



# Mozambique

mobilizing extractive  
resources for development



## Mozambique: Extractives for Prosperity, Volume II

Capstone Report:

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# Abbreviations

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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

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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

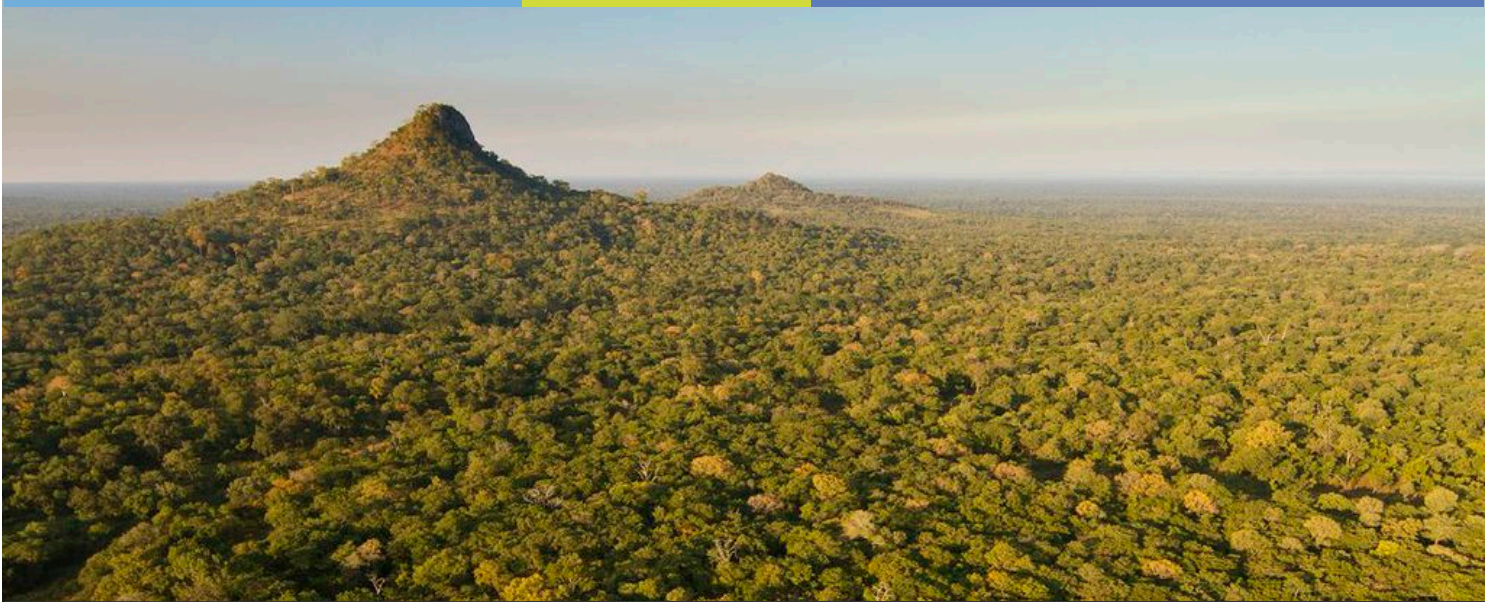


Photo: Gorongosa National Park  
Mozambique  
Piotr Nasrecki

## Section 1

### The Economic and Commercial Implications of Natural Gas and Coal

# 1 The Economic and Commercial Implications of Natural Gas and Coal

## 1.1 The Mozambican Economy

This section is an overview of several key features of Mozambique's economy. It provides a better overall understanding of the context in which extractive resource development is occurring and the potential impact it can have on the country.

Mozambique's newfound endowment of natural gas, coal, and mineral resources will undoubtedly play a dominant role in the country's economy as a source of export earnings and, to a lesser extent, infrastructure development. With significant resource-related revenues on the horizon, Mozambique must adopt a comprehensive, uniform fiscal regime, as well as a transparent policy framework, in order to effectively manage its extractive industry and reap the benefits of its resource wealth.<sup>1</sup>

Mozambique only recently discovered its abundance of natural gas and coal reserves. The country's first overseas export of coal came in 2011 from Tete Province. In 2012, four of the world's five largest natural gas discoveries that year were made in Mozambique's offshore Rovuma Basin.<sup>2</sup> Early estimates of the sheer volume of untapped natural gas reserves have since attracted a massive inflow of foreign investment. Furthermore, Mozambique's geographic location leaves it strategically positioned to serve expanding markets in Asia with exports of these resources.

### Macroeconomy

Mozambique's GDP real growth rate increased to 7.5% in 2012 due to an increase in mining production, as well as a strong performance in the financial, communication, transport, and construction sectors. A number of forecasts suggest this figure will increase to between 7.5% and 7.9% in 2013. Impressively, the country has achieved an average of 7.2% growth over the course of the last decade (**Figure 1**).<sup>3</sup>

In recent years, Mozambique's services sector has driven the country's macroeconomic growth, replacing agriculture as the largest contributor to GDP. In 2012, services accounted for 43.6% of GDP, with agriculture at 31.8% and industry at 24.6%.<sup>4</sup> However, this change is not reflected in the country's employment structure, as the overwhelming majority of the labor force (~80%) remains in agriculture.

	2010	2011	2012	2013
<b>Real GDP growth</b>	6.8	7.2	7.5	7.9
<b>Real GDP per capita growth</b>	4.5	5	5.2	5.6
<b>CPI inflation</b>	12.7	10.8	7.2	5.6
<b>Budget balance %</b>	-4	-3.3	-6.8	-7.4
<b>Current account % GDP</b>	-12.1	-25.6	-25.5	-20

Figures for 2010 are estimates; for 2011 and later are projections.

**Source:** African Economic Outlook, 2012

This trend poses a challenge for Mozambique, with significant implications for the country's poor, who are overly dependent on the slow-growing agricultural sector and simultaneously lack the education and skills necessary to join the fast-growing services sector.

Mozambique's macroeconomic achievements appear to be disconnected from the population, as impressive growth has not translated into job creation or reduced income inequality.<sup>5</sup> The country's depressed socioeconomic status is largely attributable to poor education levels and inadequate healthcare. With an overall poverty rate of 54.7%, Mozambique's life expectancy of 48 years is below the sub-Saharan average of 52 years, and literacy runs at 44% compared to the sub-Saharan rate of 62%.<sup>6</sup> The Republic of Mozambique Poverty Reduction Action Plan 2011-2014 ("PARP") aimed to cushion soaring unemployment by increasing agricultural production and rolling out social safety nets. Unfortunately, PARP has struggled to accomplish its goals. Eight out of ten Mozambicans still live on less than \$2 per day, and Mozambique was ranked the world's third least-developed country in 2012.<sup>7</sup> Its young and rapidly growing population (two-thirds of Mozambique's 23.5 million people are currently under the age of 25) is expected to double in size by 2050 – a trajectory that will only exacerbate the country's high rate of poverty.<sup>8</sup>

In an effort to attract foreign investment and increase access to global markets, Mozambique has taken measures to transition from a socialist to a free market economy. Despite the Government's efforts to liberalize, the formal economy in Mozambique remains small. With a labor force approaching 10 million, only 500,000 persons work in the formal sector.<sup>9</sup> As a result, a large informal labor market has developed – a common feature of nascent, low-skilled, and fast-growing economies. In recent years, a rapid influx of low-skilled labor, resulting from increased rural-to-urban migration, has further intensified this segmentation of Mozambique's labor market.

Inflation has decreased from 10.8% in 2011 to 7.2% in 2012 due to the Central Bank's prudent fiscal policies; additionally, inflation is expected to stabilize at 5.6% in 2013.<sup>10</sup> An ostensibly greater degree of control over inflationary pressures allows the Government to pursue monetary easing, targeting credit expansion and private sector growth. Despite these initiatives, many rural areas of Mozambique continue to have insufficient access to credit.<sup>11</sup> Furthermore, the country's private sector operates in a business environment that is not immune to political influence, with state-controlled pricing, problems with land-use rights, and an overall shortage of the financial agencies and institutions necessary to encourage competition (see *Section 1.4.1: Creating an Enabling Environment for SMEs*).

Mozambique's dependency on international aid remains high. In 2011 alone, a combination of foreign aid and grants accounted for nearly one-quarter of gross national income and directly funded the Government's national budget, accounting for close to half of all revenues.<sup>12</sup> The Government's main short-term challenge is the enlargement of its fiscal space while keeping its debt levels under control. These measures are necessary to accommodate the diverse needs of a booming extractive industry, an ambitious infrastructure investment plan, and the PARP's pro-poor measures. Accordingly, the overall fiscal deficit widened from 3.3% of GDP in 2011 to 6.8% in 2012, with expectations of 7.4% in 2013 (**Figure 1**).

The rapid growth of Mozambique's extractive sector, driven by coal exports and natural gas discoveries, has led to an influx of capital to support the development of megaprojects. According to the Central Bank of Mozambique, foreign direct investment ("FDI") increased 91% between 2011 and 2012, with megaprojects accounting for over 80% of this growth.<sup>13</sup> Over the same period, megaprojects also caused a 17% rise in imports, with predictable impacts on the country's current account balance.<sup>14</sup> Massive FDI

inflows to build up the extractive sector, together with the windfall revenues projected from the export of natural gas and coal, have crucial implications for Mozambique's economy. To put this into perspective, depending on how they are valued, recent offshore natural gas discoveries could potentially increase the overall share of megaprojects in GDP to around 40-50% in the coming decades – representing a fivefold increase from current levels.<sup>15</sup> This enormous influx of revenue poses staggering economic challenges. The Government's ability to manage the extractive industry's growth will determine whether or not Mozambique avoids the perils of the resource curse.

### Economics of the Resource Curse

The last quarter of the twentieth century is replete with examples of how the **resource curse**, broadly understood as the failure of resource-rich countries to benefit from their natural wealth, has had a detrimental effect on low-income countries. The underlying economics of this trend can be better understood by examining two key macroeconomic dynamics:

**(1) "Dutch Disease":** Large inflows of foreign exchange resulting from a sharp rise in natural resource exports will typically cause an appreciation in the real exchange rate, which will subsequently reduce the international competitiveness of the country's non-resource (agricultural and manufacturing) exports and may also reduce employment in these other sectors. This will in turn have a detrimental impact on labor, because low-skilled workers have difficulty moving from one sector to another. A lack of inter-sectoral labor mobility is largely due to limited educational opportunities, leaving workers without the skills they need to transition from agricultural/manufacturing sectors into more knowledge-based/services-oriented sectors of the economy. As a result of Dutch Disease, there tends to be an adverse welfare effect on income distribution.<sup>16</sup> Mozambique should be wary of this reality, as its agriculturally intensive economy is already heavily predisposed to the conditions of Dutch Disease.

**(2) Revenue volatility:** Earnings from the extractive sector are more subject to the disruptive economic effects of world commodity price fluctuations. Volatility is transmitted to resource-based economies, where the largest share of government revenues is derived from natural resources. This volatility, which can also stem from variation over time in rates of extraction or variability in the timing of payments by corporations to states, makes it difficult for governments to pursue a prudent fiscal policy. Too often, windfalls are consumed rather than invested during export booms; indeed, overconsumption tends to go hand-in-hand with underinvestment. Governments tend to borrow against the value of an abundant resource and maintain expenditures at the same level during downturns, resulting in deficit spending and increased indebtedness.<sup>17</sup> In these so-called "boom-bust cycles," the benefits in the good years are transitory, whereas the problems generated during the bad years endure.<sup>18</sup> A country's optimal expenditure path depends on how well it can balance the adverse macroeconomic consequences of large inflows of foreign exchange earnings with the need to invest in other sectors in order to achieve high growth rates in the long run.<sup>19</sup>

**Recommendation 1:** The Government of Mozambique must adopt a sovereign wealth/natural resource fund in order to effectively manage abundant natural resource revenues from its extractive industries and counter the ill effects of Dutch Disease and revenue volatility that are associated with the resource curse. This mechanism is discussed in greater detail in *Section 9: Managing Wealth: The Sovereign Wealth Fund*.



## 1.2 Natural Gas Exploration and Development

This section provides details regarding Mozambique's natural gas reserves, including its recent prolific offshore finds. As of the date of this report, offshore natural gas development is still in the early stages of exploration and appraisal drilling.

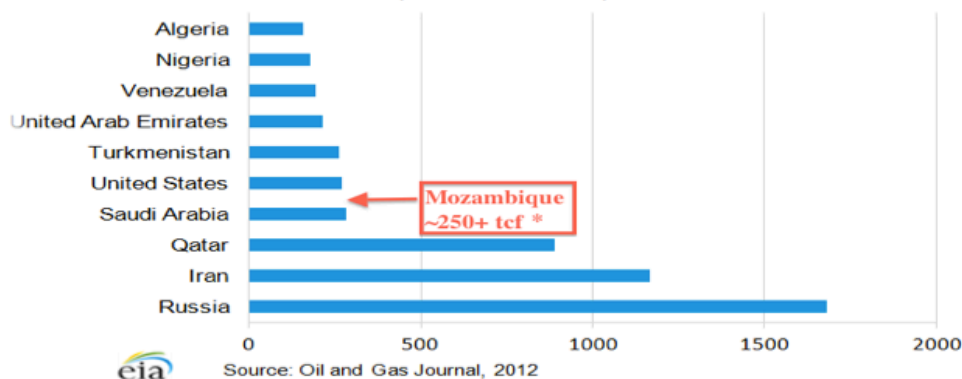
### *Onshore Reserves: Partnering with South Africa*

Mozambique initially discovered natural gas in the 1960s, but these reserves were not commercially developed until 2004. Mozambique's Empresa Nacional de Hidrocarbonetos ("ENH"), along with a consortium of other companies headed by South Africa's SASOL, facilitated the development of onshore reserves located in Inhambane province. These gas fields, Pande and Temane, have proven reserves of approximately 3.5 trillion cubic feet (Tcf).<sup>20</sup> In addition to meeting Mozambique's limited domestic needs, this gas is also currently being exported via pipeline to South Africa, where supplies are allocated under long-term contracts to buyers in the country's petrochemical industry. SASOL's role in Mozambique's energy sector is set to expand, as it also owns a number of gas exploration licenses to look for gas in the Mozambique Basin, in the offshore region of the port city of Beira. The real 'game-changing' volumes of natural gas, however, were only recently discovered in the deep waters of the Rovuma Basin, some 30-40 miles (50-65km) off the coast of Mozambique's northeastern Cabo Delgado province.

### *Offshore Reserves: Huge Discoveries in the Rovuma Basin*

In 2011-2012, exploratory drilling in Mozambique's offshore Rovuma Basin by Anadarko (a U.S. upstream oil and gas company) and ENI (Italy's energy conglomerate) uncovered the world's most significant discoveries of natural gas in over a decade. When the operators' high estimates are combined, gross volumes exceed 100 Tcf in recoverable reserves.<sup>21</sup> Geologic data indicates that there is in fact much more gas in the region. Based on industry estimating practices that infer statistics from what has already been discovered, Mozambique has close to an additional 150 Tcf of undiscovered resources, putting the total resource base of both discovered and undiscovered gas at over 250 Tcf.<sup>22</sup> To put this

**Figure 2: World's Largest Proven Natural Gas Reserves, 2012**  
(Trillion cubic feet)



Source: EIA, Oil & Gas Journal, 2012

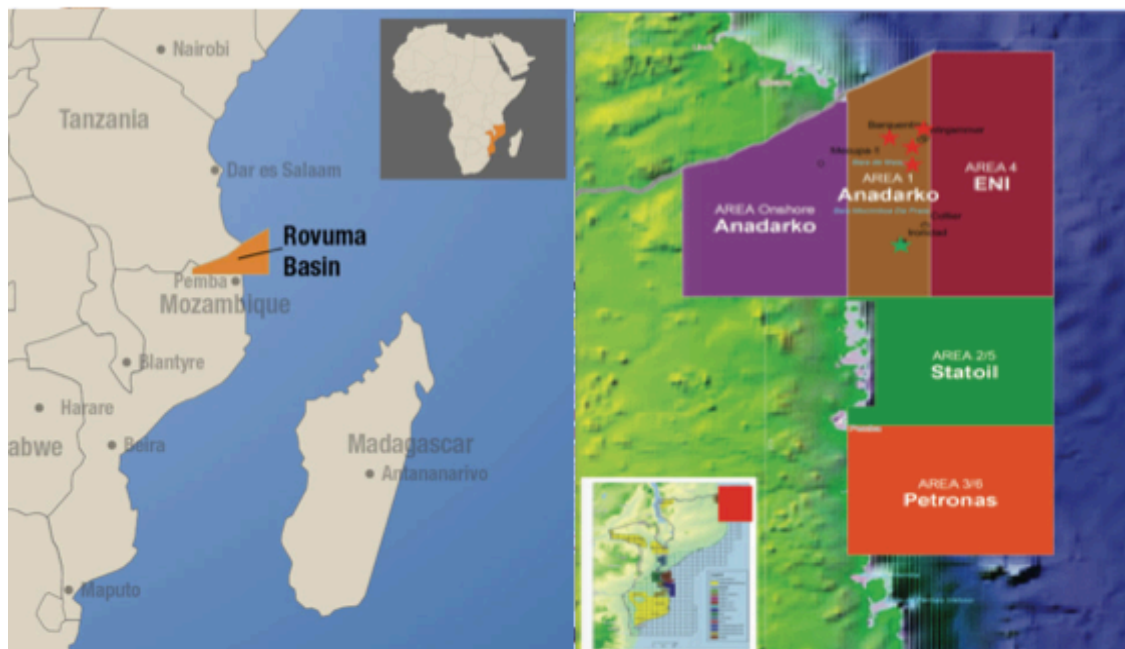
\*ICF International, Mozambique Natural Gas Master Plan (2012)

**Note:** The ICF figure (~250+ Tcf) is a preliminary geologic estimate of Mozambique's cumulative natural gas resource base (including undiscovered reserves), and is subject to change as exploratory drilling operations continue. Data presented in this figure does not include unconventional natural gas reserves (e.g. shale gas reserves in the United States).



number into perspective, if these estimates are confirmed, Mozambique will rank fourth in the world for natural gas reserves – behind Russia, Iran and Qatar – and would have enough gas to meet global demand for two years (Figure 2).<sup>23</sup>

**Figure 3: Natural Gas Acreage Map – Rovuma Basin, Mozambique**



**Sources:** National Petroleum Institute, Mozambique; company-specific sources/industry databases

**Concession Area:** [estimated recoverable reserves] Company, Country (% working interest)\*

**Area 1:** [30-65+Tcf] Anadarko, USA (36.5%); Mitsui, Japan (20%); ENH, Mozambique (15%)  
BPRL Ventures, India (10%); Videocon, India (10%); PTTEP, Thailand (8.5%)

**Area 4:** [80+Tcf] ENI, Italy (50%); CNPC, China (20%); Galp Energia, Portugal (10%);  
KOGAS, South Korea (10%); ENH, Mozambique (10%)

**Areas 2 & 5:** [unexplored] Statoil, Norway (40%); Inpex, Japan (25%); Tullow Oil, UK (25%).  
ENH, Mozambique (10%)

**Areas 3 & 6:** [unexplored] Petronas, Malaysia (50%); Total, France (40%); ENH,  
Mozambique (10%)

\*Estimated reserves and % working interest figures as of May 2013

Preliminary finds have attracted significant investment from international companies, who are now scrambling to secure an ownership stake in the massive offshore field. In addition to the wells drilled by Anadarko and ENI in offshore Areas 1 and 4, respectively, a number of other exploratory drilling projects are waiting to be operationalized in adjoining areas (Figure 3). As exploration activity in the region increases, more reserves will likely be uncovered; thus far, prospectors have drilled fewer than 500 wells in East Africa compared to more than 33,000 throughout the rest of the continent.<sup>24</sup> Anadarko and ENI have repeatedly modified their initial estimates, with appraisal wells continuing to reveal greater amounts of natural gas than expected. Wood Mackenzie, a leading global energy consultancy group, calls Mozambique “a very positive exploration story with an unprecedented high exploration success rate that has transformed the outlook for the region.”<sup>25</sup>

### 1.2.1 Liquefied Natural Gas

The following section offers a comprehensive review of the global liquefied natural gas industry and how Mozambique's exports will fit into this rapidly emerging market.

Like most of sub-Saharan Africa, Mozambique's domestic natural gas use is very limited as there is little demand for the commodity. Further, the capital-intensive upstream, transportation and distribution infrastructure needed to support the growth of natural gas in this region is lacking due to poor levels of development.<sup>26</sup> This is largely a byproduct of Mozambique's widespread poverty and poor electrification; four-fifths of the country's population still has no access to power.<sup>27</sup> Given that power generation is the main driver of natural gas demand, Mozambique's domestic needs are unlikely to change in the near future. Hence, commercial development of the Rovuma Basin's reserves hinges on the export of natural gas to markets overseas.

#### *Commercial LNG Exports*

The size of Mozambique's reserves alone has put the country on the global energy map. Experts claim that the quantity of gas in Mozambique can be a source of liquefied natural gas ("LNG") production for commercial export into global markets for upwards of 50 years. Expectations are that Mozambique could become the world's third largest exporter of LNG behind Qatar and Australia.<sup>28</sup> An onshore LNG facility will be constructed in Palma to process, liquefy, and export natural gas produced in the Rovuma Basin. The liquefaction plant could have an eventual capacity of about 50 million-tons-per-annum ("mtpa"), which would make it the largest terminal outside Qatar – currently the world's biggest exporter of the fuel.<sup>29</sup>

In the initial phase of the LNG project, a consortium led by Anadarko will build two 5 million-ton LNG trains (as natural gas processing and liquefaction facilities are called), each of which is expected to consume a total of 10-12 Tcf of gas over the life of the project.<sup>30</sup> The LNG plant might subsequently be extended to add more liquefaction capacity, as Mozambique's reserves can accommodate at least 10 trains, or 50 mtpa. Wood Mackenzie estimates that the entire Rovuma Basin, which also stretches into Tanzania's coastal waters, could support up to 20 trains, or 100 mtpa – a figure proportionate to production of over 200 Tcf of gas.

Anadarko's final investment decision on the LNG project will likely come in early 2014, with LNG production slated to begin in 2018. According to Standard Bank Group Ltd., Mozambique's gas industry may attract between \$30-50 billion in investment by 2020.<sup>31</sup> With each LNG train costing between \$7-10 billion, the project's total cost is expected to fall between \$15-25 billion.<sup>32</sup> Additional funding will be needed to install associated pipeline infrastructure that will connect the offshore producing gas fields to the onshore processing terminal. To reduce its massive cost burden, Anadarko has formed a contractual partnership with ENI to jointly plan, finance, and construct the LNG plant, while conducting separate, yet coordinated, offshore development activities in the Rovuma Basin.<sup>33</sup> To further alleviate the huge capital costs associated with financing the project's development, the two operators have struck multi-billion dollar deals to sell a percentage of their concession equity shares to a range of international companies interested in buying a stake in Mozambique's offshore blocks (see **Figure 3**).

#### *LNG: The Globalization of Natural Gas*

The main challenge for natural gas has historically been that it is relatively difficult and expensive to transport over long distances; consequently, natural gas has predominantly been a regional fuel, with

market activity generally limited to pipeline transportation.<sup>34</sup> The development of LNG technology fundamentally changed the industry. LNG offers much greater trade flexibility, allowing cargoes of natural gas to be delivered where the need is greatest and the monetary terms are most competitive.<sup>35</sup> As a result of technological advances and commercial maturity, LNG has become a more attractive and economical option for energy-importing countries looking to support rapid growth.<sup>36</sup> At the same time, advances in upstream extraction technology have revolutionized the global natural gas business and drastically enhanced supply outlooks. This evolving supply-demand balance has led to the rapid growth of globally traded LNG among a diverse range of market participants, operating in an increasingly competitive and dynamic price environment.

Despite the growing role of LNG in the world's energy system, a global natural gas market has yet to fully emerge, with universal price signals akin to other fuels like petroleum and coal. Hence, rather than strictly deriving its value from traditional market-based influences, the LNG industry is also driven by several additional key indicators, including:

- 1) **Gas monetization and contract structure:** gas/oil indexation; contract duration/flexibility
- 2) **Supply and demand:** global market balances
- 3) **LNG market competition:** project cost structure; geography; timing
- 4) **LNG price:** contractual price of LNG sales

These 4 key aspects of the global LNG industry are expanded upon below, with at least one of the ensuing sub-sections dedicated to each topic. The viability of Mozambique's LNG exports largely depends on these key market drivers.

### *The Economics of LNG: Natural Gas Monetization and Contract Structure*

The LNG industry is operated largely through a series of self-contained projects, which make up an interlinking chain of large-scale facilities, including terminals to liquefy the gas for export, carriers to transport LNG overseas, and terminals to receive and gasify the LNG and distribute it to markets via pipeline.<sup>37</sup> As in other capital intensive, competitive markets, the upstream and midstream capital investment decisions surrounding natural gas exploration, production, infrastructure development, and ultimately export, rely heavily on expectations about price. A degree of predictability surrounding prices and market conditions is required in order to assess the risks associated with the huge up-front expenditures necessary to develop the gas export supply chain. In the LNG business, buyers and sellers are typically bound together by a complex and long-term contract called a Sales and Purchase Agreement ("SPA"). These agreements often stretch 20 or more years in duration, as they are designed to help (1) producers offset production risks and secure a return on their considerable infrastructure investments, and (2) consumers ensure a long-term source of consistent supply at a competitive price to support economic growth.

The SPA's contractual terms are critical to the economic feasibility of exporting LNG. By negotiating a long-term contract with a buyer (or "off-taker") of LNG, suppliers secure a market for the liquid fuel they produce. The SPA typically requires buyers to purchase a predetermined volume of natural gas over the life of the project – known as a "take-or-pay" obligation. This contractually guaranteed sale of LNG significantly reduces the risk of LNG project development, increasing the confidence of potential investors. Of course, LNG's preset price also greatly impacts the economics of gas exportation.

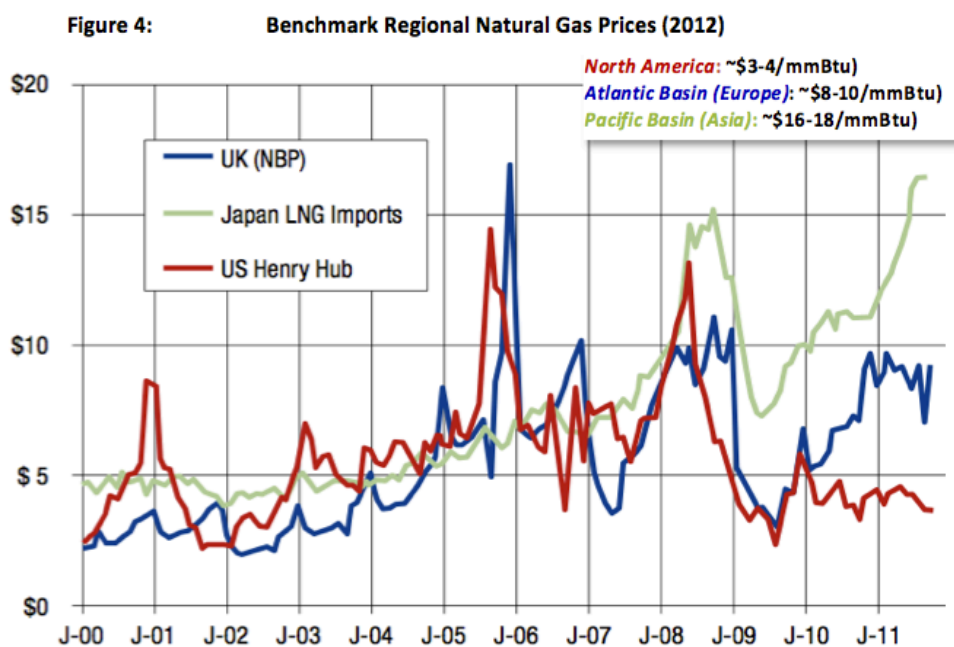
Wholesale price levels for natural gas can be established either through market-based mechanisms or price regulation. Market-based pricing mechanisms determine the price of gas in one of two ways: (1) natural gas is indexed according to spot prices reflecting the supply and demand of natural gas in a given market,<sup>38</sup> or (2) natural gas is linked to other fuel prices (such as oil, refined products, or coal) whereby the supply-demand forces in those commodity markets set the wholesale price of natural gas.<sup>39</sup> Historically, crude oil has determined the price of internationally traded gas, largely because oil and LNG projects use the same drilling rigs, engineering contractors, and labor force.<sup>40</sup> As the trade in LNG grows over the coming decades, however, the emergence of a global natural gas market is expected to loosen the tie of gas to oil prices.<sup>41</sup>

### *An Evolving Global Gas Landscape*

Until the mid-2000s, the prevailing oil-indexed structure of the natural gas business closely linked the world's three major centers of consumption – North America, the Atlantic Basin (Europe), and the Pacific Basin (Asia). Over the last five years, the wholesale price of natural gas has diverged in these three regions (**Figure 4**). As a result, there are sufficient opportunities for arbitrage in the international gas market – today's global buyers and sellers stand to make a significant profit from trading this commodity. This trend has attracted a greater number of participants to the global LNG market. Nevertheless, it is important to understand that the “law of one price” is implicit in any situation where arbitrage exists. This economic principle states that arbitrage will eventually lead to the convergence of improperly valued commodity prices towards a single “true price.” Following this logic, the International Energy Agency predicts that rising LNG supplies, increased short-term trading, and greater operational flexibility will likely lead to increased price connectivity between regions and a degree of price convergence.<sup>42</sup>

In fact, the global LNG market is already showing signs of structural change. For example, increased contractual flexibility has resulted in shorter-term offtake agreements.<sup>43</sup> Additionally, the number of available contracts is increasing, as suppliers and consumers look for counterparties that will meet their specific contractual needs.<sup>44</sup> Developments in the United States and Europe suggest that the emerging LNG market will gradually shift away from a model of fixed long-term contracts based on the price of oil towards a more short-term, commercially oriented business where the market realities of supply and demand play an important role in determining price.<sup>45</sup> Some purchasing agreements are even embracing a hybrid structure, incorporating greater flexibility with regards to volumetric offtake, and allotting a small but increasing share of contracted LNG for competitive pricing according to prevailing market conditions.

While natural gas markets continue to liberalize in Europe and North America, guided by a hub-based system with transparent price signals that steer trade and investment, prospects for a wholesale natural gas market in the Asia-Pacific region remain limited. This is largely attributed to Asian government policies that continue to emphasize energy security concerns over the need to reduce domestic energy prices.<sup>46</sup> Across the region, the need to ensure consistent sources of natural gas continues to drive Asian LNG importers towards a long-term, oil-indexed contract structure. The result, of course, is prevailing high prices (see **Figure 4**), which make Asian markets a popular destination for LNG exports.



Sources: ICF International; Brookings Institution

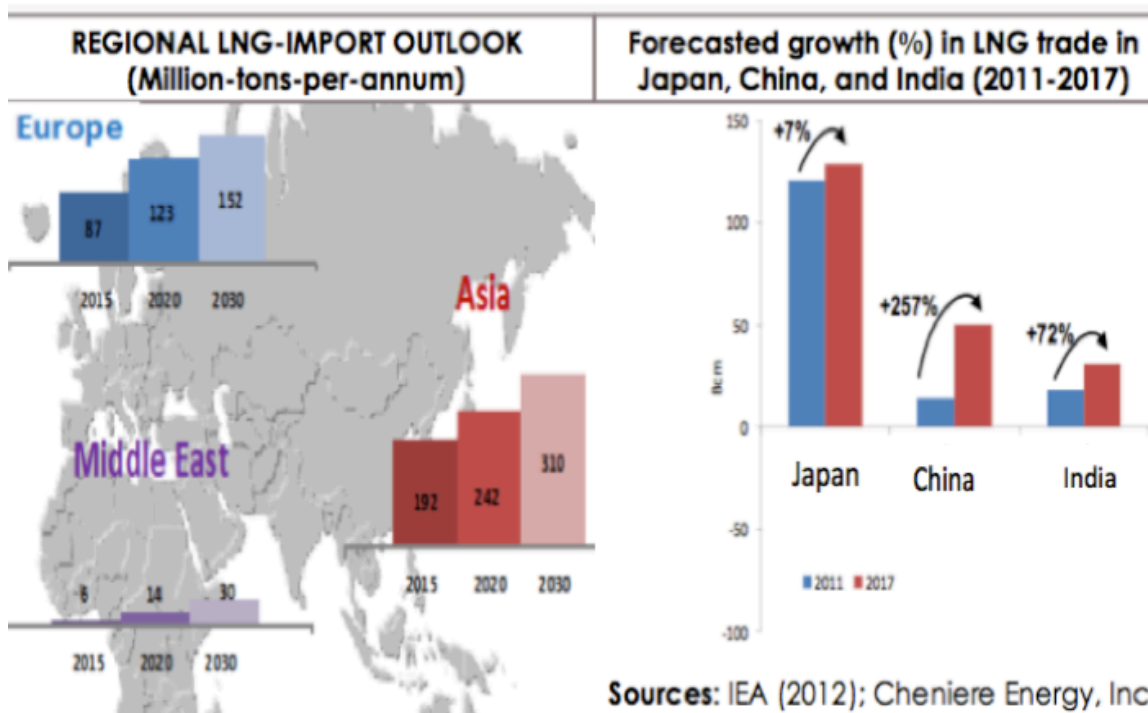
### LNG Demand

The growth in global demand for LNG drastically increases the value of Mozambique's newfound reserves. Demand for LNG has doubled over the last decade, and experts predict it will double again by 2020. The Asian market for LNG, which accounts for about two-thirds of global demand, will grow by 6% per year in the coming decade.<sup>47</sup> BG Group, an industry leader, expects China, India, Japan, and South Korea to become the world's top LNG importers by 2025.<sup>48</sup> Of this group, China will account for the largest portion of demand growth.

Driven by its rapid economic expansion, China's natural gas consumption has increased more than fivefold since 2000. Consumption is expected to continue rising at a staggering pace – about 13% annually for the next five years.<sup>49</sup> In the period through 2035, China will account for nearly 40% of the world's total expansion in the global natural gas trade.<sup>50</sup> China is building LNG import terminals quickly, with four up and running, five under construction and a dozen more at the planning stage.<sup>51</sup> By 2020, it is expected that the quantity of LNG needed to meet Chinese energy demands will more than quadruple.<sup>52</sup> **Figure 5** highlights the Asia-Pacific region's increasing demand for LNG over the next two decades.

As the demand for natural gas continues to rise, regasification capacity is also growing at a rapid pace. There are currently 25 LNG-importing countries in the world, up from 17 importing countries in 2007.<sup>53</sup> PFC Energy expects the number of new gas-importing countries to double by the end of the decade.<sup>54</sup> Indeed, growing demand for natural gas has transformed LNG into one of the fastest-growing segments of the world’s hydrocarbon industry.

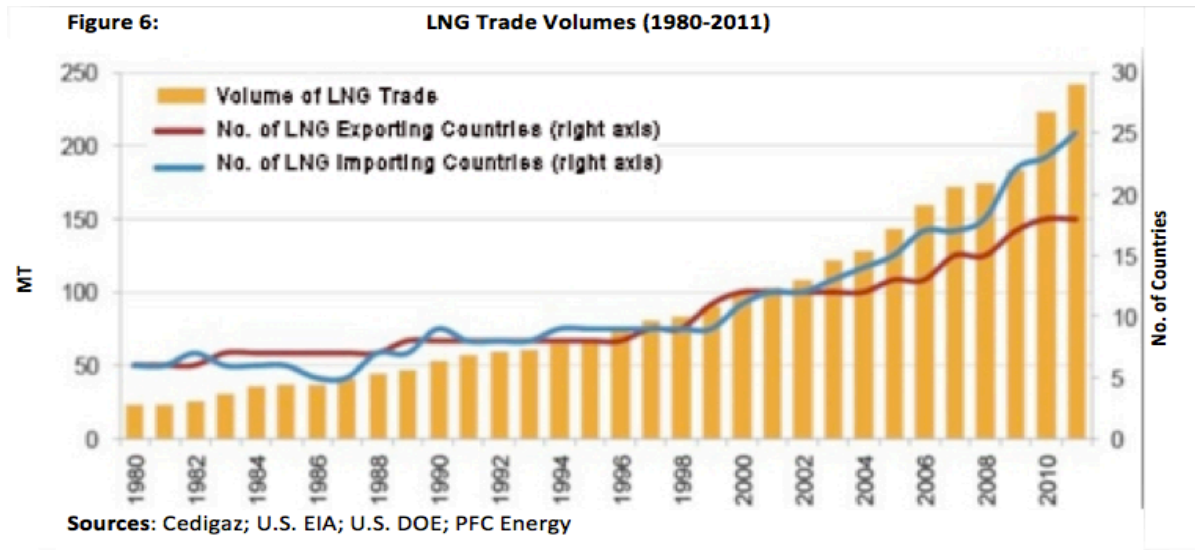
**Figure 5: LNG Demand Growth Dominated by Asia-Pacific**



**LNG Supply**

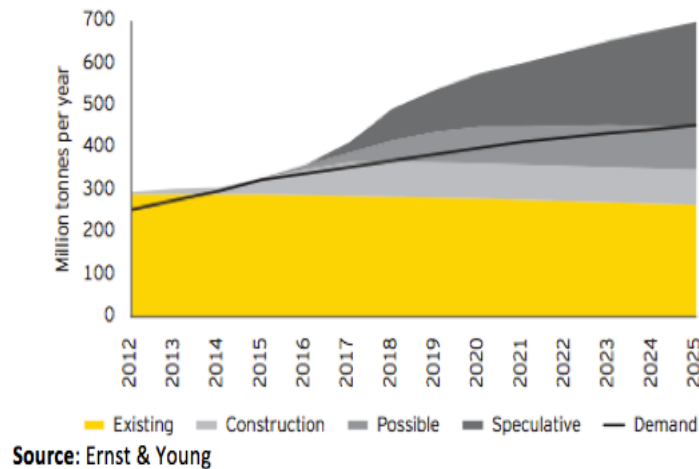
In 2012, global LNG export capacity stood at approximately 300 mtpa. According to by J.P. Morgan, if proposed additions to liquefaction capacity come to fruition, the global volume of LNG exports could reach 750 mtpa by 2020.<sup>55</sup> With global LNG production growing at an annual rate of 4.3%, the liquid fuel will account for approximately 27% of the growth in gas supply to 2030.<sup>56</sup> As supplies multiply and trade volumes increase to accommodate growing demand (Figure 6), LNG is expected to contribute close to half of the world’s traded natural gas by 2035.<sup>57</sup> Global supply outlooks are becoming increasingly distorted by uncertainties surrounding the role that unconventional (shale) gas will play in feeding the global gas market in years ahead.





A large number of new LNG projects are scheduled to come online in the second half of this decade. While there were 19 LNG exporting countries in 2012, as many as 25 additional countries could provide as much as 30% of the world’s LNG capacity by 2020.<sup>58</sup> As more gas is supplied to the market, prices will invariably fall, which will in turn shrink the profit margins of the LNG business. Industry analysis suggests that there is indeed a time horizon – often referred to as an “export window” – associated with the supply-demand balance of globally traded LNG, implying that there will be an impending increase in supply-side competition after this threshold. It appears that global demand for LNG will keep up with supply until at least around 2020. Ernst & Young projects that the global LNG market will be able to accommodate every LNG project currently under construction or seen as “possible” through 2025 (Figure 7).<sup>59</sup>

**Figure 7: Global LNG capacity and demand**



### LNG Market Competition: Strategic Advantages for Mozambique

In addition to the currents of global supply and demand, Mozambique's LNG market position is also affected by cost structure, geography, and timing. When Mozambique's gas hits global markets in 2018-2019, it will compete with projects from the United States, Canada, Australia, and Africa that are due to begin exporting cargoes in the 2015-2018 time frame.<sup>60</sup> In the U.S., the shale gas revolution has created a glut in domestic supply, resulting in sustained downward pressure on the region's gas price, thus incentivizing U.S. companies to pursue more profitable LNG exports. In Canada, robust project development on the country's west coast offers a strategic advantage for liquid gas exports across the Pacific to Japan, the world's largest LNG consumer. While the geography and timing of Australia's LNG production has positioned Australia to capture an increasing share of the growing Chinese gas market, the cost structure of these projects is not as favorable. This is particularly due to the increased price of steel, which LNG projects use in large quantities. Australian workers also demand relatively high wages, which is another factor that contributes to project cost overruns.<sup>61</sup> Mozambique will also face competition from within its own continent (**Figure 8**). BP predicts that Africa as a region will overtake the Middle East as the world's largest net LNG exporter in 2028.<sup>62</sup> In spite of these developments, and even in the face of oversupply, Mozambique has some distinct advantages that set it apart from its competitors.

**Figure 8: African LNG Capacity**

Country	Project	Start*	Capacity (MT/yr)	Operator
<b>Existing/operating</b>				
Algeria	Arzew (3 trains)	1964	1.1	Sonatrach
	Skikda (4 trains)	1972	7.6	Sonatrach
	Bethioua (12 trains)	1978	16.5	Sonatrach
Egypt	Damietta (1 train)	2005	5.0	ENI
	ELNG (2 trains)	2005	7.2	BG Group
Libya	Marsa El Brega (2 trains)	1971	3.2	Sirte Oil
Nigeria	NLNG (6 trains)	1999	22.2	NNPC
Equatorial Guinea	Punta Eur (1 train)	2007	3.7	Marathon
Angola	Angola LNG (1 train)	2012	5.2	Chevron
<b>Planned/possible</b>				
Algeria	Arzew GL3Z	2013	4.7	Sonatrach
Algeria	Skikda LNG	2013	4.5	Sonatrach
Libya	Marsa El Brega T3	2016	2.6	Sirte Oil
Nigeria	Progress FLNG	2017	1.5	NNPC
Cameroon	Kribi LNG	2018	3.5	GDF Suez
Egypt	Damietta T2	2018	4.8	ENI
Equatorial Guinea	Punta Eur T2	2018	4.4	Marathon
Mozambique	Mozambique T1	2018	5.0	Anadarko
Nigeria	Brass LNG T1	2018	5.0	NNPC
Tanzania	Tanzania LNG T1	2018	6.6	BG Group
Mozambique	Mozambique T2	2019	5.0	Anadarko
Nigeria	Brass LNG T2	2019	5.0	NNPC
Nigeria	NLNG T7	2019	5.0	NNPC
Nigeria	NLNG T8	2020	8.5	NNPC
Nigeria	OK LNG	2020	12.6	NNPC
Mozambique	Mamba	2020	10.0	ENI

Source: Ernst & Young

Perhaps the most obvious upside is Mozambique's geography (**Figure 9**). The country's proximity to Asia's gas giants across the Indian Ocean drastically reduces LNG shipping costs, in comparison to North American suppliers. While the Asia-Pacific region is likely to end up offtaking the majority of Mozambique's LNG, it is worth noting that Mozambique is similarly convenient for European buyers. European gas markets will also witness a spike in demand, as their share of natural gas imports in total consumption is projected to jump from 63% today to 85% in 2035.<sup>63</sup> As the EU looks to diversify its fuel mix and lessen its dependence on gas imports from Russia, LNG is an increasingly viable alternative.

**Figure 9: Global export potential of Mozambique LNG**



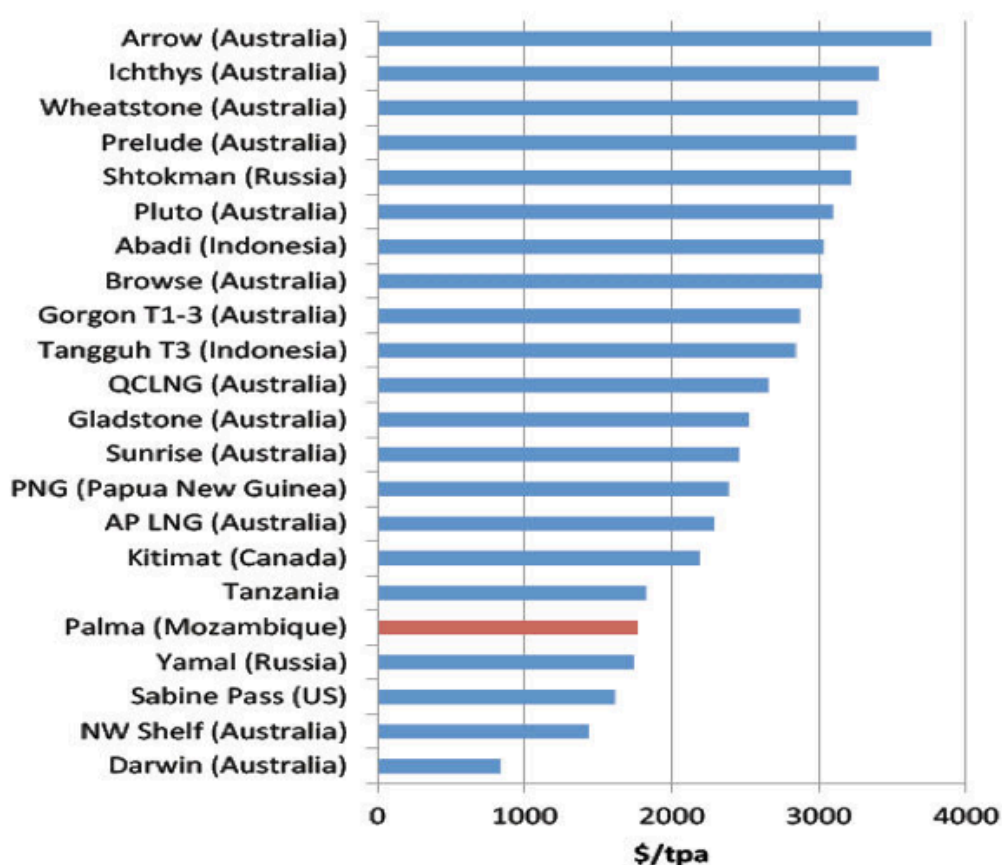
**Source:** Anadarko Petroleum Corporation

While Mozambique stands to benefit from supplying LNG to European markets, a number of considerations arise. First, Mozambican LNG may be undercut by notable offshore natural gas discoveries in the eastern Mediterranean that are in line to start production before the end of the decade. Next, a closer comparison of the economics that underpin European versus Asian LNG exports reveals a gap between each region's prevailing gas prices (see **Figure 4**) and Mozambique's LNG supply costs (liquefaction plus shipping costs). This is referred to as the "net-back margin," an important metric that clearly indicates a more favorable return from selling LNG to the Asia-Pacific region. Finally, as European gas markets continue to liberalize, long-term, oil-linked contracts with favorable take-or-pay conditions for suppliers will become less common (see *An Evolving Global Gas Landscape*). Until global natural gas prices experience a degree of convergence, the economics of LNG trade will predominantly favor exports to Asian markets.

Mozambique's natural gas sector also benefits from lower capital costs in exporting LNG, giving it an edge over other potential LNG developments around the world. For instance, consultants at Wood Mackenzie estimate that the break-even price for Mozambican gas is around US\$7 per million BTUs ("MMBtu"), in contrast to around US\$10 per MMBtu for Australian LNG.<sup>64</sup> In **Figure 10**, Credit Suisse and ICF International ranked proposed LNG projects according to their cost profile, incorporating all of the upstream capital costs associated with LNG (exploration, production, pipeline installation, gas processing, and liquefaction). The results show that the LNG produced at Mozambique's Palma facility will be in the bottom quartile of costs.<sup>65</sup> A second study done by the IEA corroborates these findings, indicating expected production costs of between \$1,500 and \$2,000 per ton for East African LNG.<sup>66</sup>

**Figure 10: Capital Costs for Potential LNG Plants across the Globe**

The cost of LNG production at Palma places Mozambique in the bottom quartile of potential global LNG projects, indicating a strong position for Mozambican LNG



Sources: Credit Suisse; ICF International: Natural Gas Master Plan for Mozambique

### LNG Price

As of the date of this report, the Government's Ministry of Mineral Resources ("MIREM") has yet to finalize the contractual terms specifying an offtake price for Mozambique's liquid gas exports. Clarifying this offtake price is essential, as it will determine the cash value of the Government's share of the gas.<sup>67</sup> Nevertheless, monetizing the Rovuma Basin's reserves to meet the specifications of a long-term SPA poses significant challenges, particularly given the uncertainties surrounding future price volatility. This process typically relies on a series of forecasts, often with significant discrepancies about commodity

price trajectories. **Figure 11** considers both high (IEA) and low (World Bank) projections of future LNG and crude oil prices, as well as an average of the two.

Figure 11: Liquefied Natural Gas & Oil Price Forecasts (2011\$)								
Commodity	Units	High Price Trajectory (IEA WEO 2011)						
		2012	2015	2020	2025	2030	2035	Average
LNG, Japanese	\$/MMBtu	13	14	15	15	16	17	15
Crude oil, avg, spot	\$/bbl	96	116	129	139	146	152	130
Low Price Trajectory (World Bank)								
Commodity	Units	2012	2015	2020	2025	2030	2035	Average
		LNG, Japanese	\$/MMBtu	16	13	12	10	9
Crude oil, avg, spot	\$/bbl	103	97	88	80	73	67	85
Average Price Trajectory (IEA/World Bank)								
LNG, Japanese	\$/MMBtu	15	14	14	13	13	12	13
Crude oil, avg, spot	\$/bbl	100	107	109	110	110	110	107

**Source:** ICF International: Natural Gas Master Plan for Mozambique

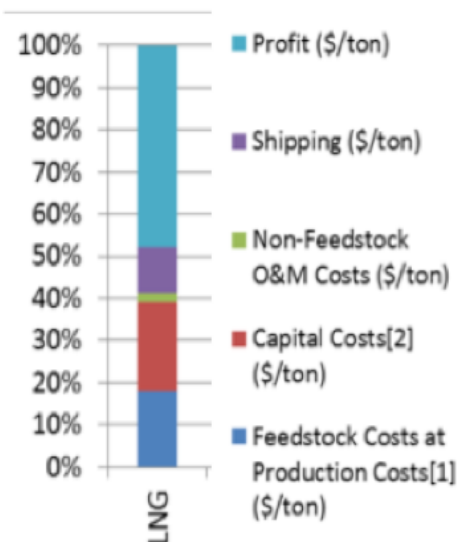
A few key observations from this table are evident. First, the two commodity prices in these outlooks are highly correlated, a result of Japanese LNG prices being indexed to oil. It is worth reiterating that as the global trade of LNG increases and the market matures, oil indexation in LNG contracts will gradually become obsolete, giving way to a hub-based system that reflects spot prices for gas.

Next, while supply-demand attributes play a role in explaining the divergence in average crude oil prices between these two scenarios, the split is largely due to differing opinions regarding the effect of policy intervention on underlying market conditions.<sup>68</sup> For example, in the World Bank's assessment, the adoption of a carbon price might reduce the demand for (and therefore the price of) oil, and spur widespread electrification of the transport sector or increase the market share of competing transport fuels (e.g. biofuels). Irrespective of any policy intervention, industry experts widely acknowledge that crude oil prices will remain high in the decades to come.

Finally, looking at the 20-year average for LNG prices in the two forecasts, estimated to be approximately \$15 (IEA) and \$11 (WB) on an MMBtu basis, analysis of these price streams vis-à-vis Mozambique's LNG production and shipping costs reveals a profitable net-back value of \$9 and \$5, respectively.<sup>69</sup> In sum, even if we assume a significant drop-off in LNG prices over the next two decades, Mozambique's natural gas exports will still be profitable (**Figure 12**).

While Mozambique appears well positioned to compete in the emerging global LNG industry, its biggest challenge remains its lack of existing infrastructure. Indeed, it is imperative that the Government secures billions of dollars of investment in order to complete the Palma facility in a timely and cost-effective manner. Additionally, the Government of Mozambique has to consider an even more important stakeholder – the people of Mozambique. The Government's ability to ensure that natural gas export revenues provide long-term benefits for Mozambique hinges upon a fragile contractual framework outlining the country's financing obligations.

**Figure 12:**  
Levelized costs and profit of LNG production at Palma



**Source:**

ICF International: Natural Gas Master Plan for Mozambique



**Recommendation 2:** The Government of Mozambique must work with Anadarko, ENI and other operators in the Rovuma Basin to confirm that long-term, oil-indexed natural gas purchase agreements with built-in take-or-pay obligations are signed with offtakers in the high-demand markets of the Asia-Pacific region.



### Mozambique LNG: A Favorable Market Outlook

As of the date of this report, Anadarko is in talks with 20 companies across 10 countries shopping for offtakers of Mozambique's LNG. Given the current global LNG price environment, Mozambique stands to benefit substantially from exporting its natural gas resources to Asian markets in the Pacific Basin. Japan, the world's largest LNG importer, has expressed considerable interest in buying Mozambique's gas.

Anadarko is pursuing long-term, predominantly oil-linked LNG Sales and Purchase Agreements, with "take-or-pay" obligations built in. This contract structure will secure stable cash flows for 20+ years, which will in turn help operators in the Rovuma Basin recuperate exploration and development costs and mitigate production risks. At the same time, a contract ensuring future sales will also attract much-needed lenders and sponsors, whose investments will finance the costly construction of Palma's LNG facility and gas export supply chain. While supply-side competition appears imminent in the global LNG market after 2020, forecasts predict that robust demand growth, particularly from Asia-Pacific, will ensure the cost-effectiveness of LNG export projects until about 2025. While this "export window" is difficult to predict, Mozambique's two-train (10 mtpa) project, due to begin production in 2018-2019, fits well within this time frame. In sum, Mozambique's LNG benefits from (1) an abundant and nearly unmatched volume of recoverable reserves; (2) a strategic geographic location that allows exports to reach markets all over the world, including fast-growing economies in Asia; finally, (3) among all competing LNG projects, Mozambique's cost structure remains one of the lowest, allowing for a profitable net-back margin.

### The Potential Impacts of Natural Gas for Mozambique

If Mozambique's natural gas discoveries are confirmed and it harnesses all of its export capacity...

- Mozambique will become a **regional energy hub** in southeastern Africa
- Mozambique's will rank **fourth in the world** in conventional natural gas reserves
- Mozambique will be the **world's third largest exporter** of liquefied natural gas
- Mozambique's liquefaction plant in Palma will be the **second largest facility** of its kind



## 1.2.2 Financing Liquefied Natural Gas Development

This final segment on natural gas explores the details surrounding the contractual and financial obligations that exist between counterparties in an LNG partnership. An understanding of how these natural gas contracts are structured is essential, particularly with regard to the “government take” metric.

Monetizing the immense economic potential of Mozambique’s natural gas reserves is an extremely difficult task. It involves making assumptions and estimates that stretch far into the future and across a highly complex and dynamic set of interrelated global energy systems. On the high end of the spectrum, the Rovuma Basin’s cumulative natural gas resource base is valued at \$800 billion, over 30 times larger than Mozambique’s current GDP.<sup>70</sup> Rather than analyzing the entire sedimentary basin, however, a more factually sound assessment is limited to the 100 trillion-cubic-feet of discovered gas that Mozambique will ultimately process into LNG exports. According to this more limited valuation, Mozambique’s gas is worth between \$350-400 billion over the lifetime of the reserves.<sup>71</sup> Assuming a reserve life of four decades, a \$400 billion valuation could conceivably result in Mozambique exporting nearly \$10 billion of gas per annum.<sup>72</sup> In turn, Mozambique’s Gas Master Plan predicts the Government’s share of revenues, including taxes, royalties, and profit gas – collectively referred to as “government take” – to comprise about half of the export proceeds, reaching as high as \$6-8 billion per year.<sup>73</sup> Mozambique’s ability to optimize government take depends on the configuration of its fiscal regime vis-à-vis its gas contracts with foreign companies operating in its coastal waters.

### *Mozambique’s Contractual Arrangements*

The complex nature of contracts and revenue streams linked to hydrocarbon development make it difficult to determine the Government’s actual “take” from a given project; moreover, there tends to be a lack of transparency surrounding the details of these contractual arrangements.<sup>74</sup> Clearly, Mozambique’s Government plays a critical role in the process of negotiating fair contracts that ensure long-term streams of revenue.

To this end, Mozambique’s Government is currently working to align its fiscal regime with the terms and conditions of production sharing contracts (“PSCs”) it has organized with a number of international oil companies (“IOCs”), including Anadarko and ENI. A PSC is a legal arrangement that allocates the costs and benefits associated with extractive resource exploration and production. A typical natural gas PSC has the following key conditions:<sup>75</sup>

- 1) **Title & Ownership:** The state owns and has legal title to the natural gas reserves.
- 2) **Exploration & Production:** The IOC provides the capital investment for exploration, drilling and infrastructure construction, and bears all of the risk.<sup>76</sup>
- 3) **Royalties, Taxes, and Production Sharing:** Once commercial gas production begins:
  - a) The IOC can recover its investment costs up to a pre-specified percentage of production, known as a “cost recovery limit.”<sup>77</sup>
  - b) The IOC must pay a royalty charged on gross production and a tax on production profits (total income less eligible expenses) to the Government.
  - c) Profit gas – the amount of gas remaining after royalties are paid and “cost gas”<sup>78</sup> is

allocated – is split between the Government and the IOC according to an agreed percentage of production sharing.

In total, the IOC is entitled to cost gas plus a share of profit gas, while government take includes proceeds from royalties, taxes, and a share of profit gas. Given these criteria, it is important to understand how Mozambique and its partners in the Rovuma Basin fit into this contractual framework.

### ***Title & Ownership***

Mozambique’s gas contracts are framed around the legislative guidelines of its Petroleum Law, which stipulates that all underground and offshore natural resources remain the property of the state (see *Section 7: Gas and Petroleum Laws*).<sup>79</sup>

### ***Exploration & Production***

In the mid-to-late 2000s, Anadarko, ENI, Statoil, and Petronas each entered into a partnership with the Mozambican Government, securing an exploration and production concession contract (“EPCC”) in order to look for oil and gas. While Anadarko and ENI have spearheaded exploration in their offshore concession areas, Statoil and Petronas have yet to commence drilling activities. Meanwhile, as **Figure 3** displays, Rovuma’s operators continue to sell shares in their blocks to companies interested in owning a stake of the reserves. Subsequent phases of gas development, production, and particularly liquefaction are likely to attract super-majors to the region. France’s Total has already bought a 40% working interest from Petronas in Areas 3 and 6, while Shell is keen to bring its unmatched LNG processing capabilities to Mozambique.

### ***Royalties, Taxes, and Production Sharing***

According to data recently published in a report by the *Center for Public Integrity of Mozambique*, once Mozambique’s commercial gas production begins:<sup>80</sup>

- The cost recovery limits for Anadarko and ENI are 65% and 75%, respectively. Anadarko’s 65% limit is commensurate with the average fiscal terms of gas contracts, while ENI’s figure is slightly higher.
- Royalties and taxes in Mozambique’s gas sector are quantified as follows:
  - Royalty rates that will be charged to Anadarko and ENI stand at 2%. Since the signing of these initial EPCCs in 2006, however, the Government has raised the royalty rate for gas production to 6%.<sup>81</sup>
  - The corporate income tax rate on income derived from hydrocarbon operations in Mozambique is currently 32%; however, as with the aforementioned royalties, this figure was lower when the EPCCs were initially signed. Prior to 2007, the Government reduced the rate by one quarter (down to 24%) in order to incentivize development. These fiscal benefits will remain in effect for the first eight years of production.
  - Finally, a new Mozambican law implemented a 32% capital gains tax, slated to begin in 2013. This legislation reflects an effort to capture revenue from gains realized by international companies making overseas transactions that involve assets based within Mozambique.<sup>82</sup>

- The Government of Mozambique will split profit gas with each respective company according to a sliding scale that will be determined by the profitability of LNG exports. Thus, government take will gradually increase as cumulative project income increases and expenses are paid off according to cost recovery provisions. Mozambique's national oil company, ENH, has a working interest in each offshore block from which it will receive a certain percentage of future production. Its largest share comes from Anadarko's offshore Concession Area 1, where it owns a 15% stake (see **Figure 3**).

### LNG Financing

These fiscal terms have drastic implications for Mozambique. Overall, the relatively high cost recovery ceilings built into these contracts make them "front-end-loaded." In other words, it will take several years of production for Mozambique to see its share of economic profits from the project increase. Additionally, Mozambique's working interest in these concessions is contingent upon its ability to meet certain key financial obligations going forward. Under most LNG financing arrangements, IOCs "fully carry" all of the costs for the host country through the exploration and production phases of LNG project development. In Mozambique, however, the Government and the IOCs have agreed to a "partial carry" model, whereby the IOCs front all of the costs and bear all of the risks related to exploration. When exploration yields commercial discoveries, such as those in the Rovuma Basin, the Government – along with every company that has a stake in the concession – must pay its respective share of exploration costs. If it cannot pay those costs, its share in the project will be diluted over time.

As an example, Anadarko estimates exploration costs at \$700 million through the end of 2012; hence, in order to take ownership of its 15% working interest in Anadarko's Offshore Area 1, the Mozambican Government will have to come up with well over \$100 million to reimburse the company when production begins.<sup>83</sup> This financial hurdle is magnified by the next phase of gas export development – construction. On the low end of projections the LNG plant in Palma will cost upwards of \$15 billion, translating into a \$2.25 billion bill for the Government.<sup>84</sup> Cost overruns could mean hundreds of millions of dollars more in expenditures. Unlike the cost recovery mechanism that is built into the gas contract for operators, the Government will have to come up with all of this money at once. This will likely create pressure for the Government to raise money from other activities – e.g. by agreeing to additional concession contracts that generate a "signing bonus."

If the Government of Mozambique wants to maintain its equity share in the Rovuma gas fields, its contractual obligations under the current LNG development framework will clearly pose a significant financial burden for the country. Clearly, the country would have benefitted more from a "full carry" financing structure. While reducing or even entirely abandoning its equity share is an option, the state-owned ENH believes production sharing is a necessary step toward becoming a fully operational petroleum company.<sup>85</sup> If the Government is unable to raise money in a timely manner, it could lead to delays in LNG construction and project development.

Long term financing is typical of projects that have high up-front capital costs – like the construction of an LNG export terminal. Mozambique should consider turning to project finance for help. Project finance is a long-term method of financing used to sponsor large industrial infrastructure projects, such as the construction of an LNG plant. Rather than focusing on the finances and creditworthiness of borrowers, lenders look primarily to the revenues expected to come from the project for interest and debt repayments and to the assets of the project as collateral. Project finance structures usually rely on sponsorship from a range of equity investors as well as a syndicate of banks that provide loans to support the project. In other words, if the Government of Mozambique were to use such a nonrecourse

financing mechanism, debt repayments would almost exclusively rely on the financial performance of LNG exports.<sup>86</sup> Under a project finance model, although the Mozambican Government would need to be willing to take a smaller profit from the project in the long term, it would no longer need to locate huge internal funds to repay its portions of exploration, production and LNG development costs. Finally, the long-term nature of project finance would also correlate well with the long-term offtake contracts that Mozambique's gas operators are looking to sign with Asian buyers.

**Recommendation 3:** To optimize the value of natural gas production and export from the Rovuma Basin, the Government of Mozambique must negotiate with Anadarko, ENI, and other gas operators to ensure that the terms of the PSC will be equitable and allow for maximum government take.

### Evaluating the Fiscal Terms of Mozambique's Gas Contracts

Mozambique's fiscal regime should seek to address the following key issues:<sup>87</sup>

- 1) **Minimize cost gas:** In negotiating cost recovery limits, the Government should minimize the percentage of gas revenues allocated to the recovery of IOC costs ("cost gas") in order to maximize its share of profit gas in the early phases of the LNG project. Under the current arrangement, between 65-75% of post-royalty gas will go directly towards paying back IOCs in the initial years of production, which means that it will likely be several years before the Government of Mozambique starts to see substantial revenue from LNG production and export.
- 2) **Enforce cost recovery limits:** The Government must also ensure that the EPCC explicitly stipulates which costs are recoverable and which costs are not. In turn, active monitoring and effective oversight of project costs will be necessary to ensure that the Government in fact receives all of its due revenue.
- 3) **Include windfall provisions:** In order to maximize the potential of profit gas, the EPCC should include provisions that allow the Government of Mozambique to profit more from an increase in the price of LNG.
- 4) **Guarantee timely and recurring income:** A minimum government take requirement would assure a certain share of stable, recurring cash flows in each accounting period. Steady income from royalties will help the Government with budgeting and also serve to guard against commodity price volatility, which can negatively impact the Government's stream of tax revenue.
- 5) **Look to project finance as a source of LNG financing:** As noted above, project finance can be a useful tool for Mozambique's Government as it looks to come up with funds to sponsor its working interest in offshore gas development.
- 6) **Improve internal management capacity:** The Government should seek to gradually increase its degree of control over its resources, with a long-term goal of taking over operations in order to fully maximize revenues. This is no small undertaking, however, as such a transition will take a very long time to complete and will require significant investment. To achieve this, the Government must retain its equity share in the offshore gas fields and use its ownership of production to build the capacity of its national oil company ("ENH"). Above all, policies should seek to promote knowledge and technology transfers from the IOCs to ENH.

## 1.3 Coal

The following section assesses Mozambique's coal reserves and the corresponding coal market outlook. Key hurdles remain in developing Mozambique's export infrastructure capacity.

### 1.3.1 Coal Development in Tete Province

Mozambique's burgeoning coal industry further enhances the magnitude of its recent gas discoveries. In the last few years, over 30 international mining companies have flocked to Mozambique's inland Tete province, where the Moatize Basin hosts one of the world's largest-known coal reserves. Altogether, Mozambique's total coal reserves are estimated to be approximately 25 billion tons.<sup>88</sup> Brazil's Vale and British-Australian Rio Tinto are the two most prominent coal companies stationed in Mozambique, with extraction from Vale's Moatize mine and Rio Tinto's Benga and Zambezi mines making up the majority of the country's exports. According to the International Monetary Fund, Mozambique's coal industry boosted output to about 5 million tons in 2012,<sup>89</sup> up from nearly 1 million tons in 2011.<sup>90</sup> If investments in the industry keep up, Mozambique could be exporting 40 mtpa in the next five years and up to 100 mtpa in a decade.<sup>91</sup>

Mozambique's coal output capacity, however, will largely depend on the development of the country's weak transport infrastructure. For now, Vale and Rio Tinto use the Sena railway to move their coal from Tete to the port of Beira; however, delayed upgrades to this rail line and a lack of capacity at Beira's coal terminal have hampered export operations. In order to reduce export bottlenecks and accommodate the increasing volume of coal coming from Tete, industry experts believe that about \$20 billion is needed to revive Mozambique's railways and ports.<sup>92</sup> In response, mining companies have been working with the Government to improve existing infrastructure and develop alternatives. Vale, for example, is heavily invested in developing the Nacala Corridor, a new export route that will ultimately cross through Malawi to Mozambique's northeast coast. This megaproject includes a deep-water seaport at Nacala, upgrades to nearly 700km of rail line and 230km of new track.<sup>93</sup> For further discussion of Mozambique's infrastructure needs and projects, see *Section 3: The Need for Inclusive Infrastructure*.

Assuming Mozambique can meet its infrastructure challenge, profitability of coal exports is expected to be high, due to low-cost, open-cast methods of extraction and abundant deposits.<sup>94</sup> Additionally, Mozambique's coal is superior in quality, with a 70% concentration of high-grade metallurgical coking coal.<sup>95</sup> Various mining forecasts speculate that the country could be producing nearly one-quarter of the world's coking coal by 2025.<sup>96</sup> Over just the next 3-5 years, presumably when its infrastructure will be able to support high-volume exports, Mozambique is expected to add about 10 million tons of coking coal to the global market.<sup>97</sup> Unlike thermal coal, which is used in power generation, coking/metallurgical coal is a key raw material in steel production. Thus, the construction boom in Asia, which will inevitably accompany that region's economic and industrial growth, will also drive demand for this type of coal.

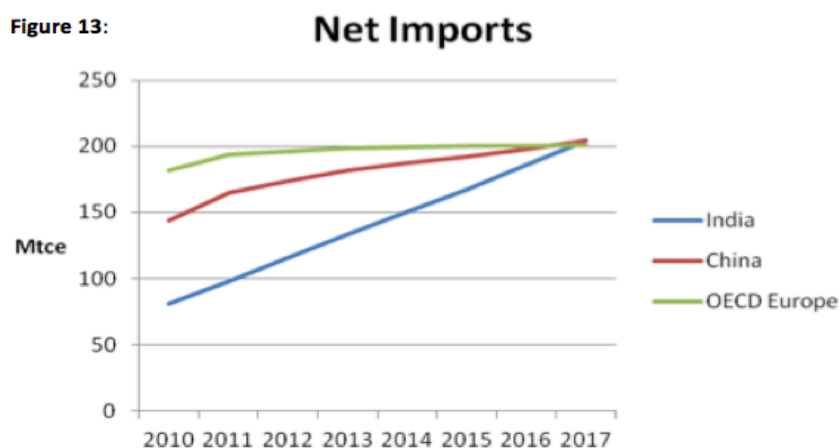
### 1.3.2 Global Coal Market Development

Over the coming decades, policies targeting coal-related greenhouse gas emissions will strongly impact international coal markets and prices. The global trade of coking coal, however, is far less affected by policy, as it cannot be so easily replaced by other less carbon-intensive inputs.<sup>98</sup> While doubts about policy will remain an important facet of the global coal business, price volatility and supply-side

competition will also contribute to market uncertainty. Although these dynamics will largely determine Mozambique's position in the global coal market, demand for coal is still very strong, particularly among Asia's giant consumers. Much like its potential LNG exports, Mozambique's proximity to the Asia-Pacific region will give the country a competitive advantage.

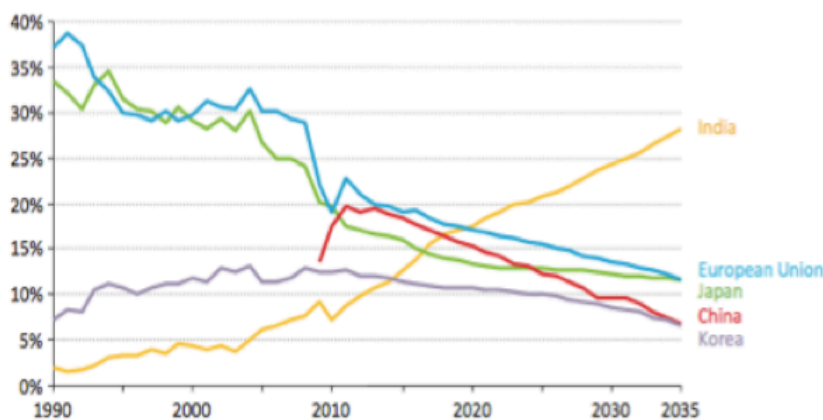
### Coal Demand

Coal still provides close to one-third of global primary energy needs and about 40% of the world's electricity. China is the world's largest producer and consumer of coal, and now burns nearly as much coal as the rest of the world combined. Moreover, China and India together will account for nearly 75% of non-OECD growth in coal use through 2035, with much of this growth expected over the next five years (see **Figure 13**).<sup>99</sup> While Chinese demand is estimated to slowly level off after 2020, the same is not the case for India, where net imports are projected to surge more than five-fold by 2035 compared to 2010, making it the world's largest coal importer by 2020 (**Figure 14**).<sup>100</sup>



Source: IEA Medium-term Coal Market Report 2012

**Figure 14: Share of major hard coal importers in global inter-regional trade in the New Policies Scenario**



Note: China became a major coal net importer in 2009.

Source: IEA World Energy Outlook 2012



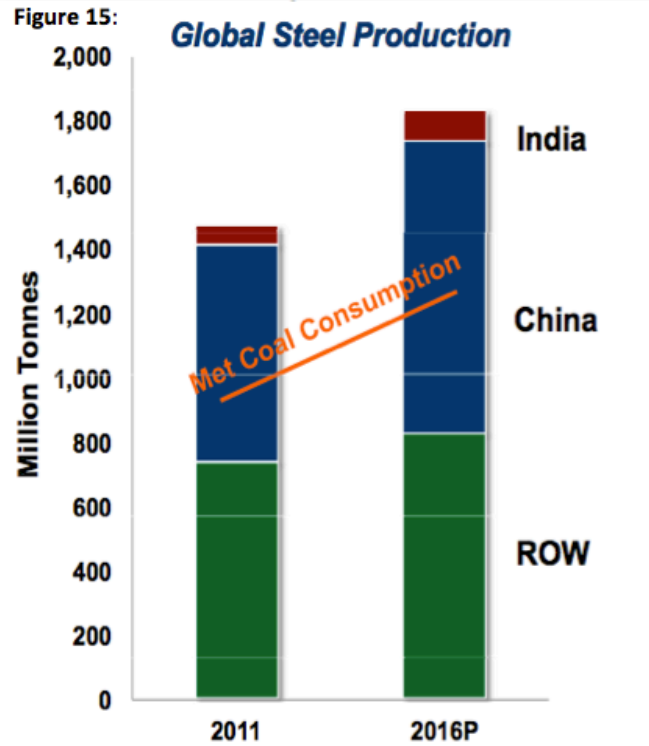
While Mozambique stands to benefit from both thermal and coking coal exports, the majority of the coal in the Moatize Basin fits into the latter category. Asian markets will dominate global demand growth for coking coal, as this high-quality coal is closely tied to the demand for steel, which is expected to increase in both China and India roughly in proportion with each country’s GDP growth. Peabody Energy, the world’s largest private-sector coal company, anticipates global steel production to grow 25% by 2016 (Figure 15).

**Coal Supply**

While China and India have huge domestic supplies of both kinds of coal, demand is growing faster than supply, implying a greater need for imports. The sheer abundance of coal worldwide means that large quantities are available at similar cost levels, reflected in a relatively flat long-run supply curve (Figure 16).<sup>101</sup> Wood Mackenzie forecasts that the seaborne supply of coking coal will increase by 60% over the next two decades.<sup>102</sup> Analogous to its LNG exports, Mozambique will be in stiff competition with Australia – the world’s largest supplier of coking coal. Above all, Australia’s advantage lies in very low shipping costs, due to its proximity to China’s thriving market. While Mozambique’s short distance across the Indian Ocean also suggests low shipping costs, China will have access to even cheaper coking coal reserves in neighboring Mongolia. Finally, Mozambique even faces competition from within its region, as South Africa is also a well-established supply source.

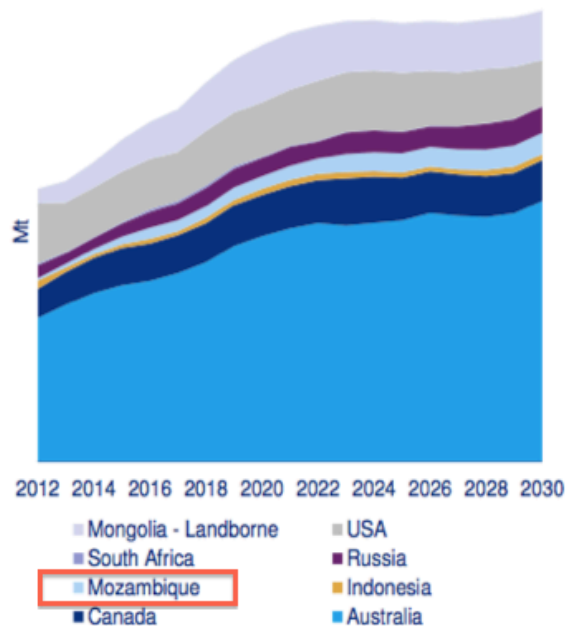
**Coal Price**

Despite optimistic predictions, increasing supplies are currently exerting downward pressure on global coal prices. While this may indeed change as Asian demand increases, experts in the coal business are worried that energy policies around the world that target

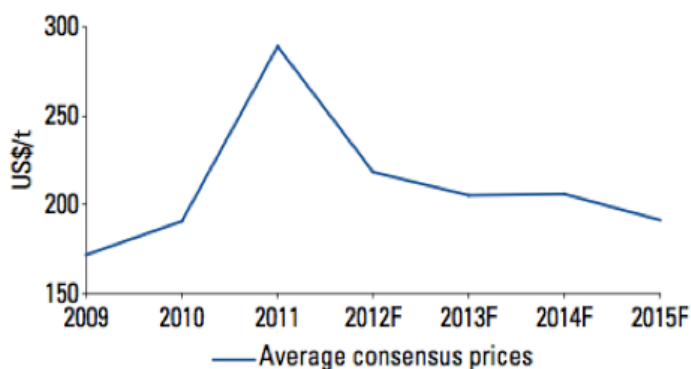


Source: Peabody Energy

**Figure 16: Global metallurgical coal supply**



Source: Wood Mackenzie

**Figure 17: Met coal prices (2009–15F)**

Sources: KPMG; Bureau of Resources and Energy Economics

inconsistent market conditions. For instance, the recent peak in coking coal prices coincided with an increase in mineral exploration in Mozambique.<sup>103</sup> In turn, the subsequent decline of coal prices has forced companies to scale back their operations in the Moatize Basin. This is particularly true for Rio Tinto, who posted losses of over \$3 billion in 2012, following a downward review of its reserves in Tete. Rio Tinto cited two factors for this devaluation: first, that the coal available was of lesser quality and quantity than it had initially projected; second, that it had been unable to efficiently move coal to port for export.<sup>104</sup>

Much like any commodity, the future price outlook for coal depends on a range of factors and is highly uncertain. Moreover, unlike the long-term recurring cash flows associated with an LNG offtake contract, coal is purchased according to prevailing spot price signals. The extent to which buyers in Asia-Pacific make switches in their domestic energy sectors (e.g. substituting natural gas for coal in power generation), infuse carbon-free alternatives such as nuclear and renewables into their fuel mix, and reduce their demand through improvements in energy efficiency and conservation, will collectively drive global coal market dynamics. Policy developments in China and India will likely have the biggest impact on global prices, given the potential for large swings in each country's coal imports according to their domestic supply-demand balance.<sup>105</sup> Lately, Japan also increased its presence in the international coal scene. The country is increasingly turning to cheaper coal to offset high oil and LNG import costs, with a return to nuclear power proving unlikely in the wake of the 2011 Fukushima crisis.<sup>106</sup>

Today, the price of coking coal is nearing an all-time low. Growing speculation suggests that if prices don't recover, a number of mining operations could become "sub-economic" – that is, the global coking coal price could fall below marginal coal production costs.<sup>107</sup> Wood Mackenzie, however, remains optimistic that metallurgic coal prices will rebound, driven by China's shift towards more efficient blast furnaces, which utilize Pulverized Coal Injection ("PCI") technology and require higher quality coking coals.

**Recommendation 4:** The Government of Mozambique must work with Vale, Rio Tinto and other coal operators in the Moatize Basin to guarantee that buyers in China, India, and elsewhere in the Asia-Pacific region are obtained for the offtake of Mozambique's thermal and coking coal. More importantly, the Government must work with coal project developers to secure investment for the infrastructure development that is necessary for expanded coal exports.

CO<sub>2</sub> reduction could eventually prove detrimental to the global coal market. In the short-term, coal prices will continue to be volatile, evidenced by a huge drop-off in demand following the onset of the Global Financial Crisis. Analysts attribute the recent surge in coking coal prices (**Figure 17**) to the inability of global supply to keep up with rapid Chinese demand growth. Supplies from Australia have since met the majority of this demand, resulting in yet another rapid decline in prices.

Recently, Mozambique's coal development has echoed these

### Mozambican Coal Exports: An Uncertain Market Outlook

Thus far, the 2012-2013 period has witnessed enormous coal demand growth in both China and India, with India's imports growing 35% and Chinese imports up 29%.<sup>108</sup> Mozambique must secure the offtake of its coal to both of these markets.

In order to meet this objective, however, Mozambique must drastically upgrade its rail and deep-water port capacity to accommodate increasing export volumes (discussed further in *Section 3: The Need for Inclusive Infrastructure*). The timeliness of these infrastructure upgrades is essential, as they will in turn impact three other important market variables:

- 1) **Price:** Most of Mozambique's coal reserves are of the high-grade coking coal variety – a valuable steel-making input. Competing sources of supply, however, have sustained downward pressure on the current price of this type of coal. While some in the industry speculate that this price depression will continue through the end of the decade, other analysts predict a rebound in prices, driven by the higher quality coking coal needed to operate increasingly efficient blast furnaces. Mozambique's low shipping costs to Asian markets and its low-cost, open-cast extraction operations in the Moatize Basin will increase exports, slightly offsetting commodity price risk.
- 2) **China:** Despite its proximity to China, which by itself accounts for half of the world's demand for coking coal, cheap seaborne imports from Australia and increasingly abundant supplies from bordering Mongolia will likely undercut Mozambican supplies. Furthermore, China's growth spurt in steel output may level off by the time Mozambique is able to develop its export infrastructure. Nonetheless, there will likely be sufficient demand for Mozambique's coal exports to China in the decades ahead.
- 3) **India:** While some commentators foresee Chinese growth tapering off sometime by the middle of the 21<sup>st</sup> century, the same is not true for India, where domestic energy demand will continue to increase beyond 2050. To this end, Mozambique's short-term plan should be to secure export offtake for its coal reserves in India. It has already achieved this to an extent, as India's Tata Steel has a 35% working interest in Rio Tinto's Benga mine, which is already delivering both thermal and coking coal to India. As of March 2013, Coal India, the country's state-run mining company, set aside \$6.5 billion to invest in overseas mining assets.<sup>109</sup> While Mozambique remains on the company's radar, its infrastructure constraints remain an ongoing issue, as evidenced by Rio Tinto's recent \$3 billion write-down.

## 1.4 Creating Economic Linkages

Increasing FDI inflows in the extractive sectors provide Mozambique with a valuable opportunity to improve its traditionally poor economic performance and take measurable action to reduce extreme poverty. However, increases in FDI do not necessarily lead to better development outcomes for host countries. It is the quality, not only the quantity of FDI that matters. The establishment of megaprojects in the developing world tends to raise unrealistic expectations with respect to employment creation; in reality, megaprojects have proven to have little impact on the labor market of host countries (see *Section 2.2: Local Content*). Extractive megaprojects tend to require fewer, more highly skilled workers

compared to the labor-intensive, low-skilled workforce that comprises traditional sectors in a developing country's economy (e.g. agriculture or manufacturing). Therefore, in order to maximize the social benefits of foreign investment inflows on a national level, it is crucial for policymakers to create an environment that is conducive to the development of powerful economic linkages.

In order to support linkages between extractive industries and the local economy, national policies should aim to improve the trade balance, increase the scope of comparative advantages, and enhance the competitiveness of local production.<sup>110</sup> Creating a favorable environment in which small and medium-sized enterprises ("SMEs") can grow and thrive would drastically improve linkages between megaprojects and local suppliers. Extractive resource development requires a long list of goods and services to support megaproject activities; in turn, increasing the capacity of SMEs makes it conducive for megaproject developers to source these needs locally, rather than having to import them. Local sourcing in megaprojects adds tremendous value to host countries by promoting local job growth and increasing the transfer of knowledge and skills. Before Mozambique reaches the point at which it can cultivate its human capital to support megaprojects, the country needs to invest heavily in improving the quality of its education. Having a skilled labor force would decrease the need for project developers to import foreign specialized labor, while also serving to sustain long-term growth. Indeed, given that extractive resources are nonrenewable, Mozambique must expand its private sector and develop its domestic capacity to ensure that economic growth and development continue even after resources run out.

#### 1.4.1 Creating an Enabling Environment for SMEs

Mozambique holds tremendous potential for SME development, particularly in areas surrounding its railway corridors. The economies of regions tied to extractive infrastructure development could significantly improve if SMEs are provided with crucial production inputs, such as adequate access to the transport infrastructure system, reliable electricity, and affordable credit. Given the growing willingness of donors and private organizations to invest in Mozambique, the Government has the opportunity to increase the economic presence of SMEs. For example, in Tete – where most of the country's coal and mineral extraction is currently taking place – the World Bank has identified a number of districts with the capacity to support megaprojects, including Cahora Bassa and Magoé (service industries) and Chiuta (agricultural inputs). Likewise, Nampula's districts around the Nacala Corridor present good possibilities for the development of industries in Nacala, Muecate, and Mecante, for agriculture in Erati-Namapa, Ribaué and Monapo, and for tourism in Memba, Mola and Malema. Finally, districts in the provinces of Sofala and Manica surrounding the Sena rail line of the Beira Corridor also display great agricultural potential.<sup>111</sup> Private investors like Rio Tinto are currently considering the possibility of partnering with nonprofits and farmers around these corridors to increase food production.

**Recommendation 5:** The Government needs to undertake careful studies to determine the potential for SMEs to develop in the extractive regions of Tete and Cabo Delgado and in the neighboring provinces – especially Niassa, Nampula, Zambezia and Sofala – and to link this SME development to both the needs of extractive industries and other infrastructure projects such as railway corridors.

#### *Shortfalls of SME Development*

While many of the abovementioned opportunities for SME development exist in Mozambique, there are a number of factors that inhibit megaproject linkages within the country. One of the biggest problems is

that there is a huge lack of local demand for natural gas and coal within Mozambique, largely due to an overall deficit of electrification throughout rural areas of the country. Furthermore, the remoteness and underdevelopment of provinces where megaprojects are located poses logistical and technical challenges for economic linkages. For example, Anadarko and ENI's Rovuma offshore discoveries are closest to Palma, the far northeastern corner of Cabo Delgado, located hundreds of kilometers away from the towns where potential gas use exists.<sup>112</sup> Thus, it is important for the Government and its national oil company, ENH, to work with foreign developers to find alternative domestic markets for the natural gas outside of power generation. Proposals for domestic industries include gas-to-liquids ("GTL"), liquefied petroleum gas ("LPG"), methanol, fertilizer, cement, iron and steel manufacturing.<sup>113</sup> However, Mozambique's unskilled and uneducated workforce will make the development of such industries a challenge. The country presently limits the employment of expatriate workers to a maximum 5%-10% of a company's total workforce, yet skilled labor required for such industrial megaproject development remains largely unavailable within Mozambique.<sup>114</sup>

**Recommendation 6:** The Government of Mozambique needs to work with IOCs operating in the Rovuma Basin to isolate possible synergies between offshore natural gas development and the country's domestic industrial base. Since electricity generation is the primary source of offtake for natural gas, the Government of Mozambique should direct investment towards building up electricity transmission infrastructure. Further, the Government should look to develop alternative industrial uses for natural gas, including the use of gas in heating and liquid gas in transportation, as well as the development of manufacturing hubs for methanol, fertilizer, cement, iron and steel production.

There is also a significant disconnect between Mozambique's need to attract sufficient foreign investment and its poor rankings in a range of "doing business" indices (see Appendix 3: Development Indicators). The private sector in Mozambique faces an unfavorable business environment that considerably limits its capacity to provide economic linkages. Private developers in Mozambique face an extensive bureaucratic process to formally register their businesses. It is also particularly costly and burdensome to deal with construction permits, employ workers, register property, trade across borders, and enforce contracts.<sup>115</sup> In addition to these regulatory constraints, state-controlled pricing and skewed tax incentives further inhibit market-based competition within Mozambique – megaprojects are largely exempted from taxation, while SMEs are not.<sup>116</sup> Furthermore, all land in Mozambique remains in the hands of the state and cannot be owned on a private basis; access to land in Mozambique is unequal and not transparent.<sup>117</sup> The cost of and access to capital is also an ongoing issue, as there is an overall shortage of financial agencies and institutions to provide sufficient credit to private businesses. These problems are accentuated by the fact that the country does not have a credit-rating agency for banks to use in the provision of loans.

**Recommendation 7:** In order to create powerful economic linkages between Mozambique's extractive industries and its domestic small-and-medium-enterprises, the Government of Mozambique must institute legislative reforms to improve its private-sector business environment. More specifically, reforms should encourage market-driven competition by reducing bureaucratic and regulatory constraints, eliminating the influence of state-controlled pricing and unequal taxation policies, addressing issues related to land-use rights, and increasing access to capital through the development of key financial agencies and institutions.



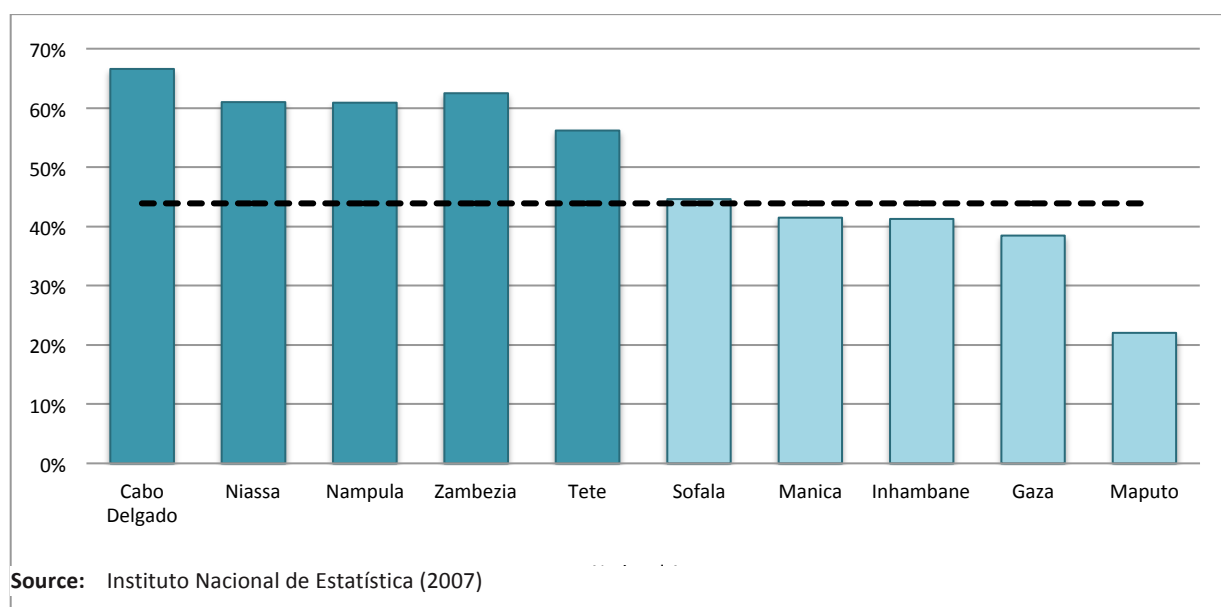
## 1.4.2 Infrastructure

Even when incentives are provided for private sector and SME development, firms often face the problem of scarce or unreliable infrastructure. As will be shown in the infrastructure section of this report, most provinces in Mozambique remain disconnected from each other, hampering the development of linkages between local businesses and foreign investors (see *Sections 3.1, 3.2, and 3.3*). Furthermore, unreliable or unavailable electricity in the few places where the grid exists prevents many people from starting businesses (see *Section 3.4*). Moreover, some Mozambican firms have reported producing at only half of their capacity due to insufficient electricity supply.<sup>118</sup>

## 1.4.3 Education

One of the most important factors hindering the creation of linkages in Mozambique is the lack of an adequately educated workforce, with the capacity to establish businesses and work in the country's emerging industries. Policies have usually failed to prioritize *vocational technical education* that is responsive to the needs of the country's production sectors.<sup>119</sup> Currently, concerns focus on the unavailability of both low-skilled and skilled labor to work in the growing extractive industries. Specifically, as shown in **Figure 18** below, the worst rates of literacy in the country are found in the regions where extraction activities are taking place – Cabo Delgado and Tete, as well as their neighboring provinces of Niassa, Nampula and Zambézia. All present illiteracy rates in these provinces are above the national average. This is particularly worrisome, because even if the social strategies of extractive companies involve hiring local personnel, this might not become a reality given the low education levels of the local workforce.

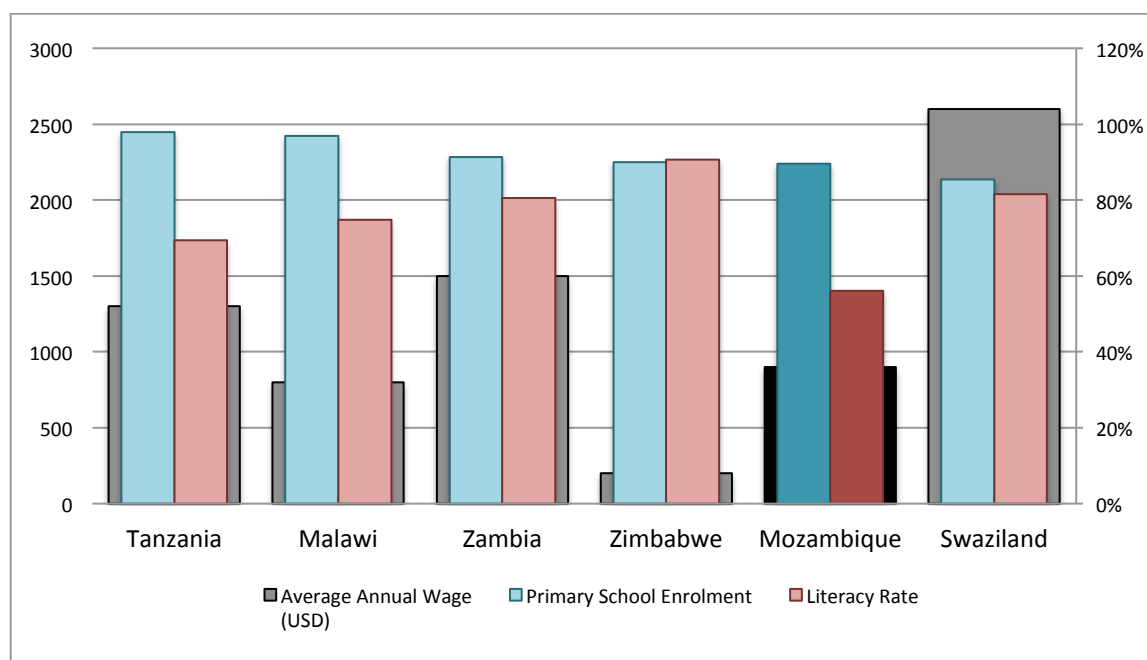
Figure 18: Illiteracy Rates per Provinces<sup>120</sup>



**Recommendation 8:** The Government must invest heavily in improving primary education on a national scale to tackle the country’s poor literacy rate and to increase the competitiveness of its labor force in the long run. The Government should also consider working with IOCs to develop targeted vocational training in regions where extractive industries are active in order to facilitate local hiring by project developers in these areas.

The abundance of Mozambique’s low-skilled labor force arguably represents a *competitive advantage* for industries requiring *intensive labor*.<sup>121</sup> However, extractive industries are typically not labor-intensive, and Mozambique’s low-skilled workforce is not necessarily the most attractive in Southeastern Africa. As shown in **Figure 19** below, Mozambican labor is not the cheapest option in the region. Specifically, the average wages, and rates of literacy and primary education enrollment in Malawi and Zimbabwe are greater compared to Mozambique. Literacy rates serve to assess current human capital,<sup>122</sup> while primary education enrollment is used as a proxy of future labor productivity.<sup>123</sup> Mozambique must improve access to and opportunities in education in order to strengthen the quality of its human capital, otherwise foreign investors may resort to hiring better-educated workers from neighboring regions at lower costs. Furthermore, with more Mozambicans enrolled in primary school, the educated low-skilled labor force has a greater chance of becoming more competitive in the medium to long term in both the extractive industries and in emerging local SMEs.

**Figure 19: Regional Wages, Literacy and Primary Education**<sup>124</sup>

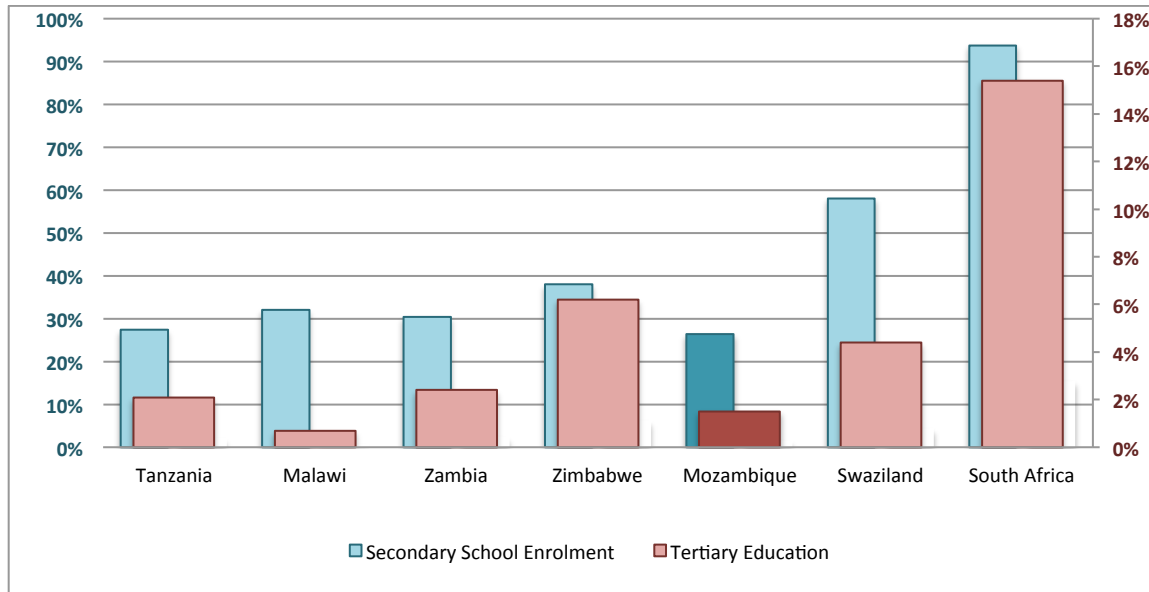


**Source:** WEF (education enrolment rates, 2012), Average Salary Survey (annual average salaries, 2012), Worldvision (annual average salary of Swaziland, 2013), and CIA’s World Factbook (literacy rates, 2012).

From the perspective of higher technical educational levels, the Mozambican labor force once again does not hold up well against its neighbors. Much like primary education, secondary education can help assess the future availability of local technical, managerial and directive staff in the short to medium term. In this respect, the Government needs to undertake greater efforts to increase secondary education enrollment – a rate that is currently the lowest in the region (see **Figure 20** below). Moreover,

Mozambique’s strikingly low rate of university-level education (currently less than 2%) underscores the urgent need for the country to aggressively invest in its secondary and tertiary education in order to ensure that Mozambicans can fill managerial and director positions in the extractive and services industries.

Figure 20: Regional Secondary Enrolment and Higher Education<sup>125</sup>



Source: WEF (education enrolment rates, 2012).

**Recommendation 9:** Mozambique urgently needs to invest in improving the quality of its primary, secondary, and tertiary education in order to cultivate its domestic human capital in both the immediate term and the long run.

## Notes to Section 1

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