the local private sector to emerge and develop, and to produce efficiently¹⁶⁴.

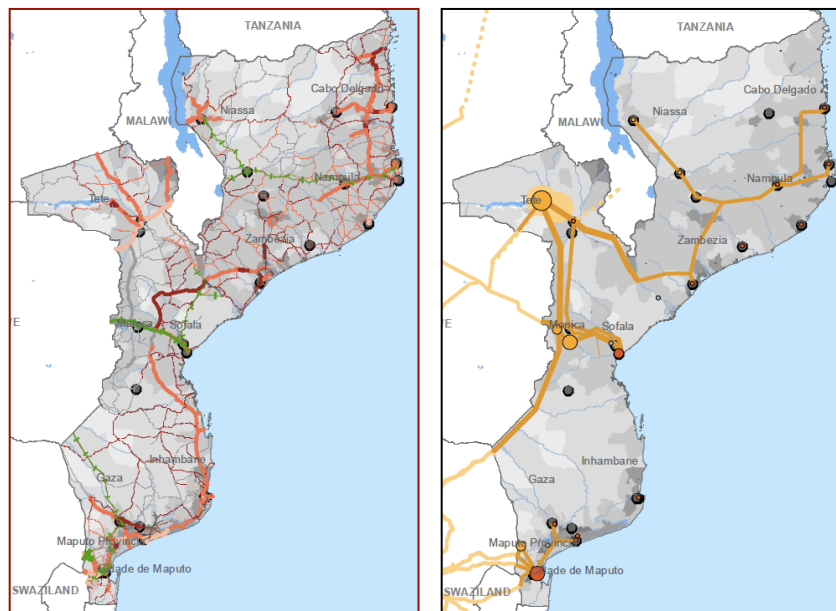
In Mozambique, recent public, private and donor investment in infrastructure has been intended to facilitate the trade derived from mega projects. These investments may represent either an extension of the status quo or an unparalleled opportunity to build an infrastructure system that fosters inclusive social development. The following discussion presents that the Government can take advantage of the international willingness to invest and orient economic resources to address infrastructure-related impeders of development. Ensuring inclusiveness, through both connection and universal access to infrastructure, must be at the heart of this endeavor.

As it aims to explore the challenges, impacts and opportunities of the extractive industries in Mozambique, this report does not directly address the lack of *social infrastructure*;¹⁶⁵ rather, it argues that the implementation of a more socially oriented *civil infrastructure* can significantly contribute to improving the current indicators of underdevelopment.

3.1 Infrastructure Endowment

Honored with an advantaged geographic location, Mozambique represents a natural pathway to the ocean for its six neighbors. Traversing its territory is practically the only way through for the imports and exports of the four landlocked countries bordering Mozambique – Malawi, Zimbabwe, Zambia and Swaziland. Consequently, infrastructure has been traditionally developed by linking the Indian Ocean with these nations through multimodal clusters, as illustrated in Figure 22 below. The central transport corridor connects the Port of Beira with Zimbabwe, Malawi and Zambia, whereas the Port of Maputo is linked with South Africa, Swaziland and Zimbabwe through the southern transport network.¹⁶⁶ Likewise, power infrastructure development has either concentrated in the biggest cities, followed the alignment of the transport corridors, or has been developed to serve other countries.

Figure 22 Transport (left) and Power (right) Infrastructure in Mozambique¹⁶⁷



Source: AICD, Interactive Infrastructure Atlas for Mozambique (2011)

Roads

Mozambique has only 32,500 km of roads.¹⁶⁸ Compared with countries of similar shapes and land surfaces, Namibia has double this amount, and Chile has more than double. South Africa, a country one and a half times larger than Mozambique, has a road network more than 11 times greater. Yet, at only around 20%, both countries have a very low rate of paved roads in comparison to middle and higher income countries with similar geographic features. For example, Turkey, a country having the same size of Mozambique, has almost 90% of its network

paved.¹⁶⁹

As per ownership, the entire network used to be managed by Administração Nacional de Estradas (“ANE”). It is only in recent years that the national entity has begun to award concession contracts with the objective to improve road management. The case of Tete province deserves special mention: in addition to the 700 km conceded to a private operator in 2010, ANE has recently launched the tender for another 2,000 km, also under a Public Private Partnership (“PPP”) framework. Both investments are expected to support the development around the mining industries in the northwest region.¹⁷⁰

Railways

Mozambique’s railway network of 4,787 km¹⁷¹ is comprised of several lines structured around three disconnected corridors, linking Indian Ocean ports with bordering countries. The Nacala Corridor in the North comprises the port in Nacala and the railroad that connects with Malawi’s railway. In the central region, the Beira Corridor includes Beira Port, the Machipanda line to Harare, Zimbabwe, and the Sena Line to the coalfields of Moatize. In the South, Maputo’s Corridor comprises the port and four lines, Ressano Garcia to South Africa, Limpopo to Zimbabwe, and Goba to Swaziland, and Salamanga branch.¹⁷²

A political bulletin released in February 2013 summarized the current and future projects to extend Mozambique’s railway network, and the international extractive companies linked to those projects.

MOZAMBIQUE POLITICAL PROCESS BULLETIN
Joseph Hanlon, Thomas Selemane, February 15th 2013

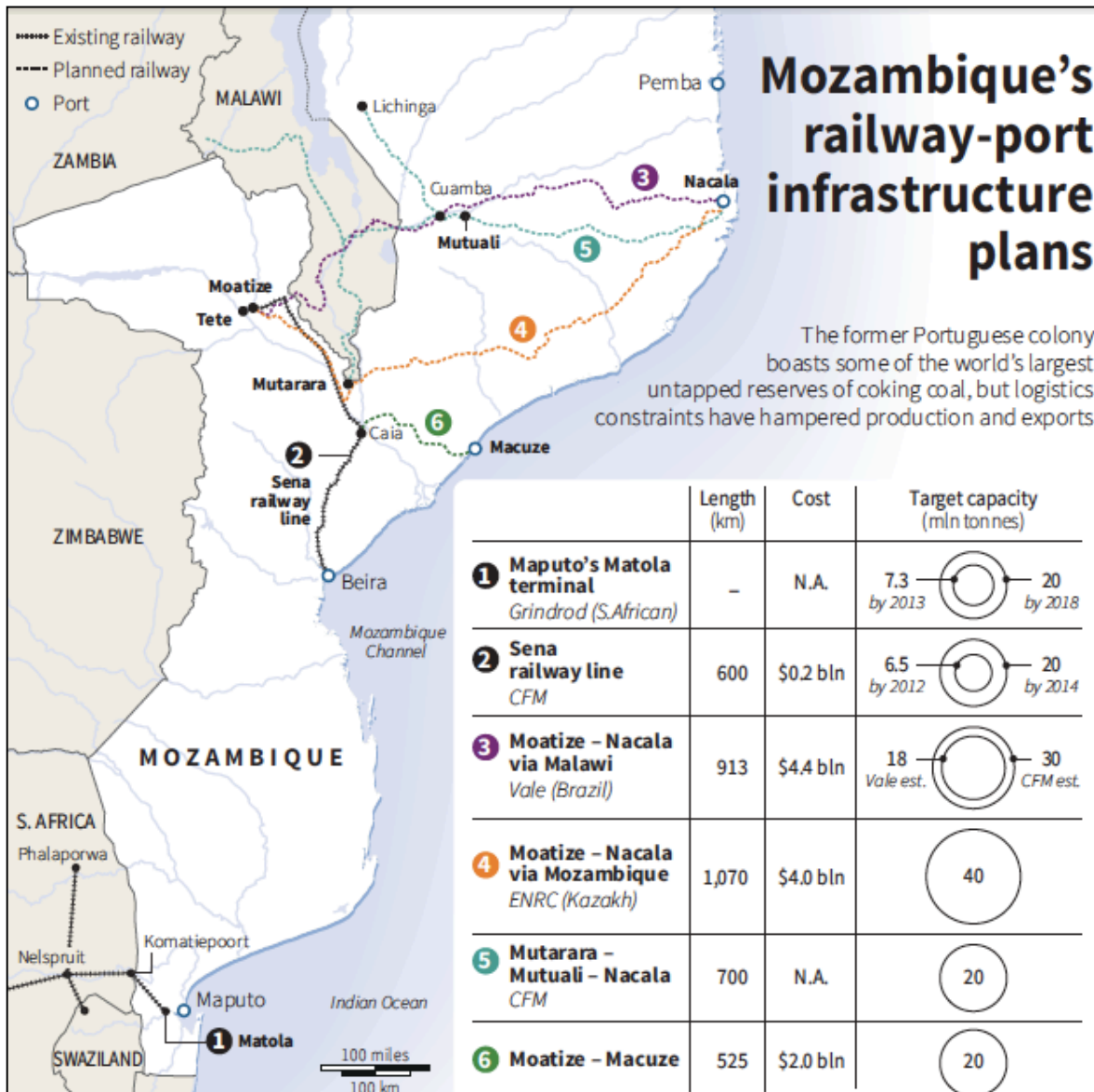
In order to respond to their export needs, major coal miners are interested in extending the rail systems in Mozambique under PPP models. See **Figure 23** below:

VALE: the Brazilian company is already building the Malawian branch of the rehabilitated line that will connect Tete and Nacala.

ENRC: the Kazakh firm proposed an analogous line, yet entirely in Mozambican territory.

RIO TINTO: the Anglo-Australian firm has recently qualified as preferred bidder to build a new rail line from Tete to Macuse, where a new port will also be constructed.¹⁷³

Figure 23: Mozambique’s Railway-Port Infrastructure Plans¹⁷⁴



Source: Reuters, (2013).

CFM is the publicly owned enterprise responsible for the ports and railways in Mozambique. After a recent restructuring, the company owns 100% of the Maputo railway system, the cereal and aluminum terminals in Maputo port and the fuel terminals in all ports. The remaining port operations and the North and Central railway corridors are in theory managed along with private partners under concession contracts granted by CFM.¹⁷⁵ However, CFM has also operated the Sena line on its own since 2010, after the contract with the Indian company RICON

was terminated due to delays in the reconstruction works.¹⁷⁶ Additionally, CFM recently announced its intention to hire an independent railway operator in 2013 to manage railway lines in Mozambique, whereas the pricing and access policies will remain the responsibility of a national regulating enterprise.¹⁷⁷

Energy and Electricity

Mozambique's energy supply is mainly composed of biomass at 78%, followed by hydropower at 14%,¹⁷⁸ while natural gas, petroleum and coal make up the remaining 8%.¹⁷⁹ This energy supply is derived from both domestic and international sources. However, a significant amount of the energy that is produced in Mozambique is actually exported.

With abundant renewable resources, all the energy that is produced in Mozambique is clean, with 88% hydropower and 12% solar energy.¹⁸⁰ Hydropower is generated in six dams¹⁸¹ that, together, amount to an installed capacity of 2,184 MW.¹⁸² Cahora Bassa is the biggest in the country and the largest regional generator, producing more than 16,000 GWh annually, out of which more than 90% is exported to South Africa, and to a lesser extent to Zimbabwe. Interestingly, 30% of that amount is re-imported to Mozambique through South African transmission lines and entirely consumed by the Mozal aluminum smelter.¹⁸³ Mphanda Nkuwa, a dam being built downstream Cahora Bassa, is expected to add 8,600 GWh every year, on average.¹⁸⁴

Electricidade de Moçambique ("EDM") is the national entity responsible for the generation, transmission and sale of the electricity produced in all hydro plants but Cahora Bassa, which is owned by another public company – Hidroeletrica de Cahora Bassa ("HCB"). Yet, as the Mphanda Nkuwa ownership structure shows,¹⁸⁵ the sector permits private engagement through governmental concessions.¹⁸⁶

3.2 Foreign Investment to Develop Railways for All

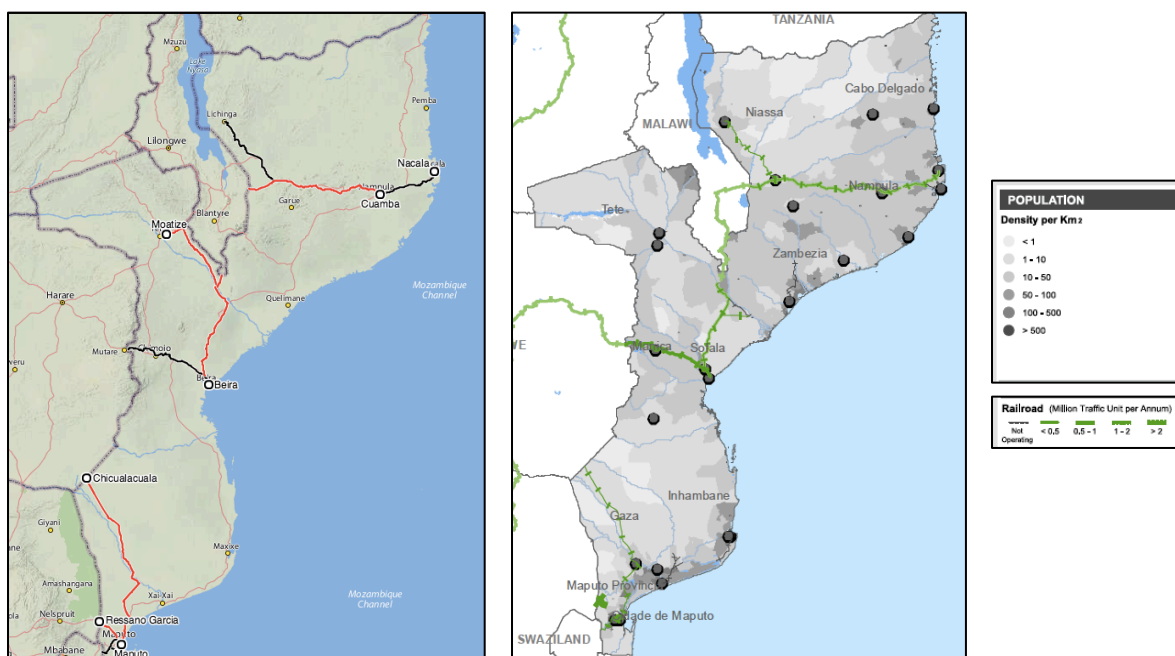
Despite the efforts of the government to improve railway services in Mozambique by opening the system to private participation, the capacity and the quality of both infrastructure and rolling stock remain very low. This has translated into unreliable operations that hamper the strategic potential of Mozambican railways. In fact, the World Bank has reported that decreases in passengers and cargo in 2008 reached 60% and 10%, respectively, relative to figures from 2005.¹⁸⁷

As in other Sub Saharan countries, the low level of income of Mozambicans lead many to think that passenger services are *highly unprofitable*, and indeed, its user fees are subsidized at an 85% level.¹⁸⁸ This may help explain why, as shown in Figure 2 below, only five railway services carry passengers – as indicated by the red lines of the map on the left. However, unprofitability could be due to many other factors, including the poor condition of the facilities, low accessibility to the system, and an insufficient number of stations. Indeed, the fact that trains are overloaded where passenger services are offered seems to suggest that more users would pay a train fee if they were given the possibility. Moreover, railways are so far the preferred means of transport by Mozambicans, as alternatives such as public buses are rare and expensive.

On the other hand, not only would demand increase by facilitating the access to regular

passengers, but greater accessibility to the system would also likely boost small and medium scale production of goods, which in turn would increase the profitability of the railways. As mentioned in the linkages part of this report (see *Section 1.4: Creating Economic Linkages*), there are many regions in Mozambique with great potential for production where farmers currently produce at subsistence levels because they lack the infrastructure to market their products. Interestingly, many of these areas are relatively close to an existing rail corridor. Examples can be found in Niassa, Nampula, and Beira, among others.

Figure 24: Railways in Mozambique, Passenger and Cargo Services



Sources: Sharemap (2012) and AICD's Interactive Infrastructure Atlas for Mozambique (2011)

Unfortunately, this uncertainty over latent demand¹⁸⁹ for railways – from the perspective of both regular users and SMEs – means it would be difficult to justify public investment in new railway infrastructure to serve such a potential market. Yet, ensuring greater accessibility to existing services and to new projects would not significantly increase the investment cost of the railways, and it would provide Mozambicans with an opportunity to develop businesses and improve livelihoods.

Recommendation 13: The Government of Mozambique must ensure that, wherever possible, services in the existing and projected railways are accessible for passengers and for enterprises other than mining companies. The Government should also undertake studies to determine the most convenient location of train stops, taking into account the potential for local trade and connection with roads that link hinterland with the railways.

Vale's New Nacala Corridor

In July 2012 the CLIN, a consortium formed by the Brazilian company Vale (80%) and CFM (20%), was awarded the contract to upgrade 682 km of the old corridor and build 230 km in new

branches from Cuamba to Malawi's southeastern border and from Moatize to Malawi's southwestern border. Additionally, Vale had already been granted a contract with the Malawian Government to build 136 km of new railway infrastructure and rehabilitate an existing 99 km branch within that country. The concession by the Mozambican Government grants Vale the construction and operation of the entire infrastructure, including the new port in Nacala, while it compels the company to cede a 5% of its share to Mozambican citizens and enterprises, once the construction is completed.¹⁹⁰ Furthermore, the contract foresees that in the future CFM will gradually increase its participation up to 50%.¹⁹¹ While little information has been disclosed on the economic details of the contract, the terms with the Mozambican Government could be similar to those signed in Malawi, where the government is expected to receive US\$ 8 billion in concession fees annually.¹⁹²

Once the new system starts operations, it is expected to transport coal, general freight and passengers. In fact, although Vale will increase its mining capacity up to 22 million tons per year in the next decade, the railway project will be designed to move around 30 million tons annually.¹⁹³ By comparison, the current system from Cuamba to Nacala¹⁹⁴ transports 200,000 tons of general freight and some 700,000 passengers every year. Thus, there is a large margin to increase both passenger and cargo other than coal in the rehabilitated system. The locations of stations and crossings with rural roads and the main road network have to be carefully taken into account so as to maximize the benefit of the railway at the local level.¹⁹⁵

Recommendation 14: The Government must ensure that the alignment of the new Nacala railway supports the current commercial dynamics around the corridor, by linking with the rural and general road network to productive areas in Nampula and neighboring Niassa and Cabo Delgado.

Recommendation 15: The Government must ensure that at least general freight transport is granted to and from Nacala port, in order to extend the market for local businesses, and decrease their total transport costs.

Recommendation 16: Once connection is granted, access must also be ensured. The Government must negotiate payment mechanisms with the concessionaire to make sure that the user fees charged to passengers and local traders willing to use the train are affordable for the income levels of the area. These mechanisms must be set out and guaranteed in the operations contract. As part of the consortium, CFM is expected to earn profits from operations. This flow of revenue could serve to partially subsidize the fees for passengers and low-income level farmers in the first years of operations.

A New Railway to Macuse

In late 2012 CFM launched a tender for the project involving the construction and operations of a new port in Macuse – located in northern Quelimane in Zambezia province – and a new 525-km railway from Tete to Macuse. This project, estimated at US\$ 3 billion, is intended to increase

the coal export capacity of Mozambican railways by 20 million tons annually, while it will likely provide Rio Tinto's operations in Tete with a transport route for its product that is much more reliable than the current one through the Sena line.¹⁹⁶

Although at the date of this report, details regarding the design, construction and operations of the railway are unknown, a contractual structure similar to Nacala's upgrade project is expected. If so, a consortium will be formed to design, finance and build the infrastructure, partnering with CFM, in exchange for obtaining the profits during the operations period, extended over several decades.

It is very common that when talking about infrastructure needs in Africa the focus is set on the need to *maintain* what is already in place or the need to implement *basic* civil infrastructure.¹⁹⁷ Yet, the companies willing to engage in concession partnerships in Mozambique have both sufficient financial backing and broad knowledge as to implement modern durable systems. The Government must demand the highest standards of efficient, current infrastructure. Anything less will amount to condemning the national railways to permanent obsolescence.

Recommendation 17: Given that infrastructure concessions usually have a term of several decades, the Government of Mozambique must compel the concessionaire to implement a modern system at the levels of the best European or Asian railways. This means constructing a state-of-the-art infrastructure and purchasing the latest rolling stock technology.

A new port certainly has the potential to boost the local economy as well as to increase its population, as the need for labor force in port operations and other related activities in Macuse grows. More importantly, the new railway has the potential to increase the economy at the provincial level as it traverses Zambezia, the most populated province of Mozambique. Indeed, providing a broader population with a wider range of opportunities would have significant microeconomic and social development outcomes. The new railway to Macuse could even signify a means of daily transport for workers to new growth poles, which is already occurring with the train services arriving at full capacity to Maputo every day. However, mining companies usually prefer *dedicated* systems to move their coal, as these operations are simpler, do not require intermediate stops, and a fixed amount of profits is guaranteed.

Recommendation 18: Demand-side studies should be conducted, including hypotheses for the development of the new corridor and neighboring lands over the next decades. These studies may be used as a basis for the Government to negotiate with the concessionaire on different operational models that ensure access to the system for passengers and SMEs, at user fees affordable for the income levels of the area. The studies may also be crucial in deciding the most economically and socially convenient location for train stops, as well as the number of stations.

A handful of projects around the world show different options to operate railway systems that transport not only extracted natural resources but also general freight and passengers.

Examples of Mixed Railway Operations From Brazil and Australia

In **Brazil**, Vale is the only operator of both freight and passenger services in its 2 railway lines. The 905-km EFVM connects the mines in the state of Minas Gerais with the state of Espírito Santo, in the Atlantic coast. It carries people and cargo – Vale’s iron extractions, and general freight and agricultural products for others. The passenger service, used by some 1 million Brazilians annually, is the only one offered in Brazil daily, and runs on 664 km between the capital cities of both states during a 13-hour trip. The 892-km EFC connects the mines in Pará with Ponta Madeira, in the coast of Maranhão, hauling manganese, iron, coal, copper and fuels. The train, which passes through 25 municipalities, also moves 350 thousand people annually, offering six services per week. Aside from being significantly cheaper than the public buses, the railway represents the only means of transport during the rainy season, when the road traffic is cut off.¹⁹⁸

In **Australia’s** Hunter Valley, HVCC – the world’s largest coal operation scheme – uses a rail infrastructure managed by the state-owned ARTC. However, the access to the track is open to any rail operator willing to use it for cargo or passenger transport. Today, the private Pacific National, and the public QRNational operate independently hauling agricultural and industrial products as well as coal and other freight, while the public CityRail offers passenger services in some parts of the track. The trains in the main corridor or the system are constrained to move along *train paths* within a track section and a timeframe pre-agreed by the operators.¹⁹⁹

Sena Line

To date, all the mining companies in Tete haul their coal through the Sena line, the 600-km railroad that runs to the port in Beira. This line had been awarded under a concessional model, but the government terminated the contract in 2011 after a series of delays with the much-needed rehabilitation of the infrastructure. CFM then took responsibility for the line, but operations have often been unreliable. In early 2013, for example, a derailment caused the suspension of the service for two weeks. Vale failed to export some 250,000 tons of coal alleging force majeure while Rio Tinto had to stop producing. Contractors are now undertaking rehabilitation of the line, after which the transport capacity is expected to rise from 3 to 20 million tons annually.²⁰⁰

The mining company Beacon Hill – owner of Minas Moatize Limitada (“MML”) – announced in February 2013 that they had recently appointed a railway operator to transport their coal. The appointment represented a crucial step toward obtaining permission to operate Beacon Hill’s own railways in the Sena line, which they expect to begin by the third quarter of 2013.²⁰¹ This illustrates that CFM may be willing to have a track open to different rolling stock operators.

As highlighted in *Section 1.4: Creating Economic Linkages*, the lands surrounding the Sena line constitute one of the most productive agricultural areas of Mozambique. Efforts are already being undertaken between the Government, non-profits and private partners to boost agricultural potential in the region. In 2010, the Beira Agricultural Growth Corridor (“BAGC”) initiative was launched *to stimulate and significantly increase production and farmers’ income through sustainable private investment*.²⁰² Under this scheme, Rio Tinto signed an agreement with the agricultural non-profit AgDevCo to research the possibility of producing food goods along the Beira corridor and supplying them to local communities and mining businesses in Tete.

Such a scheme would be a significant improvement over the current model where foreign companies are compelled to import food, as local suppliers are not capable of supplying the qualities and quantities needed *at a competitive price*.²⁰³

Recommendation 19: While a number of private operators are transporting their coal from Tete to Beira, an additional operator such as CFM needs to continue offering services for passengers and other freight. The Government should ensure that the rail line constitutes a reliable connection between the potential agricultural production areas along the Beira corridor, and the industries in Tete, thus providing the means for its “*growth poles*” strategy (discussed further below) to function.

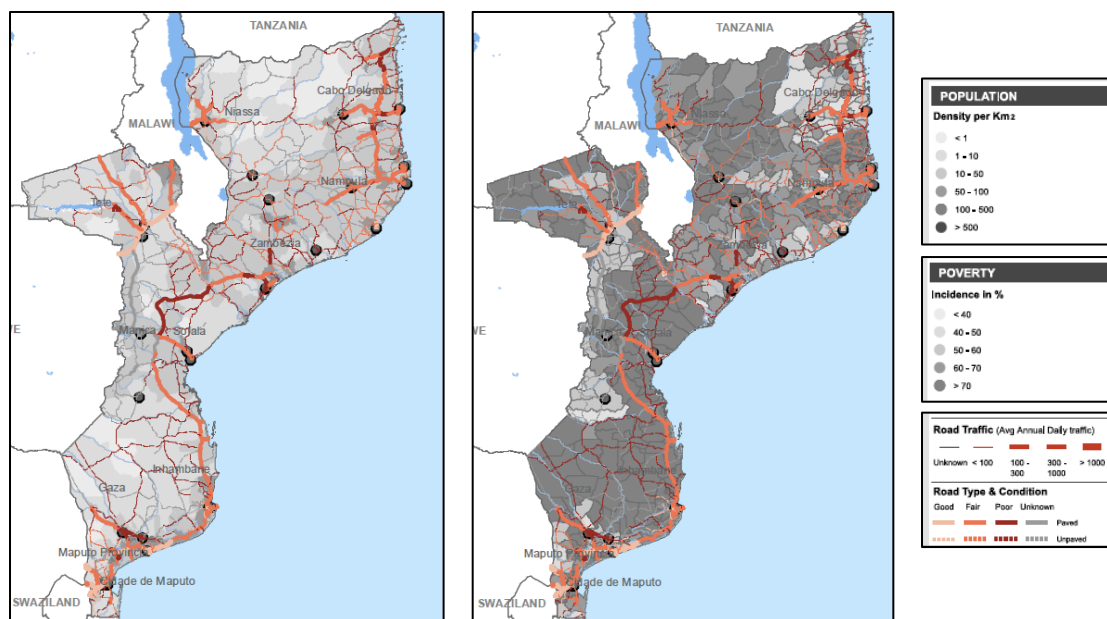
3.3 Roads that Fight Inequality

More roads are needed everywhere...

With only 37 km of roads for every 1,000 km² of land, Mozambique has one of the lowest road density rates in the world. By contrast, the average road density for middle-income and low-income countries is 132 and 318 km, respectively. Consequently, urban-economic hubs and rural areas alike are quite disconnected, which results in isolation and inefficiency. Indeed, only 25% of Mozambican peasants can access a road within 2 km.²⁰⁴ As most of Mozambique’s population – 62% – live in rural areas, such isolation which is a key factor to take into account when considering inclusive development. Agriculture’s contribution to GDP amounts to 32%. While this is significant, it is important to note that agriculture also employs 81% of the national labor force.²⁰⁵ This means that an extension and rehabilitation of the transport network, with a focus on rural areas, would undoubtedly result in GDP growth and potentially benefit the whole country.

...Yet, Some Provinces are Worse than Others

At the provincial level, infrastructure endowment is also rather unequal. Predominantly rural provinces like Niassa, Sofala, Inhambane, or Gaza, have some of the greatest incidences of poverty and the worst levels of road infrastructure endowment, measured by quantity and quality, see **Figure 25**.

Figure 25: Road Network Over Population (left) and Poverty (right)²⁰⁶

Source: AICD, Interactive Infrastructure Atlas for Mozambique (2011)

Differences can also be found *within* provinces. For example, new state-of-the-art highways are being planned or built in Tete linking the mining area with Zimbabwe, Zambia and Malawi, while the western-most part of the province, where the incidence of poverty is largest, remains disconnected. Both Cabo Delgado and Tete – the provinces where the majority of exploration and extraction is taking place – present some of the most alarming levels malnutrition.²⁰⁷ The worst-affected groups are probably concentrated in areas where roads remain inaccessible, either because of their quantity or quality. Indeed, the condition of rolling stock for railways – a crucial factor affecting access times – might be especially important in Cabo Delgado and Zambezia. In these areas, despite having a reasonable number of roads relative to other Mozambican regions, we see the worst levels of GDP per capita in the country,²⁰⁸ showing that where roads are theoretically available they may not actually provide users with the levels of connection and accessibility needed, probably due to the insufficient number and poor condition of roads. The eastern part of Inhambane has a major road axis in fair condition that links with Sofala, in the North, and Gaza, in the South, but the minor roads connecting this axis with the interior of the province are in very poor condition, meaning that the interior of the province lacks access and/or connection with the main corridor of the province, in the coast.

Unfortunately, the international community's economic support for transport infrastructure is focused on enabling private foreign investment around extractive areas. On the whole, financiers do not consider or address the potential risks of increasing inequality among districts and provinces.

Recommendation 20: In order to ensure greater participation by Mozambique's provinces in economic activity, and distribution of the profits from extractive operations, the Government and donors should focus on constructing paved rural roads to connect the extremely isolated rural areas with railway corridors and highways. Initial efforts could concentrate in the western region of Tete, Niassa, Cabo Delgado, Nampula, Sofala and Zambezia.

Addressing the Problem of Disperse Population

An additional constraint the Government faces to supply infrastructure in the poorest regions of the country is the dispersion of Mozambicans. Interviews in the field reported that, in some regions, population hubs of about 25 families live as far as 50 kilometers away from the closest village, while two neighboring dwellings may be at a 1-kilometer distance. This issue poses a great financial challenge for the Government, since delivering infrastructure to every dwelling would require significant investment. In addition, the Government would probably need to implement subsidy programs to facilitate payment for infrastructure-related services – such as electricity – by the poorest peasants. In fact, this dilemma is at the heart of the strategy called *polos de crescimento* – growth poles – developed by the Government and supported by aid agencies. The Growth Pole strategy aims to group populations around certain economic clusters endowed with a decent infrastructure stock. However, in most cases the studies for this strategy emphasize the supply side of agricultural economies – what could be produced and where – as opposed to taking into account the existing skills and preferences of Mozambican peasants, that is, what activity they would like to be engaged with, or where they would be willing to move to. For example, it has been reported that some traditional rural populations reject the idea of moving, as they are very attached to the land where their ancestors rest. Furthermore, the strategy does not itself solve the problem of extremely low incomes in numerous rural communities, as it focuses exclusively on the lands surrounding the railway corridors,²⁰⁹ leaving a large surface of the country unattended.

Recommendation 21: In order to ensure the success of strategies such as the growth poles, public consultation must take place in rural areas before the Government undertakes any action. Given the unwillingness of some Mozambicans to leave their customary towns, the relevant Ministries must engage with local communities about planning and decision-making to identify the natural growth possibilities in each region. The community's preferences must be taken into account to ensure that infrastructure implementation is attractive and effective. Without such consultation, there is a risk that new or upgraded infrastructure will not, in fact, attract the people.

Handling the Risks of Crowding and Slumming

The rapidly growing cities of Tete, Pemba, Palma, Macuse, and potentially others, are transforming from rural subsistence economies to industrial urban clusters.²¹⁰ There is an enormous risk that this change will *increase* poverty rather than improve development, as slums and new pockets of poverty can easily emerge if the infrastructure and services needed to host rising populations are not available.

The potential risks of crowding and slumming have two perspectives in the new Mozambican economy. On the one hand, given that Mozambique's unemployment – at 17%²¹¹ – and underemployment rates are high, those cities are expected to attract large numbers of workers in the near future. If regional infrastructure is in poor condition, this translates to slow commute times. In turn, and combined with a scarce and unreliable public transport system, workers have no option but to settle where their job is, overwhelming the few existing urban services.²¹² Therefore, the provision of paved roads from neighboring towns and villages to the new urban-industrial clusters will play a key role in orderly development, as they allow workers to settle uniformly in several towns instead of crowding in the slums of the *new cities*.

Even with upgraded infrastructure, the low income levels of local populations make it likely that Mozambicans will still prefer to settle around their work place, given the lack of economic resources to purchase vehicles, fuel or even tickets for public transportation means – where it exists.

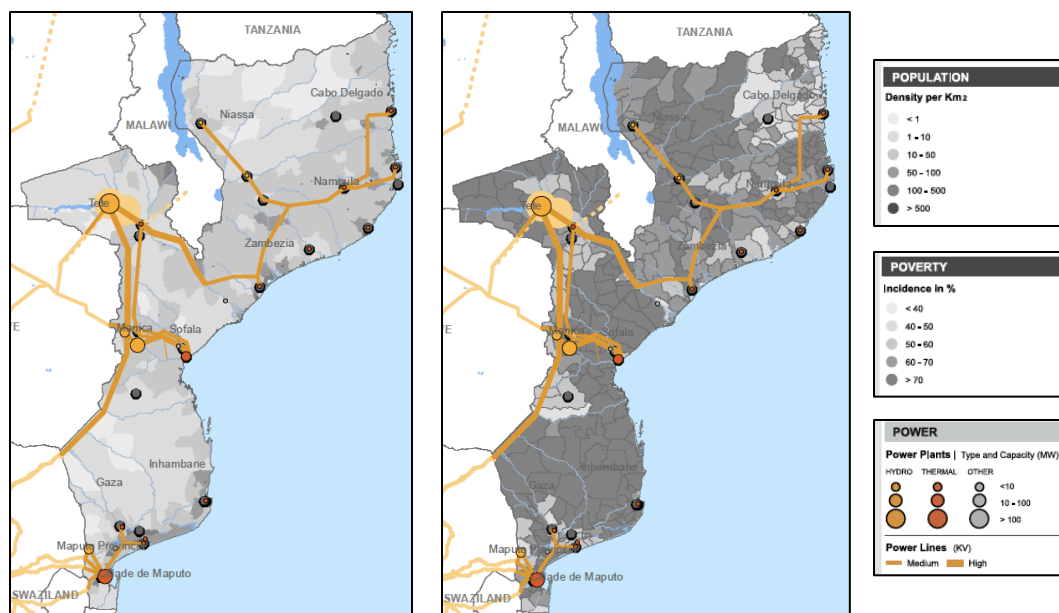
Recommendation 22: When roads are available between the industrial hubs and the neighboring villages, the extractive companies could partially finance the provision of shuttle services from those villages to the economic clusters where the mega projects and the businesses *servicing* them take place.

On the other hand, as mentioned in other parts of this report, mining activities often require the resettlement of communities surrounding extractive areas. The new locations need not only to provide the communities with basic social infrastructure, but they also need to be endowed with roads that connect them with main corridors and economic clusters. As highlighted in *Section 5.2: Gender considerations in extractive industry operations*, improved roads and footpaths would help to mitigate the greater effects of resettlement on women, as they would facilitate some of the tasks usually undertaken by them – collecting water, transporting children and elderly to schools or health facilities or delivering goods to markets.

3.4 Addressing the Paradox of Electricity

Mozambique has strikingly low rates of electrification, given the great potential for electricity production in the country. The World Bank estimates that in 2007 only 9.4% of the population had access to electricity, a figure much smaller than the averages of low and middle-income countries at 32.8 and 49.5%, respectively.²¹³ In particular, the access rate for Mozambique's large rural population is one of the lowest in the world, at 1.7%. By contrast, 26% of the urban population has electricity. Moreover, dwellings that do have electricity consume only 26kWh per capita annually, also much lower than the averages in low and middle-income countries.²¹⁴

Electricity inaccessibility is undoubtedly hampering development. **Figure 26** below shows that, as of 2011, power infrastructure reached less than half of the country's populated districts, and did not extend to the poorest regions. Niassa and Cabo Delgado, for example, are greatly neglected in terms of power infrastructure, and also presented the worst per capita GDP.²¹⁵ Even around the corridors – along with the extractive zones, the supposed “drivers of growth” – electricity is available to less than 10% of households.²¹⁶ This represents a tremendous challenge for the future, as the World Bank has reported that it expects Mozambique's electricity demand to grow by 7%.²¹⁷

Figure 26: Electricity Over Population (left) and Poverty (rate)²¹⁸

Source: AICD, *Interactive Infrastructure Atlas for Mozambique (2011)*

At the firm level, electricity provision and unreliability also represent a challenge. While more than one tenth of Mozambique's companies have to generate their own electricity, those relying on the national grid report that they may be losing almost 3% of their sales because of outages. These outages occur some 40 days per year, lasting half of the workday, on average.²¹⁹

The Government is undertaking several initiatives in an attempt to respond to the increasing needs of the population and firms willing to settle in Mozambique. The so-called "backbone project", Projeto Regional de Transporte de Energia Centro-Sul ("CESUL"), is a double line that will transport electricity generated in Cahora Bassa and Mphanda Nkuwa to Maputo and South Africa.²²⁰ If distribution systems are also built, CESUL has the potential to improve access in *power-neglected* Inhambane and Gaza. However, this mega-project does not address the immense electricity needs in the northern regions of the country. To this end, the publicly-owned Fundo de Energia ("FUNAE") *funds and provides guarantees to develop projects enabling the expansion of low-cost energy services.*²²¹ In practice, its purpose is to supply energy where the national electricity grid is unavailable. Estimates gathered from several ministerial officials show that only 12% of Mozambicans today are connected to off-grid solar electricity systems. Additionally, EDM has been able to extend the national grid to 109 districts, while it expects to reach all 128 districts by 2014. Research in the field, however, showed that power infrastructure usually reaches the center of the districts, providing electricity to official buildings and neighboring businesses, while most of the inhabitants remain disconnected to the grid. This means that EDM's investment in the grid extension fails to benefit most of the people in those districts, who then lack incentives to secure and maintain the infrastructure. In some places like Palma, for example, EDM invested in extending the grid, only to experience significant losses after due to the theft of substantial amounts of wire. The wire is then bought by small-scale Mozambican and South African businessmen in the informal market, who transform them into easily sellable items such as pans or pots.²²²

As highlighted before, several of the poorest regions have also the biggest potential for economic growth and household income increases. Electricity availability will be crucial in this process.

Recommendation 23: The Government must ensure that the grid not only reaches the districts but that it actually reaches the people. A combination of public, FUNAE, donor and private funds could finance these investments, following consultation with the target communities. Access to electricity must be granted to the people at affordable prices, and subsidized if necessary.

Mozambique needs to take advantage of its great potential to produce more energy, especially from clean renewable sources. Specifically, hydropower production potential is estimated at 65,000 GWh per year – four times greater than current production – out of which as much as 70% is located in the Zambezi basin in the north of the country.²²³

The Government should not neglect its hydropower potential in favor of current natural gas extraction. Energy policy in Mozambique can be much more focused on this renewable source, especially given the fact that fossil fuels are likely to become much more scarce, and expensive, in the coming decades. With an energy model based on renewables, the Government could even pursue options such as electric public transport.

Recommendation 24: The Government should conduct analysis of potential hydropower developments, alongside its gas strategy. In particular, options to generate and use renewable energy sources domestically could help to drastically reduce Mozambique's energy costs (and environmental impacts) in future generations.

Notes to Section 3

¹⁶¹ Human Development Index 2012 considers 187 countries. United Nations Development Program. *Human Development Index (HDI) - 2012 Rankings*. 2012. <http://hdr.undp.org/en/statistics/>.

¹⁶² Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*. Africa Infrastructure Country Diagnosis, Washington, DC: The International Bank for Reconstruction and Development, The World Bank, 2011, 3.

¹⁶³ United Nations Development Programme. Human Development Report 2013. The Rise of the South: Human Progress in a Diverse World – Mozambique Explanatory note on 2013 HDR composite indices. United Nations Development Programme, 2013.

¹⁶⁴ Adapted from UN-HABITAT The Global Urban Economic Dialogue 2011.

¹⁶⁵ Social Infrastructure understood as housing, education infrastructure (schools and their amenities), health infrastructure – hospitals, nurseries, community clinics, and their amenities –, water and sanitation facilities at the community level and in schools and health centers, and climate change resilience –to combat, for example, the high risk of flooding in a number of Mozambican provinces.

¹⁶⁶ Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 8.

¹⁶⁷ Maps adapted from the WB's AICD Interactive Infrastructure Atlas for Mozambique (2011).

¹⁶⁸ Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 10.

¹⁶⁹ Central Intelligence Agency. Publications The World Factbook, several countries. 2013. <https://www.cia.gov/library/publications/the-world-factbook/>.

¹⁷⁰ MacaHub. "2 mil quilómetros de estradas vão ser entregues em regime de concessão em Moçambique." *MacaHub*. Macau, December 18, 2012.

¹⁷¹ Central Intelligence Agency. Publications The World Factbook - Mozambique. 2008. <https://www.cia.gov/library/publications/the-world-factbook/geos/mz.html>.

¹⁷² Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 13-15; Caminhos de Ferro de Moçambique. Linhas Ferroviárias. 2013. <http://www.cfm.co.mz/infraestrutura/linhas-ferroviarias/>. Caminhos de Ferro de Moçambique. Linhas Ferroviárias. 2013. <http://www.cfm.co.mz/infraestrutura/linhas-ferroviarias/>

¹⁷³ Reuters. *Rio Tinto among main bidders for Mozambique railway project*. April 10, 2013. <http://www.reuters.com/article/2013/04/10/mozambique-rail-riotinto-idUSL5NOCX4BB20130410>.

¹⁷⁴ Reuters. *Rio Tinto among main bidders for Mozambique railway project*. April 10, 2013. <http://www.reuters.com/article/2013/04/10/mozambique-rail-riotinto-idUSL5NOCX4BB20130410>.

¹⁷⁵ Caminhos de Ferro de Moçambique. Linhas Ferroviárias. 2013. Sobre o CFM - Restruturacao. 2013. <http://www.cfm.co.mz/sobre-o-cfm/a-empresa/restruturacao/>.

¹⁷⁶ All Africa. *Mozambique: Sena Line Closure Costing CFM Millions of Dollars*. February 25, 2013. <http://allafrica.com/stories/201302260223.html?page=2>.

¹⁷⁷ Cargo Edições. *Moçambique: Lançado concurso público de 2 mil milhões de dólares para projeto ferro-portuário*. November 22, 2012. <http://www.cargoedicoes.pt/site/Default.aspx?tabid=380&id=8435&area=Cargo>.

¹⁷⁸ Does not include electricity trade

¹⁷⁹ International Renewable Energy Agency. *Renewable Energy Country Profile Mozambique*. Country Profile, IRENA, IRENA, 2012.

¹⁸⁰ Ministry of Energy

¹⁸¹ Cahora Bassa, Chicamba Real, Mavuzi, Corumana, Cuamba, and Lichinga.

¹⁸² Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 33.

- ¹⁸³ Ministry of Energy.
- ¹⁸⁴ Hidroelectrica Mphanda Nkuwa. *Main Technical Features*. 2011. <http://www.hmnk.co.mz/en/go/o-projecto-main-technical-features> (accessed April 17, 2013).
- ¹⁸⁵ Partnership of Camargo Corrêa, Insitec and EDM.
- ¹⁸⁶ Foreign Policy Magazine. *Mozambique Private Sector Poised for Progress*. Special Advertising Supplement, Foreign Policy, 2011.
- ¹⁸⁷ Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 15.
- ¹⁸⁸ *Ibid.*, 16.
- ¹⁸⁹ Refers to the transport demand that is not satisfied because the service is unavailable or inexistent.
- ¹⁹⁰ Vale. *Controlada da Vale e governo moçambicano assinam contratos de concessão*. July 13, 2012. <http://saladeimprensa.vale.com/pt/releases/interna.asp?id=21755>.
- ¹⁹¹ Macahub. *Linha de caminho-de-ferro entre Moatize e Nacala, em Moçambique, entregue em concessão a parceria com a brasileira Vale*. July 4, 2012. <http://www.macahub.com.mo/pt/2012/07/04/linha-de-caminho-de-ferro-entre-moatize-e-nacala-em-mocambique-entregue-em-concessao-a-parceria-com-a-brasileira-vale/>.
- ¹⁹² Chiyembekeza, Chikondi. *Vale to prioritise Malawi rail project*. 2012. <http://mwnation.com/business-news-the-nation/16423-vale-to-prioritise-malawi-rail-project>.
- ¹⁹³ Macahub, July 4, 2012.
- ¹⁹⁴ Passenger service covers from Cuamba to Nampula but not from Nampula to Nacala.
- ¹⁹⁵ Vale Columbia Center on Sustainable Investment's research on the Nacala corridor, summer of 2012.
- ¹⁹⁶ Voices Of Mozambique. *Coal miner Rio Tinto named by Mozambique as a preferred backer for new US\$3bn rail and port*. April 11, 2013. <http://voicesofmozambique.com/news-articles/coal-miner-rio-tinto-named-mozambique-preferred-backer-new-us3bn-rail-and-port>.
- ¹⁹⁷ Basic railroads with limited speed and transport capacity, as opposed to state-of-the-art systems.
- ¹⁹⁸ Vale. *Ferrovias*. 2013. <http://www.vale.com/brasil/PT/business/logistics/railways/Paginas/default.aspx>.
- ¹⁹⁹ Guarnani, Hareesh, Anuj Mehrotra, and Saibal Ray. *Supply Chain Disruptions: Theory and Practice of Managing Risks*. London: Springer-Verlag, 2012, 282.
- ²⁰⁰ Mocaweb. *Ferrovia de Sena reabre ao tráfego após paralisação de duas semanas*. March 6, 2013. <http://mocaweb.com/section-table/46-sociedade-mocambicana/2204-ferrovia-de-sena-reabre-ao-trafego-apos-paralisacao-de-duas-semanas.html>.
- ²⁰¹ Beacon Hill Resources PLC. *Rolling Stock Operating Lease Signed, Sena Line*. February 1, 2013. <http://www.bhrplc.com/News.aspx?ArticleId=20662138>.
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- ²⁰³ Rio Tinto. *Growing Opportunity for Mozambique's Farmers*. February 2013. <http://m2m.riotinto.com/article/growing-opportunity-mozambiques-farmers>.
- ²⁰⁴ Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 12.
- ²⁰⁵ Central Intelligence Agency. *The World Factbook Mozambique*. 2012. <https://www.cia.gov/library/publications/the-world-factbook/geos/mz.html>.
- ²⁰⁶ Maps adapted from the WB's AICD Interactive Infrastructure Atlas for Mozambique (2011).
- ²⁰⁷ The World Bank. *Mapping for Results - Mozambique, Africa*. 2012. <http://maps.worldbank.org/afr/mozambique>.
- ²⁰⁸ Knoema. *Regional Statistics of Mozambique, upto 2012*. 2012. <http://knoema.com/MNSORS2012Nov>.
- ²⁰⁹ The World Bank. *Perspectivas para os Pólos de Crescimento em Moçambique: Sumário do Relatório*. Summary, The World Bank, The World Bank, 2010.
- ²¹⁰ Transformation is already undergoing in Tete and Pemba and is expected to happen soon in Palma and Macuse, among others.
- ²¹¹ Central Intelligence Agency. *Publications The World Factbook - Mozambique*. 2008. <https://www.cia.gov/library/publications/the-world-factbook/geos/mz.html>.

²¹² Such as water systems, electricity grid, schools, or health facilities.

²¹³ As of 2013 the Ministry of Energy reports a 36% rate of electrification including grid and off-grid connections.

²¹⁴ Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 31.

²¹⁵ Knoema. Regional Statistics of Mozambique, up to 2012. 2012.

²¹⁶ Vale Columbia Center on Sustainable Investment's research

²¹⁷ This figure might be larger, given the increasing interest of foreign companies in Mozambique. In fact, ministerial sources in Maputo estimated annual consumption growth at a 16% rate. Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 33.

²¹⁸ Maps adapted from the WB's AICD Interactive Infrastructure Atlas for Mozambique (2011).

²¹⁹ Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 33.

²²⁰ Infrastructure Trust Fund - European Union Africa. *Mozambique Backbone (CESUL) Project*. 2013. <http://www.eu-africa-infrastructure-tf.net/activities/grants/mozambique-backbone-cesul-project.htm>.

²²¹ FUNAE. *Strategy Plan 2008 - 2010*. Summary, Maputo: FUNAE, 2007, 4.

²²² Local testimonies gathered in the research done to inform this report.

²²³ Dominguez-Torres, Carolina, and Cecilia Briceño-Garmendia. *Mozambique's Infrastructure: A Continental Perspective*, 33.



Mozambique Capstone Project

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Cover: Gorongosa National Park, Mozambique
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Back Cover: Gorongosa National Park, Mozambique
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