CLIMATE
POLICY
INITIATIVE

Understanding the impact of a low carbon transition on Uganda's planned oil industry

Matthew Huxham
Muhammed Anwar
Eoin Strutt
David Nelson

December 2020

A CPI Energy Finance paper

Acknowledgements

This project would not have been possible without the support of our funder, Rockefeller Brothers Fund.

We received invaluable guidance and feedback during the analytical process from stakeholders inside and outside of Uganda including insight into Uganda's policy priorities and development plans; the planned allocation of risk between stakeholders across the industry and on the changing approach of global financial markets to climate-related financial risk.

The development of our approach to assessing the impact of climate transition risk on public finance was originally funded and continues to be supported by the Agence Française de Développement as part of a global programme.

Descriptors

Sector	Energy, oil, sovereign risk	
Region	Uganda	
Keywords	Climate transition risk; stranded assets; sovereign risk	
Related CPI Reports	Government Assets: Risks and Opportunities in a Changing Climate Policy Landscape 2016	
	Understanding the impact of a low carbon transition on South Africa 2019	
Contact	Matthew Huxham	Matthew.Huxham@cpilondon.org
	Felicity Carus	Felicity.Carus@cpilondon.org
	Muhammed Anwar	Muhammed.Anwar@cpilondon.org

About CPI

Climate Policy Initiative works to improve the most important energy and land use policies around the world, with a particular focus on finance. An independent organization supported in part by a grant from the Open Society Foundations, CPI works in places that provide the most potential for policy impact including Brazil, China, Europe, India, Indonesia, and the United States.

The Energy Finance practice is a multidisciplinary team of economists, analysts and financial and energy industry professionals conducting independent research that can help accelerate the energy transition by providing insights for policymakers, investors and businesses.

Executive Summary

In late 2020, the governments of Uganda and Tanzania inked key agreements with a consortium of international oil companies and in so doing, injected momentum into a planned oil industry in Uganda. Nearly 15 years after the confirmation in 2006 of "commercially recoverable" quantities of oil in the Albertine Basin, Uganda and its international partners finally appear confident of taking Final Investment Decision (FID). However, in the intervening period, prospects for the global oil industry have changed dramatically and serious questions have been raised about the environmental risks associated with oil in Uganda. These have called into question the industry's economic viability for the international oil companies and its potential to be a major part of Uganda's economic development plans.

Among the many headwinds that the global oil industry faces, a low carbon transition that brings a structural long-term shift away from fossil fuel consumption is one of the most serious. A transition that is aligned with the goal of the Paris Agreement to keep global warming to well below two degrees celsius (WB2C) could reduce global demand for oil, resulting in lower prices and hitting the value of physical and financial assets, tax flows, jobs and knowhow linked to the oil sector. These risks are what we call "climate transition risk".

Climate Policy Initiative's Energy Finance team, with the support of the Rockefeller Brothers Fund, have examined the impact of climate transition risk on Uganda's planned oil industry. The analysis was designed to provide a transparent and balanced assessment of the impact of a global low carbon transition on Ugandan oil aimed at key potential investors (principally, Total SA or Total and China National Offshore Oil Company or CNOOC) and lenders, but above all, the Ugandan government. The analysis uses economic and financial modelling to quantify the impact of a global low carbon transition on the profitability and value of Uganda's two principal upstream oilfields (Tilenga and Kingfisher), the export pipeline that would transport crude oil to export markets via Tanga port in Tanzania (the East Africa Crude Oil Pipeline or EACOP) and the planned oil refinery in Hoima province. The analysis included an assessment of how that change in value would be allocated between the Ugandan government, international investors and lenders, and between the upstream fields, EACOP and the refinery.

Several significant findings emerged from this analysis, which are summarised in this section, including:

1) Structural changes in the global oil industry over the last five years have reduced the value of Uganda's upstream oil reserves by 70% ($47 billion) to $18 billion, compared with the value if first oil had flowed in 2018, as originally planned when production licences were awarded in 2013.

2) There is further value at risk of $10 billion in a WB2C-aligned transition, mostly caused by lower oil prices.

3) The returns that Total and CNOOC might expect to earn under the terms originally agreed with the Ugandan government now appear too low for the companies to take FID. We expect that the companies will try to renegotiate terms so that they can either gain a higher share of available economic value and/or de-risk their investments.

4) If Uganda wants investments in the oil industry to proceed, it could have to pay a significant price in a renegotiation, ranging from hundreds of millions of dollars in tax revenues, to the security of fuel supply and balance of payments benefits it would lose if it is forced to cancel its planned oil refinery.

5) Economic benefits to Uganda will decline in a WB2C-aligned transition, at the same time as risks to the public finances are likely to escalate. The viability of oil as a driver of economic development in Uganda will fall as governments round the world ratchet up their climate "ambition" and as global financial markets accelerate the reallocation of capital away from fossil fuels.

This report outlines the results of the analysis that we undertook to arrive at the findings included in this Executive Summary. We concluded that, for Uganda, an economic strategy that relies on oil as a major driver of economic development is an increasingly risky one and may not be as conducive to sustainable development as a diversified strategy with more emphasis on other economic drivers, such as electrification. Uganda should consider carefully whether the potential value from its oil industry still outweighs the risks. However, at the same time, Uganda's deteriorating public finances mean it has limited flexibility to change strategies and is likely to need proactive support from donors and development finance lenders in order to pursue alternative options.

Finding 1: The value of Uganda's upstream oil reserves has fallen by more than 70% (from $61 billion to $18 billion) since 2013, when Total and CNOOC started investing in the country

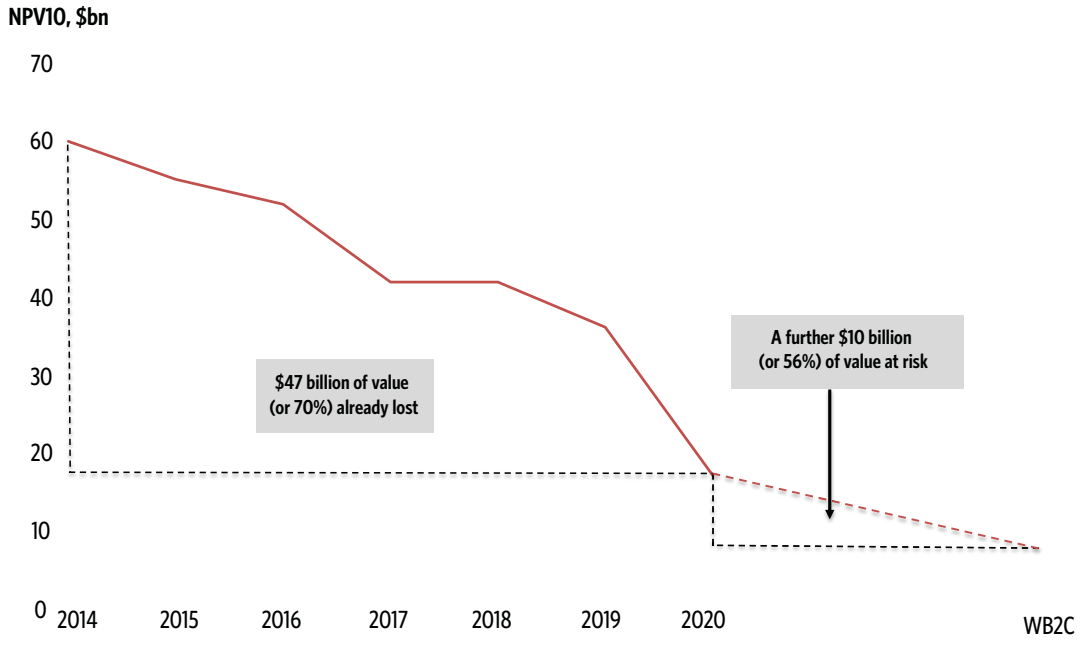
When Tullow started investing significant amounts into Uganda's oil sector and, in 2013, brought in Total and CNOOC as partners, the companies heralded Uganda's low-cost reserves as part a growing wave of investment to open up East Africa as a new frontier for oil and gas exploration, from Kenya in the north to Mozambique in the south. At that time, the c. 1.6 billion barrels of commercially recoverable reserves could have been worth (based on the net present value of future cashflows using a 10% discount rate) $61 billion based on CPI's long-term oil price projection from time of the original planned FID of 2015[1] .

Since then, changes in the oil market have reduced oil production costs while the accelerating global low carbon transition has depressed expectations for long-term oil demand. A combination of these two factors has progressively reduced long-term "business as usual" (BAU) price projections, causing the value of Uganda's upstream oil reserves to fall by 70% or $47 billion, to $18 billion today (figure ES-1 below). That is, in the scenario which we believe could be the base case for potential investment decisions in Uganda – a scenario which equates to global warming of more than 3 degrees[2] – Uganda's upstream oil reserves would be worth $18 billion[3] with first oil being produced in 2024 and the industry lasting between 25 and 40 years.

Finding 2: In a global low carbon transition consistent with keeping global warming to well below two degrees celsius, the value of Uganda's oil reserves could fall a further $10 billion (or 56% of its value today) in present value terms

Uganda's upstream oil reserves face a further $10 billion of climate transition risk in a WB2C-aligned scenario, where global climate action is more successful than in BAU. The assets would lose 56% of today's BAU value and would be worth 88% less than they were in 2013.

Figure ES-1: The value of Uganda's upstream oil reserves has declined over the last 7 years



[1] The price forecast was included in the following CPI publication: https://climatepolicyinitiative.org/wp-content/uploads/2014/10/Moving-to-a-Low-Carbon-Economy-The-Impacts-of-Policy-Pathways-on-Fossil-Fuel-Asset-Values.pdf
[2] There are numerous sources implying that the IEA STEPS scenario puts the world on track for 3 degrees of warming, including: http://priceofoil.org/2020/10/22/weo-2020-a-small-step-when-the-world-needs-a-giant-leap/
[3] NB This figure does not account for the mostly unpriced impacts of physical climate risk and other environmental risks (such as that related to biodiversity). If these were priced, they would most likely reduce this value figure.

These risks are beyond Uganda's control as they are driven by lower global demand for oil resulting from technological change and national low carbon transitions in countries and regions that are major importers of oil, like China and Europe.

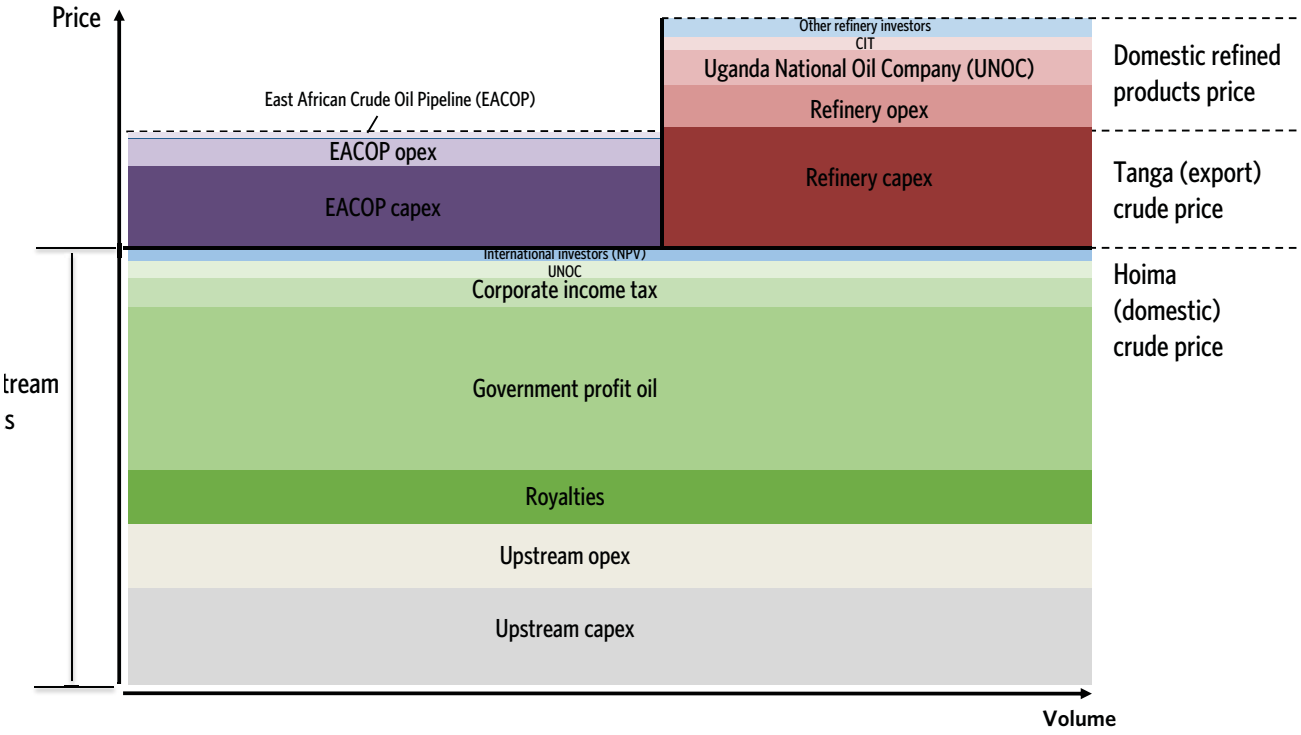
In a WB2C scenario, Uganda is still able to sell 81% of the oil that it would sell in a BAU scenario (or 1.3 billion barrels vs. 1.6 billion barrels), so it is lower realised prices that are the main driver of the 56% value at risk. Oil prices in the WB2C scenario start to diverge from BAU prices in the 2020s, but the gap between the two price curves accelerates sharply from the 2030s onwards as more countries accelerate their reductions in greenhouse gas emissions.

If Uganda plans for a BAU scenario, but the world decarbonises in line with a WB2C-aligned transition, the government could receive substantially less oil revenue than it is counting on in its projections for the public finances and hence the availability of oil revenue to bolster public finances would be significantly constrained.

Finding 3: Under current commercial terms, expected returns do not appear sufficient for international oil companies to take the final investment decision to develop the oil

While we find that there would be value in Ugandan oil in both BAU and WB2C scenarios, that does not mean that the parties planning to develop the industry will take the final investment decision. Uganda's decision to proceed will be based on an assessment of the extent to which its strategic objectives are met, such as economic benefits like oil revenue and improvements to the balance of payments as well as non-economic benefits like fuel security. For Total, CNOOC and other investors and lenders in the EACOP and refinery project financings, investment criteria are likely to be more narrowly financial.

Figure ES-2: Illustration of the potential split of revenues from Uganda's oil industry, between upstream, EACOP and refinery and between costs and returns (the areas of different bars are in proportion to the different present values of each set of cash flows in the chart)



In theory, Uganda should be able to attract investment in its oil industry if, as illustrated in figure ES-2, it can allocate enough revenues from the sale of oil and oil products to cover the cost of developing and operating cost oil production facilities, the EACOP pipeline and the refinery, and to provide international investors and lenders a financial return sufficient to compensate them for the risk they are taking on. Levers include upstream production sharing agreements, taxes and regulation.

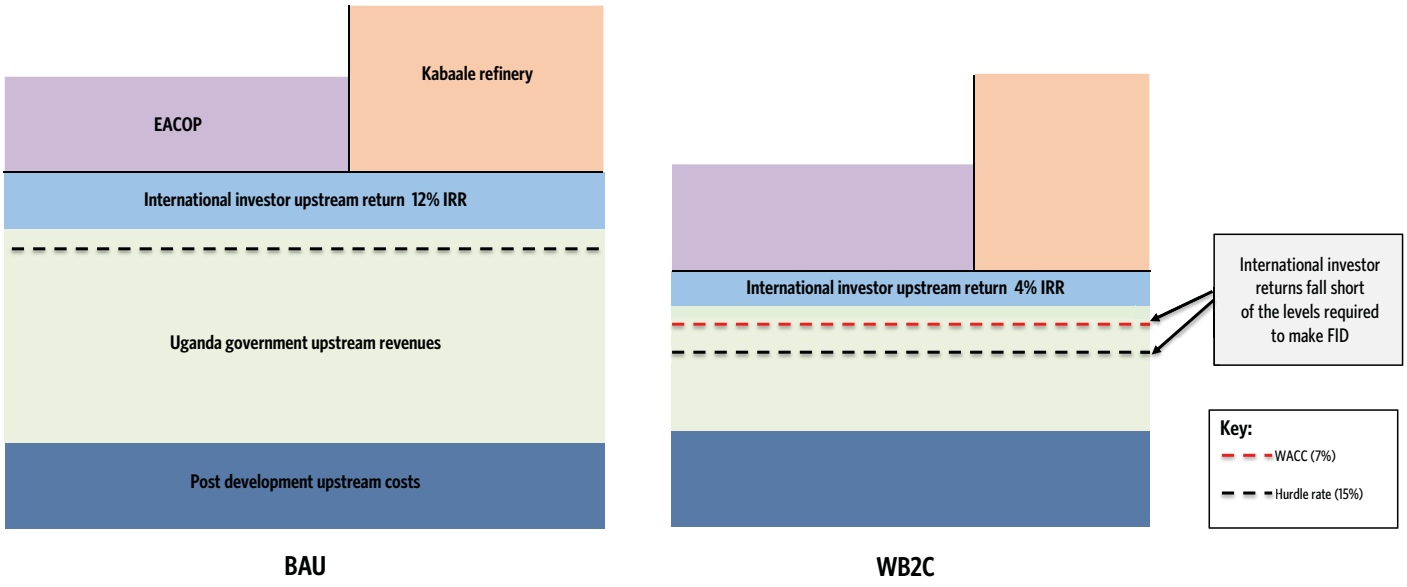
In practice, while we understand that many of the terms specifying allocation of risk and value were fixed in production sharing agreements signed around the time that licences were awarded, the Ugandan government has been able to make certain concessions (including a 10 year "tax holiday" and other exemptions in relation to the EACOP pipeline) in order to incentivise Total, CNOOC and until recently, Tullow Oil, to take FID. Notwithstanding these concessions, the analysis in this report suggests that, amidst the decline in the value of the upstream reserves, expected returns (internal rate of return or "IRR") for Total and CNOOC still fall short (at 12% in a BAU scenario) of the 15% hurdle rate that Total states as the standard that new upstream investments need to meet. That is: even if a WB2C transition did not happen, upstream returns to international investors based on current terms would not be high enough to justify investment.

As illustrated in figure ES-3 below, in a WB2C scenario, investor IRRs (at 4%) would not only be lower than the 15% hurdle rate but would even fall short of Total's weighted average cost of capital (WACC), meaning the investment would destroy value. CNOOC's investment decision-making criteria are more uncertain and may include other strategic considerations, given that the company's minority shareholder is the Chinese government and given China's exposure to Uganda as the country's largest bilateral lender. However, regardless of CNOOC's position, the project is unlikely to proceed without Total given that it is now the majority shareholder.

If this were their analysis of the potential returns from this project, Total would struggle to make a positive case for taking FID. Without Total's investment, it is unlikely that either the upstream oil developments or EACOP would proceed. However, when the company released its Q3 2020 results in October 2020, it expressed confidence that the company could take FID by the end of the year. This could indicate that the company is confident of renegotiating commercial terms with the Ugandan government in its favour.

Total also stated publicly that the Uganda investment was "consisten[t with] capex allocation for Total climate ambition"[4], implying that they think the investment is viable in a WB2C scenario. Again, this could be because

Figure ES-3: Expected Total and CNOOC returns (blue) fall short of investment hurdle rates in both BAU and WB2C scenario and fall short of the WACC in WB2C (red dashed line)



[4] This is from page 40 of the pdf of Total's strategy presentation in September 2020: https://www.total.com/sites/g/files/nytnzq111/files/documents/2020-09/strategy-and-outlook-2020.pdf

the company is confident of renegotiation. Our analysis also suggests that the oil price forecast they use to perform their climate transition sensitivity analysis may not be consistent with a WB2C-aligned transition.

Finding 4: Renegotiating commercial terms will come at a significant cost to Uganda, ranging from hundreds of millions of dollars in taxes to giving up the benefits from the Kabaale refinery

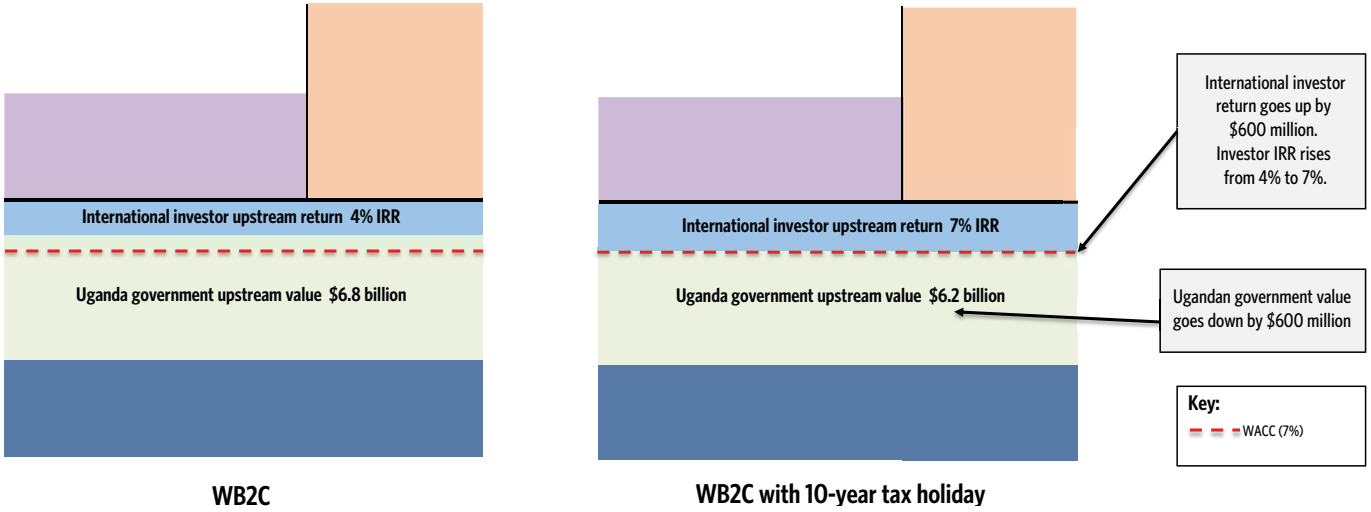
Our analysis suggests that Uganda still has a range of options for renegotiating a deal with Total and CNOOC, should it still wish to proceed with developing the industry. However, in any of those scenarios, a renegotiation would come at a significant cost to the country.

As many of the strategic benefits that Uganda is planning to gain from the oil industry are bound up with the refinery, we expect that Uganda would first seek to renegotiate a deal via fiscal and commercial terms and continue to pursue investment in the refinery. As illustrated in figure ES-4 below, Uganda may be able to reallocate enough value to Total and CNOOC by extending the 10-year tax holiday that it has provided to the EACOP pipeline to the upstream oil resources.[5]

However, this would cost the country $600 million or more of value in present value terms or nearly 10% of the total value that the Ugandan government would stand to earn over the 20+ year life of the industry.

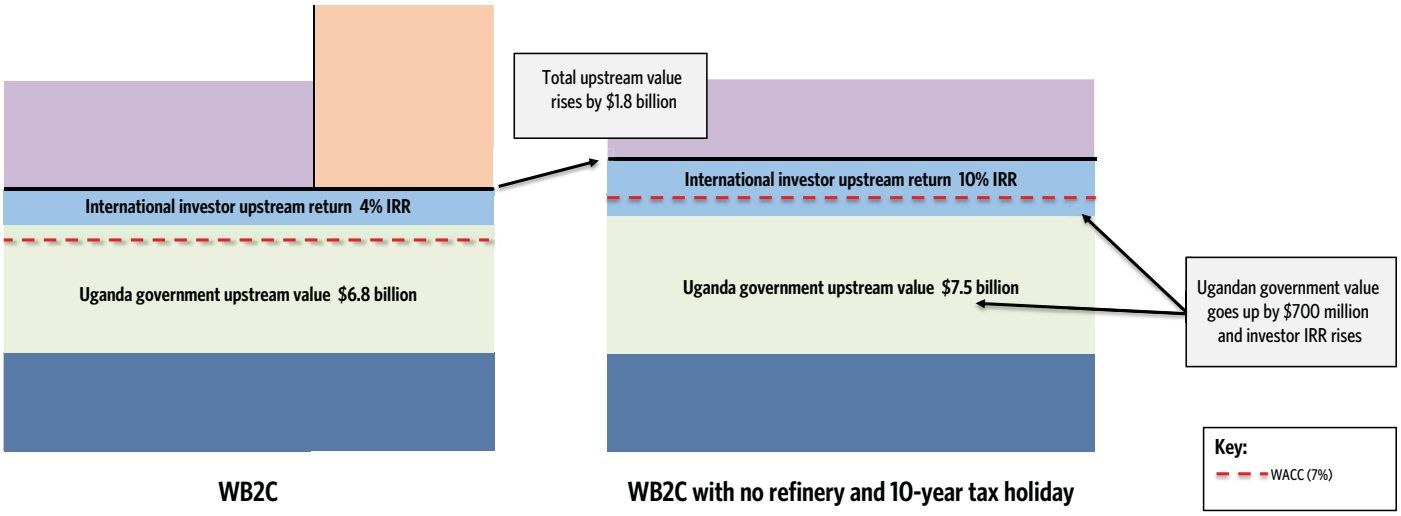
If Uganda was principally concerned with oil revenues to the public purse, its optimal option would be to cancel the Kabaale refinery. If Uganda cancelled the refinery and exported all the oil produced, it would be able to spread EACOP costs over a larger number of barrels, increasing the amount of value available per barrel. If Uganda cancelled the refinery and extended the 10-year tax holiday to upstream resources, it might be able to secure the commitment of international investors without giving up on any oil revenue at all on a net basis , as illustrated in figure ES-5 on the next page. This is because while Uganda's corporate income tax revenue would fall, increased government share of profit oil and UNOC's upstream return would more than cover the lost tax.

Figure ES-4: A 10-year tax holiday could reallocate just enough value to create viable investment case for Total and CNOOC in both BAU and WB2C scenarios, although the position would be very marginal



[5] Tax treatment for the EACOP pipeline is summarised here: https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Energy-and-Resources/gx-eri-oil-gas-tax-newsletter-august2018.pdf. The Tanzanian government also reportedly provided a tax holiday for 20 years but will take a stake in the pipeline.

Figure ES-5: Cancelling the refinery would be the optimal strategy if the Ugandan government's only concern was for public oil revenue.



While public revenues are a materially important benefit to Uganda from developing the oil industry, they are not the only benefit. Fuel security is a key concern, considering that Uganda is landlocked and reliant on one main import route via Mombasa in Kenya for covering its growing annual demand for liquid fuels. Fuel imports are the largest items on Uganda's annual import bill and Uganda hopes to use domestically produced oil products (combined with residual oil exports) as a means to reduce its consistent annual trade deficit or even turn it into a surplus. There are also plans to build on the refinery infrastructure to develop further downstream production industries including petrochemicals and fertilisers. These would reduce imports and potentially also create jobs.

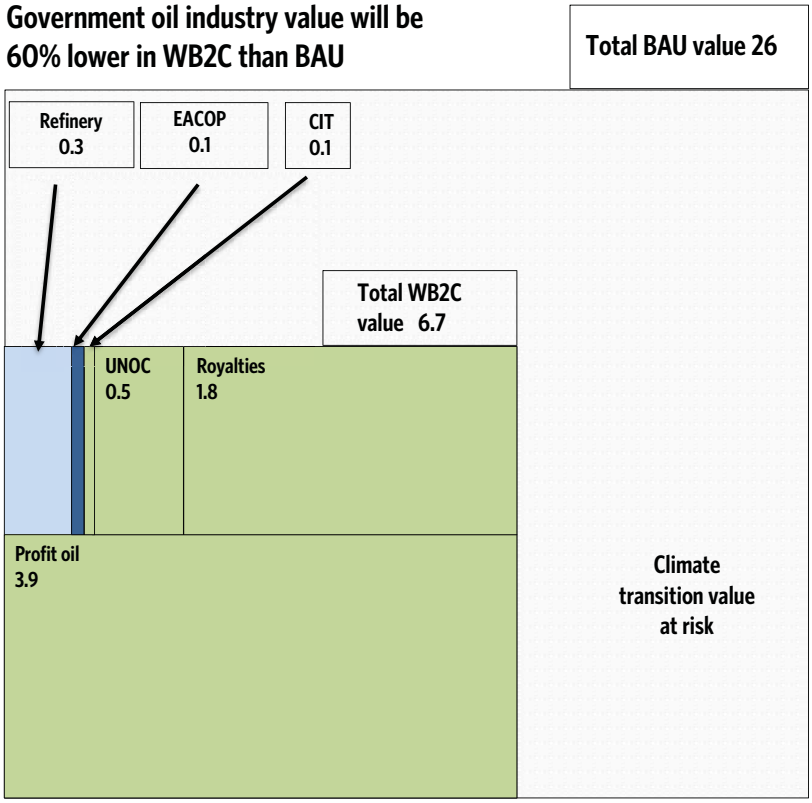
If the Ugandan government does decide to proceed with the refinery (and can attract sufficient third-party equity investment and project finance debt, far from a certainty) and implies a renegotiation as per figure ES-4 above, it means that it is valuing the other strategic benefits from building the refinery at more than the $600-$700 million it would otherwise need to transfer to Total and CNOOC to secure their investment while retaining the refinery.

Finding 5: The benefits to Uganda of developing an oil industry while the low carbon transition accelerates will likely be much lower than policymakers expect. However, oil-led development also brings with it material financial and economic risks. Uganda should reconsider its policy to develop the oil industry in the light of this analysis

For the Ugandan government, time is of the essence given that its negotiating hand has weakened in recent years. Our analysis showed that if the negotiation were to be prolonged for a further three years, the Ugandan government would suffer most of the value lost. At the same time, further delay in oil revenues would contribute to continued budget deficits and continued deterioration of the key public debt to GDP metric, which is expected to rise to just under 50% in 2021, up 20 percentage points over 5 years.

Whichever strategy the Ugandan government decides on, the benefits of the oil industry in terms of public revenues will be significantly lower than expected. As illustrated in figure ES-6, government value in a WB2C scenario would be 60% lower than in the BAU scenario and 90% lower than it would have been if the investment decision had been taken in 2015.

Figure ES-6: Oil benefits to Uganda will be significantly lower than expected ($bn)



If public oil revenues are much lower than expected, that means that any residual oil benefits would be much less transformative as a driver of economic development than was originally conceived of.

Our analysis also suggests that lower benefits are far from the only issue that the Ugandan government should consider. In enabling investments in the oil industry, the government may also need to take on significant contingent economic and financial risks – both explicitly (through government guarantees to financing and in respect of Uganda National Oil Company's obligations) and implicitly, through potential exposure to underfunded decommissioning, costs relating to environmental degradation and potential loss of tourism revenues, if the industry damages Uganda's biodiversity and endangered wildlife habitats. Deciding to proceed would also create public finance exposure to oil price volatility and to the changing behaviour of global financial markets and international financial institutions, who are increasingly starting to price not just climate transition risk but physical climate risk and other unpriced environmental costs as well (eg, biodiversity risks). Uganda could easily find that transition-related risks more than offset the benefits it expects to earn.

The analysis of value and risk set out in this report shows that, far from being transformative for the Ugandan economy, oil – if climate transition risks are not managed appropriately – could damage Uganda's economic resilience over the long term.

Our report contains several recommendations for key decision-makers in relation to climate transition risk. First, we highlight issues for Uganda to consider when assessing the role that oil can play in a successful, sustainable economic development strategy. Second, we point out a number of ways in which climate transition risk can be incorporated into the analysis that will underpin decisions about pre-FID commercial and financing terms. Third, we make a series of recommendations to Ugandan policymakers for managing climate transition risk if they do decide to proceed with developing the oil industry. Finally, we highlight material issues relating to oil and development during a low carbon transition that are relevant to Uganda and beyond, especially financial institutions with a development mandate, the IMF and the rating agencies. These recommendations are summarised in table ES-1

Recommendation	Recommendation for
Strategic considerations for Uganda in the context of its economic development planning	
1 Reconsider the decision to develop oil industry in Uganda after accounting for climate transition risk.	Government of Uganda
2 Investigate alternative options that allow for a more diversified development pathway and provide similar short-term economic benefits to those expected from the Kabaale refinery (such as electrification as a means of expanding energy access and offsetting demand for liquid fuels)	Government of Uganda
Considerations for those negotiating commercial and financing terms	
3 Incorporate climate transition risk into negotiations with commercial partners, co-investors and lenders.	Uganda National Oil Company
4 Do not proceed with Ugandan upstream oil investments without a renegotiation of upstream commercial terms	Total and CNOOC
5 Do not proceed with Ugandan upstream oil investments without an assessment of whether the deal is equitable for Uganda.	Total and CNOOC
6 Test the robustness of project finance structures against a WB2C scenario and redesign if necessary.	Structurers of EACOP and Kabaale project financings
Managing climate transition risk effectively if Uganda decides to continue developing its oil industry while the low carbon transition accelerates	
7 If the oil industry proceeds, develop processes and strategies for monitoring and funding contingent liabilities.	Government of Uganda
8 Incorporate climate transition risk into oil-based "fiscal rule" and plans for the spending of oil revenues.	Government of Uganda
9 Incorporate physical climate risk and other environmental risks[6] into forecasts of public debt sustainability.	Government of Uganda
10 Develop in-house processes for monitoring and developing policy responses to the global climate transition and its impact on Ugandan exports, drawing on international expertise, potentially through the Network for Greening the Financial System[7] .	Bank of Uganda
Managing climate transition risk beyond the Ugandan context	
11 Delay making material new investment decisions until they can be assessed vs. a company-wide understanding of climate transition risk appetite, relative to value.	Total and CNOOC
12 Where investors/lenders rely on credit support from the Ugandan government, factor in climate transition risk into the assessment of Uganda's sovereign credit profile.	Prospective investors and lenders to project financings
13 Do not lend to Ugandan oil industry or ancillary infrastructure projects without an assessment of the development benefits for the country that would arise, adjusted for climate transition risk.	Public donors, lenders and export credit agencies considering lending to Uganda oil projects
14 Encourage the Ugandan government to incorporate climate transition risk into its decision-making processes	Public donors and lenders to Uganda at sovereign level
15 Gradually phase in the incorporation of climate transition risk and physical climate risk into published assessments of public debt sustainability.	Rating agencies and IMF

[6] Physical climate risks are the risk of loss of value of assets arising from the physical consequences of climate change (or climate hazards). Much of these climate hazards are "locked in" as a result of historic global greenhouse gas emissions, though Uganda can reduce its losses from these by investing in adaptation spend. Uganda is likely to include exposure to the increased intensity of floods and droughts, as summarised in https://www.climatelearningplatform.org/sites/default/files/resources/uganda_climate_risk_assessment_report_-_final_version.pdf. Unlike physical climate risks, environmental ones are caused by the Uganda oil projects themselves. These include a range of risks to biodiversity, including to wildlife, as set out inset out in SEI/IGSD. 2020. The East African Crude Oil Pipeline - EACOP: a spatial risk perspective. If endangered wildlife habitats were destroyed through the oil industry, Uganda could lose significant tourism revenues, another sector which the country was placing its hopes on as an engine of economic growth.

[7] The Network for Greening the Financial System is an international group of central banks and financial supervisors whose aim is to share best practice around managing climate-related financial risks and reorienting financial systems towards sustainable investment practices. The group was launched in 2017 and now has 77 members. African countries are underrepresented, however, with only 4 member institutions at the time of writing. More information can be found on their website at https://www.ngfs.net/en

Table of Contents

1. Introduction

For decades, extracting and selling natural resources was seen as an effective (and perhaps, primary) route for developing countries with large resource endowments to lift their populations out of poverty. However, while countries, such as Nigeria and Angola have grown into major players in global oil and gas markets, earning significant amounts of export revenues, the extent to which resource earnings have translated in tangible economic development benefits has been mixed. In 2018, there were 9 Sub-Saharan African countries[8] where the value of fossil fuel commodity exports comprised more than a fifth of their total exports, but none of these countries had significantly stronger public finances than their non-resource-exporting neighbours.

For countries with weak public finances (and hence weak capacity to bear economic shocks), accelerating global action on climate change will create additional challenges. With the EU, China, Japan and Korea all committing to reach net zero emissions by mid-century, the chances of meeting Paris Agreement goals of keeping global warming to well below 2 degrees (WB2C) above pre-industrial levels has never looked higher. Action by the world's largest consumers of coal, oil and natural gas will reduce global demand for those commodities, negatively impacting on price and profits and put downward pressure on critical sources of import revenues for those countries that have built their economies around resource extraction industries. Not only does it now seem clear that fossil fuel extraction businesses will be less lucrative in future, but the speed of decline in these industries is increasing as global financial markets start to withdraw capital and reallocate it to industries that will grow in a low carbon world (such as renewable energy or green hydrogen). The combination of government policy, the changing behaviour of financial institutions and the increasingly assertive position of the world's central bankers who see climate-related financial risk as a threat to global financial stability[9] has even prompted several of the global privately owned "oil majors" to make radical changes to their strategies.

Against a backdrop of an accelerating climate transition, 2020 is a risky time to be making new investments in fossil fuel resources, particularly in greenfield developments, where expensive long-life infrastructure is required to transport those resources to global markets. However, the allure of resource-driven development remains in many countries, especially where weakening public finances may drive a development strategy that can bring in the greatest possible economic benefit over the short term, even if it exposes the country to significant risks over the long term. Uganda and its planned oil industry are, in many ways, emblematic of the challenges facing developing countries in this position as the climate transition accelerates.

In the years after commercially recoverable quantities of low-cost oil were confirmed in Uganda in 2006, economic prospects for the country soared. However, as Uganda and its international oil company (IOC) partners, Tullow Oil, Total and China National Offshore Oil Corporation (CNOOC) have worked via prolonged negotiations towards a final investment decision (FID), financial market actors (including investors in and lenders to those international partners) have become increasingly aware of the financial risk (climate transition risk) that oil assets could face as the global climate transition plays out. As uncertainty around long term oil prices and hence, investor returns, has risen, the bar for the IOCs investing in Uganda has risen and the viability of Uganda's oil industry has fallen. With billions of dollars of capital already sunk into developing the Uganda projects, the IOCs have nonetheless pressed forward with commercial negotiations, even climate transition risk is starting to materialise in the form of lower long-term expectations for global oil demand and crude prices. A deal may be there to be done, but only if the Ugandan government is willing to help IOCs de-risk their investments by taking on a greater share of the climate transition risk itself.

[8] Source: https://www.moodys.com. The countries in question are Angola, Cameroon, Chad, Congo, Ghana, Mozambique, Nigeria, Sudan and South Sudan.
[9] The Bank of International Settlements has conceptualised the risks posed by mismanaged climate-related financial risk as a "green swan". Source: https://www.bis.org/publ/othp31.pdf

Uganda now faces a quandary. The IOC consortium preparing to develop the fields have publicly stated the intention to take FID by the end of 2020[10] . However, if Uganda is negotiating without incorporating an understanding of the impact of a global transition on the project, it may take decision to proceed on terms which, far from providing a major boost to the country's economic development, could lock in fiscal inflexibility and damage the country's economic resilience over the long term.

In this paper, we suggest that the Ugandan government should only take a decision on whether or not to proceed with the development of the oil industry after having weighed up the likely lower-than-expected benefits to the country in a WB2C world vs the risks that the country may need to take on to secure international investment. The aim of this paper is to provide the analytical evidence base about the Ugandan oil industry's climate transition risk exposure for key decision-makers in the Ugandan government. We believe that the approach has relevance not only in Uganda, but to potential fossil fuel resource investment decisions – brownfield and especially, greenfield – more broadly.

Overview of the analysis

This paper covers three main areas: 1) the decline in value of Ugandan oil over the last few years and the value at risk as a result of the climate transition; 2) the implications of risk allocation for Uganda's ability to strike a deal with international investors to develop the sector; and 3) an assessment of the likely benefits and risks to the Ugandan government if it decides to proceed with developing the sector.

Chapter 2 sets out the scope for the analysis, covering crude oil resources (sited principally within the Tilenga and Kingfisher developments), the East Africa Crude Oil Pipeline (EACOP) and the Kabaale refinery. The chapter explains how we performed the analysis, touching on the CPI Energy Finance methodology for quantifying climate transition risk and the assumptions, data and assessment of planned risk allocation that were important to the Uganda analysis.

Chapter 3 describes the findings of the first phase of our analysis, where we quantified the climate transition risk associated with the upstream oil reserves before accounting for the risk allocation mechanisms (or commercial terms). This step is important as risk allocation mechanisms are a decision – part of a deal negotiated between the Ugandan government and international investors. If our analysis prior to risk allocation shows that the assets do potentially have economic value, then in theory, there may be a risk allocation solution which could allow the investments to proceed if it can meet the strategic objectives of all parties.

In **Chapter 4**, we describe how our analysis suggests that final investment decisions in the Ugandan oil sector will not be viable under the current commercial terms. We analysed a series of potential alternative risk allocation scenarios to identify potential renegotiation options and the cost of those options, in terms of value and risk, to the Ugandan government.

Chapter 5 takes potentially viable risk allocation scenarios from chapter 4 to assess what the implications of those scenarios would be for the Ugandan economy, public finances and population and weighs them up against significant contingent liability risks and other unpriced environmental costs and risks that the Ugandan government may need to take on.

Recommendations for all key actors in the Ugandan oil sector are set out in **Chapter 6** which also contains recommendations for parties that are not directly involved in the Ugandan oil sector but have exposure to the Ugandan sovereign credit rating and/or development mandates. Given Uganda today is economically constrained, it may have few options for mitigating transition risk that will not require donor or development financial support and hence we believe this analysis is just as important for those institutions with a Uganda-focused development mandate as it is for those actively involved in the oil industry.

[10] Total announced this in its Q3 2020 results strategy presentation, available from https://www.total.com/sites/g/files/nytnzq111/files/documents/2020-09/strategy-and-outlook-2020.pdf. The Ugandan government has made several similar recent announcements.

2. Measuring climate transition risk in Uganda

Key messages

1. This paper evaluates the nature and magnitude of "external" climate transition risk to Uganda's planned oil industry and the impact that it could have on oil development as a viable leading driver of future economic development in Uganda.

2. This approach uses both detailed global oil models and Uganda-specific economic models to assess the gap between a "business as usual" scenario, which we assume is currently used for planning, and a WB2C scenario. The difference in value between these two scenarios is the climate transition value at risk.

3. The analysis also explores how risk allocation mechanisms like contracts, regulation and financing structures influence the willingness of investors to commit as well as how much risk will be borne by Ugandan government. If not clearly identified and managed, these risks could damage Ugandan economic resilience and reverse progress on development rather than drive it.

2.1 Introduction

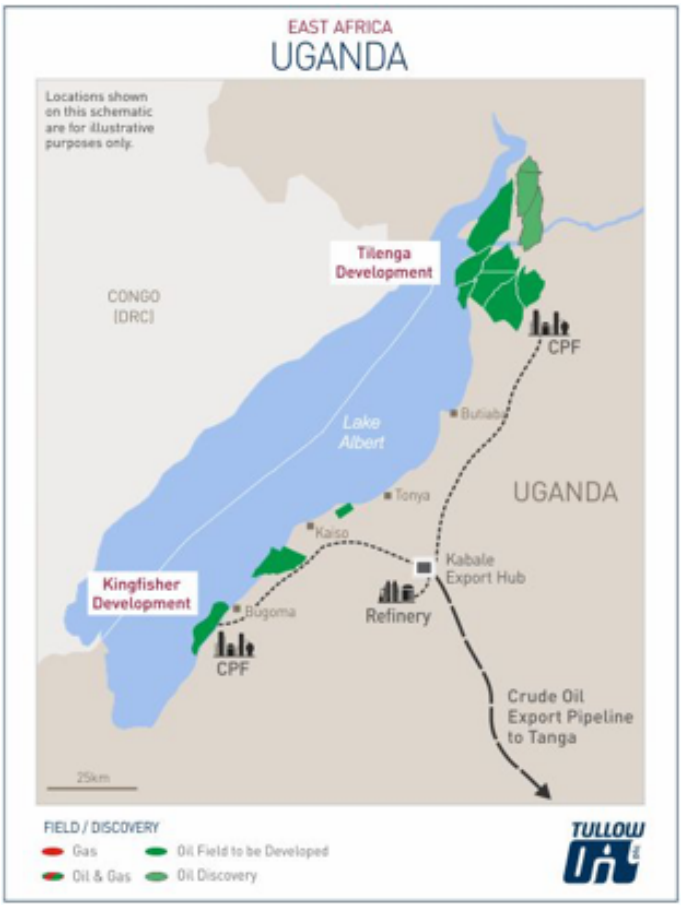
When Uganda's untapped oil reserves were confirmed at "commercial scale" in 2006, the oil industry was still discussing "peak oil" supply and spiking global oil prices. If international investment could be secured to develop the reserves, the oil industry appeared to herald an era of accelerated economic growth, foreign direct investment and job creation. For Uganda, oil could help its economy and turn a persistent international trade deficit into a surplus. A virtuous circle of oil revenues driving stronger public finances and hence attracting further investment offered Uganda the prospect realising an ambitious national development plan that originally aimed to lift Uganda to middle income status by 2020.

However, over the intervening period, as uncertainty about the route of the export pipeline, the size and timing of a domestic refinery and protracted negotiation of contract and fiscal terms have delayed final investment decisions (FID), the world has accelerated action on climate change. A decision to proceed with oil investments in Uganda could now introduce a new source of external risk that Uganda has no control over – climate transition risk - that could compound some of Uganda's existing economic vulnerabilities over the long term. The analysis in this paper sets out our understanding of the nature of that risk, its timing and who could bear it. The rest of this chapter explains the approach to our analysis.

2.2 Our focus is on the three main assets at the core of Uganda's oil industry

Uganda's recoverable oil reserves are principally located onshore around the Lake Albert basin. As illustrated in the map (figure 1) below, exploration has been concentrated in two principal zones on the Ugandan side of the lake. The largest site, known as Tilenga, is at the north end, while Kingfisher is at the south end. Two central processing facilities (CPFs) near each zone would collect crude oil that would then be passed into

Figure 1: Location of main Ugandan oil industry assets



Source: Tullow Oil

an onshore pipeline system that takes it to the Kabaale industrial park near Hoima. In the first instance, crude oil would be used as feedstock for a new refinery located at that industrial park, the rest would then be transported south east, via pipeline for export through the Tanzanian port of Tanga. Other new infrastructure would include a pipeline network to distribute fuel products across the country as well as other midstream infrastructure, such as storage facilities.

The climate transition risk analysis we describe in this paper is focused on the three principal assets: the "upstream" fields of Tilenga and Kingfisher; the "midstream" EACOP and the "downstream" Kabaale refinery. If Uganda proceeds to develop these assets, it would require up-front investment totalling $13.6 billion.

The Ugandan government and the investor consortium preparing to develop the fields have publicly stated their intention to take FID by the end of 2020. However, we assume that further delays may ensue because of the upcoming Ugandan elections and the challenges to reach financial close (FC) on the EACOP pipeline. Our model therefore has FID in late 2021, with first oil being produced at the end of 2024. Our assumptions about the key characteristics of these assets are set out in table 1 below:

Table 1: Characteristics of key assets under review in this project

	Upstream (Tilenga and Kingfisher)	Midstream (EACOP)	Downstream (Kabaale refinery)
FID timing	Late 2021	Late 2021	Late 2021
Commissioning date	Late 2024	Late 2024	Late 2024
Size of resource	Up to 1.6 billion barrels of commercially recoverable production	-	-
Maximum production / capacity	230,000 barrels per day	216,000 barrels per day	60,000 barrels per day
Capital investment (US$ real 2020)	6 billion [11] (development) 3.5 billion (maintenance and life extension) 3.9 billion (future phases)	3.6 billion [12]	4 billion [13]
Ownership	Total (57%) [14], China National Offshore Oil Corporation (CNOOC) (28%), Uganda National Oil Company (UNOC) (15%)	Total (up to 57%), CNOOC (up to 28%), UNOC (15%), Tanzania Petroleum Development Company (TBD) [15]	UNOC (up to 40%), other investors TBD (up to 60%)

[11] Our oil supply provider Rystad Energy uses similar capex numbers to the figure Tullow published in a recent report following the announcement of the sale of their stake to Total Source: https://www.tullowoil.com/application/files/6715/9247/0563/Circular_Final.pdf
[12] Recent publications such as https://www.unoc.co.ug/news-oil-and-gas-sector-in-uganda-an-exclusive-interview-with-our-ceo/ suggest that the cost may have fallen to $3.5 billion, but we have gone with the more widely quoted and conservative higher figure of $3.6 billion.
[13] This figure is also quoted in https://www.unoc.co.ug/news-oil-and-gas-sector-in-uganda-an-exclusive-interview-with-our-ceo/
[14] Tullow retains two residual claims. A $75m lump sum payable on final investment decision and a residual claim on revenue contingent on oil prices rise above $62 and $70 per bbl, ranging from 1.25% of revenues net of tax and 2.5% respectively.
[15] Tanzania Petroleum Development Corporation is listed as a partner by the EACOP company at http://eacop.com/our-partners/ but it is not clear what stake they hope to take, whether it would be required to fund a share of capex and if, so, by what means.

2.3 Quantifying climate transition risk for Uganda's oil industry

We quantified climate transition risk for Uganda's upstream oil resources, EACOP pipeline and the Kabaale refinery using CPI EF's climate transition risk methodology that we have tested in the context of coal mines, oil wells and power plants as well as companies, regional and national governments over the last seven years.

We measure climate transition risk as the difference in the net present value (NPV)[16] of future cash flows accruing to a given asset or party between a baseline or "business as usual" (BAU) scenario and one or multiple lower carbon scenarios. We typically consider a well-below two degrees Celsius scenario (WB2C) scenario in line with the Paris Agreement but also in the process of deriving scenarios that show a transition to a world consistent with limiting global warming to only 1.5C above pre-industrial levels.

Climate transition risk can have a wide range of drivers. Debates about climate transitions often focus on the speed of a particular country or region's internal or "domestic" transition. National low carbon transitions, driven by domestic policies, such as specific carbon taxes or emissions performance standards, can be "domestic" sources of climate transition risk, ie - structural changes that could reduce the value of heavily polluting assets. For Uganda's oil industry, domestic transition risk will likely be very limited, compared with oil industries in the developed world. We assume that Uganda, as a "least developed country" (LDC) responsible for an extremely small proportion of global emissions[17] , will face limited international pressure to retire GHG-intensive assets before the end of their economic lives[18] although reaching net zero GHG emissions globally will likely, at some point, mean Uganda will have to reduce its emissions.

Domestic risks, by their very nature, are easier to control than "external" sources of risk, arising from global or regional trends. External sources of risk can be harder to predict and hence can pose a more serious risk to economic or financial stability. For Uganda's oil industry, the most material external sources of climate transition risk are the changes to oil markets resulting in lower demand for oil and lower oil prices as the low carbon transition accelerates. There is unlikely to be one major driver for these changes, rather they will be the result of technological advances, shifts in consumer behaviour and a range of national and pan-national policies. Uganda will also be impacted by risks that are much harder to predict: the growing awareness of climate transition risk by global financial market actors and development financial institutions, which is starting to manifest itself through increasing reluctance to provide capital to coal-fired power stations, fossil fuel resources and producers of those resources.

To quantify climate transition risk in Uganda's oil sector, we used a range of in-house global commodity models (to derive internationally traded crude oil and oil product prices) and asset specific economic models for the upstream fields, EACOP pipeline and the Kabaale refinery. One of the most important inputs to these models is climate transition scenarios.

2.3.1 Climate transition scenarios

The most important variable in the quantification of climate transition risk for Uganda's oil industry is global oil demand. Global oil demand is one of the key inputs into CPI EF's global crude oil model, which projects annual Brent oil prices in different climate transition scenarios as the marginal cost of the marginal field which is required to meet global oil demand at the lowest cost.

To derive BAU and WB2C scenarios for global oil demand between 2020 and 2050, we used a combination of International Energy Agency (IEA) data and CPI EF research (as described in Box 1 below). We use a government source for expected growth in Ugandan liquid fuel demand[19] .

[16] Throughout this analysis, we use a discount rate of 10% when calculating present values.
[17] According to https://ourworldindata.org/co2/country/uganda?country=~UGA, in 2017, Uganda's CO2 emissions were 5.64 mt or 0.02% of global CO2 emissions.
[18] There is placeholder in Uganda's NDC for "development and implementation of a long-term transport policy accounting for climate change mitigation concerns, there is no timetable nor is there an attempt to quantify potential GHG-emissions mitigation potential beyond new fuel efficiency/economy standards. Available from: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uganda%20First/INDC%20Uganda%20final%20%2014%20October%20%202015.pdfhttps://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uganda%20First/INDC%20Uganda%20final%20%2014%20October%20%202015.pdf
[19] Source: Ugandan Ministry of Energy and Mineral Development, Strategic Investment Plan 2014/15 – 2018/19, page 46, Available from: http://npa.go.ug/wp-content/uploads/2018/01/Energy-Sector-Development-plan-Final.pdf

CPI EF's BAU and WB2C scenarios

CPI's oil analysis uses supply and cost assumptions from independent researchers Rystad Energy as well as specific demand elasticity assumptions derived from previous CPI work. The refinery analysis takes inputs from the oil model about the chemical composition of the global crude production in each year and each climate transition scenario.

BAU crude oil

BAU demand assumptions from 2020-2040 are based on the IEA's 2020 STEPS scenario.

WB2C crude oil

WB2C demand assumptions from 2020 to 2040 are based on the IEA's 2020 SDS scenario.

Post-2040 demand assumptions

IEA oil scenarios only go out to 2040, meaning we need another approach to estimate post-2040 demand.

In the BAU scenario, we keep global oil demand flat from 2040 to 2050.

In WB2C, we derive demand assumptions from 2040 to 2050 using a methodology which calculates the remaining global carbon budget at 2040 and the required emissions reduction trajectory between 2040 and 2050 in order to meet a WB2C scenario. In this scenario, the share of energy demand taken up by oil remains flat between 2040 and 2050. Finally, we keep the 2050 price flat until 2070, reflecting the significant modelling uncertainty about this final 20-year period. However, the 2050-70 assumption is not material to our analysis as Ugandan oil stops being economic to produce in 2047 in the WB2C scenario.

Refining

In our refining model, we use demand assumptions for major oil product types from the IEA's 2020 STEPS scenario and SDS scenario, in BAU and WB2C cases, respectively.

"Perfect foresight"

When modelling a WB2C scenario, we use a notion of "perfect foresight", which implies that investors make well-informed decisions with a clear understanding of future price and trends . In practice, until climate transition risk becomes priced into global financial markets (ie, when the "expected" climate scenario is consistent with a WB2C scenario), information asymmetry about climate transitions means that investors will have different levels of awareness of climate transition risk. When modelling climate transition risk, we do not attempt the subjective task of assessing the extent to which each actor is aware of climate transition risk when making investment decisions.

2.3.2 Climate transition risk modelling: upstream oil

The starting point for assessing climate transition risk in Uganda's oil industry was to take scenario variables set out in the previous sections and use our global crude oil model to assess which upstream fields are economic in BAU and WB2C scenarios and the price at which the crude market balances. The supply module of the global crude model includes a supply curve containing the world's available production (including the Ugandan fields) in each year, broken down at a field or country level (depending on the size of reserves), and ranking by marginal cost.

We then use the price projections generated by the crude model as an input to asset-level economic models, which we use to project the future cash flows of each field in each scenario. These models also contain production profiles and expected decline rates, as well as mechanics which simulate incremental investment or early shut-down decisions, based on the forward-looking economics of a field. Further information on the mechanics of CPI-EF's global crude oil model is set out in Appendix A. A description of the asset-specific economic models is set out in Appendix B.

The competitiveness of Ugandan crude oil on the global market is largely related to its production cost.[20] In order to be competitive, the marginal cost of Ugandan oil to the global market needs to be lower than that of the field setting the global oil price. The marginal cost of Ugandan oil includes lifting costs, those relating to production (including fuel and labour) and admin expenses relating to the production process. These add up to approximately $12 per barrel in real terms.

For a Brent oil price of $40, in theory, Ugandan oil would have at least $28 of profit per barrel to cover upfront investment in oil production facilities and investment in and operation of the EACOP pipeline, while delivering a return to investors. In practice, the decision to finance the EACOP pipeline separately from the upstream oil reserves (see section 2.4) will affect the value of Ugandan oil in important ways. However, the main driver of upstream oil value and climate transition risk remains the same: if global oil prices fall, profits from selling Ugandan oil will fall and vice versa, if global oil prices rise.

We set out the results of this analysis in chapter 3.

[20] Ugandan oil will also trade at a discount to Brent because its waxy quality makes it more expensive to refine.

2.3.3 Climate transition risk modelling: Kabaale refinery

Projections of global oil demand in BAU and WB2C scenarios are also the starting point for an assessment of the climate transition risk exposure of the Kabaale oil refinery. Oil demand projections are themselves derived from projections of demand for major refined oil products, such as gasoline, diesel and jet fuel. Our global refining model projects global market "crack spreads" (or profits per barrel) for these products. It does this via an assessing the supply/demand balance of each of these products after accounting for the average chemical composition of global oil supply (the "assay") and the stock of global refineries with different upgrading technologies.

We use this global model to project the cost at which refined oil products are imported into Uganda via Mombasa based on a combination of the global crude price, crack spreads and transport costs. This cost is also the basis for the price at which the Kabaale refinery would be able to sell its product into the Ugandan market, based on the "import parity" principle.

There has been some scepticism that a refinery as small as Kabaale could be viable given its relative complexity (and hence high capital costs) and the economies of scale advantage that major new international refineries can have, given that they are often ten times the size of Kabaale. However, the Ugandan refinery has two major competitive advantages which may more than offset size-related disadvantages: the fact that its product does not need to incur the c. $8/barrel land transport cost between Mombasa port and the Ugandan border and its privileged access to cheap Ugandan crude.

Provided that it can maintain its cost advantage vs imports, the Kabaale refinery will be economic if it can generate sufficient profits to cover upfront investment and a viable return to investors. As with profits from the upstream oil assets, refinery profits will also move up and down, dependent on movements in global oil and oil product markets.

2.4 Mapping the allocation of climate transition risk in Uganda's oil industry

The climate transition risk models outlined in section 2.3, when applied to the specific costs of the Tilenga and Kingfisher fields and the Kabaale refinery, allowed us to assess whether those assets have economic value. However, a viable deal to develop those assets depends an acceptable risk allocation, ie a split of value and risk between the Ugandan government, international investors and lenders in a way that meets all parties' strategic objectives and tolerance for risk and reward.

In trying to assess whether there was a viable deal to invest in Uganda's oil assets, we first adjusted the asset-specific economic models discussed in section 2.3 for the "explicit" allocation of risk between the parties according to production sharing agreements (PSAs), fiscal arrangements, regulation and financing structures. Table 2 summarises key risk allocation mechanisms and their implications.

Table 2: Risk allocation mechanisms within Uganda's oil industry and their implications

Risk allocation mechanism	Which assets affected?	Impact of mechanism?
Production sharing arrangements (PSAs)	Upstream	Splits crude oil value between investors and government so that investors are reasonably confident of recovering their costs, but government receives an equitable share of upside when oil prices are high.
Royalties	Upstream	A less volatile share of oil value for government than profit oil covered under the PSAs. 6% of royalties are transferred by national government to local governments.
Upstream UNOC share	Upstream	Government takes a share in profits but does not have to fund its share of investment up front. In theory, investors should be compensated through the PSA for carrying this cost.
EACOP project financing	EACOP, Upstream, Refinery	Shifts value around. Share of value required to incentivise lenders; Tariff required to create revenue for the EACOP company increases the marginal cost of crude oil and reduces crude oil value; Tariff also influences the netback price that the refinery pays for crude oil.
EACOP corporate income tax holiday	EACOP, Upstream, Refinery	Subsidy to investors. Increases EACOP cash flows, meaning a lower tariff is required to support the financing and crude oil value is higher.
Refinery timing, size	Refinery, EACOP, Upstream	Decision to build refinery and its timing and size all influence the quantity of barrels of crude available for export and hence, EACOP tariff.

2.4.1 Risk allocation mapping: East Africa Crude Oil Pipeline

The decision to build the EACOP pipeline as the main export route for Ugandan crude oil, as opposed to a shorter alternative route through Kenya will likely mean that exporting Ugandan crude oil is more expensive than it could have been. The decision to project finance the pipeline will add yet more cost. The project finance option means that the EACOP pipeline will be owned in a separate company and financed separately from the rest of the project, using mostly debt financing. While debt typically has a lower cost than equity, in this case, the cost of raising project finance debt for a Uganda-based project may be higher than the cost of balance funding from an investment grade international oil company at its weighted average cost of capital. Project finance also typically has high transaction costs, due to the complex legal structures that need to be put in place.

The simplest option for financing the construction of the EACOP pipeline would have been for the upstream oil investors to finance the pipeline using their balance sheets, as they are planning to do for upstream development costs. However, there are several plausible potential reasons why they might have decided on project finance instead. Large corporates typically use project finance with large, complex and risky projects in order to limit their exposure to cost overruns during construction or other operational issues[21]. Setting up the pipeline with its own company and financing would also make it easier for the developers to sell their stakes in the pipeline after construction is finished. Given the challenging nature of the construction of this pipeline (1,445 km across a route with significant endangered wildlife habitats and biodiversity[22]) and complexities of its operation, EACOP fits the bill as the sort of risky asset where project finance could be useful to help protect developers' balance sheets as they proceed with the upstream investment.

[21] Project finance lenders are often described as being "non-recourse" or having "limited recourse" to shareholders. This means that in the event of financial distress, lenders can only seek to recover losses from shareholders up to a predetermined maximum amount. With "balance sheet financing", a shareholder's exposure is not limited in the same way.
[22] Concern has been raised that the Environmental and Social Impact Assessment for the EACOP project underrepresented biodiversity risks. Source: https://africa.panda.org/food_footer/?uNewsID=30121

The effect of using project finance is to transfer risk from shareholders to lenders and a series of principal contractors, who also take on obligations. The aim is to achieve a financing structure where key risks are identified and allocated systematically to creditworthy parties, creating a robust structure, which gives lenders enough comfort to lend a relatively high amount of debt against the asset's value. Examples of key contractors are likely to include engineering, procurement and construction (EPC) contractors.

Little information has been made public about the planned structure of the EACOP project financing, other than the amount of debt that the shareholders are looking to raise ($2.5 billion or 70% of the capex), the identity of the shareholders (Total, CNOOC, UNOC and the Tanzanian Petroleum Development Company) and the identity of the project finance advisers[23]. However, we assume that lenders will be willing to commit to the investment if their financial model shows that they would get their money back with interest and a reasonable amount of headroom even in a series of reasonable downside scenarios.

We built and used an asset-specific model of the EACOP pipeline, including tax, debt and reserve mechanics, using assumptions gained from research about comparable recent infrastructure finance transactions.

The model calculates the flat nominal per barrel transit tariff required to meet both investor and lender requirements. The tariff is then charged to the oil investors or other shippers wishing to transport crude through the pipeline. As such, it becomes part of the marginal cost of Ugandan oil to the global market. It also influences the price at which the Kabaale refinery buys crude as it represents the "netback" to global crude prices. A higher pipeline tariff results in lower upstream profitability but higher refinery profitability and vice versa with a lower pipeline tariff[24].

2.4.2 Risk allocation mapping, Kabaale refinery

While the risk allocation for the EACOP pipeline will largely be determined by its financing structure, the risk allocation for the Kabaale refinery will largely be defined by the contracts and regulation[25] governing its operation. That regulation, which we assume is designed to protect the refinery against import substitution, gives the refinery privileged access to Ugandan crude ahead of export shippers. By allowing the refinery to sell product at the import parity price, it also allow refinery investors to capture all of the value associated with the cost saving to the country of producing refined oil products locally. This means that, other than the more intangible benefit of fuel security, Ugandan fuel consumers should not expect to see any benefit from having a local refinery.

As both the refinery's selling price and crude feedstock cost (global crude price less the EACOP tariff) are linked to global markets, its margins would be partly protected against fluctuations in those markets. If oil prices fall, both feedstock and selling prices fall (albeit to slightly different extents) and vice versa. The asset's relatively stable margins may also make it a candidate for project finance lending.

Unlike with EACOP, the decision to project finance the refinery is probably not primarily to do with the riskiness of the investment. In the case of the Kabaale refinery, we are not aware of interest from investment grade investors with strong balance sheet, hence, for UNOC (hitherto the expected to be the largest shareholder, with 40% ownership) and other potential shareholders with relatively weak balance sheets, project debt may be the only available avenue to raise enough finance for the construction. We assume that lenders will be willing to commit to the investment if their financial model shows that they would get their money back with interest and a reasonable amount of headroom even in a series of reasonable downside scenarios. However, unlike EACOP, where upstream investors are committed to providing equity for the pipeline, the ability to attract equity investors to the refinery may be dependent on the ability 1) to attract commitments from other East African governments and 2) to attract private equity investment requiring high levels of gearing in order to "leverage" equity returns to target levels.

We have built an asset-specific model of the refinery using operating assumptions derived from research into

[23] According to NGO Banktrack, Standard Bank (though Ugandan subsidiary StanBic), Industrial and Commercial Bank of China and Sumitomo Mitsui Banking Corporation are linked up to be the advisers. Source: https://www.banktrack.org/project/east_african_crude_oil_pipeline#financiers

[24] If the shareholders were able to agree it with lenders, they would be able to boost their returns by structuring the pipeline tariff, so it was lower in early years when oil prices are higher and then rising in later years. However, this would result in lenders taking on more risk as it would mean that debt repayments were shifted backward till later during the loan tenor.

[25] While the published 2012 production sharing agreement for the Kanywatbab prospect area is not directly relevant for these projects, it makes clear that all oil (whether exported or sold to the refinery) governed by the agreement is sold at the Hoima price (ie, the netback to global prices). Available from: https://www.globalwitness.org/documents/17832/contract_kanwatanya.pdf

refineries with similar estimated Nelson complexity processing similar qualities of crude oil and financing assumptions gained from research about comparable recent infrastructure finance transactions.

2.4.3 Oil production sharing agreements (PSAs) and fiscal terms

If the EACOP pipeline is merely the means of getting Ugandan crude to export markets and the refinery is principally a means of improving Ugandan fuel security and the balance of payments, the majority of economic value in the Ugandan oil industry is in the resources and so, the risk allocation associated with oil value is the most important topic for negotiation between the parties.

Since 2013, the rights to the economic value of Uganda's oil have been held under a series of exploration licences by a consortium of three developers, Tullow Oil plc, Total SA and CNOOC Ltd, which owned equal stakes. Tullow has recently divested its 33.33% stake to Total, meaning Total now owns two thirds of the consortium, with CNOOC owning the remaining third. UNOC plans enter the consortium with a 15% stake, reducing Total's stake down to 57% and CNOOC's to 28%. However, UNOC will not be required to fund any of the upfront investment under an arrangement where Total and CNOOC agree to fund UNOC's share, with the carry cost being recovered through the cost oil provisions in the production sharing agreements.

The terms which regulate the sharing of value (and risk) between the developer consortium (including UNOC) and the Ugandan government are set out in a series of production sharing agreements (PSAs)[26] and fiscal arrangements[27]. PSAs are a common approach to sharing value and risk related to oil developments in host countries that do not have the capital and/or knowhow to develop the resources without international investors. They use mechanisms including royalties and cost/profit oil splits in order to try to balance the objectives of the key parties: giving international investors some certainty over their ability to recover their investments and for, governments, mitigating some of the oil price volatility on public finances. We assume that international investors will be willing to invest in upstream oil reserves if expected equity returns[28] are higher than investor "hurdle rates" in a BAU scenario and higher than investor weighted average cost of capital in a plausible downside scenario like a WB2C scenario.

We created asset-specific economic models for the Tilenga and Kingfisher fields including PSA and fiscal terms to assess how value and risk would be split between investors and government in a range of climate transition scenarios. More detail on the structure of those models is set out in Appendix B.

We set out the results of this analysis for all three assets in chapter 4.

2.5 Implicit risk and contingent liabilities

If the amount of value (described in section 2.3) and the explicit allocation of value and risk (described in section 2.4) may be the principal factors influencing whether international investors and lenders will commit to investments in Uganda's oil sector, the question of who actually ends up bearing climate transition risk when it crystallises depends on another analysis. This is a particularly relevant analysis for governments and central banks who are concerned with economic, social, political and financial stability.

Going beyond "explicit" risk allocation requires us to consider the likely strategies that today's key investors might take to protect themselves against climate transition risk when that transition starts to accelerate ("implicit risk transfers") as well as other, harder-to-predict sources of risk that governments often assume by allowing development of major infrastructure assets in their countries ("contingent liabilities"). Box 2 below explains the difference between different types of risk allocation in more details.

[26] We used the 2012 PSA (https://www.globalwitness.org/documents/17832/contract_kanwatanya.pdf) as the starting point for understanding the PSA terms to which the Tilenga and Kingfisher fields are subject (for "blocks" EA-1, EA2 and EA-3), which were signed earlier than this. As those terms are not publicly available, we had to use information provided by Rystad Energy to estimate the ways in which the relevant PSAs differ from the published 2012 PSA.
[27] Source: International Monetary Fund., 2017. Uganda: Technical Assistance Report-Fiscal Regimes for Extractive Industries: Next Phase. IMF Staff Country Reports, 17(367), Available from : https://www.imf.org/en/Publications/CR/Issues/2017/12/13/Uganda-Technical-Assistance-Report-Fiscal-Regimes-for-Extractive-Industries-Next-Phase-45462
[28] We use the internal rate of return or "IRR" as a measure of investor returns.

Risk allocation within CPI EF's climate transition risk methodology

CPI EF's methodology identifies three different types of climate transition risk allocation: **explicit** risk allocation, **implicit risk** transfer and **contingent liabilities.**

Explicit risk allocation is the allocation of risk at that given point according to law, regulation, contracts and financing structures.

As climate transition risks start to crystallise, most parties explicitly exposed to those risks will seek to mitigate their exposure to those risks (for example, via divestment), and where they are successful in doing so, they push some of their explicit risks onto other parties – we call this implicit risk transfer. Workers can often face implicit climate transition risk of this sort if their employers are able to make them redundant or weaken their employment rights when the employer undergoes financial distress.

Contingent liabilities then crystallise for the effective "risk managers of last resort in an economy" when companies, workers and municipalities directly exposed to climate transition risk experience financial distress because they have been unable to mitigate their exposure and are financially not strong enough to bear it on their own balance sheets. Financial sector actors, such as insurance providers, banks and other lenders (if climate transition risk results in debt default) often bear these contingent liabilities, but it is the public balance sheet that backstops the financial system and often takes on contingent risk where the financial sector is absent. One of the key findings of our climate transition risk analysis in South Africa was that governments often bear much more climate transition risk after implicit risk transfers and contingent liabilities than they do explicitly. In practice, this can range from the crystallisation of government guarantees made to defaulting companies to the political expectation that governments will support workers and communities or make good environmental liabilities, where it cannot claim these costs from other parties.

2.5.1 Implicit risk allocation and contingent liabilities

Our analysis of potential implicit risk transfers focuses on the parties that we have identified as bearing significant explicit risk, reviews the potential options they might have to mitigate that explicit risk and considers how it might reallocate risk to other parties.

Well-diversified investors with investment grade balance sheets (like Total and CNOOC) are likely to have many options for mitigating climate transition risk. As the transition accelerates, they could try to protect margins by cutting costs; try to renegotiate risk allocation contracts (i.e. the PSAs) in their favour or seek targeted government economic support (eg, reducing an asset's tax burden or even asking for an emergency cash injection or "bailout"). Alternatively, they may seek to buy a hedge to offset climate transition risk at the level of their whole portfolio, thereby transferring risks onto financial markets.

The likelihood of risk falling onto the Ugandan government in any of these scenarios will be influenced by the identity of the shareholders at the time when climate transition risks crystallise. If they can do so before climate transition risk crystallises, we expect investors such as Total and CNOOC to sell down part or all of their stakes and hence pass the climate transition risk problem onto whoever is the buyer. Future shareholders may be less diversified, more highly leveraged and less willing or able to bear climate transition risk. If the Ugandan operations were to go bankrupt, it could implicitly leave decommissioning obligations with the Ugandan government unless decommissioning costs are pre-funded and appropriately ringfenced, in particular for environmental costs.

Ultimately, the centralised nature of political decision-making in Uganda means that the national Ugandan government will, in theory, determine how climate transition risk (either explicitly or implicitly) borne by the Ugandan government is allocated to different parts of the Ugandan public finances (between national and local government; current and capital spending) and the non-oil economy. In practice, the Ugandan government may have limited options if, by the time climate transition risk crystallises, its economic standing has been weakened by the contingent liabilities it has taken on to secure oil investment and by the increasing attention paid by global financial markets and development financial institutions to other, currently un(der)priced risks, to which it has significant exposure, like physical climate risk and biodiversity risk. We set out the results of this analysis in chapter 5.

3. Climate transition risk in Uganda's industry: a summary

Key messages

1. Since Uganda signed an initial agreement with the current consortium in 2013, the value of Uganda's oil reserves has fallen more than $40 billion or over 70% to $18.1 billion.

2. Uganda's oil reserves face a further $10 billion of climate transition risk – or 56% of the remaining BAU value.

3. Further delays to final investment decision would result in further reductions in the oil's value.

3.1 Introduction

Uganda's oil reserves have the potential to create value for the country through economic development; could provide fuel security; improvements in the balance of payments; foreign direct investment, jobs and improvements in the public finances. However, some of these sources of value are difficult to quantify and all are contingent on the speed and scale of the global low carbon transition.

Development of Uganda's oil industry includes three main assets, the upstream resources, the EACOP pipeline and the Kabaale refinery. Of these, the upstream resources are the most valuable asset, but most this value can only be realised if the oil reaches the international market. This makes the pipeline that would take the oil to the international market (EACOP) a necessity for the development of the upstream resources. The refinery only makes sense if the upstream resources are developed and hence, its viability too is dependent on the EACOP pipeline. Much of the potential improvement that the oil industry could bring to Uganda's balance of payments is dependent on the refinery, as is the prospect of the oil industry being a creator of significant jobs over the long term.

Uncertainties about the timing and viability of a deal to develop Uganda's oil may depend on the commercial terms agreed between the government and international investors, and the allocation of risk and value (explored in chapter 4). But the terms that make a viable commercial deal depend on how much estimated value there is to share between Uganda and the international investors. The more value available, the easier it will be reach agreement on sharing that value. In this chapter, we chart how that value has changed over time, how that value would be affected by a global low carbon transition and how the prospects of reaching FID would be affected by further delay.

3.2 Delay to-date in reaching final investment decision

Uganda's hopes of developing oil reserves in the Albertine Basin were beset with challenges for several decades even before commercially recoverable reserves were confirmed in 2006. In 2013, the first production licenses were awarded to Tullow, Total and CNOOC in 2013, with the FID expected in 2015 and first oil expected in 2018. Since then, delays have hampered the project, including the decision in 2016 to reject a shorter original pipeline route through Kenya, long-running disputes over the tax treatment of capital gains and the collapse of an agreement that would see both Total and CNOOC acquiring part of Tullow's stake.

In the latter part of 2020, progress towards FID seems to have accelerated with the signing of the host government agreement to enable the construction of the planned export pipeline across 1,147km of Tanzanian territory, and the Ugandan government's approval of the transaction by which Tullow sold its entire stake to Total (October 2020).

However, the global oil market has changed significantly since the licences were awarded in 2013.

CPI EF's analysis of climate transition risk shows significant impacts of global climate action on fossil fuel commodities during this period, even before the Paris Agreement of 2015 that called for global efforts to limit global warming to well below 2 degrees.

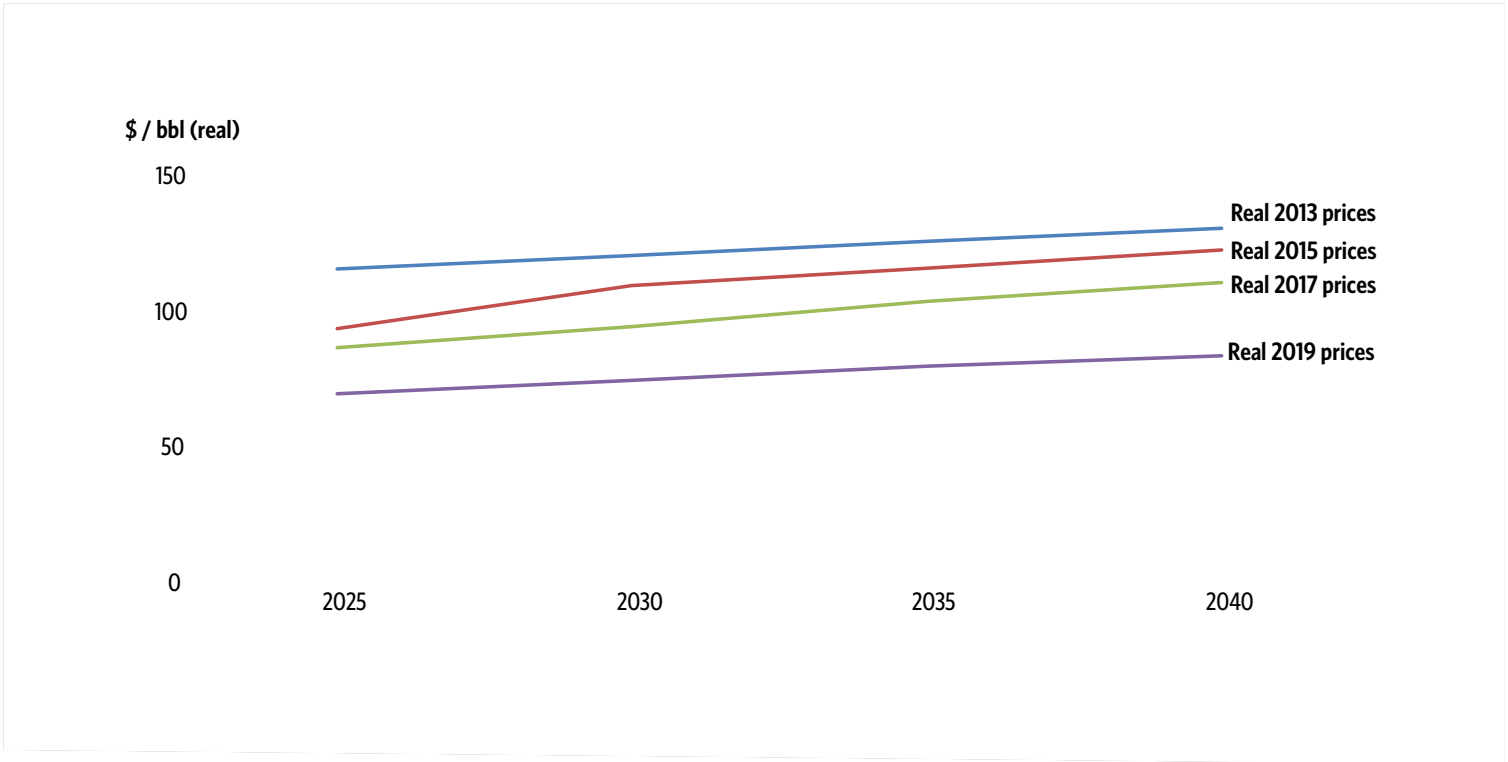
Our models show that global demand for thermal coal peaked in 2013 and since then, has started an inexorable decline, and is being pushed out of power systems in most parts of the world spurred by a range of policy measures, including carbon taxes and emissions performance standards and technological change, such as the collapse in the cost of solar photovoltaic and onshore wind power spurred by cheap and innovative financing.

In the oil sector, Brent prices rose from just under $78 a barrel at the end of 2009 to peak at nearly $130 a barrel in early 2012, before collapsing to below $30 a barrel in 2016. The impact of the COVID-19 pandemic on oil demand in 2020 has been dramatic, with prices holding at around $40 a barrel at the time of writing. The IEA forecasts that although oil demand will recover, it will be from a lower base than pre-pandemic levels, with consumption still 5% below its pre-crisis level by the end of 2021[29] .

Unlike in the coal sector, few of the causes of oil market volatility can be directly attributed to the energy transition over this period. However, a review of the IEA's long-term price projections over this period (set out in figure 2 below) show a steady downgrading of long-run price expectations.

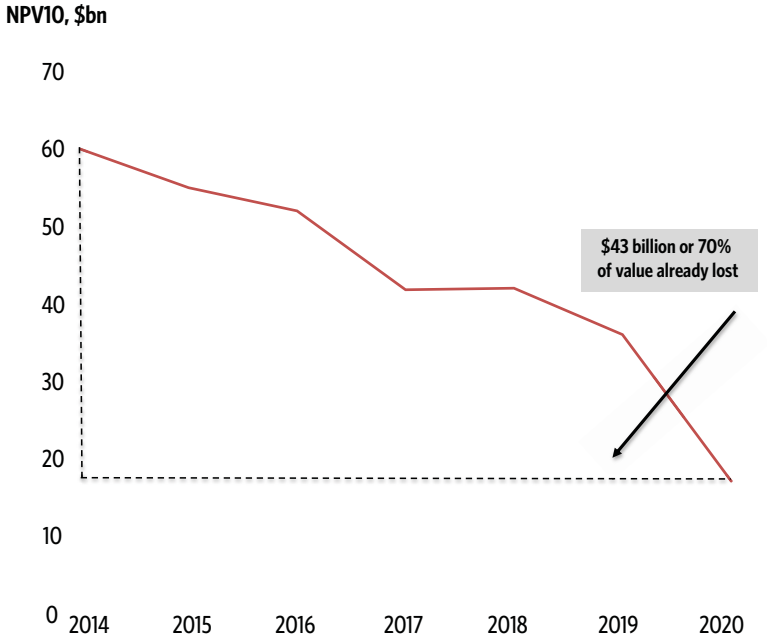
To assess the impact of the delay in making the FID on the economic value of the assets, we generated a "historic" valuation of the assets, using a price curve first published in a report CPI produced for the New Climate Economy project[30] , using demand inputs from the IEA's 2013 CPS scenario. We then compared it against our current BAU valuation. Our analysis shows that the entire potential production of 1.6 billion barrels in Tullow's report would be economic in both "historic" and "current" BAU cases. However, the significantly lower price curve means that the value of the assets, as illustrated in figure 3 would be 70% lower, at $18.1 billion, compared with $60.5 billion over the lifetime of the project, ie, between 25-40 years.

Figure 2: IEA long-term price projections over time



[29] International Energy Agency (2020), World Energy Outlook. Available from: https://www.iea.org/reports/world-energy-outlook-2020
[30] Climate Policy Initiative (2014), Moving to a Low-Carbon Economy – The Financial Impact of the Low- Carbon Transition, Available from: https://climatepolicyinitiative.org/wp-content/uploads/2014/10/Moving-to-a-Low-Carbon-Economy-The-Financial-Impact-of-the-Low-Carbon-Transition.pdf

Figure 3: BAU value is 70% lower than it would have been without delay



3.3 Further climate transition risk

In our WB2C scenario, global oil demand is only 21% below our BAU scenario in 2030 but at this point the trends start to diverge, with global demand 33% below BAU and 84% in 2050. As illustrated in figure 4, this results in a growing divergence in Brent prices between our BAU and WB2C prices.

Under the WB2C scenario, the value of Ugandan crude oil would fall 56% compared to BAU to only $8.01 billion[31]. This is primarily the result of the lower oil prices set out in figure 4. Lower prices also mean that total Ugandan oil production would be 19% lower in a WB2C scenario. From the late 2040s, Ugandan oil would become increasingly uneconomic in the face of fast falling global oil demand. As illustrated in figure 6 below, that means Uganda's oil assets in a WB2C world would be worth 88% less than they would have been worth based on the BAU scenario when the FID was originally planned in 2015. The value at risk would be higher still if the world kept global warming to only 1.5 degrees, a more ambitious target around which growing international consensus appears to be building.

Figure 4: CPI EF Brent price projections in different climate transition scenarios

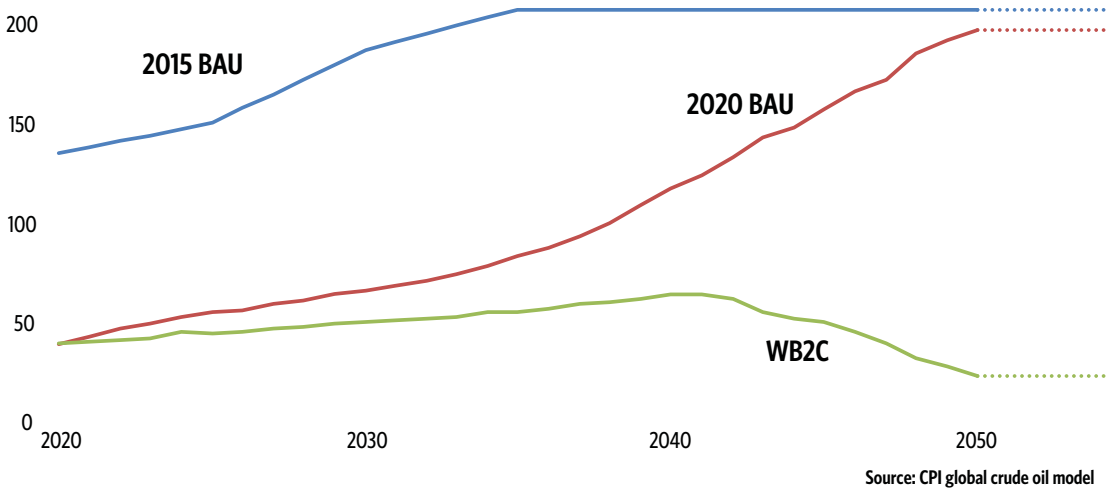
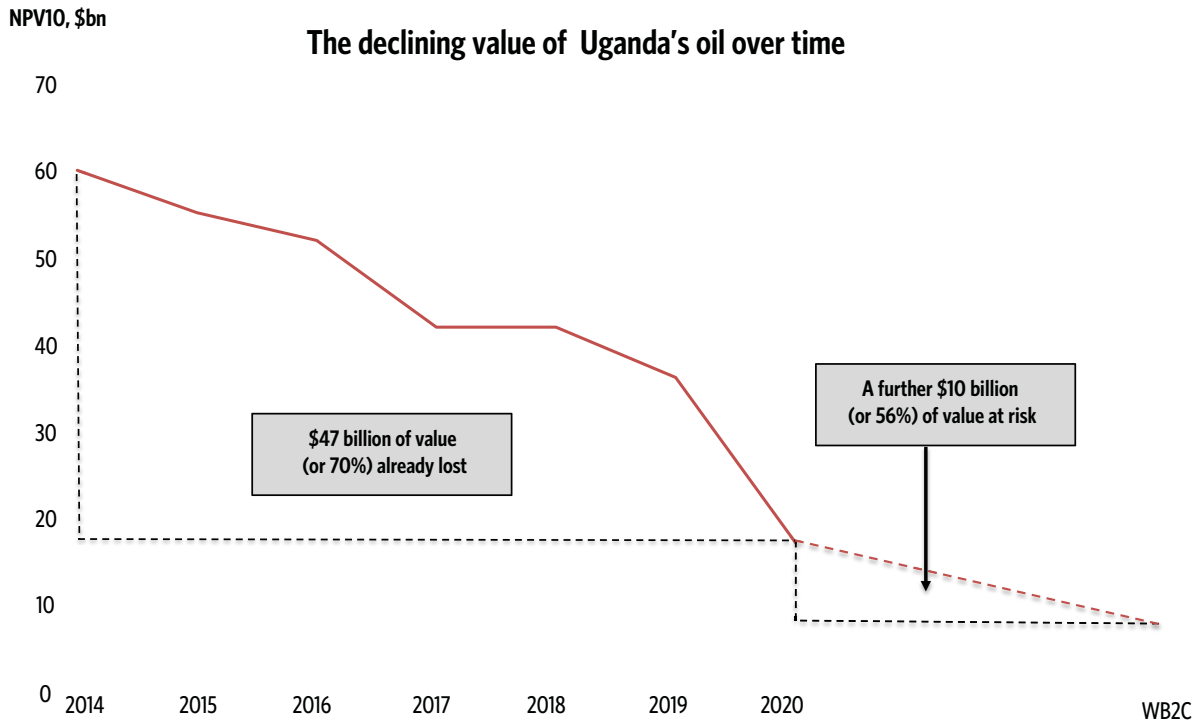


Figure 5: A global climate transition could destroy most of the remaining value in the assets



3.4 Impact of further delay

While the project has taken important steps forward in recent months, there are several reasons why the project might be further delayed beyond the publicly stated FID target of the end of 2020 or even our modelled FID time of the end of 2021. These include the need to finalise and choreograph the timings of the pipeline and refinery projects financings as well as other contracts; challenges created by the COVID-19 pandemic and the finalisation of commercial terms between international investors and lenders and the Ugandan government (see Chapter 4 for more detail).

Our analysis indicates global oil prices will begin falling after 2040 as demand falls and reduces the need for higher cost oil development in a global low carbon transition. A further delay of Ugandan oil will therefore reduce the amount of oil sold at relatively high prices before 2040. In this case, the value of the oil would decline by between $600-$700 million per year. If FID were delayed until late 2024, the year when first oil is currently expected, the value of the reserves would fall to $6 billion in a WB2C case, 25% lower than if FID proceeded according to the timing in our current modelling.

3.5 Conclusion

The results set out in chapter 3 illustrate how the value of Uganda's oil has deteriorated significantly over the period of negotiation with its international partners and stands to lose the majority of that value if global decarbonisation targets are met. However, this chapter also shows that even if oil started flowing in 2030, some economic value would remain. In chapter 4, we explore whether there is still a deal to be done that meets all key parties' strategic objectives in the context of increasingly lower amounts of available oil value.

[31] The value could be higher if oil prices in a WB2C scenario were more similar to those set out in the IEA's Sustainable Development Scenario (SDS). As illustrated in figure 10 in this paper, prices in that scenario are higher that CPI's WB2C scenario even for the years where our model uses global oil demand from the SDS as an input. The IEA does not present detailed assumptions about oil supply, but we assume that it must assume a faster decline rate from existing fields than our oil supply data provider, Rystad Energy. According to think tank Carbon Tracker in https://carbontracker.org/reports/the-decline-rate-delusion/, Rystad uses average decline rates of around 4%, whereas the IEA uses average decline rates of around 8%. All else being equal, the IEA would require more new supply to meet demand than Rystad and hence, require higher prices in order to compensate for the capital costs of developing new fields.

4. How risk allocation could make or break Uganda's oil industry

Key messages

1. The refinery has important strategic benefits for Uganda, but building it puts downward pressure on international upstream investor returns. The materiality of the refinery decision increases as the value of upstream resources falls, in the cases where FID is delayed and in the WB2C scenario.

2. Expected returns under existing commercial terms do not appear high enough for international upstream investors to take FID. They are below Total's investment hurdle rates in the BAU scenario and its weighted average cost of capital in the WB2C scenario

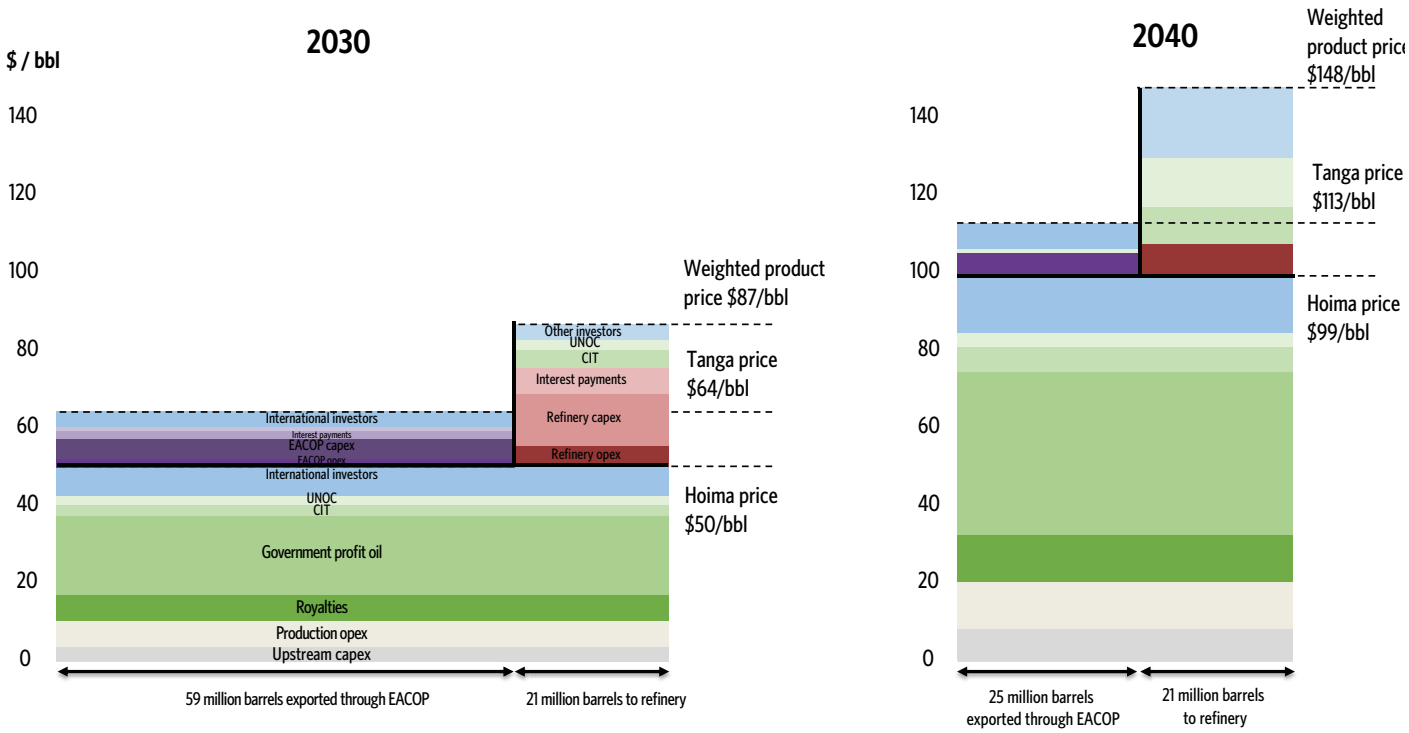
3. Meeting oil investor requirements could force Uganda to give up significant public value and/or cancel the refinery. If it retains the refinery, it may need to transfer up to 10% of its WB2C value based on current terms. If it cancels the refinery, the government loses no value, but gives up important strategic benefits.

4.1 Introduction

While in chapter 3, we demonstrated that there is likely to be value in Ugandan oil even in a lower carbon world, Uganda will only be able to secure international investment to develop the industry if it can structure a deal with international investors to share value and risk which provides them with an acceptable financial return.

In theory, Uganda has a range of levers to pull to do this. First, it needs to ensure that there is enough value available to support the financing of the EACOP pipeline, which is necessary to support the export of Uganda's oil. Then, if it decides to build the Kabaale refinery, it needs to ensure that the refinery is competitive vs. international imports and promises a high enough return to attract third party investment. It then needs to allocate enough of the remaining upstream value to its international partners to give them a return sufficient to compensate them for the risk they are taking on, as illustrated in figure 6. In practice, as explained in the following box, there needs to be enough revenue available from the export of oil and the sale of domestically produced oil product to cover all the industry's capital and operating costs, as well as an acceptable return.

Figure 6: Breakdown of the costs of a barrel of Ugandan crude and domestically produced refined product in 2030 and 2040 (BAU)



Analysing the split of value within Uganda's oil industry

The principal charts in this chapter (figures 6, 8, 9, 11, 12) are a representation of the results of our assessment of how climate transition risk is split between investors and government and between upstream, EACOP and the Kabaale refinery. The total area of each chart represents the NPV of total revenues accruing to key stakeholders. These revenues are then used to pay for the various different types of costs shaded in different colours and government share of value. The remainder, in blue, is the international share of value. The different areas of each bars are proportional to the different magnitudes of each cost or return category.

In this chapter, we explore whether there may be a viable agreement that satisfies enough of the requirements of all key parties in the context of an accelerating global transition and a declining pot of available value.

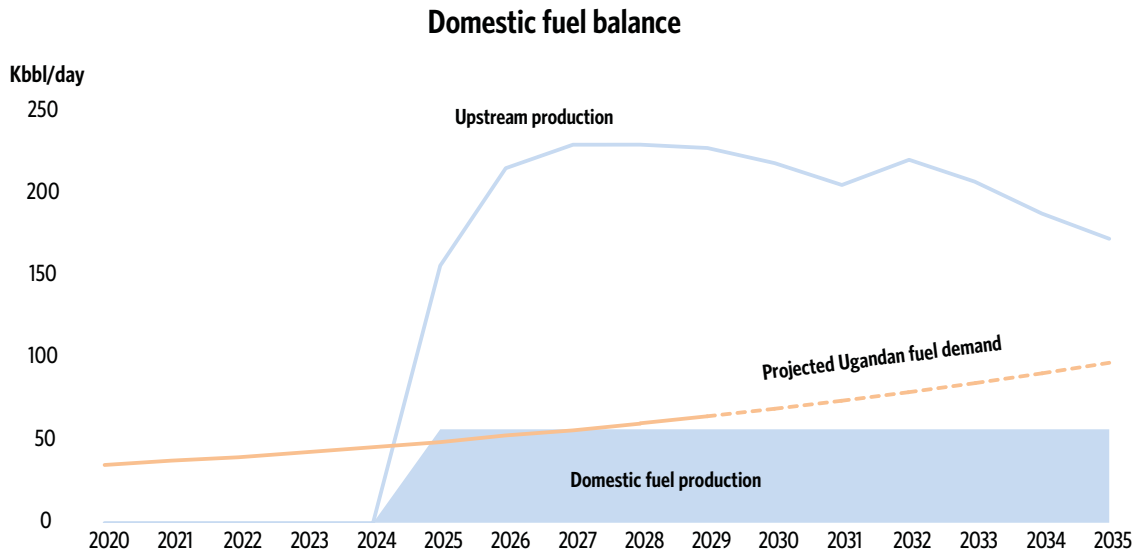
Firstly, we weigh the economic benefits and downsides of building the Kabaale refinery, one of Uganda's most important strategic objectives for the oil industry. Then we review whether, in the context of the decline in upstream value discussed in the previous chapter, a deal on current commercial terms might be viable for international investors in the upstream resources. Finally, we assess the impact of the likely renegotiation of commercial terms on the value that Uganda stands to gain from the oil industry.

4.2 Uganda's commitment to a domestic refinery balances investment value with fuel security objectives

The history of the development of Uganda's oil reserves is bound up concerns about fuel security. As Uganda is a landlocked country, hitherto without oil production or refining capacity, Uganda is entirely reliant on imports to satisfy the c. 35,000 barrels per day of liquid fuels that Uganda consumes annually. These fuels are transported inland by truck along one poorly maintained route from the port at Mombasa in Kenya. Reducing this import dependence has been a key potential strategic benefit for the Ugandan government throughout the period from discovery of Ugandan oil.

As negotiations with international oil companies to develop the reserves have become protracted, Uganda has been forced to moderate its ambitions as a refiner. Shortly after oil was discovered towards the end of the 2000s, President Museveni planned a ban on the export of oil and the construction of a refinery with throughput capacity of 150,000 barrels a day. Such a refinery would not only cover Uganda's liquid fuel demand but would be capable of servicing liquid fuel demand in much of East Africa. However, as oil companies refused to invest unless they could get access to dollar revenues through the export market, the Ugandan government first approved an export pipeline and then agreed to reduce the size of the planned refinery to 60,000 barrels a day. A smaller refinery would be a less risky investment in one sense as it could rely on Ugandan demand to offtake a higher proportion of its product, but it be more expensive,

Figure 7: In most years, Uganda still requires imports to meet demand, despite a refinery



losing the economies of scale of a large refinery and hence putting the inland Ugandan refinery at greater risk of import substitution. As illustrated in figure 7 below, our modelling suggests that while the refinery at its currently planned size will significantly reduce Ugandan fuel imports, the country will remain reliant on the Mombasa import route, albeit to a lesser degree than historically. Unless there is future investment to increase the refinery's capacity, the decision to build a 60,000 barrel a day refinery means that Uganda appears to be giving up on its ambitions to become an East African oil industry hub. The refinery is also likely to be likely protected in the early days of any future Ugandan climate policy that seeks to reduce GHG emissions in the transport sector. If Uganda sought to reduce fossil fuel use, the country would likely reduce imports before reducing refinery utilisation.

4.2.1 Economic benefits of a refinery

Beyond strategic and political considerations, the refinery also could also have important economic benefits to Uganda. It would result in a significant improvement in Uganda's balance of payments relative to today and even relative to a scenario where all Uganda's crude was exported. With refined oil products being the largest line item on Uganda's import bill ($1.1 billion or 17% of total imports in 2018 [32]), the impact of the refinery could go a long way to closing Uganda's persistent annual trade deficit [33]. Once the refinery is established, UNOC also plans to leverage the infrastructure by developing a petrochemical complex, which could, in turn, further increase the value of the balance of payments benefit by producing other products, such as plastics and fertiliser that are currently imported [34]. There may be other potential strategies for reducing Uganda's fuel imports – including expansion of the use of biofuels and renewable electricity – but the refinery appears to be the only strategy currently under consideration. We briefly explore the alternative options in chapter 6.

There may also be other economic benefits, such as those relating to jobs and ancillary investment and economic activity around the refinery and the Kabaale industrial park more generally. However, the size and timing of the latter indirect benefits are highly uncertain, especially given the challenging business environment in Uganda[35]. This means it is also far from clear that those indirect benefits would outweigh the costs associated with land clearance and resettlement of people in order to make way for the industrial park[36] .

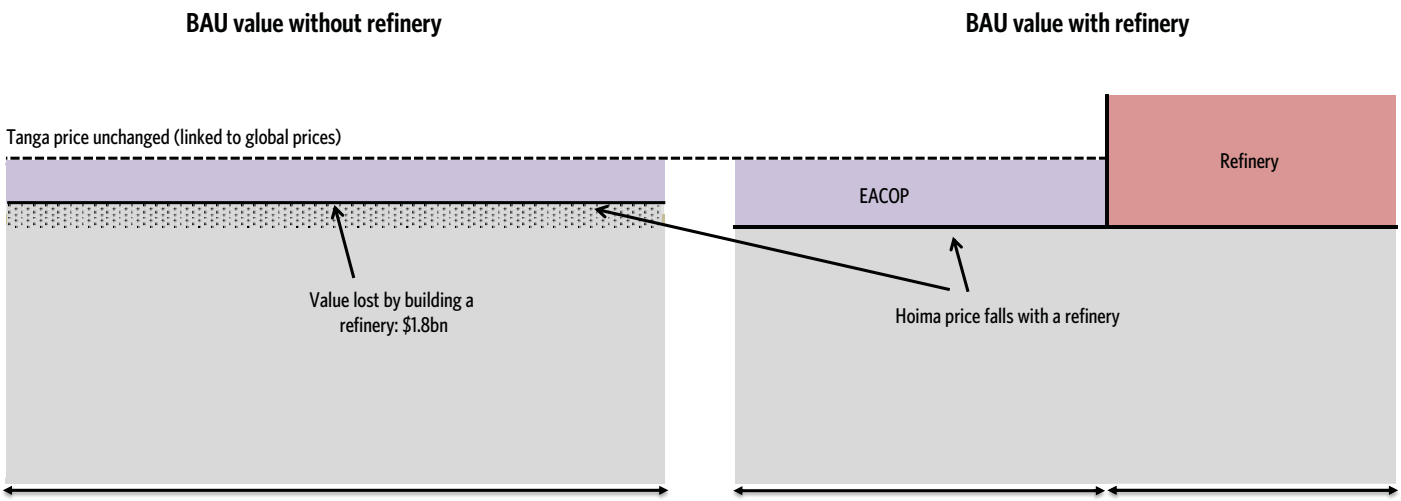
4.2.2 Trade-off of refinery vs oil value

Because of the complexity required to refine Uganda's waxy oil, capital costs of $4 billion for the Kabaale refinery are very high for a refinery which is of very small scale compared with the global market. Given this, a refinery in Uganda can only be competitive with imports if it able to take advantage of cheap local feedstock – that is, if both the refinery and upstream oil ("upstream") investments are made.

According to the regulation governing the Ugandan refining industry, the refinery will buy crude at a netback price – that is the price that the oil would earn on its way to export at the point it enters the EACOP pipeline (i.e. before the pipeline tariff is applied). In theory, upstream investors should therefore be ambivalent about whether they sell to the refinery or to export markets. However, they will not be ambivalent about the decisions to be made in the short term about the size of the refinery, its planned timing and even whether the refinery gets built at all. Building a refinery results in a $1.8 billion loss of potential value to the upstream oil reserves as EACOP, with $400 million of the loss accruing to international investors and $1.4 billion accruing to the Ugandan government.

[32] The Observatory of Economic Complexity (2020), Uganda (UGA) Exports, Imports, and Trade Partners, Available from: https://oec.world/en/profile/country/uga/
[33] Ibid, The Observatory of Economic Complexity (2020)
[34] NB our analysis does not include an estimate of the value from plastics and fertilisers
[35] Source: World Bank "Ease of doing business" 2020 rankings, Available from: https://www.doingbusiness.org/en/rankings
[36] A series of NGOs have alleged human rights violations in relation to the projects and have brought a case against Total in French courts. Source: https://www.foei.org/press_releases/total-uganda-france-court-appeal-human-rights

Figure 8: Building a refinery results in a $1.8 billion hit to upstream value



For international upstream investors, building a refinery (which is our base case assumption) increases the cost per barrel of oil exports. If the refinery is built, fewer barrels of oil will be exported using the EACOP than would have been the case without the refinery. As EACOP costs are largely fixed (and mostly capital costs), the decision to build the refinery means that the pipeline's costs get amortised over fewer barrels, meaning that the pipeline cost per barrel would increase. A higher per barrel cost might mean that Ugandan oil might be less competitive on the global market and it would certainly mean that the value available to investors from exporting the oil would be lower than would be the case if the refinery were not been built. The decision to build a refinery (resulting in $300-$400 million of lost value to international upstream investors) has significant consequences in a BAU scenario, with "lost" value representing 30% of potential upstream value to international investors. In a WB2C scenario, the consequences of the decision are much more material, given that that the upstream investment does not return upstream investors' weighted average cost of capital on current commercial terms.

For the Ugandan government, the economic implications of the decision to build a refinery are more complex. The decision to build a refinery results in $1.4 billion in "lost" upstream value (through lower profit oil, royalties, corporate income tax and returns on UNOC's 15% ownership stake), representing 9% of the government's share of potential upstream value in BAU and 17% in WB2C. On the other hand, it would earn $1.2 billion in BAU from the refinery (through UNOC's 40% ownership stake and corporate income tax) and around $500 million in WB2C. That Uganda might continue to invest in the refinery despite is not a surprise, given its other benefits that are not included in these numbers (fuel security, balance of payments, etc.). The implicit value placed on those other benefits – being the economic "loss" incurred to get access to those benefits - rises significantly in WB2C, to around $900 million, compared with only $200 million in BAU[37].

4.3 Uganda's oil industry is unlikely to be viable without a reallocation of risk

Just as Uganda has important strategic objectives that may justify investing in the refinery, a deal between Uganda and international investors can only be viable if it can also satisfy the more narrowly financial objectives of the key international parties across upstream, pipeline and refinery investments. Table 3 below sets out a summary of what we understand to be the key strategic objectives and investment criteria for those parties.

[37] The "loss" incurred to get access to refinery benefits is calculated as the difference between the upstream value "lost" as a result of having a refinery and the value gained as a result of having a refinery. For BAU, this is $1.4 billion "lost" vs. $1.2 billion gained, or $200 million net "lost". For WB2C, the amount lost is still $1.4 billion, but the amount gained is only $500 million, hence $900 million "lost".

Table 3: Objectives of participants in Uganda's oil industry

Party	Direct objective	Indirect or other strategic interest
Oil investors (Total and CNOOC)	Earn a return higher than its hurdle rate (BAU); higher than WACC in downside scenarios (WB2C).	Expand footprint across value chain in growing East African fuel market (Total). Support of Chinese national interests as largest bilateral creditor to Uganda (CNOOC).
Oil investors (Tullow)	Unlock final $75m of Total consideration contingent on FID. Access to small residual share of post-FID oil revenues.	Protect commercial relationships with Total and CNOOC outside of Uganda (eg, Kenya).
Advisers: EACOP and refinery financing	Earn fees; protect against reputational risk.	Support of Chinese national interests as largest bilateral creditor to Uganda (ICBC). Align with principal shareholder (Standard Bank re: ICBC). Grow market share in growing Ugandan banking market (Standard Bank via StanBic subsidiary).
Project finance lenders	Get deal done but only if acceptable risk profile or syndication is possible; protect against reputational risk.	Support valuable client relationships.
Development Financial Institutions (DFIs)	Support deal(s) seen to be positive from a development perspective – most likely "ancillary" investments, such as electricity infrastructure or Kabaale airport, rather than oil resources themselves.	Protect position as lenders/donors to Uganda (re sovereign credit risk).
Export Credit Agencies (ECAs)	Support key investors and EPC contractors in lowering project costs.	Get deal done, but only if acceptable risk profile; protect against reputational risk.

4.3.1 Allocation of upstream climate transition risk between international investors and the Ugandan government

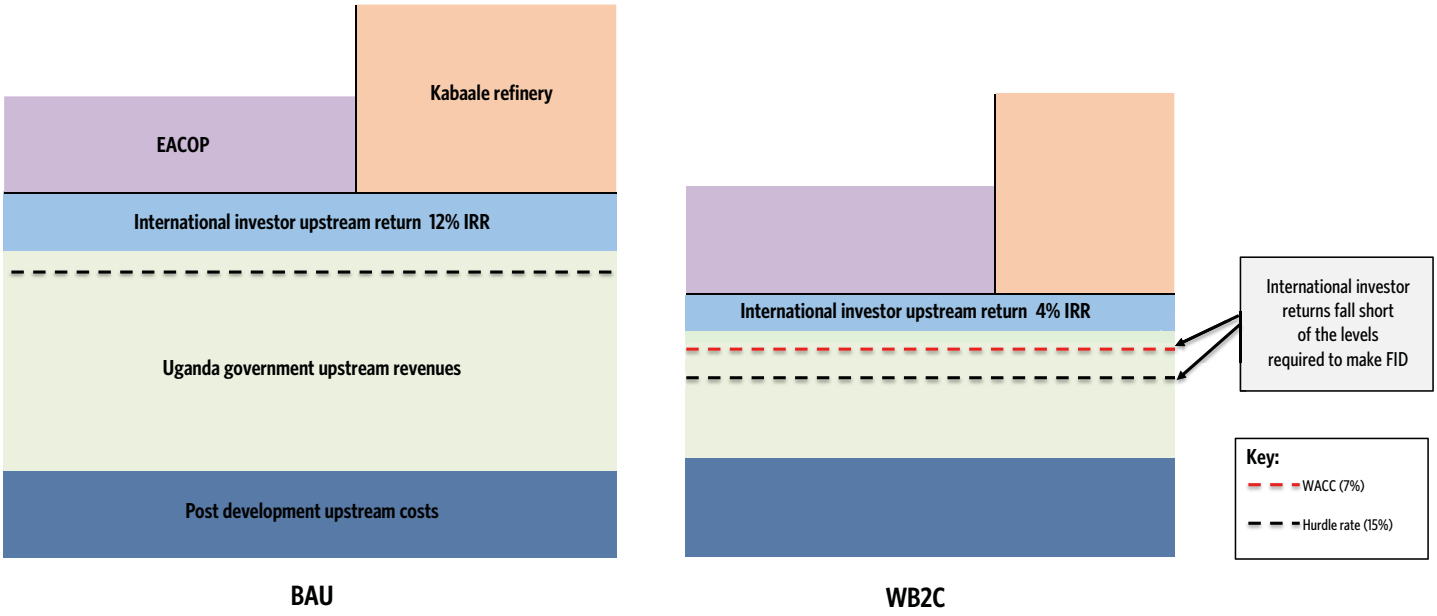
Investment in the development of Uganda's upstream oil production infrastructure is the lynchpin of the Ugandan oil industry and a prerequisite to investment in the refinery and access to the related economic and strategic benefits. The Kabaale refinery would likely not be competitive without access to Ugandan oil.

The split of value and risk relating to Ugandan oil resources is principally determined though contracts and regulation - dealing with production sharing (including cost and profit oil), royalties and the fiscal framework - and through the position of UNOC as future shareholder in the resource assets. After production licences were agreed in 2013, there was some dispute over whether Uganda had secured a good deal for itself under the pre-2012 PSAs [38] while the country developed a next-generation set of PSAs for future licences that allocated more value to Uganda [39] . Nonetheless, as illustrated in figure 10, our modelling of the "historic BAU" case (discussed in Chapter 3) showed that Uganda would have earned more than 84% of the available value if FID had not been delayed, while leaving enough value for investors to meet an investment hurdle rate.

However, as the amount of value available to all stakeholders has fallen by 70% since that point (between our "historic BAU" and BAU cases), we investigated whether a deal was still possible on the same commercial terms. As illustrated in figure 9 below, internal rates of return for investors are now just 12% and would fall to 4% in a WB2C case. That is, even in the BAU case, expected returns are under Total's quoted investment hurdle rate of 15%. The expected return is also below Total's publicly quoted weighted average cost of capital (7%), suggesting the investment would be value-destructive in a WB2C world.

[38] Platform (2012), Contracts Curse, Available from: https://platformlondon.org/p-publications/contracts-curse-uganda-oil-agreements-profit-before-people/ and Global Witness (2012), A Good Deal Better? Uganda's secret oil contracts explained, Available from: https://www.globalwitness.org/en/reports/good-deal-better/
[39] The published PSA for the Kanywatbab prospect area is an example of the "new" PSA design, Available from: https://www.globalwitness.org/documents/17832/contract_kanwatanya.pdf

Figure 9: The investment looks unviable for Total and CNOOC without terms being renegotiated



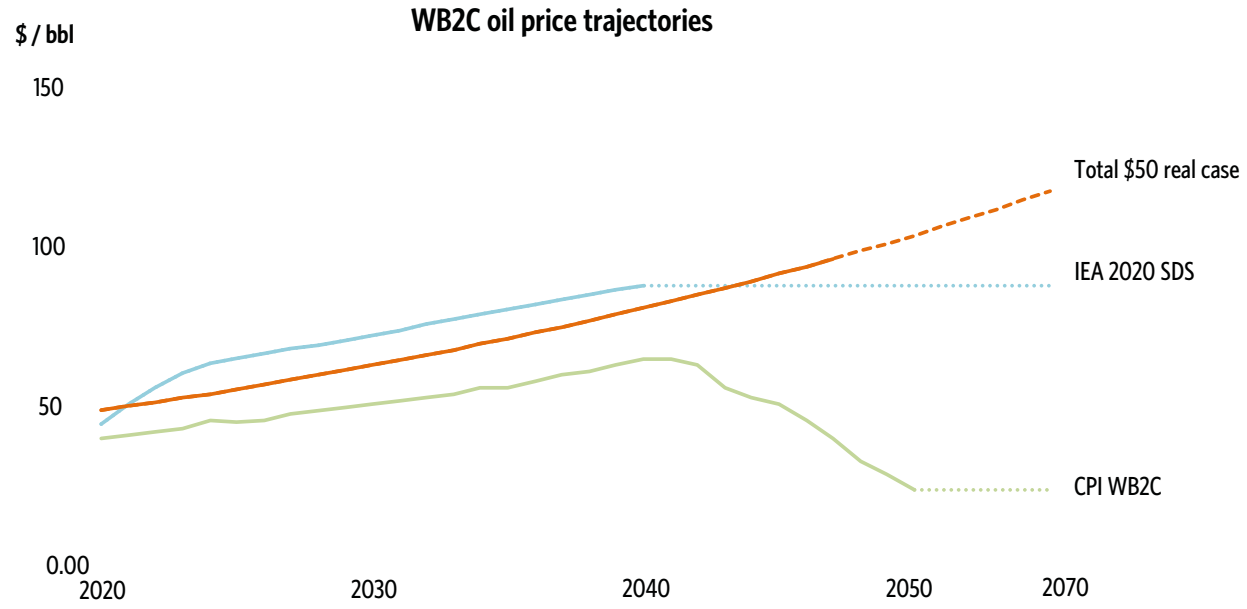
A decision to go ahead with the upstream investment on current terms would be hard to justify for Total, in particular, given the announcement in early 2020 of a new "climate ambition", where it committed to "assess[ing] each new material capex investment... for consistency with the Paris goals"[40]. At its Q3 2020 results announcement published in October 2020, Total reported that the Uganda project would return an IRR of 15% at a price of $50/barrel (real). As illustrated in figure 10, a $50 price trajectory diverges from CPI's WB2C scenario, particularly over the long term. The long-term price trajectory is unlikely to be consistent with a WB2C-aligned transition, while higher prices in the short term imply either higher global oil demand than included in our scenario, or faster decline rates[41] .

Regardless of WB2C scenarios, our model shows Total falling a long way short of a 15% IRR in a $50 price trajectory, perhaps implying that Total has already had some success in renegotiating risk allocation that has not yet been made public.

For CNOOC, investment decision-making criteria and the extent to which climate risks are incorporated within those decisions, are considerably opaquer than for Total. The company does not have a publicly quoted hurdle rate and its investor communications do not suggest that climate-related financial risk is incorporated into decision-making. In the company's most recent strategy presentation for investors[42] , the company set a target increase oil production by 11% between 2019 and 2022, while at the same time promising to "maintain prudent investment decision-making" and "focus on shareholder returns". If the company's majority shareholder, the Chinese government, believes that returns from CNOOC have been sub-standard in recent years, this could mean that CNOOC is encouraged to take an increasingly risk averse position in the Uganda negotiations. The fact that CNOOC did not take up the opportunity to purchase part of Tullow's stake, even at a seemingly attractive price, would suggest this. However, for as long as the Chinese government has interests in Uganda developing its oil industry, CNOOC may be given leave to sacrifice shareholder return for Chinese strategic interest. China also has significant economic exposure to Uganda as by far the largest bilateral government to government creditor[43] .

[43] Source: https://new-publications.total.com/05052020/pr/original-joint-statement-total-climate-action-100-plus.pdf
[41] See footnote 31 for a description of the potential differences between CPI's WB2C oil supply curve and the IEA's. There is limited transparency around both the supply and demand assumptions underlying Total's case.

Figure 10: Total's $50 real case diverges from CPI's WB2C case, particularly over the long term



4.3.2 Allocation of refinery climate transition risk between international investors and the ugandan government

Compared with the oil resources, the oil refinery will be relatively well protected against climate transition risk, unless it is impacted by future domestic climate policy aimed at reducing fuel use in Uganda.

As the refinery buys crude at a price linked to global market prices and would sell product at import parity prices, both input costs and revenues fall in a WB2C scenario, its profitability is partially protected, although product prices would fall further than crude prices. The fall in cost would be mostly passed through to consumers, although government could seek to capture some of this value by adjusting per barrel fuel taxation upwards[44] .

As illustrated in table 4 below, refinery investor returns would fall in a WB2C, however they would fall by much less than upstream investor returns fall between scenarios.

[42] Source: https://www.cnoocltd.com/attach/0/712e8768bfc7440f900afa8543179bf5.pdf
[43] At December 2019, Uganda had outstanding public debt of $13.4 billion, of which $8.8 billion was external debt. Of that, $2.3 billion of exposure was to China. The World Bank, through its International Development Agency, had larger exposure than China (at $3.4 billion), but as the IDA's loans are at deeply subsidised interest rates, China's loans are easily Uganda's most onerous debt service obligation. Source: https://www.finance.go.ug/sites/default/files/Publications/Public%20Debt%20Report%20MTDS%2019-20.pdf
[44] Taxes and duties currently comprise around 52% of the price of a barrel of petrol and 46% of a barrel of diesel. The absolute numbers are set out in the following: https://www.ey.com/en_gl/tax-alerts/uganda-issues-tax-amendment-bills-2020#:~:text=of%20processed%20milk-,Excise%20Duty%20(Amendment)%20Bill%2C%202020,per%201%2C000%20sticks%20from%2080%2C000

Table 4: Summary of investor returns by business segment

	Total SA upstream IRR	CNOOC upstream IRR	UNOC upstream NPV10	Non-UNOC refinery IRR	UNOC refinery IRR
"Historic" BAU (2015)	37.3%	39.4%	$3.2 billion	22.7%	22.7%
BAU	11.6%	12.2%	$1.0 billion	13.6%	13.6%
WB2C	4.0%	4.4%	$500 million	9.6%	9.6%

Based on this, a private (non-UNOC) investment in the refinery could still be viable in a WB2C scenario, provided there was a viable upstream investment, so long as the expected WB2C IRR of 9.6% is higher than potential investor weighted average cost of capital[45]. Whether that is the case will depend on the investor. Levered equity returns (ie, after project finance) below 15% in the BAU case would discourage many international financial investors (such as private equity funds), let alone the lower returns that would materialise in a WB2C transition.

As with upstream, the case for the Ugandan government is more nuanced. It would continue to receive corporate income tax from the refinery in a WB2C case, albeit lower sums. However, as with the putative international investors discussed the previous paragraph, it may also be challenging for UNOC, as 40% owner of the refinery, to make FID given those expected returns. As UNOC does not yet have significant accumulated financial reserves, it may need to raise project specific funding for its $640 million share of the $4 billion capex. If it raises these funds entirely from the Ugandan government (and hence from the issuance of sovereign debt), the investment may be viable, especially given the other benefits that the government is hoping to realise from this project. However, if that is not possible, given Uganda's weakened public finances, it may need to seek some third-party financing, such as debt and/or a minority non-government equity stake. Climate transition risk will make it harder and/or more expensive to raise that funding.

4.3.3 Why international investors will look to renegotiate terms in their favour

The analysis set out in the previous section demonstrates how – based on economic and financial considerations – there does not look like a viable deal to develop the Ugandan oil industry based on the "current" commercial terms that we use in our model. The continuing negotiations between the parties suggest that a process of renegotiation is likely already underway while public statements of FID by end of 2020 suggests that they may nearly be complete.

The current risk allocation framework that left significant risk with international investors in a higher oil price scenario does not appear viable in today's BAU scenario, let alone in a WB2C world.

If equity investors, such as Total, seek to renegotiate terms with the Ugandan government, we must assume that all other key parties will seek to renegotiate terms as well.

In recent years, most commercial banks, development financial institutions (DFIs), insurance companies and export credit agencies (ECAs) have, to differing degrees, started to understand the implication of climate transition risk on their portfolios. Spurred on by pressure from supervisory authorities as well from an increasingly vocal shareholder base, these industries are in the early stages of their own transition. Countries with significant DFI and ECA exposure to the Ugandan government[46] face a particularly tricky position given that they may seek to support Uganda's oil industry because they believe that it will bring economic (and development) benefits, but are increasingly prevented from lending to fossil fuel-related projects by climate change-related mandates. However, those mandates may not prevent them from providing more indirect support to the industry, for example, through UK Export Finance's loan to support the construction of Hoima airport[47] or investments in upgrading electricity transmission networks in the region.

[45] If the search for funding or the finalisation of the Environmental and Social Impact Assessment results in significant delays to the refinery project, it would increase the chance that the refinery cannot attract financing. This is because the economic value of the refinery and the availability of international capital for fossil fuel assets are both likely to fall over time.

[46] The Ugandan government regularly publishes the list of major public creditors. Available from: https://www.finance.go.ug/sites/default/files/Publications/Public%20Debt%20Report%20MTDS%2019-20.pdf
over time.

[47] Source: https://www.gov.uk/government/case-studies/colas-uk-to-help-build-ugandan-airport-with-ukef-support#:~:text=The%20largest%20ever%20UK%20Export,of%20equipment%2C%20materials%20and%20services.

Beyond the advisers on the EACOP project finance deal, we are not aware of the identities of other financial institutions associated with Uganda's prospective oil industry investments and so can only speculate on the actions they might take during a renegotiation in order to reduce their exposure to climate transition risk.

At one extreme, this could include pulling out of the project all together. For those lenders that remain, actions to reduce their climate transition risk exposure would likely push cost and risk onto the Ugandan government. Options could include an increase in pricing or a reduction in the amount of debt they are willing to lend relative to the total investment in the project (reducing the gearing). The latter might be justified by incorporating WB2C oil market assumptions into the base lending case. All else being equal, lower gearing would mean that higher revenues would be required for EACOP investors to achieve their target returns, meaning higher EACOP tariffs and marginally lower value for upstream.

4.3.4 Options for Uganda to renegotiate a deal

For Uganda, renegotiating new terms in the favour of international investors would be to go back on the public rhetoric which accompanied its tough negotiating stance over the last decade. However, the country's negotiating position has weakened as the value of the oil has diminished and so we would expect the Ugandan government to entertain potential renegotiations or else risk the collapse of plans to develop the industry.

We modelled a range of options, all of which would see Uganda taking on more risk and/or passing more value back to the international investors. For us to consider an option to be potentially "viable", it needs to produce an expected investor IRR of at least 7% (Total's WACC) in a WB2C case . Table 5 below sets out a summary of the results. These are divided into four groups: 1) adjusting PSC and fiscal terms; 3) adjusting the profile of or cancelling the refinery; 3) a combination of 1 and 2; and 4) a combination of 2) and 3).

Table 5: Summary of all modelled renegotiation options

Renegotiation option	Upstream investor IRR	Refinery investor IRR	Viable for upstream investors?	Viable for refinery investors?	Overall viable?
Base: WB2C	4%	10%	No	Uncertain	No
1. Base plus 10-year corporation tax holiday for upstream	8%	10%	No	Uncertain	No
2. Base plus waive corporation tax for upstream	8%	10%	No	Uncertain	No
3. 2) plus renegotiate PSC[48]	14%	10%	Yes	Uncertain	Yes
4) 3) plus reduce UNOC oil stake to 10%	15%	10%	Yes	Uncertain	Yes
5) Base plus delay refinery 3 years	5%	7%	No	No	No
6) Base plus refinery downsized by 50%	6%	6%	No	No	No
7) Base plus refinery cancelled	6%	-	No	-	No
8) 7) plus 10-year corporation tax holiday for upstream	10%	-	Yes	-	Yes
9) 7) plus waive corporation tax for resources	11%	-	Yes	-	Yes

[48] This scenario includes a reduction of the government's share of PSA value by 20% points across all tiers of profit oil and a reduction of royalties by 5% points

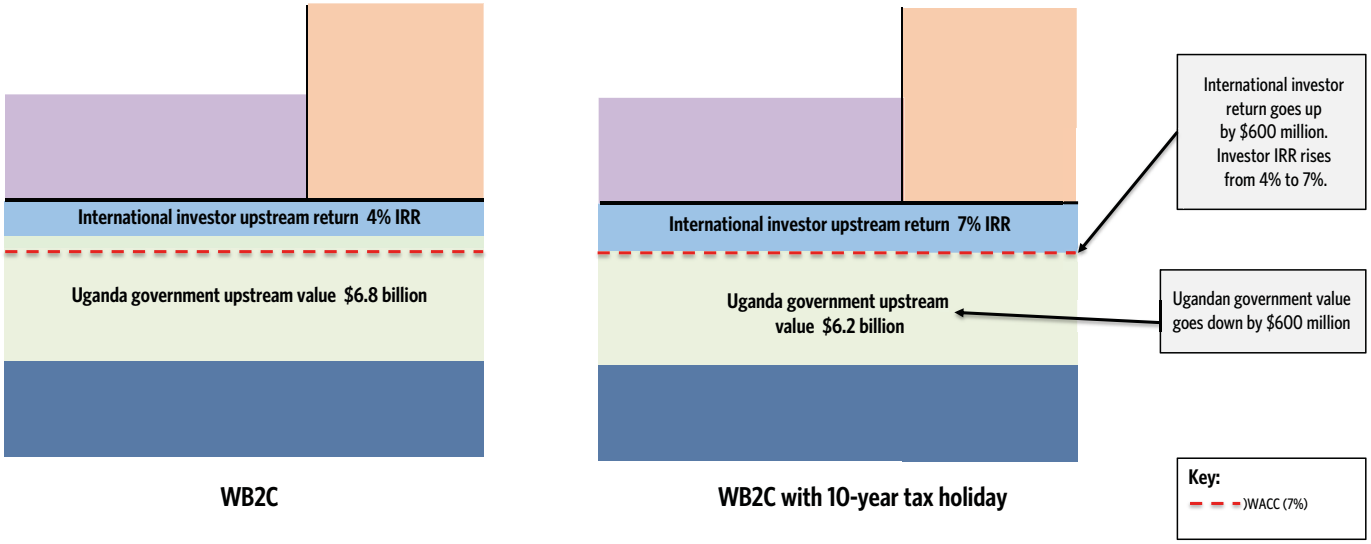
Table 5 shows that Uganda potentially has options to secure international investment both with and without cancelling the Kabaale refinery. Given that strategic benefits associated with the refinery, we expect that Uganda would prefer to secure an agreement using commercial terms alone. Our analysis shows that Uganda would be able to strike a deal that meets Total's WACC in a WB2C scenario through the extension of the 10-year tax holiday principle used with the EACOP pipeline to the upstream resources (renegotiation option 1).

As illustrated in figure 11 below, our analysis suggests that this renegotiation option would mean Uganda would need to give up WB2C value of around $600 million in order to secure international investment. There must be some uncertainty as to whether this would be sufficient to secure a deal, given increasing investor awareness of about climate transition risk[49]. By contrast, renegotiation option 3 would result in the government transferring $2.1 billion in WB2C value.

A transfer of $600 million would represent a transfer of nearly 10% of the total value that the Ugandan government would earn on current terms, more than the $470 million that it would stand to earn from the refinery in the same WB2C scenario.

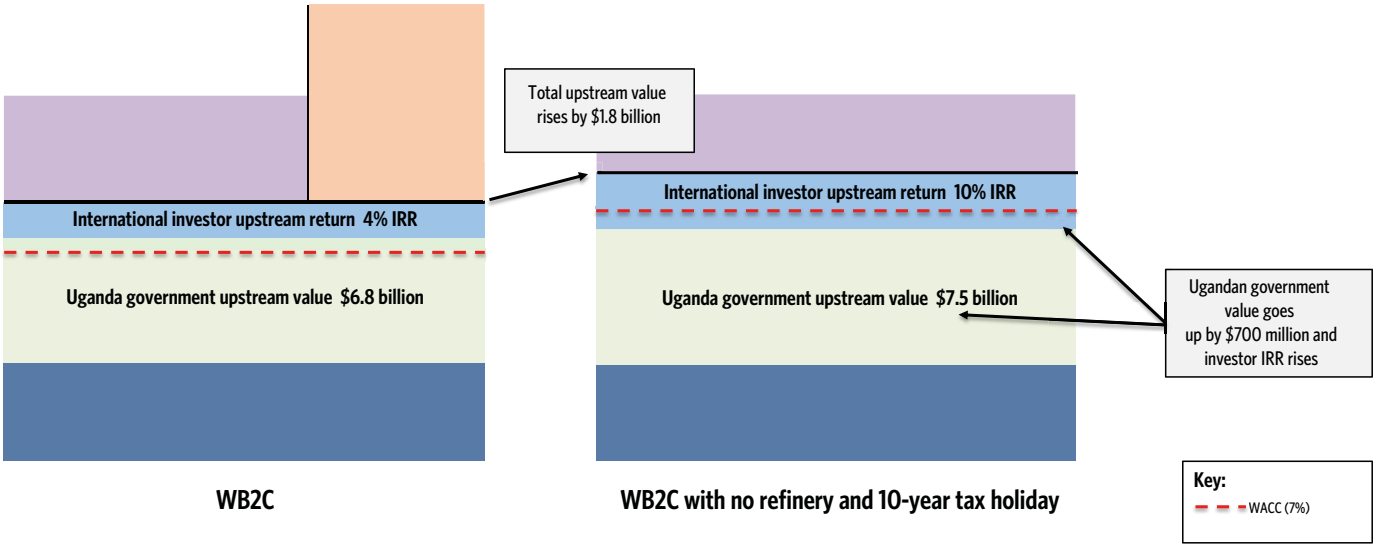
By contrast, in renegotiation option 8, where Uganda did not proceed with the refinery, Uganda could potentially secure international investment and not lose any economic value at all (even after accounting for lost refinery value), as illustrated in figure 12 below.

Figure 11: A ten-year tax holiday could reallocate just enough value to create viable investment case for Total and CNOOC in both BAU and WB2C scenarios, although the position would be very marginal



[49] Whether a ten-year tax holiday would be sufficient remains uncertain, given how marginal the economics are with this renegotiation and given the project's sensitivity to capex cost overruns and lower production. Capex cost overruns would hurt investor returns as even though investors would be able to recover increased costs through the cost oil provision in the PSA, this would be deferred by the cost oil cap. The project is more sensitive to lower-than-expected outturn production than capex cost overruns, as there is no mechanism in the PSA to compensate investors for lower sales volumes.

Figure 12: Cancelling the refinery would be the optimal strategy if the Ugandan government's only concern was for public oil revenue.



Were it not for the additional strategic benefits the government hopes to realise from the refinery, the optimal strategy would clearly be for Uganda not to proceed with the refinery. However, if the decision to build the refinery is not open for discussion, international upstream investors might pursue an in-between strategy to push for a delay to the refinery investment. This could allow investors to benefit from exports of more crude at higher prices in the early years of production, before the global transition accelerates (renegotiation option 5). By itself, delaying the refinery would be unlikely to raise expected upstream returns to acceptable levels, but it would damage the viability of the refinery itself.

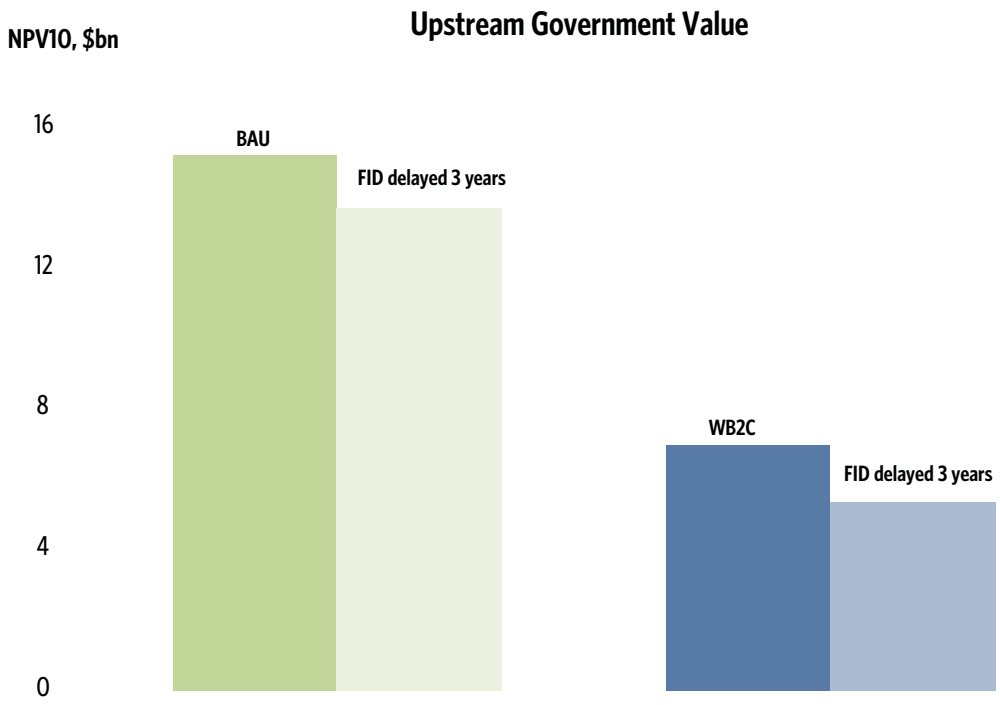
Overall, in a viable renegotiated deal, value accruing to the Ugandan government may be 60% lower than BAU and 90% lower than the value the government would have expected to flow to the public finances if the deal had not been delayed in negotiation.

4.3.5 Why further delay weakens the Ugandan government's negotiating hand

The likely need to renegotiate terms, as well as the potential political challenges associated with making material concessions, raises the risk of further delay to FID.

However, unlike the impact of previous delay (discussed in chapter 3), which worsened prospects for all parties, further delay at this point would principally weaken the government's negotiating hand. If the project is unviable for oil investors based on current terms and the value of the oil declines with further delay, then amount of value that the Ugandan government needs to reallocate under a renegotiation goes up with time.

Figure 14: Delays weaken the government's negotiating hand in both BAU and WB2C scenarios



4.4 Conclusion

With the significant decline in the value of Ugandan oil over the last few years, finding a deal which satisfies the strategic objectives of all parties may not be possible. Uganda will face challenges to secure financing for the Kabaale refinery and Uganda will likely not be able to secure the commitment of international upstream investors without giving up value. Our analysis suggests that cancelling the refinery would be the cheapest option for Uganda, but this would mean giving up on other significant strategic benefits provided by the refinery. If the government is not willing to give up on the refinery, the cost of securing international upstream investors could be significant.

In the next chapter, we consider the question of whether developing an oil industry is still worthwhile for Uganda, given the significantly lower benefits to the country that the industry would bring in a WB2C. The size of available value needs to be considered alongside the material risks to the public balance sheet that could arise from a decision to proceed with the industry.

5. Towards a more comprehensive picture of climate transition risk to the Ugandan public finances

Key messages

1. The benefits to the Ugandan public finances from the oil industry would be much lower than expected in the WB2C scenario, and even that residual value may need to be retained to stabilise weakening public finances, rather than spent on development.

2. The Ugandan government should reconsider whether to proceed with developing the oil industry, given lower than expected benefits and the need to take on significant long-term risks in order to secure international investor commitments.

3. Contingent liabilities arising from the oil industry can be hard to predict but could damage Uganda's economic resilience and introduce volatility into the public finances if not proactively managed.

4. Increasing awareness by global financial markets – particularly rating agencies and international financial institutions – of climate transition risk and other unpriced environmental externalities could erode Uganda's national risk-bearing capacity in the eyes of international donors and lenders.

5.1 Introduction

From the analysis set out in chapters 3 and 4, it is now clear that the value that Uganda stands to earn from developing an oil industry is a small fraction of what it might have expected to earn when the government placed the oil industry at the heart of its national development plan. The value of Uganda's upstream resources will continue to fall and it will become more uncertain as the global low carbon transition accelerates and Uganda's share of that declining pool of value may also fall as part of a renegotiated deal to secure the commitment of international partners Total and CNOOC.

Recent public statements about a FID before the end of 2020 suggest either that Uganda may be willing to proceed despite the insights set out in this report. However, it is also possible that Uganda is approaching the deal without incorporating climate transition risk into its decision-making. This chapter summarises the implications of climate transition risk for the Ugandan government, including likely lower-than-expected economic benefits and the potentially material other risks which the government is taking on by proceeding with the industry. We highlight potentially material contingent liabilities associated with the physical upstream, EACOP and refinery assets and their financing structures. We then discuss the risks to Uganda's external borrowing capacity posed by changing global financial market attitudes towards climate transition risk. Finally, we consider the risks to Uganda's economic resilience posed by other unpriced environmental costs that the country would take on as a result of the investment in oil.

There are several important practical implications that emerge from the conclusions set out in this chapter. In the context of a decarbonising world, the risks associated with developing a greenfield fossil fuel industry are so high that a government strategy that relies too heavily on oil (or coal) is unlikely to end up producing a sustainable development trajectory. Furthermore, those risks could impair Uganda's economic resilience and hence reduce its capacity to switch to a more sustainable strategy later down the line unless its donors and lenders are willing to provide debt relief in return for climate action. This is not something that Uganda can rely on. For Uganda's population, while oil revenues could bring some short-term benefit, a decision to proceed with developing the oil industry could therefore damage longer-term development prospects.

5.2 The benefits of oil to Uganda may be smaller than expected

In a renegotiated deal with international investors which retains the Kabaale oil refinery, the Ugandan government stands to earn $6.7 billion in net present value terms (10% discount rate) from its investments in the oil industry and the share of value it earns through taxes and PSAs. Government revenue is not the only source of value that will accrue to Uganda – the industry

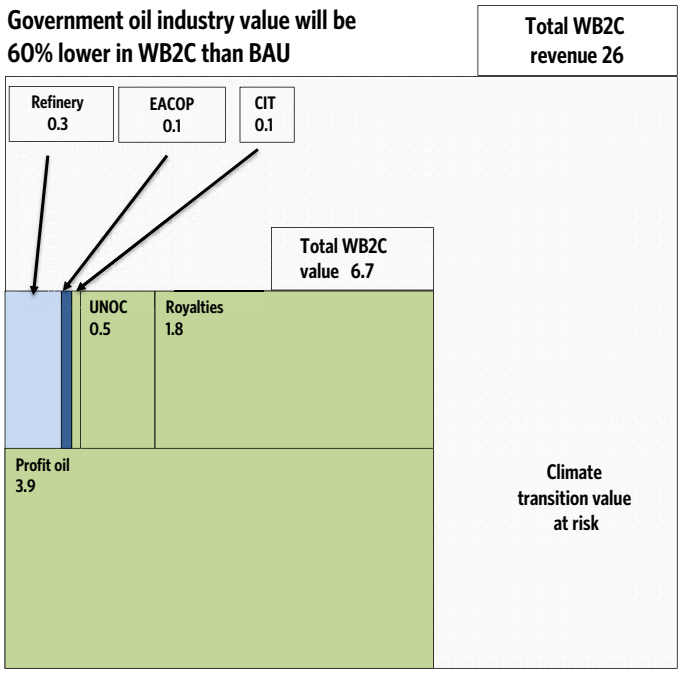
could generate around 15,000[50] direct jobs during construction and operation and an uncertain amount of indirect jobs and associated economic activity.

5.2.1 Benefits to the Ugandan public finances

As is illustrated in figure 15 below, our model shows revenues accrue to the country for a period of 22 years from first oil in late 2024 to the end of production and closure of the refinery in 2047. 85% of government value arises from profit oil ($3.9 billion), royalties ($1.8 billion) with smaller shares from UNOC ($500 million) and corporate income tax ($500 million).

Based on today's population of around 45 million[51] , $6.7 billion of value over more than 20 years amounts to around $150 (or USh 555,000) per capita. That amounts to around 20% of Uganda's 2019 GDP.

Figure 15: Value to the public finances from the oil industry will be significantly lower than expected in a WB2C-aligned transition



5.2.2 Sharing of revenues with local government

We expect that decisions as to the utilisation of Uganda's oil revenues will mostly be centralised at the level of the national government. The 2015 Public Finance Management Act[52] (the Act) provides for the sharing of 6% of royalties (or 2% of total government value) with local governments. The local government share of value in the WB2C scenario would therefore be around $110 million[53] over the whole operating period. Half of the shared royalties are to be split with local governments where oil exploration and production activities are going on, with the rest distributed across the country. Whether royalty sharing proceeds on this basis once oil starts to flow remains to be seen, given apparently inconsistent recent application of the provisions of the Act in relation to government spending of oil revenues[54] and the uncertain implications of the Act more broadly for relations between national and local governments[55] .

5.2.3 Spending of oil revenues by national government

Assuming that royalties are shared according to the Act, the $6.6 billion of remaining government value should be managed through the Petroleum Fund, which was also established through the Act. All government oil revenues should, in theory, be transferred into the Petroleum Fund and only withdrawn for one of two purposes: a) released to the government to support the annual budget (and then, only for "infrastructure and development projects") or b) to the Petroleum Revenue Investment Fund, a sovereign wealth fund.

As well as the two petroleum Funds, Uganda has also sought international advice on how to manage the implications of oil revenue volatility on its public finances, including the adoption of a "fiscal rule"[56] (currently being designed) which would aim to stabilise spending of oil revenues with the aim to ensure that public debt sustainability is maintained.

[50] Total E&P (2014) Planning for the future: A demand and supply study on the oil and gas sector in Uganda, Available from: https://unctad.org/system/files/non-official-document/12-OILGASMINE%20Special%20Event%2015-16%20Oct%202014-HAMMANN-2-en.pdf
[51] World Bank population data, Available from: https://data.worldbank.org/indicator/SP.POP.TOTL?locations=UG
[52] Source: https://www.ugandainvest.go.ug/wp-content/uploads/2016/02/Uganda_Public_Finance_Management_Act_2015_3.pdf
[53] This figure is calculated based on 6% of $1.8 billion total royalty value in net present value terms
[54] The Auditor General in Uganda has queried the Ugandan government's spending of the Petroleum Reserve Fund. Source: https://allafrica.com/stories/201902140195.html
[55] Mushemeza, E (2019), Decentralisation in Uganda: Trends, Achievements, Challenges and Proposals for Consolidation
[56] The fiscal rule is referred to in recent IMF publications on Uganda, most recently the May 2020 request for disbursements under the Rapid Credit Facility. Source: https://www.imf.org/en/Publications/CR/Issues/2020/05/14/Uganda-Request-for-Disbursement-under-the-Rapid-Credit-Facility-Press-Release-Staff-Report-49427

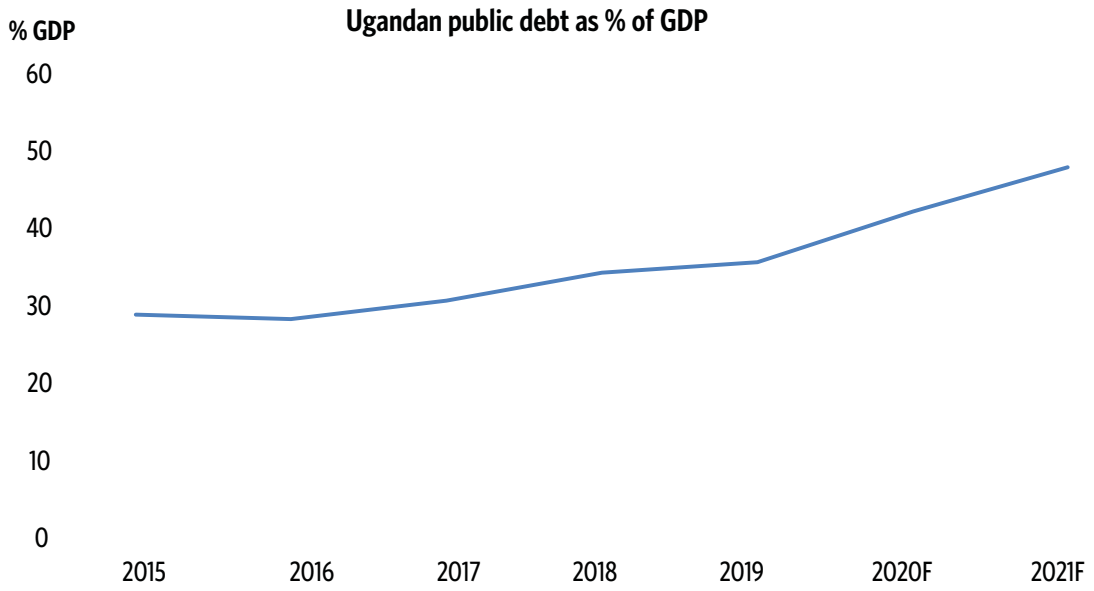
This makes a material expansion of public spending unlikely any time soon (see figure 16 below), especially given significant recent oil-related infrastructure spending that used all accumulated funds in the Petroleum Fund and caused public debt to rise sharply as oil revenues have been delayed through the period of negotiation[57] . With much of the increase in public debt funded at non-concessional rates (particularly from domestic lenders), the shift has resulted in a deterioration of Uganda's debt affordability metrics as the share of concessional debt as a proportion of Uganda's total debt stock continues to fall[58]. The negative economic impact to the Ugandan public finances from the COVID-19 crisis has exacerbated the situation, halving GDP growth forecasts from recent historic levels (to below 3% real GDP growth) at the same time as increasing vulnerability to external shocks, driven by low reserve coverage of imports and a growing share of public debt held externally to Uganda [59] .

With Uganda's financial position weakening, there may be a temptation for the Ugandan government to use oil revenues to fund budget deficits and arrest the decline in its public finances, rather than committing to significant incremental development spend. This may mean that it takes take many years for Uganda's population to see the benefit from the oil industry in the form of improved basic services or well-distributed economic benefits.

5.2.4 Balance of payments

Just as the distribution of oil revenue benefits among the Ugandan population is uncertain and may take several years to filter through, other important advantages to the public finances, such as the balance of payments, are also likely to be lower than expected if the government is not factoring climate transition risk into its planning. The balance of payments benefit that Uganda might expect to earn arises from a combination of crude oil export revenues and, where Uganda decides to build the Kabaale refinery, from reduced oil product

Figure 16: Rising public debt to GDP means that Uganda may prioritise short term cash flows and use oil revenues to shore up its public balance sheet



[57] A recent parliamentary statement by a finance minister confirmed "there isn't any money in the Petroleum Fund, we appropriated it last year, what was there, so we can't get what isn't there". Source: http://parliamentwatch.ug/the-state-of-the-ugandas-petroleum-fund/

[58] Source: https://www.moodys.com/research/Government-of-Uganda-B2-Stable-Regular-update-Credit-Opinion--PBC_1228633

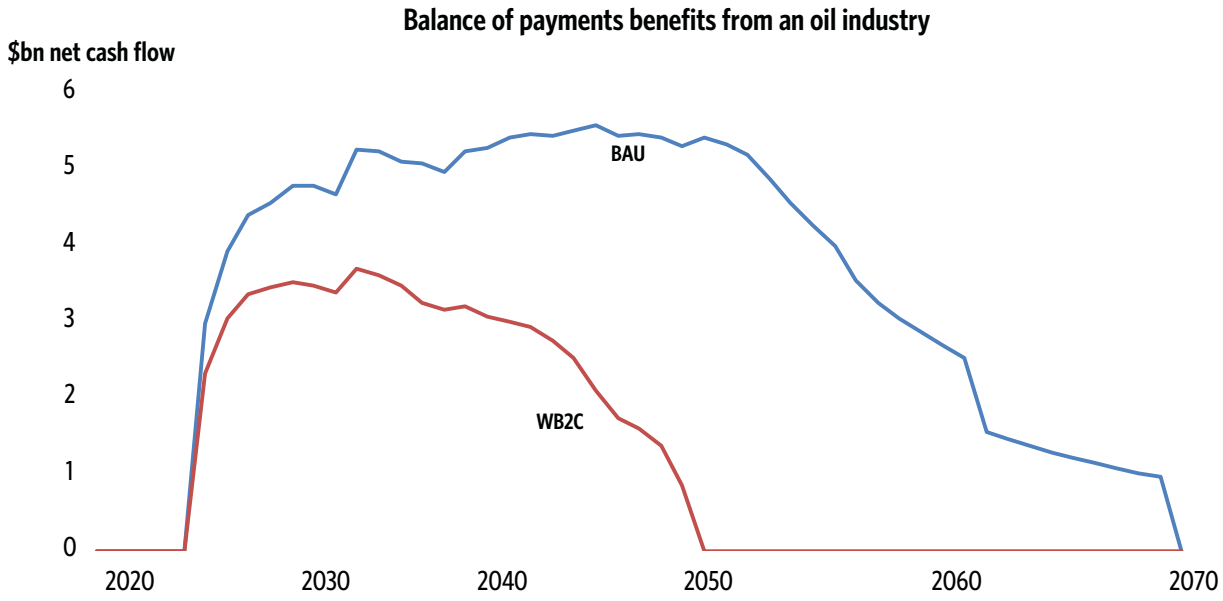
[59] See the IMF paper (https://www.imf.org/en/Publications/CR/Issues/2020/05/14/Uganda-Request-for-Disbursement-under-the-Rapid-Credit-Facility-Press-Release-Staff-Report-49427) for more detail. China remains the largest bilateral external creditor.

imports. Just as with public oil revenues, the quantum of balance of payment benefits will be very dependent on the final commercial terms agreed with international investors.

Uganda has recorded a trade deficit every year this millennium with 2018 marking the smallest annual deficit of $2.1 billion (or about 8% of GDP). Persistent trade deficits over this period have caused volatility for the Ugandan shilling although depreciatory pressure has been largely offset by increased foreign direct investment[60]. Balance of payments benefits from the oil industry could significantly benefit Uganda's external trade position but could bring additional challenges associated with an appreciating currency[61] .

If Uganda builds the refinery, annual balance of payments benefits peak in the late 2020s at around $3.5 billion in the WB2C scenario, a figure made up of $1.4 billion of crude oil sales and $2.1 billion of reduced oil product imports. While this is material compared with Uganda's recent trade deficits, it is significantly lower than Uganda's policymakers and central bankers might be planning for in a BAU scenario and the period over which these benefits accrue to the economy is much shorter .

Figure 17: The benefit to the balance of payments is short lived in a WB2C scenario



[60] Several papers including (https://archive.bou.or.ug/archive/opencms/bou/bou-downloads/research/BouWorkingPapers/2019/All/Exchange-Rate-Volatility-in-Uganda-Causes-and-Desirable-Policy-Options.pdf) detail the policies undertaken by the Bank of Uganda to help support the value of the Ugandan shilling

[61] There is a long literature documenting so called "dutch disease" in economies dependent on commodity exports.

5.3 The oil industry may be riskier than expected

As Ugandan officials work to complete commercial negotiations with their international partners to support FID as soon as possible, the question of how value will be shared in renegotiated terms will be front of mind. However, deciding whether a new deal works for Uganda requires a consideration not just of value, but of risk.

The Ugandan government will need to take on significant risk in any new deal and if it is not factoring those risks into its decision-making process, the decision to proceed with the oil industry could have long-term negative consequences for Uganda's economy – for the state of its public finances (and its sovereign credit rating), the ability to spend on development and the ability to mitigate physical and other environmental climate risks which will also sap the Ugandan government's long-term economic resilience, whether Uganda proceeds with its oil industry or not.

5.3.1 Contingent liabilities

As with all key participants in Uganda's oil industry, the Ugandan government is taking on a share of the total investment risk. However, the Ugandan government is also likely to take on contingent liabilities, which, by their uncertain nature and timing, are harder to plan for, but could have material implications for the Ugandan public finances.

Table 6 below summarises the potential contingent liabilities to government that could crystallise as the global low carbon transition accelerates.

Table 6: Potential contingent liabilities arising from oil developments

Contingent liability	Explicit (budgeted)?	Potential magnitude	Scenario in which risk could crystallise	Potential impact / timing
Government guarantees or other credit support in relation to EACOP and refinery project financings	Yes	Max: total value of debt ($4.9 billion [62])	If the transition accelerates and lenders have not ensured that financing structures are robust to transition risk	Unbudgeted cash outflows and increase in public debt / 2030s onwards
Additional government support / UNOC contributions to infrastructure investments	No	Max: 60% non-UNOC share in refinery ($1 billion)	If international investor appetite for fossil fuel investments falls as the transition accelerates and government cannot attract sufficient international funding (particularly a risk with the refinery)	Increase in public debt / next 5 years
Government guarantees or other credit support in relation to potential third- party financing of UNOC's equity participations in EACOP and refinery project financings	Yes		If UNOC's capital contributions are leveraged and climate transition risk reduces its equity returns, the company could face financial distress	Unbudgeted cash outflows and increase in public debt / 2025 onwards
Early decommissioning costs (ie, the costs relating to the dismantling of infrastructure and the making good of environmental degradation)	No	$1-$1.5 billion depending on the year	If oil or refinery assets become uneconomic earlier-than-expected and operators go bankrupt / decommissioning costs are not properly funded up front	Unbudgeted cash outflows and increase in public debt / 2030s onwards
Worker, community and local government support in case of early decommissioning	No		As above, but political/societal expectation of public spending to compensate those impacted by the transition	Unbudgeted cash outflows and increase in public debt / 2030s onwards

[62] This maximum exposure could materialise if both the EACOP ($2.5 billion debt) and refinery ($2.4 billion debt) project finances defaulted shortly after commissioning

Contingent liabilities like the ones noted above introduce the risk of unexpected and unbudgeted one-off cash obligations that increase volatility in the public finances. Their magnitude could also be material in the context of Ugandan current public debt levels of around $15 billion. Contingent liabilities, combined with stabilisation clauses that restrict the government's ability to make future changes to fiscal regimes, serve, like debt, as a drag on Uganda's long-term fiscal flexibility and hence, reduce its resilience to deal with economic uncertainty. However, recognition of climate-related contingent liabilities by credit rating agencies is uneven, potentially creating misaligned incentives for Uganda and other sub-investment grade sovereign credits.

5.3.2 Changing attitudes of global financial markets towards climate transition risk and public debt sustainability

While consideration of climate transition risk by global financial market actors has been accelerating in recent years, credit rating agencies and international financial institutions (IFIs) have been relative laggards. Moody's Investors Service (Moody's) launched a "carbon transition risk assessment" for rated companies in September 2019[63] but has yet to extend this service to rated sovereign and sub-sovereigns. The IMF announced in October 2019 that it was assessing the impact of climate risk on financial markets, but it has not yet integrated climate risk considerations into its standard assessments of the sustainability of public finances, the "Article 4 consultation". For as long as considerations of climate-related financial risk are absent, the assessment frameworks of these key institutions, governments may be incentivised to prioritise policies that provide short term economic gains, even if in so doing, they take on long-term economic or fiscal risks and lock-in current economic or development trajectories.

At the time of writing, Moody's held a sub-investment grade rating for Uganda of B2, with stable outlook. In a report from May 2020, it seemed like the balance of risks to Uganda was to the negative, with the analyst highlighting a series of challenges including weak institutional strength, the "erosion of fiscal strength" arising from sustained public deficits and rising public debt levels and concern that recent "fiscal expansion" is used to plug current spending deficits, rather than directed to productive public spending.

The oil industry is presented as one of the few positive stories for the Ugandan economy, with short-term investment and long-term revenue generation being one of the few potential contributors to raised GDP growth rates and hence debt service capacity. However, the paper seems to take at face value the suggestion that the oil industry would lead to significant revenues and makes no mention of the risks that the government could have to take on to secure the commitment of international investors, as discussed earlier in this chapter and in chapter 4 of this paper. However, if rating agencies do not account for sovereign climate transition risks of the sort described in this paper, then it is no surprise that sovereigns like Uganda do not do this on a systematic basis either.

Rating agencies typically prefer to use relatively short forecasting time horizons as they argue that issuers will always have options to mitigate declines in short-term credit quality and hence long-term forecasts are likely to be misleading. However, this approach does not account for the long-term drag on sovereign credit quality caused by short-term decisions of the sort described in the previous sub-section. The impact of long tenor contingent liabilities is likely to be more significant in less diversified economies and magnified as sovereign credit quality deteriorates, when the options for arresting a decline in public finances diminish at precisely the time when they are needed the most.

If rating agencies were to incorporate the risk and uncertainty in relation to Uganda's oil industry as well as the benefits, the current rating scorecard might show a different picture and Uganda's finance officials might be incentivised to consider a different approach, as shown in Table 7 below.

Uganda, like other sovereigns with existing or potential future dependencies on exports of transition-exposed commodities, faces significant risk from future changes in approach at rating agencies, IFIs and other international arbiters of the sustainability of public finances as international pressure for them to incorporate climate transition risk into their analysis increases.

5.3.3 Unpriced environmental risks and costs beyond climate transition risk

Global financial markets underemphasise climate transition risk but are starting to price it in in sectors like coal-fired power, thermal coal and increasingly oil markets. However, they do not yet account for climate transition risk in other emissions-intensive sectors (such as steel and cement production) and they do not

[63] Moody's launches tool to assess carbon transition risk for rated companies, Available from: https://www.moodys.com/research/Moodys-tool-assesses-carbon-transition-risk-for-rated-companies--PR_410850

Table 7: Key sovereign rating metrics (Moody's Investors Services) and potential adjustments [64]

Factor	Metric	Current Uganda assessment	Impact of climate transition risk
Economic strength	Average real GDP growth (5 year historic and projected)	5% (aa2)	Potential downward adjustment to GDP to account for underpriced risks
	Volatility in real GDP growth (10 year historic)	1.8% (a2)	As above
	Nominal GDP ($bn)	31.7 (b1)	As above
	GDP per capita (PPP $bn)	2,497 (ca)	As above
Institutions and governance strength	Quality of legislative and executive institutions	b	N/a
	Strength of civil society and the judiciary	caa	N/a
	Fiscal policy effectiveness	b	Could be marked down if climate risks not actively managed
	Monetary and macro policy effectiveness	b	Could be marked down if climate-risk not actively managed
Fiscal strength	Government debt / GDP	34.8% (aa3)	Debt could rise if climate risk not managed
	Government debt / Revenue	272.4% (ba2)	As above
	Government interest / Revenue	14.8% (ba3)	Debt could rise faster than revenue. Interest costs rise if rating downgraded.
	Government interest / GDP	1.9% (a1)	Debt could rise faster than revenue. Interest costs rise if rating downgraded.

account for other unpriced environmental risks. This means that that public assessments of Uganda's public debt sustainability overestimate the country's current economic resilience and hence, capacity to bear climate transition risk when it crystallises.

Unpriced environmental risks and costs can be split into two categories: those that are incremental to/caused by the decision to invest in the oil industry and those that are not. In the former category, are risks related to biodiversity loss during the construction phase for the oil facilities and the pipeline (with associated loss of value in the tourism industry) and the risk of polluted water sources if there are oil spills. Environmental risks that are not directly related to the project include Uganda's exposure to physical climate risk, the principal concern of Uganda's climate policy. Much of Uganda's physical risk exposure is already "locked-in" – it will result from global warming arising from global GHG emissions to date. Both types of unpriced environmental risk can be mitigated to some degree using a range of strategies, including reforestation, critical asset risk management and climate adaptation strategies, including insurance. However, just as with climate transition risk, with physical and other environmental risks, Uganda cannot protect itself against the likelihood that unpriced risks become priced.

5.4 Conclusion

If it decides to proceed with developing it oil industry, Uganda will likely need to take on significant long term risks to its public finances which could partially or more than offset the benefits that could arise from the industry in terms of oil revenue, benefits to the balance of payments and jobs. Uganda may still decide that it is worth pursuing oil-led development, but if it makes a decision to continue with the industry without factoring the risks into its plans, a net benefit to the country could turn into a net drag on economic resilience, hampering Uganda's capacity to bear risk at exactly the time when it needs to be investing in climate change adaptation measures to mitigate the accelerating physical consequences of climate change.

[64] "Current" Uganda assessment column contains metrics from https://www.moodys.com/research/Government-of-Uganda-B2-Stable-Regular-update-Credit-Opinion--PBC_1228633

6. Recommendations

The analysis set out in this paper was designed to provide a transparent and balanced assessment of the impact of a global low carbon transition on Ugandan oil. We have found that the economic case for Uganda to continue investing in the oil industry is marginal, at best. When considering the new offer on commercial terms that we expect Total and CNOOC to propose, the Ugandan government should consider carefully whether the benefits still justify a positive decision, given the risks involved.

Our recommendations are split into four categories. Two are directly related to the upcoming decisions in Uganda in the context of its economic development and considerations for those negotiating the risk allocation in commercial terms and long-term financing structures. A third provides guidance for Uganda to manage the climate transition risk that would arise from a decision to proceed with developing the industry. The final category of recommendations relates to the position of global financial market actors, such as rating agencies, to the impact of climate transition risk on sovereigns, as exemplified by Uganda in this paper.

These recommendations are primarily aimed at those who share value and risk related to that industry, including international investors – in upstream oil resources such as Total and CNOOC and the Kabaale refinery – and lenders directly involved in the project. A range of Ugandan public institutions also have direct interests, including the Presidency, Ministry of Finance, Planning and Economic Development; the Ministry of Energy and Mineral Development and the Uganda National Oil Company, which counts the two aforementioned ministries as its shareholders and is the one investor across the value chain.

However, as explored in chapter 5, the impact of climate transition risk in the Ugandan oil industry has broader implications within Uganda than just those who are directly affected. These include the Bank of Uganda, Ugandan local governments, workers and communities and may include other government ministries such as the Ministry of Local Government, and agencies such as the Ugandan Revenue Authority, the National Planning Authority and the Auditor General. As oil and climate transition risk will affect the Ugandan public finances, the management of that risk will also have implications for their bilateral public creditors and donors, such as those from China, Japan, France, Germany, the UK and multilaterals, such as the World Bank, IMF and the African Development Bank.

There will also be important implications for governments, investors and development institutions considering their approach to climate transition risk in developing countries out of Uganda.

6.1 Strategic considerations for Uganda in the context of its economic development planning

6.1.1 Recommendation 1 (to Government of Uganda): reconsider the decision to develop the oil industry in Uganda, after accounting for climate transition risk

In September 2020, Total, CNOOC and the Ugandan government signed the Host Government Agreement, reportedly one of the last hurdles before final investment decisions now slated for the end of the year. Renegotiation of commercial terms, of the sort discussed in chapter 4 of this paper, may already be well advanced. However, until final decisions are made, and in particular, long-term financing commitments are put in place, the Ugandan government has time to review its forecasts and negotiating strategy to account for the issues pointed out in this paper, if it has not already done so.

Until it does this, the government runs the risk of locking itself into a deal with limited scope for subsequent renegotiation, which does not meet its strategic objectives on items like improving the public finances, balance of payments, jobs and development goals. It also runs the risk of rejecting alternative development options (or groups of options), which might provide more climate transition risk-adjusted benefit to the Ugandan economy than the oil industry.

We expect that these issues will be particularly relevant for the Ministry of Finance and Economic Development, which has responsibility for fiscal policy and public debt as well as the Presidency. At a minimum, we would recommend that officials sensitise the models and projections used to support negotiations with the IOCs to see whether the government's strategic objectives continue to be met in the global transition scenarios set out in this paper. Performing this sort of analysis prior to investment decisions being made would also prepare those ministries to embed climate transition risk analysis into the ongoing process of managing the public finances if it decides to proceed with oil industry investments.

6.1.2 Recommendation 2 (to Government of Uganda): Investigate alternative options that allow for a more diversified development pathway and provide similar short-term economic benefits to those expected from the Kabaale refinery

In chapter 4, we set out why cancelling the Kabaale oil refinery could allow Uganda to renegotiate a deal with the international oil investors and not lose value to the public finances. However, if Uganda did that, it would lose the other significant benefits associated with the refinery, including the balance of payments.

If Uganda had alternative options – both for providing the benefits that it expects to flow from the Kabaale refinery and for the expected economic benefits of the oil industry as a whole – it could pursue an alternative strategy that was resilient to the global transition and would increase Ugandan policymakers' strategic options over time, rather than reducing their flexibility. However, as Uganda has expended significant time and cost over time in developing the institutional infrastructure for the oil industry, we are not aware of similarly powerful potential development ideas being discussed.

One such option may lie in expanding reliable and clean energy access. According to a recent International Energy Agency report on energy access[65] , in 2016, Uganda had 33 million people without access to electricity. 23% of people in urban settings and 19% of people in rural settings had access, way below the East Africa average at that time of 66% of people in urban settings and 31% of people in rural settings. An economic analysis from approximately a decade earlier estimated that for every 1% increase in electricity consumption in Uganda, GDP would increase by 0.603% [66] . This implies significant economic upside if Uganda were able to accelerate gains in electricity access, an enterprise that would likely create significant jobs and attract significant DFI funding. Extending electricity access would help to reduce dependence on biomass as cooking and heating fuel, a leading cause of premature deaths in Uganda.[67]

[65] International Energy Agency (2017), Energy Access Outlook. Available from: https://www.iea.org/reports/energy-access-outlook-2017
[66] Mawejje, J and Mawejje, D (2016). Electricity consumption and sectoral output in Uganda: an empirical investigation. Source: https://www.econstor.eu/bitstream/10419/147238/1/868592471.pdf
[67] International Health Metrics and Evaluation (2017), Global Burden of Disease Study 2017. Available from: http://www.healthdata.org/sites/default/files/files/policy_report/2019/GBD_2017_Booklet.pdf

6.2 Considerations for those negotiating commercial and financing terms

6.2.1 Recommendation 3 (to Uganda national oil company): incorporate climate transition risk into its negotiations with commercial partners, co-investors and lenders

Uganda National Oil Company (UNOC) currently has limited operations and today, principally, acts as the agent of the Ugandan government in the development of the oil industry. As the government's agent, UNOC has taken on a lot of responsibility for Uganda's public climate transition risk management.

UNOC faces transition risk to the value of its investments, and it is more exposed than any of the other parties we have surveyed if the government decided to cancel the refinery as part of its renegotiations with the IOCs investing in upstream.

UNOC is likely to have more influence over the negotiation of its EACOP and refinery investments as it is required to fund a share of capex in those assets, unlike its upstream stake. In doing this, UNOC may make commitments both a) to EACOP and refinery lenders and b) to funders of the combined $805 million in equity stakes that it needs to raise in respect of these projects. UNOC should ensure that it sensitises the models used to support these funding negotiations to ensure that it can still service any debts in a WB2C scenario and that it has secured funding for any capital commitments or contingent liabilities up front.

UNOC should also ensure that it seeks protections in shareholder agreements against the entry into the various upstream, pipeline and downstream consortia of investors with weaker credit standings.

6.2.2 Recommendation 4 (to total and cnooc): do not proceed with Ugandan upstream oil investments without a renegotiation of upstream commercial terms

As set out in chapter 4 of this paper, our analysis shows that Total and CNOOC's upstream investments in the Ugandan oil sector could be value-destructive in a WB2C case under the current terms.

A prudent approach to capital allocation, especially in sectors, such as greenfield oil exploration that are no longer strategic priorities (at least, for Total), would mean that Total and CNOOC should not invest in the assets unless they can renegotiate commercial terms to earn a higher risk-adjusted share of Ugandan oil value.

6.2.3 Recommendation 5 (to total and cnooc): do not proceed with ugandan upstream oil investments without an assessment of whether the deal is equitable for the Ugandan government

If a strategy to maximise risk-adjusted shareholder returns would suggest that Total and CNOOC should only invest on enhanced terms, a responsible investment approach would suggest that Total and CNOOC should only invest in Uganda if they believe that the deal is equitable or at least would bring net benefit to the country.

The parties should incorporate country climate transition risk assessments into screening processes for potential material developing country investments in order to ensure that their strong negotiating positions do not result in a deal that damages host country economic resilience. These assessments would also help the companies make public disclosures about their responsible investment processes.

6.2.4 Recommendation 6 (to commercial lenders): for parties structuring pipeline and refinery project financings, they should test the robustness of financing structures against a wb2c scenario and redesign where necessary

The three banks reportedly structuring the pipeline project financing (ICBC, Standard Bank and Sumitomo Mitsui Banking Corporation), should ensure that the structuring of the project is robust to a WB2C scenario.

This need not represent a change in typical project finance structuring practice whereby models are typically stressed with a range of sensitivities to ensure robustness to a wide range of uncertainty. If the project debt service coverage ratios fall below a targeted minimum level when stressed with a WB2C scenario, the banks should restructure the deal. There are a variety of ways in which they could do this, including reducing gearing and tenor, frontloading amortisation profiles; increasing the size of required project reserves and/or requiring other forms of credit support, such as guarantees and mezzanine or subordinated debt. The impact of bank de-risking activity is likely to increase required revenue for the project, and hence the pipeline tariff and the cost of Ugandan oil on the global market.

6.3 Managing climate transition risk effectively if Uganda decides to continue developing its oil industry

6.3.1 Recommendation 7 (to government of Uganda): if the oil industry proceeds, develop processes and strategies for monitoring and funding contingent liabilities.

In chapter 5, we identified several contingent liabilities that could arise from a potential deal to secure IOC investment. Before long-term commitments are made relating to the development of the industry, we recommend that the government scrutinise the deal specifically for contingent liabilities. Where possible, the government should take action in the negotiations to mitigate those contingent liabilities or at the very least, make them explicit, so they are easier to quantify and to monitor.

Explicit contingent liabilities, such as guarantees and other forms of credit support or other contingent capital contributions, should be explicitly budgeted for and monitored. We would expect these to be monitored and reported publicly in the same way that other contingent liabilities are reported publicly, in documents such as the National Budget Framework [68].

Implicit contingent liabilities, such as responsibility for decommissioning and environmental restoration costs in the context of early shutdowns, could be made explicit in commercial negotiations. Government could ensure that ringfenced security[69] is provided by oil investors to pre-fund upstream, pipeline and refinery decommissioning costs and other environmental contingent liabilities that is resilient to future changes of ownership. This could include a provision to restrict transfer of ownership in the upstream development company unless replacement security is provided and a provision to ensure that if Total or CNOOC were to divest part or all of its stake to a company with weaker credit standing, the incoming investor could be required to post security but from a financial institution with a minimum rating threshold.

Otherwise, government should be able to mitigate some of the impact of implicit contingent liabilities arising from the decline of the industry by incorporating climate transition risk into standard economic planning practice.

6.3.2 Recommendation 8 (to government of Uganda): incorporate climate transition risk into oil-based "fiscal rule" and plans for the spending of oil revenues.

If Uganda does renegotiate a deal with the IOCs and proceeds with the development of its oil industry, the government should ensure that it factors climate transition risk into the plan for spending the oil revenues. Uganda should take the opportunity afforded by the ongoing process of developing the policy infrastructure to protect its economy from oil volatility (including a "fiscal rule") to incorporate an understanding of climate transition risk into its public policy and public debt forecasting.

In practice, this would likely mean public spending plans that utilise only oil revenue that would be expected based on a WB2C scenario, rather than the higher revenues that would be implied by a BAU scenario. As has been the case in recent years as Uganda has invested $2 billion[70] in advance of oil revenues that were then delayed, there could be significant incremental risk to the public finances if the country implemented public spending plans based on a BAU expectation of oil prices, only to see revenues fall a long way short.

If Uganda did not factor in climate transition risk into its public spending plans, it would run the risk of continued increases in public debt, relative to GDP, reducing its debt sustainability and potentially leading to credit rating downgrades.

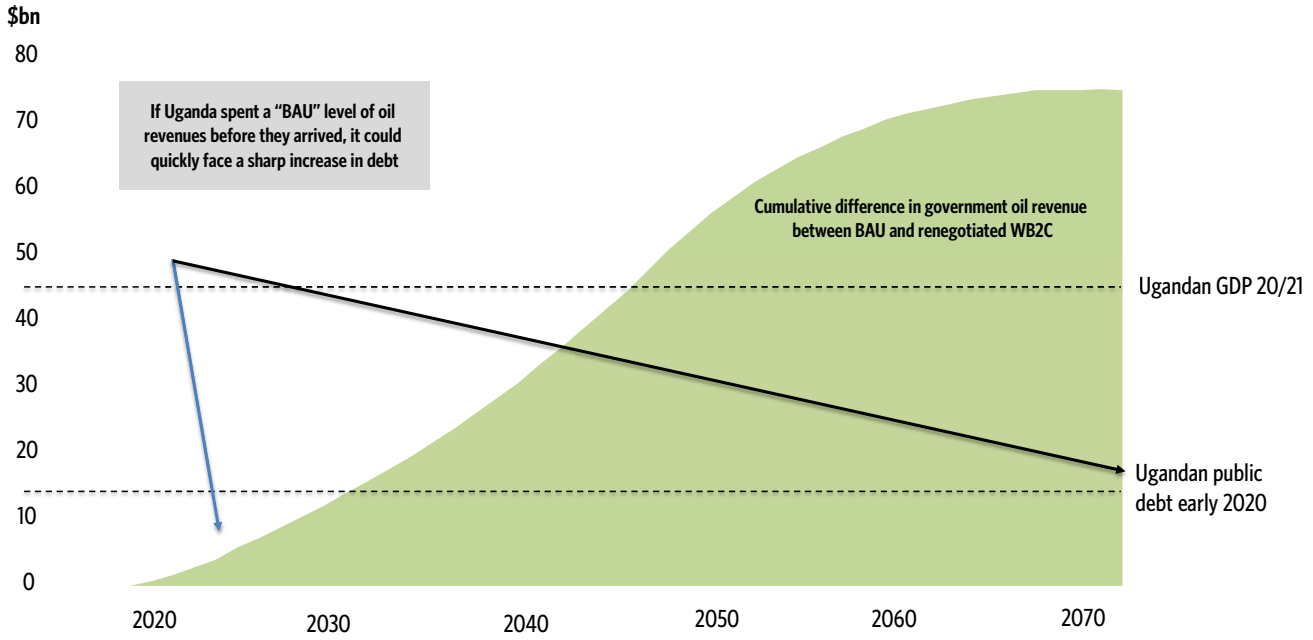
6.3.3 Recommendation 9 (to government of Uganda): incorporate physical climate risk and other environmental risks into forecasts of public debt sustainability.

In its most recent Article IV assessment of Uganda [71], IMF staff recommended that Uganda frames its oil-related fiscal rule in the context of a strategy to ensure public debt sustainability over the long term. The implication of the recommendation was that the Ugandan government should manage oil revenues prudently or else risk public debt sustainability becoming a concern.

As set out in recommendations 2 and 3, Uganda faces risks to its public debt position if it proceeds with the oil development but does not appropriately plan for the

[68] Source: ational Budget Framework Paper FY 2020/21 – FY 2024/25, Ministry of Finance, Planning and Economic Development, Available from: https://budget.go.ug/sites/default/files/National%20Budget%20docs/National%20Budget%20Framework%20Paper%20FY%202020-21_0.pdf
[69] This security could be a mix of cash, contingent facilities and insurance.
[70] Source: https://www.unoc.co.ug/news-oil-and-gas-sector-in-uganda-an-exclusive-interview-with-our-ceo/
[71] The latest Article IV consultation concluded in 2019. Source: https://www.imf.org/en/News/Articles/2019/05/07/pr19148-uganda-imf-executive-board-concludes-2019-article-iv-consultation-with-uganda

Figure 18: Uganda's public debt could rise sharply if it does not account actively monitor its climate transition risk exposure



consequences of climate transition risk. However, it also potentially faces significant already locked-in physical climate risk (as a result of historic GHG emissions) and nature-related risks resulting from the potential damage to Ugandan biodiversity that could arise through construction and operation of the upstream facilities and pipeline. These risks are currently mostly unpriced – ie, even though they might cause damage to physical and financial assets as well as degrading Uganda's natural capital, the costs associated with these risks are not factored into asset values. However, as with climate transition risk, there is significant momentum in developed countries to drive enhanced disclosure of physical climate risks and more recently, biodiversity and nature-related risks. As with climate transition risk, we would expect rating methodologies and IFIs to adjust their methodologies in the coming years to reflect these risks, a move which could undermine investor or donor perceptions of the risks of investing in Uganda, unless Uganda can demonstrate that it has identified these risks and is being proactive in seeking to mitigate them, though activities like climate adaptation and biodiversity conservation activities.

6.3.4 Recommendation 10 (to bank of uganda): develop in-house processes for monitoring and developing policy responses to the global climate transition and its impact on Ugandan exports and consider joining the network for greening the financial system.

Bank of Uganda (BOU) is an independent central bank that has responsibility for monetary policy. It operates a fairly orthodox inflation targeting regime and seeks to let the value of the Ugandan shilling be determined by currency markets, rather than through proactive management. BOU is also responsible for macroprudential and microprudential regulation of Ugandan financial markets and jointly responsible (with the Ministry of Finance and Economic Development) for maintaining financial stability.

If the value of crude oil exports is lower than expected in a WB2C scenario, there might be depreciatory pressure on the Ugandan shilling, putting upward pressure on the price of imported goods, and hence, inflation. If BOU developed an in-house team to monitor the speed of the global low carbon transition and its implications for the economy, it could make policy proactively to protect the economy against declines in oil markets. If an expert team were created at BOU, it could then provide valuable independent advice to the Ministry of Finance and Economic Development.

As it starts to build capacity relating to global oil markets and the low carbon transition, BOU might

benefit from being part of the Network for Greening the Financial System (NGFS). Through this organisation, it could get access to comprehensive resources on how its peer central banks around the world are dealing with similar issues. This insight could help the BOU in building its own internal expertise. Natural potential partners would include countries with significant bilateral lending operations in Uganda that are on the steering committee of the NGFS, including the Banque de France, Bank of England and the People's Bank of China.

6.4 Managing climate transition risk beyond the Ugandan context

6.4.1 Recommendation 11 (to total and cnooc): delay making new investment decisions until they have made an assessment of climate transition risk and how much to accept, relative to value

Our analysis showed that, in theory, Total faces downside risk of $1.2 billion between BAU and WB2C cases under existing commercial terms, while CNOOC faces downside risk of around $630 million, representing about 1% of current market capitalisation for each company[72]. This shows that, even though the upstream investments appear unviable on current commercial terms, value at risk is not material for either company.

However, climate transition risk is likely to be material at the portfolio level for each company. Total booked an $8 billion impairment charge at its H1 results in July 2020 in relation to Canadian oil sands and certain liquefied natural gas projects. A couple of months earlier, the company had released its new climate ambition to reach net zero by 2050[73] and set out a series of criteria for making new investments, including the requirement to stress test them against a Paris-compliant scenario.

The modelling set out in this paper suggests either that Total is not yet stress testing investments in that way; that the scenario it is using is not consistent with a WB2C scenario or that it has already renegotiated commercial terms with the Ugandan government in order to improve its expected WB2C return to an acceptable level. Either way, the company could benefit from improved transparency and disclosure about the assumptions and hurdle rates it has used to assess the viability of the investment in a WB2C "downside" case. If the company were to make a clearer articulation of the criteria it used in relation to climate transition risk beyond "alignment" – perhaps through explaining how new investment propositions are tested against the company's tolerance or appetite for climate transition risk – it could demonstrate to investors a prudent, methodological approach to capital allocation in uncertain times. This could allow the company to benefit from share price re-rating relative to European peers BP and Royal Dutch Shell, whose share prices have also fallen sharply since announcing "net zero" targets.

Similar recommendations would apply to CNOOC, although the company faces less pressure from equity markets given the Chinese government is a majority shareholder.

6.4.2 Recommendation 12 (to commercial lenders): if project lenders rely on credit support from the government of uganda, they should factor climate transition risk into the assessment of Uganda's credit profile

Banks structuring the project financings may seek credit support from the Ugandan government as one means of de-risking the deals and attracting lenders. However, to the extent that loan tenors are expected to be longer than the forecasting time horizons of rating agencies, banks should supplement rating agency credit analyses with their own analyses of how climate transition risk will impact Ugandan sovereign creditworthiness.

6.4.3 Recommendation 13 (to public financial institutions): do not lend to Uganda's oil industry projects or supporting/ancillary infrastructure without an assessment of the development benefits to Uganda that accounts for climate transition risk

Public financial institutions with development mandates, including DFIs and IFIs should not lend to Ugandan oil industry projects or ancillary infrastructure (such as airports, roads and electricity transmission lines) unless the development benefits are shown to be resilient to a sovereign climate transition risk analysis.

[72] Market capitalisation as of 10th November 2020
[73] Source: https://www.total.com/media/news/total-adopts-new-climate-ambition-get-net-zero-2050

The extent to which Uganda's largest multilateral lenders, the World Bank and the African Development Bank, are involved in these projects is unknown, except for the fact that the African Development Bank has publicly stated that it would not participate in the EACOP financing .[74]

Governments should adjust the mandates of export credit agencies (ECAs) to ensure that those agencies demonstrate that their investments – at project level and where sovereign credit support is obtained – are resilient to a WB2C scenario. They should also ensure that the mandates of ECAs when it comes to climate-related financial risk are aligned with the often stricter standards implemented by DFIs from the same country[75].

6.4.4 Recommendation 14 (to public financial institutions): encourage the Ugandan government to incorporate climate transition risk into its decision-making and to consider alternative, more diversified, development strategies

We expect that most of Uganda's largest public DFIs (such as France and Germany) are unlikely to participate in oil-related lending, due to increasing reluctance to take on climate transition risk and climate-related reputational risk. Others, such as China and Japan, have not yet implemented significant restrictions on overseas fossil fuel lending [76] . However, if Uganda's public debt sustainability declines as a result of mismanaged climate transition risk, development lenders potentially face incurring losses on their investments .[77]

At a minimum, public creditors to Uganda should protect their own economic interests by using their engagement with the Ugandan Ministry of Finance to encourage the government to adopt policies that are at least neutral for Ugandan sovereign credit quality and to adopt prudent public finance management practices that incorporate climate transition risk. Public DFIs with mandates geared to support the Paris Agreement and UN Sustainable Development Goals should scale up their current level of support for research to develop development strategies that at least are resilient to a low carbon transition and can even benefit from one. This research should include the development of alternatives to fossil fuel projects that can replace the benefits from those projects (to GDP, jobs and the balance of payments) that can meet both short-term and long-term economic goals.

Going beyond risk management and research, DFIs and sovereign bond investors could build on recent innovations in green and sustainable financing markets to offer new sovereign loans with variable pricing to incentivise governments to reduce their climate-related financial risk exposure (physical and transition risk) with lower debt costs .[78]

6.4.5 Recommendation 15 (to rating agencies and the imf): phase in the incorporate climate transition risk and physical climate risk into sovereign credit ratings and public debt sustainability analyses

Many of the recommendations set out above refer to unilateral action by parties to Uganda's oil industry to incorporate climate transition risk into their planning. While there are currently no trusted public sources of information about climate transition risk at either the corporate or sovereign level that allow investors to compare relative exposure and make investment decisions, it is likely that climate-related financial risk analysis will be adopted unevenly and information asymmetry may result in investment decisions being made that place significant climate transition risk onto companies and governments with limited risk-bearing capacity.

If respected arbiters of public debt sustainability, such as the rating agencies and the IMF, were to incorporate a constant measure of climate transition risk into their public debt sustainability analyses, all parties would have access to the same information and information asymmetry would reduce, resulting in better aligned major investment decisions. However, these agencies should phase in these assessments over time and after

[74] Source: https://www.afdb.org/en/news-and-events/press-releases/african-development-bank-strongly-rebuts-claims-it-plans-provide-financial-support-east-african-crude-oil-pipeline-project-35282

[75] Agence Française de Devéloppement (AFD) has a mandate that aims for 100% compatibility with the Paris Agreement. Source: https://www.afd.fr/en/our-priorities. Whereas the French state recently announced climate targets that still allow significant scope for supporting fossil fuel investments in the long term via BPI France. Source: https://uk.reuters.com/article/us-france-economy-export-financing/france-to-rein-in-export-guarantees-for-oil-and-gas-industry-idUKKBN26X1VI

[76] Overseas Development Institute tracks public finance flows to fossil fuels. China, Japan and Korea still provide material financial support to coal. Source: https://www.odi.org/sites/odi.org.uk/files/resource-documents/12744.pdf

[77] The recent sovereign default by Zambia and debt restructuring in Angola illustrate the limited capacity of some commodity-dependent Sub-Saharan Africa to cope with external shocks.

[78] South Africa's "Just Transition Transaction", currently being structured, is an example of such innovative thinking. Source: http://meridianeconomics.co.za/wp-content/uploads/2020/04/SA-Just-Transition-Transaction-proof-of-concept_Meridian-Economics_Master_v0.2-1_April-2020_compressed_final.pdf

wide public consultation. If they were to shift their methodologies sharply and without adequate warning, the shift in methodology could, in itself, create risk to sovereigns if climate transition risk was suddenly priced into sovereign bond markets. Similar principles apply for the incorporation of physical climate risk and other nature-related risks.

Recommendations	Recommendation for
Strategic considerations for Uganda in the context of its economic development planning	
1 Reconsider the decision to develop oil industry in Uganda after accounting for climate transition risk.	Government of Uganda
2 Investigate alternative options that allow for a more diversified development pathway and provide similar short-term economic benefits to those expected from the Kabaale refinery (such as electrification as a means of expanding energy access and offsetting demand for liquid fuels)	Government of Uganda
Considerations for those negotiating commercial and financing terms	
3 Incorporate climate transition risk into negotiations with commercial partners, co-investors and lenders.	Uganda National Oil Company
4 Do not proceed with Ugandan upstream oil investments without a renegotiation of upstream commercial terms	Total and CNOOC
5 Do not proceed with Ugandan upstream oil investments without an assessment of whether the deal is equitable for Uganda.	Total and CNOOC
6 Test the robustness of project finance structures against a WB2C scenario and redesign if necessary.	Structurers of EACOP and Kabaale project financings
Managing climate transition risk effectively if Uganda decides to continue developing its oil industry while the low carbon transition accelerates	
7 If the oil industry proceeds, develop processes and strategies for monitoring and funding contingent liabilities.	Government of Uganda
8 Incorporate climate transition risk into oil-based "fiscal rule" and plans for the spending of oil revenues.	Government of Uganda
9 Incorporate physical climate risk and other environmental risks into forecasts of public debt sustainability.	Government of Uganda
10 Develop in-house processes for monitoring and developing policy responses to the global climate transition and its impact on Ugandan exports, drawing on international expertise, potentially through the Network for Greening the Financial System.	Bank of Uganda
Managing climate transition risk beyond the Ugandan context	
11 Delay making material new investment decisions until they can be assessed vs. a company-wide understanding of climate transition risk appetite, relative to value.	Total and CNOOC
12 Where investors/lenders rely on credit support from the Ugandan government, factor in climate transition risk into the assessment of Uganda's sovereign credit profile.	Prospective investors and lenders to project financings
13 Do not lend to Ugandan oil industry or ancillary infrastructure projects without an assessment of the development benefits for the country that would arise, adjusted for climate transition risk.	Public donors, lenders and export credit agencies considering lending to Uganda oil projects
14 Encourage the Ugandan government to incorporate climate transition risk into its decision-making processes	Public donors and lenders to Uganda at sovereign level
15 Gradually phase in the incorporation of climate transition risk and physical climate risk into published assessments of public debt sustainability.	Rating agencies and IMF

Appendix A: Further information about CPI's global crude oil model

In order to understand the impacts of the transition on global oil markets, we have developed a detailed global crude oil model. Having an in-house model allows us to project which fields are likely to be economic in which scenarios and hence, understand the distribution of climate transition risk exposure between different companies and countries.

The CPI global crude oil model produces an annual Brent oil price forecast for each year from 2020 to 2050 for any given climate transition scenario. The model contains field-level data on available oil supply, mostly taken from independent data provider Rystad Energy. Supply data is kept stable between different climate transition scenarios, while global oil demand varies with each climate transition scenario.

The model generates a Brent price by balancing global oil supply and demand, with the price determined by reference to the marginal (most expensive) field required to meet demand, while minimising global supply costs.

Oil demand curves

The starting point for creating the demand modules of our global crude oil model is demand inputs taken from the International Energy Agency's (IEA's) principal scenarios. For the BAU scenario, we take demand inputs from the IEA's STEPS (stated policies) scenario. For the WB2C scenario, we take demand inputs from the IEA's SDS (sustainable development) scenario.

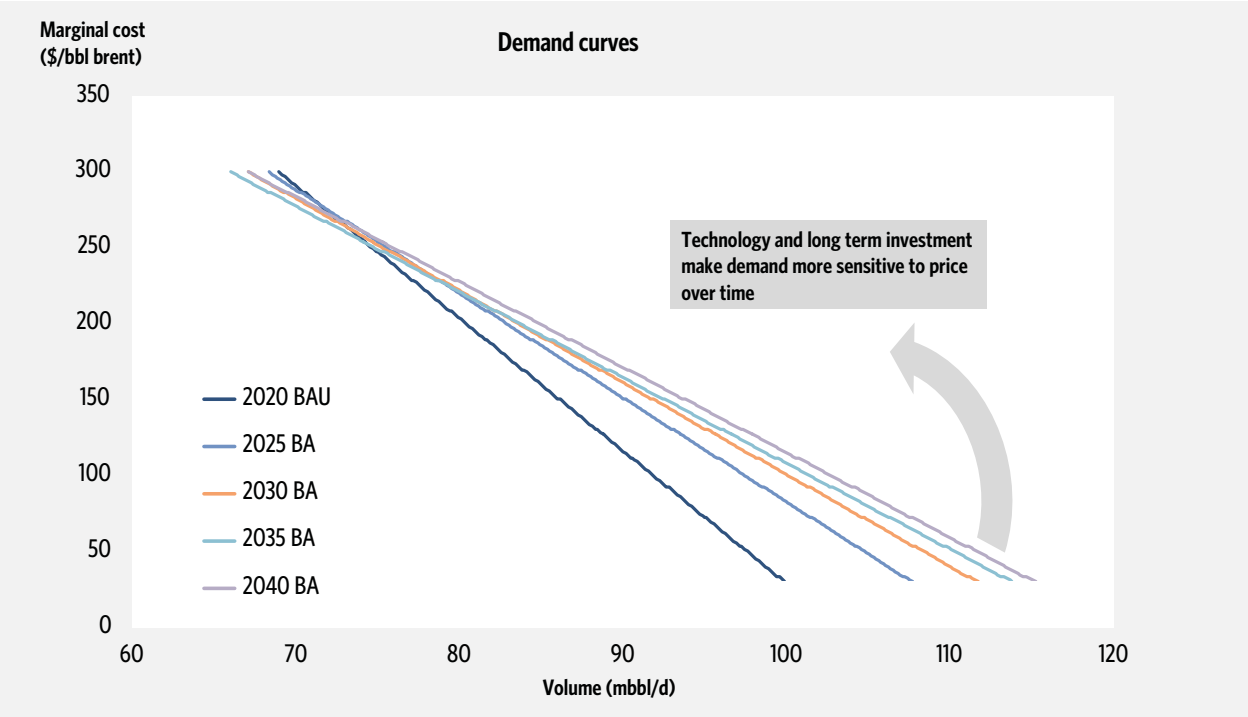
IEA oil scenarios only go out to 2040, meaning we need another approach to estimate post-2040 demand.

In the BAU scenario, we keep global oil demand flat from 2040 to 2050.

In WB2C, we derive demand assumptions from 2040 to 2050 using a methodology which calculates the remaining global carbon budget at 2040 and the required emissions reduction trajectory between 2040 and 2050 in order to meet a WB2C scenario. In this scenario, the share of energy demand taken up by oil remains flat between 2040 and 2050. Finally, we keep the 2050 price flat until 2070, reflecting the significant modelling uncertainty about this final 20-year period. However, the 2050-70 assumption is not material to our analysis as Ugandan oil stops being economic to produce in 2047 in the WB2C scenario.

We do not use the demand inputs described above directly. Rather, we adjust them to account for consumer demand price elasticity over both short- and long-term horizons. Oil markets are less elastic over the short-term as consumers are less able to respond to changes in price, whereas the ability of markets to adjust to long-term structural changes in prices is more pronounced. Elasticity of consumer demand depends on the sector in question. We assume, for example, that it takes about 15 years to depreciate and retire capital equipment in oil intensive industries, but only 8 years on average to retire light transport vehicles – showing that light transport could be more responsive to long-term oil price signals than heavy industry. By incorporating long-term elasticity, we create a flatter and more responsive demand curve as we forecast over longer term time horizons.

Figure 19: Since more factors, including investment in energy efficiency, are variable over longer time periods, oil demand becomes more elastic over time

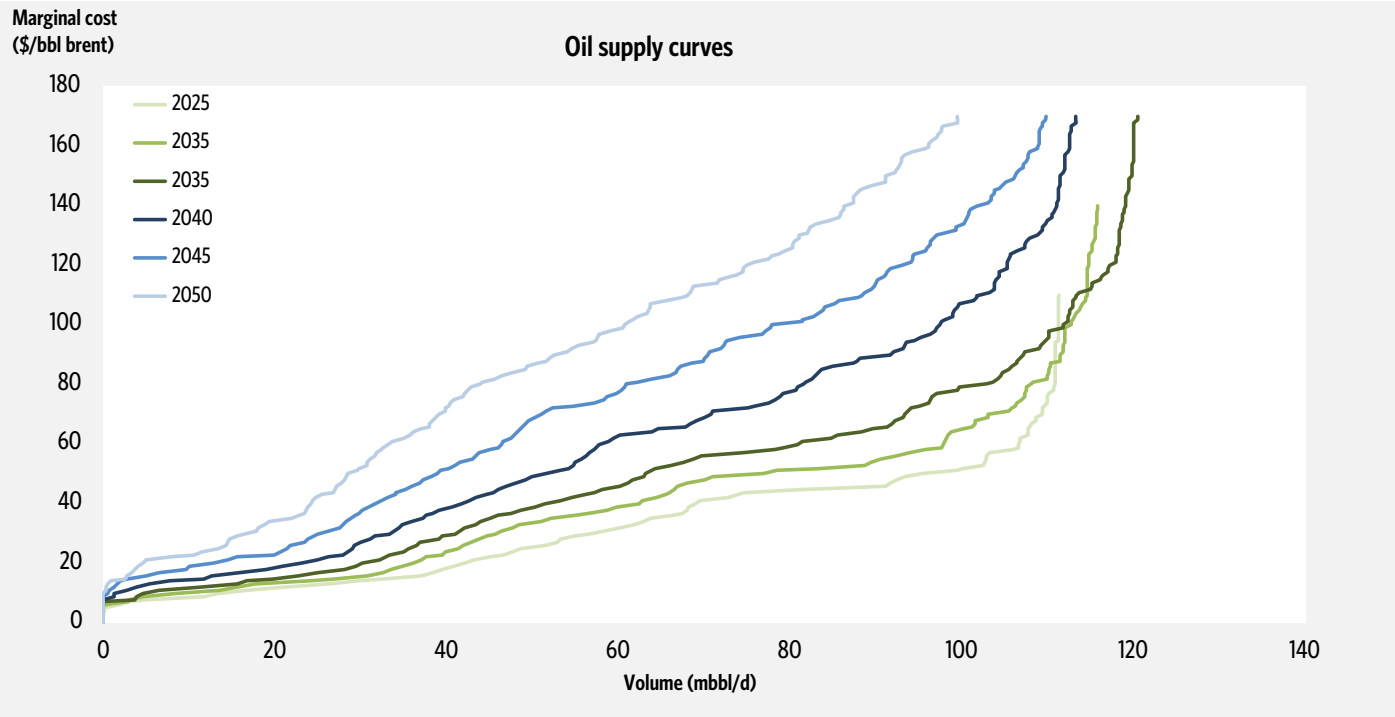


Oil supply curves

The crude oil model contains a supply curve using field-level data from Rystad Energy. The supply curve contains information about the production likely to be available from each asset and the costs associated with supplying this production. The cost curve includes the largest fields as individual assets, while smaller fields are grouped, according to other criteria, such as country, type of development and lifecycle. For "existing" assets, ie, those which are currently producing the cost curve includes individual fields with over 3 billion barrels of economically recoverable reserves. For "future" fields, we include individual fields with over 300 million barrels of economically recoverable reserves. We assess future fields more closely because future projects are more likely to be marginal and set the price across the model time horizon

The model splits the supply curves into assets at different points of the development lifecycle – between those that are existing; those that have been discovered but are yet to be developed and those that are yet to be discovered. The calculation of the marginal cost for each group of assets is different. Existing assets will supply volumes to the market if market prices are higher than their marginal operating costs. Capital costs are not included in their marginal cost because these have already been sunk. Assets which have been discovered but are yet to be developed require prices that allow their owners to recover development costs, hence these assets enter the supply curve at their project "breakeven" prices (opex + maintenance capex + development capex charge). Assets which are yet to be discovered also need to account for exploration costs associated with their discovery. The inclusion of development and exploration costs for future assets means that these volumes tend to be more expensive. Given that these assets make up a greater portion of the supply curve in later years when future projects replace existing fields where output is declining; this also implies a degree of cost escalation within supply curves as we move through time.

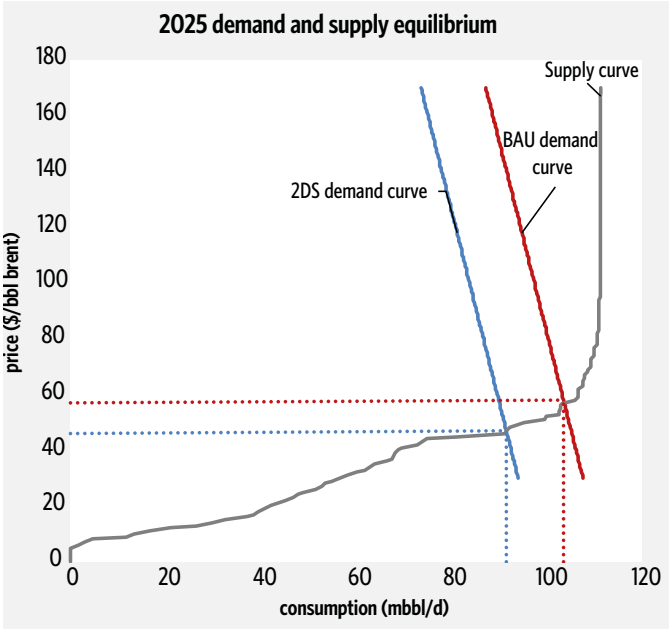
Figure 20: Oil supply curves escalate over time as investors have greater opportunity to manage investments with respect to future price expectations

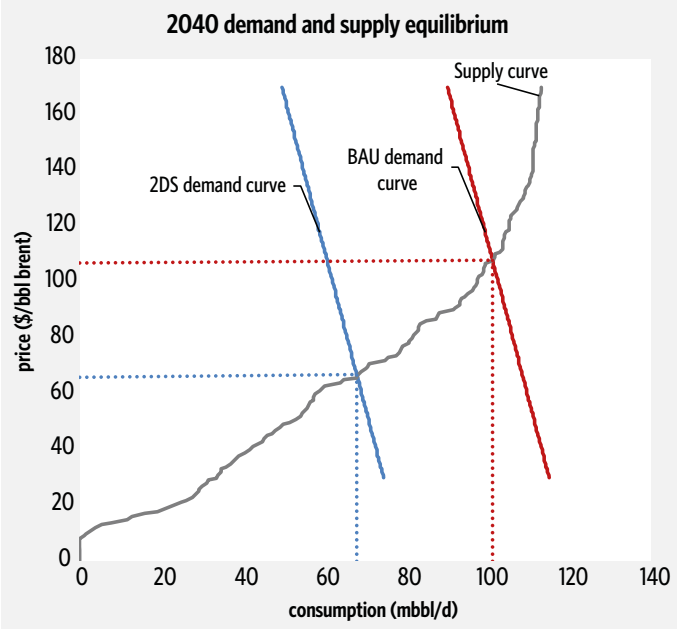


Price formation

To generate crude oil price projections, the model balances supply and demand curves. For globally integrated markets, such as crude oil, that trade according to a few primary global benchmark prices, the process of balancing is simply a case of establishing the equilibrium point at which supply satisfies demand in each given year. The price is then set at the marginal cost of the marginal field required to balance supply and demand.

Figure 20: Price and consumption for each year and given demand scenario are determined by the market equilibrium at the intersection of the supply and demand curves





Appendix B: Further information about CPI's asset-level upstream economic models

Asset-level economic models for upstream oil assets are an important addition to CPI's global crude model as it allows us to mimic the decision process that investors carry out (assuming perfect foresight of the climate transition scenario) in relation to issues such as whether or not to commit to a given under-development field or whether to keep open an existing one. For our Uganda project, we developed economic models for each of fields that were part of the Tullow/Total/CNOOC shareholder agreement.

The models produce asset-level upstream cash flows for each field, incorporating the prevailing global oil price (as adjusted for any relevant quality differentials) as an input from the crude oil model. At this stage, the cash flows are prior to the terms of production sharing agreements (PSAs) or fiscal regime.

Next, we apply the terms of relevant PSA to split revenues between "investors" (including the Uganda National Oil Company (UNOC), which does not have to fund its share of capex) and government. The PSA terms that are applicable to each field depend on which licence area or "block" the fields are covered by. Table 8 below summarises the PSA terms that we apply to each block. As the PSAs for these blocks are not published, we rely on data from Rystad Energy.

Table 8: PSA terms by Ugandan oil block

Block		EA-1	EA-2	EA-3
	Production BOPD			
Royalty	<2500	5.0%	5.0%	5.0%
	<5000	7.5%	7.5%	7.5%
	<7500	10.0%	10.0%	10.0%
	>7500	12.5%	12.5%	12.5%
Cost oil limit	% of post-royalty production	60%	60%	60%
	Production BOPD			
Profit oil	<5000	45.0%	40.0%	46.0%
	<10000	47.5%	45.0%	48.5%
	<20000	52.5%	50.0%	53.5%
	<30000	57.5%	55.0%	58.5%
	<40000	62.0%	60.0%	63.0%
	>40000	67.0%	65.0%	68.0%
State participation		15%	15%	15%
		Carried through development		

Each PSA works in a similar fashion. For each licence area, royalties are deducted from revenues at a rate that varies based on average daily production. Then, a share of post-royalty revenue (ie, revenue less royalties) accrues to investors as "cost oil". In theory, the maximum that an investor could claim each day is the sum of the costs it incurs in any given period plus the total historic costs carried forward that it has not yet recovered as cost oil. The includes UNOC's "share" of capex funded by Total and CNOOC.

In practice, the PSA limits the amount of post-royalty revenue that can be claimed as cost oil in any one period at 60% of that day's post-royalty revenue. After cost oil is claimed, the remainder, known as "profit oil" (a minimum of 40% of post-royalty revenue) is then split between the government and investors according to the percentages set out in table 8 (the percentages refer to the government's share at different production levels).

The investors' share of revenue is then subject to corporate income tax (CIT). The CIT regime is based in legislation rather than contract and so, in theory, can be amended from time to time. However, we understand that the PSAs contain "stabilisation clauses" that prevent the government from adjusting regulatory or fiscal terms in a way that would adversely affect the profitability of the projects.

CIT is charged at 30% of investors' taxable profits, being revenue, less costs, less tax depreciation. We use a standard oil and gas depreciation method, with the annual depreciation charge calculated based on the product of the number of barrels produced and the per barrel depreciation charge. The per barrel depreciation charge is calculated so as to spread the net book value at the beginning of the year over the expected remaining life of the field.

The value of investors' stakes in Uganda's upstream resources as presented in the face of this report is the net present value of future cash flows after accounting for the PSA terms and corporate income tax provisions discussed above.

References

Methodology

Climate Policy Initiative. 2014. Moving to a Low-Carbon Economy: The Impact of Policy Pathways on Fossil Fuel Asset Values. Available from: https://climatepolicyinitiative.org/wp-content/uploads/2014/10/Moving-to-a-Low-Carbon-Economy-The-Impacts-of-Policy-Pathways-on-Fossil-Fuel-Asset-Values.pdf

Climate Policy Initiative. 2016. Government assets: risks and opportunities in a changing climate policy landscape. Available from: https://climatepolicyinitiative.org/publication/government-assets-risks-opportunities-changing-climate-policy-landscape/

Climate Policy Initiative. 2019. Understanding the impact of a low carbon economy on South Africa. Available from: https://climatepolicyinitiative.org/publication/understanding-the-impact-of-a-low-carbon-transition-on-south-africa

Huxham, M. 2020. Understanding and Mitigating Risks from a Low Carbon Transition: A Micro-Based Approach to Assessing Climate Transition Risk, a chapter from Network for Greening the Financial System. 2020. NGFS Occasional Paper: Case Studies of Environmental Risk Analysis Methodologies. Available from: https://www.ngfs.net/en/case-studies-environmental-risk-analysis-methodologies

Sources of information on Ugandan asset costs, contracts, regulation

Deloitte. 2018. Global oil and gas tax newsletter: views from around the world. Available from: https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Energy-and-Resources/gx-eri-oil-gas-tax-newsletter-august2018.pdf

Global Witness. 2012. A Good Deal Better? Uganda's secret oil contracts explained. Available from: https://www.globalwitness.org/en/reports/good-deal-better/

Global Witness. 2012. Petroleum Sharing Agreement for Petroleum Exploration Development and Production in the Republic of Uganda by and between the Government of the Republic of Uganda and Tullow Uganda Limited in respect of the Kanywataba Prospect Area. Available from: https://www.globalwitness.org/documents/17832/contract_kanwatanya.pdf

International Energy Agency. 2016. World Energy Outlook. Available at: https://www.iea.org/reports/world-energy-outlook-2016

International Energy Agency. 2017. World Energy Outlook. Available at: https://www.iea.org/reports/world-energy-outlook-2017

International Energy Agency. 2018. World Energy Outlook. Available at: https://www.iea.org/reports/world-energy-outlook-2018

International Energy Agency. 2019. World Energy Outlook. Available at: https://www.iea.org/reports/world-energy-outlook-2019

International Energy Agency. 2020. World Energy Outlook. Available at: https://www.iea.org/reports/world-energy-outlook-2020

International Monetary Fund. 2017. Uganda: Technical Assistance Report-Fiscal Regimes for Extractive Industries: Next Phase. IMF Staff Country Reports, 17(367). Available from : https://www.imf.org/en/Publications/CR/Issues/2017/12/13/Uganda-Technical-Assistance-Report-Fiscal-Regimes-for-Extractive-Industries-Next-Phase-45462

Observatory of Economic Complexity. Uganda (UGA) Exports, Imports, and Trade Partners. Available from: https://oec.world/en/profile/country/uga/

Our World in Data. Uganda: CO2 Country Profile. Available from https://ourworldindata.org/co2/country/uganda?country=~UGA

Platform. 2010. Contracts Curse: Uganda's oil agreements place profit before people. Available from: https://platformlondon.org/wp-content/uploads/2012/01/Contracts-Curse-Uganda-Platform-CSCO.pdf

Rystad Energy. Not publicly available

Tullow Oil. 2020. Proposed sale of Tullow's entire stake in the Lake Albert Development Project in Uganda: Circular to Shareholders and Notice of Annual General Meeting. Available from: https://www.tullowoil.com/application/files/6715/9247/0563/Circular_Final.pdf

World Bank. Data. Population, total – Uganda indicator. Available from: https://data.worldbank.org/indicator/SP.POP.TOTL?locations=UG

World Bank. Doing Business. Ease of Doing Business Rankings. Available from: https://www.doingbusiness.org/en/rankings

Sources of information on international investors, lenders

African Development Bank. 2020. African Development Bank strongly rebuts claims that it plans to provide financial support to the East African Crude Oil Pipeline Project. Available from: https://www.afdb.org/en/news-and-events/press-releases/african-development-bank-strongly-rebuts-claims-it-plans-provide-financial-support-east-african-crude-oil-pipeline-project-35282

Banktrack. 2020. East Africa Crude Oil Pipeline (EACOP). Available from: https://www.banktrack.org/project/east_african_crude_oil_pipeline#financiers

CNOOC. 2020. 2020 Strategy Preview. Available from: https://www.cnoocltd.com/attach/0/712e8768bfc7440f900afa8543179bf5.pdf

EACOP. Our partners. Available from: http://eacop.com/our-partners/

Total E&P. 2014. Planning for the future: a demand and supply study on the Oil and Gas sector in Uganda. Available from: https://unctad.org/system/files/non-official-document/12-OILGASMINE%20Special%20Event%2015-16%20Oct%202014-HAMMANN-2-en.pdf

Total SA. 2020. From Net Zero ambition to Total's strategy. Available from: https://www.total.com/sites/g/files/nytnzq111/files/documents/2020-09/strategy-and-outlook-2020.pdf

Total SA. 2020. Total Adopts New Climate Ambition Target to Get To Net Zero By 2050. Available from: https://www.total.com/media/news/total-adopts-new-climate-ambition-get-net-zero-2050

Total SA. 2020. Joint statement between Total SA and Institutional Investors as participants in Climate Action 100+. Available from: https://new-publications.total.com/05052020/pr/original-joint-statement-total-climate-action-100-plus.pdf

Uganda National Oil Company. 2020. An exclusive interview with our CEO. Available from: https://www.unoc.co.ug/news-oil-and-gas-sector-in-uganda-an-exclusive-interview-with-our-ceo/

UK Export Finance. 2017. Colas UK to help build Ugandan airport with UKEF support. Available from: https://www.gov.uk/government/case-studies/colas-uk-to-help-build-ugandan-airport-with-ukef-support#:~:text=The%20largest%20ever%20UK%20Export,of%20equipment%2C%20materials%20and%20services.

Changes in global financial sector in response to climate-related financial risk

Agence Française de Devéloppement. 2020. Our Priorities. Available from: https://www.afd/fr/en/our-priorities

Bank of International Settlements. 2019. The green swan: central banking and financial stability in the age of climate change. Available from: https://www.bis.org/publ/othp31.pdf

Meridian Economics. 2020. The Role of Transition Finance for Climate Mitigation: A Just Climate Transition Transaction for South Africa. Available from: http://meridianeconomics.co.za/wp-content/uploads/2020/04/SA-Just-Transition-Transaction-proof-of-concept_Meridian-Economics_Master_v0.2-1_April-2020_compressed_final.pdf

Moody's Investors Service. 2020. Moody's Tool Assesses Carbon Transition Risk for Rated Companies. Available from: https://www.moodys.com/research/Moodys-tool-assesses-carbon-transition-risk-for-rated-companies--PR_410850

Overseas Development Institute. 2019. G20 coal subsidies: tracking government support to a fading industry. Available from: https://www.odi.org/sites/odi.org.uk/files/resource-documents/12744.pdf

Reuters. 2020. France to rein in export guarantees for oil and gas industry: Available from: https://uk.reuters.com/article/us-france-economy-export-financing/france-to-rein-in-export-guarantees-for-oil-and-gas-industry-idUKKBN26X1VI

Global oil market

Carbon Tracker Initiative. 2019. The Decline Rate Delusion. Available from: https://carbontracker.org/reports/the-decline-rate-delusion/

Price of Oil. 2020. A small step when the world needs a giant leap. Available from: http://priceofoil.org/2020/10/22/weo-2020-a-small-step-when-the-world-needs-a-giant-leap/

Structure of Ugandan government, public sector, economy and development indicators

All Africa. 2019. SHS 125 billion withdrawn from the Petroleum Reserve Fund irregularly – Auditor General. Source: https://allafrica.com/stories/201902140195.html

International Energy Agency. 2017. Energy Access Outlook. Available from: https://www.iea.org/reports/

energy-access-outlook-2017

International Health Metrics and Evaluation. 2017. Global Burden of Disease Study 2017. Available from: http://www.healthdata.org/sites/default/files/files/policy_report/2019/GBD_2017_Booklet.pdf

Mawejje, J and Mawejje, D. 2016. Electricity consumption and sectoral output in Uganda: an empirical investigation. Source: https://www.econstor.eu/bitstream/10419/147238/1/868592471.pdf

Mugume, A and Opolot J. 2019. Exchange Rate Volatility in Uganda: Causes and Desirable Policy Options. Available from: https://archive.bou.or.ug/archive/opencms/bou/bou-downloads/research/BouWorkingPapers/2019/All/Exchange-Rate-Volatility-in-Uganda-Causes-and-Desirable-Policy-Options.pdf

Mushemeza, E. 2019, Decentralisation in Uganda: Trends, Achievements, Challenges and Proposals for Consolidation. Available from: https://media.africaportal.org/documents/Decentralization_in_Uganda.pdf

Ugandan government policy, regulation and legislation

EY. 2020. Uganda issues Tax Amendment Bills 2020. Available from: https://www.ey.com/en_gl/tax-alerts/uganda-issues-tax-amendment-bills-2020#:~:text=of%20processed%20milk-,Excise%20Duty%20(Amendment)%20Bill%2C%202020,per%201%2C000%20sticks%20from%2080%2C000

Government of Uganda. 2015. The Public Finance Management Act. Available from: https://www.ugandainvest.go.ug/wp-content/uploads/2016/02/Uganda_Public_Finance_Management_Act_2015_3.pdf

Government of Uganda. Ministry of Energy and Mineral Development. 2015. Energy and Mineral Development Sector. Sector Development Plan 2015/16 to 2019/20. Available from: http://npa.go.ug/wp-content/uploads/2018/01/Energy-Sector-Development-plan-Final.pdf

Government of Uganda. Ministry of Finance, Planning and Economic Development. 2020. National Budget Framework Paper FY 2020/21 to 2023/24. Available from: https://budget.go.ug/sites/default/files/National%20Budget%20docs/National%20Budget%20Framework%20Paper%20FY%202020-21_0.pdf

Government of Uganda. Ministry of Finance, Planning and Economic Development. 2020. Report on Public Debt, Guarantees, Other Financial Liabilities and Grants for FY2019/20 and the Medium Term Debt Management Strategy 2020/21 -2023/24. Available from: https://www.finance.go.ug/sites/default/files/Publications/Public%20Debt%20Report%20 MTDS%2019-20.pdf

UNFCCC. 2015. Uganda's Intended NDC. Available from: https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uganda%20First/INDC%20Uganda%20final%20%2014%20October%20%202015.pdfhttps://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Uganda%20First/INDC%20Uganda%20final%20%2014%20October%20%202015.pdf

Sebudde, R and Grantcheva, E. 2020. Uganda - Oil Revenue Management - Closing the Gaps in the Fiscal and Savings Frameworks to Maximize Benefits. Source: https://openknowledge.worldbank. org/bitstream/handle/10986/33899/Uganda-Oil-Revenue-Management-Closing-Gaps-in-the-Fiscal-and-Savings-Frameworks-to-Maximize-Benefits.pdf?sequence=1&isAllowed=y

Ugandan government debt and sovereign credit rating

IMF. 2019. IMF Executive Board Concludes 2019 Article IV Consultation with Uganda. Source: https://www.imf.org/en/News/Articles/2019/05/07/pr19148-uganda-imf-executive-board-concludes-2019-article-iv-consultation-with-uganda

IMF. 2020. Uganda: Request for Disbursement under the Rapid Credit Facility – Press Release; Staff Report; and statements by the Executive Director for Uganda. Source: https://www.imf.org/en/Publications/CR/Issues/2020/05/14/Uganda-Request-for-Disbursement-under-the-Rapid-Credit-Facility-Press-Release-Staff-Report-49427

Physical risk, biodiversity risks and other

Friends of the Earth International. 2020. Oil company Total back in court for human rights violations in Uganda. Source: https://www.foei.org/press_releases/total-uganda-france-court-appeal-human-rights

World Wildlife Fund. 2019. Potential Loss of Biodiversity Due to Oil Pipeline not Insignificant – WWF. Available from: https://africa.panda.org/food_

SEI/IGSD. 2020. The East African Crude Oil Pipeline - EACOP: a spatial risk perspective

CLIMATE
POLICY
INITIATIVE