Rovuma LNG Project: Macroeconomic Study

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Prepared by
Standard Bank

Together with

Conningarth Economists

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Executive Summary

Introduction

The purpose of this report is to provide an independent, objective assessment of Phase 1 of the Rovuma Liquefied Natural Gas ("**LNG**") Project at Afungi, Mozambique (''**the Project**''). The Project is being developed by Mozambique Rovuma Ventures (''**MRV**'') on behalf of ''**Area 4**''. Area 4 is located in northern Mozambique, in the offshore Rovuma Basin.

Standard Bank (supported by Conningarth Economists (''**Conningarth**'')), has prepared an independent study (''**The Report**'') upon the macroeconomic impact of the Project, upon the Mozambican economy (2018 GDP of USD 14bn) from its production and sale of LNG, Domestic Gas (''**Domgas**'') and Condensate, ultimately extracted from three (3) offshore deposits in two (2) fields licenced to Area 4, namely two (2) in Mamba Straddling reservoirs and one (1) from a Mamba Non-Straddling reservoir (385E).

The Project is intended to have a production capacity of 15.2 MTPA and includes the world's first ''Mega-Trains'' outside the State of Qatar. In 2017, Area 4 declared FID on the 3.4 MTPA Coral South FLNG Project. The Project, Area 4's second LNG project, is targeted to be Area 4's first onshore LNG project, which in turn has followed the discovery of 150 - 200 trillion cubic feet (''**Tcf**'') of offshore natural gas in the wider Rovuma Basin (across Areas 1 and 4), equivalent to around 26 - 36 billion barrels of oil equivalent (''**BOE**'') and arguably one of the world's top-ten largest recoverable gas reserves.

We note upfront that Standard Bank is not receiving a fee for this Report but is simply passing on the costs of its supporting sub-contractor to MRV.

Headlines

- The Project can develop and monetise the discovered hydrocarbon resources in a safe, timely and economic way, in line with its goals to create value for the GOM and Area 4; to optimise USD 3 billion of Mozambican content (''**Local Content**'') and to maximise recovery of reserves. The Report explores the Project's direct impacts at a macroeconomic level as well as both its indirect and induced effects, noting especially its larger scale to the 2014 Macroeconomic Study (for example, the first two trains are fifty two (52%) larger than those outlined in that Report). Importantly, the Project is assumed to be the leading single source of repayment for Mozambique's outstanding external debt and ENH's funding raised to follow its rights in participating in the ''**Rovuma Basin investment programme**'';

- Determine how delays in Project implementation (e.g. the ''**Combined Delay Case**'') materially impact the Mozambican economy, worsen project economics, impede the repayment of Government of Mozambique (''**GOM**'') external debt and increase the risk of non-realisation of such benefits, in what is one of the world's poorest countries;

- Outline the critical path activities needed to ensure a FID within mid-2019 (chiefly, approval of the POD including all associated requirements). In addition, and, arguably more importantly, outline the challenges to be overcome to ensure the Project is delivered on time and to budget and can therefore be a catalyst for a growing Mozambique LNG and Domgas industry that establishes Mozambique as a world-scale and world-class hydrocarbons and industrial producer (our ''**Project Vision**''); and

- More broadly, once the two initial onshore projects (Mozambique LNG and Rovuma LNG) achieve FID in 2019, and the Domgas Vision (outlined in the 2018

Macroeconomic Study) is in the process of realisation (Domgas FIDs by 2021), we see a need for Mozambique to have a clear vision of the next step in its LNG journey, which we argue should accelerate not decelerate, within a world seeking cleaner energy. We argue for two considerations:

- Effective implementation – there is an immense and permanent loss to Mozambique if projects are implemented with a delay (for example, due to inefficient bureaucracy within Mozambique processing customs paperwork) hence implementation needs to become an increasing focus within GOM; and

- Becoming an anchor supplier to China – at March 2019, China appears on a course to become a major LNG purchasing market (as with other industries) with LNG consumption now 52 MTPA (Reuters, 2018). We argue that Mozambique ought to position itself to become a reliable and fast LNG supplier to meet increasing Chinese demand, as that country implements coal to gas switching (a doubling of current LNG demand is broadly equivalent to only 1.3% of China's coal consumption cap). LNG analogies can be drawn with the role of Indonesia and Malaysia to Japan in the past. We prefer the examples of Australia (mining resources) and New Zealand (food), which have become reliable supply partners to China and, the key point, have developed major, domestic industries which are economic bedrocks within such economies and employ thousands of indigenous citizens and boost national prosperity.

Key findings

The report offers several key findings:

1. **Positive economic impact –** LNG is of transformational macro-economic importance for Mozambique. It is in line with the GOM's Gas Master Plan (''**GMP**'') to boost industrialisation and promote the best chance of economic diversification. LNG adds value by upgrading Mozambique's natural resources in-country before generating massive export benefits. The Project is likely to trigger the start of a decade-long process of Foreign Direct Investment (''**FDI**'') after the construction of the Initial Onshore Trains starts, therefore promoting increased macro-economic stability. In addition, the Project is offering ''**Committed Domgas Volumes**'' (75 mscfd per train for Phase 1), which should allow Mozambique to develop multiple Domgas Projects (e.g. GTL, Fertiliser, IPPs, MTO);

2. **Benefit to all –** The Project makes sense for Mozambique because it offers a win-win for the GOM, MRV, future Domgas Projects, and civil society. It provides Mozambique with a massive future revenue stream and provides the basis for various linked and ancillary revenue streams and economic developments (for example, Domgas, Condensate, LPG, SSLNG and LNG bunkering). In terms of headline numbers, the Project's contribution is enormous:

    a. Gross Domestic Product (''**GDP**'') is envisaged to annually increase in real terms 2018 by USD 15.4 billion in the ''**High Capex**'' scenario and USD 18.5 billion in the ''**Low Capex**'' scenario (both more than Mozambique's current GDP). We note that around 60% of GDP benefits accrue to the non-O&G sectors;
    b. In the High Capex scenario, Gross National Product (''**GNP**'') (excluding net foreign transfers) will increase by USD 9.9 billion p.a. and USD 14.2 billion in the Low Capex scenario;

c. Mozambique's Balance of Payments (''**BOP**'') is expected to benefit by USD 7.7 billion p.a. in the High Capex scenario and 9.8 billion p.a. in the Low Capex Scenario (over 300% of the 2017 annual deficit)
d. Fiscal proceeds are expected to be USD 4.3 billion p.a. in the High Capex scenario and USD 5 billion p.a. in the Low Capex scenario
e. In addition, in the High Capex scenario the Project provides some 257,586 on-site, supply chain and economy-wide job opportunities within Mozambique, rising to 323,050 in the Low Capex scenario. The Project itself is assumed to employ 20,500 people in the construction phase and 1,300 in the operational phase, with these jobs massively outweighed by the creation of ''Supply Chain'' and ''Economy-Wide'' jobs. Whilst these numbers appear large at face value, they are proportionately less (3.6%) as a percentage of Mozambique's total employment (7.1 million people) than its impact on GDP (over 100% in each scenario).
f. Individually, the Project will boost Mozambique's long-term projected GDP growth from 4% to 4.8% in the High Capex scenario and to 5.4% in the Low Capex scenario, which implies that Rovuma LNG and Mozambique LNG together will increase long-term projected GDP growth from 4% to over 6%
g. The Project will also be the catalyst for future Domgas Projects. Standard Bank explicitly notes the Project's economic contribution is understated as we do not include the benefits of the any ensuing Domgas Project (which use the Project's supplied Domgas) within this Report. In the case of GTL, for example, this has been calculated in the 2018 Macroeconomic Study.

3. **Risks of delay –** At date of drafting, Standard Bank has three primary concerns with respect to the implementation of the Project (and associated projects):

a. Security – this is outside of our competence but needs to be closely monitored and acted upon by GOM;

b. Domgas – as outlined in the 2018 Macroeconomic Study, Standard Bank has a clear ''Domgas Vision'', which we believe is shared by the GOM. MRV also believes it can contribute to the realisation of this vision, through its offer of Committed Domgas Volumes outlined in the POD (included in the Report). We also believe that Mozambique has the chance to be at the cutting-edge of new Domgas opportunities (for example, SSLNG and LNG bunkering). We have outlined in the 2018 Macroeconomic Study challenges we see for the Domgas Vision, which we do not repeat in this Report; and

c. Implementation. Standard Bank is concerned that the scale of implementing parallel onshore LNG construction projects at the same site, at the same time, may cause unprecedented strain on national business processes, as specified within the Decree Law. For example, the issue of customs clearance, import permits, work permits, issue of identification documents, construction permits and so on for what is a massive construction project. Within Section 3, we outline the two-fold permanent cost of the risk arising from the ''**Cost of Bureaucracy**'' upon the GDP of Mozambique. Firstly, the cost arising out of parallel delays in the First Gas of Mozambique LNG and Rovuma LNG. Secondly, through the Combined Delay Case, the overall cost arising out of a delay in Mozambique's entire **Rovuma Basin investment programme**. For example, if Rovuma LNG is delayed twelve (12) months in achieving First Gas, by definition Rovuma LNG Phase 2 (Trains 3 & 4) will be twelve (12) months late in achieving their own FID and then subsequent First Gas. This delay cannot be recovered. Within Section 5, Standard Bank outlines one option to mitigate this risk (for the benefit of GOM and all Mozambicans). There will be others.

4. **Leading role for GOM –** The GOM should take a leading role in creating the appropriate commercial, fiscal and legal conditions to enable the timely development of a competitive Project. This encompasses:

    a. Promptly approving MRV's POD submission such that it can declare FID in mid-2019;
    b. Determining its position on the implementation challenges raised within this Report such that those challenges are of reduced likelihood of occurrence; and
    c. Determining its position on the ''Domgas Vision'' outlined within the 2018 Macroeconomic Study, such that Domgas will not be an obstacle to the Project implementation and its benefits can be realised for all Mozambicans

Summary Project Description

The Project will be located adjacent to Area 1's Mozambique LNG project, within the 6,475 km 50 year DUAT at the Afungi peninsular, Palma. The Project will produce approximately 15.2 MTPA of annual LNG output, using Air Products' AP-X liquefaction process. Assuming 100% availability, this will require in the order of 2,488 mscfd natural gas feedstock, with an additional 150 mscfd required to provide the Committed Domgas Volumes.

The ensuing, required 19.1 Tcf of natural gas feedstock will be delivered from two separate fields: Mamba Straddling (12 Tcf) and Mamba Non-Straddling (385E, 5.7 Tcf); plus 1.4 Tcf for Domgas. To produce the feedstock, 24 individual wells will need to be drilled, apportioned sixteen (16) from the Mamba Straddling resources and eight (8) from the 385E deposit. The straddling resources will be produced up to 12tcf in an independent but co-ordinated manner alongside a similar production of 12 Tcf by Area 1 (24 Tcf in total).

Following ExxonMobil's accession to the Area 4 concession in December 2017, the Operatorship of Area 4 was divided between Eni Rovuma Basin BV (''**ERB**'') as the offshore operator (''**Upstream Operator**'') and ExxonMobil Moçambique Limitada SA (''**EMML**''), as the liquefaction and related operations operator (''**Midstream Operator**'').

The EPCs of the Project components (onshore and offshore) will be assigned to a consortium of companies able to perform the activities in line with targeted timing and costs.

Under this Report, FID is targeted for mid-2019, with Train 1's First Gas scheduled for 2024 (5 years from FID) and Train 2's for late 2024 / early 2025 (5.5 years from FID). Cash flows will then flow until the 2049 expiry of the EPCC Development & Production period (30 years after POD approval of the individual Mamba Straddling Discovery Area).

Financial Analysis

Standard Bank reviewed a nominal Project Financial Model (''**PFM**'') developed by ExxonMobil which is technically consistent with (1) the Open Book Financial Model (''**OBFM**'') presented to the GOM (in support of the POD) and (2) the developing Lenders Financial Model (''**LFM**''), being built to support the future raising of a project finance loan for the Project). The financial analysis was then carried forward to a Cost Benefit Analysis (''**CBA**'') performed by Conningarth in their work in Section 3.

The PFM is based upon the LFM Base Case which assumes a LNG Free on Board (''**FOB**'') price of 9.5% of Brent in the High Capex scenario and 10.5% in the Low Capex scenario, with a specific projected Brent profile provided by Poten & Partners. We outline this profile within Section 2.

The Project will generate three different revenue streams: LNG (approximately 95% of revenues); Condensate (approximately 3% of revenues) and Domgas (approximately 2% of revenues). The technical bedrock of each model is an annual production of 0.75 Tcf (equivalent) of LNG from the two Mega-Trains.

Within Section 2, we outline key elements of the financial analysis. In order to make this Report as comparable as possible to the 2014 Macroeconomic Study (for ease of analysis by GOM and Civil Society), the Report outlines the Project's financial reporting in the same manner as Mozambique LNG did in that Report.

Before noting the results, it is important to note significant headline differences between the two projects, which affects an easy comparability by the reader:

- The Project's output is 52% larger than the 10 MTPA Mozambique LNG plant then assumed in the 2014 Macroeconomic Study (by volumes);
- Mozambique LNG's assumed capital costs were provided within the 2014 market environment, whereas the Project's estimates have been made within the 2018-2019 costing environment;
- The Project's pricing profile is derived from Poten's current LFM case, whereas the 2014 Macroeconomic Study included a flat LNG pricing assumption of USD 12 MMBTU. Within the Section 3 Economic Analysis, we also include assumed 2% annual indexation of revenues and operating costs with a view to then fixing analysis in 2018 constant prices. Noting the Poten profile, this means in later years the Project has a higher revenue assumption than Mozambique LNG within Section 3;
- In the 2014 Study, Mozambique's GDP was USD 15 billion whereas 2018 GDP is USD 14 billion (which affects the relative baselines);
- In the 2014 Study, neither Mozambique LNG's condensate or Domgas revenues were included, hence revenues under this Report are higher; and
- In the 2014 study, prices were based at 2014 whereas in the Report prices are based to 2018

Given the stage of Project development, expected capital costs are subject to a range of uncertainty (e.g. EPC tenders in progress). That said, economic analysis requires a single number to be set in order for messages to be easily communicated. The broad funding required to build the Project within the Report is an assumed, (all-in) nominal USD 32.8 billion in the High Capex scenario (over 200% of Mozambique's projected 2018 GDP of USD 14 billion). In the Low Capex scenario, the projected costs are USD 26.9 billion (192% of current Mozambique GDP). A [60 – 66] month timeframe is required for Project construction.

In terms of financing structure, all upstream and Domgas costs will be funded by each Area 4 Concessionaire pro-rata to their interests in the Concession. For the onshore part of the Rovuma LNG Phase 1 development, Area 4 plans to fund construction costs through a mixture of equity and debt. The issue of financing plays little role in this Report as it is focused on economic and commercial concerns.

From a financial perspective, Standard Bank concludes that in each case the results are highly attractive for the GOM. On a non-discounted basis, the GOM earns 63.9% of the available take, in nominal terms, in the High Capex scenario. In the Low Capex scenario, the GOM take rises to 66.5%. These ratios are in line with that calculated in the 2014 Macroeconomic Study. On a discounted basis, and noting the Project is scheduled to take its FID in 2019 (whereas the 2014 Macroeconomic Study assumed a 2015 FID), the discounted take (which includes the time value of money) calculates the total Mozambique Inc take is 95% in the High Capex

scenario and 90% in the Low Capex scenario. Therefore, the Project is of immense importance to Mozambique.

Economic Analysis

Conningarth's Macroeconomic Analysis was comprised of two elements. Firstly, a CBA that utilised the same individual cases as the Financial Analysis above. The CBA was also accompanied by a Benefit Cost Ratio (''**BCR**'') analysis. The CBA as supplemented by indexation for Revenues and Opex, before deflation to 2018 constant prices, generally found the same results as the Standard Bank financial analysis.

Secondly, a Macroeconomic Impact Analysis based upon the latest Social Accounting Matrix (''**SAM**'') model for Mozambique was also performed. As with the Financial Analysis, the economic analysis used the pricing within the LFM Base Case. As with previous reports prepared with Standard Bank, Conningarth focused its Macroeconomic analysis upon a conventional set of output variables: GDP, GNP, Employment, BOP, fiscal contribution, capital utilisation and distribution of income.

The Base Case reflected the following transformative macroeconomic impacts, of unique importance to Mozambique (expressed in annual average 2018 real terms):

- GDP is envisaged to annually increase by USD 15.4 billion in the ''High Capex'' scenario and USD 18.5 billion in the ''Low Capex'' scenario (more than Mozambique's current GDP), which includes a USD 3 billion LC commitment by Area 4.
- Around 60% of the GDP benefits accrue to the non-O&G sector, with the leading other sector beneficiaries being Agriculture (14%) and Trade & Accommodation (13%);
- In the High Capex scenario, GNP (excluding net foreign transfers) will increase by USD 9.9bn p.a. and USD 14.2 billion in the Low Capex scenario;
- The Project will benefit national capital formation to the annual amount of USD 34.9 billion in the High Capex scenario and USD 32.7 billion in the Low Capex scenario. Significantly, this will be funded by foreigners and not by Mozambique's relatively limited savings. Noting the scale of the Rovuma Basin's GIIP (150 – 200 Tcf) and the fact this cannot be consumed by the end of the assumed EPCC term in 2049, this is extremely important for Mozambique's long-term prosperity, in particular the reinvestment of savings
- In the High Capex scenario, the Project is projected to generate and sustain an additional 257,586 on-site, supply chain and economy-wide jobs during its life, rising to 323,050 in the Low Capex scenario, with the scale of the Project's contribution towards savings/reinvestment being crucial in achieving these numbers. The Project itself is assumed to employ 20,500 people during the construction phase and 1,200 staff during the operational phase. **These jobs are significantly outweighed by the creation of ''Supply Chain'' and ''Economy-Wide'' jobs, by a factor of between 122-153x.** Whilst these numbers appear large at face value, they are proportionately less (3.6%) as a percentage of Mozambique's total employment (7.1 million people) than its impact on GDP (over 100% in each scenario).
- The BOP annual impact will be USD 7,793 million in the High Capex scenario, rising to USD 9.8 billon in the Low Capex scenario. The latter is a switch around of over 300% of the 2017 Current Account deficit of USD 2.6 billion
- The annual fiscal impact will be USD 4,337 million in the High Capex scenario and USD 5,345 million in the Low Capex scenario
- The Project increases total household income per capita by 50% in the High Capex scenario, and by 61% in the Low Capex scenario
- We should be clear the impact of the Project is underestimated as we do not include any of the subsequent economic benefits of the Domgas supplied by the Project being processed in Mozambique through any subsequent Domgas project. This has been addressed in the 2018 Macroeconomic Study

Noting the Project will be, essentially, built in parallel with Area 1's Mozambique LNG Project at the Afungi Site, we considered it appropriate to conduct a twin-fold sensitivity upon the impact of a one year (1) year delay in the First Gas of each Project. From a Mozambique perspective, Standard Bank is concerned of the potential impact of the ''**Cost of Bureaucracy**'' causing a delay in the Project's First Gas. Such bureaucratic delays could be caused by a delay in among others issuing customs clearances, issue of work permits, construction permits or associated licences. From the perspective of Rovuma LNG and Mozambique LNG, a one-year delay in First Gas results in a permanent annual GDP loss of 778 million (high capex scenario) or USD 1,031 million (low capex scenario). Note this scenario is underestimated as it is based on Rovuma LNG's increased costs from a one (1) year delay in FID, a six (6) year construction period will be of significantly higher costs (including IDC).

There is another area where this calculation is underestimated. A one year delay in the First Gas of Mozambique and Rovuma LNG will lead to a delay in the FID of, for example, Prosperidade (Area 1) or Rovuma LNG Phase 2 (Area 4). This therefore means the entire **Rovuma Basin investment programme** will be delayed (for example, Domgas Projects fed by the second phase of onshore LNG production will also be delayed). Accordingly, in this ''**Combined Delay Case**'' we envisage a one (1) year delay in achieving First Gas leads to a USD 1,637 million loss in Mozambique's GDP (High Capex scenario) or USD 2,169 million (Low Capex scenario), which cannot be recovered during the analysis period.

In this regard, a particularly topical issue is Mozambique's outstanding external debt (USD 14.1 billion), ENH's USD 11-12bn funding requirements (see below) and the long-term potential creation of a Sovereign Wealth Fund (''**SWF**''). Standard Bank assumes the Project is one of the major sources of repayment of each element, before the balance of its proceeds are used elsewhere (when not used to fund badly needed social and transportation infrastructure).

Commercial Analysis

The bulk of commercial issues relating to the Project relate to issues surrounding the sale of LNG to global markets. These issues are not Mozambican and macro-economic in nature and are therefore not analysed in detail in this Report (subject to the below comments on the changing nature of China's LNG demand).

Standard Bank instead limits its commercial comments to issues that relate to intra-Mozambique considerations.

Firstly, Domgas. Standard Bank sees Domgas as a topic that is vital for Mozambique in the long-term, but continues to move slower than desired by stakeholders. We have analysed the issue of Domgas in detail in the 2018 Macroeconomic Study so we do not repeat the bulk of that discussion here (e.g. concerning the Aggregator; its credit risk; its corporate structure; pricing and supply portfolio; legislation; fiscal provisions; the Domgas Tender and the independent economic regulation etc). Within the Report, we comment as follows:

- Area 4 is supportive of Domgas, to the extent the development of no individual LNG train is impacted as a result (as LNG is of far larger economic benefit to Mozambique. As a rule of thumb, even larger Domgas projects only represent 10%-15% of the benefit of a large LNG project). To this end, the Area 4 position is the same as that outlined in the 2018 Macroeconomic Study
- The Project has proposed Committed Domgas Volumes within its POD. This is inclusive of the 2016 deferment of Domgas in relation to Coral FLNG; and

- Per Section 4, the Committed Domgas Volumes are integral to the overall POD including Area 4's deep-water offshore characteristics; the proposed UUOA with Area 1 and the use of Mega-Trains to monetise the bulk of resources

From a Condensate perspective, Area 4 acknowledges that Condensate forms a complimentary source of revenues for the Project (representing around three (3) % of revenues). Area 4 is exploring whether there is an optimal domestic utilisation of the Condensate, or whether there it is more optimal to be exported (more likely due to high benzene content). Either way, from Standard Bank perspective, it is clear at this stage that Condensate is a secondary issue compared to the LNG. We recommend it is progressed following the approval of the POD. Within Mozambique though, we should note that even projected Condensate from the Project is 10,000 bpd (equivalent to 28% of Mozambique's current downstream demand, (CITAC, 2018)).

From a LPG perspective, MRV proposes a twin-fold scheme of supplying the Palma community with LPG (for cooking purposes) and more widely, developing a 17,000 TPA project to supply wider Mozambique with LPG (equivalent to over 50% of current national LPG demand).

From an ENH funding perspective, Standard Bank believes it is very important to closely monitor ENH's long-term funding options, noting ENH's shareholding in individual projects (e.g. 10% Area 4, 15% Area 1, up to 30% in other projects such as Domgas). Based on our current schedule of expected Projects, Standard Bank can see a peak ENH investment requirement in the order of USD 11 - 12 billion. This amount represents up to 86% of Mozambique's current GDP, noting the current external debt to GDP ratio is in the order of 100% (further noting ENH is a SOE).

For this Project, and assuming the Project is looking to raise USD 12 – 15 billion debt finance, we can envisage ENH have an individual funding requirement in the order of USD 1.2 – 2 billion (for its equity component), and USD 1.2 – 1.5 billion (in respect of its pro-rata completion support undertaking for the debt component), thus in total USD 2.4 – 3.5 billion. These numbers are assuming costs per the High Capex or Low Capex scenarios outlined in Section 2, and assumed debt raising of USD 12 – 15 billion.

We note this obligation essentially has to be provided in parallel for that for the Mozambique LNG project, in which ENH has a fifteen (15) % shareholding, which Standard Bank understands has an approximate all-in cost in the order of USD 25 billion (including historic exploration). Thus, ENH's expected funding under Mozambique LNG may be USD 3.75bn, comprising USD 1.88 billion equity and completion support of the same amount (assumed debt USD 12.5bn). Taken together, for the two Projects, ENH will need to raise USD – 6.1 - 7.25 billion in 2019 (at a time when there is a 100% external debt to GDP ratio).

From a policy perspective, Standard Bank considers it very important for GOM and ENH to have a close alignment in terms of how its borrowings will be repaid and over what timeframe. For example, will they be repaid solely by dividends from the individual projects (which will take longer)? Alternatively, will the GOM consent to some of its tax proceeds being utilised to repay ENH's borrowings. This issue has implications for ENH's autonomy and freedom to decide its actions in the later 2020s. It is also linked to the creation of a future SWF and what it chooses to spend its money on.

Lastly, Standard Bank raises other Project discussion points (e.g. unitisation, local content (''**LC**'') and affiliate sales) to be resolved to achieve the fastest possible FID during 2019.

Next Steps & Conclusion

In the 2014 Macroeconomic Study, Standard Bank sought to outline LNG's likely benefits to Mozambique and to encourage the enactment of the Decree Law (to move LNG forward). In the 2018 Macroeconomic Study, Standard Bank sought to outline its Domgas Vision and to indicate the risks to the achievement of Domgas (which Mozambique sees as vital, following soon after the development of LNG).

In the Report, we make three main points:

- The Project is wholly economically beneficial for Mozambique. To pick just two examples, GNP is likely to benefit by an annual average of USD 9.9 billion in the High Capex scenario or USD 14.2 billion in the Low Capex scenario. Alternatively, the Project is projected to result in 257,586 nationwide jobs within Mozambique (divided into on-site, supply chain and economy wide jobs) in the High Capex scenario and 323,050 in the Low Capex scenario. Given scale, it is clear the Project is Mozambique's best ever economic opportunity and will hopefully be the start of a monumental development sequence that takes Mozambique to a middle-income country;
- The Project's POD should be promptly approved. Our main concern is then the parallel physical implementation of the Project and Mozambique LNG projects throughout the 2020 - 2024 periods. We are concerned the scale of bureaucratic requirements and obligations for each project arising from within Mozambique, could affect the speed of Project execution. To that end, we calculate the Rovuma Basin investment programme cost of the Combined Delay Case (in terms of lost GDP) of a one-year implementation delay is USD 1,637 million p.a. (High Capex scenario) or USD 2,169 million (Low Capex scenario). For clarity, the GOM (and by extension Mozambican citizens) lose most if the Project is delayed.
- Moving forward, changing global events such as China's move towards cleaner energy offer Mozambique a ''once in an existence'' opportunity to become a major natural gas supplier to China for the 2020s, 2030s and beyond. To that end, we would encourage Mozambique to follow the examples of Australia (mining resources) and New Zealand (agricultural and food products) to become a major supplier to China (among other markets), and by extension developing a major domestic supporting industry (employing hundreds of thousands of indigenous citizens) to underpin the LNG exports.

In terms of action points, we would argue for a close evaluation of how the Decree Law can best be implemented throughout the construction period of Mozambique and Rovuma LNG, which involves in the order of 40,000 construction workers at a single site (Afungi) and the import of thousands of pieces of equipment, to then be assembled and installed in a precise sequence.

At today, we consider it may be worth exploring whether an outsourcing of many of the implementation activities within Cabo Delgado under clear political oversight (for example, to groups of consultants present in all key ministries and bureaucratic functions) could be the most optimal means to build each project on time and to budget, such that the projected economic benefits of Mozambique and Rovuma LNG can be realised for the benefit of all Mozambicans.

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Key Terms & Definitions

Defined Term	Definition
2014 Macroeconomic Study	Standard Bank's independent Macroeconomic Study (for Anadarko, on behalf of Area 1) on the impact of LNG on Mozambique, public domain since 2014
2018 Macroeconomic Study	Standard Bank's independent Macroeconomic Study (for Shell, in respect of the Afungi GTL & Power Project, which was privately released to relevant private and public stakeholders in November 2018 and is expected to be publicly released shortly
Aggregator	The monopoly, wholesale purchaser and seller of natural gas envisaged by the Decree Law, expected to be ENH or an affiliate. The 2018 Macroeconomic Study envisages the Aggregator's operations to be divided between a "HoldCo", "GasCo", "InfraCo", with all ‘"EquityCo" interests reporting directly to ENH
APC	Anadarko Petroleum Corporation
Area 1	Concession led by APC in Area 1 of the Rovuma Basin
Area 4	Concession awarded initially to Eni East Africa (90%), now MRV, and ENH (10%). Noting also that Galp Energua Rovuma B.V. (''**Galp**'') (10%) and KG Mozambique Ltd (''**Kogas**'') (10%) each acceded to the JOA in 2007
BBL	Barrels
Bcf	Billion cubic feet
BCR	Benefit Cost Ratio
BOP	Balance of Payment
Bpd	Barrels per Day
CAGR	Compound Annual Growth Rate
CBA	Cost Benefit Analysis
Combined Delay Case	A delay in the First Gas of Mozambique LNG and Golfinho LNG which affects the FID of subsequent trains and/or Domgas projects
Committed Domgas Volumes	MRV's proposal in the POD to deliver 75 mscfd per train for RLNG Phase 1, with a commitment to supply an additional 350 mscfd over time
Common Facilities	The MOF and the LNG Marine Terminal
DCF	Discounted Cash Flow

DFI	Development Finance Institution
Domgas	Domestic Gas, treated by the Upstream Suppliers
Domgas Project	Domestic Gas Project
DSF	Domestic Stabilisation Fund
DUAT	Direito do Uso e Aproveitamento da Terra
Economy-Wide Impact	The induced impact of the Project defined in Section 3.4.4
EITI	Extractive Industries Transparency Initiative
ENH	Empresa Nacional de Hidrocarbonetos
EMML	ExxonMobil Moçambique Limitada
Eni East Africa	Wholly-Owned affiliate of Eni SpA until 2013 and then controlled by Eni SpA (71.43%), and CNODC Dutch Cooperatief U.A) (28.57%) (‘‘CNODC’’) until 2017 when it was denominated MRV
EOI	Expression of Interest
EPC	Engineering, Procurement & Construction
EPCC	Exploration & Production Concession Contract (Mozambique)
ERB	Eni Rovuma Basin BV
ESIA	Environmental & Social Impact Assessment
FDI	Foreign Direct investment
FEED	Front End Engineering & Design
FID	Final Investment Decision, for the Project envisaged to take place in mid-2019
First Gas	The initial production of LNG from Rovuma LNG
FLNG	Floating Liquefied Natural Gas
FX	Foreign Exchange
GCA	Gas Commitment Agreement
GDP	Gross Domestic Product refers to and measures the domestic levels of production in a country. It represents the monetary value of all goods and services produced within a nation's geographic borders over a specified period of time

GIIP	Gas Initially In Place
GJ	Gigajoule
GMP	Gas Master Plan
GNP	Gross National Product measures the levels of production of all the citizens or corporations *from a particular country* working or producing *in any country*
GOM	Government of Mozambique
Greenfield	Development of a project in an area where no project currently exists
GTL	Gas-To-Liquids
HOAs	Heads of Agreements
IDC	Interest During Construction
IDF	Initial Development Facilities
IMF	International Monetary Fund
IMO	International Maritime Organisation
Initial Onshore Trains	Mozambique LNG and Rovuma LNG (each comprising two trains)
INP	Instituto Nacional de Petroleo
IRR	Internal Rate of Return
km	Kilometres
LC	Local Content
LDCs	Least Developed Countries
LFM	Lenders Financial Model
LNG	Liquefied Natural Gas
LNG Marine Terminal	The LNG loading jetty
LPG	Liquefied Petroleum Gas
m	Million
Marine Concessions	Two agreements that Area 1 / 4 signed to design, build and operate its marine facilities (i.e. LNG Marine Terminal and MOF)

mbtu	Million British Thermal Units
Mcf	Thousand Cubic Feet
MDGP	Minimum Domestic Gas Price
MIREME	Ministry of Mineral Resources and Energy
MOF	Materials Offloading Facility
MOU	Memorandum of Understanding
Mozambique Inc	GOM interests aggregating the income arising from GOM taxation and ENH income
MRV	Mozambique Rovuma Venture S.p.A., the current Area 4 Operator, formerly known as Eni East Africa SpA. Owned by Eni SpA (35.715%), ExxonMobil Development Africa B.V. (35.715%) and CNODC Dutch Cooperatief U.A) (28.57%) (''CNODC'')
mscfd	Thousand Standard Cubic Feet per day
MTO	Methanol to Olefins
MTPA	Million Tonnes Per Annum
MW	Megawatts
NOC	National Oil Company
Northern Industrialisation	Defined in Section 1.1
NPV	Net Present Value
O&G	Oil & Gas
OBFM	Open Book Financial Model
On-Site Impact	The direct impact of the Project defined in Section 3.4.4
p.a.	Per Annum
PFM	Project Financial Model
POD	Plan of Development
PP	Profit Petroleum
PPT	Petroleum Production Tax

Project	The Rovuma LNG Project Phase 1, including all associated onshore (e.g. two LNG trains, including Common Facilities) and offshore infrastructure
Project Vision	Defined in Section 1.1
Report	This independent Macroeconomic Study
Rovuma Basin	Offshore basin at mouth of the Rovuma River, containing Area 1 and Area 4
S&I	Savings & Investment
SAM	Social Accounting Matrix
SME	Small & Medium-Sized Enterprise
SOE	State Owned Entity
SPA	Sale & Purchase Agreement
SPE	Special Purpose Entity
SPV	Special Purpose Vehicle
SSA	Sub-Saharan Africa
SSLNG	Small-scale Liquefied Natural Gas, inclusive of associated storage and regasification options (e.g. Floating Storage & Regasification Units (''**FSRU**''), Floating Storage Units (''**FSU**'') and Floating Regasification Units (''**FRU**''))
Standard Bank	Standard Bank of South Africa together with Standard Bank Mozambique
Supply Chain Impact	The indirect impact of the Project defined in Section 3.4.4
TBA	To Be Announced
Tcf	Trillion Cubic Feet
TPA	Tonnes Per Annum
Upstream Suppliers	Together, Areas 1 and 4 in their capacity as developers of Mozambique LNG and Rovuma LNG respectively, and potential suppliers of Domgas to the Aggregator
USD	United States Dollars
UUOA	Unit Unitization and Operating Agreement
VAT	Value Added Tax

WHT	Withholding Tax

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1 Introduction

1.1 Purpose of this Report

The purpose of this Report is to outline various salient descriptive, commercial, policy and macro-economic considerations concerning the Project (which upon completion, will be one of the world's largest single-phase LNG projects).

As with the 2014 Macroeconomic Study (Mozambique LNG) and 2018 Macroeconomic Study (Afungi GTL & Power Project), Standard Bank is providing an independent analysis of the Project from a general Mozambican economic development / public interest perspective and is not receiving a payment from, nor has any other form of commercial interest in, any of the Area 4 concessionaires, in consideration for this Report.

The "**Project Vision**" of this Report is that the Project, and its peer Mozambique LNG, are each built on-time and to budget, which allows the construction of successor trains to promptly commence as part of a long-term **Rovuma Basin investment programme**. This will facilitate the achievement of the Domgas Vision (outlined in the 2018 Macroeconomic Study) as well as a wider vision of ''**Northern Industrialisation**''.

Within this Report, Standard Bank defines Northern Industrialisation as the sum of:

- Multiple onshore trains of LNG (perhaps up to 90 MTPA plus at the Afungi Site), which may lead to the visual Afungi Site scenario outlined in Section 1.4.4;
- Multiple Domgas projects (e.g. IPP, Fertiliser, MTO, GTL), noting the dry nature of Rovuma Basin gas (high methane, low liquids components);
- The facilitation of SSLNG and LNG Bunkering within Mozambique;
- The creation of multiple primary, service and tertiary industrial, commercial and agricultural developments to serve each of the above, across Mozambique, thus maximising Local Content (''**LC**''), in effect turning Northern Mozambique into a proxy for a Qatari-type LNG and industrial complex (e.g. Ras Laffan)
- Underlying the above is the vision to make Mozambique the world's number 4 or 5 LNG supplier (behind USA, Qatar, Australia and potentially Russia)

1.2 Chronology of Activities

Standard Bank notes below a summary chronology of activities in relation to the Project:

Table 1: Chronology of Activities

Section	Comment
2006	Award of the Area block to Eni East Africa and ENH, effective from February 2007
2007	Entry of Galp and Kogas into Area 4
2011	Area 4's initial well (MS-1) that discovered material offshore gas
2013	Farm-In by CNODC into Eni East Africa and declaration of the Mamba Complex and Coral Discovery Areas
2014	Entry into force of the Decree Law 02/2014 (December)
2015	Execution of the UUOA between Area 1 and Area 4 (to be approved by GOM)

2017	FID of Coral South FLNG (after approval of the Coral South POD) in June and farm-in by ExxonMobil into Eni East Africa, since renamed MRV, in December
2018	MRV submission of POD and Standard Bank engaged to provide the Report
2019	Envisaged FID of Rovuma LNG Phase 1
2022	Target First Gas of Coral South FLNG
2024/2025	Target First Gas of Train 1 (5 years) and Train 2 (5.5 years)
2049	Expiry of underlying EPCC for Rovuma LNG Phase I

For the general reader, it is worth noting the speed of Area 4's development to date. Its initial project, Coral South FLNG for the development of the Coral field, took its FID only three (3) years after last exploration well within the petroleum deposit discovered in 2012. The Project, an extremely large integrated offshore and LNG development by any definition, is now scheduled to achieve FID within eight (8) years of initial exploration discovery. By SSA standards, this is extremely fast and also competitive by global LNG standards. Should the Project be able to take FID in mid-2019, this will be a tribute in part to the GOM's work to date with the pressure then switching towards facilitating Project implementation, to ensure the potential economic benefits outlined in this Report actually materialise.

1.3 Assumptions

- The assumed date of drafting is 15th March 2019. Only public domain information has been used in relation to the status of the Area 1 development (including the 2014 Macroeconomic Study). For comments relating to Domgas, we have noted the 2018 Macroeconomic Study (sent to GOM stakeholders and the Area 1 and 4 partners on 29th November 2018);

- As a general matter, if an issue relevant to the development of LNG in Mozambique was analysed in detail in the 2014 Macroeconomic Study (for example, Implications for the State; Project Impact on Mozambique Banking Sector; Project Special Regimes; Public Domain Financial Analysis; Downstream Project Methodology; Mozambican Context) we do not analyse it in his Report, with one exception (Policy Options) per Section 5.2;

- Similarly, as Domgas has been analysed in detail in the 2018 Macroeconomic Study we do not repeat any of the analysis herein. As an additional example, Previous Projects in Mozambique have been analysed through a combination of the 2014 or 2018 Macroeconomic Studies, so we do not evaluate them in this Report;

- We assume Project FID will take place in mid-2019, following the approval of the submitted POD (submitted on 9th July 2018);

- From the perspective of our in-house Petroleum Engineer, we have assumed that the Technical Information included in the December 2018 POD Update is correct;

- The Project is proposing to develop a 20,000 TPA LPG project as part of its wider development. The LPG has not been modelled at this stage for any economic or social benefit;

- Standard Bank understands the Project will sell its LNG output on a FOB basis. Per a Press Release of 28th December 2018, Area 4 has agreed SPAs sell a portion of the Rovuma LNG output to affiliated buyers (i.e. Affiliates of the Area 4 Concessionaires). We have therefore ignored shipping considerations and assumed the PFM pricing represents

the price at which LNG is sold to such Affiliate Buyers and in turn the taxation regime under the EPCC through which GOM secures its income envisaged by Sections 2 and 3;

- Through this Report, Standard Bank is not providing financial advice. MRV has a Financial Adviser upon the Project and this Report does not intend to cut across any of their scope of work in any form (for example, Project capital structure or debt raising);

- The macroeconomic indicators presented herein in Section 3 are an illustrative example of the macroeconomic outcomes that may be possible from the Project, based upon the assumptions outlined herein, which were underpinned by more detailed assumptions, but cannot be assured or guaranteed (for example, as a result of the risk factors outlined in this Report); and

Although we acknowledge they will be required to be assessed, for clarity, we have ignored for the purposes of this Report:

- All legal, tax, technical, accounting, insurance and environmental considerations surrounding the Project; and

- Security considerations (as they are outside of our professional competence);

1.4 Project Summary

1.4.1 Description

The onshore part of the Project will be located adjacent to Area 1's Mozambique LNG project, within the 6,475 km 50 year DUAT at the Afungi peninsular, Palma, Cabo Delgado. The Project will produce approximately 15.2 MTPA of annual LNG output, using Air Products' AP-X liquefaction process. Assuming 100% availability, this will require in the order of 2,488 mscfd natural gas feedstock, with an initial, additional 150 mscfd required to provide the Committed Domgas Volumes.

The required gross 19.1 Tcf of natural gas feedstock will be delivered from two (2) separate fields: Mamba Straddling (12 Tcf) and Mamba Non-Straddling (385E) 5.7 Tcf); from target reservoirs as well as 1.4 Tcf to provide the Committed Domgas Volumes. The fields are located around 100 kilometres offshore in an average of 1,600 metres water depth. To produce the feedstock, 24 individual wells will need to be drilled, apportioned sixteen (16) from the Mamba Straddling resources and eight (8) from the 385E deposit. In terms of GIIP, Area 4's Straddling resources comprise 42.6 Tcf and non-straddling resources 10.3 Tcf, making 52.9 Tcf within the Mamba discovery area.

The straddling resources will be produced in an independent but co-ordinated manner up to 12 Tcf alongside a similar production of 12 Tcf by Area 1 (24 Tcf in total). Such developments are known as the ''**Initial Development Facilities**'. Subsequent offshore developments, for the full exploitation of Straddling Resources, will be executed and operated jointly by Area 1 and Area 4 pursuant to the UUOA and dedicated PODs.

Following extraction, the gas will be collected in subsea pipelines and routed to landfall (by a direct tieback). In time, offshore compression may be needed for certain of the offshore resources. At the Afungi landing point, the Condensate and water will be separated from the gas stream at the inlet separation facilities, following which the gas becomes the feedstock for the LNG plant (being liquefied into a mixture of methane and light hydrocarbons).

Once produced, the LNG will be stored in one of two (2) 200,000 m^3 storage tanks (there will also be two (2) 45,000 m^3 condensate storage tanks), before being exported by ship. The LNG Marine Terminal will be able to handle ships with storage capacities up to 266,000 m^3 capacity (i.e. Q-Max). The Project currently assumes FOB sales, hence no shipping costs are included in the PFM (or this Report).

Following ExxonMobil's accession to the Area 4 concession in December 2017, the Operatorship of Area 4 was divided between ERB as Upstream Operator and EMML, as the Midstream Operator.

The EPCs of the Project components (onshore and offshore) will be assigned to a consortium of companies able to perform the activities in line with targeted timing and costs.

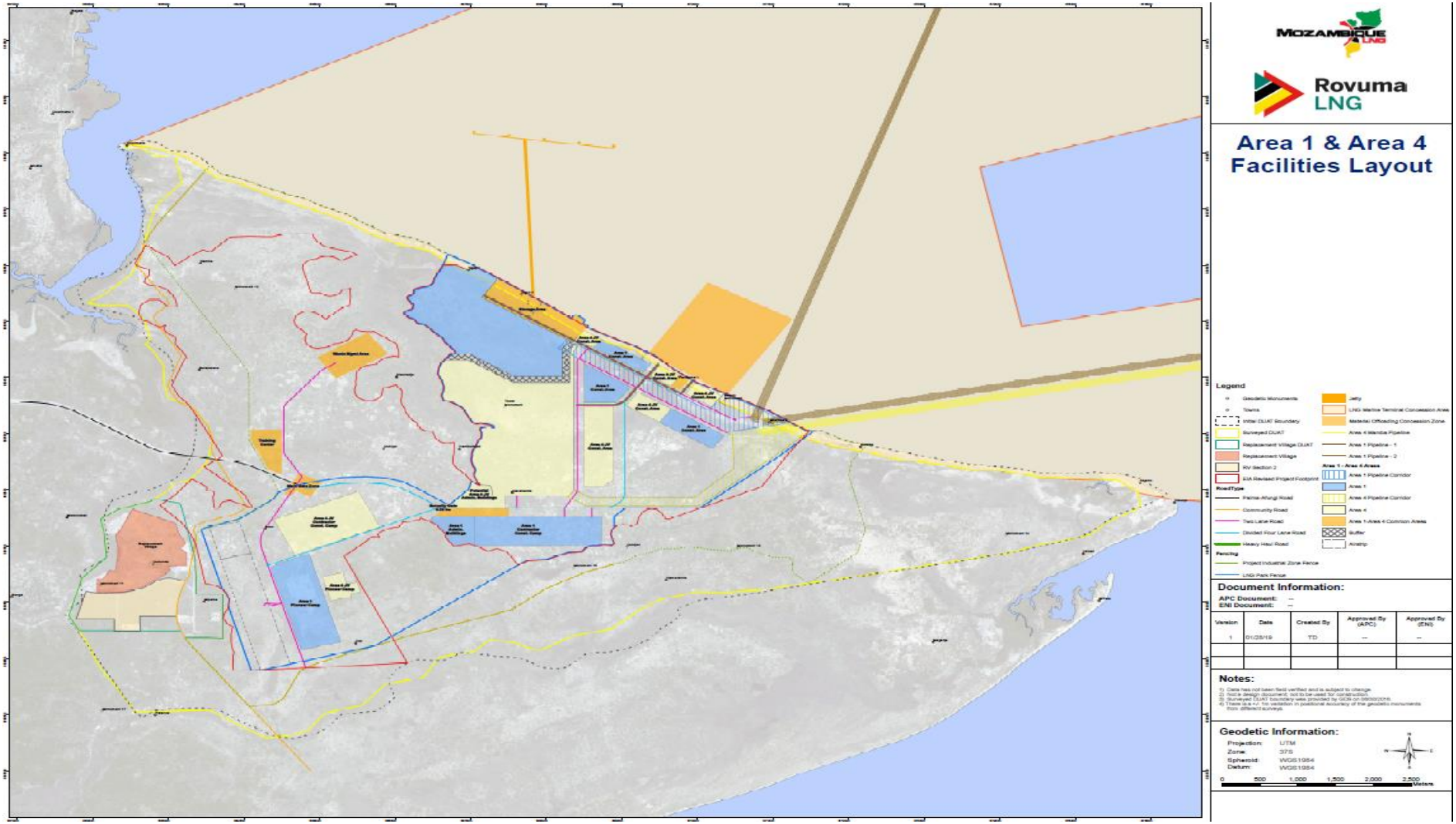
Under this Report, FID is targeted for mid-2019, with Train 1's First Gas scheduled for 2024 (5 years from FID) and Train 2's for late 2024 / early 2025 (5.5 years from FID). As with capital costs below, the precise schedule will be finalised in line with the EPC tender. Cash flows will then flow until the 2049 expiry of the EPCC's Development & Production Period.

1.4.1 Site Layout (Aerial Representation)

Please find below at **Figure 1** a Site Layout (Aerial Representation) of the Project Phase 1

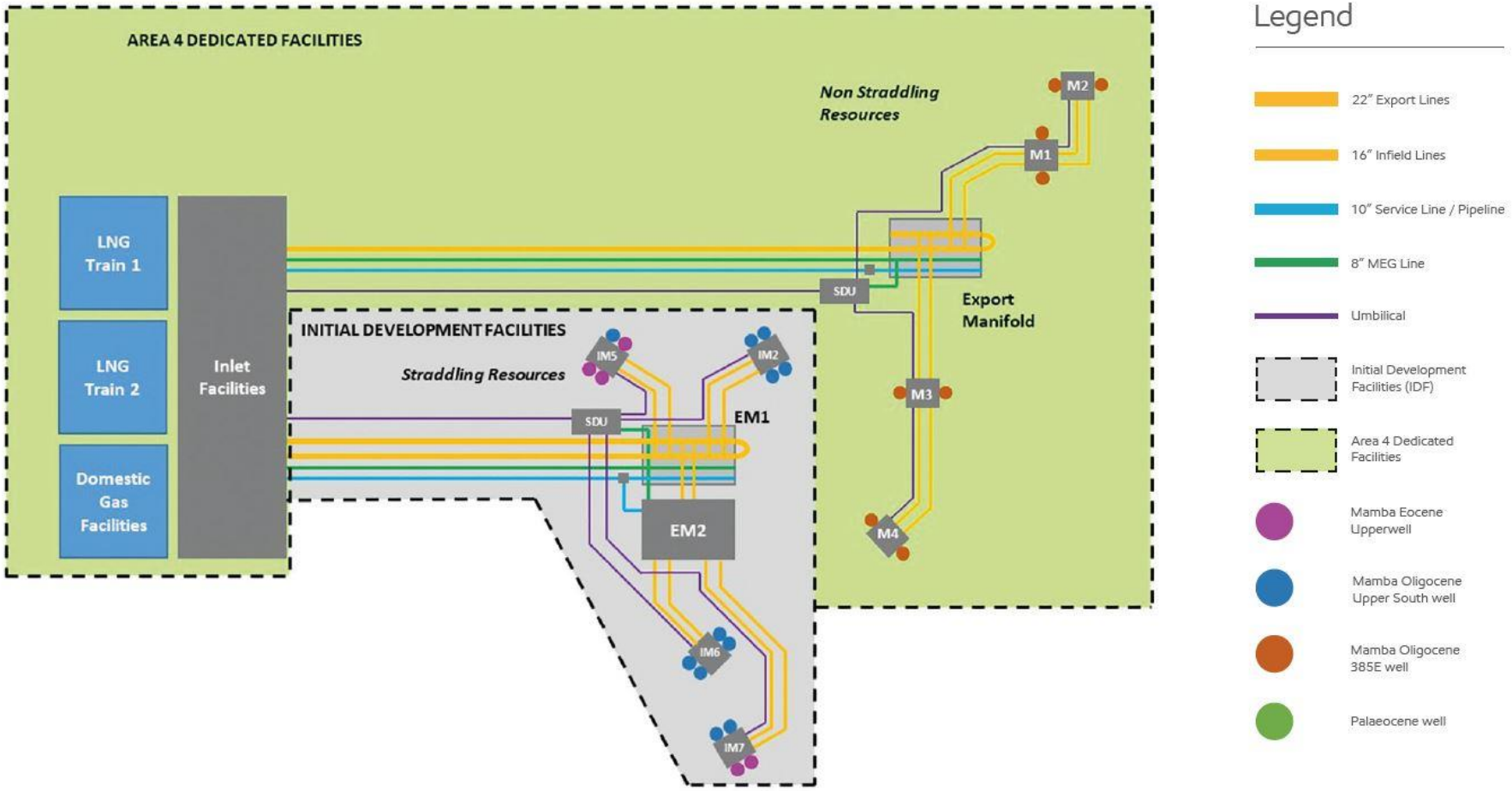
1.4.2 Site Layout (Plot Layout)

Please find below at **Figure 2** a Site Layout (Plot Layout) of each of the first phase of MLNG and the Project Phase 1



1.4.3 Offshore Facilities Layout

Please find below at **Figure 3** a representation of the Project's Offshore Facilities



1.4.4 Site Layout (Full Field Development)

Please find below at **Figure 4** an indicative layout of the Afungi Site arising from a Full Field Development (developed by Area 4).

1.5 Report Structure

To give effect to the scope of the Project, the Report is structured as follows:

Chapter 2: Financial Analysis;

Chapter 3: Economic Analysis;

Chapter 4: Commercial Analysis; and

Chapter 5: Conclusion & Recommendations

In addition, we also outline as background and supporting information the following Annexures:

Annexure 1: Cost Benefit Analysis,

Annexure 2: Social Accounting Matrix,

Annexure 3: Third Party Bibliography,

Annexure 4: Contact Details

2 Financial Analysis

2.1. Introduction

The PFM was developed by MRV and is consistent with the OBFM presented to the GOM as part of the POD. LNG pricing within the PFM is based on the LFM base cases provided by Poten & Partners.

Standard Bank requested a one (1) year delay case to be run through the PFM. The PFM output reports were used as a basis for this analysis which in turn was provided to Conningarth for usage in their own SAM economic model (Section 3).

2.2. Model Scenarios

This analysis is conducted by considering the wider economic impacts across two Project financial scenarios:

1. High Capex scenario, with a 12 month delay scenario

2. Low Capex scenario, with a 12 month delay scenario

2.3. Project Costs

The PFM project costs are presented below. The costs are presented in nominal terms per the OBFM. Note that under the EPCC, cost recovery is limited to 75% of Disposable Petroleum per annum with any excess Cost Petroleum carried forward until fully recovered. It is assumed that all Project expenditure is cost recoverable under the EPCC.

Table 2: Project Costs

High Capex	USDbn
Upstream (Pre-FEED / FEED studies, EPC)	8.2
Midstream (Pre-FEED / FEED studies, EPC)	15.4
IDC & Fees during Construction	**8.1**
Upstream	2.8
Midstream	5.3
Abandonment Capital	**1.1**
Upstream	0.7
Midstream	0.5
Total Capex to First Gas	**32.8**
Of which	
Upstream	11.6
Midstream	21.2

**1 All exploration drilling applied to first mover project within Area 4 (e.g. Coral FLNG)*

Low Capex	USDbn
Upstream (Pre-FEED / FEED studies, EPC)	6.6
Midstream (Pre-FEED / FEED studies, EPC)	12.6
IDC & Fees during Construction	**6.7**
Upstream	2.3
Midstream	4.4
Abandonment Capital	**0.9**
Upstream	0.5
Midstream	0.4
Total Capex	**26.9**
Of which	
Upstream	9.5
Midstream	17.4

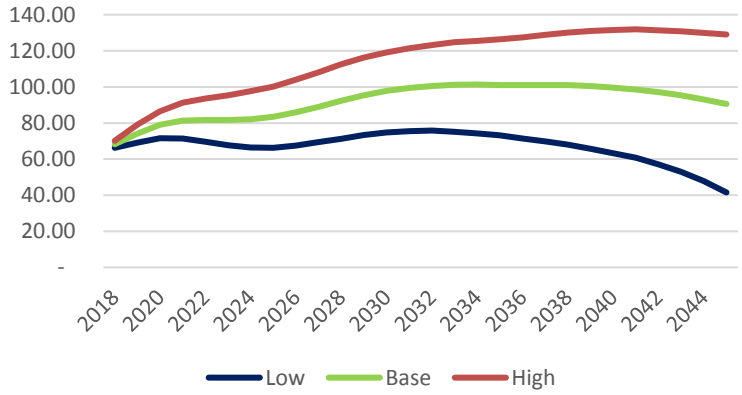
**1 All exploration drilling applied to first mover project within Area 4 (e.g. Coral FLNG)*

Project all-in capital costs are USD 32.8 billion (high capex scenario) and USD 26.9 billion (low capex scenario). IDC is included for the 2 trains at 10% per annum.

2.4. Project Operations

Project revenues for LNG is based on the LFM Base Case profile which has a FOB price of 9.5% (High Capex scenario) and 10.5% (Low Capex scenario) of projected Brent, with an annual escalation factor of 2% applied for Section 3 purposes. This Section 2 does not include escalation of revenues and costs at 2% p.a. and is in flat nominal terms.

Figure 5: LFM Profiles



Key Project operational information is detailed below.

Table 3: Project Operational Data

High Capex	Number
Gross Wellhead Gas Volume (Tcf)	17.72
Net Gas Volume (Tcf)	15.89
Gas Tariff (USD / mcf)	9.81
Revenue (USD bn)	152.95
Operating Expenses (USD bn)	15.48
Domgas Incremental Phase Operating Cost	0.97

Low Capex	Number
Gross Wellhead Gas Volume (Tcf)	17.72
Net Gas Volume (Tcf)	15.89
Gas Tariff (USD / mcf)	10.61
Revenue (USD bn)	169.05
Operating Expenses (USD bn)	11.55
Domgas Incremental Phase Operating Cost	0.79

The Project consists of two (2) LNG trains of 7.6 MTPA per train. Net volumes of gas consumed for the 2 trains are 15.89 Tcf for 15.2 MTPA, with Domgas production of 75 mscfd per train.

Moving down the Profit & Loss account, total revenues for the 2 trains is USD 153 billion (high capex scenario) and USD 169 billion (low capex scenario) with operating expenses (including Domgas) of USD 15.5 billion and USD 11.6 billion for high and low capex scenarios respectively. Key figures are as follows:

Table 4: Project Operational Data: Selected Years

High Capex	2024	2025	2026	2030	2035	2040
Net Gas Volume (Tcf)	0.29	0.76	0.76	0.76	0.76	0.76
Gas Tariff (USD / mcf)	8.08	8.22	8.45	9.61	9.94	9.82
Revenue (USD bn)	2.32	6.26	6.44	7.32	7.57	7.48
Operating Expenses (USD bn)	0.49	0.60	0.70	0.80	0.65	0.63

Low Capex	2024	2025	2026	2030	2035	2040
Net Gas Volume (Tcf)	0.29	0.76	0.76	0.76	0.76	0.76
Gas Tariff (USD / mcf)	8.93	9.08	9.34	10.62	10.99	10.85
Revenue (USD bn)	2.56	6.92	7.12	8.10	8.37	8.26
Operating Expenses (USD bn)	0.37	0.45	0.52	0.60	0.49	0.48

2.5. Mozambique Inc. Project Revenues

The Mozambique Inc. share of the Project revenues comes from multiple sources inclusive of:

- State Participating Interest "**funded carry**"– 10% (held by ENH) up to the approved POD (which reduces upfront capital commitments), following which ENH must secure its own funding.
- 2% **Petroleum Production Tax ("PPT")** in respect of Natural Gas produced from deposits in water depth in excess of 500 metres
- **Profit Petroleum** is shared according to a varying scale determined by the R-Factor value. This can be taken in kind (subject to additional contracts) but is assumed to be taken in cash for the purposes of this Report.
    - The R-factor is defined as cumulative cash inflows divided by the cumulative cash outflows
    - Clearly, the higher the R-factor the more Mozambique Inc.'s take increases. The R-factor is hence a form of windfall tax.

Table 5: EPCC R-factors

R-factor	GOM Portion Profit Petroleum	Area 4 Portion Profit Petroleum
Less than one	15%	85%
Between 1 & 2	25%	75%
Between 2 & 3	35%	65%
Between 3 & 4	45%	55%
Greater than 4	55%	45%

- **Taxation**
    - 24% Corporate Tax (for first 8 years of production, 32% thereafter)
    - 8% estimated withholding tax (absent the use of jurisdictions with double tax treaties with Mozambique)
- **Training Fees and Production Bonuses**
    - USD 3 million per annum

Pursuant to the above, below is a summary of the non-discounted Mozambique Inc. take:

Table 6: Mozambique Inc Summary Fiscal Take

High Capex	USD billion
Fees / Bonus	0.03
PPT	6.1
Corporate Income Tax	25.9
Profit Petroleum	43.0
ENH Net Cash Flow	5.2
Net Take	**80.2**

Low Capex	USD billion
Fees / Bonus	0.03
PPT	6.7
Corporate Income Tax	28.9
Profit Petroleum	59.1
ENH Net Cash Flow	5.9
Net Take	**100.6**

In contrast to the 2014 Macroeconomic Study, where CGT proceeds of USD 928 million were included in the Mozambique Inc proceeds, Area 4 does not calculate CGT raised from previous farm-ins within the overall Mozambique Inc take. It is estimated that the Mozambique Inc. will directly earn USD 80 billion (high capex scenario) or USD 100 billion (low capex scenario) from the Project over the EPCC contract term (2019 to 2049). In addition to fiscal take from the LNG trains, the envisaged Domgas will provide the Aggregator with processed, indigenous gas, for use in Domgas projects, as well as additional fiscal income in the form of taxes paid by such Domgas projects.

2.6. ENH & Area 4

ENH is the holder of the GOM's 10% carried interest (through the exploration period). ENH receives a funded carry up to the first approved POD. It is thereafter responsible for its own capital investments and fund raising and the initial funding is repaid to the concessionaires from cost gas.

ENH and the concessionaire share in the Profit Petroleum according to a varying scale determined by the R-Factor value (per Section 2.5). They are taxed on their share of the profit petroleum.

They are entitled to a **Cost Recovery** which is limited to 75% of Disposable Petroleum per annum. Disposable Petroleum is defined as revenue after the 2% **PPT** is paid. The cost recovery allows ENH and Area 4 to recover their investment and share of operating costs associated with the project.

On this basis, the relevant ENH and Area 4 IRRs are as follows:

Table 7: ENH & Area 4 Net Cash Flow and IRRs

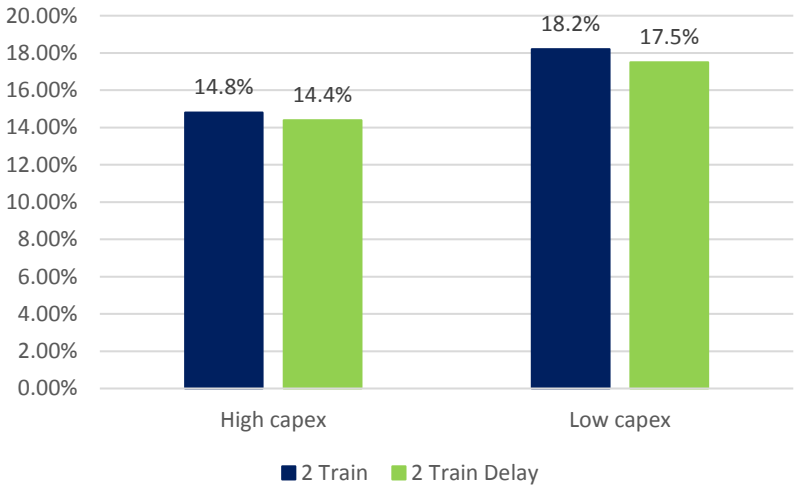
High Capex				
USDbn	ENH		Area 4 (ex-ENH)	
	Net Cash flow	IRR	Net Cash flow	IRR
2 train	6.7	14.8%	60.2	14.8%

Low Capex				
USDbn	ENH		Area 4 (ex-ENH)	
	Net Cash flow	IRR	Net Cash flow	IRR
2 train	7.4	18.2%	66.6	18.2%

On a non-discounted basis, ENH and Area 4 (excluding ENH) generate net cash flows of USD 6.7 billion and USD 60.2 billion respectively for the high capex scenario with an IRR of 14.8%; USD 7.4 billion and USD 66.6 billion for the low capex scenario, with an IRR of 18.2%.

Per Section 2.7.3, the delay cases results in a lower IRR due to the increased capital cost and delay in revenue. The 12 month delay scenario below results in a lower IRR for the 2 trains due to increased capital cost and a delay in revenue

Figure 6: Comparative IRRs for ENH and Area 4



2.7. Key Discussion Points

The financial analysis leaves no doubt as to the significance of achieving Project First Gas as soon as possible to achieve the Project benefits. A delay in First Gas delays the timing of Mozambique Inc.'s fiscal take and it further delays the availability of Domgas which can offer

Mozambique major benefits to complement those of LNG (per the 2018 Macroeconomic Study and the 2014 Macroeconomic Study).

Table 8 below is a summary analysis of the Mozambique Inc fiscal take:

Table 8: Mozambique Inc Fiscal Take

High Capex (USD billion)	2 Trains
Mozambique Inc. Take	80.2
Revenue	164.1
Less	
Opex Cost Recovery	16.5
Capital Cost Recovery	22.2
Revenue less capex and opex recovery	125.4
Mozambique Inc. as %	63.9%
Total Cost Recovery	**38.7**

Low Capex (USD billion)	2 Trains
Mozambique Inc. Take	100.6
Revenue	182.1
Less	
Opex Cost Recovery	12.3
Capital Cost Recovery	18.5
Revenue less capex and opex recovery	151.3
Mozambique Inc. as %	66.5%
Total Cost Recovery	**30.8**

From Standard Bank's perspective, we believe Mozambique Inc.'s fiscal take of 64% - 67% is very satisfactory.

2.7.1. Credit Ratings

Although per Section 1.3, Standard Bank is not providing Financial Advice through this Report, we believe it is worth noting the strength of the Area 4 partners credit ratings (in most cases). We believe, from a GOM perspective, this provides an added assurance of their ability to fund the Project and the credit quality of the Affiliated Buyers of the LNG (referred to in Section 4.5.2).

Table 9: Area 4 Partner Credit ratings

Company	Moody's	S&P
ExxonMobil (US)	Aaa	AA+
Eni (Italy)	Baa1	A-
CNPC (China)	A1	A+
Galp (Portugal)	-	-
Kogas (South Korea)	Aa2	AA-
ENH (Mozambique)	-	-

2.7.2. Assumption and Timing of Risk

As is well known, upstream O&G projects take time to develop and early stage risks are high prior to and during the exploration phases. Further, these can take place over a long time period before there are any cash inflows. As an example, MRV signed the EPCC in 2006 (effective from early 2007), and assuming there are no delays, will only start to receive its first cash inflows as a result of exploration in 2022 from Coral FLNG and 2024 in respect of the Project. This represents approximately fifteen (15) years of absolute cash outflows (during pre-exploration, exploration and first construction phases (2006 – 2022)) and approximately two (2) to three (3) years of net cash outflows (Project construction costs exceed early revenue streams from Coral FLNG and early revenues from the Project) amid assuming substantial technical and commercial risk.

Therefore, based on the principles of risk and return as well as the time value of money, in calculating the various takes of Area 4, ENH and the GoM, Standard Bank believes it is important to take account of:

- The different discount rates the parties have (as a result of their different risk taking positions in the Project per the signed EPCC); and
- The different time frames over which a party is required to go on risk (per the signed EPCC).

Accordingly, MRV remodelled the parties' different takes per the 2014 Macroeconomic Study methodology assuming:

- Discount rates of 10% p.a. for the Area 4 and 5% for each of ENH and the GoM; and
- Taking account of the fact that the Area 4 have invested in exploration since 2007; and that ENH does not have to invest until 2019 for the Project (until the POD is approved)

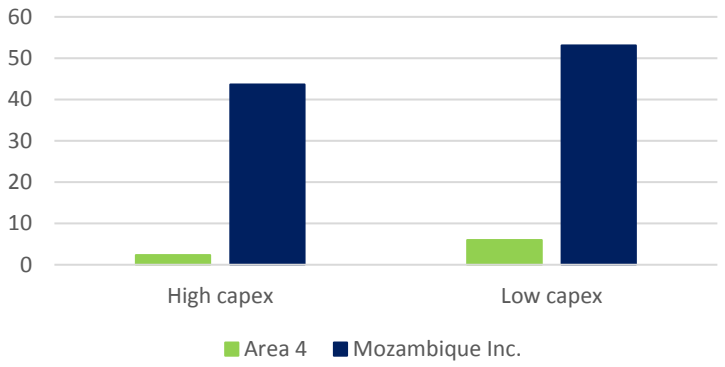
The allocation of benefits which result is shown in the table and figure below:

Table 10: Risk Adjusted NPVs between Area 4 (excluding ENH) & Mozambique Inc.

High Capex	USDbn	%
Area 4	2.3	5%
Mozambique Inc.	43.6	95%
Total	**45.9**	**100%**

Low Capex	USDbn	%
Area 4	6.0	10%
Mozambique Inc.	53.1	90
Total	**59.1**	**100%**

Or expressed graphically at **Figure 7: Risk Adjusted NPVs between Area 4 & Mozambique Inc.**



Standard Bank believes that a risk adjusted Mozambique Inc. fiscal take in the order of 90% – 95% is highly acceptable to Mozambique and is very high by global standards for a frontier market. Any benefits from Domgas Projects (other than the sale of Domgas feedstock by the Project to such Project) would be supplemental to this.

2.7.3. The Implications of Delay

Table 11: Implications of Delay

Under the PFM, the implications of a 12 month delay in each of the High or Low Capex scenarios are as follows

USDbn	High Capex	High Capex (Delay)	Change (%)	Low Capex	Low Capex (Delay)	Change (%)
Capex	32.8	33.6	2%	26.9	27.7	3%
Opex	15.48	15.46	(0.1%)	11.55	11.53	(0.1%)
Revenue	152.95	153.53	0.3%	169.05	169.69	0.3%
Fiscal Take	80.2	80	0%	100.6	101	0%
IRR (%)	14.8%	14.4%	40bps	18.2%	17.5%	70bps

Given this stage of project development (various EPCs under tender), the PFM models the cost of a 12 month delay in achieving FID, which adds incremental capex costs of USD 800 million for both capex scenarios. However, there is no material impact on opex, revenue and fiscal take for both high and low capex scenarios. As a practical matter, the ‘’**Cost of Bureaucracy**’’ (which would result in an assumed six (6) year construction period referred to in Section 5.3 would add significantly more to capital costs inclusive of IDC (calculated at 10%).

2.8. LNG Macroeconomic Study Comparisons

Table 12: LNG Macroeconomic Study Comparisons

Standard Bank is cognisant the GOM or Civil Society in Mozambique may wish to compare the two Standard Bank Reports of 2014 and 2019 in terms of key data relating to Mozambique LNG and Rovuma LNG. For this reason, we have elected to perform the task ourselves. For a variety of reasons outlined below, the two projects studied by ourselves in 2014 and 2019 are not particularly comparable for reasons of different scale and market timing (which drives the then associated costs), but are both considered good projects that will benefit Mozambique. In summary, the Project and Mozambique LNG have the following key differences:

Item	Project		MLNG	Commentary
	High Capex	Low Capex		
Brent at Report date (USD/bbl) (15th March 2019 from www/tradingeconomics.com)	67.16	67.16	98.97	The applicable Brent price (within the then oil price environment) is a relevant indicator for two reasons: • It influenced the trend of selected LNG prices in the Report. As noted the Brent price in 2014 was 47% higher than the current Brent price • Within the O&G industry, higher oil prices tend to, over time, push up exploration, development and capital costs. Thus, MLNG was prepared in a higher cost environment than the Project, which costs materially fell in 2016-2017 although industry costs are now increasing again.

Mozambique GDP (USD bn)	14	14	15	The difference in GDP baselines affects percentage contributions from each Project
Capacity (MTPA)	15.2	15.2	10	This is a major point. Mozambique LNG is now fixed at 12.88 MTPA capacity in contrast to the studied 10 MTPA. Thus when the 2014 Study was written MLNG was 65.7% of the current capacity with relative diseconomies of scale in comparison. Now, MLNG is 84.73% of the Project, with higher economies of scale than in 2014 and fewer relative diseconomies of scale
Annual LNG volumes (BCF)	749	749	487	This point is largely a function of the above, noting the MLNG of 2019 is a larger project than in 2014
LNG pricing (USD/MCF)	9.81	10.61	12.30	Selected LNG pricing is largely a function of the prevailing oil price environment, per the above
Total revenues (USD bn)	152.95	169.05	149.87	Total revenues are a function of differences in the above LNG pricing and above capacity. Note the Project's revenues are inflated by 5% compared to MLNG as a result of the inclusion of Condensate (3% of revenues) and Domgas (2% of revenues), both of which were excluded from the 2014 Report
Total LNG Opex (USD bn)	15.48	11.55	15.48	Total opex is largely a function of the then prevailing capacity and cost structure
Capex (USD bn)	32.8	26.9	26.1	Estimated capex is largely a function of the then prevailing capacity and cost structure as well as the offshore geology and water depth (a constant between 2014 and 2018)
All-in capex per tonne (USDm), including offshore	2,158 (32.8bn divided by 15.2)	1,769 (26.9bn divided by 15.2)	2,610 (26.1bn divided by 10)	Mathematical function of the above trends
All-in LNG opex per tonne (USD)	1,018 (15.48bn divided by 15.2)	759.9 (11.55bn divided by 15.2)	1,580 (15.48bn divided by 10)	Mathematical function of the above trends

Mozambique Inc fiscal take (USD bn)	80.2	100.6	67.2	Mathematical function of the above trends, plus Area 4 excludes CGT proceeds (included within 2014 Area 1 Report)
Mozambique Inc fiscal take (%)	63.9%	66.5%	62.1%	For each project, this result shows the robustness of the EPCC mechanics, from a GOM point of view
Area 4 / 1 IRR (excl. ENH)	14.8%	18.2%	12.2%	For each project, this result shows the robustness of the EPCC mechanics, from a GOM point of view
GOM NPV Fiscal Take (%)	95%	90%	88%	For each project, this result shows the robustness of the EPCC mechanics, from a GOM point of view

2.9. Summary Conclusions

As shown in this Section 2, the Project is an extremely large (by global standards) investment which represents an unparalleled cost stream for Mozambique that must be incurred. Once incurred and funded, following First Gas, the Project then switches to an **unprecedented revenue stream for Mozambique**. Looking at the Project lifecycle as a whole, various financial elements stand out:

- On a non-discounted basis, Area 4 receives 33% - 36% of net Project cash flows, in an environment subject to a sovereign default since 2016 (and is rated CCC, higher risk requiring higher return than in a pre-sovereign default environment). When discount rates are taken into account over Area 4's 17 year investment period (2007-2024), per Section 2.7.2, Area 4 only (excluding ENH) receives between 5% - 10% of net cash flows for the first two trains.

- Conversely, the Project is hugely profitable for Mozambique Inc. On the one hand, it is taking significantly less risk than Area 4 (e.g. by investing for the first time over a decade later than the non-ENH partners). On the other, the fiscal streams it will receive are of enormous significance. Broadly speaking, two trains generate flat nominal proceeds of between USD 80 billion (High Capex) to USD 100 billion (Low Capex). Ignoring discount rates, this equates to a fiscal take of between 64% – 67% (depending on capex scenario). However, when one takes into account the timing and nature of Mozambique's risk (through differential discount rates starting at different dates), the Mozambique Inc fiscal take climbs towards 90% - 95% (depending on capex scenario). This is a superb result for Mozambique Inc. by any standards, noting also it was not required to fund any of the exploration risk (which no one knew would be successful in advance).

Given the adverse effects of a potential delay and the beneficial effects of multiple trains, it seems clear to Standard Bank that the most financially optimal strategy for Mozambique is to seek a Project FID as soon as possible (through a prompt approval of the POD) and then to ensure First Gas takes place as soon as possible. If there is a delay in First Gas, Mozambique is the largest loser (as it receives the largest portion of benefits). This point is reiterated by the results of Section 3 and flows through to our recommendations within Section 5.

3 Economic Analysis

3.1 Scope and Methodology

The purpose of this Section 3 is to provide an analysis of the Project's macroeconomic impact.

This study's main focus was to measure the nature and magnitude of the impact of the Project on Mozambique's economy with respect to macroeconomic indicators such as GDP, GNP, employment opportunities, capital utilisation (investment), the distribution of income, BOP and GOM revenue. A comprehensive analysis was undertaken to ensure that all the relevant impacts were measured. Where values were involved, price calculations were made in 2018 constant prices. This means that costs numbers have been deflated to 2018 constant prices from the original 2019 nominal values. Working with 2018 constant prices implies that the effect of inflation is excluded from calculations.

The socio-economic impacts of both the construction and operational phases of the Project on the Mozambican economy were measured. Notably, the On-Site, Supply Chain and Economy-Wide impacts of the Project were quantified. For example, one direct effect of the Project is the creation of jobs for the Project's workers (1,200 in the operational phase). Supply Chain effects spread out from the direct effects to reach areas or population far removed from the Project's intended or original purpose and refer to the impact of the Project on the suppliers of inputs to the Project. Economy-wide effects include the economic impact of the paying out of salaries and wages to those employed by the Project and industries that are indirectly linked to the LNG industry. The multiplier effect of that income is the economy-wide effect. These terms are another way of referring to the initial, secondary and tertiary impacts that ripple throughout the economy when a change is made to a given input level.

The methodology employed in this study consists of two components: firstly, it comprises of a cash flow analysis (also referred to as a financial CBA) and economic CBA of the Project. Secondly, it encompasses a macroeconomic impact analysis of the Project. The analysis follows sequentially: the results from the economic CBA serve as an input for the macroeconomic analysis. For analytical purposes, the total macroeconomic impact of the Project investment was disaggregated into the following components:

- The impact of the initial investment phase (i.e. the construction phase) which is expected to commence in 2019 and be fully completed in 2025 (when both trains have achieved First Gas and been fully commissioned);
- The impact of the everyday operations of the completed Project over the period 2024 – 2049 on the economy of Mozambique;
- The reinvestment of savings, in the Mozambican economy. The savings is generated mostly from the profits of the GOM (paid through taxation payments made by the Project) and the importance of this item cannot be overstated.

In order to measure all of the economic implications regarding economic indicators such as GDP, GNP and employment associated with the construction, operational and savings/re-investment phases of the Project, a partial general macroeconomic equilibrium analysis was conducted, based on the latest, updated SAM for Mozambique.

3.2 CBA Introduction

3.2.1 Financial CBA

The financial analysis represents the NPV of the projected cash flows available to all providers of capital, net of the cash needed to be invested for generating the Project's growth. The concept of financial analysis valuation is based on the principle that the value of a business or asset is inherently based on its ability to generate cash flows for the providers of capital. To that extent, the financial analysis relies more on the fundamental expectations of the business than on public market factors or historical precedents, and it is a more theoretical approach relying on numerous assumptions.

The financial analysis entails the following aspects:

- The appropriate price for cost estimates and the level of prevailing inflation;
- Whether analysis of relative prices is necessary for some cost items (e.g. labour costs);
- What the base year (or discount year) is to be;
- What is to be the base/initial evaluation discount rate; and
- The evaluation period (or the Project operating).

Theoretically, financial analysis is arguably the soundest method of evaluation. The DCF method is forward looking and depends on future expectations rather than historical results. The DCF method is more inward-looking, relying on the fundamental expectations of the business or asset, and is influenced to a lesser extent by volatile external factors. In addition, the financial analysis is focused on cash flow generation and is less affected by accounting practises and assumptions. The financial analysis method also allows expected (and different) operating strategies to be factored into the evaluation.

The cash flow analysis for this study was conducted for a 30 year programming period as follows:

- 2019 - 2025 (the initial investment phase, Project construction);
- 2024 - 2049 (the operational phase, including production and exports);
- 2024 – 2049 (the reinvestment-of-profits phase).

Investment decision criteria

Typically, three related decision criteria are considered upon which to base investment choices:

- The valuing of the NPV is normally undertaken from an economy-wide perspective. Benefits are streams of economic gains that accrue to members of the economy, both direct users and third parties. Costs reflect the economic consumption of resources or imposts on third parties as a result of the proposed project investment. Projects with a NPV greater than zero indicates a positive net social return, with the present value of the stream of economic benefits exceeding the present value of the stream of economic costs;

- The BCR divides the present value of estimated benefits by the present value of estimated costs. A ratio of equal to or more than 1 indicates economic viability; and
- Thirdly, the IRR is that discount rate at which a project's NPV becomes zero. If the calculated IRR is greater than the minimum acceptable rate, the project is considered acceptable.

3.2.2 Cash flow assumptions and inputs

The cash flows for the LNG, Condensate and Domgas operations of the Project as supplied by Standard Bank were used in the analysis of the macro-economic impacts of The Project. They were derived from the PFM outlined in Section 2. As noted, we did not model LPG at this stage.

From these cash flows the assumptions for the years 2024 - 2049 were used to determine the net cash flows as well as the impact of The Project. Key assumptions include the following:

- Oil price varies over time, on average equates to Brent of approximately USD 66 per barrel (Constant 2018 prices). Per Section 2, the price deck was sourced from the LFM. The deck was deflated by the IMF's projected US Inflation rate for 2018-2022, thereafter (2023-2049) inflation of 2.2% p.a. is assumed.
- 15.2 MTPA Project, with incremental Condensate and Domgas production
- Taxation as outlined in Section 2
- The nominal financial discount rate = 10% (i.e. NPV10)
- The real financial discount rate = 8% (calculated as (1.10/1.02) rounded off to 8%. A commonly used rule of thumb to determine the real rate is to subtract the inflation rate from the nominal rate). The discount rate can also calculated as the weighted average cost of capital.
- The economic discount rate = 8%
- Base Year = 2018
- Construction period =2019-2025, and
- Operational period = 2024-2049

The core principle of a CBA can be described as the comparison of costs and benefits on a standardized basis. One factor that can complicate this technique is the required discounting of future costs and benefits, to present values with an assumed social discount rate. The social discount rate used in the nominal CBA-analysis entails a uniform 10% discount rate involving all the major Project components of the project (the economic discount rate, above).

This is in line with the discounting rates used by DFIs such as the African Development Bank and the World Bank. For purposes of determining the impact on the Project, which is more aligned to the private sector and to financial analysis, a real financial discount rate of 8% was applied per Section 3.3.

For the analysis contained in this report, it was assumed that Area 4 (excluding ENH) will provide 90% of the capital cost, while GOM through ENH will contribute the remaining 10%.

In line with the cash flow projections as supplied by Standard Bank to Conningarth Economists, it was presumed that the first train will achieve First Gas in 2024 and that the Project will reach full production by late 2024 / early 2025 (after commissioning of both trains).

It was assumed that the labour force will reach a maximum of 20,500 workers during the construction phase and 1,300 staff members during the operational phase. MRV has confirmed that 5,000 Mozambicans will be engaged to fill 3,600 full-time equivalent positions. It was also assumed that the staff complement will be comprised as follows:

- Skilled staff 30%
- Semi-skilled staff 40%
- Unskilled staff 30%

In what follows below we will use the term “financial CBA” instead of the term cash flow analysis in analysing the project. This is in line with the terminology mostly used in Cost – Benefit studies.

3.2.3 Economic CBA

From the economic point of view, financial cash flows need to be translated into economic flows. In general terms, cost and revenue cash flows need to be adjusted in order to reflect the real value or cost for society. The current market prices for many costs (but also revenues) usually reflect the real costs for the society as they appropriately provide opportunity costs. However, some cost estimations may not reflect an appropriate cost for society, since they may be biased for several reasons or because a market simply does not exist for them (externalities). When this occurs, it may be necessary to make some adjustments.

A specific item’s current market price may not reflect its real price when the specific market has imperfections, especially when it is a regulated market or item (currencies, oil, energy, and other commodities, as well as labour and others). When this occurs, the concept of “shadow prices” should be introduced. These shadow prices shall be estimated and used instead of the market price being included in the financial analysis. The shadow price is an attempt to value a benefit or a cost where no competitive or explicit market price exists.

There may be some costs that are not a direct cash cost of the project, but should be considered within the socio-economic analysis. The most typical example is public land or public properties. When there is no cost for the land or the site, or a building or other asset is being provided by a public entity for the project, ideally its cost should be included in the analysis. In the case of land it should be valued at its market price so as to reflect the opportunity cost for the authority. However, in cases in which there is no alternative use for the asset, the cost is deemed to be zero since it is a sunk cost.

The price of an item (in cash terms) generally includes taxes that are in fact public revenue. Therefore, the tax effect has to be removed from the calculations; for example, corporate taxes, value-added tax (not only for costs, but also for revenues) and other taxes; and social charges within labour costs — as they transfer price payments to individuals.

There may be some indirect taxes and subsidies that could be used as corrections for externalities, for example, taxes on energy to discourage negative environmental externalities. In such cases, including the tax may be justified, while also adding an adjustment for the externality in order to avoid double counting. Another example of tax adjustment is the case of imported products where the effect of the respective duty should be removed.

3.2.4 Decision criteria for Economic CBA

Normally, three related decision criteria are considered upon which to base investment choices. These criteria in essence are similar to those used in Financial CBA.

Firstly, the valuing of NPV is typically undertaken from an economy-wide perspective. Benefits are streams of economic gains that accrue to members of the economy, both direct users and third parties. Costs reflect the economic consumption of resources or imposts on third parties as a result of the proposed project investment. As identified earlier, these values may be reflected in market values where the relevant market captures the full economic cost in the transaction. Projects with a NPV greater than zero indicate a positive net social return, with the present value of the stream of economic benefits exceeding the present value of the stream of economic costs. Projects with a NPV less than zero should be rejected because economic welfare is being reduced. Relevant cash flows in the NPV analysis should be reconcilable to the financial analysis as they are drawn from the same sources (Section 2).

Secondly, the BCR divides the present value of estimated benefits by the present value of estimated costs. A ratio of equal to or more than 1 indicates economic viability. The treatment of benefits and costs needs to be carefully considered. It is important to see the full resource costs of an option expressed in the denominator. In certain circumstances the cost of raising public funds needs to be taken into account, especially where this is likely to impose a significant cost.

Thirdly, the IRR is that discount rate at which a project's NPV becomes zero. Generally speaking, the higher a project's IRR, the more desirable it is to undertake. IRR is uniform for investments of varying types and, as such, IRR can be used to rank multiple prospective projects on a relatively even basis. Assuming the costs of investment are equal among the various projects, the project with the highest IRR would probably be considered the best and be undertaken first.

Importantly, these indicators should be used in a complementary way in order to guide investment decisions. Generally, a project with a higher BCR would be preferred. However, BCR tends to be biased towards projects with lower initial capital costs, so it would also need to be considered with the NPV in making project decisions. Given such limitations, the economic NPV approach is used as the primary method for valuing project benefits in (societal) CBA, as it is reflective of the total value of economic worth to society. The CBA is explained in detail in Appendix 1.

CBA has traditionally been performed for “a project” with a revenue and cost stream, both of which are discounted by a discount rate to arrive at present values for the two streams. The difference between the discounted streams is the NPV.

The decision on what the end date for the analysis should be, normally depends on a number of factors such as the expected physical life of the project, the rate of depletion of resources, expected material changes in the project, significant new investments required for upgrading/expanding the project, and / or contractual agreements with Government. Another consideration is that the end date is normally chosen far enough into the future to the point where that discounted revenue and cost streams become negligibly small. Furthermore, the risks associate with events or changes far in the future is likely to be substantial.

The choice of the Project end date (2049) was based on the above considerations (the expiry of the EPCC 30 years after POD approval). The date 2049 does not imply that the Project physically reaches the end of its life in 2049. Why? There are multiple LNG trains in global operation that have been working more than 25 years (with adequate maintenance and refurbishment). Secondly, Mozambique has discovered 150-200 Tcf in the Rovuma Basin. Even producing c 70 MTPA for 20 years will not utilise all of this gas. Therefore, there is likely to be ample remaining gas assets in Mozambique. An analogy (of different scale) can be drawn with the North Sea, where recently a 1 Tcf field was recently discovered by Total (43 years after the UK’s initial production of oil). Or, alternatively, technological innovations allowed the long-producing Permian Basin to find world-scale reserves in the last decade.

Fundamentally, 2049 represents the date that EPCC between Area 4 and the GOM expires. Unless amended, ownership of Area 4 then reverts back to GOM, with all the accompanying risks and reward. The GOM may want to renegotiate the concession terms, change tax rates, decides to go it alone or propose any other changes. Nonetheless, these potential changes occur far in the future and are unlikely to have a significant effect on or implication for the numbers presented in this Section 3.

3.3 CBA Results

As indicated earlier, three main Project components are considered, namely the construction phase; the operational phase; and the re-investment or savings phase.

The construction phase is typically of a short-term nature (over the period 2019 - 2025 in this study) and is driven by the capital goods that are required to deliver the project. **Table 12** outlines the breakdown of costs and benefits.

As and when required, the Tables provided below consist of two components, the first being the results stemming from the high capex case followed by the results emanating from the low capex case. In the written sections below, where applicable, initial reference will be made to the high capex case with the results from the low capex case followed immediately in brackets.

3.3.1 Results from financial CBA in real terms

Table 12: Summarised Account: Project Financial CBA (USD million, Constant 2018 Prices)

High Capex								
	USDm							
Constant Cash flows	Units	Total	2024	2025	2026	2030	2035	2040
Discount Factor	8%							
	Year		6	7	8	12	17	22
Total Benefits		167,298	2,540	6,844	7,040	7,984	8,250	8,147
Total Capital Costs		24,269	2,282	330	0	0	0	0
Total O&M		16,134	484	585	685	782	642	622
Net Operating Benefits (Costs)		126,895	-227	5,929	6,355	7,202	7,608	7,525
NPV		25,748						
BCR		2.2x						
IRR	%	19%						

Low Capex	USDm							
Constant Cash flows	Units	Total	2024	2025	2026	2030	2035	2040
Discount Factor	8%							
	Year		6	7	8	12	17	22
Total Benefits		185,657	2,821	7,595	7,810	8,848	9 142	9,028
Total Capital Costs		19,769	1,842	267	-	-	-	-
Total O&M		12,101	363	438	514	586	481	466
Net Operating Benefits (Costs)		153,788	616	6,889	7,297	8,262	8 660	8,562
NPV		34,974						
BCR		3.1						
IRR	%	24%						

The PV calculated for the revenue and spending streams indicates that the PV of total benefits (revenue) is USD 167,298 million (low capex case USD 185,657 million), while the PV of spending on capital and operating and maintenance costs comes to USD 40,403 million (low capex scenario USD 31,869 million), resulting in net operating benefits of USD 126,895 million (low capex scenario USD 153,788 million).

In terms of the decision criteria discussed earlier, the Project NPV is USD 25,748 million (low capex scenario USD 34,974 million), the BCR ratio is 2.2x (low capex scenario 3.1x) and the IRR is 19% (low capex scenario 24%). These numbers suggest that the Project is an attractive financial and economic proposition.

Total capital cost for the high capex case is USD 24, 269 million (low capex scenario USD 19, 769 million). Total operating costs amount to USD 16,134 million for the high capex case (low capex scenario USD 12,101 million).

For the high capex case the BCR is 2.2 (3.1 for low capex case), the pre-tax IRR for the high capex case is 19% (24% for the low capex case). Further to the above, Table 13 provides a summary of the distribution of profits of the Area 4 concession:

Table 13: Project Financial CBA (USD Millions, Constant 2018 Prices)

High Capex	Discount rate	Project pre-Tax	Area 4 After tax (excluding ENH)	GOM After tax (including ENH)
NPV	8%	25,748	1,290	18,395
BCR		2.2x	1.04x	8x
IRR		19%	9%	36%

Low Capex	Discount rate	Project pre-Tax	Area 4 After tax (excluding ENH)	GOM After tax (including ENH)
NPV	8%	34,974	5,971	23,973
BCR		3.1x	1.21x	12x
IRR		24%	12%	44%

From the last column of Table 13 it can be seen that the NPV, BCR and IRR are very large for the GOM. The explanation for this stems from the role that GOM plays in The Project (specifically, its right to receive tax in the order of 64% of nominal cash flows per Section 2) and the way CBA calculations are made. The BCR of the Area 4 partners (excluding ENH) is 1.041x (low capex scenario 1.207x) and for GOM 8x (low capex scenario 12x). The pre-tax IRR is 19% (low capex scenario 24%). For GOM, IRR is 36% for the high capex scenario (low capex case 44%). Looking at the last column of Table 13 it is evident that GOM stands to lose the most by far if the Project is delayed.

3.3.2 Results from Economic CBA

Table 14: Project Economic CBA (USD Millions, Constant 2018 Prices)

High Capex	Discount rate	Total Project
NPV	8%	25,794
BCR		2x
IRR		19%

Low Capex	Discount rate	Total Project
NPV	8%	35,011
BCR		3x
IRR		24%

Note: The economic CBA differs from the financial CBA in that externalities and shadow prices were taken into account.

As explained earlier, the economic CBA is obtained after making certain adjustments to the Financial CBA. Some of these adjustments include shadow prices for petroleum products

(petrol and diesel), the price of electricity, remuneration for unskilled and semi-skilled labour and the exchange rate misalignment.

It is clear from the Table 14 that the numbers from the Economic CBA do not differ significantly from those of the Financial CBA. Since the financial CBA is better known than the Economic CBA, in this study the financial CBA in constant values will be used in the macroeconomic impact analysis that follows.

3.4 Macroeconomic Impact Analysis

3.4.1 Introduction to SAM

The macroeconomic impact of the Project is calculated by utilising a SAM for Mozambique. A SAM is a comprehensive, economy-wide database that contains information about the flow of resources that takes place between the different economic agents that exist within an economy (i.e. business enterprises, households, government, etc.) during a given period of time – usually one calendar year. Thus, a SAM is a matrix that incorporates the interrelationships that exist between the various economic agents in the economy, including the distribution of income and expenditure amongst household groups.

The development of the SAM is very significant as it provides a framework in which the activities of all economic agents are accentuated and prominently distinguished. By combining these agents into meaningful groups, the SAM makes it possible to distinguish clearly between groups, to research the effects of interaction between groups, and to measure the economic welfare of each group.

There are two key reasons for compiling a SAM:

- Firstly, a SAM provides a framework for organising information about the economic and social structure of a particular geographical entity (i.e. a country, region or province) for a particular time period (usually one calendar year); and
- Secondly, it provides a database that can be used by any one of a number of different macroeconomic modelling tools for evaluating the impact of different economic decisions and/or economic development programmes.

Since the SAM is a comprehensive, disaggregated, consistent, and complete data system of economic entities that captures the interdependence that exists within a socio-economic system, it can be used as a conceptual framework for exploring the impact of exogenous changes in such variables as exports, certain categories of government expenditure, and investment on the entire interdependent socio-economic system.

The SAM, because of its fine disaggregation of private household expenditure into relatively homogenous socio-economic categories that are recognisable for policy purposes, has been used to explore issues related to income distribution. Appendix 2 contains a more thorough discussion of SAMs and elaborates on the use of SAMs as analytical tools for specific applications in general economic equilibrium analysis.

The development of the ideas that underpin the SAM is largely attributable to Sir Richard Stone and the work undertaken by the Cambridge Growth Project in the 1950's and 60's. This group started out by integrating disaggregated production accounts in the form of Input-Output Tables into the System of National Accounts (''**SNA**''). A SAM is a presentation of the SNA in a matrix format that incorporates an analysis of the interrelationships that exist between the

various economic agents in the economy, including the distribution of income and expenditure amongst household groups, thereby, providing the national accounts with a social dimension.

A SAM is very similar to the traditional Input-Output Table in the sense that it reflects all of the inter-sectoral linkages that are present in an economy. However, in addition to these inter-sectoral linkages, a SAM also reflects the activities of households, which are the basic unit where significant decisions regarding important economic variables such as expenditure and saving are taken. By combining households into meaningful groups, the SAM makes it possible to clearly distinguish between these household groups, and to study the economic welfare of each household group separately.

The data requirements for all economic models can always be expressed in the form of a SAM. If it is not possible to express the data in this particular manner, the model will invariably be flawed, making its application in the model-building arena impossible. It is this particular characteristic of the SAM that has made it popular as the database of preference for multi-sector economic models that are used to assess the economic implications of policy changes (or shocks) that will have effects not only on macroeconomic aggregates such as GDP, job opportunities, the balance of payments, etc., but also upon the structure of the economy. As such, these models must have access to information about production, consumption, labour markets; and the functional distribution of income and the composition of trade.

The aforementioned impacts focus on all backward and forward linkages associated with The Project. In order to measure all of the economic implications associated with the construction, operational and re-investment components of The Project, a partial general macroeconomic equilibrium analysis was performed, based on the SAM for Mozambique.

The latest available SAM for Mozambique which was used in the 2014 Macroeconomic Study has been developed and updated by Conningarth to take into account the current national account data. In addition, economic data and information were obtained, inter alia, from the Central Bank of Mozambique, the World Bank, Development Bank of Southern Africa and other sources. The SAM was therefore adjusted and modified to meet the specific requirements of the study. The same SAM was used for the 2018 Macroeconomic Study.

3.4.2 Capex

Please see below in Table 15 the breakdown of Capex between categories of costs (per ISIC codes within the SAM). The percentage of local content within such amounts is of importance.

Table 15: Project Breakdown of Capex and Import Intensity (%)

Asset	Breakdown
1. Furniture	2%
2. Rubber products	0%
3. Structural Metal Products	27%
4. Other Fabricated metal products	8%
5. Machinery and equipment	9%
6. Electrical machinery and apparatus	8%
7. Manufacturing of transport equipment	5%
8. Other manufacturing and recycling	0%
9. Buildings	8%
10. Civil Construction	12%
11. Business activities (architects, attorneys, etc.)	22%
Total	**100%**

Imports = 91% of Construction cost

Sources: Capex Breakdown: OIES; Import intensity: MRV.

Table 15 shows that the three most important capital costs are Structural Metal Products (27% of total capital costs), Business Activities (22%) and Civil Construction (12%). These three components account for more than 60% of capital costs.

LNG projects are highly capital intensive. As is not surprising for a new emerging market LNG producer, developing countries such as Mozambique most often do not have producers of the specialised equipment and machinery that such facilities require. Consequently, by far the largest share of such equipment and machinery will be imported. The assumption of this study is that 91% of total capital cost will be in the form of imports for the Project, with 9% indigenous LC contributing to domestic Fixed Capital Formation. The Project is a large project. Therefore, it should be recognised and congratulated that Area 4 is making a USD 3 billion LC commitment for the Project.

The analysis, however, does allow for some import substitution to take place as Mozambique over time develops the capacity and capability to meet the technical and cost specification for capital and other inputs. It can be envisaged that future trains of Rovuma LNG will have a higher LC amount.

An assumption in this study is that the import intensity in the Mozambican economy is likely to increase by almost one third. We also hypothesise that towards the latter part of the Project, the import intensity is likely to decline, in parallel with the development of the Mozambique economy.

3.4.3 Opex

Please see below in Table 16 the breakdown of Opex between categories of costs (per ISIC codes within the SAM). The percentage of local content within such amounts is of importance.

Table 16: Project Breakdown of O&M and Import Intensity (%)

Operational Cost Sector	Assumed O&M Cost %
Agriculture	0%
Mining	0%
Non-fuel chemicals incl. plastics and rubber	17%
Metal and non-metal mineral products	9%
Machinery equipment incl. Transport	11%
Fuels	4%
Other manufacturing	25%
Electricity and water	3%
Construction	3%
Trade and repair services	1%
Restaurants and hotels	5%
Transport and communication services	4%
Financial and business services	14%
Government, social and community services	3%
Total	**100%**

*Imports = 90% of Operating and Maintenance cost.

Sources: Operational Structure: PWC, Conningarth own calculations and OIES. Import intensity: MRV.

The bulk of O&M costs are associated with the following sectors of the economy: Other manufacturing (25% of the total), Non-fuel chemicals incl. plastics and rubber (17%) and Financial and Business services (14%). Again it is assumed that, at least initially, the import intensity will be high (90%). Thus, we assume that future trains of Rovuma LNG will have a higher LC percentage than Phase 1.

3.4.4 The Macroeconomic Impact of Rovuma LNG

A partial general macroeconomic equilibrium analysis was performed, based on the SAM for Mozambique, to determine the nature and magnitude of the impacts of The Project on various economic indicators such as:

- GDP and GNP;
- Capital utilisation;
- Employment impact by skill level;
- Household income by income group;
- Fiscal impact to the GOM from tax revenues (income tax, PPT and Profit Petroleum);
- Efficiency indicators for capital and labour, and
- The BOP.

The total impacts were calculated as the sum of the direct, indirect and induced macroeconomic impacts stemming from the construction, operations and re-investment of savings of the Project. The meaning and measurement of these impacts are discussed below.

3.4.4.1 On-Site Impact

The "on-site impact" refers to the quantified tangible effects of the construction and operational phase components of the Project. Everything to do with the physical Afungi site (i.e. construction, operations/production, labour, company head offices that ultimately produce the LNG/Condensate/Domgas) is included in on-site impact. However, the **"on site"** (direct) impact does not include any forward downstream linkage impacts, i.e. Domgas supplied by Rovuma LNG to any Domgas Project.

3.4.4.2 Supply Chain Impact

"Supply Chain impacts" refer to the effects of the Project on all other industries that supply inputs during the construction and operational phases.

The Supply Chain impact that serves the ''On Site'' impact (construction and operational phases) incorporates all of the upstream suppliers that produce goods and services that are used as inputs to the initial construction and on-going operation of the core Rovuma LNG project located at the Afungi site. This includes all so-called 'first-round' contractors, suppliers, sub-suppliers; as well as second and subsequent round suppliers and contractors that supply goods and services as inputs to first round suppliers.

In terms of the construction phase, such inputs could refer to cement, steel and bricks, for example. With regard to the operational phase, they refer to products such as electricity, fuel and chemicals. In order to explain the meaning of the concept of supply chain impacts further, an example can be used. When the Project starts operating, it will require materials such as machinery and equipment, fuel (largely supplied by itself), lubricants, electricity (largely supplied by itself), and even inputs such as stationery and bank services. In order to produce these products and services, the relevant suppliers in turn require certain inputs from other producers in different economic sectors. The supply chain impacts therefore represent the total interactions that occur in the economy in order to supply the direct materials and services

used by the Project, as well as the products and services that complement those used by the Project.

These interactions are expressed in terms of their contributions to GDP/GNP, employment creation and income, as well as other macroeconomic variables.

3.4.4.3 Economy-Wide Impact

The economy-wide impacts are the effects throughout the economy of paying out salaries, wages and bonuses to people who are employed by the Project (whether Mozambican or foreign), as well as the spending of the salaries and wages that are paid out to the workers employed by upstream suppliers, and that are spent inside Mozambique. It is important to note that the first round of spending of wages and salaries paid to these workers creates further rounds of spending by the workers employed in the second and subsequent round upstream suppliers due to the paying out and spending of salaries and wages.

The spending of these additional salaries and wages creates a multiplier effect through their boost of demand for various consumable goods that need to be supplied by various economic sectors. So, an initial amount of spending by the Project (i.e. payment of wages and salaries) leads to increased consumption spending, thus boosting national income and increases GOM tax revenue.

The economy-wide impact does not include the impact of the spending of wages and salaries by workers employed in downstream businesses (i.e. forward linkages). This is because the existence of many of these downstream businesses is not 100% dependent on the existence of the Rovuma LNG project on the Afungi site, and, as such, may not be impacted by the Rovuma LNG project.

Multipliers that are found by using on-site and supply chain effects are known as simple multipliers. When on-site, supply chain and economy-wide effects are used, the multipliers are called total multipliers.

3.4.5 Economic features impacting on the magnitude of the multiplier effects

The multiplier effect comes about because injections of new demand for goods and services into the circular flow of income stimulate further rounds of spending – in other words “one person’s spending is another’s income”. This can lead to a bigger eventual final effect on output, employment and other indicators.

The value or magnitude of the multiplier depends on a number of key features and determinants present in an economy. Some of these are briefly discussed below:

- **Propensity to consume**

The higher is the propensity to consume domestically produced goods and services, the greater is the multiplier effect. The government can influence the size of the multiplier through changes in direct taxes. For example, a cut in the rate of income tax will increase the amount of extra income that can be spent on further goods and services. The flip side of this is that if the propensity to save is high, extra income will be saved rather than spend, leading to a lower multiplier.

- **Propensity to import**

An important factor in the context of this study which affects the size of the multiplier is the propensity to purchase imports. If, out of extra income, people or companies spend money on imports, this demand is not passed on in the form of fresh spending on domestically produced output. It leaks away from the circular flow of income and spending, reducing the size of the multiplier.

- **Propensity to tax**

A high propensity to tax reduces the amount of extra income that can be spend on additional goods and services.

- **Availability of spare capacity in the economy**

The multiplier process also requires that there is sufficient spare capacity for extra output to be produced. In the aggregate, if short-run supply is inelastic, the full multiplier effect is unlikely to materialise, because increases in demand will lead to higher prices rather than a full increase in real national output. In contrast, when short run supply is perfectly elastic an increase in aggregate demand causes a large increase in national output. In such a case, businesses in the economy have the capacity to expand production to meet increases in demand.

- **Avoidance of crowding out**

Crowding out can occur when increased government spending or lower taxes lead to a rise in government borrowing and/or inflation. This causes interest rates to rise and has the effect of slowing down economic activity.

- **Consumer and business confidence**

When consumer and business confidence are high, the willingness of consumers and producers to spend the increase in income or profits is enhanced, leading to higher growth in the economy.

3.5 Macroeconomic Impact Results

3.5.1 Introduction

The results of the macroeconomic impact analysis study are presented according to the following themes:

- Project macroeconomic impact;
- Project sectoral impact;
- Project economic effectiveness; and
- Project fiscal impact.

The analysis is performed in terms of the different types of impact (on-site, supply chain and economy-wide and/or in terms of the different phases of the Project (construction, operational and savings/re-investment).

As and when required, the Tables provided below consist of two components, the first being the results stemming from the high capex scenario followed by the results emanating from the low capex scenario. In the written sections below, where applicable, initial reference will be

made to the high capex scenario with the results from the low capex scenario followed immediately in brackets.

3.5.2 Project Macroeconomic Impact

The construction, operational and re-investment phases of the Project will impact the economy, but construction is a once-off event that will last a maximum of five (5) years, while the operational phase and re-investment are long term impacts, potentially stretching over multiple decades (in this Report, a twenty five (25) year operational period is used). The impacts of the different individual components were integrated in order to come to an annualised macroeconomic impact of the total Project. As such, the macroeconomic impact of the construction phase was annualised, to match that of the operational phase. In the discussion below we will only refer to the final stage when the Project is fully operational, given this is the most material phase.

Please see below Table 17 which shows the average annual direct lifetime operational impact of the Project.

Table 17: Project On-Site Operational Economic Impact [Average p.a. over the period 2024 – 2049, USD Million, 2018 Constant Prices]

Economic Indicators	High Capex Scenario	Low Capex Scenario
GDP	6,136	6,922
Capital formation	24,269	19,769
Employment	1,300	1,300

Over the period 2024-2049 the project will annually generate USD 6,136 million of GDP (USD 6,922 million for low capex case), while the annual capital formation is in the order of USD 24,269 million in the High Capex scenario (USD 19,769 million in the Low Capex scenario). The number of annual jobs p.a. to be created and then sustained by the Project at the Afungi site is estimated to be 1,300 during the Project's operational phase.

Turning now to outline the wider impact of the Project, Table 18 provides a summary of the different types of impacts as well as the total impact of the Project on the leading economic indicators. The impacts on each of the individual indicators will be discussed in more detail below.

Table 18: Project Combined Macroeconomic Impact [Average p.a. over the period 2024 – 2049 2018 Constant Prices]

High Capex USD million	On-Site Impact	Supply Chain Impact	Economy-Wide Impact	Total Impact
Impact on GDP	6,195	3,363	5,831	15,388
Impact on GNP				9,900
Impact on capital formation	24,363	2,107	8,420	34,890
Impact on employment [number of job opportunities]	2,088	90,478	165,020	257,586
Impact on Households				8,126
Household Income per Capita				264
Fiscal Impact				4,337
BOP				7,793

Low Capex USD million	On-Site Impact	Supply Chain Impact	Economy-Wide Impact	Total Impact
Impact on GDP	6,970	4,458	7,120	18,549
Impact on GNP				14,197
Impact on capital formation	19,845	2,589	10,253	32,687
Impact on employment [number of job opportunities]	2,088	119,615	201,346	323,050
Impact on Households				9,885
Household Income per Capita				321
Fiscal Impact				5,345
BOP				9,802

The Project's operational phase lasts for 25 years and has a sizable impact in terms of GDP, capital and employment. For example, the Project annually sustains some 257,586 national employment opportunities on average (high capex scenario) over its operational life. The low capex scenario is expected to sustain 323,050 employment opportunities on average over the life of the Project. It is interesting to note that the savings and re-investment phase of the Project has a disproportionally large impact on overall employment numbers. The understood reason for this is that the savings/investment element impacts on multiple economic sectors and is therefore likely to be felt throughout the Mozambican economy. From Table 23 it is clear that these sectors are more labour intensive compared to the capital intensive nature of the Project. For example, agriculture will be greatly impacted upon by reinvestment projects, due to the very labour intensive nature of the sector.

The re-investment impact is often not included as part of the total impact of a Project, but is clearly important, in many ways crucial. A good theoretical example to consider is that of Dubai. Dubai used its income from its limited oil production to, among others, form its own airline and to develop a tourist industry, which in time has branched out into related industries (e.g. hosting sporting events). In time, the tourism industry has become a major industry (and employer) within Dubai.

This impact is generated mostly through taxes paid to the GOM by the Project, which serves as another injection in the economy (assuming these funds are wisely spent by the GOM). Interestingly, its biggest relative impact is on employment numbers. The GOM receives two revenue/income streams from Rovuma LNG namely income/profits from the project (e.g. PPT,

income tax, Profit Petroleum) and other taxes paid by individuals (e.g. current taxes on personal income and wealth, VAT, etc.).

It is assumed that 64% of the Project's net income (per the High Capex scenario) (i.e. the GOM's entire take in the High Capex scenario, as amended by the CBA) is re-invested in the Mozambican economy, after provision was made for:

- the partial repayment (54%) of Mozambique's external debt (USD 14.1 billion); and
- the partial repayment (54%) of ENH debt to be incurred to fund its participation in the Rovuma Basin investment programme (USD 12 billion), the remaining proceeds will be used for purposes of spending or investment in social up-liftment programmes such as education, health etc, in Mozambique.
- Why 54%? This represents Area 4's share of the initial Onshore Trains, assuming Mozambique LNG's production is 12.9 MPTA and Rovuma LNG's production is 15.2 MTPA.

It is assumed the foreign partners of Area 4, will ultimately repatriate all of their profits even though we understand the initial target for profits will be reinvestment into future phases of Rovuma LNG) or further developments or the Mozambican economy at large. For example, within Area 4, ExxonMobil/ENI also have Fifth Licensing Round blocks, Galp has an existing downstream chain, Kogas is involved in gas distribution and CNPC has multiple business interests.

3.5.3 National Output (GDP)

GDP within the Project context is the total production of goods and services within the geographical boundaries of Mozambique within a given period of time (one year). The IMF is projecting a real growth rate of 5.3% for Mozambique's GDP in 2018, increasing the value of GDP to USD 14 billion this year.

The Project is very significant in relation to Mozambique's small economy. Specifically, the Project (high capex scenario) is expected to contribute an additional USD 15,388 million per annum to GDP (USD 18,549 million low capex scenario). As such, the impact of the Project on Mozambique's GDP is equivalent to 1.1x the country's anticipated 2018 GDP in the high capex scenario (1.3x low capex case), and is of monumental importance. Obviously, the Project will have an even greater impact on the extraction (mining) sector, given that this sector is currently estimated to generate only 4.1% of GDP.

Given this significant project is but one of potentially several other large projects (e.g. Mozambique LNG, Mozambique LNG / Prosperidade, subsequent phases of Rovuma LNG), it is clear that huge opportunities and serious challenges (and dangers) will face the economy and the country in coming decades.

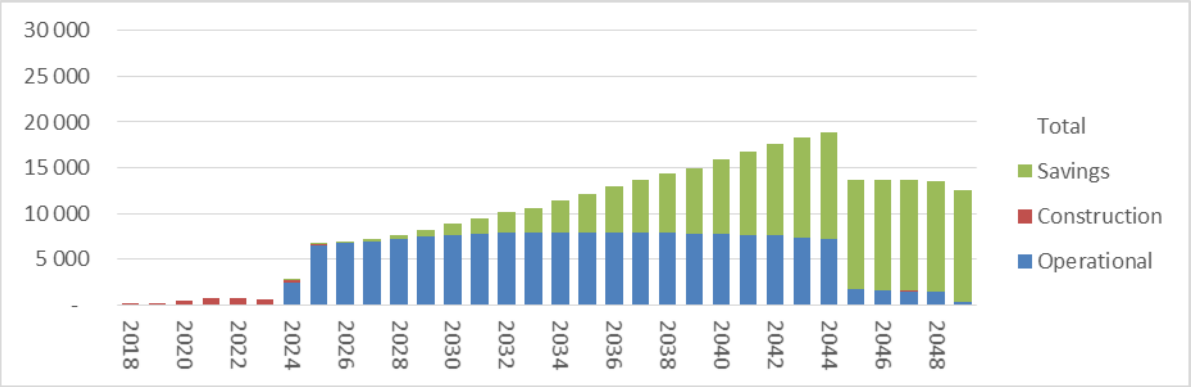
Figure 8 shows the annual GDP created by the Project, per phase, subdivided into High Capex and Low Capex scenarios. The period from 2019 to 2025 forms the construction phase with LNG production commencing from 2024. Clearly, the operational / savings/reinvestment phase is of the greatest importance.

The figure clearly shows the relative small GDP impact during the very early years (construction) phase of the Project life cycle. After that, the GDP impact of the operational phase kicks in with a sizable contribution to GDP, but starts to slowly taper off about mid-life of the Project. The savings/investment impact increases steadily over time to form the bulk of the GDP contribution during the last one-third of the Project lifecycle.

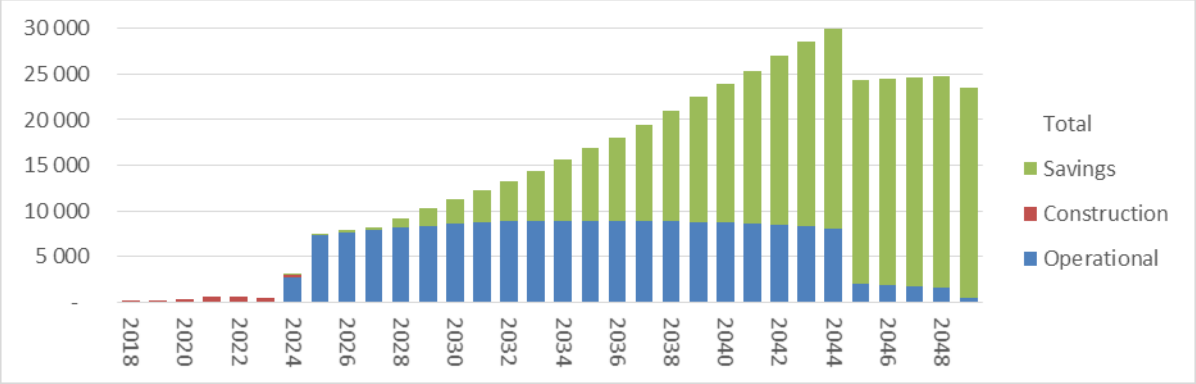
As stated in Section 3.2.4, although the evaluation period stops in 2049 (with the expiry of the 30 year EPCC), as a practical matter net revenues will likely continue as a result of the infrastructure in place, as well as the remaining GIIP (with the Project owned by either of GOM or Area 4) and most likely the amount of reinvestment/savings will increase in the future. In addition the number of trains is likely to increase beyond the Project (e.g. Mozambique LNG, Mozambique LNG / Prosperidade, Rovuma LNG Phase 2), hence leading to even larger amounts of savings and investment in the Mozambican economy.

Figure 8: GDP Impact of the Project Components [p.a. over the period 2018 - 2049 US$ Million, 2018 Constant Prices]

High Capex Scenario



Low Capex Scenario



Expressed graphically, the total GDP contribution of the High and Low Capex scenarios are as follows:

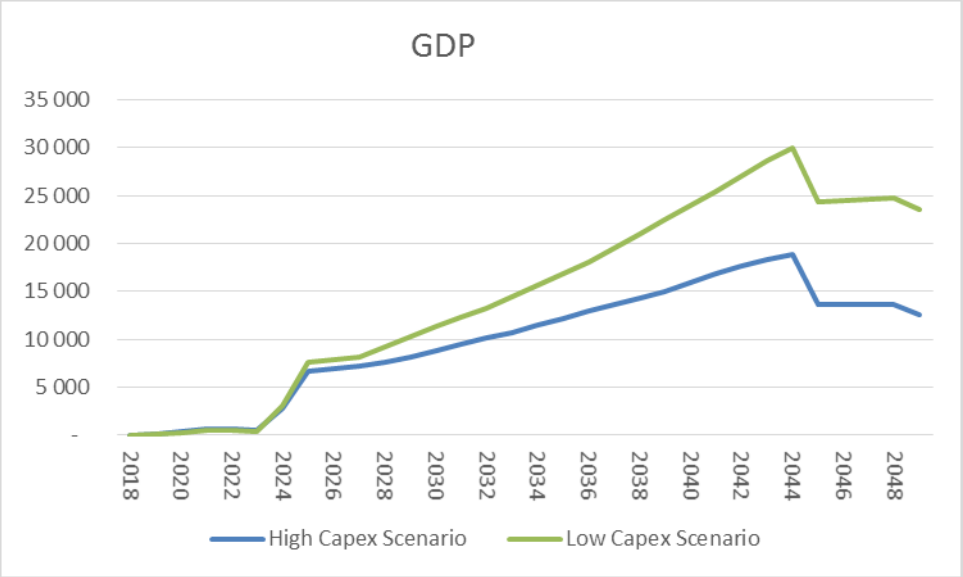
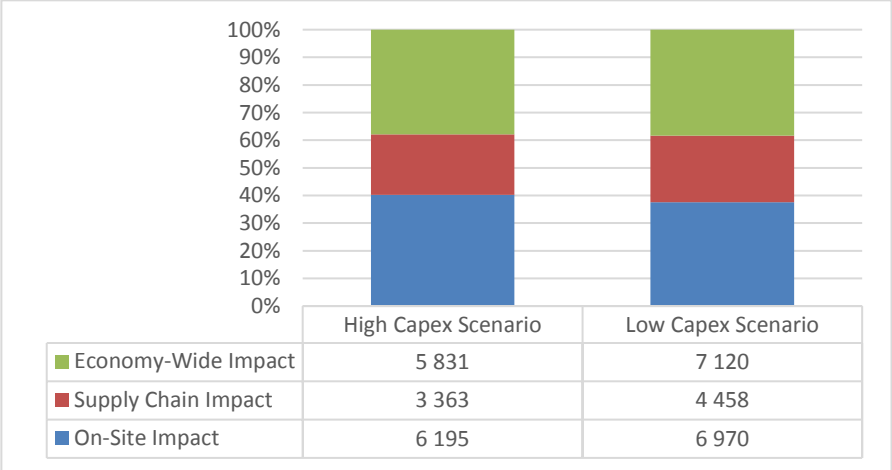


Figure 9 allocates the total GDP impact to the different types of impacts. On average, for both scenarios, the on-site impact amounts to approximately 40% of the total impact value, the supply chain impact 22% and the induced impact 38% of the total.

Figure 9: GDP Impact [Average p.a. over the period 2024 – 2049]



	High Capex Scenario	Low Capex Scenario
Economy-Wide Impact	5 831	7 120
Supply Chain Impact	3 363	4 458
On-Site Impact	6 195	6 970

3.5.4 National Output (GNP)

For analytical purposes, it is important to distinguish between GDP and GNP. GDP and GNP both attempt to measure the market value of all goods and services produced for final sale in an economy. GDP refers to and measures the domestic levels of production in a country. It represents the monetary value of all goods and services produced within a nation's geographic borders over a specified period of time.

GNP measures the levels of production of **all the citizens or corporations** from a particular country working or producing in any country. As a result, a country's GNP differs from its GDP by the net balance on factor incomes:

- adding the income received by domestic residents for their contribution to production that takes place in other countries, while
- (subtracting the income paid to foreign residents for their contribution to production that takes place within home country).
- The factor incomes included in this calculation comprise compensation of employees (sometimes estimated from worker remittances sent back to the home country); corporate profits (dividends, earnings of unincorporated affiliates, and reinvested earnings of incorporated affiliates); and net interest.

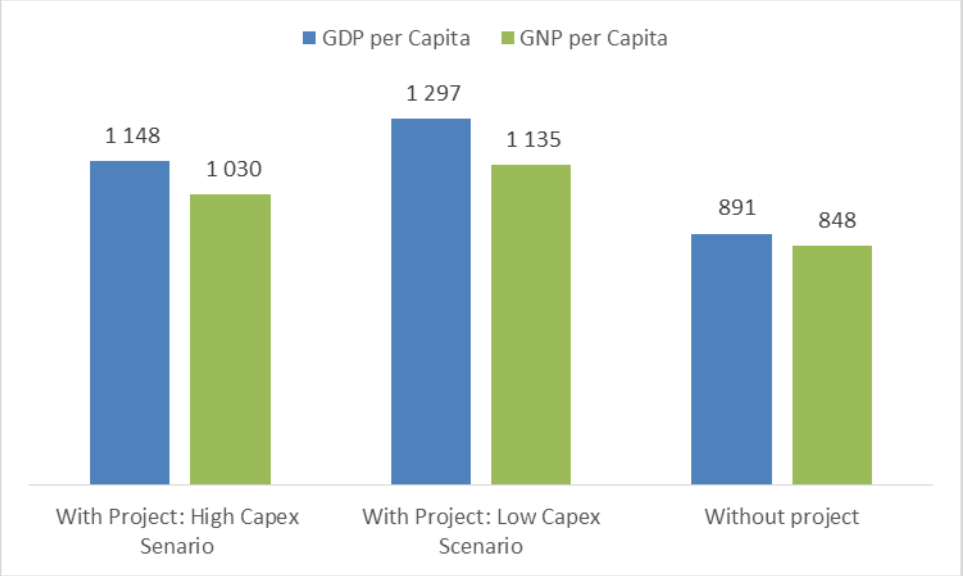
Consequently, any country whose residents pay more factor income to foreigners than they receive from foreigners, will have a GDP that exceeds its GNP. This might be the case for a country that has borrowed a lot of money from the rest of the world, or has absorbed a lot of FDI, or has large numbers of foreign workers, or a combination of all three. **This is likely to be the case for Mozambique for the first decade or more of LNG production**. GNP, however, is less commonly referred to as an economic indicator than GDP, primarily because of the difficulty of obtaining credible and accurate data on factor incomes generated by local citizens and/or institutions outside the country.

In working out GDP or GNP calculations, it is important to emphasise that care should be taken to ensure that assumptions, caveats, definitions and modelling pitfalls should be clearly stated, understood and communicated. A case in point is that saying "the size of the economy will double if the project is implemented" will have significantly different outcomes depending on whether GDP or GNP is used for the analysis. In developing countries using GNP rather than GDP could tone down perhaps overly- optimistic outcomes sometimes expected by politicians and citizens at large.

For clarity, the GNP impact of the Project is substantially lower than the GDP impact (due to repatriation of profits by foreign investors (90% of Area 4)) but is highly material. The projected annual GNP impact for the high capex scenario is USD 9,900 million and USD 14,197 million for the low capex scenario. For small, less developed countries relying on capital inflows (such as Mozambique}, GNP may be the preferred measure to determine the likely impact on an economy.

Please see in Figure 10 a calculation of average GDP and GNP per capita over the Project period (to 2049), which shows the scale of the Project impact.

Figure 10: Average GDP and GNP per Capita 2024-2049, USD 2018 Constant Prices



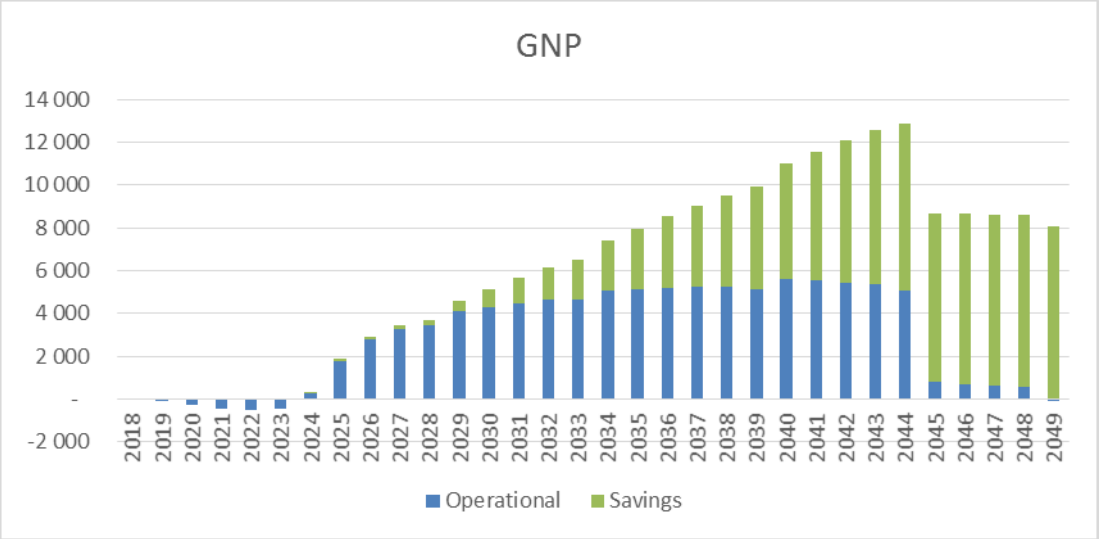
Although GDP numbers are important in themselves and convey a good deal of information, GDP/GNP per capita numbers add an additional layer of information (as they in essence show the impact of projects on the average person on the street).

From the figure it can be seen that in terms of GDP per capita, on average over the life of the project, The Project in the case of high capex adds USD 257 in 2018 prices to GDP (around 30%) for every person, including children in Mozambique. In the case of the low capex scenario the additional per capita impact of some USD 406 (46%) is even more impressive.

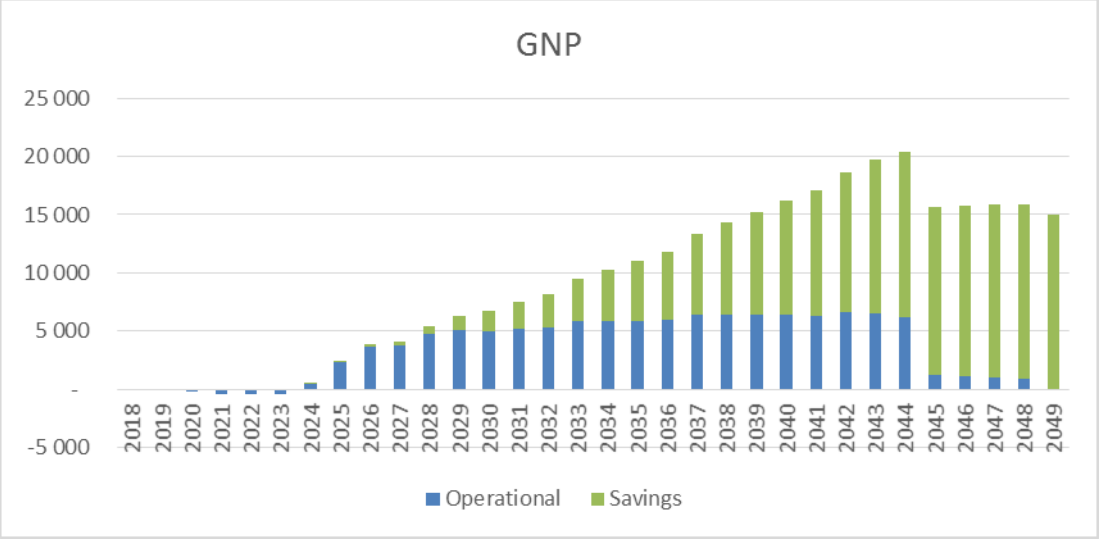
Figure 11 shows the annual generation of GNP by the Project. It can be seen that the figure is similar to the GDP graph in section 4.2.1, but at a lower level for both scenarios. The operational GNP tends to dominate over the first half of the life of the Project's operational life, while the savings/re-investment phase dominates the Project's second half of its operational life.

Figure 11: GNP Impact of the Project Components [p.a. over the period 2018-2049 USD Million, 2018 Constant Prices]

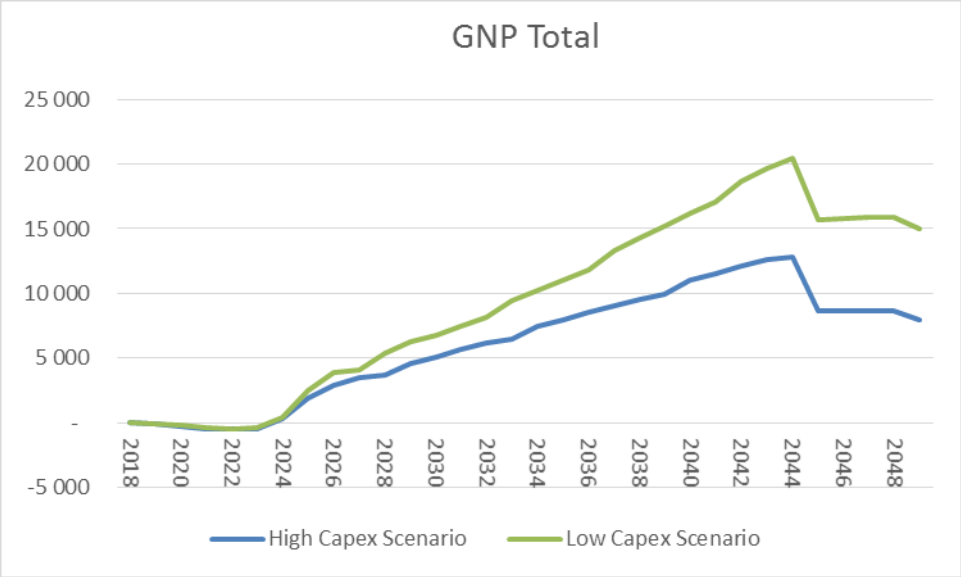
High Capex Scenario



Low Capex Scenario



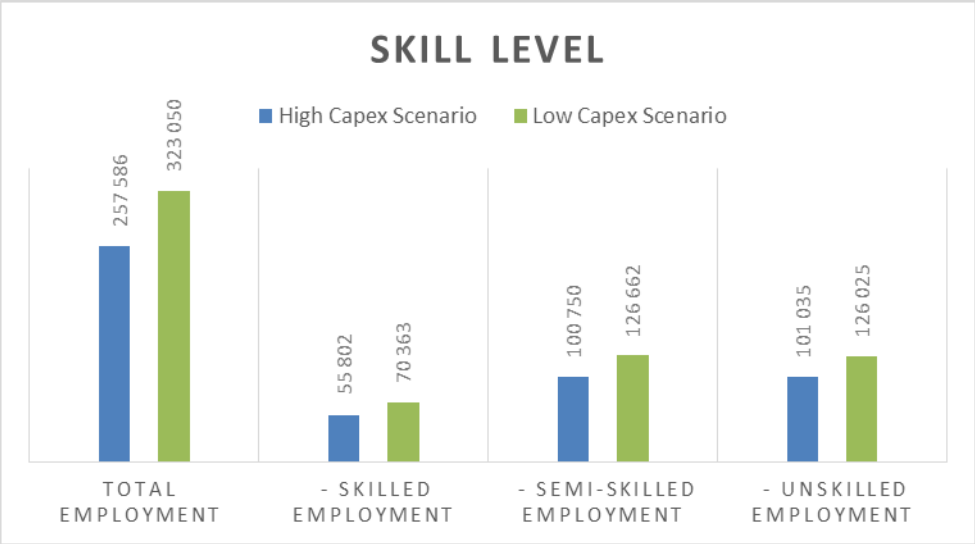
Expressed graphically, the total GNP contribution of the High and Low Capex scenarios are as follows:

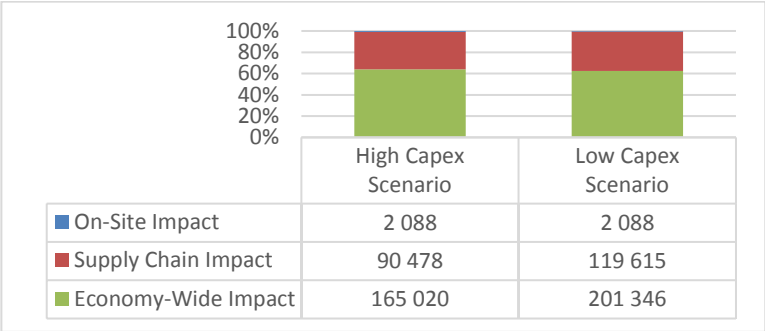


3.5.5 Employment Impact

According to the World Bank, Mozambique had a labour force of approximately 12.9 million in 2017. The total labour force comprises people ages 15 and older who meet the International Labour Organization definition of the economically active population. Alternatively, Mozambique's most recent employed population was 7,089,144 (shorthand 7.1 million). Mozambique's unemployment rate was approximately 25% in 2017. About 43% of the country's youthful population of 29.7 million is in the labour force, of which a large share is unskilled and semi-skilled. Of those that are employed, a disproportionate share is involved in agriculture and the informal sector. Job creation is thus an important objective of the GOM and a key requirement by the GOM of foreign investors. As outlined in Figure 12, the Project is expected to generate and sustain approximately an additional 257,586 jobs across Mozambique during the life of the Project (high capex scenario) or 323,050 jobs in the low capex case. Note the Project itself will employ 1,300 people during the operational phase, hence its wider impact is very substantial.

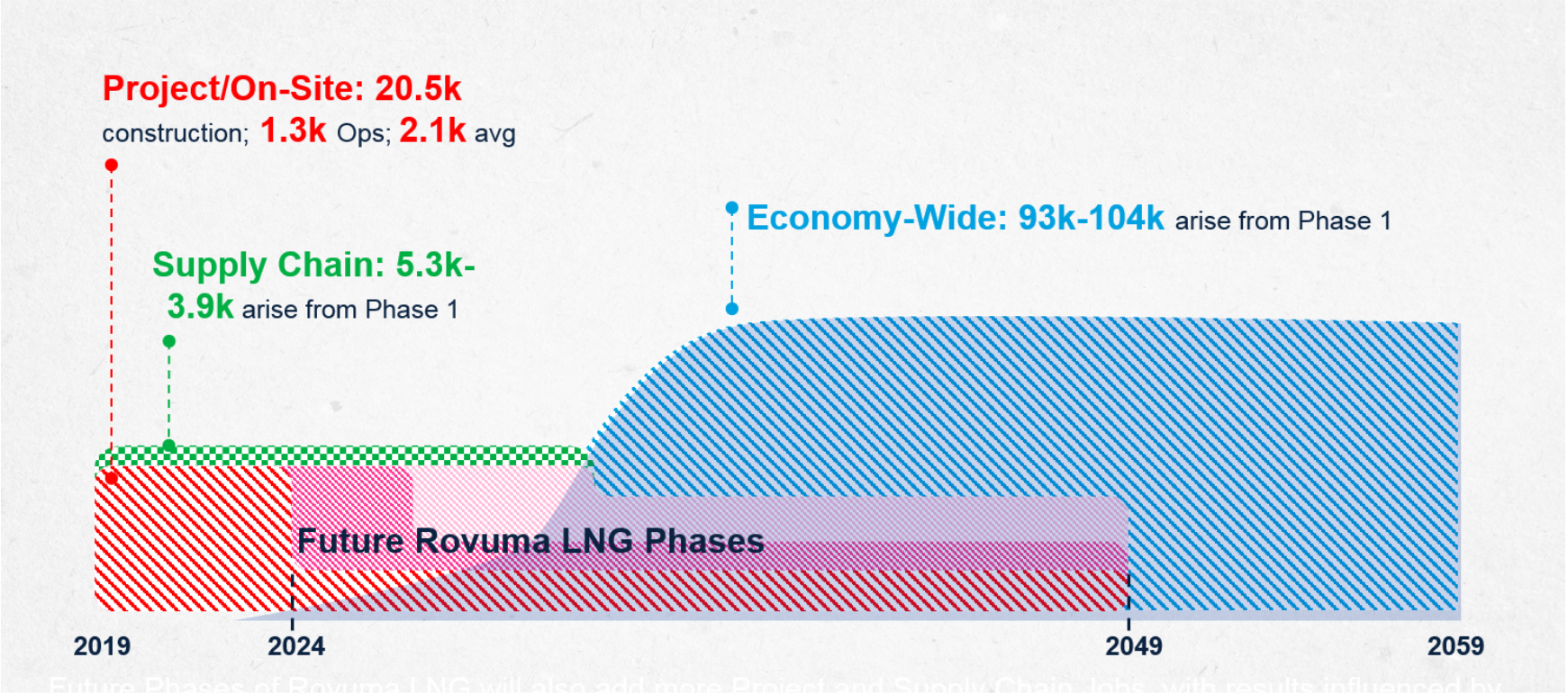
Figure 12: Employment Impact level of skill and linkage impact.





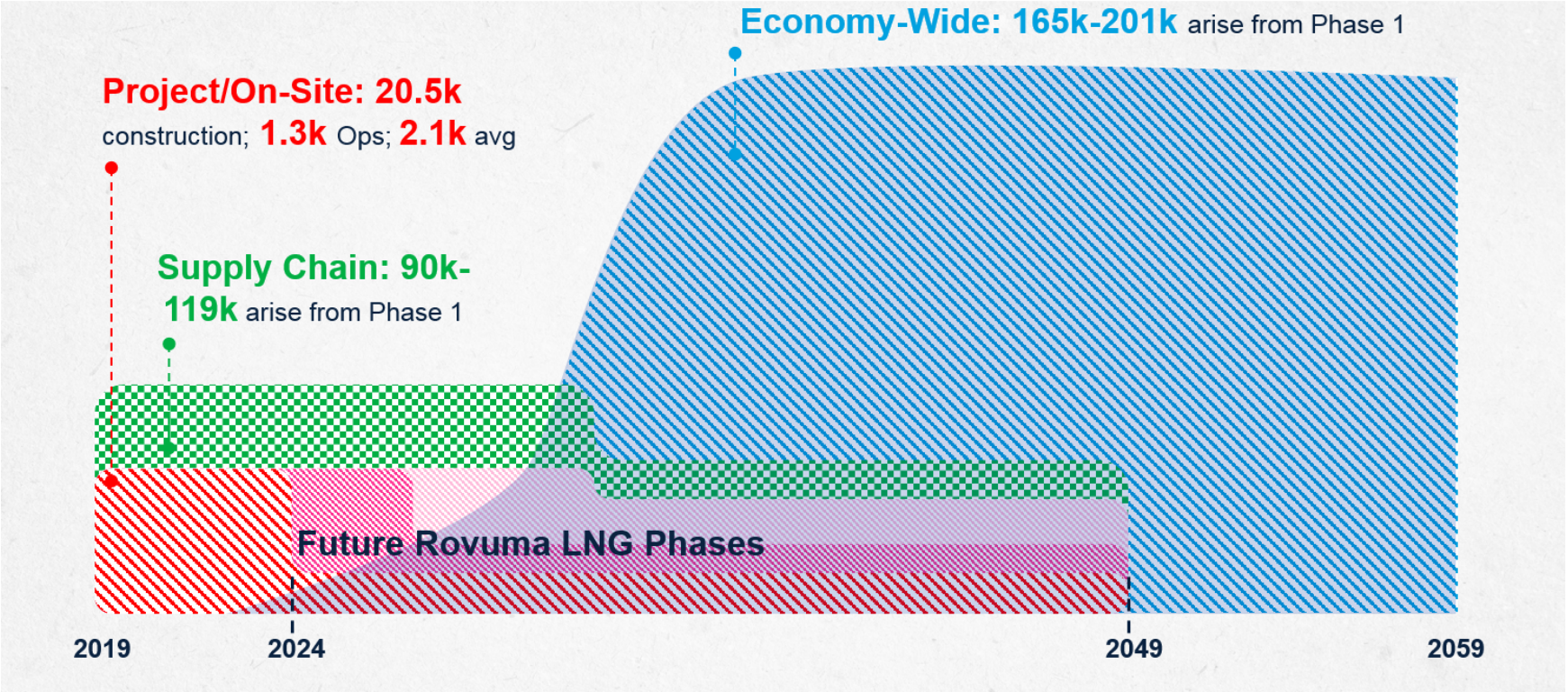
	High Capex Scenario	Low Capex Scenario
On-Site Impact	2 088	2 088
Supply Chain Impact	90 478	119 615
Economy-Wide Impact	165 020	201 346

Expressed as a schematic, we show as follows **Figure 13: Schematic Onsite, Supply Chain & Economy-Wide Employment (excluding Savings & Reinvestment:**



The above schematic, which shows High Capex then Low Capex Scenario numbers, is influenced by Mozambique's current lack of capital and abundance of labour. Its practicality will depend upon extensive skills development and training.

Expressed as a schematic, we show as follows in **Figure 14: Schematic Onsite, Supply Chain and Economy-Wide Employment (including Savings & Reinvestment):**



The above schematic, which shows High Capex then Low Capex Scenario numbers, is influenced by Mozambique's current lack of capital and abundance of labour. Its practicality will depend upon extensive skills development and training.

It must be kept in mind that the re-investment or savings component of the Project is included in this calculation and again this is the crucial element. The re-investment/Savings Component is mainly the profit that GOM receives from the Project (its 64% - 67% share depending on capex scenario). This is reinjected into the Mozambican economy through the multiplier effects which creates increases in economic activity and employment creation. It is worth noting that although 257,586 jobs (in the high capex scenario), appears a large number it is only 4% of Mozambique's total employed population (of 7,089,144). Therefore, the Project's proportional impact on employment is less than its impact on GDP, for example, which is over 100% in each scenario. It should also be noted the Project continues beyond the 2049 EPCC expiry date.

In both the high capex and low capex scenarios, approximately 64% of the total jobs that will be created by the Project are envisaged to result from the economy-wide impact, which reflects the additional labour remuneration and thus consumer spending and generation of gross operative surpluses from the Project's supply chain. The on-site impact is around 1% of the total jobs sustained. The supply chain contribution is 35%.

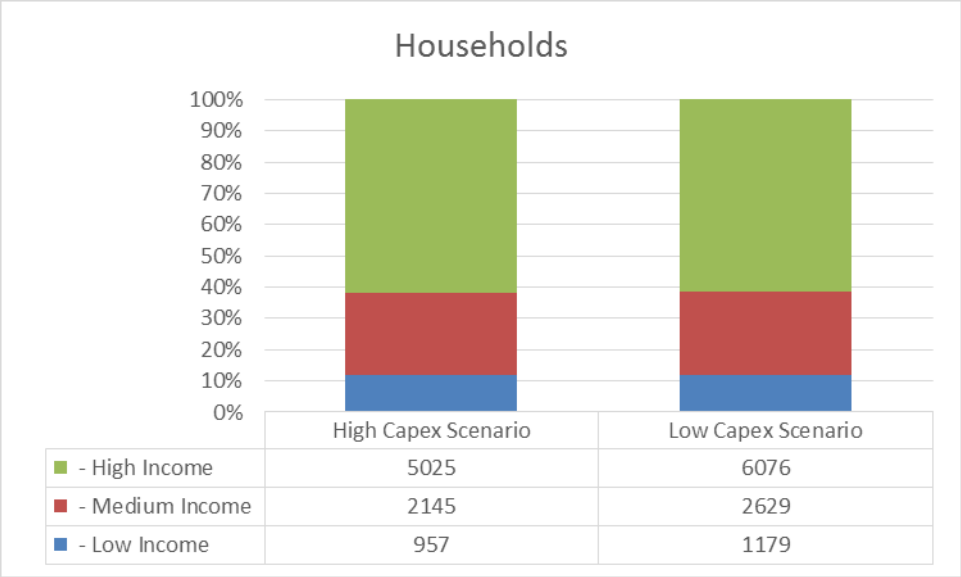
Notably, (in both scenarios), 39% of the jobs that will ultimately be created by the Project, will be for unskilled workers and the same percentage (39%) will be for semi-skilled workers. The remaining 22% of jobs are skilled workers, implying that skilled labour will have to migrate into the area from other areas of Mozambique (as well as from abroad). With almost one in four workers of the project skilled, there is potential for skills transfer to occur, thus up-skilling the local labour force.

3.5.6 Household Income

Although a household is considered to be the smallest economic unit within an economy, combined they make up around three quarters of total GDP. The average household size tends to be bigger in LDCs and Mozambique is no exception, with an average of five to six persons per household.

Per Figure 15, the Project is expected to have a significant effect on households' consumption expenditure. It is estimated that it will galvanise annually an additional USD 8,127 million of consumer spending in 2018 prices for the high capex scenario and USD 9,884 million for the low capex scenario. This additional consumer expenditure is equivalent to more than 68% (high capex case) of total household consumption expenditure in Mozambique of USD 11.94 billion in 2017 (current prices, World Bank data). In the low capex scenario this percentage increases to 83%.

Figure 15: Household Income [Average p.a. 2024 - 2049 USD Million, 2018 Constant]



	High Capex Scenario	Low Capex Scenario
- High Income	5025	6076
- Medium Income	2145	2629
- Low Income	957	1179

Notably, 62% of the additional household consumption expenditure stimulated by the Project, will be accrued by high income households (both scenarios), which is synonymous with skilled and some semi-skilled households. Lower- and medium-income households are expected to gain additional USD 3,102 million per annum in consumption expenditure as a result of the Project (high capex scenario) and UDS 3,808 million per annum for the low income case.

It is expected that household income per capita will grow by USD 264 on average over there period of 2024 – 2049 (high capex case) and USD 321 for the low capex case. Using World Bank data, Household income per capita is estimated as USD 525 in 2018, implying that in the high capex scenario household income per capita will increase by 50% compared to the base year and by approximately 61% in the low capex scenario.

In summary, the Project is expected to increase household incomes and, in so doing, boost households' consumption expenditure and GDP growth.

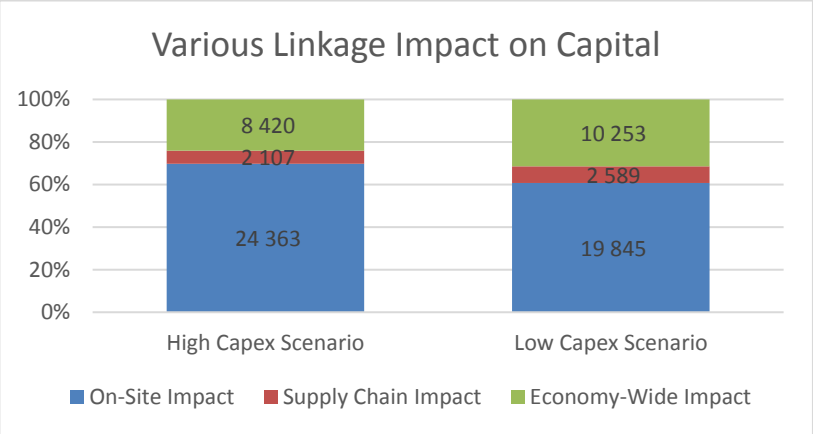
3.5.7 Capital Formation

Capital formation is important since it makes large scale production and a greater degree of specialization possible. A characteristic of most developing countries, however, is an acute shortage of capital. Any project that contributes to capital formation would thus be welcomed in such countries. A project such as Rovuma LNG is likely to have a significant impact on capital formation in Mozambique. Also important is the capital will remain in Mozambique after the EPCC expiry in 2049. The total capital impact for the high capex scenario amounts to USD 34,890 million p.a. (USD 32,687 million for the low capex scenario). In terms of the different phases of the Project the construction phase will contribute 1% of capital formation, the operational phase 81% and the savings/re-investment component 18%. It should be noted that the project will be financed by FDI, thus not strain limited local S&I.

As noted in Section 3.2.4, although this Report assumes the Project ends upon EPCC expiry, this is unlikely to be the case and the capital emanating from the Project is likely to be a permanent feature of the Mozambican economy. Standard Bank can see analogies with the UK building railways in Victorian England or the US building inter-state highways in the 1950s.

Per Figure 16, in contrast to the issue of GDP/GNP the bulk of capital formation arises from the Project's direct impact.

Figure 16: Capital Formation per Project Phase [Average p.a. over the period 2019-2049, 2018 Constant Prices]



In all respects, it should be noted the Project will be financed by FDI, thus not straining limited local S&I in any way.

3.5.8 Summary Results of Main Indicators per project phase

For the High Capex scenario (as selected point of comparison), Figure 17 shows the results of the main Project indicators (GDP, GNP, Capital Formation and Employment) without the impact of Savings/ Reinvestment. Figure 17 clearly shows that the Operational Phase is by far the largest contributor when it is compared to the construction period over the same period of time.

Figure 17: High Capex Scenario Results per Project phase (excluding Savings & Reinvestment) [Average % p.a. 2019 - 2049, 2018 Constant Prices]

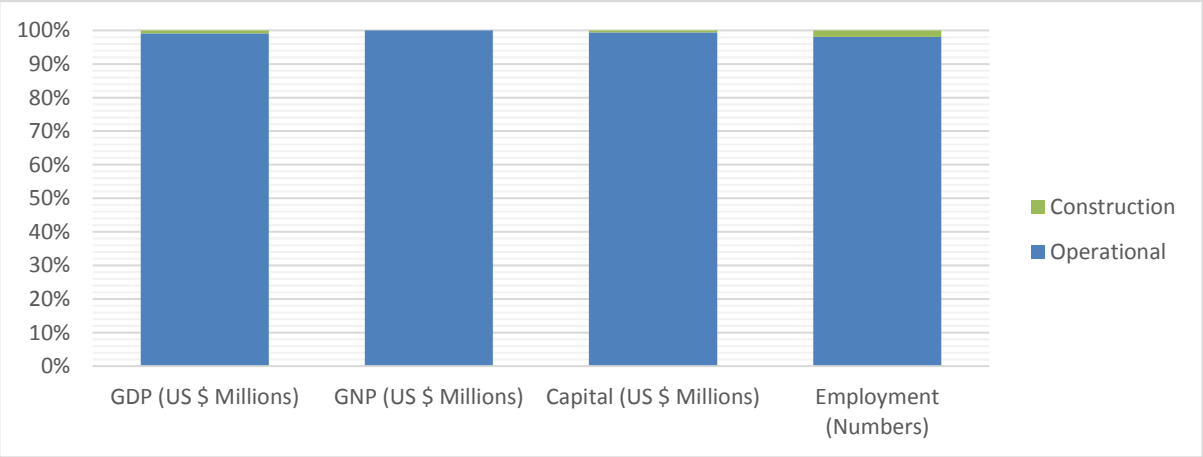


Figure 18 reiterates the point that the Project savings/reinvestment phase is absolutely crucial for facilitating Mozambique's long-term economic growth.

The savings / reinvestment impact is calculated using the earnings that the GOM will receive from the Project. Per Section 3.5.13, it is assumed that the tax revenue the GOM will receive will be used to upgrade social services (education, health, etc.). The model was then filtered on a sectoral basis. The combination of sectors was to a large extent based on the current investment pattern of the Mozambique economy (per the SAM).

Figure 18: High Capex Scenario Results per Project phase (including Savings & Reinvestment phase [Average % p.a. 2019 - 2049, 2018 Constant Prices]

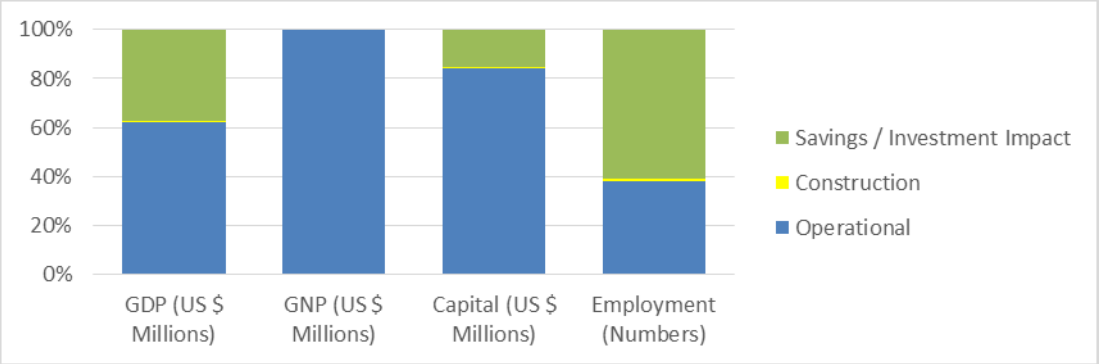


Table 20 shows the same information expressed in numerical terms for each of the High and Low Capex Scenarios.

Table 20: Project Results of main components per Project phase, including and excluding Savings & Re-investment phase [Average USD million p.a. 2019 - 2049, 2018 Constant Prices]

High Capex Scenario /Phases	GDP USDm	GNP USDm	Capital USDm	Employment (Numbers)
Operational	9,530		29,342	98,284
Construction	116		179	2,431
Total excluding Savings & Re-investment	9,646		29,521	100,715
Savings & Re-investment Impact	5,743		5,369	156,871
Total	15,388	9,900	34,890	257,586
Percentage Savings/Re-investment	37%	n/a	15%	61%

Low Capex Scenario / Phases	GDP USDm	GNP USDm	Capital USDm	Employment (Numbers)
Operational	10,654		25,248	107,841
Construction	95		145	2,126
Total excluding Savings & Re-investment	10,748		25,394	109,967
Savings / Re-investment Impact	7,800		7,293	213,083
Total	18,549	14197	32,687	323,050
Percentage Savings/Re-investment	42%	n/a	22%	66%

From Table 20, above it is easy to identify the Total excluding the impact of Savings & Reinvestment and the magnitude of the contribution of Savings/ Re-investment Impact to the Economic Indicators provided above.

3.5.9 Balance of Payments

Mozambique traditionally has a major BOP deficit (excluding grants) as a result of a wide trade deficit and negative net balance in the services and income account that explain the perpetual current account deficit (estimated by the World Bank in 2017 to be almost -20% of GDP). The Project is expected to swell the import bill over the medium term as machinery and equipment are imported; however, this will be dwarfed over the Project life time once exports start to flow. It is important to note though that imports are funded by Area 4 hence there is no impact upon Mozambique's limited domestic S&I. Table 21 outlines the relevant numbers.

Table 21: Balance of Payments

High Capex	Real		Nominal	
USDm	Total over period	Average	Total over period	Average
A. Project LNG BOP Impact	**129,964**	**4,999**	**183,216**	**7,047**
- Additional LNG Exports	167,298	6,435	235,847	9,071
- Imports of Capital Equipment during Construction	-22,813	-877	-32,160	-1,237
- Imports of Intermediate G&S during Operational	-14,521	-558	-20,470	-787
B. Broader Economy BOP Impact through Re-investment (incl. indirect imports)	**72,650**	**2,794**	**102,418**	**3,939**
- Benefits (Exports and Impacts Substitution)	164,236	6,317	231,530	8,905
- Total Imports	-91,586	-3,523	-129,112	-4,966
C. Total Balance of Payments (A-B)	**202,614**	**7,793**	**285,634**	**10,986**

Low Capex	Real		Nominal	
USDm	Total over period	Average	Total over period	Average
A. Project LNG BOP Impact	**156 184**	**6 007**	**220 237**	**8 471**
- Additional LNG Exports	185 657	7 141	261 798	10 069
- Imports of Capital Equipment during Construction	-18 583	-715	-26 204	-1 008
- Imports of Intermediate G&S during Operational	-10 891	-419	-15 357	-591
B. Broader Economy BOP Impact through Re-investment (incl. indirect imports)	**98 675**	**3 795**	**139 143**	**5 352**
- Benefits (Exports and Impacts Substitution)	223 252	8 587	314 812	12 108
- Total Imports	-124 577	-4 791	-175 669	-6 756
C. Total Balance of Payments (A-B)	**254 859**	**9 802**	**359 380**	**13 822**

Notes:

* Export and Import Substitution of Goods and Services produced in Mozambique as a consequence of additional profits/savings of the Project that are reinvested in the economy

** Capital Equipment Imports due to additional Investment that takes place in Mozambique as a consequence of LNG profits/savings that are reinvested in the economy. Plus imports of Intermediate Goods and Services due to additional Production that takes place in Mozambique as a consequence of LNG profits/savings that are reinvested in the economy.

** Capital Equipment Imports due to additional Investment that take place in Mozambique as a consequence of LNG Savings that are reinvested in the economy.

*** Imports of Intermediate Goods and Services due to additional Production that take place in Mozambique as a consequence of LNG Savings that are reinvested in the Economy.

According to the analysis, the Project is expected to generate very significant additional export revenue for the country's external account. Net exports from LNG sales in nominal terms are calculated as USD 183 billion for the high capex case USD 220 billion of the low capex case). The broader economy net BOP impact (i.e. including re-investment, non-LNG exports and import substitution) adds USD 102 billion (USD 139 billion for low capex scenario). The total

BOP impact is the sum of the Project LNG net exports plus the broader economy net exports, resulting in a total BOP impact of USD 285 billion for the high capex case (USD 359 million for low capex scenario). The average annual impact is USD 10,986 million for the high capex scenario and USD 13,822 million of the low capex scenario. For a comparison, note that Mozambique reported a Balance of Payments deficit of USD 2,625 million in 2017.

Also note that indirect Rovuma LNG BOP impacts are included in Table 21. These impacts are the results from the extra stimulus provided by the reinvestment of savings/profits in the economy (see notes attached to Table 21).

3.5.10 Project Sectoral Impact

Evidently, the differential impact of the various components of the Project on macroeconomic variables, implies the Project would also have a varied effect on different economic sectors. Table 22 below presents the relative impact of the Project in terms of nine economic sectors within Mozambique for the two scenarios under consideration. Note that in terms of the percentage sectoral allocation of the impacts, the differences are quite small. Only in the case of the mining sector a notable change is likely to occur with the mining sector contributing 41% of GDP for the high capex scenario as compared with 38% for the low capex scenario. As far as employment is concerned, the additional number of workers in the mining sector for the high capex scenario is 5,614 as compared with the additional 7,100 workers for the low capex scenario.

Table 22: Project Sectoral Impact [Average p.a 2024 – 2049, 2018 Constant Prices]

High Capex USD million	GDP	GDP %	Employment (Numbers)	Employment %
Sector				
1. Agriculture	2,094	14%	44,947	17%
2. Mining	6,297	41%	5,614	2%
3. Manufacturing	1,188	8%	30,833	12%
4. Electricity & water	387	3%	4,450	2%
5. Construction	226	1%	11,899	5%
6. Trade & accommodation	1,991	13%	77,014	30%
7. Transport & communication	1,088	7%	26,390	10%
8.Financial & business services	1,490	10%	30,622	12%
9. Community services	627	4%	25,816	10%
TOTAL	15,388	100%	257,586	100%

Low Capex USD million	GDP	GDP %	Employment (Numbers)	Employment %
Sector				
1. Agriculture	2,586	14%	55,502	17%
2. Mining	7,139	38%	7,100	2%
3. Manufacturing	1,492	8%	38,688	12%
4. Electricity & water	507	3%	5,830	2%
5. Construction	294	2%	15,477	5%
6. Trade & accommodation	2,470	13%	95,568	30%
7. Transport & communication	1,358	7%	32,963	10%
8. Financial & business services	1,923	10%	39,834	12%
9. Community services	780	4%	32,088	10%
TOTAL	18,549	100%	323,050	100%

The mining sector is the economy's biggest beneficiary (41% of GDP generated by Project in the High Capex scenario). This is especially significant given that presently the mining sector is relatively small (4%). The agriculture sector is also expected to benefit noticeably (14% of GDP generated by the Project, in either scenario), followed by the Trade and Accommodation sector with 13% of GDP generated by the Project (in either scenario). The relatively large impact on the agricultural sector shows the future importance of this sector in the economy. The sectoral results show that the Rovuma LNG project is expected to have a pronounced, economy-wide, pronounced effect on the economy of Mozambique.

In terms of employment, the trade and accommodation sector is expected to be the largest beneficiary (30% of total employment, in either scenario), of the new projects created by the Project, owing to the sector's high employment multiplier. The agriculture sector benefits to the tune of 17% of the jobs created and the manufacturing sector benefit by 12% of jobs created. Notably, only 2% of all the jobs created by the Project are in the mining sector. This is not unexpected given the capital intensive nature of the Project.

On a sector by sector basis, we note the following:

3.5.10.1 Agriculture

Notwithstanding the fact that only a relatively small amount of agricultural products will be purchased as inputs to the project (i.e. supplies to the construction and operational workforce), and as inputs to other supplying businesses, most of the Project's impact on the agricultural sector is through the economy-wide induced impact resulting from the spending of salaries and wages paid out to workers at the project, upstream input suppliers and the recycling of fiscal proceeds. Downstream businesses such as a Fertiliser Project that purchases Domgas from the Rovuma LNG project is not included in this economic impact analysis.

3.5.10.2 Mining

The Project is classified as being a mining sector project. As such its ''On Site'' Impact occurs within the mining sector. It is important to note that there will be a sizeable additional nationwide demand for gasoline, diesel etc, as a result of the nationwide economic growth envisaged from the Project. This increased demand will provide the opportunity for other Domgas projects (e.g. GTL).

3.5.10.3 Manufacturing

This project will result in a significant increase in manufacturing activity throughout the economy, partly as a result of the impact that it will have on its upstream supply chain, more generally as a result of the stimulus effect that it will have on economic growth envisaged by the Project's ''Economy Wide'' impact, as well as the savings/investment impact in the manufacturing sector. For example, consumer packaging factories could be built across Mozambique to support the increased economy-wide economic activity, or a fabrication facility could be built by suppliers to the Project (in Palma).

3.5.10.4 Electricity & Water

Represents the increase in the demand and supply of electricity and water that results from the Project's activity, its supply chain, and the nationwide economic growth envisaged from the Project. For example, an increase in the economy's GDP requires a corresponding increase in electricity supply to support it.

3.5.10.5 Construction

Represents the increase in the demand for construction services that results from the Project's activity, its supply chain, and the nationwide economic growth envisaged from the Project. The number is relatively low as although construction may appear continuous in the future (to visitors to Mozambique), each individual project's construction is averaged out over the 25 year Project operational lifetime (for example, the construction of a Domgas port) with the economic activity measured elsewhere during operations

3.5.10.6 Trade & Accommodation

Represents the increase in the demand for trade and accommodation that results from the Project's activity, its supply chain, and the nationwide economic growth envisaged from the Project. Examples include retail activity and hotel rooms. For example, existing retail chains may expand in Mozambique (for example, Shoprite) and/or new chains may open up as income grow (e.g. Zara, H&M, Tata Motors, Amazon). Similarly, due to the change in nationwide activity and travel patterns, significant growth in accommodation will occur in Palma, Nacala, Maputo etc.

3.5.10.7 Transport & Communication

Represents the increase in the demand for transport and communication that results from the Project's activity, its supply chain, and the nationwide economic growth envisaged from the Project. Examples include the growth in domestic air travel (for example, growth in flights between Palma/Pemba and Maputo, as well as growth in international flights to and from Maputo or the improvement of road links to Southern Tanzania). Alternatively, the demand in data services (for example) with telephone and ISP companies in Mozambique is also likely to increase.

3.5.10.8 Financial & Business Services

Represents the increase in the demand for financial services (e.g. consumer credit) that results from the Project's activity, its supply chain, and the nationwide economic growth envisaged from the Project. Examples include a growth in property ownership (increased demand for residential loans), increased demand for car loans, credit cards or foreign exchange (as more Mozambicans travel and trade externally) and so on. Increases in the demand for professional services (e.g. accounting) will also be seen as a result of the Project.

3.5.10.9 Community Services

It is important to recognise that the GOM will receive significant additional tax revenues from the Project. Per the spending in Section 3.5.13, it can be expected that social services in Mozambique (i.e. education, health care, etc.) will improve significantly as a result of GOM investing this money into improved socio-economic services. As noted in Section 5.2, a crucial requirement is to improve Mozambique's human capital

3.5.11 Project Effectiveness Indicators

The effectiveness of the factors of production employed by the Project is presented herein in Table 23. Effectiveness indicators of projects are measured and compared to national effectiveness indicators and those of other projects, to demonstrate how efficiently a particular project employs the factors of production to arrive at a certain output. The efficiency of the capital investment is deduced by calculating the ratio of the Project's contribution to GDP to the Project's capital investment (GDP/Capital), which shows the amount of output produced from every USD 1 of capital invested. Similarly, a labour to capital ratio was calculated, which shows the number of jobs created for each USD 1 million of capital investment.

Table 23: Project Economic Effectiveness Criteria

	GDP/Capital Ratio	Labour/Capital Ratio	Low/Total Income Households Ratio
High Capex Scenario	**0.44**	**7.38**	**0.12**
Low Capex Scenario	**0.57**	**9.88**	**0.12**
Comparative Sectoral Results			
Agriculture, hunting, forestry and fishing	0.82	19.43	0.22
Mining and quarrying	0.52	13.54	0.20
Manufacturing	0.53	12.69	0.26
Electricity, gas and water supply	0.82	13.99	0.18
Construction	0.34	10.99	0.21
Wholesale and retail trade	0.39	9.81	0.22
Transport storage and communication	0.61	14.42	0.21
Financial, insurance, real estate and business services	0.52	10.96	0.20
Community, social and personal services	0.94	27.01	0.21
Total Economy	0.60	15.27	0.34

Note: The Economic effectiveness criteria depicting very high capital- and high-skilled labour intensiveness of the project. It can be misleading due to the fact that the direct capital used in the Project is funded by foreign capital.

Given that Mozambique is a low income country, it seemed apt to include a social efficiency indicator among the effectiveness indicators in Table 23 and compared this to the relevant averages for the Mozambican economy. A poverty alleviation ratio was used to demonstrate the impact of The Project on improving the economic welfare of Mozambican households. The proxy for this was the percentage of additional household income created by The Project that accrued to low income households.

The effectiveness indicators for capital investment efficiency highlight the capital-intensive nature of the Project. For each USD of capital invested in the Project, USD 0.44 additional GDP is generated by the high capex scenario and USD 0.57 of additional GDP by the low capex scenario, compared to USD 0.60 generated from an equivalent capital investment in an average Mozambican project. This implies that the capital employed in the Project is not as efficient in generating output as is capital in the average Mozambican project. Nonetheless,

the capital efficiency of the Project's low capex scenario is similar to investment projects in the construction and in wholesale and retail trade sectors.

Similarly, the labour-to-capital ratio reveals that, for each USD 1 million of capital investment 7.38 new jobs will be created by the high capex scenario and 9.88 jobs by the low capex scenario. An equivalent capital investment in the average Mozambican project would create 15.27 jobs, which is once again indicative of capital intensive projects. Thus, 257,586 jobs (in the high capex scenario) is not large in the scale of the Project's overall capital.

These effectiveness indicators speak to the capital intensity of projects that include mines, power stations and transport activities. Furthermore, the higher showing of the average Mozambican project is testimony to the dearth of capital-intensive projects in Mozambique. Similarly, the low/total household income ratios are indicative of capital-intensive projects with specialised labour requirements.

Overall, the effectiveness indicators may not match the national average but it still demonstrates that the Project will create new jobs, increase national output and increase household income. It has other, more material benefits.

3.5.12 Project Fiscal Impact

Per Table 24, GOM revenue consists of:

1. Taxes directly related to the Project (approximately USD 116 billion for the high capex scenario (low capex scenario USD146 billion) in nominal values over the period of the Project, including indexation for both scenarios);
2. Taxes indirectly related to the Project (USD 18 billion, high capex scenario and USD 20 billion for low capex scenario) in nominal values; plus
3. Taxes related to the savings/re-investment aspect of the Project (USD 16 billion for high capex and USD 22 billion for low capex scenario) in nominal values. In real 2018 values, the total fiscal proceeds are USD 104 billion (high capex scenario) and USD 130 billion for low capex scenario.

Table 24: Project Fiscal Impact [Total Impact and Average p.a. 2024 – 2049 USD Million, 2018 Constant Prices]

High Capex	Real		Nominal	
	Total over period	Average	Total over period	Average
A. Taxes related directly to project	**79,789**	**3,405**	**116,469**	**4,480**
- PPT	6,061	233	8,880	**342**
- Corporate Income Tax – Area 4	25,874	995	36,459	**1,402**
- Profit Petroleum	43,006	1,654	63,606	**2,446**
- Other (Fees/Bonus and provision for ENH Net Cash Flow)	4,847	186	7,525	**289**
B. Taxes related indirectly to project	**12,987**	**500**	**18,712**	**720**
- Direct Tax (Primarily personal income tax)	1,870	72	2,694	**104**
- Indirect Tax (Primarily sales tax)	11,118	428	16,019	**616**
C. Taxes related directly and indirectly to re-investment to project	**11,244**	**432**	**16,200**	**623**
- Direct Tax (Mostly Taxes paid by employees)	774	30	1,116	**43**
- Direct Tax (Primarily personal income tax)	10,469	403	15,084	**580**
TOTAL	**104,020**	**4,337**	**151,381**	**5,822**

Low Capex	Real		Nominal	
	Total over period	Average	Total over period	Average
A. Taxes related directly to project	**100,495**	**4,219**	**146,158**	5,621
- PPT	6,706	258	9,826	378
- Corporate Income Tax – Area 4	28,907	1,112	40,147	1,544
- Profit Petroleum	59,088	2,273	87,564	3,368
- Other (Fees/Bonus and provision for ENH Net Cash Flow)	5,794	223	8,621	332
B. Taxes related indirectly to project	**13,984**	**538**	**20,148**	775
- Direct Tax (Primarily personal income tax)	2,070	80	2,983	115
- Indirect Tax (Primarily sales tax)	11,914	458	17,165	660
C. Taxes related directly and indirectly to re-investment to project	**15,273**	**587**	**22,005**	846
- Direct Tax (Mostly Taxes paid by employees)	1,052	40	1,515	58
- Direct Tax (Primarily personal income tax)	14,221	547	20,489	788
TOTAL	**129,751**	**5,345**	**188,311**	7,243

Note: The average US inflation factor for the period is about 44%. In terms of an index with 2018=100 and using a 2% p.a inflation, the index in 2049 will be 184.8 with the median approximately 44%.

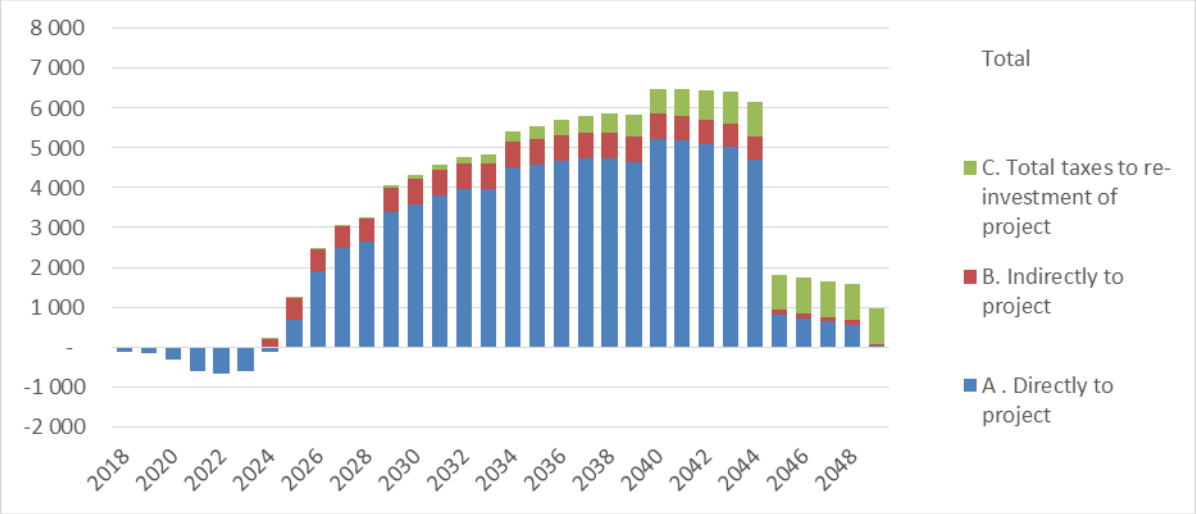
The savings/re-investment tax is an important tax revenue channel through which the Mozambican economy will benefit from the LNG investment and generate additional tax revenue. The creation of jobs implies an increase in labour remuneration and the Project's operations suggest a new source of profits. This implies an increase in revenue from income tax and corporate tax. Furthermore, the projected increase in household consumption expenditure due to greater household income implies additional revenue from indirect taxes, including value added tax (VAT). The Project and its workers will also be spending on supplies, thus contributing to the GOM's VAT revenue.

In real terms, the Project will contribute on average USD 4,337 million per annum for the high capex scenario and USD 5,345 million per annum for the low capex scenario to the GOM's coffers, of which 77% will be in the form of direct taxes. The remaining amount (23%) will be in the form of indirect taxes, similar to induced benefits.

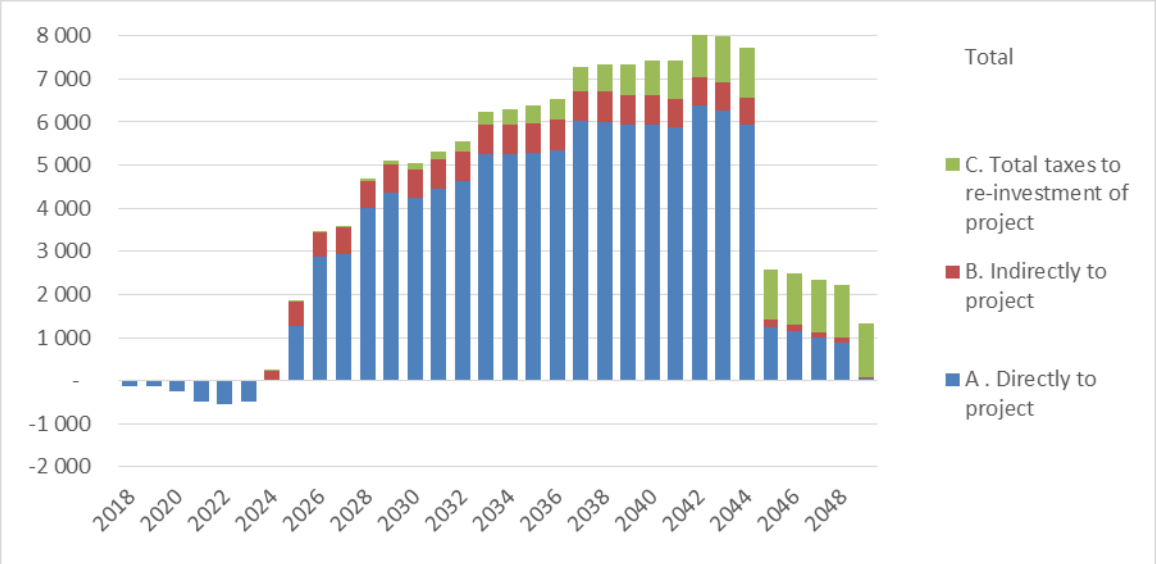
Outlined graphically, fiscal revenue streams over the Project lifecycle are shown in Figure 19.

Figure 19: Project Fiscal Impact [p.a. 2024 – 2049 USD Million, 2018 Constant Prices]

High Capex Scenario



Low Capex Scenario



Total positive revenue materialises in 2025 when LNG production fully comes on stream. Total revenue with grow strongly over the period 2025 – 2029. A period of about 5 years follows where GOM revenues remain quite stable. From 2034 revenue starts to grow again but at a fairly slow rate, reaching a peak in 2040. For the rest of the Project life, revenue remains stable at a slightly lower level.

3.5.13 Project Social Impact

To form a rough idea what the extra tax and other revenue may mean for GOM spending, calculations were made based on Mozambique's current Budget priorities and budget

allocations and spending (Table 25). Note that such calculations were made after the Project was assumed to service 54% of the USD 14.1 billion outstanding external debt and 54% of ENH's assumed borrowing (incurred to fund investment in the LNG and Domgas projects).

Overall, the additional fiscal resources generated by the Project will bolster the authorities' drive to achieve the United Nations' eight Millennium Development Goals, in particular 'achieve universal primary education' (goal 2), 'reduce child mortality' (goal 4) and 'combat HIV/AIDS, malaria and other diseases' (goal 6).

Table 25: Additional Social Infrastructure potentially funded by GOM Fiscal Take

Social Indicators	Number per Year: High Capex Scenario	Number per Year: Low Capex Scenario
Additional Educators	17 671	21 303
Additional Hospital Beds Serviced	3 905	4 708
Additional Doctors	851	1 026
Additional Low-Cost Houses	3 155	3 804

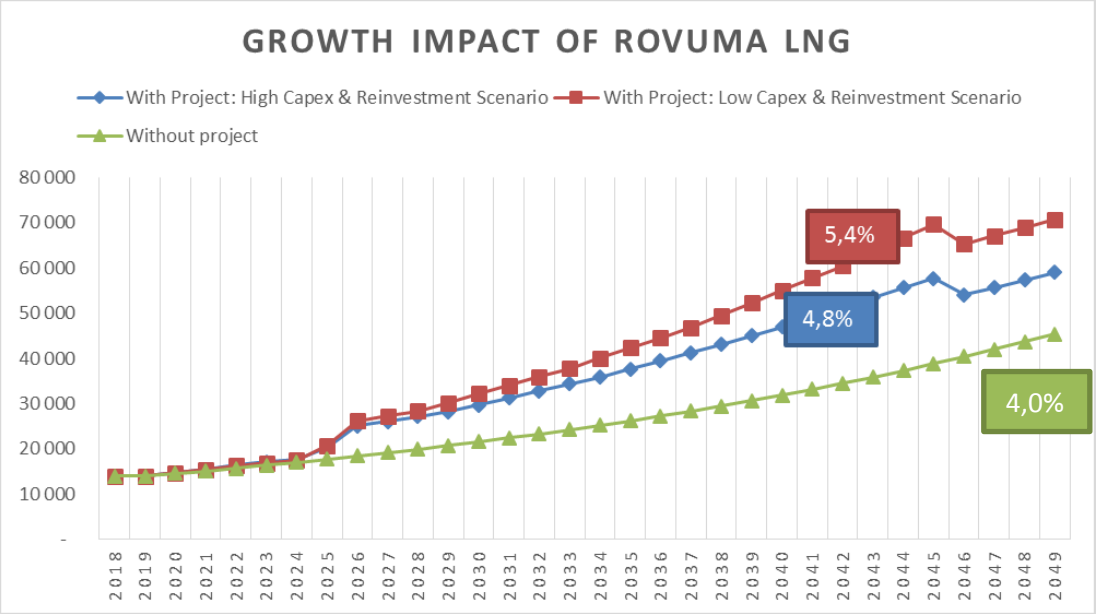
Note: The funding for these infrastructures are calculated after 54% of outstanding external sovereign debt and ENH borrowings is repaid.

The above is a representative example. In practice, Mozambique has a number of choices to make. In Section 5.2, Standard Bank identifies a few policy options that can be chosen with transforming the country's agricultural sector being one.

3.5.14 Project Impact on Long-Term Growth

Figure 20 shows in summarised form the impact of the Project on Mozambique's GDP growth over time. The figure shows a projection of the Mozambican economy without the Project, assuming a growth rate of 4% p.a. (bottom, **green line**). The top two lines in the figure show the likely trajectory of GDP if the Project is successfully implemented and operated for the high capex scenario (middle, **blue line**) and the low capex scenario (top, **red line**). The lines show a growing divergence over time with projected GDP growth boosted by 0.8% and 1.4% respectively from 4% over the life of the Project.

Figure 20: Project Impact on Mozambique GDP growth 2018-2049 (USD million, 2018 constant prices)



It should be borne in mind that the Project will, essentially, be implemented in parallel with Mozambique LNG, whose impact could also be added to the above line. As a simple extrapolation, that Project could add 1.2% to GDP in the Low Capex scenario (given the Mozambique LNG capacity is 85% of the Project), which takes real GDP growth to 6.6% p.a.. There is also the under-construction Coral FLNG to add to this amount. In addition, both projects are expected to be followed by other LNG projects (for example, Rovuma LNG Phase 2 or Mozambique LNG / Prosperidade) as well as by Domgas projects. The potential GDP impact of a large Domgas project is outlined in the 2018 Macroeconomic Study. Accordingly, Mozambique's potential GDP increase following the LNG projects may be in the order of 8% - 10% per annum (2018 constant prices), with the higher end more likely if Domgas is successfully implemented.

3.5.15 Project Delayed First Gas

Delays in the implementation of projects are a reality that potential investors and other role players often have to deal with. We consider in this section the implications of a delay in achieving First Gas of the Project.

A delay in the achievement of First Gas may jeopardise the possibility of future LNG trains taking their own FID and in turn selling LNG to global markets (especially in a competitive global environment, with competing projects in Canada, USA, Qatar and Russia). This will have a negative impact on the Mozambican economy. Delay of the Project's operations means that wealth creation for the current population and future generations is denied. Although we assume it will eventually materialise, sacrificing it in the interim means it cannot really be recovered (from a time value of money perspective at a time when the Project is badly needed). This applies to the loss of activity of the Project as such, as well as the negative dynamics that it has on economic growth in general, due to its multiplier impact effects throughout the economy.

In this section 3.5.15, a scenario is developed to project the impact of a one (1) year delayed commercial operation of the Project (delayed First Gas), for reasons arising from inside Mozambique. Such reasons could include delays in the issue of applicable permits or licences by the relevant authorities, or repeated delays in securing customs clearances. This is the potential ‘’Cost of Bureaucracy’’ referred to in Section 5.3. This scenario will investigate the impact of a parallel one (1) year delay in each of the Rovuma LNG and Mozambique LNG Projects achieving First Gas, on economic growth and development. Mozambique LNG is calculated using an assumed ratio of 84.86% (12.9 MTPA / 15.2 MTPA) of Rovuma LNG.

Table 26 below depicts the marginal impact of delaying the Project’s commercial operations by one (1) year relative to the base scenario. A one year delay means that the Project’s production phase will only start in 2025, and full operations in 2026. Due to the fact that the analysis is calculated in constant prices, the effect of inflation is negated in this exercise. However, as already been explained in Section 3.2.3, the relative price changes of commodities are of importance in an exercise of this nature.

Table 26: Rovuma LNG and Mozambique LNG 12 month Delay [Average p.a. 2018 - 2049 USD Million, 2018 Constant Prices]

High Capex	**A**	**B**	**C**	**D**	**E**	**F**	**C+F**
USD Million	Rovuma LNG	Rovuma LNG Delay	Delta	MLNG extrapolated	MLNG, extrapolated, Delay)	Delta	Combined Delay
Impact on GDP	15,388	14,967	-422	13,019	12,662	-357	-778
Impact on GNP	9,900	9,662	-239	8,376	8,174	-202	-440
Direct investment	24,269	24,759	490	20,532	20,946	415	905
Impact on employment [number of job opportunities]	257,586	245,640	-11,947	217,918	207,811	-10,107	-22,054
Impact on Households	8,126	7,889	-237	6,875	6,674	-201	-438
Household per capita	264	256	-8	223	217	-7	-14
Fiscal Impact	4,337	4,310	-27	3,669	3,647	-23	-50
BOP	7,793	7,404	-389	6,593	6,263	-329	-719

Low Capex	A	B	C	D	E	F	C+F
USD million	Rovuma LNG	Rovuma LNG Delay	Delta	MLNG extrapolated	MLNG, extrapolated, Delay)	Delta	Combined Delay
Impact on GDP	18,549	17,990	-559	15,692	15,219	-473	-1,031
Impact on GNP	14,197	13,855	-342	12,011	11,721	-289	-632
Direct investment [US $million]	19,769	20,259	490	16,724	17,139	415	905
Impact on employment [number of job opportunities]	323,050	307,282	-15,768	273,300	259,961	-13,340	-29,108
Impact on Households	9,885	9,571	-314	8,363	8,097	-266	-580
Household per capita	321	311	-10	272	263	-9	-19
Fiscal Impact	5,345	5,315	-30	4,522	4,496	-25	-56
BOP	9,802	9,307	-495	8,293	7,874	-419	-913

Notes: The delayed scenario differs from the base in terms of discounted NPV, due to the one year delay, as well as the fact that a one-year delay means one year falls outside the 2019 – 2049 timeline. It is assumed that Mozambique LNG delay equals 84.86% (12.9 MTPA / 15.2 MTPA) of Rovuma LNG delay

From Table 26, the following aspects are highlighted:

- The Project delay comes with a cost for the Mozambique economy. Following the end of the operational phase, in the high capex scenario, GDP is USD 778 million lower per annum in the 12 month delay scenario. In the low capex scenario, GDP is USD 1,031 million lower;

- GOM income is USD 50 million lower per annum in the High Capex case and USD 56 Million lower in the low Capex case;
- It's important to note that the absolute impact on nationwide employment opportunities is 22,054 workers lower than in the high capex scenario and 29,108 workers lower in the low capex scenario;
- The household income in the high capex case is about USD 438 million lower per annum than the base scenario, and USD 580 million lower in the low capex case;
- Household Income per capita will decline by USD 14 in the high capex case and USD 19 in the low capex case;
- Capital formation under the delayed scenario is USD 905 million higher in the higher capex case as well as the low capex case; and
- The effect of BOP represents a weakening of the BOP position of USD 719 million for the high capex scenario and USD 913 million for the low capex scenario.

3.5.16 Rovuma Basin Implications of Project Delay

The above analysis focused on the impact of a delay of one (1) year on the two initial onshore LNG projects, namely Mozambique LNG (Area 1) and the Project (Area 4). This though is an underestimate of the actual costs of delay, due to the ensuing delay in the development of the wider **Rovuma Basin investment programme**.

Clearly, there is a consequential effect on further potential investments or development plans for follow-on LNG trains by Area 1 or Area 4, as well as a potential delay in the implementation of Domgas projects (that will be fed by Area 1 or Area 4's Domgas or PPT in kind). . Delays of any kind will push all subsequent projects and other possible development later with an adverse economic impact on the Mozambican economy.

As understood by Standard Bank, each of Area 1 and Area 4 are considering the further development of their gas fields, in the form of additional LNG trains. The potential developments include Rovuma LNG Phase 2 and Mozambique LNG / Prosperidade for Area 1. These two projects should therefore be included in analysing the potential total cost of delays of the initial, primary developments (as they will also be delayed a year in taking their own FID in the future).

It is assumed that Prosperidade and Rovuma LNG Phase 2 will benefit from the infrastructure put in place by the initial projects (thus having economies of scale). Standard Bank does not have access to the detailed plans at this stage which in any case could change. Ordinarily, we would expect up to 25% economies of scale being possible for additional trains. However, such trains come online later and therefore in 2018 constant prices their value is lower. For simplicity, we therefore assume these benefits amount to 10% on average for these potential projects.

Table 27 shows the Combined Delay Case, the potential combined effect of a one (1) year delay in First Gas for each of Mozambique and Rovuma LNG and the knock-on effect of the delayed implementation of additional trains by Areas 1 and 4. The total combined effect of the delay amounts to an annual loss in GDP of USD 1,637 million for the high capex case (USD 2,169 million for the low capex case). Apart from the GDP impact, nationwide employment losses of about 46,378 opportunities can be expected for the high capex case (61,213 in the low capex scenario). Similarly, household income will be USD 920 million lower for the high capex case (USD 1220 Million in the low capex scenario). Household Income per capita will decline by USD 30 million in the high capex scenario (USD 40 in the low capex scenario), while the fiscal impact implies a loss of USD 1,511 million in GOM revenue for the high capex scenario (USD 1,921 million in the low capex scenario). Per Section 2, as the underlying information only calculates the increased cost of a delay to FID, the above results are significantly underestimated (e.g. a 6 year build period compared to a 5 year build period, with a one year FID, will cost a lot more).

Table 27: Impact of Combined Delay Case [Average p.a. 2018 - 2049 USD Million, 2018 Constant Prices]

High Capex	A	B	C (A+B)	D	E	F (D+E)	G (C+F)
USD Millions	**Rovuma LNG Delay**	**MLNG Delay**	**Combined Delay**	**Rovuma LNG Phase 2 Delay**	**MLNG/ Prosperidade Delay**	**Combined Phase 2 Delay**	**Total Combined Delay**
Impact on GDP	-422	-358	-779	-464	-394	-857	-1,637
Impact on GNP	-239	-202	-441	-262	-223	-485	-926
Direct investment	490	416	906	539	458	997	1,903
Impact on employment [number of job opportunities]	-11,947	-10,138	-22,085	-13,141	-11,152	-24,293	-46,378
Impact on Households	-237	-201	-438	-261	-221	-482	-920
Household Income per capita	-8	-7	-14	-8	-7	-16	-30
Fiscal Impact	-27	-23	-50	-30	-25	-55	-104
Balance of Payment	-389	-330	-720	-428	-363	-792	-1,511

Low Capex	A	B	C (A+B)	D	E	F (D +E)	G (C+F)
USD Millions	Rovuma LNG Delay	MLNG Delay	Combined Delay	Rovuma LNG Phase 2 Delay	MLNG/ Prosperidade Delay	Combined Phase 2 Delay	Total Combined Delay
Impact on GDP	-559	-474	-1033	-615	-522	-1136	-2169
Impact on GNP	-342	-290	-632	-376	-319	-696	-1328
Direct investment	490	416	906	539	458	997	1903
Impact on employment [number of job opportunities]	-15768	-13381	-29149	-17345	-14719	-32064	-61213
Impact on Households	-314	-267	-581	-346	-293	-639	-1220
Household Income per capita	-10	-9	-19	-11	-10	-21	-40
Fiscal Impact	-30	-26	-56	-33	-28	-61	-117
Balance of Payment	-495	-420	-915	-544	-462	-1006	-1921

3.6 Sovereign Wealth Funds

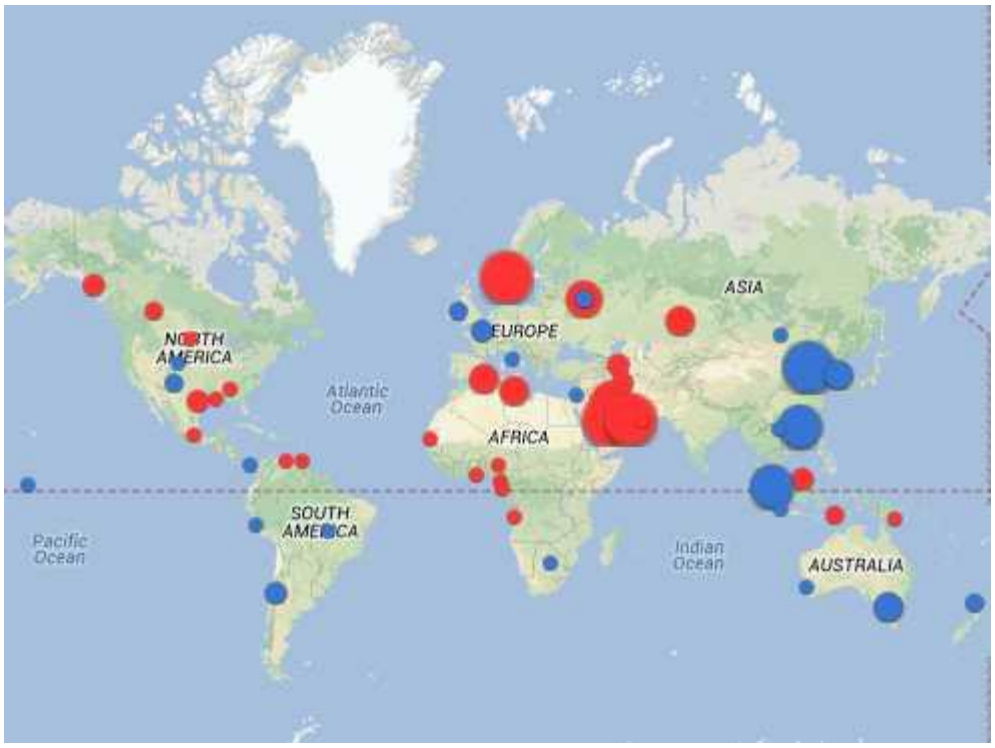
Clearly, over the term of the Report, Mozambique will start to generate very significant amounts of money, emanating from LNG sales. The savings /investment phase can also be viewed from the point of view of a SWF. As noted above, a key emphasis of this Section 3 is on the domestic re-investment of the GOM income / savings that the Project generates. These investments are mostly seen as investments in non-financial sectors of the economy.

A SWF is a state owned investment fund or entity that is commonly established from BOP surpluses, official foreign currency operations, the proceeds of privatisation, government transfer payments, fiscal surpluses and receipts from resource- or other exports.

This definition of a SWF excludes foreign currency reserve assets held by monetary authorities for traditional BOP and monetary policy purposes, SOEs, government employee pension funds or assets managed for the benefit of individuals.

The first SWF established for a sovereign state is the Kuwait Investment Authority, a commodity SWF created in 1953 from oil revenues before Kuwait gained independence from the United Kingdom. . Today, the United Arab Emirates, Kuwait, Norway, and Russia all have funds devoted to investing in oil and natural gas exports. Other countries with investment funds are as varied as China, Singapore, Chile, and the Pacific island nation of Kiribati.

Figure 21: Oil & Gas and Non-Oil & Gas SWFs

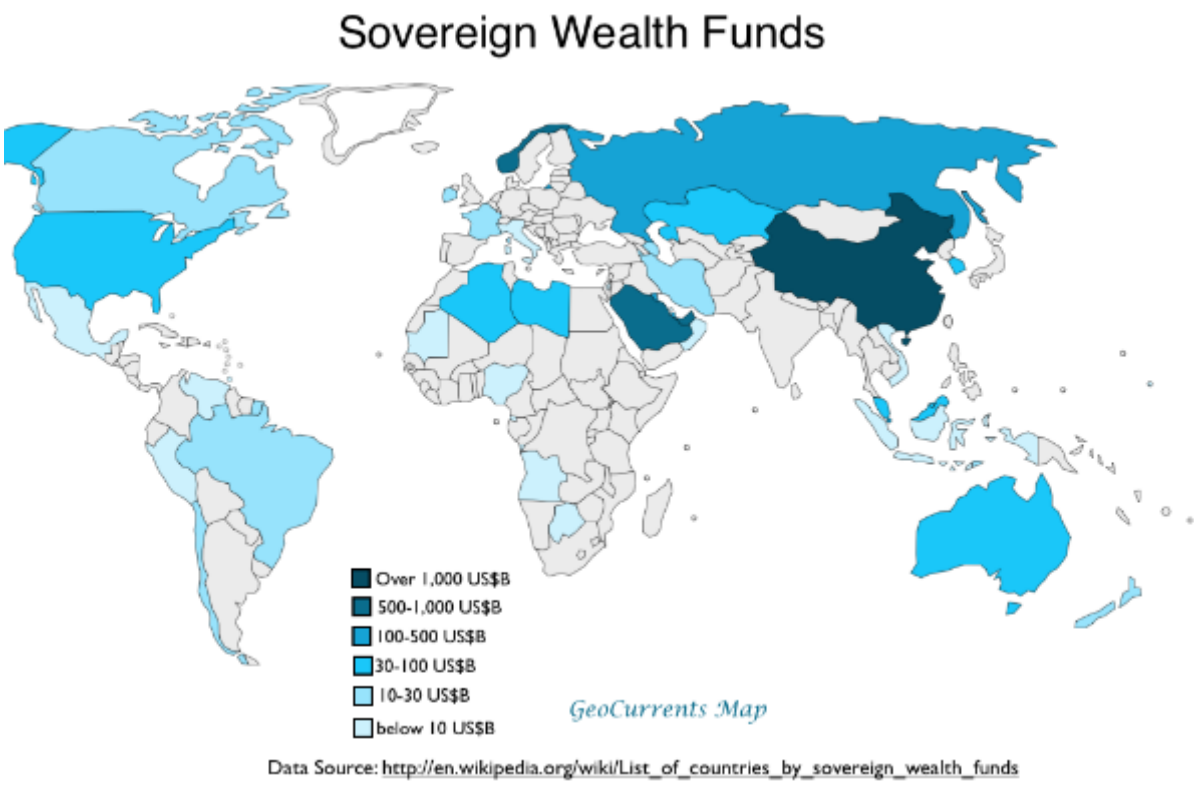


Source: Sovereign Wealth Fund Institute

Globally, assets under management of SWFs increased for the tenth year running in 2018 to a record USD 8.1 trillion. There was an additional USD 7.2 trillion held in other sovereign investment vehicles, such as pension reserve funds, development funds and state-owned corporations' funds and USD 8.1 trillion in other official foreign exchange reserves. Taken together, governments of SWFs, largely those in emerging economies, have access to a pool of funds totalling USD 20 trillion. Some of these funds could in future be channelled towards funding development of infrastructure for which there is global demand.

Non-commodity SWFs are typically funded by transfer of assets from official foreign exchange reserves, and in some cases from government budget surpluses and privatisation revenue. Asian countries account for the bulk of such funds.

Figure 22: Size and Geographical Distribution of SWFs



Some SWFs may be held by a central bank, which accumulates the funds in the course of its management of a nation's banking system; this type of fund is usually of major economic and fiscal importance. Other SWF are simply the state savings that are invested by various entities for the purposes of investment return, and that may not have a significant role in fiscal management.

In general, SWF are set up for one or more of the following types:

- Domestic Stabilisation of Funds (‘’**DSFs**’’);
- Savings or Future Generations Fund;
- Pension or Reserve Funds;
- Reserve Investment Funds;
- Strategic Development Fund.

The above means that a SWF will have its own unique reason for its existence and thus also its own objective(s). SWFs are typically created when governments have budgetary surpluses and have little or no international debt. It is not always possible or desirable to hold this excess liquidity as money or to channel it into immediate consumption. This is especially the case when a nation depends on raw material exports like oil, gas, copper or diamonds. In such countries, the main reason for creating a SWF is because of the properties of resource revenue: high volatility of resource prices, unpredictability of extraction, and exhaustibility of resources. Some other more specific objectives could be to:

- Protect and stabilise the Budget from excessive volatility in exports or revenue;
- Counter the "boom-bust cycles" adverse effect on the national economy of excess volatility in exports;
- Diversify the economy away from reliance on non-renewable exports;
- Earn greater returns than on FX reserve;
- Increase savings for future generations;
- Fund social and domestic economic development (a key DSF focus);
- Contribute to achieving and sustaining long-term capital formation in the economy (a key DSF focus);
- Assist resource-rich countries to avoid the "resource curse" (but the literature on this question is controversial); and
- Support political strategies.

The engagement of SWF with macroeconomic policies is mostly indirect and occurs through the following channels:

- The transfer of funds to the Budget for exceptional and targeted interventions;
- The drawdown of funds to be transferred to the Central Bank in the case of exceptional BOP or monetary policy needs; and
- The stabilisation of domestic businesses or corporate entities vital to the interest of the economy.

It should be noted that these instances should be "exceptional and targeted'. To achieve this will often require a high degree of political and fiscal discipline.

The SWF typically invests in real and financial assets such as stocks, bonds, real estate, precious metals, or in alternative investments such as private equity fund or hedge funds. SWFs invest globally, rather than domestically. SWF should not be seen as a cure-all for the potential pitfalls that resource-rich developing countries face. Concerns about SWFs and their growth are attracting close attention for a number of reasons:

- As this asset pool continues to grow in size and importance, so does its potential impact on various asset markets;
- Some countries worry that foreign investment by SWFs raises national security concerns because the purpose of the investment might be to secure control of strategically important industries for political rather than financial gain;
- Their inadequate transparency is a concern for investors and regulators: for example, size and source of funds, investment goals, internal checks and balances disclosure of relationships, and holdings in private equity funds;
- SWFs are not nearly as homogeneous as central banks or public pension funds and may be difficult to manage; and
- A lack of transparency and hence an increase in risk to the financial system.

If and when the GOM decides to form a SWF in the 2020s, the GOM will have to commit to follow certain rules:

- Accumulation rule (what portion of revenue can be spent/saved?);
- Withdraw rule (when the GOM can withdraw from the fund?); and
- Investment (where revenue can be invested in foreign or domestic assets?).

The point has earlier been made that SWFs are typically created when governments have budgetary surpluses and have little or no external debt. Neither these two conditions are currently present in Mozambique and will not be present for perhaps a decade.

It appears to makes both economic and financial sense for Mozambique first to service and repay its USD 14.1 billion external debt, as well as ENH repaying its borrowings to fund its investments in the wider **Rovuma Basin investment programme** in LNG and Domgas, as well as Sasol's natural gas projects.

This implies that Mozambique over the short term has little scope to, or logic in, embarking on a road to establish a SWF. We envisage a SWF could perhaps be set up by Mozambique around 2025, whilst Cost Gas amortization is starting and before the major inflows start (after majority Cost Gas amortization, sovereign debt and ENH borrowing repayment) therefore allowing a start-up period for the SWF to ensure successful operations when the major revenues arrive.

3.7 Summary and Conclusions

The primary objective of this Section 3 was to measure the nature and magnitude of all economic and socio-economic impacts emanating from the Project. A comprehensive analysis was undertaken to ensure that all the relevant impacts, including possible commercial and secondary industries that will be stimulated as a result of the Project, were measured.

The socio-economic impacts of both the construction and operational phases of the Project on the Mozambican economy were measured. Notably, the On-Site, Supply Chain and Economy-Wide impacts of the Project were quantified. For example, one direct effect of the Project is the creation of jobs for the Project's workers. The Supply Chain effects refer to the impact of the Project on the suppliers of inputs to the Project itself. Indirect effects spread out from the direct effects to reach areas or population far removed from the Project's intended or original purpose. Induced effects include the economic impact of the paying out of salaries and wages to those employed by the Project and industries that are indirectly linked to the LNG industry. The re-investment of savings/investment generated by the project (primarily profits) was taken into account in the calculations of the different impacts on the broader economy.

The greatest impact of the Project on the Mozambican economy measured as an increase in GDP will stem from the direct effects, which are expected to contribute 56% of the total impact of the Project in the High or Low Capex scenario. The total effect on GDP further include the indirect effects resulting from the Project's suppliers and their suppliers (approximately 6%), while the induced effect, which measure the impact on consumer spending resulting from the payment of salaries and dividends to employees along the value chain, is approximately 37%. The impact of the Project is thus projected to filter through the entire economy. The effect on GDP would amount to USD 15,388 million p.a. in the High Capex scenario or 18,549 million p.a. over the Project lifetime in the Low Capex scenario.

Note the 2018 projected Mozambican economy is USD 14.1 billion. Arguably, a more appropriate measure of the total impact is GNP which measures the output produced by Mozambican citizens. The Project's GNP impact is approximately 64% of the size of GDP in the High Capex scenario, or 77% in the Low Capex scenario and therefore highly material.

Mozambique being a poor country, much is expected of how the Project would impact on the socio-economic improvement of the population. In this regard the focus was placed on how the Project would impact on employment and the financial wellbeing of Mozambican households. On the employment side it was calculated that the Project would have a major impact on the demand for workers with 257,586 jobs per annum sustained over the Project lifetime in the High Capex scenario, and 323,050 in the Low Capex scenario.

The largest demand will originate from Economy-Wide sources. What is of importance here is that 61% of jobs demanded will require some form of applicable skill, which means Mozambique needs to develop a major focus on human capital formation. This also will have an important implication for GOM to provide the necessary education and training facilities, and Areas 1 and 4 to work with GOM in this regard.

Linking up with the above, it is expected that the Project will have a significant effect on households' income and consumption expenditure. It is estimated that the Project will galvanise on average an additional USD 8,126 million of consumer spending annually in the High Capex scenario (USD 9,885 million in the Low Capex scenario), or on a per capita basis an additional USD 311 per household annually. This additional consumer expenditure is equivalent to 80% of the estimated total household consumption expenditure in Mozambique of USD 11.94 bn in 2018.

Being a developing country Mozambique traditionally has a BOP deficit (excluding grants) as a result of a wide trade deficit and a negative net balance in the services and income account that explain the perpetual current account deficit. According to the analysis, the Project in broad terms is expected to generate sizable additional export revenue for the country's external account, with a contribution to the BOP over the period (in nominal terms) of about USD 285 billion or USD 10.99 billion (in the High Capex case) or USD 359 billion or on average USD 13.8bn per annum in the Low Capex scenario. In real terms, the annual impact is USD 7,793 million in the High Capex scenario and USD 9,802 million in the Low Capex scenario. For comparison, Mozambique had a BOP deficit of USD 2.6 billion in 2017.

One of the outstanding positive results of the Project, once implemented, will be its ability to generate a substantial flow of tax revenues for the GOM. It is calculated that an additional source of GOM revenue to the tune of USD 5,822 million annually (nominal) will flow to the GOM's coffers in the High Capex scenario (USD 7,243 million in the Low Capex scenario), or USD 4,337 million in real terms in the High Capex scenario or USD 5,345 million in the Low Capex scenario. In terms of breakdown, 78% of tax revenue inflow will tax directly associated with the Project, 11% from taxes indirectly associated with the Project and 11% of tax inflows will be related directly and indirectly to the savings/re-investment component of the Project.

The impact of these flows will depend on how the GOM plans to utilise these additional resources at its disposal to the benefit of the broader population. Again, the crucial point is the role of savings and reinvestment.

It is also interesting to observe how the Project will impact on the Mozambique economy's sectoral composition over time. Overall, the economy would portray a much more diversified character than today. Especially the mining sector (within which O&G is housed) should be in a better position to support growth and development of Mozambique. Other sectors to be significantly impacted directly and indirectly by the Project are manufacturing, construction, trade and communication and the agriculture sector.

In terms of employment creation the trade and accommodation sector will benefit the most (30% of employment created or sustained), followed by the agriculture sector (17%) and manufacturing and financial and business services (both 12%).

In addition, a delay in the project has important negative financial implications. A one year delay in achieving First Gas of Rovuma and Mozambique LNG amounts to a permanent USD 778 million loss in GDP (high capex scenario) or USD 1031 million (low capex scenario), from those two projects alone. Including the delay's consequential impact on a delayed construction of Prosperidade LNG and Rovuma LNG Phase 2 (the wider Rovuma Basin investment programme), results in a USD 1,637 million loss in GDP (high capex scenario) or USD 2,169 million (low capex scenario). Other sizable losses were calculated for employment, household income and GOM revenue. Each result is likely to be underestimated compared to the practical outcome (i.e. a 1 year delay in achieving FID as modelled, as opposed to a 6 – 6.5 year plus construction schedule).

In conclusion, the Project is expected to produce multiple positive externalities for the rest of the economy, and provide attractive opportunities for firms looking to expand into Mozambique.

4 Commercial Analysis

4.1 Sub-Surface

4.1.1 Introduction

The fields discovered in the Rovuma Basin, offshore north Mozambique can truly be described as world-class and consist of a series of very high-quality gas reservoirs filled with lean, low-contaminant gas that will provide long-term feed-stock for the proposed onshore and offshore LNG developments.

The Rovuma Basin is at the southern end of the East African marginal basin, with the deposition of carbonate, clastic and marine sediments occurring in the Early Jurassic rift phase of the East African margin through to the Tertiary.

Multiple gas discoveries have been made within Area 4 and the adjacent Area 1, as presented on Figure 21 below.

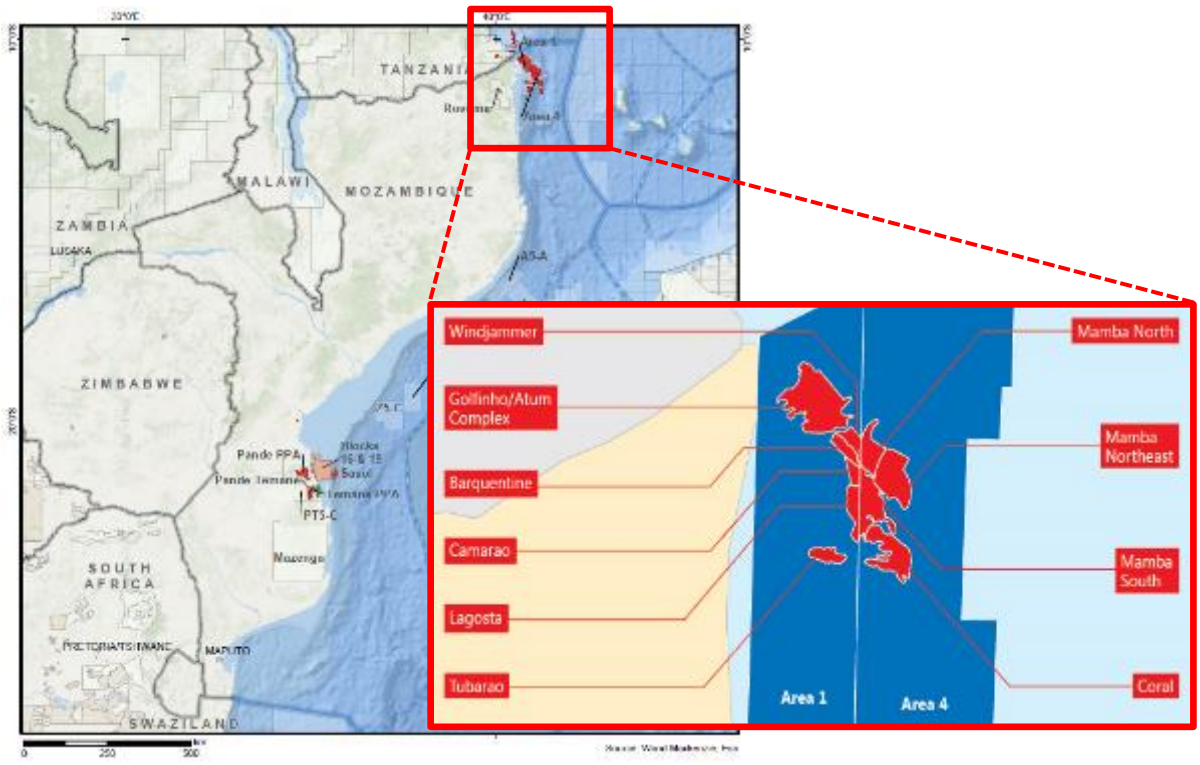


Figure 23: Location Map and Rovuma Basin Fields

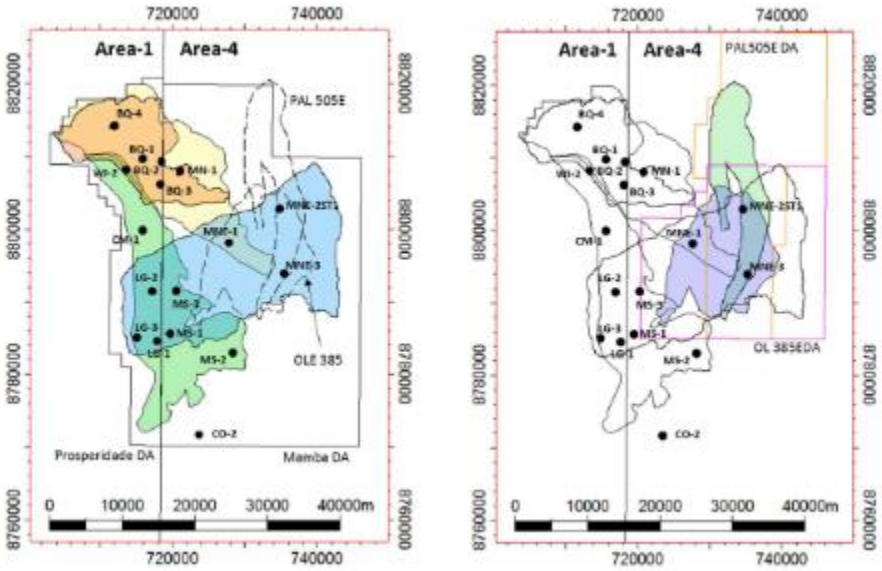
These discoveries have been made in a combination of structural and stratigraphic traps in the Tertiary (Palaeocene to Oligocene) with oil encountered in the Upper Cretaceous. Structurally the main gas reservoirs are turbidite fans with combined net reservoir thickness of greater than 200 metres being observed in many of the wells and up to 370 metres in the best wells. Reservoir parameters are excellent with average net-to-gross (NTG) up to 83%, average porosities up to 22% and average permeabilities up to 400mD. Several of the appraisal wells were tested that indicated prolific production rates will be achievable.

The reservoir fluids are primarily dry gas with small volumes of condensate. The gas composition is 95 - 96% methane with very low (<0.5%) inert components and no H_2S (Hydrogen Sulfide).

4.1.2 Resources

A significant gas resource has been discovered in the Rovuma Basin offshore Mozambique, with GIIP of more than 150 Tcf found predominantly in the Mamba and Coral fields in Area 4 and the Golfinho-Atum field and Prosperidade Complex (Barquentine, Lagosta and Windjammer fields) in Area 1.

The Mamba Field and Prosperidade Complex form the straddling reservoirs between Area 4 and Area 1, as presented on Figure 22 below.



Source – Mozambique Rovuma Venture PoD December 2018 Update

Figure 24 –Mamba Field and Prosperidade Complex
(Area 4/Area 1 straddling reservoirs on left, Area 4 non-straddling reservoirs on right)

Area 4's current GIIP is c.71.5 Tcf including Coral but excluding Agulha and 505N, which are not yet part of the onshore LNG development. Of this resource, 19.1 Tcf of the Area 4 gas is planned to be developed in Phase 1 of the onshore LNG development, while the total twenty five (25) year production capacity is included in Figure 23 below.

Field	Reservoir	Area 4		Area 1	Area 4 + Area 1
		GIIP (Tcf)	Planned Phase 1 Gas Production (Tcf) *see note i.*	Straddling GIIP (Tcf)	Total Straddling GIIP (Tcf)
Mamba Straddling	Oligocene Upper North (OUN)	7.2		10.8	18.0
	Oligocene Upper South (OUS)	14.7		19.6	34.3
	Oligocene Upper Total (OU)	**21.9**	**6.4**	**30.4**	**52.3**
	Oligocene Lower (OL)	1.0		6.9	7.9
	Eocene Upper (EU)	19.7	8.7	5.7	25.5
	Total Straddling	**42.6**	**15.1**	**43.0**	**85.6**
Mamba Non-Straddling	Oligocene Lower 385 East (OL385E)	10.5	6.4		
	Palaeocene 505 East (PAL 505E)	2.8	0.0		
	Total Non-Straddling	**13.3**	**6.4**		
Mamba	**Total**	**55.9**	**21.5**		
Coral	*Total*	*15.6*	*(see note iii.)*		
Area 4 Total		**71.5**	**21.5**		

Source – Mozambique Rovuma Venture PoD December 2018 Update

Figure 25 – Area 4 GIIP and Phase 1 Gas Production

Notes

i. Phase 1 developed gas volumes include a Domgas commitment of 1.4Tcf.
ii. In addition to the gas, an estimated 88.4MMbbls of associated condensate will be recovered during the Phase 1 development.
iii. Area 4 is separately undertaking the stand-alone development of the Coral South Field using a floating LNG vessel, having taken FID on this project in June 2017.
iv. The above table excludes Agulha and 505N, which contains approximately 5 Tcf GIIP

4.1.3 Project Phase 1

Area 4 propose to commence the phased development of the Area 4 resources (excluding Coral South) using an onshore LNG development. The Decree Law 02/2014 and the UUOA, executed on 23 November 2015 between Area 1 and Area 4) permits Area 4 and Area 1 to each initially develop 12Tcf from the straddling Mamba-Prosperidade Complex, and it is this gas plus the non-straddling OL 385E that will be developed in Phase 1 utilising two (2) dedicated 7.6 MTPA LNG trains.

In addition to feeding the LNG trains, Area 4 has made a Domgas commitment (Domgas) to supply up to 500 mscfd of which an initial 150 mscfd is associated with Phase 1, with an additional 350 mscfd to be developed in time (terms to be agreed). The Domgas is on top of that required to feed the LNG plant and will be sourced from the straddling and non-straddling reservoirs (with the non-straddling share also including the Coral South Domgas commitment).

Overall, Phase 1's LNG requires a total feed-stock of 2,488 mscfd which will be developed with 24 wells; 16 on the straddling reservoirs (Mamba) and 8 on the non-straddling reservoirs (385E). Average operational production rates for the development wells will be between 95 and 105 mscfd/well which is well within their design capacity (up to 200 mscfd and consistent with the productivity observed from the appraisal well testing. Provided the development wells encounter the high-quality reservoirs expected the project will have sufficient excess production capacity to meet periods when some wells may not be available or are under-performing.

Over the proposed 25-year life of the Phase 1 development the total gas feed-stock required, including Domgas, is 19.1 Tcf. This gas would be supplied as follows:

- 12 Tcf supplied for LNG production from Area 4's initial share of the Mamba straddling reservoirs as set-out in the UUOA
- 5.7 Tcf supplied for LNG production from the non-straddling OL 385E reservoir - implying a 54% recovery factor which is considered achievable from reservoirs of this quality
- 1.4Tcf to cover the Domgas commitment, shared between the straddling and non-straddling reservoirs

With a remaining GIIP in the straddling Mamba Field and Prosperidade Complex of 61.6Tcf (after taking the initial 24 Tcf of UUOA gas into account) there is clearly sufficient gas to support RLNG Phase 1 and associated Domgas commitment.

4.1.4 Future Developments

It is expected that Area 4 will develop the remaining UUOA GIIP in the Mamba Fields and Prosperidade complex on behalf of both Area 4 and Area 1 on a 50:50 basis and will continue to utilise 7.6 MTPA trains. Assuming these developments would require the same gas volumes as Phase 1, there is currently sufficient gas resources remaining to support 2 additional 25-year development phases (i.e. each phase consisting of 2 x 7.6 MTPA trains, plus the associated Domgas commitment). This would require up to 44 Tcf of feed stock and implies a total gas production of c.68 Tcf and corresponds to an ultimate recovery factor of 79% which is considered achievable for reservoirs of this quality. However, it is likely that the addition of compression facilities offshore would be required to achieve this level of recovery.

On this basis, the current incremental Domgas proposal of up to 350 mscfd made by Area 4 (which is not associated with any future LNG development) is prudent. Any commitment beyond this level would push the limits of the currently available gas resources and introduce some uncertainty to the viability of the later phases of LNG development.

4.2 Domgas Projects

Standard Bank has twice analysed the issue of Domgas in Mozambique. Firstly, in the 2014 Macroeconomic Study (for Mozambique LNG). Secondly, in the 2018 Macroeconomic Study (for Afungi GTL & Power Project). We do not repeat any of the points outlined in those Reports as we believe they speak for themselves at the time of drafting.

Based on Standard Bank's understanding of the Mozambique stakeholder position (for example, H.E. Nyusi's speech to Chatham House (UK) on 17th April 2018) it is clear that the development of Domgas remains a priority for the GOM, in parallel with the execution of the LNG developments. Domgas is likely to be developed through the execution of individual projects in line with the ''Domgas Vision'' (definition – Domgas project construction around the

Afungi site is expected to start in late 2021, roughly two and a half (2.5) to two and three quarter (2.75) years after the FID of Mozambique/Rovuma LNG)

From Standard Bank's perspective, among others, Domgas appears to be seen as a clear element of a LNG producer's social licence to operate in Mozambique. That is, a commitment to voluntarily offer Domgas to Mozambique through the POD is indelibly linked to the process of securing the GOM's approval to develop individual LNG projects.

It also maximises the possibility of domestic beneficiation of national resources, promoting Northern Industrialisation and avoiding problems that a number of African oil producers have encountered in developing their resources over the years.

4.2.1 Domgas

Under the POD for Phase 1 of the Project, MRV has offered the GOM Committed Domgas Volumes of 75 mscfd per LNG train (i.e. 150 mscfd) to the Aggregator for purchase on commercial terms, with the delivery point being at the LNG site. MRV is currently negotiating its POD so Standard Bank excludes the applicable Domgas pricing from the Report until negotiations are concluded.

In addition, through the POD, MRV also makes a commitment to look to supply a future Domgas amount of 350 mscfd, on technical, commercial and scheduling terms to be agreed,

MRV supports Mozambique's declared objectives to develop a Domgas industry that does not negatively impact upon any individual higher value and transformative LNG development, provided Area 4 is kept whole against its market alternative, which is to sell the applicable natural gas production in the form of LNG.

Given the Report solely looks at the revenues arising from the sale of Domgas, the numbers calculated in Section 3 therefore underestimate the highly significant benefits that Area 4's theoretical provision of up to150 mscfd to the Aggregator could have when transformed into a Domgas Project domiciled in and taxed by Mozambique.

We envisage such projects will have significant macroeconomic benefits for Mozambique, as outlined in the 2018 Macroeconomic Study. Implicitly, by supplying a significant percentage of the Domgas utilized by such projects the Project implicitly contributes further to the economic benefit of Mozambique.

4.2.2 Condensate

As is well-known, Mozambique's offshore natural gas is dry (96% methane content) and drier than many of its peer developments (e.g. Qatar). That said, there are some liquids to be taken into account (Condensates).

In the 2014 Macroeconomic Study, Area 1 elected not to include condensate revenues within its modelling agreed with Standard Bank. Area 4 has elected to include condensate revenues within its modelling given their production is integral to the overall production of natural gas. Condensate revenues represent 3% of revenues per Section 2. From the Report perspective, this is all that has been included.

Area 4 envisages its condensate production will be in the order of 10,000 bpd. We note the Condensates technical qualities are low sulphur (good for gasoline) but have a high benzene component (good for petrochemicals, bad for gasoline) to the condensates. However, on its own, this is 28% of Mozambican current downstream demand (28,000 bpd equivalent per CITAC 2018), which we envisage could be used to develop a new (export) industry

Mozambique's Condensate potential has received little attention to date, thus we use this Report to publicise some commercial options, namely:

- Selling condensate ''as is'' on the international markets, as a blending feedstock (limited refineries will be able to take the current composition) or as feedstock for power generation. Standard Bank notes Mozambique does not have a refinery and is unlikely to build one (although a GTL project is planned);

- Upgrading the condensates to sell as chemical products or LPG; or

- Non-hydrogen uprating and benzene extraction or condensate separation

Given Condensates do ultimately represent only 3% of Project revenues, Standard Bank envisages stakeholder attention to condensate could optimally focused after POD approval and the resolution of the ''Domgas Vision''. We envisage a threefold FID of Coral FLNG, Mozambique and Rovuma LNG will increase Mozambique's condensate utilization or export options, of which there are several

Lastly, we note the Decree Law acknowledges joint marketing of petroleum (including Condensate) and does not appear to require the Aggregator to domestically market condensate (in contrast to the position for natural gas). We therefore recommend focus on Condensate from the FID in 2019 onwards.

4.2.3 SSLNG

Standard Bank sees SSLNG as offering significant potential benefits for Mozambique and something that should be explored by the GOM as a priority. Why?

- Mozambique is a long (c 2800 kms) and relatively sparsely populated country, with development centres every 500 kms of so. The distance between the Afungi Site and Maputo is essentially the same as New York – Houston; London – Casablanca or Paris – Moscow. This means it is not naturally suited to long-distance pipelines and offers the alternative of maritime transport as a realistic possibility, given industry developments;

- From the Project, the Mozambique LNG Project, and future LNG projects to be developed by Area 4 or 1, Mozambique has the opportunity to become a leading global exporter of LNG, hence there should be no particular constraint on LNG supplies produced in Mozambique for customers in Mozambique;

- On the underlying demand side, Mozambique has the opportunity to develop a coastal network of gas to power plants (located at development centres) and potentially also the ability for transported LNG (by truck) to substitute diesel fuel (with various mines being key potential customers). This can be complemented with inland renewable energy developments, as well as export opportunities (to South Africa, Malawi, Swaziland or Zimbabwe, for example);

- Technology developments offer the opportunity for Mozambique, like Indonesia and Norway, to avoid developing costly fixed cost long-distance backbone infrastructure, with likely low utilisation. Instead, there is the possibility of developing various options extending from a harbor inland (for example, FSRU, FSU, FRU), which can be integrated with renewables (e.g. PV solar)

- At this stage, Standard Bank does not necessarily see SSLNG as needing to be developed as Domgas by Mozambique. Why?

- Over time, Mozambique will have access to significant revenues from LNG proceeds (per this Study). If desired, some can be used to fund the up-front costs of SSLNG infrastructure, or potentially, to reduce the price charged to national customers (recall per Section 2 the GOM will earn 64% -67% of all net revenues), noting that Mozambique's domestic demand will always be a small portion of exported LNG;

- SSLNG offers a large import substitution opportunity (reduced diesel purchases) on an economic basis through utilizing indigenous resources (gas turned into LNG); and

- Various regional neighbours have no present natural gas alternative and so SSLNG offers a more efficient (in terms of energy output) source of fuel, which can compete against diesel

4.2.4 LNG Bunkering

From 1 January 2020, the IMO introduces rules which prevent the maritime emission of high sulphur diesel (>0.5%). In the short term, consumption of low-sulphur diesel (<0.5%) is expected to increase (with the potential for ships to introduce scrubbers to allow existing high sulphur fuel to be used, although there are physical limitations on how many ships can be converted at a given time)

In the medium term, the market expects a major increase in the maritime usage of LNG (LNG Bunkering). According to Woodmac (2018) and other analysts, LNG Bunkering (after China) is likely to be the world's fastest growing area of LNG consumption over the period to 2040. Regionally, in contrast to conventional LNG, Asia is expected to rank second to Europe in this regard. Standard Bank sees this as a major market opportunity for Mozambique's LNG production (i.e. selling LNG to players who will use it for marine bunkering).

In addition, in this regard, Mozambique's extensive coastline (2,800 km length), extensive coastline and pending LNG production status is expected to lead to a significant LNG bunkering opportunity to serve transit traffic passing around the Cape of Good Hope (e.g. travelling to Middle East or to Asia one way, or to Latin/North America the other way). In essence, we see this as a quick win and easy means to increase export revenues, whilst cementing Mozambique's presence in the global maritime economy. It also has the advantage of requiring low capex (for example, USD 60 million for individual sites (PWC, 2017).

Standard Bank is aware that a number of ports in Europe, Middle East, the Americas and Asia are commencing LNG bunkering, but we are not yet aware of one in Africa.

Within Mozambique, Maputo harbor is the most established port in Mozambique (operated by MPDC/Grindrod). Similarly, Beira Port (operated by Cornelder) is also an established route to market into inland Africa. Likewise, Nacala is usually seen as the most natural harbor in Mozambique. At this stage, as a non-maritime specialist, Standard Bank does not have a firm view on which of the above harbours (or, for that matter, Pemba or Palma Domgas Port) would be most optimal for bunkering. Our guess though is Maputo or Nacala. Clearly, SSLNG can be closely linked to LNG bunkering.

4.2.5 LPG

Within its POD, MRV has made a two-fold LPG proposal of social and economic benefit to Mozambique, with the source feedstock being its offshore natural gas. The benefits of LPG have not been modelled within this Report.

Firstly, MRV will issue free of charge to up to 5,000 local households and community centres, LPG burners, stoves and all associated equipment (e.g. hoses and LPG bottles). The provision of LPG will initially be subsidized by Area 4 with subsidies only gradually tapering down. Full training will also provided on how to use, store and refill such LPG equivalent.

Once the Project is operational, Area 4 proposes to sell 17,000 TPA of LPG to the Mozambican market (roughly 50% of national LPG imports), which will boost local production and distribution, as well as saving on Mozambique's

4.3 ENH Funding & NOC Considerations

From an ENH funding perspective, Standard Bank believes it is very important to closely monitor ENH's long-term funding options, noting ENH's shareholding in individual projects (e.g. 10% in Area 4 projects such as Coral FLNG or the Project, 15% of Area 1 projects such as Mozambique LNG or potentially up to 30% in other projects such as Sasol's developments or Domgas projects such as Afungi GTL and Power (if ENH is selected as the GOM's investment vehicle). The Report clearly shows the Project has immense economic benefits for Mozambique, and it is important to ensure that no funding issues stand in the way of project developments which are in Mozambique's national interests.

Under the EPCC, ENH is only carried for the exploration period and must meet its development funding obligations. In this regard, a crucial point is Clause 12.11 of the Decree Law, which prescribes that ENH will take an active role in all elements of the natural gas value chain (i.e. upstream, midstream and downstream). This implies a major funding commitment is required in order for ENH to follow its rights across all projects (Domgas as well as LNG). ENH also participates in Sasol's natural gas projects.

It should also be borne in mind that in respect of O&G project finance, it is typical for completion support to be required (N.B. given the multi-contract nature of the drilling/construction phase of O&G projects, it is typical for sponsors to guarantee/support the raising of debt (pre-physical completion) on a pro-rata basis). Note in Rovuma LNG this will absolutely be the case as the offshore elements are being funded directly by the Area 4 partners (hence Lenders will have limited visibility into them), within which ENH will have to fund 10% of upstream costs for Mamba and 385E. Thus, in addition to ENH funding 10% equity in the shareholder financed portion of Rovuma LNG's onshore assets (the LNG trains and Common Facilities) it will also have to guarantee 10% of the debt raised to fund the Rovuma LNG plant (as well as funding 10% of the offshore portion, which is solely shareholder funded)

Based on our current schedule of expected LNG and Domgas Projects (at March 2019), Standard Bank can envisage a peak ENH investment requirement in the order of USD 11 - 12 billion until 2029, with peak investment years expected in 2025 and 2027. Here, the limited term of the EPCC (30 years from POD approval of an individual Discovery Area) works against ENH, although it is in favour of the GOM. The pressure of the term limit means that each concession will likely build multiple LNG trains as quickly as possible (in order to make a return within the limited term of the 30 year EPCC). In turn, assuming LNG market growth, this increases the pressure on ENH funding options (as its concession partners will want to build trains and ENH needs money to follow its rights).

We specifically note the above calculation excludes the Fifth Licensing Round (for which 5 EPCCs have now been signed) within which ENH also has a participation in each block. At today, exploration drilling on these blocks will likely commence in the next eighteen (18) months and the results are, of course, presently unknowable. Although ENH is carried through the exploration period, the period to 2029 is long enough to also include a development period for any or all of the five (5) blocks, with and unknown funding requirement. For example, if

material oil is found, one can easily imagine ENH's share of a new Angoche Basin development (for instance) being USD 2 billion or more.

This USD 11 – 12 billion amount represents 78 - 86% of Mozambique's current GDP, noting the current external debt to GDP ratio is in the order of 100%, and that ENH is ultimately a SOE. Thus, adding ENH's obligations to external debt, gives a potential external/ENH debt to GDP ratio of 186%. In terms of challenges, a key issue is the limited cash flows ENH has access to when it needs to contribute its funding, noting that Coral FLNG will only enter commercial operations in 2022, Mozambique LNG likely in 2024 and the Project in 2024 / 2025. Although ENH's subsidiaries (CMH and CMG) have long been involved in the successful Sasol Pande - Temane projects, they are of a different scale to the LNG projects.

For this Project, and assuming the Project is looking to raise USD 12 – 15 billion debt finance, we can envisage ENH have an individual funding requirement in the order of USD 1.2 – 2 billion (for its equity component), and USD 1.2 – 1.5 billion (in respect of its pro-rata completion support undertaking for the debt component), thus in total USD 2.4 – 3.5 billion. These numbers are assuming costs per the High Capex or Low Capex scenarios outlined in Section 2, and assumed debt raising of USD 12 – 15 billion.

We note this obligation essentially has to be provided in parallel for that for the Mozambique LNG project, in which ENH has a fifteen (15) % shareholding, which Standard Bank understands has an approximate all-in cost in the order of USD 25 billion (including historic exploration). Thus, ENH's expected funding under Mozambique LNG may be USD 3.75bn, comprising USD 1.88 billion equity and completion support of the same amount (assumed debt USD 12.5bn). Taken together, for the two Projects, ENH will need to raise USD – 6.1 - 7.25 billion in 2019 (at a time when there is a 100% Mozambican external debt to GDP ratio).

Although largely out of this Report's scope, this issue has implications for ENH's decision-making and autonomy as a NOC and we argue should be reflected on by GOM. Within Section 3, Standard Bank assumes the Project's taxation payments will, inter alia, repay 54% of ENH's borrowing incurred to fund its participation in LNG, natural gas and Domgas projects (calculated as Rovuma LNG capacity / (Rovuma LNG + Mozambique LNG capacity)). This effectively means the GOM elects to use some of its tax proceeds for this purpose (instead of other uses). This will reduce ENH's indebtedness most quickly. Alternatively, if the GOM does not choose this route, ENH will only be able to reduce its indebtedness through the dividends it receives from an individual project. This will take longer for ENH to be free of debt, and also challenges it ability to fund any additional projects that may arise (e.g. from the five (5) blocks within the Fifth Licensing Round, or potentially the Sixth Licensing Round).

4.4 Local Content

As outlined elsewhere, Mozambique is a poor country (2018 GDP USD 14 billion). Based upon our current market expectation, Standard Bank envisages up to USD 128 billion could be directly invested in the Mozambique O&G opportunity (FIDs between 2017-2025), with the majority being allocated to onshore projects. Inherently, onshore activities have a higher LC potential than offshore activities.

Clearly, the Project and its neighbour, Mozambique LNG, offer Mozambique the opportunity to develop, over time, a significant volume of LC that can be utilised within the Afungi Site and surrounding areas. On its own, this is likely to be of material importance to Mozambique (for example, it will materially boost national Fixed Capital Formation):

Standard Bank notes:

- We envisage Mozambique LNG / /Rovuma LNG has a major opportunity to introduce a ‘’LC escalator’’ into Mozambique for each of, inter alia, LC, skills and enterprise development, education and training among others, with a virtuous circle seen for the enhancement of GOM capacity and capability, as well as for the development of local/regional infrastructure;

- Article 10 of the Decree Law provides for:

    - An objective of a ‘’gradual transfer of operational capacity’’, with a view to enhancing the Mozambican private sector;

    - Each POD must include a detailed LC plan, which has to be approved in parallel with the overall POD. The LC plan is required to be updated every three (3) years throughout the 30 year EPCC term;

    - Preference is given to Mozambican goods and services of equal quality, provided the price is not greater than ten (10)% more than the foreign alternative (Standard Bank notes this is a conventional provision); and

    - INP has review and approval rights for all material contracts.

- We therefore do not see the need for any national LC law for the LNG developments, as this is already covered by the Decree Law. For Domgas projects, the position may be slightly different.

- More generally, now the Mozambique and Rovuma LNG FIDs are nearing, Standard Bank believes it is now time for other sectors and industries to look to increasing their domestic capacity over time with a view to supplying the LNG projects with their requirements (e.g. food). Section 3 shows clearly the macroeconomic impact of so-called indirect and induced economic impacts.

- An example we frequently use in public fora is that of chickens and eggs. Building two (2) LNG trains in parallel requires among others one (1) million eggs month to feed the construction workforce. Therefore, building four (4) trains in parallel (Mozambique LNG and Rovuma LNG) requires in the order of two (2) million eggs a month, for an assumed maximum combined construction workforce of 40,000 people. Standard Bank understands this requires 60,000 chickens laying 1.2 eggs per day. We note of course that these chickens cannot be eaten, as otherwise egg production will be quickly affected. This simple example, to us, shows the scale of the LC opportunity within Mozambique which we argue should be a major priority of the GOM.

To that end, and consistent with Section 3.4.2, Area 4 has committed to a **USD 3 billion** LC target and sees LC as an important issue to develop within Mozambique for Phase 1 of the Project.

We therefore envisage it is in the interests of the GOM to provide the swiftest possible review and approval of individual PODs. We envisage the fact that GOM has approval rights over individual PODs should allow the ‘’LC escalator’’ to organically be created.

We would envisage that Rovuma LNG Phase 2 will have a higher percentage of LC than the Project (as by then the capacity of Mozambique to supply necessary goods and services will have increased). The same will also apply to Area 1’s Mozambique LNG / Prosperidade LNG/offshore field development compared to that of Golfinho.

4.5 Project Discussion Points

As noted in Section 1.1, Standard Bank notes the Project has a Financial Adviser and our intention is not to make any comments that cut across such role. In this regard, from a Report perspective, we make only two comments both of which may impact on the economic projections herein.

4.5.1 Unitisation

Under Article 7 (Unification) of the Decree Law, it is envisaged that Area 1 and 4 will agree a unitised development of straddling resources. Per Article 7, under a master depletion plan, each Area is allowed to individually develop twelve (12) Tcf without regard to the other Area. After the individual development of the permitted 12 Tcf, developments within the straddling resources must be co-ordinated and unitised. Standard Bank understands the principles have been codified within the UUOA, which is pending approval by the GOM and for which advisers have been appointed to review (on behalf of the GOM).

The Project's envisaged macroeconomic benefits (outlined in Section 3) are dependent upon the timely approval of the proposed unitisation arrangements by the GOM, given the primary (but not exclusive) source of feedstock for the Project are the Mamba field's straddling resources.

We also note that Article 7 is silent with regard to how Domgas is treated from the unitisation perspective. As in, are Committed Domgas Volumes for an individual project included within the 12 Tcf, or supplemental? Regarding the Project, the POD assumes the 12 Tcf solely relates to LNG production with Domgas supplemental to this, but also permissible for individual development.

4.5.2 Affiliate Sales

In its press release of 28th December 2018, Area 4 confirmed it had agreed SPAs with a number of its affiliated buyers (i.e. offtakers under the ownership/control of partners in the Area 4 licence) concerning the output of RLNG Phase 1. Noting:

- The target FID date (mid-2019); and
- MRV's wish to raise a project financing to part fund the construction of the onshore assets (e.g. the LNG trains)

Selling a portion of LNG output to affiliates seems a sensible means to fast-track the raising of project finance debt (as otherwise negotiating multiple third party SPAs could take a significant amount of time, as occurs in many greenfield LNG projects). In this regard, we make only two comments from a Mozambique perspective.

Firstly, ENH, at time of drafting is a subsidiary of a country rated (CCC) and who has been in sovereign default since 2016. We comment on ENH's funding considerations in Section 4.3. We assume ENH's portion of output (10%) will be commercially assumed by the other partners in Area 1 and their affiliated buyers.

Secondly, we assume that transfer pricing will be a key issue to be analysed and agreed from a Mozambican perspective. That is, the pricing at which output is sold by the Project to MRV's affiliates will need to be analysed to ensure there is no potential value leakage in relation to the EPCC assumed taxation rates per Sections 2 and 3 of this Report.

5 Conclusion & Recommendations

5.1 Conclusion

With its move to utilise Mega-Trains for the first time outside of the State of Qatar, Rovuma LNG is the largest project in the history of the African continent, overtaking Mozambique LNG, its near neighbour. We believe LNG represents Mozambique's best ever economic opportunity and hopefully represents the start of a monumental development sequence that takes Mozambique to a middle income country.

The world's most expensive object is Gorgon LNG in Australia (USD 54bn). The only object in human history more expensive is the International Space Station (USD 100bn), which is no longer located on Planet Earth. Adding Mozambique LNG to Rovuma LNG, the Afungi site will become the most significant real estate on Planet Earth since the beginning of time (c USD 52 - 57 billion cost, including Golfinho exploration costs), which number will only increase with the completion of additional LNG trains and Domgas projects.

We envisage Rovuma LNG will take a Final Investment Decision (''**FID**'') in mid-2019 and reach Financial Close in 2019, representing the first phase of multiple developments that will change Mozambique forever.

Given its recent change in energy policy (coal to gas switching), Standard Bank believes that Mozambique, in effect, has an opportunity to become a reliable long-term supplier of LNG to China, in the same way that Australia supplies China with mineral resources or New Zealand food products. In total, China takes 32% of Australia's exports and 19% of New Zealand's exports (2016). We see this as a very realistic national goal, noting China currently purchases in LNG the equivalent of slightly over 1% of its 2017 coal consumption, with even a doubling of current LNG consumption (52 MTPA) only displacing 1.3% of China's current coal cap (Worley Parsons, 2018).

As noted in this Report, the economic benefits of Rovuma LNG are enormous, key highlights being:

- Annual GDP contributions of USD 15 billion (High Capex scenario) or USD 18 billion (Low Capex scenario), or USD 9.9 billion (High Capex scenario) or USD 14 billion to GNP (Low Capex Scenario)

- The creation of 257,586 national employment opportunities in the High Capex scenario and 323,050 national employment opportunities in the Low Capex scenario. The bulk of these jobs are ''Supply Chain'' and ''Economy-Wide'' jobs rather than ''on-Site'' jobs. Whilst in isolation this number may appear large, it is 4% of Mozambique's total employment in the High Capex scenario, whereas the impact on GDP is over 100%;

- Annual contribution of USD 7,793 million to BOP in the High Capex scenario, and USD 9,802 million in the Low Capex scenario (the latter, over 300% of the current deficit);

- Annual fiscal contribution of USD 4,337 million to GOM in the High Capex scenario and USD 5,345 million in the Low Capex scenario; and

- More broadly, the Project will be a key means to facilitate Northern Industrialisation along the lines of a Qatari integrated LNG and industrial development.

From a Cabo Delgado perspective, the numbers are even more astonishing. The USD 128 billion sequence of investments will largely take place in a single province which had a 2016 GDP of USD 550 million. The only analogy that Standard Bank can think of for Cabo Delgado's potential is Guangdong Province, China.

Upon China's 1978 start of economic liberalisation, Guangdong Province's GDP was USD 11 billion. In 2017, it was 1,332 billion, a CAGR of 13% for the last 39 years. Standard Bank fervently hopes that Mozambique's LNG developments improve the lives of all Mozambicans, with a child born in 2015 likely to have better life prospects than one born in 1975.

We therefore recommend the POD should be promptly approved such that FID can take place in mid-2019.

5.2 Policy Options

In Section 1.3, we noted that Standard Bank would not repeat any elements of the 2014 or 2018 Macroeconomic Studies. We make one exception to this, Policy Options, which was covered in Section 7.2 of the 2014 Macroeconomic Study.

In that section, we extensively quoted McKinsey Global Institute (2013), which remains good advice to a developing LNG producer such as Mozambique. Updating the section's concluding table for the passage of time, we note some specific policy options for consideration, with a transaction recommendation noted in Section 5.3 below:

Option	Comment
1	Facilitate FID of the two onshore LNG projects as soon as possible. There remain a number of competing LNG projects (e.g. USA, Qatar, Russia, Canada) so the earliest possible FID cements Mozambique's LNG market position and provides the bedrock for future expansions as the LNG market grows (as well as the development of Domgas projects). Therefore, the first two (2) onshore LNG FIDs will be the foundation of Northern Industrialisation, intended to allow Mozambique to develop major supporting domestic industries along the lines of Australia (for mining) and New Zealand (for agriculture / food products)
2	Per Section 3.5.2, we note Mozambique's significant external debt. Using the future LNG revenues to pay down debt (external national, domestic national and SOE) will increase Mozambique's macroeconomic stability (allowing for the potential of a future reduction in interest rates); provides the possibility for significant improvements in sovereign credit ratings (as occurred with Qatar between 1996-2007), and creates flexibility to take on future debt when most optimal for the country to do so.
3	Per Section 3.5.10, between 59% - 62% of the Project benefits sectors other than the Mining (Oil & Gas) sector. The next leading sector beneficiary is Agriculture (which consistently represents over 20% of the Mozambican economy and represents the majority of its labour force). It is crucial that Mozambique uses the four (4) – five (5) year construction time of onshore LNG to think through how it wants each sector to respond to the changes that

	will come from the LNG production starting and the revenues arising. Indeed, Mozambique only has around 3.25 years from today until it becomes a LNG producers (through Coral FLNG) and so the process needs to soon commence. Perhaps there could be an Economic Master Plan based on the impact of three LNG projects? Could DFIs help in this regard?
4	Within Section 3.6, as part of a potential solution for the risks of ''Dutch Disease'' or ''Resource Curse'', we use a SWF as a label for a range of options including but not limited to DSFs. Clearly, neither SWF nor DSFs are immediate priorities with USD 14.1 billion of external debt to be repaid by Mozambique. Standard Bank assumes that a SWF (or similar variant) may be looked to be formed from the mid-2020s onwards. From our perspective, we consider a DSF should be investigated and favoured over a SWF. Mozambique has significant development challenges to be solved and major investment requirements. We envisage DFI's have an important role to play in solving these challenges and consider that minimum income guarantees can form part of a solution and they could include (on the South Africa model): Pensions; Child Benefit and Disability Benefit, as well as a focus on socially beneficial infrastructure (e.g. transport infrastructure).
5	Per the 2018 Macroeconomic Study, Standard Bank believes that Domgas projects can be developed through promptly putting together a workable commercial and physical structure around Domgas (following the LNG). If well implemented, Domgas can achieve forward linkages and boost the Mozambican economy. The crucial (but difficult) example remains that of a fertiliser project. An optimal fertiliser project (fed by Domgas) may also include a nationwide system of fertiliser distribution, a detailed programme of training in the use of fertilisers and be linked to an increased mechanisation of agriculture. This may in turn have a major impact upon Mozambique's GDP, for example. Thus, the overall requirement is a lot more than a single project.
6	As noted, in Section 1.2, Mozambique achieved FID on Coral FLNG within six (6) years of its first gas discovery and will achieve onshore LNG FIDs in just over nine (9) years from the Windjammer discovery (announced 18 February 2010). This is competitive by global standards. Mozambique will in next eighteen (18) months or so see the drilling of the first exploration wells from the Fifth Licensing Round. The results of these are presently unknowable. However, it may be appropriate for Mozambique to conduct a learning exercise to see how (if commercial discoveries are made), the Fifth Licensing Round can be implemented even faster than the LNG projects. Within recent years, Eni's Zohr project (Egypt) and ExxonMobil's Guyana projects stand out as fast track discoveries and developments, of potential inspiration for Mozambique.
7	Mozambique currently ranks 158 on Transparency International's 2018 Corruption Perception Index and 180 on the UN's 2018 Human Development

	Indicators. Mozambique is a member of the EITI and therefore all payments made by the LNG projects will be monitored through that mechanism. It is therefore crucial that once the income from LNG enters the GOM, that Mozambique quickly develops the capability to manage large resource flows and strengthens its fiscal and revenue management (this is a key recommendation of McKinsey, 2013). We envisage that DFIs can play a key role in capacity building in this regard, such that the spending can be allocated to economically and socially beneficial projects and outcomes, such that Mozambique can gradually climb the ladder in the above metrics (and others). A good example of this is improving the education sector and the need for Mozambique to improve its broader human capital formation, such that the largest percentage of the direct, indirect and induced jobs arising from the Project in Section 3.5.5 can be filled by Mozambican nationals. Section 3.7 clearly states that 61% of the envisaged national employment opportunities require some form of skill, hence a focus on developing human capital is crucial.
8	After the Mozambique LNG and Rovuma LNG FIDs, Mozambique should promptly progress project solutions for Condensate and consider the merits of SSLNG within Mozambique as well as LNG Bunkering. The former can potentially link with Mozambique's electric power and mining sectors, helping regional growth outside of Cabo Delgado and facilitating regional export opportunities; the latter allows Mozambique's natural geography to serve a growing future global market.
9	Per the 2018 Macroeconomic Study, Standard Bank has a general expectation that Mozambique in time (after the next two Area 1 and 4 LNG developments?) may be ''long Domgas'', and have more Domgas than it has projects to use the Domgas. Potentially, given that Mozambique may develop multiple trains of LNG (per Section 1.4.4), one option to explore before the FID of Rovuma LNG Phase 2 and / or Mozambique/Prosperidade LNG is whether it is economically more optimal for Mozambique to focus on LC a little more, and Domgas a little less. Thus, using future LNG train developments to achieve a LC escalator in priority to Domgas.
10	Per Section 5.1, we note the scale of investment that will take place in Cabo Delgado province, for which there are few global parallels. Aside from the issue of Security (per Section 1.3), the long-term success of the Project depends on Cabo Delgado becoming a model of emerging market development. Therefore, we recommend the GOM develops a master plan for Cabo Delgado arising from, and complementing the LNG developments. Examples could include developing a major agricultural business to feed the 40,000 workers (per the example in Section 4.4) that may be at the Afungi Site for the next decade or more. The issue is challenging. There is on the one hand the risk of developing wealthy communities within a generally poor country. There is also the likelihood of significant inward migration as the

> Cabo Delgado economy takes off, which may challenge social stability. Solving such issues are outside of Standard Bank's competence and we recommend DFI assistance in this area too.

5.3 Project Recommendation

Noting our Project benefits in Section 5.1, as cautious bankers we have to ask the question, what can go wrong?

We see three major issues, of which security is outside of our competence to analyse. The second issue is Domgas. As outlined in the Executive Summary, the 2018 Macroeconomic Study on the Afungi GTL & Power Project is intended to contribute to a solution in this regard.

The third is the process of physical implementation of the Project, in parallel with Mozambique LNG. Not all LNG projects come in on time and to budget. In recent years, there have been numerous examples in Australia (with remote sites) of this fact, with also some current US examples (non-remote sites). From a country point of view, if a Project is late due to contractor performance the risk is largely privatised (the cost overruns will be the responsibility of first the Contractors and then the Area 4 partners). GOM will be keen to ensure there is no major increase in Cost Gas due to such delays. However, if the Project is late for reasons of ''country issues'' there will be difficult discussion around the implications for Cost Gas. In addition, the extensive benefits foreseen in this Report will be delayed in receipt (as well as delays in repaying external debt and ENH's borrowing to fund its investment in LNG and Domgas projects).

Leaving aside the issue of security, the primary concern we have is GOM capacity and capability to implement on a timely basis the decisions it is required to take and the business processes it is required to process. To pick one example, the Decree Law is a solid piece of legislation but under which the GOM still retains significant duties and obligations in terms of ''making the project happen'', in a remote area some 2,700 kilometres from Maputo. Annex E, for instance, includes a long list of Port Authority Services which are the responsibility of the relevant body within the GOM. Standard Bank can see there remains a myriad of risks facing the Project's construction phase in Cabo Delgado, as well as the phase running from POD approval to FID. As examples, are the risks of customs / import delays, industrial action, non-timely issue of approvals or permits. To coin a phrase, there is thus the potential ''**Cost of Bureaucracy**'' facing each of Rovuma and Mozambique LNG, at the same time when using the same site.

From our perspective the Cost of Bureaucracy, if it occurs, is very real. Section 3.5.15 shows that a parallel delay to Mozambique LNG and Rovuma LNG (the most likely scenario if there is a delay) is a permanent loss to Mozambique's GDP of USD 778 million in the high capex scenario or USD 1,031 million in the low capex scenario (among other variables). However, this scenario is an understatement. As a practical matter, Mozambique's entire LNG project development would be delayed a year (for example, Rovuma LNG Phase 2 would take FID one (1) year later than initially planned). Therefore, in 3.5.16, we include a calculation of a Combined Delay Case to show the costs of a one (1) year delay to First Gas upon the wider Rovuma Basin investment programme, which is a permanent loss to Mozambique's GDP of USD 1,637 million in the high capex scenario or USD 2,169 million in the low capex scenario (among other variables).

To put this in perspective, a one (1) year delay in First Gas therefore leads to **a loss of 15.5% of Mozambique's current GDP** (in the Low Capex scenario) and a delay in the expected benefits for Mozambique being realized. In addition, and for clarity, this also means a delay in Mozambique being able to repay its USD 14.1 billion external debt, as well as a delay in

ENH being able to repay its external funding raised to fund its participation in the LNG, natural gas and Domgas projects.

Therefore, Standard Bank argues there is a need for the GOM to consider remedies to reduce this risk. The GOM is the largest loser if the Project (or Mozambique LNG) is delayed for ''country reasons''. For now, our suggestion is for GOM to consider ''outsourcing'' the implementation of challenging logistical elements of the Decree Law until the achievement of First Gas. Under this suggestion, each relevant GOM Ministry and / or SOE within Cabo Delgado (and potentially elsewhere) involved in the Decree Law execution process would have its capacity supplemented by the addition of external consultants based in such offices, who would help the relevant Ministry/SOE process the necessary paperwork for the period up to First Gas. For clarity:

- all consultants would report functionally and managerially to the relevant Ministry/SOE;
- all consultants would be required to extensively train and develop incumbent personnel such that this measure may only be necessary for the construction of Mozambique and Rovuma LNG; and not for future LNG or Domgas projects (assuming additional capacity is built by then);
- There would be no waiver of any provisions of the POD approval, including the associated LC plan;
- There would be no waiver from the various processes outlined within the Decree Law, simply an increase in the human resources of the relevant Ministry/SOE to process the paperwork; and
- We envisage the above costs would be recoverable as Cost Gas under the EPCC and can be seen, in essence, as an insurance policy.

We invite comments and feedback on this Report.

We look forward to approval of the Project POD and to two (2) FIDs of onshore LNG projects in 2019 that will transform Mozambique forever.

Annexure 1: Cost Benefit Analysis

The financial flows consist of the following components:

- Capital expenditure (C0), it is assumed that the capital expenditure (capex) is fully expended in year 0;
- Revenue for each year, which is the product of incremental volume in year n (Vn) and relevant tariff (T0) plus inflationary increase in tariff (assuming a constant inflation of i); and
- Operating expenditure (O0) plus inflationary increase.

The free cash flow is mathematically described as follows:

$$CF = -C_0 + \sum_{n=1}^{N} T_0 \times (1+i)^n \times V_n - \sum_{n=1}^{N} O_0 \times (1+i)^n$$

Financial performance of projects is measure by net present value (NPV), internal rate of return (IRR) and payback period. The NPV is calculated by discounting the revenue and operating expenditure in each year by the weighted average cost of capital (WACC). A WACC of 10% was assumed.

$$NPV = -C_0 + \sum_{n=1}^{N} \frac{T_0 \times (1+i)^n \times V_n}{(1+WACC)^n} - \sum_{n=1}^{N} \frac{O_0 \times (1+i)^n}{(1+WACC)^n}$$

IRR is obtained by solving for i% such that the resulting NPV is zero:

$$0 = -C_0 + \sum_{n=1}^{N} \frac{T_0 \times (1+i)^n \times V_n}{(1+IRR)^n} - \sum_{n=1}^{N} \frac{O_0 \times (1+i)^n}{(1+IRR)^n}$$

The payback period is obtained by solving for k (number of years) such that the undiscounted cash flow is zero

$$0 = -C_0 + \sum_{n=1}^{k} T_0 \times (1+i)^n \times V_n - \sum_{n=1}^{k} O_0 \times (1+i)^n$$

Financial viability is indicated by an NPV greater than zero and IRR greater that the WACC.

Annexure 2: Social Accounting Matrix

5.4 The structure of a SAM

When economic agents in an economy are involved in transactions, financial resources change hands. The SAM provides a complete database of all transactions that take place between these agents in a given period, thereby presenting a “snapshot” of the structure of the economy for that time period.

As a system for organizing information, a SAM presents a powerful tool in terms of which the economy can be described in a complete and consistent way:

- Complete in the sense that it provides a comprehensive accounting of all economic transactions for the entity being represented (i.e. country, region/province, city, etc.), and
- Consistent in that all incomes and expenditures are matched.

Consequently, a SAM can provide a unifying structure within which the statistical authorities can compile and present the national accounts.

The concepts of circular flow and double-entry bookkeeping
The most basic principles underlying a SAM are the concepts of circular flows and double-entry bookkeeping.

5.4.1 Circular flow

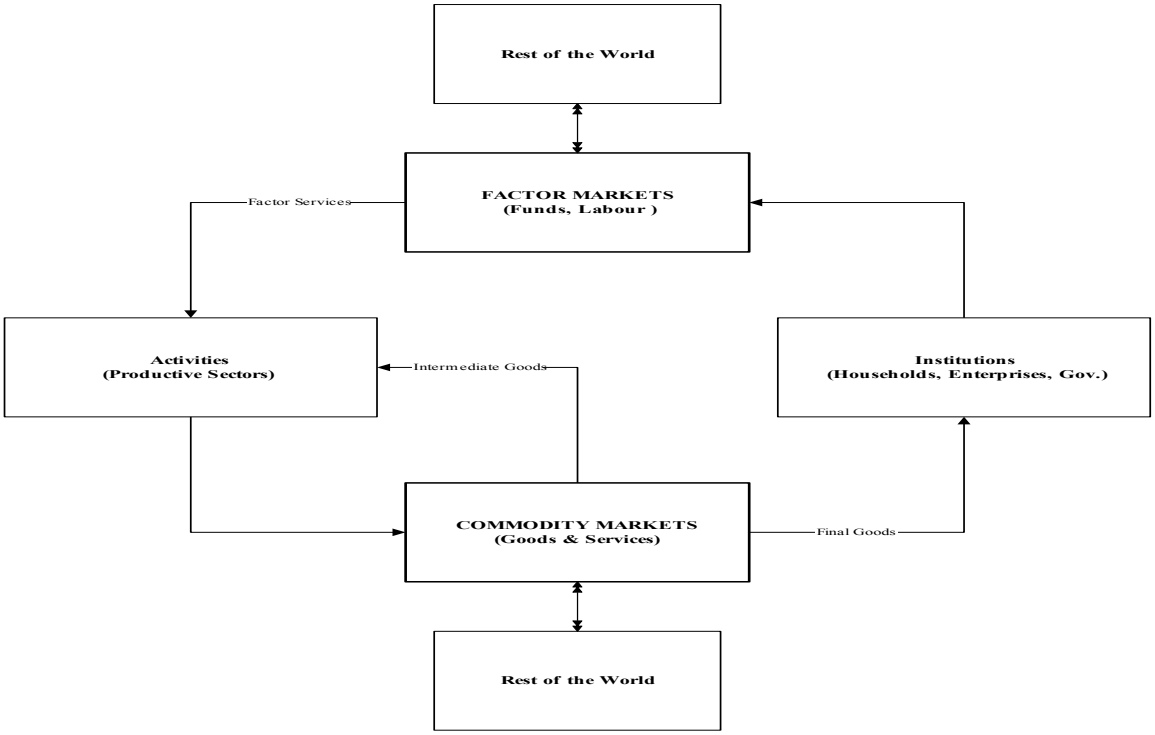
The concept of circular flows relates to a particular angle from which an economic system is viewed and traced. The various productive sectors (i.e. the “activities”) in the economy act as producers and sellers of goods and services (i.e. the “commodities”) to institutions such as households, business enterprises, and the government (the “purchasers” of the commodities). For their part, households, enterprises, and the government act as sellers of factor services to the various activities, who then becoming the purchasers of these factors (i.e. labour, capital, etc.).

Going one way around, the circular flow involves tracing out the flows of goods and services (i.e. the commodity markets). Going the other way around, the circular flow traces out the flows of funds (i.e. the factor markets). Transactions with the rest of the world can take place through both the commodity and factor markets. The figure on the following page presents a schematic representation of these flows.

According to this figure, a continuous flow of factor services exists from the factor markets to the activities in the economy, which in turn provides commodities (i.e. products/goods and services) to the commodity markets, from where these reach all of the institutions in the economy (i.e. households, enterprises and government). For their part, institutions provide factor services in factor markets, where activities act as purchasers.

The commodity market provides goods and services to two types of users. The first type of user includes the institutions, such as households, that use goods and services for purposes of final consumption (i.e. final goods). The second type of user is other producers in the economy that use goods and services in their own production process (i.e. intermediate goods). In addition, both the factor and commodity markets can interface with the rest of the world.

Figure 26: Circular flow of all transactions in an economy



Source: McDonald, Punt et al.

5.4.2 Double-entry bookkeeping

The SAM captures the monetary value of economic transactions, and organises them into a series of “accounts”. There are six major types of accounts that form the basis of a SAM:

- Commodity Accounts that capture the value of products/goods and services traded in an economy
- Activity Accounts that capture the value of products/goods and services produced in an economy
- Factor Accounts that capture the value of payments made to the essential factors of production (i.e. labour, capital, land, etc.)
- Institutional Accounts that capture the value of transactions by Business Enterprises, Households and Government, and
- The Rest of the World Accounts that capture the value of imports and exports

Structurally, a SAM is a square matrix, within which each account has both a row and a column. The column entries record the expenditures/payments/out-goings for each account, whilst the incomes/receipts/in-comings for each account are recorded as row entries. As such, a SAM is a form of double entry bookkeeping where each entry is a transaction (that has both price and quantity dimensions), that identifies both its source and destination. Therefore, the total expenditures by each account must be exactly equal to the total receipts for the account. As such, the respective row and column totals must equate.

Consequently, a SAM provides a complete and consistent set of information about an economic system in an efficient and, ultimately, simple way. Moreover, it will provide that information in a manner that is consistent with the aggregate/macro accounts for the SNA.

Furthermore, in the context of an entire economy, a SAM will contain not only the information provided by the SNA, but also further details on the transactions between various groups of agents within the system.

5.4.3 Economic multipliers

Once a SAM has been developed, it becomes a powerful tool that can be used to conduct various macroeconomic analyses such as calculating sectoral multipliers. The multiplier concept is defined as the nature and extent of the impact/effect of an autonomous change in a specific economic quantity on another economic quantity or quantities. Samuelson (1970) defines the multiplier concept as follows:

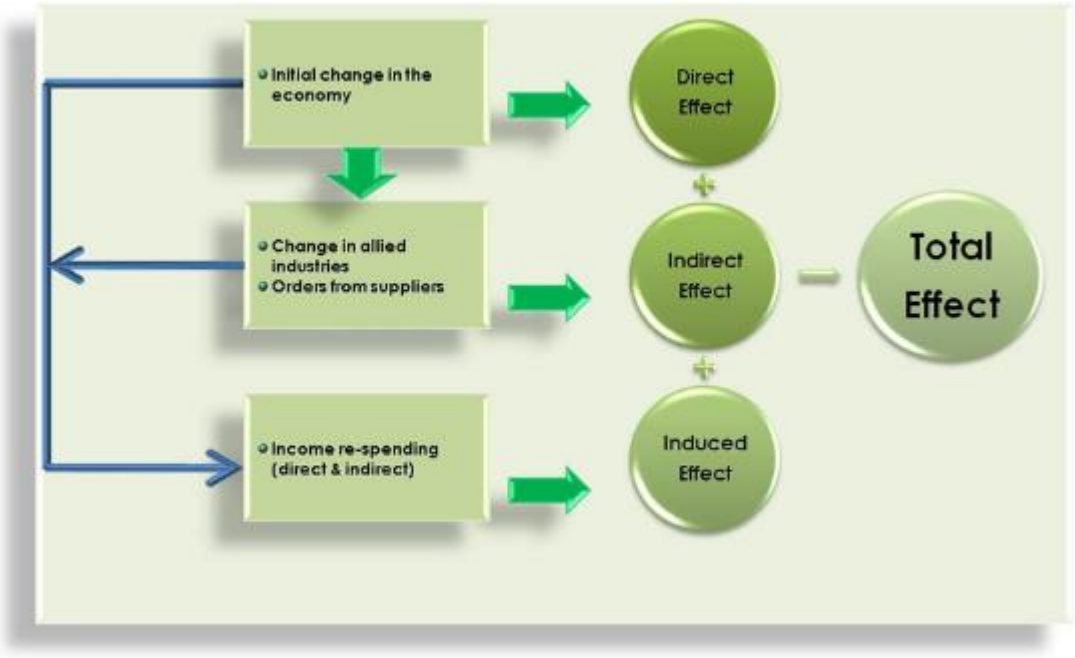
“The multiplier is the number of which the change in investment must be multiplied in order to present us with the resulting change in income”.

In order to make the multiplier concept more general, investment and income can be substituted respectively by other independent and dependent variables such as production output, interest rate changes, government and/or household expenditure, etc.

Direct, indirect and induced impacts
Sophisticated macroeconomic modelling, utilising a SAM as the database, highlights the direct impact that a specific project will have within its own industry environment, as well as the indirect impacts that The Project will have on upstream industries that supply The Project with key raw materials and other inputs; plus the induced impacts that The Project will have throughout the broader economy that result from the increased expenditure by households and other institutions that benefit from the income they derive from direct and indirect involvement in The Project.

These linkages are represented schematically in the figure on the following page.

Figure 27: Schematic representation of Direct, Indirect, and Induced Impacts



5.4.3.1 Direct multipliers

The direct multiplier measures the direct impact emanating from a particular sector on itself. For instance, the direct multiplier will measure how an increase in the production of a particular sector will effect employment within the same sector. These direct impacts are most closely related to the sector and, as such, are probably the most important impacts from a strategic planning point of view.

5.4.3.2 Indirect multipliers

Indirect multipliers reflect the impacts that a particular sector will have on all other industries that supply inputs (materials) for the operations taking place in the sector. These 'backward linkages' are important as they measure the broader impact that changes in the direct sector will have on the economy. Frequently, these indirect impacts are very significant, and may even exceed the direct impacts themselves.

5.4.3.3 Induced multipliers

Economic impacts will result from the paying out of salaries and wages to people who are employed in a particular sector, as well as the salaries and wages paid by businesses operating in the sectors indirectly linked to this sector due to the supply of inputs. These additional salaries and wages lead to an increased demand for various consumable goods that need to be supplied by various economic sectors throughout the broader economy. Clearly, these induced impacts can be considerable and are measured by using induced multipliers.

Economic indicators

Macroeconomic modelling calculates the impact that a specific event such as an investment The Project would have on a variety of economic indicators. This section describes the most frequently measured indicators.

5.4.3.4 Gross domestic product

GDP reflects the magnitude of the value added in the economy. Value added consists of three elements, namely:

- Remuneration of employees
- Gross operating surplus (which includes, amongst others, profits and depreciation)
- Net indirect taxes

It is therefore possible to also assess the increase in new business sales by interpreting net indirect taxes. The same will apply to the increase in salaries and wages.

5.4.3.5 Capital formation

For an economy to operate at a specific level, an amount of capital stock is needed to support such level of activity. Capital, together with labour and entrepreneurship form the basic factors needed for production in the economy. The effectiveness and efficiency with which these factors are combined influences, the overall level of productivity/profitability of the production process.

5.4.3.6 Employment creation

Labour is a key component of the production process. Macroeconomic impact analysis determines the number of new employment opportunities that will be created by the construction and operation of a particular project. These opportunities are broken down into those created directly in the sector being analysed and those indirectly created and induced throughout the broader economy. The employment opportunities created during the construction phase will be mostly temporary, while those created during the operational phase will be mostly permanent.

5.4.3.7 Fiscal impact

The government is directly or indirectly affected by changes in economic activities occurring within the various sectors of the economy. Therefore, it is important to calculate the impact that the construction and operation of a particular project will have on government accounts (the fiscal impact). Usually, government receives income in the form of property income, direct tax (mainly personal tax and company tax) indirect tax (VAT – which results from additional household spending) and customs and excise tax and transfers. On the expenditure side there will be a cost to government in providing services. The net effect between income and expenditure is determined as part of the macroeconomic impact assessment.

5.4.3.8 Balance of payments

The construction and operation of the infrastructure will have direct, indirect and induced impacts on the export and import of goods and services across all of the various economic

sectors that are interconnected with a project. Imports consist of direct and indirect material imports, as well as goods consumed by households that are imported as a result of the induced impact resulting from increased household income.

5.4.3.9 Household income

One of the elements of additional value-added (i.e. GDP) is remuneration of employees, which affects household income. Macroeconomic impact assessment measures the magnitude of the changes that will occur to both household income and spending/saving patterns as a result of the construction of The Project. The specific impact on Low Income Households can be isolated, measured, and reported on.

5.4.3.10 Effectiveness criteria

Besides the macro-economic impacts reflected above, the macro-economic impact of the projects are also evaluated in terms of “effectiveness” (efficiency) criteria. These criteria measure the extent to which The Project utilises resources effectively. Since capital is a scarce resource in South Africa, the effectiveness of the utilisation of capital in terms of labour/employment and GDP creation is measured in relation to the total South African economy.

When evaluating the construction and operation of a project and the related activities, these efficiency criteria are the most reliable indicators as to whether or not the expansion will represent an effective use of capital. In order to make these comparisons, two key multipliers/ratios are calculated, i.e.

- The GDP/Capital ratio, and
- The Labour/Capital ratio

Using these ratios, the contribution towards economic growth and job creation relative to the capital employed in The Project can be established. If the decision-maker considers continuous, long-term economic growth to be more important than job creation in the short-term, then the GDP/Capital ratio is the more important of the two measures of macroeconomic effectiveness. On the other hand, if job creation, particularly in the short term, has priority, the Labour/Capital ratio is more important.

5.5 Application of the SAM

The development of the SAM is very significant as it provides a framework within the context of the International System of National Accounts (SNA) in which the activities of all economic agents are accentuated and prominently distinguished. By combining these agents into meaningful groups, the SAM makes it possible to clearly distinguish between groups, to research the effects of interaction between groups, and to measure the economic welfare of each group. There are two key reasons for compiling a SAM:

- Firstly, a SAM provides a framework for organizing information about the economic and social structure of a particular geographical entity (i.e. a country, region or province) for a particular time period (usually one calendar year); and
- Secondly, to provide a database that can be used by any one of a number of different macro-economic modelling tools for evaluating the impact of different economic decisions and/or economic development programmes

The SAM's main contribution in the field of economic policy planning and impact analysis is divided into two categories:

a. As a primary source of economic information

As a detailed and integrated national and regional accounting framework consistent with officially published socio-economic data, a SAM instantly projects a picture of the nature of a country or region's economy. As such, it lends itself to both descriptive and structural analysis

b. As a planning tool

Due to its mathematical/statistical underpinnings it can be transformed into a macro-econometric model that can be used to:

- Conduct economic forecasting exercises/scenario building
- Conduct economic impact analysis both for policy adjustments at a national and provincial level and for large project evaluation
- Conduct self-sufficiency analysis i.e. gap analysis to determine, with the help of the inter industry and commodity flows contained in the provincial SAM, where possible investment opportunities exist, and
- Calculate the inflationary impacts on provincial level of price changes instigated at national level (i.e. administered prices, VAT, etc.)

To summarize, the SAM mechanism provides a universally acceptable framework within which the economic impact of development projects and policy adjustments can be reviewed and assessed at both national and provincial/regional levels. It serves as an extension to the official National Accounts of a country's economy and, therefore, provides a wealth of additional information, especially when disaggregated to more detailed levels.

Annexure 3: Third Party Bibliography

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Annexure 4: Contact Details

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