Rovuma LNG

Macroeconomic Study
Standard Bank

19 March 2019

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Section 1

Project & Market Introduction

STANDARD BANK ECONOMIC STUDY

Rovuma LNG will be the
largest Project in Africa's history

Standard Bank has prepared an independent Macroeconomic Study upon Rovuma LNG. We have previously analysed Mozambique LNG (2014) and Afungi GTL & Power (2018)

We envisage Rovuma LNG will take a Final Investment Decision **(''FID'')** **in mid-2019** and **reach Financial Close in 2019.**

The Project will be a 15.2 MTPA, USD 27bn (Low Capex) - 32bn (High Capex) Project which will **monetize 2.6 Bcf/d of Mozambique's offshore resources.**

PROJECT & PROJECT PARTIES

Party	Licence Interest	Role
ENI	25%	Operator - Offshore
Exxon Mobil	25%	Operator - Liquifaction & Related Operations
CNPC	20%	
Galp	10%	
Kogas	10%	
ENH	10%	

Value Chain

Mamba straddling (12 Tcf)

Non-Straddling (5.7 Tcf)

Domgas (1.4 Tcf), from both

Offshore

Onshore Megatrains

Affiliated Buyers and / or Third Parties

OFFSHORE FACILITIES LAYOUT

Please find adjacent the Offshore Facilities Layout, divided between the Straddling Resources from Mamba (**Grey**) and the Non-Straddling Resources from 385E (**Green**)
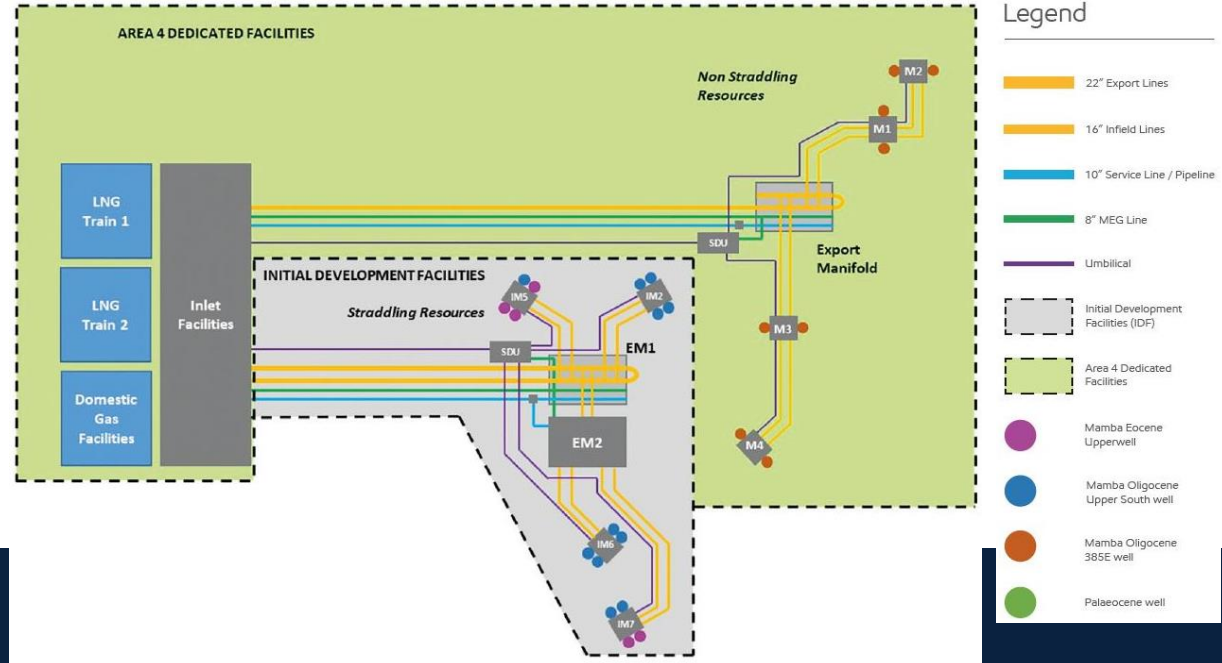
AFUNGI SITE LAYOUT

Please find adjacent Phase 1 of Mozambique LNG and Rovuma LNG. The scale of the Afungi site is apparent
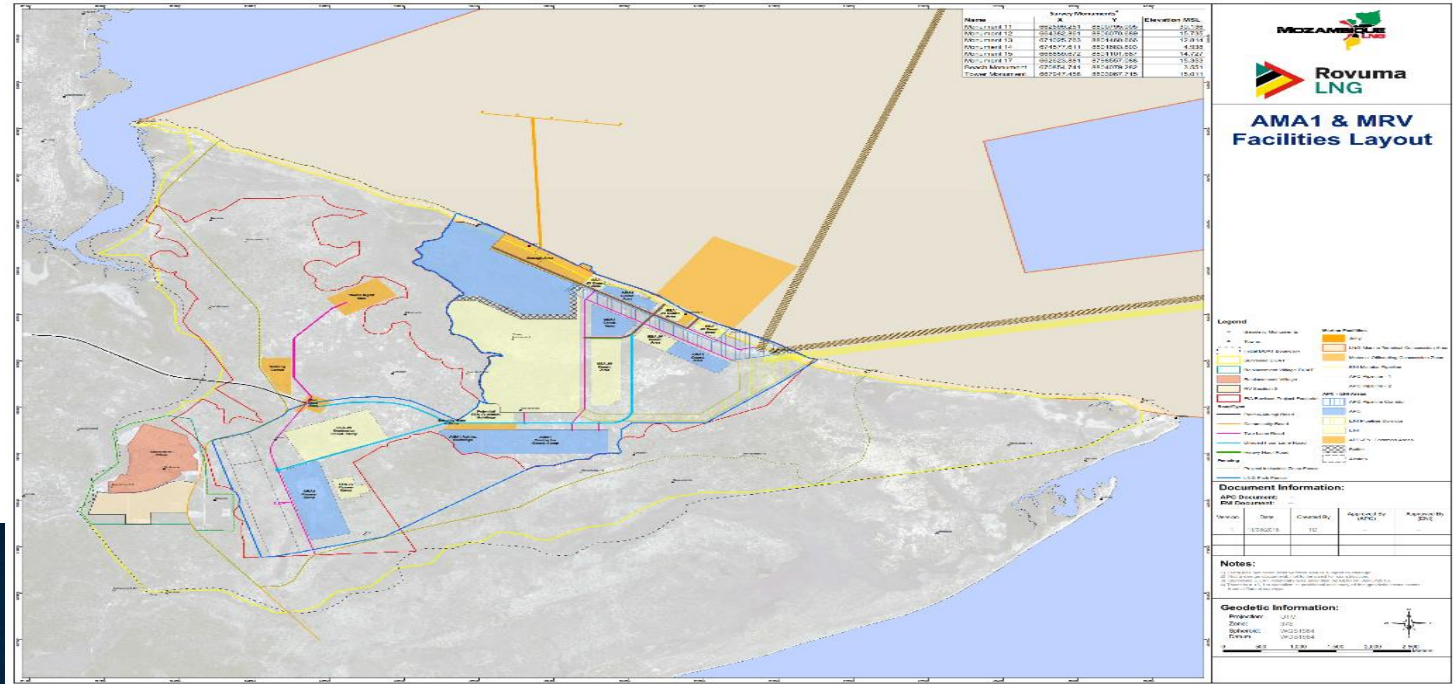
FULL FIELD DEVELOPMENT

Please find adjacent an indicative layout of the Afungi Site, arising from a Full Field Development (presented by Area 4). The site includes multiple LNG and industrial facilities

As shown above, a Full Field Development can lead to a truly world class Afungi site

LNG DEMAND COMPARISON

Eleven independent LNG demand forecasts outlined from 2020-2040:

1) 2016&2017: Actual International Gas Union – 2018 Edition
2) 2018A: Shell LNG Outlook 2019 P (Feb'19)
3) BAML: P (July'17) Bank of America Merrill Lynch FLNG Overview*
4) Bloomberg New Energy Finance (BNEF): P (Mar'18) Global LNG Outlook 1H2018
5) BP: P (Feb'19) Energy Outlook 2019
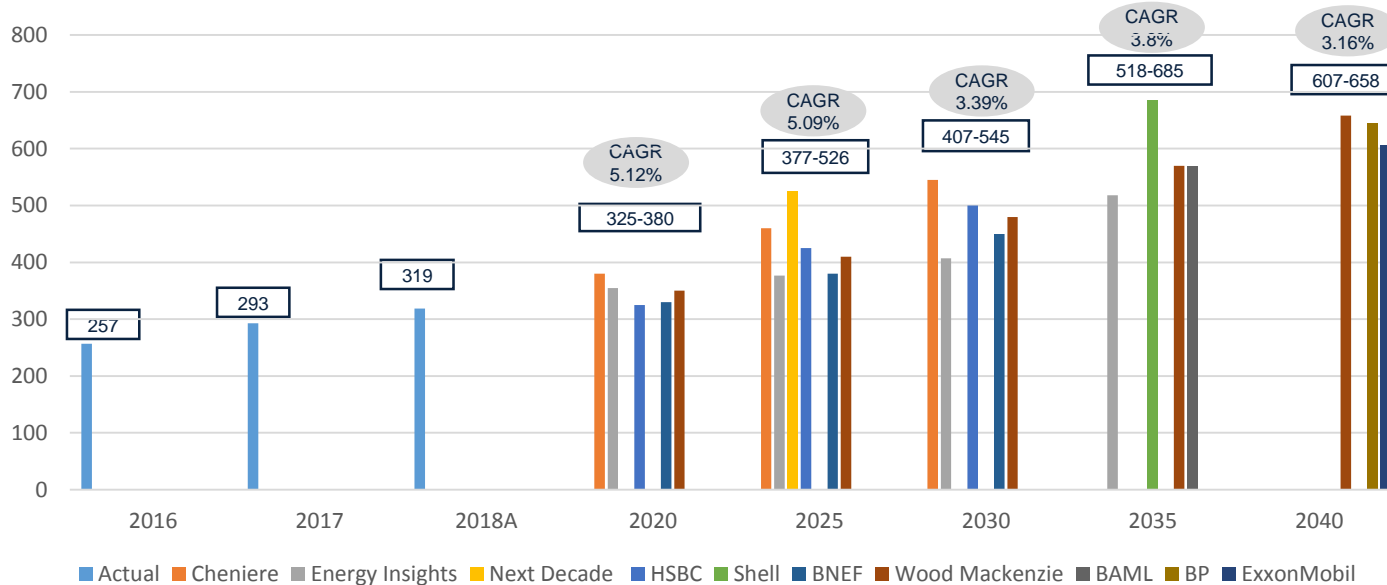6) Cheniere: P (Dec'18) Corporate Presentation
7) Energy Insights: P (Sept'18) Analysis, Energy Insights Gas Intelligence Model
8) ExxonMobil: P (Feb'18) Energy Outlook 2040
9) HSBC Global Research: P (Mar'18) Global LNG: The glut abates, the crunch awaits
10) Next Decade: P (Oct'18) Corporate Presentation
11) Shell: P (Feb'19) LNG Outlook 2019
12) Wood Mackenzie: P LNG Tool 2018

Summarised by Standard Bank

Forecast LNG Demand (MTPA)

- CAGR 5.12%
- CAGR 5.09%
- CAGR 3.39%
- CAGR 3.8%
- CAGR 3.16%

257 — 293 — 319 — 325-380 — 377-526 — 407-545 — 518-685 — 607-658

Legend: Actual, Cheniere, Energy Insights, Next Decade, HSBC, Shell, BNEF, Wood Mackenzie, BAML, BP, ExxonMobil

P Published

Demand is expected to increase from 319 MTPA to 632 MTPA (average) from 2018-2040 using leading industry players forecasts

LNG IS THE BEDROCK OF FUTURE GROWTH

D
- Power
- Trucks
- Containers
- Marine Bunkering

SSLNG

LNG

A

B
- Condensate
- LPG

C

Domgas
- IPP
- MTO
- Fertiliser
- GTL

Section 2 / Introduction to Macroeconomic Study

SNAPSHOT OF ASSUMPTIONS

On average, equates to Brent of approximately **USD 66 per barrel** (Constant 2018 prices).

Source: Poten Lenders Base Case Brent price deck deflated by the projected U.S. Inflation rate as projected by the IMF for 2018-2022, thereafter (2023-2049) inflation rate of 2.2% is assumed.

Standard Bank worked with Conningarth Economists on the Macroeconomic Study

Nominal Financial discount rate

=

10%

Real Financial discount rate

=

8%

Economic discount rate

=

10%

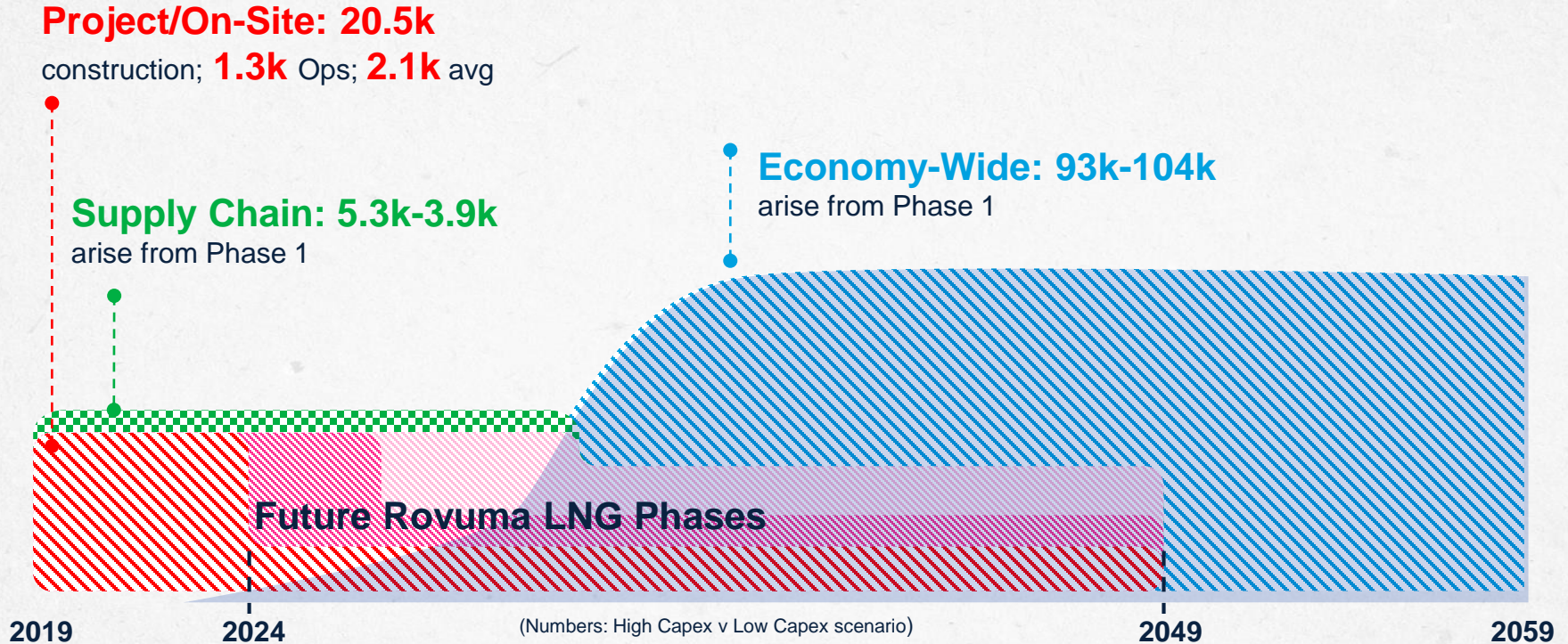Base Year

=

2018

Construction period =

2019-2025

Operational period =

2024-2049

The Project will employ 20,500 workers during construction and 1,300 workers during operations

SCHEMATIC POTENTIAL NATIONAL EMPLOYMENT (NO REINVESTMENT)

Project/On-Site: 20.5k
construction; **1.3k** Ops; **2.1k** avg

Supply Chain: 5.3k-3.9k
arise from Phase 1

Economy-Wide: 93k-104k
arise from Phase 1

Future Rovuma LNG Phases

(Numbers: High Capex v Low Capex scenario)

2019   2024   2049   2059

Future Phases of Rovuma LNG will also add more Project and Supply Chain Jobs, with results influenced by Mozambique's scarcity of capital and abundance of labour. Skills development and training will be key

EXTERNAL DEBT & ENH FUNDING

1

Standard Bank assumed that **64% (High Capex) or 67% (Low Capex)** of the Project's net income is reinvested into Mozambique by GOM (its entire take).
The **33% - 36%** balance is earned by Area 4 (excluding ENH).

2

The Project provides a means to service **USD 14.1bn** of sovereign external debt.

3

Standard Bank calculated Project benefits net of the repayment of **54%** of the sovereign external debt (the Project's onshore MTPA % contribution **(15.2 / (15.2 + 12.9))**

EXTERNAL DEBT & ENH FUNDING

4

Standard Bank assumes the next priority is to repay ENH's borrowing from its partners to fund its equity stakes in the Rovuma Basin investment programme. We assume this also requires
USD 11 - 12bn. This number may be too low, noting potential development commitments from the Fifth Licensing Round.
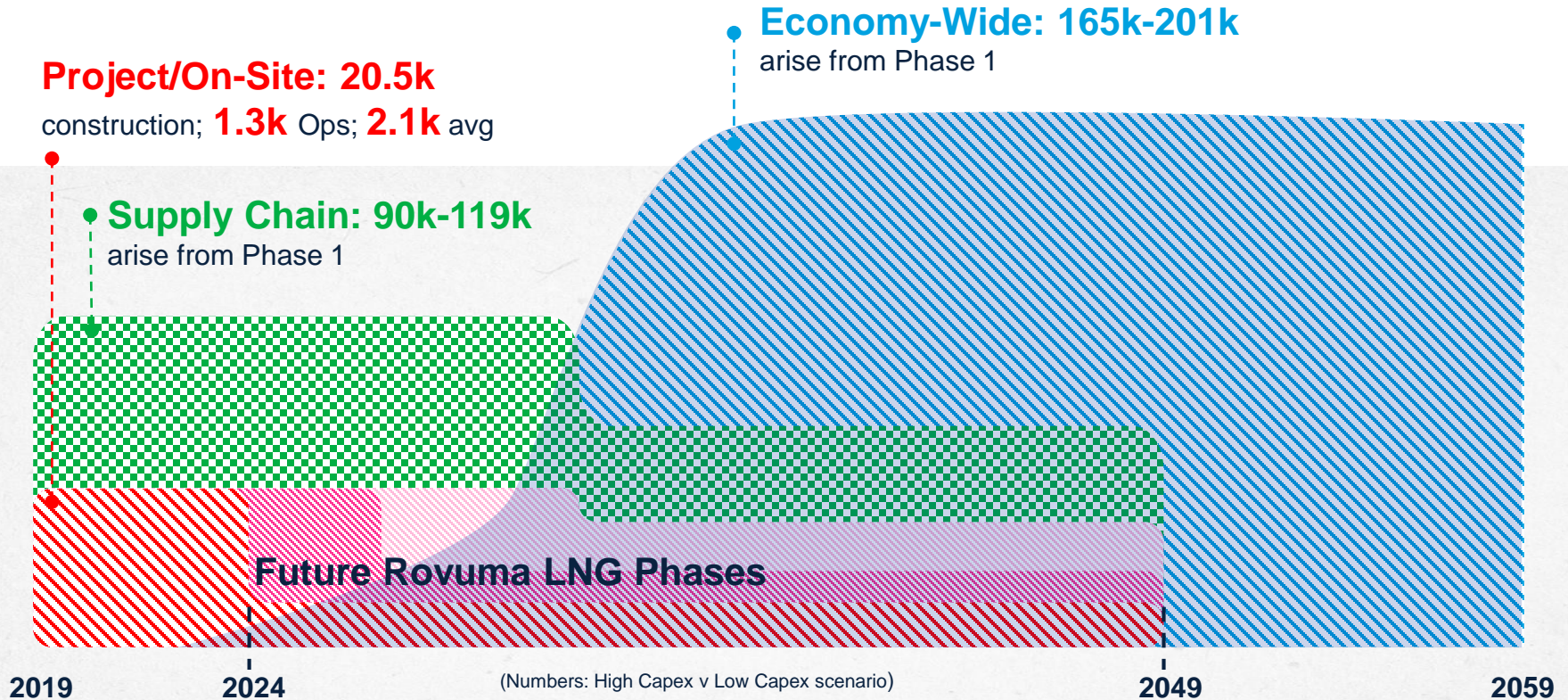
5

Once this is done, Standard Bank assumes the GOM will **prioritise social expenditure** (per the results).

6

A future debate will be whether GOM should set up a Sovereign Wealth Fund (''**SWF**'') to diversify the Mozambican economy **away from LNG reliance.** Standard Bank envisages a DSF could perhaps be set up by Mozambique around 2025, before the major inflows start (after debt repayment) therefore allowing a build-up period.

SCHEMATIC POTENTIAL NATIONAL EMPLOYMENT (WITH REINVESTMENT)

Economy-Wide: 165k-201k
arise from Phase 1

Project/On-Site: 20.5k

construction; **1.3k** Ops; **2.1k** avg

Supply Chain: 90k-119k
arise from Phase 1

Future Rovuma LNG Phases

2019   2024   (Numbers: High Capex v Low Capex scenario)   2049   2059

Future Phases of Rovuma LNG will also add more Supply Chain and Economy-Wide Jobs, with results influenced by Mozambique's scarcity of capital and abundance of labour. Skills development and training will be key
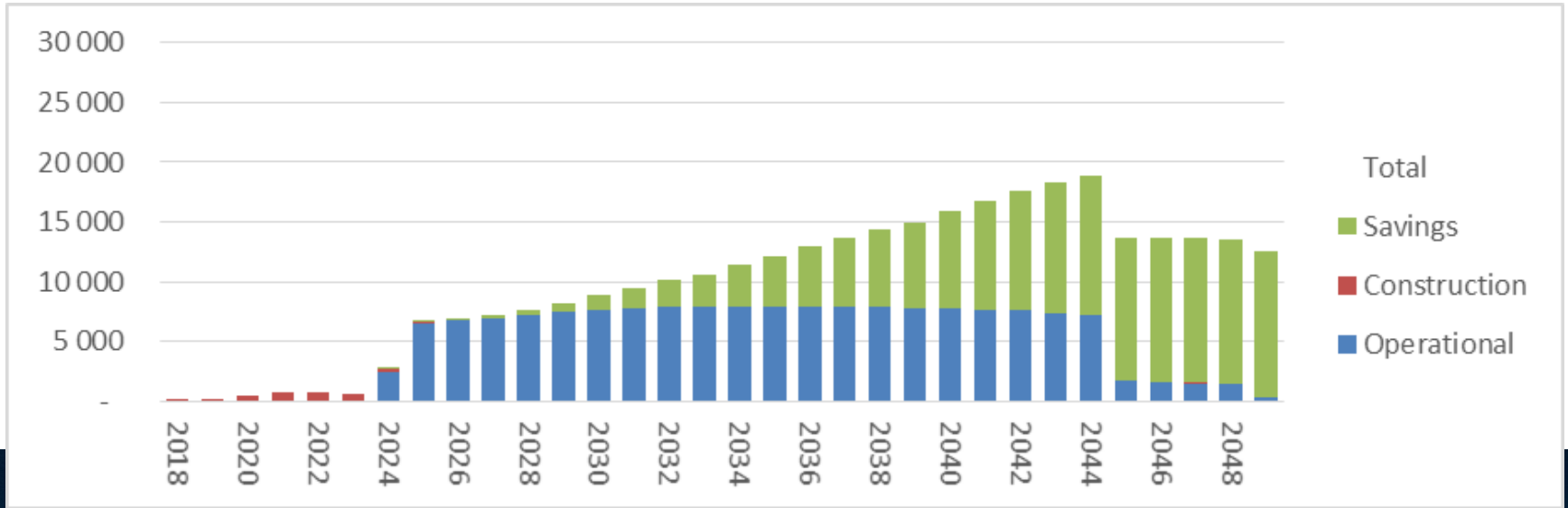
Section 3

High Capex & Reinvestment Scenario

FINANCIAL CBA

USDm	Discount rate	Project pre- Tax	Area 4 After tax (excluding ENH)	GOM (including ENH)
Net Present Value (NPV)	8%	25,748	1,290	18,395
Benefit Cost Ratio (BCR)		2.20x	1.04x	8.00x
Internal Rate of Return (IRR)%		19%	9%	36%

PROJECT COMPONENTS GDP IMPACT, USDM

Operational cash flows are the initial material contribution with the role of savings (reinvested cash flows) becoming increasingly important over time.

RESULTS OF MAIN COMPONENTS, USDM
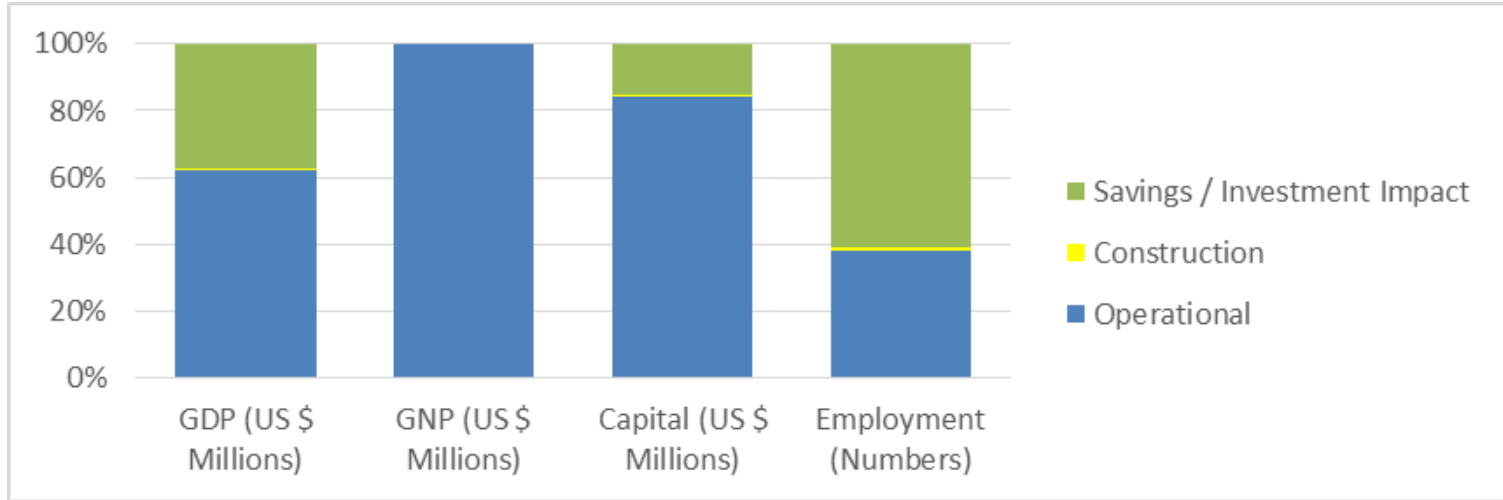
Phases	GDP	GNP	Capital	Employment (Numbers)
Operational	9,530		24,413	98,284
Construction	116		2,057	2,431
Savings/ Investment Impact (Reinvestment)	5,743		8,420	156,871
Total	**15,388**	**9,900**	**34,890**	**257,586**

* Numbers = annual average real

COMBINED MACROECONOMIC IMPACTS, USDM

	On-Site Impact	Supply Chain Impact	Economy Wide Impact	Total Impact
Impact on Gross Domestic Product (GDP)	6,195	3,363	5,831	**15,388**
Impact on Gross National Product (GNP)				**9,900**
Impact on capital formation	24,363	2,107	8,420	**34,890**
Impact on employment [national job opportunities]	2,088	90,478	165,020	**257,586**
Impact on Households				**8,126**
Household Income per Capita				**264**
Fiscal Impact				**4,337**
Balance of Payments				**7,793**

* Numbers = annual average real

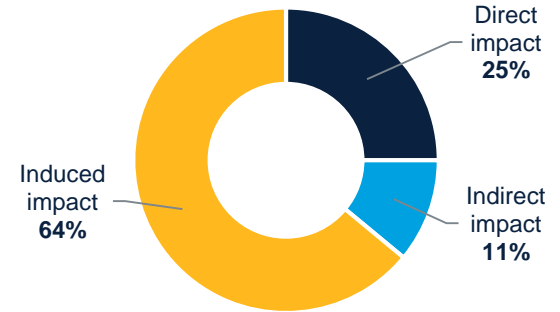# NATIONWIDE EMPLOYMENT IMPACT (NUMBERS)

Employment Impact Level of Skill

55,802
Skilled employment

100,750
Semi-skilled impact

101,035
Unskilled impact

Percentage share of Various Linkage Impacts

- Direct impact **25%**
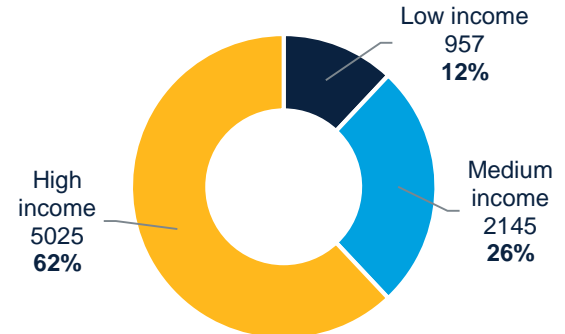- Indirect impact **11%**
- Induced impact **64%**

It is expected household per capita will grow by **USD 264** on average (2024-2049), a 50% increase on the 2018 average.

12% of this will go to the Lower Income group which will boost consumption expenditure.

* Numbers = annual average real

Household Income, USD Million

- Low income 957 **12%**
- Medium income 2145 **26%**
- High income 5025 **62%**

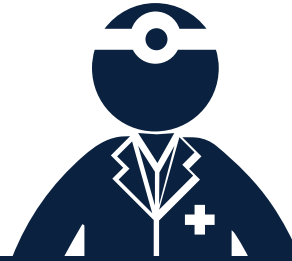# ADDITIONAL POTENTIAL SOCIAL INFRASTRUCTURE

Additional educators

17 671

Additional hospital beds serviced

3 905

Additional doctors

851

Additional low-cost houses

3 155

Note: The funding of these infrastructures are calculated after 54% of outstanding external debt and ENH funding (to invest in all LNG, Natural Gas & Domgas projects) is repaid.

ROVUMA BASIN IMPACT OF 1 YEAR DELAY

	Rovuma LNG	Mozambique LNG (extrapolated)	Combined Phase 1 Delay	Rovuma LNG Phase 2	Prosperidade LNG (extrapolated)	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 (USDm)	490	416	906	539	458	997	1,903
Impact on employment [national job opportunities]	-11,947	-10,138	-22,085	-13,141	-11,152	-24,293	-46,378
Impact on Households	-237	-401	-438	-261	-221	-482	-920
Fiscal Impact (USDm)	-27	-23	-50	-30	-36	-66	-104
Balance of Payments (USDm)	-389	-330	- 720	-428	-363	-791	-1,511

Notes:
- The **delayed scenario differs from the base i.t.o. discounted NPV,** due to the one year delay, as well as the fact that one-year of the delay falling outside the timeline (2018 - 2049).
- Assumed that Mozambique LNG delay equals to **84.86% (12.9/15.2)** of Rovuma LNG delay.
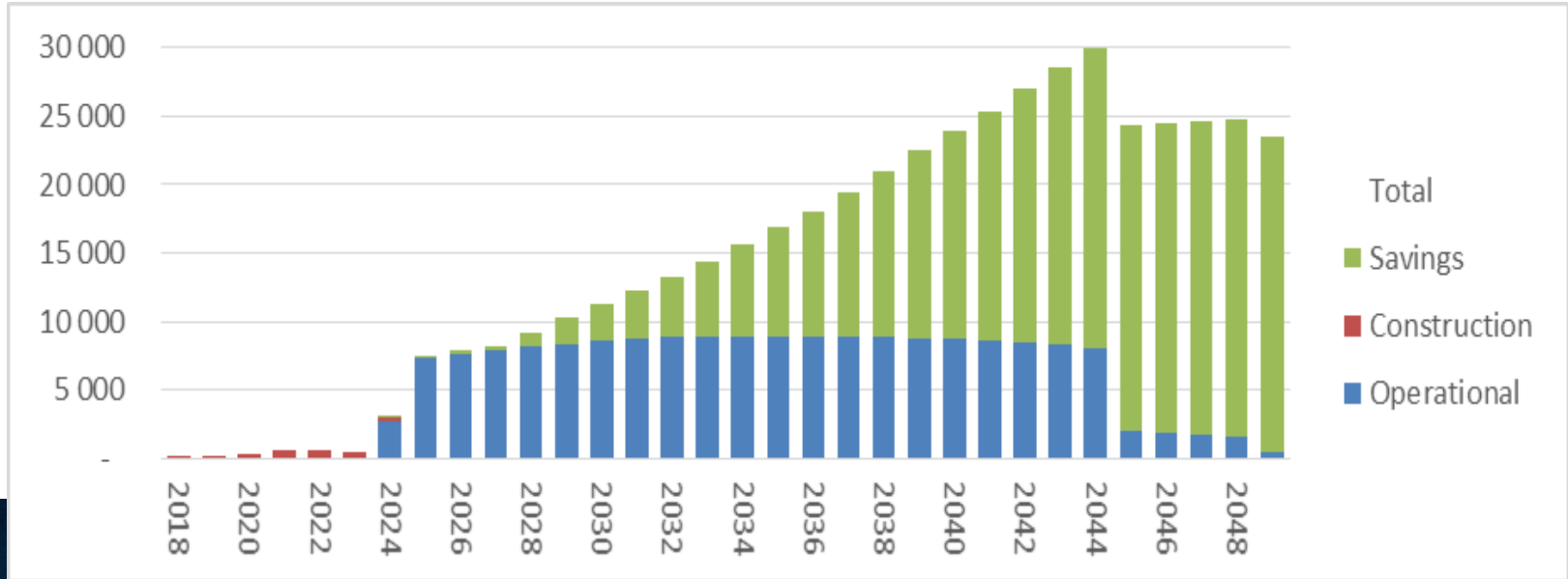
Section 4 / Low Capex & Reinvestment Scenario

FINANCIAL CBA

USDm	Discount rate	Project pre- Tax	Area 4 After tax (excluding ENH)	GOM (including ENH)
Net Present Value (NPV)	8%	34,794	5,971	23,973
Benefit Cost Ratio (BCR)		3.10x	1.21x	12.00x
Internal Rate of Return (IRR)%		24%	12%	44%

PROJECT COMPONENTS GDP IMPACT, USDM

Operational cash flows are the initial material contribution with the role of savings (reinvested cash flows) becoming increasingly important over time.

RESULTS OF MAIN COMPONENTS, USDM
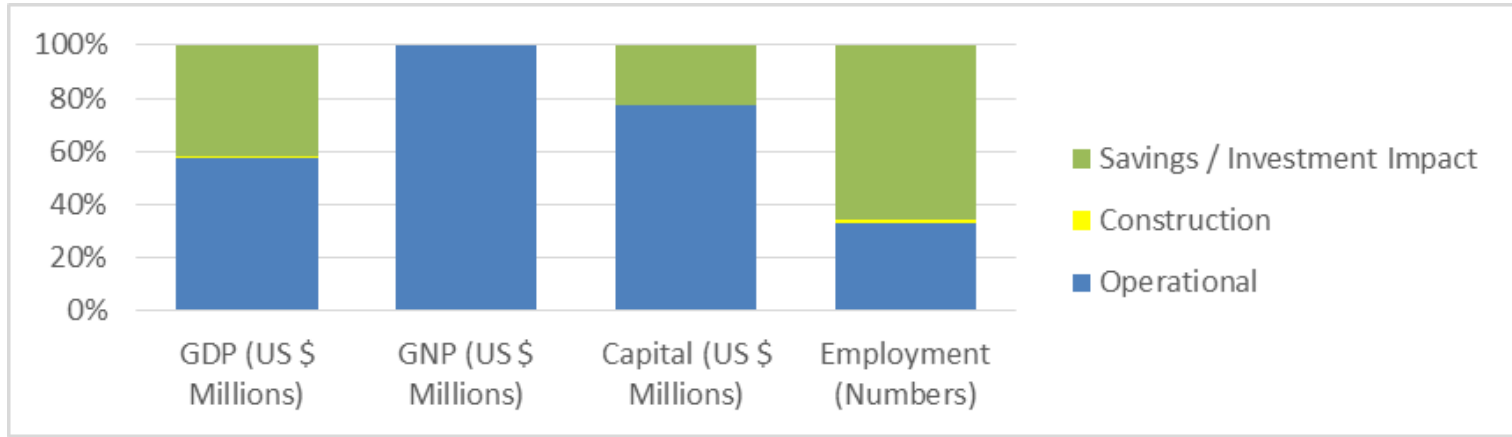
Phases	GDP	GNP	Capital	Employment (Numbers)
Operational	10,234		19,913	87,501
Construction	1,195		2,521	34,203
Savings/ Investment Impact (Reinvestment)	7,120		10,253	201,346
Total	**18,549**	**14,197**	**32,687**	**323,050**

* Numbers = annual average real

28

COMBINED MACROECONOMIC IMPACTS, USDM

	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 [national job opportunities]	2,088	119,615	201,346	**323,050**
Impact on Households				**9,885**
Household Income per Capita				**321**
Fiscal Impact				**5,345**
Balance of Payments				**9,802**

* Numbers = annual average real

NATIONWIDE EMPLOYMENT IMPACT (NUMBERS)

Employment Impact Level of Skill

70,363
Skilled employment

126,662
Semi-skilled impact

126,025
Unskilled impact

Percentage share of Various Linkage Impacts

- Direct impact **27%**
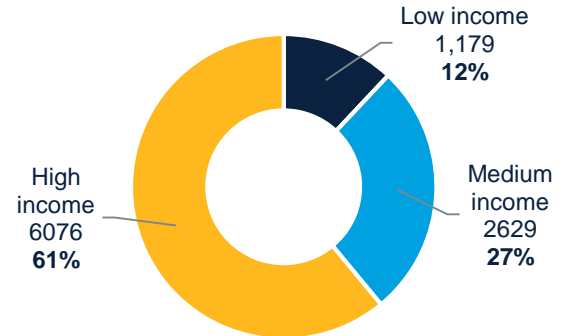- Indirect impact **11%**
- Induced impact **62%**
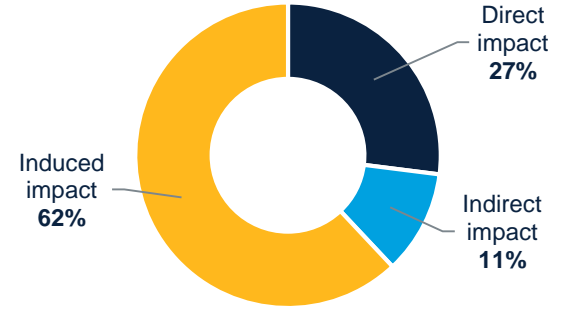
It is expected household per capita will grow by **USD 321** on average (2024-2049), a 61% increase on the 2018 average.

12% of this will go to the Lower Income group which will boost consumption expenditure.

* Numbers = annual average real

Household Income, USD Million

- Low income 1,179 **12%**
- Medium income 2629 **27%**
- High income 6076 **61%**

30

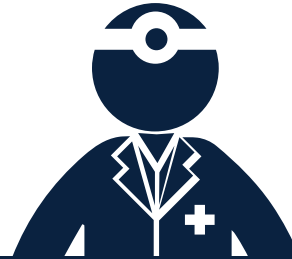# ADDITIONAL POTENTIAL SOCIAL INFRASTRUCTURE

Additional
educators

21 303

Additional hospital
beds serviced

4 708

Additional
doctors

1 026

Additional
low-cost houses

3 804

Note: The funding of these infrastructures are calculated after 54% of outstanding external debt and ENH funding (to invest in all LNG, Natural Gas & Domgas projects) is repaid.

ROVUMA BASIN IMPACT OF 1 YEAR DELAY

	Rovuma LNG	Mozambique LNG (extrapolated)	Combined Phase 1 Delay	Rovuma LNG Phase 2	Prosperidade LNG (extrapolated)	Combined Phase 2 Delay	Total Combined Delay
Impact on GDP	-559	-474	-1033	-615	-522	-1136	-2,169
Impact on GNP	-342`	-290	-632	-376	-319	-696	-2138
Direct investment (USDm)	490	416	906	539	458	997	1,903
Impact on employment [national job opportunities]	-15,768	-13,381	-29,149	-17,345	-11,152	-32,064	-61,213
Impact on Households	-314	-267	-581	-346	-293	-639	-1,220
Fiscal Impact (USDm)	-30	-26	-56	-33	-28	-61	-117
Balance of Payments (USDm)	-495	-420	- 915	-544	-462	-1006	-1,921

Notes:
- The **delayed scenario differs from the base i.t.o. discounted NPV,** due to the one year delay, as well as the fact that one-year of the delay falling outside the timeline (2018 - 2049).
- Assumed that Mozambique LNG delay equals to **84.86% (12.9/15.2)** of Rovuma LNG delay.
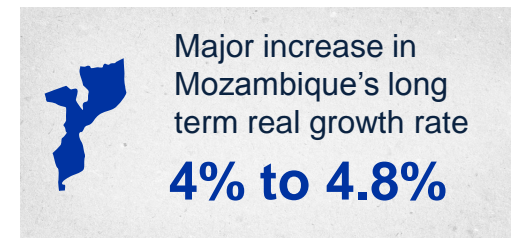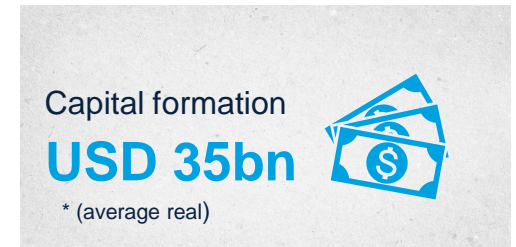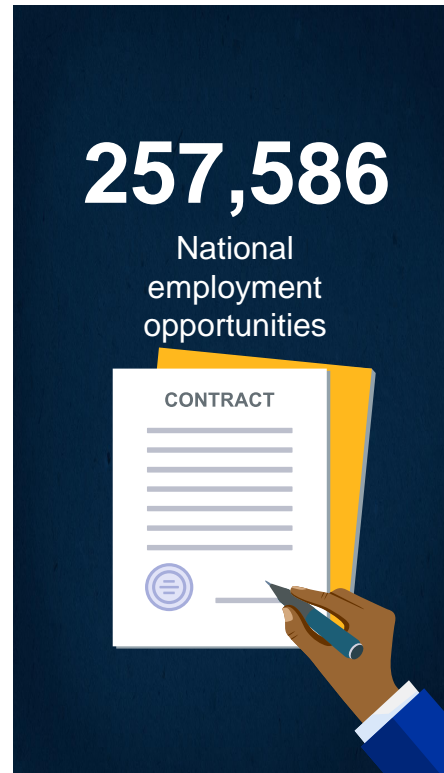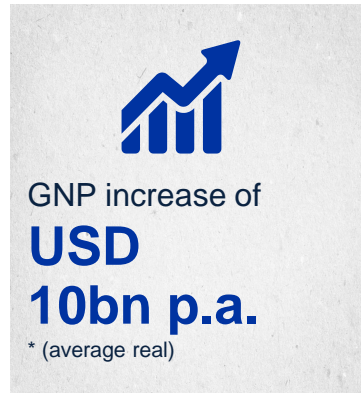
Section 5

Study Results and Conclusions

KEY MESSAGES – HIGH CAPEX & REINVESTMENT SCENARIO

Key Project benefits include:

GDP increase of

USD 15bn p.a.

* (average real)

GNP increase of **USD 10bn p.a.**
* (average real)

USD 8bn

Balance of Payments contribution p.a.
*(average real)

257,586

National employment opportunities

CONTRACT

USD 4bn
fiscal contribution to GOM p.a.
* (average real)

Capital formation
USD 35bn
* (average real)

Major increase in Mozambique's long term real growth rate
4% to 4.8%

KEY MESSAGES – LOW CAPEX & REINVESTMENT SCENARIO

Key Project benefits include:

GDP increase of
USD 18bn p.a.
* (average real)

GNP increase of
USD 14bn p.a.
* (average real)

USD 10bn
Balance of Payments contribution p.a.
*(average real)

323,050
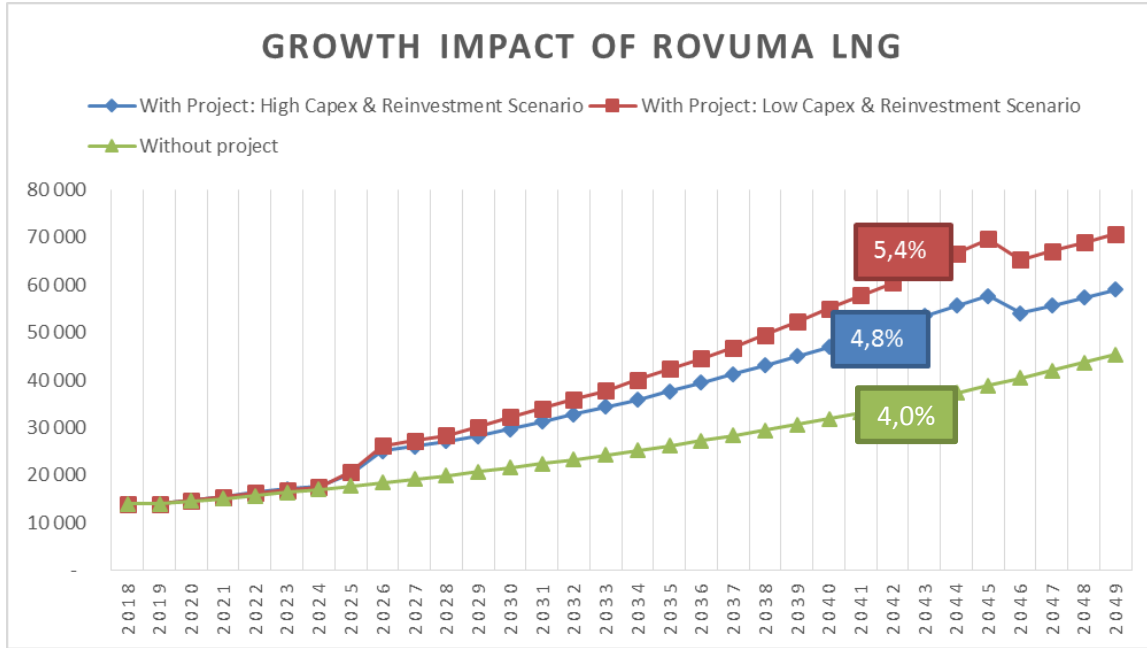National employment opportunities

CONTRACT

USD 5bn
fiscal contribution to GOM p.a.
* (average real)

Capital formation
USD 33bn
* (average real)

Major increase in Mozambique's long term real growth rate
4% to 5.4%

GDP GROWTH IMPACT

GROWTH IMPACT OF ROVUMA LNG

Legend:
- With Project: High Capex & Reinvestment Scenario
- With Project: Low Capex & Reinvestment Scenario
- Without project

5,4%

4,8%

4,0%

The Project can raise national projected real GDP growth from **4% to 4.8% - 5.4% p.a.** We note Mozambique LNG will be executed in parallel and c. 60% of GDP benefits go to non-O&G sectors

MACROECONOMIC STUDY COMPARISONS

| Rovuma LNG (2019) High Capex Scenario	Rovuma LNG (2019) Low Capex Scenario	USD (unless stated)	Mozambique LNG (2014)
67.16	67.16	Oil price (Brent bbl)	98.97
9.81	10.61	Gas price (mcf)	12.30
14	14	Mozambique GDP (bn)	15
15.2	15.2	Capacity (MTPA)	10
2,158	1,769	Capex per tonne	2,610
1,018	759.9	Opex per tonne	1,580
63.9%	66.5%	% GOM fiscal take	62.1%
95%	90%	% NPV fiscal take	88%

Notes:

- Oil prices significantly different; Mozambique LNG then smaller with relative diseconomies of scale compared to now

- Mozambique LNG capital costs significantly reduced (announced June 2018).

- Therefore, not much in common but consistent fiscal takes show these are good deals for Mozambique

KEY MESSAGES AND BENEFITS

The Rovuma LNG study assumes a FID in **mid-2019**
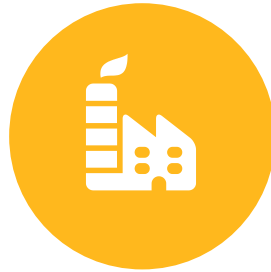
The Project will **kick start Northern Industrialisation,** with the development of a ''Qatari LNG/industrial model'' in Cabo Delgado.

The only Cabo Delgado parallel we can think of is **Guangdong Province, China.**

1978 GDP - USD 11 bn

2017 GDP - USD 1,332 bn

13% p.a. CAGR

KEY OPPORTUNITIES AND CHALLENGES

In 2017, China **changed its energy policy** to promote coal to gas switching. Standard Bank considers Mozambique can become to China for LNG, as Australia is for minerals and New Zealand food.

Multiple mega-trains promptly developed allows the maximum amount of LNG sold to increase national prosperity, develop local content (USD 3bn commitment) and facilitate Domgas.

We are aware of **Domgas' importance.** Rovuma LNG has offered 75 mscfd per train Committed Domgas Volumes for Phase 1 and offers 350 mscfd long-term Domgas to the Aggregator, to help **kick-off Mozambique's Domgas projects.** As well as Domgas projects already tendered, we believe Mozambique can develop new industries such as SSLNG, LNG Bunkering and indigenous LPG. This will help GOM achieve a ''Domgas Vision'', where Domgas promptly follows LNG.

KEY OPPORTUNITIES AND CHALLENGES
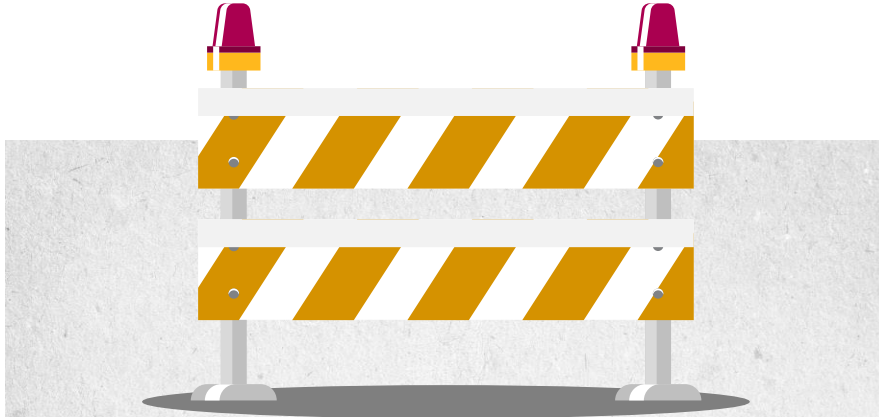
Under the Decree Law, the GOM **retains all approval rights** relating to imports, customs clearances, licences and permits etc.

Standard Bank notes a delayed First Gas has **a major negative economic impact upon Mozambique.**

As example, a 1 year delay in the Rovuma Basin investment programme from the ''Cost of Bureaucracy'' leads to USD **1.6 – 2.2** billion lost GDP

Standard Bank suggests, until the Project's First Gas, the **partial outsourcing of the Decree Law's approval process.** Teams of external consultants would **supplement involved Ministries and SOEs** in Cabo Delgado/elsewhere to **process the paperwork,** within the approved POD, and up-skill personnel**.**

Section 6

Policy Options

Facilitate onshore FIDs ASAP

Underpins Northern Industrialisation (supporting supply/value chain) and middle-income status

Use LNG revenues to pay down external debt

Increases macroeconomic flexibility

Develop economic master plan

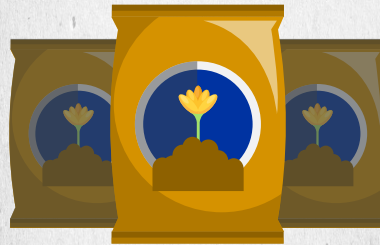Non-O&G sectors crucial (59% - 62% of national benefit)

Mozambique SWF?

DSF likely more suitable (e.g. social benefits and transport infrastructure funding)

Solve Domgas structure and design

e.g. Fertiliser crucial, if integrated into wider agricultural value chain

Execution Speed

Can LNG development learnings help the 5th Licensing Round?

Fiscal and Revenue Management

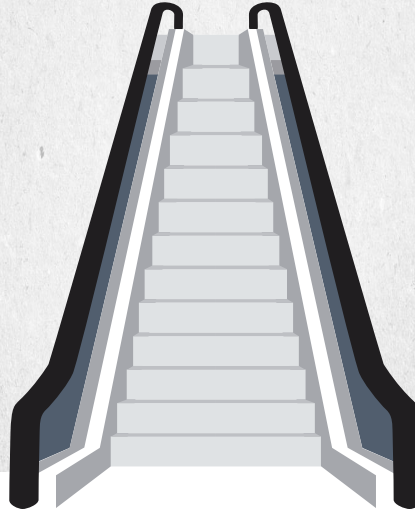Increase capacity to ensure spending of future fiscal proceeds on beneficial projects

Ancillary Projects

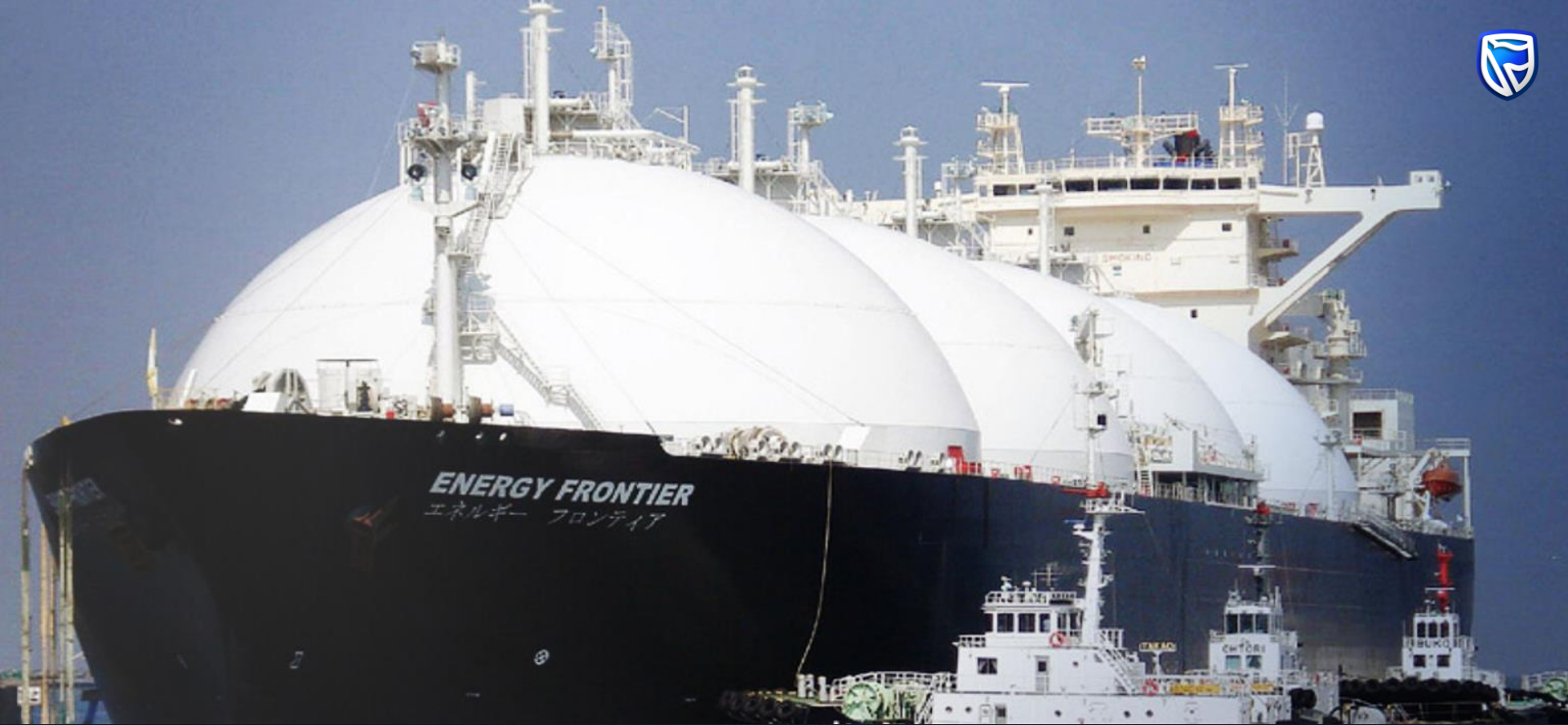Progress Condensate, SSLNG and LNG Bunkering

Local Content

Use future trains as a LC escalator

Cabo Delgado Vision

Develop provincial master plan to reflect, complement and service the LNG developments

Thank You