

South Africa's long-term fiscal choices

Fiscal Policy Workshop | 5 November 2014
Michael Sachs | Deputy Director-General : Budget Office | National Treasury



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Social spending as a measure to address inequality

“Since the eighteenth century, the rise of tax-based social spending has been at the heart of government growth.

It was social spending, not national defence, public transportation, or government enterprises that accounted for most of the rise in government’s taxing and spending as a share of GDP over the last two centuries.

The increasing role of social spending in our lives has been linked to three other great social transformations: the transition to fuller democracy, the demographic transition towards fewer births and longer life, and the onset of sustained economic growth.

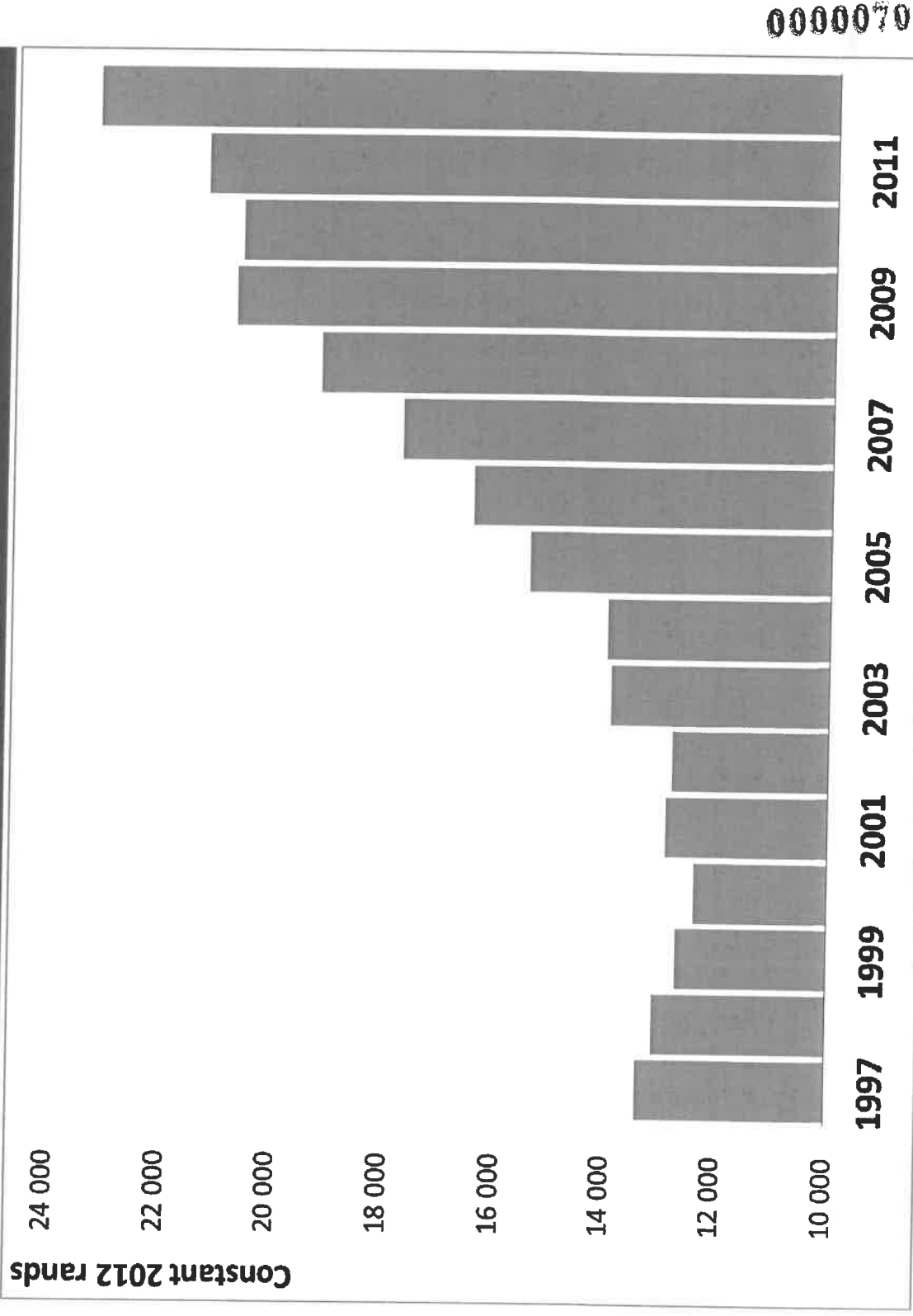
Social spending’s share of national product derives its permanence from the likely permanence (we hope) of these three great transformations – that is, of democracy, of human longevity, and of prosperity.”

Peter Lindert, *Growing Public: Social Spending and Economic Growth since the Eighteenth Century* (2004)



Dramatic increasing in spending per capita since the democratic transition

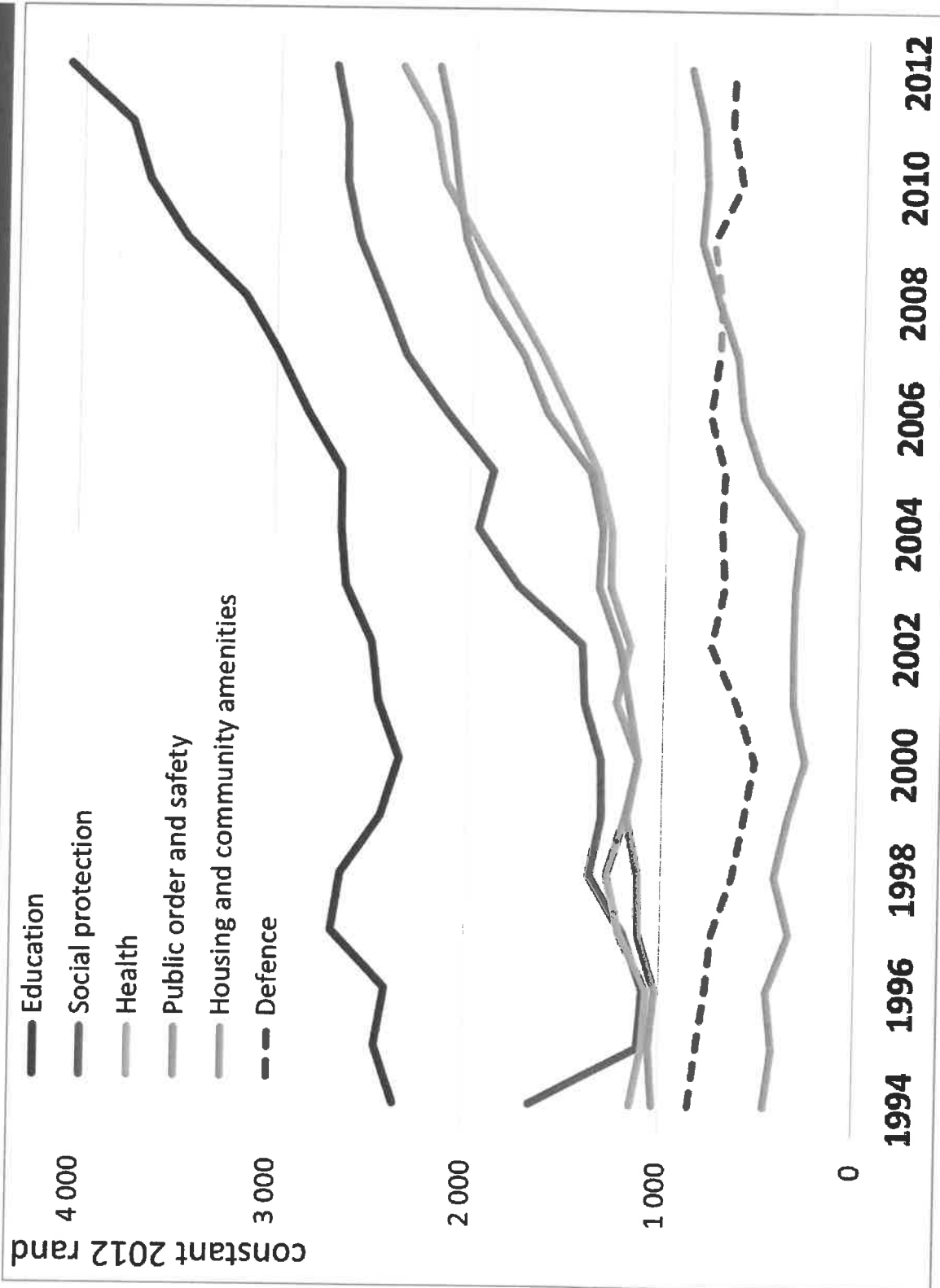
Real spending per capita of general government



Source Data: StatsSA (population), SARB (expenditure), CPI inflation

Changes in the composition of expenditure

Real spending per capita of general government



Is it sustainable?

- It is often presumed that the democratic fiscal dividend is not sustainable. Some have gone as far to argue we face a “fiscal cliff”!
- The **long term fiscal model** is a framework for posing the question: is this level of social spending sustainable over the next several decades.
- It does so by looking at the impact of the following factors on public expenditure:
 - Economic growth and income per capita
 - Demographic trends and utilisation of public services
 - Policy scenarios that take account of NDP objectives
- It then benchmarks sustainability as follows: *assuming no change in tax policy, is the expenditure path consistent with a stable debt trajectory.*
- A debt path that is stable or declining over time is regarded as sustainable. An explosive debt path is not sustainable.



Issues and drivers of spending projections

▪ Key drivers of spending projections

- Population growth and demographic structure (*updated to reflect a new population baseline*)
- Economic growth and per capita income (*updated to reflect lower medium term growth assumptions*)
- Take-up rates, enrolment, utilisation and access
- Wages, prices and excess cost growth: (*public sector wages are assumed to remain in line with overall wages, which growth at CPI + labour productivity*)

▪ Difficult issues

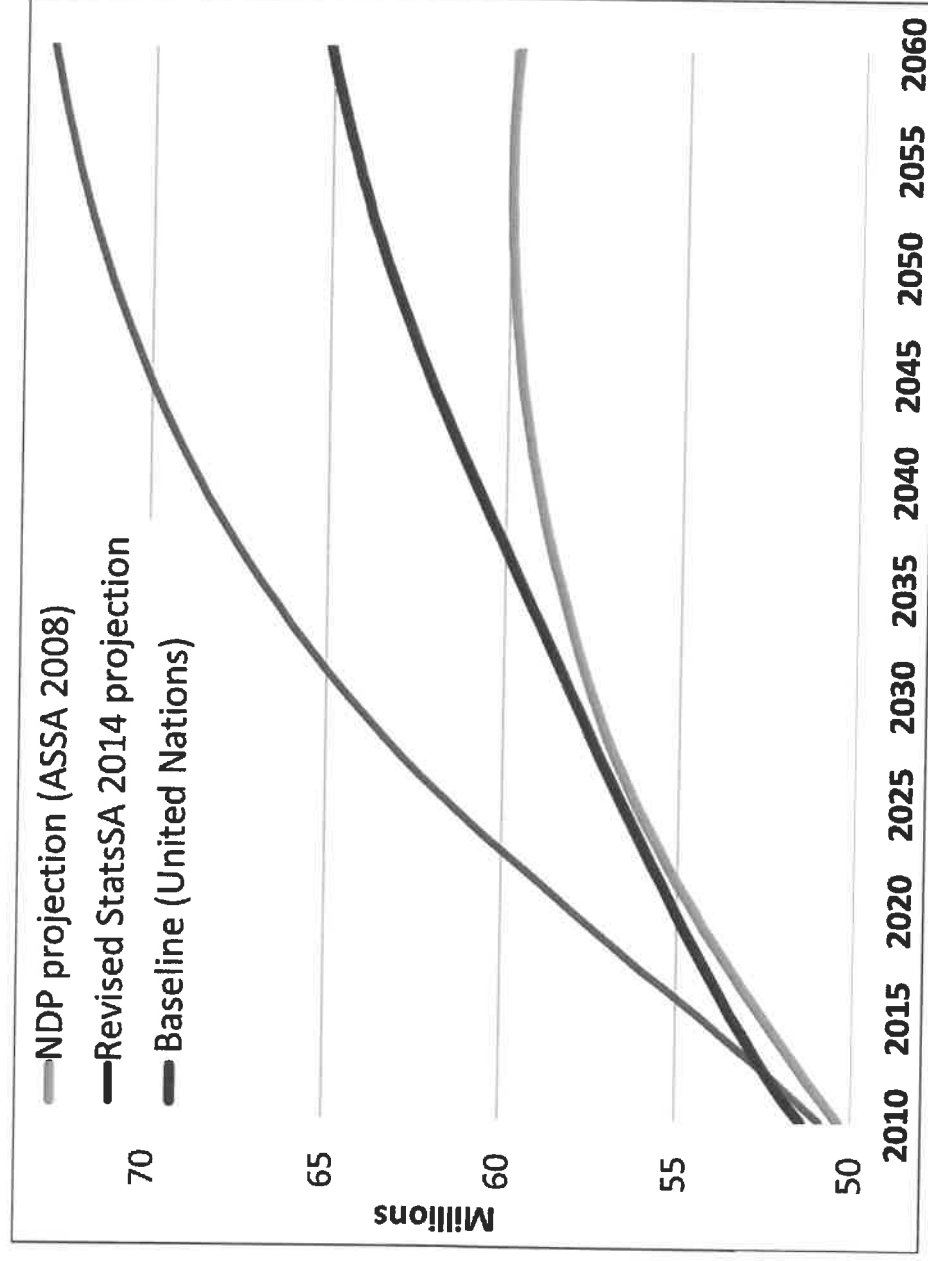
- Forecasts vs. projections
- Projecting from a time of deep structural change
- Census, 2011
- Medium-term forecasts and transition to long term projections
- Defining ‘unchanged policy’ assumption
 - Policy intent vs. policy practice
 - Recent growth rates or share of income
- Feedback effects
- Income distribution and poverty levels



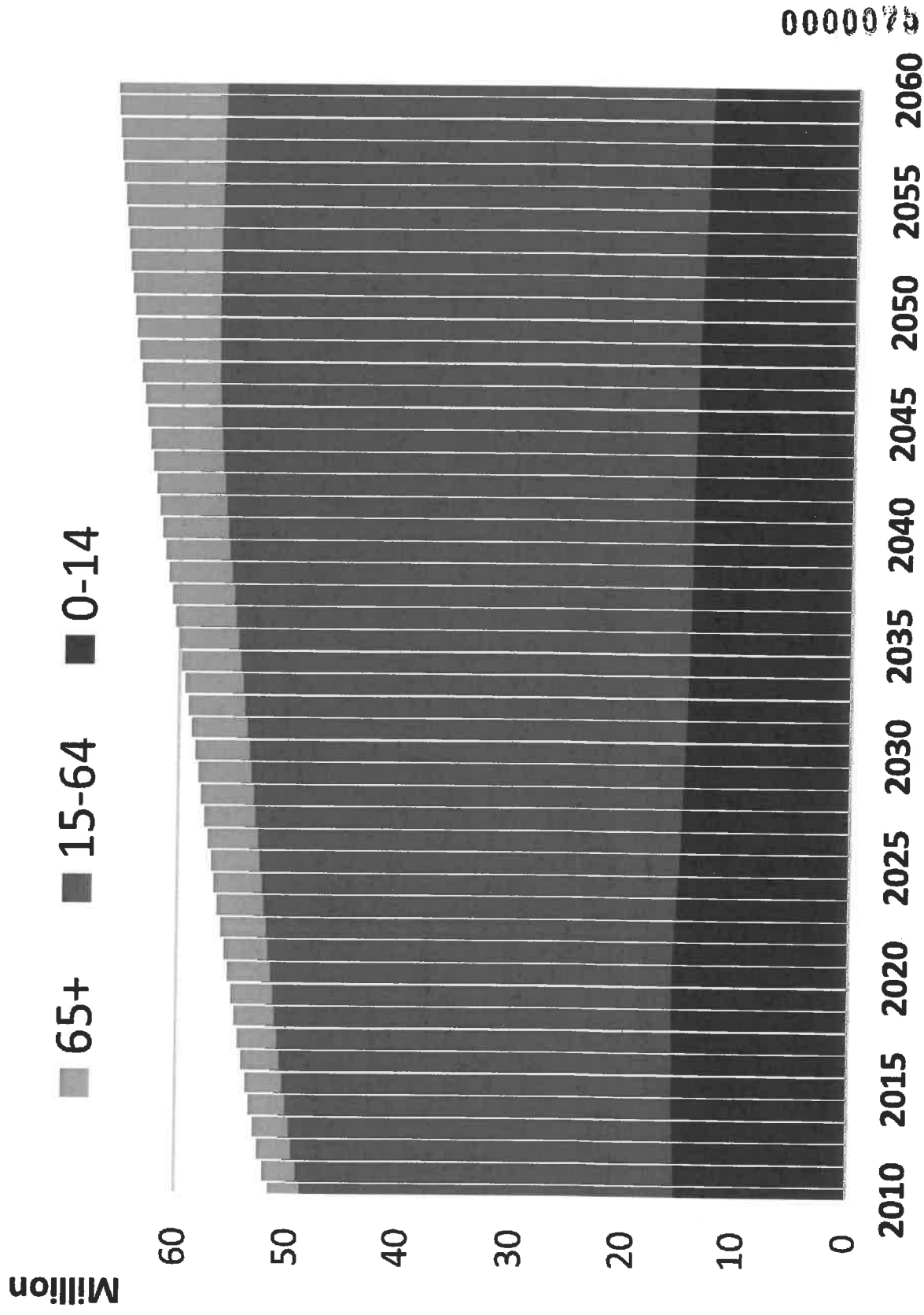
Variation in population estimates

- Population estimates were initial based on NDP projections
 - The NDP used a base population of 50.6 million as the estimated 2012 population. Census 2011 estimates the 2012 population to be 51.8 million.
 - The NDP projected the population to be between 58.2 million to 61.5 million in 2030. Census 2011 projected that in 2030 the total number of people living in South Africa will be 64.5 million persons

- There remains uncertainty about population trends (Fertility, HIV/AIDS, Migration)
- Official mid-year estimates show a dramatic acceleration of population growth
- How sustained will the Census 2011 Fertility trend be?
- We have chosen to use the revised UN projection as our baseline.

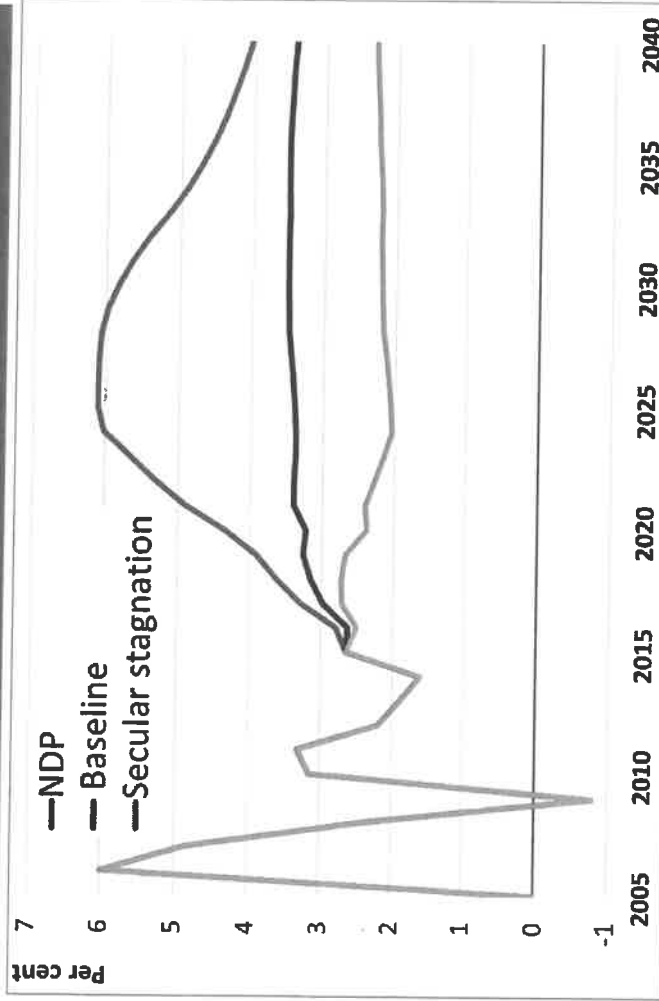


Population trends and fiscal incidence

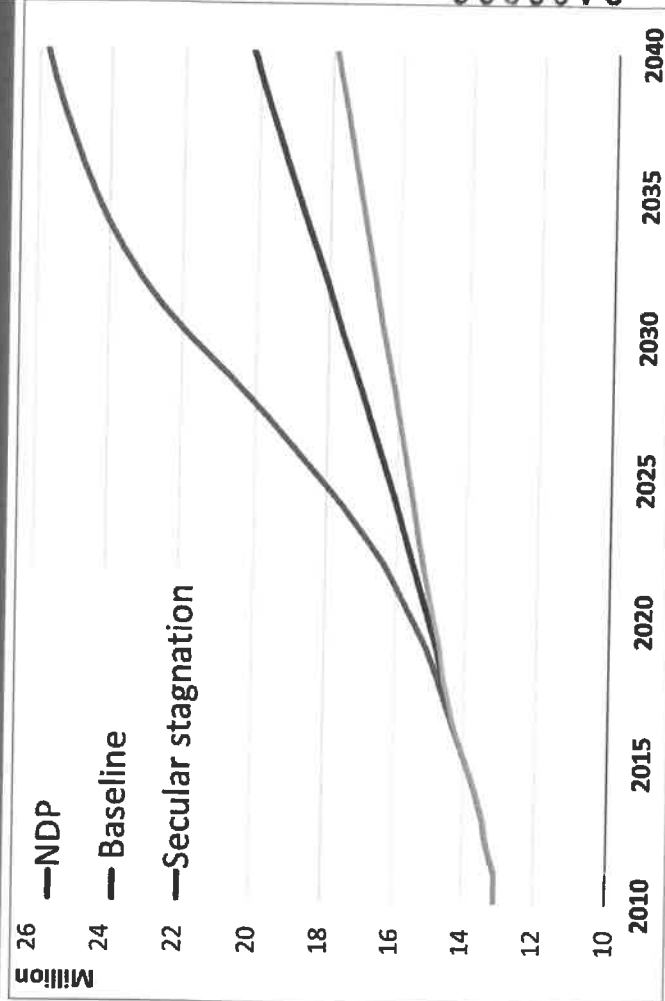


Growth and employment prospects

Three economic scenarios



Formal employment in three economic scenarios



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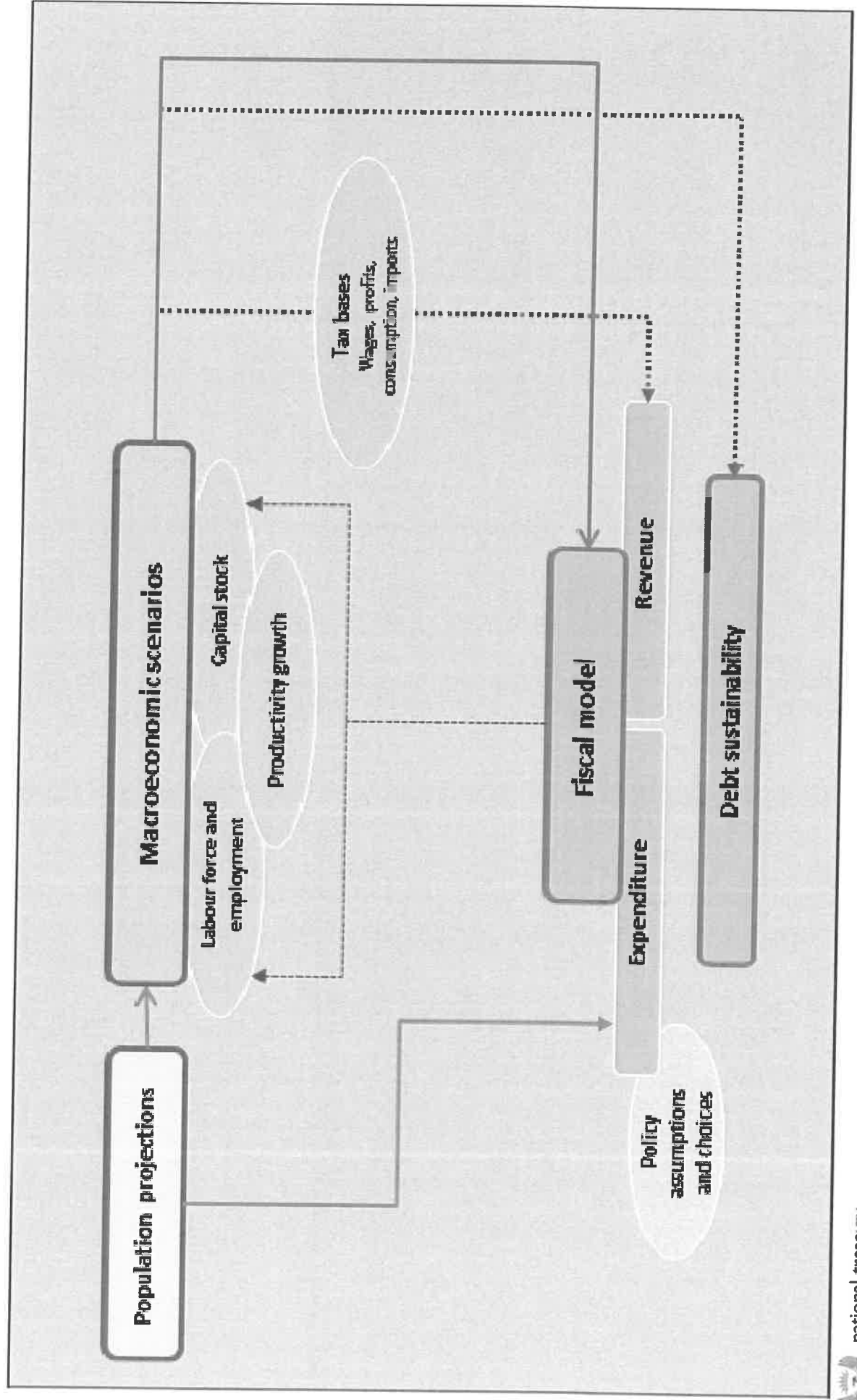
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Policy scenarios

	"No policy change" scenario	Policy change scenario
Social grants	Take-up rates increase as access improves, and then stabilise	- Universalisation: raising of means test to tax threshold - Take-up rates increase further to threshold rates
Health	Utilisation rates per age group grow moderately	National Health Insurance: significant increases in utilisation rates financed by public contributions
Basic education	Learner-education ratios decline with falling number of school children	No major policy changes
Post school education	Enrolment ratios increase moderately in line with recent trends from 2012 to 2030	White Paper on post-school education and training; significant increase in enrolment rates
Expanded Public Works Programme	1 300 000 work opportunities by the year 2020, declining thereafter	2 000 000 work opportunities by the year 2020, declining thereafter



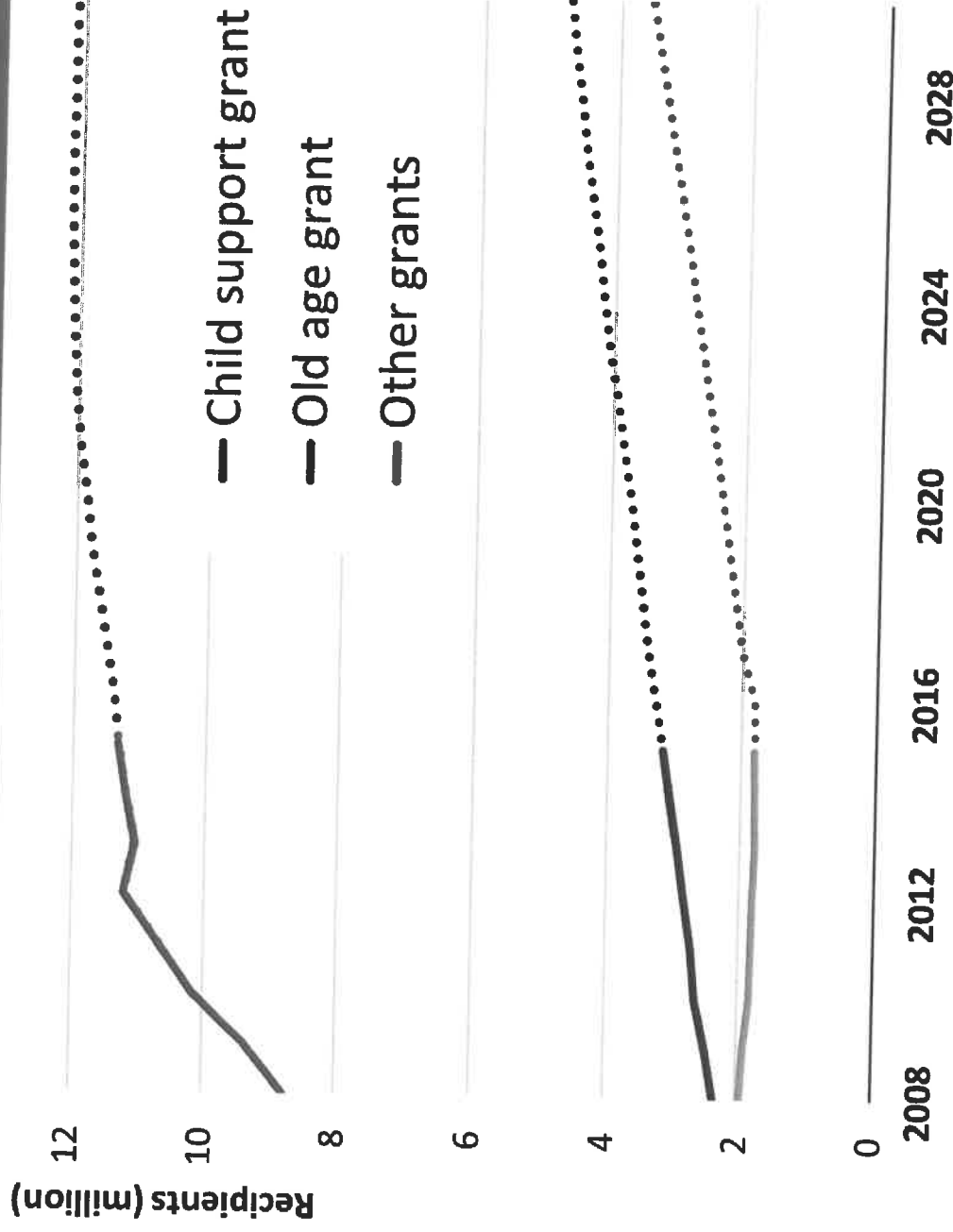
Modelling approach



Social grants (Assumptions)

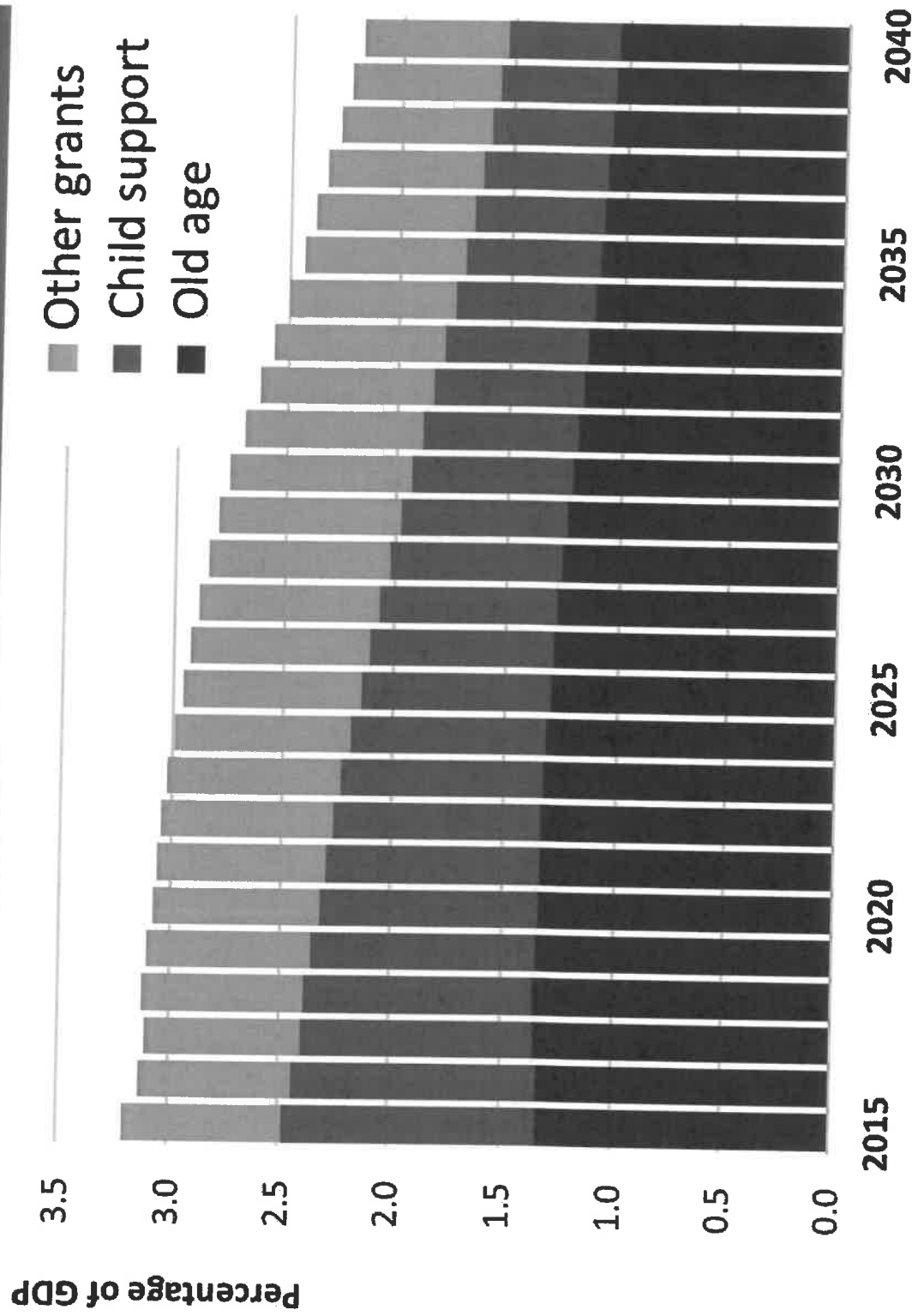
- Uptake rates have growth dramatically over the last ten years mainly as a result of changed eligibility criteria
- Assuming stable policy going forward, the model assumes a 10 percentage point increase in uptake rates for eligible cohorts over the next 15 years

Projected recipients



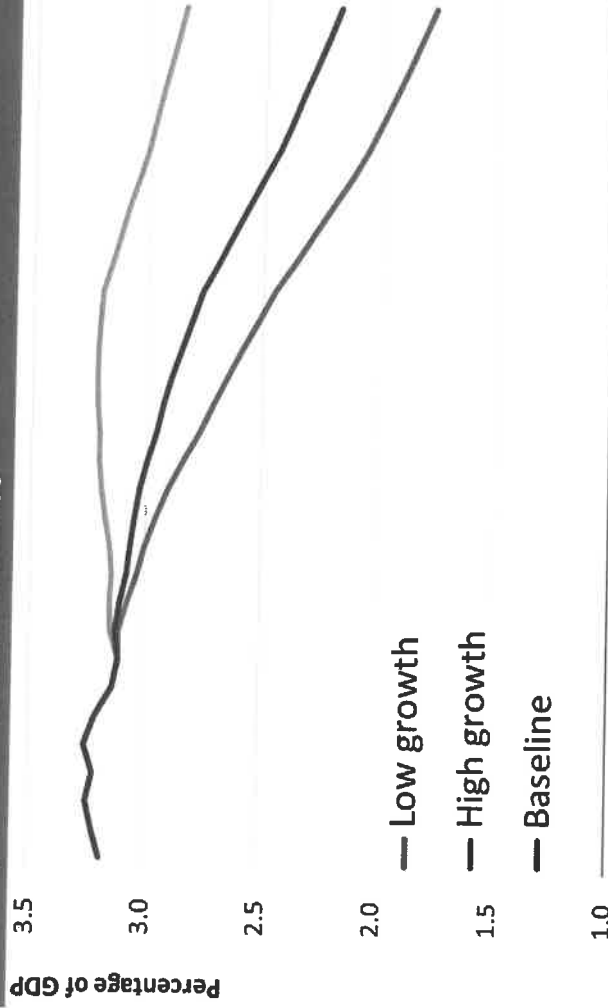
Social grant projection

Projected grant expenditure as a percentage of GDP

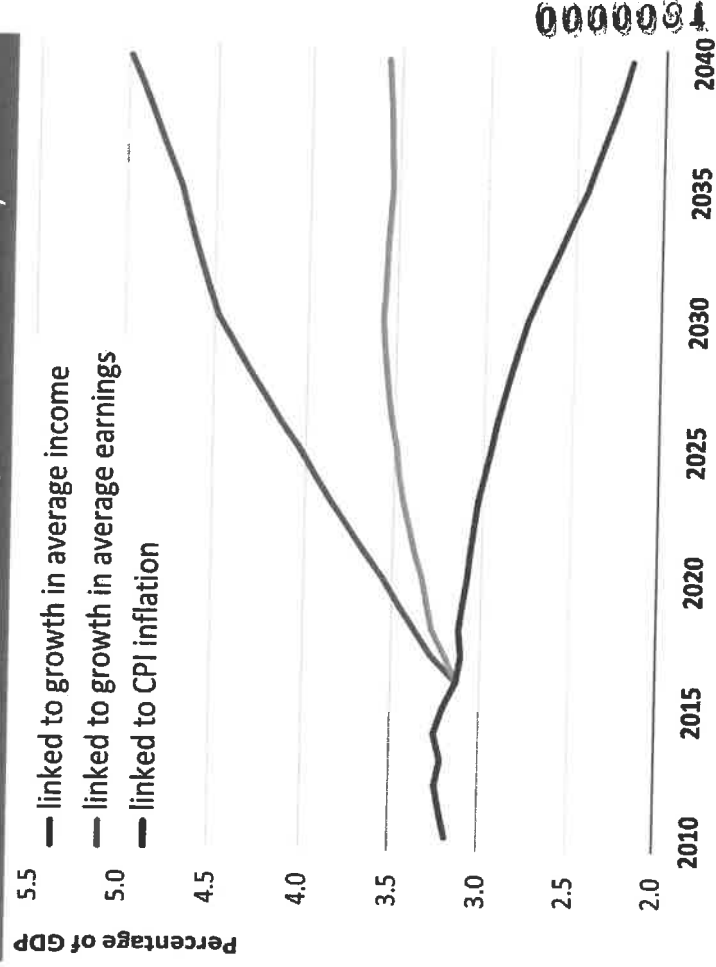


Social grants scenarios

Spending in three economic scenarios

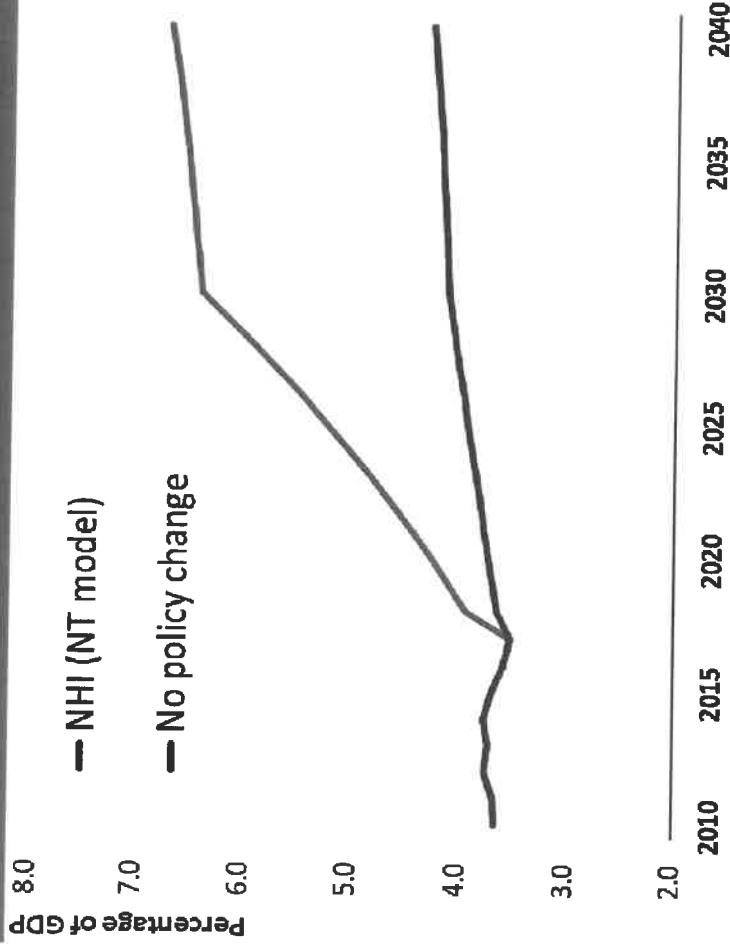


Varying policy on grant increases (in baseline scenario)

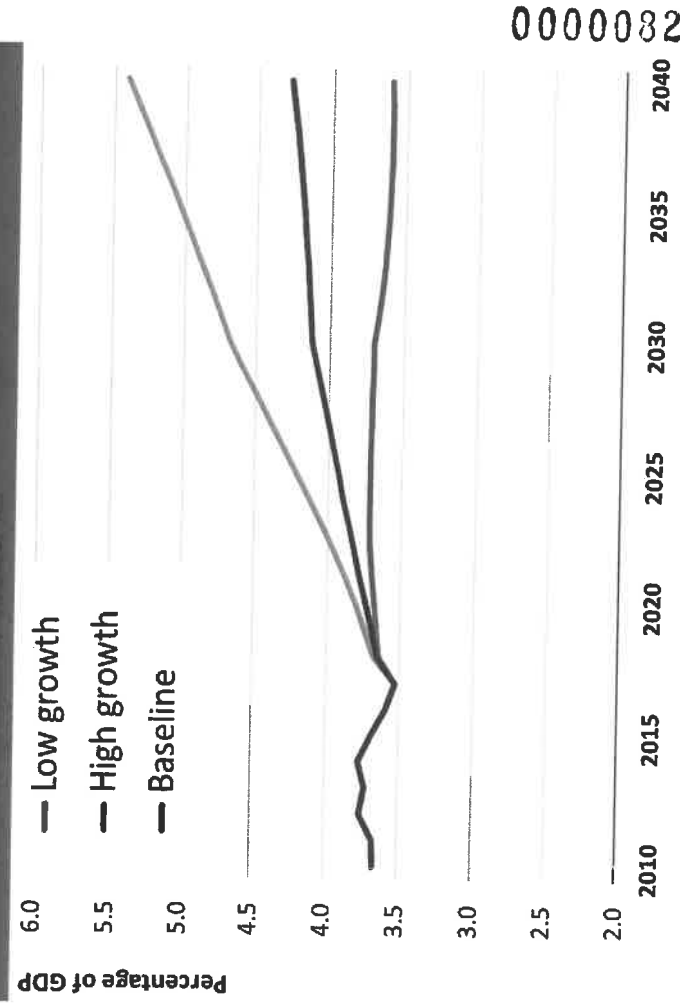


Health care with and without NHI

Public health spending as a share of GDP

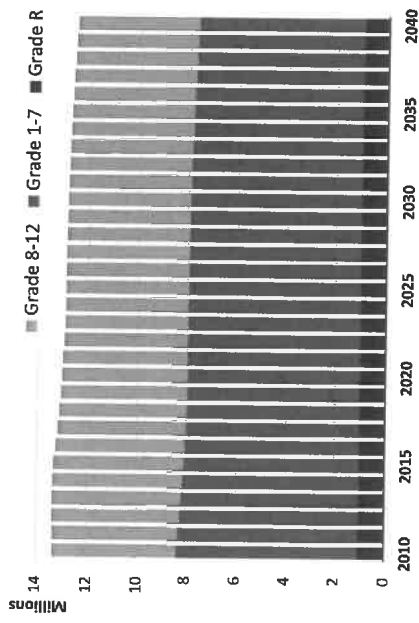


NHI under three economic scenarios

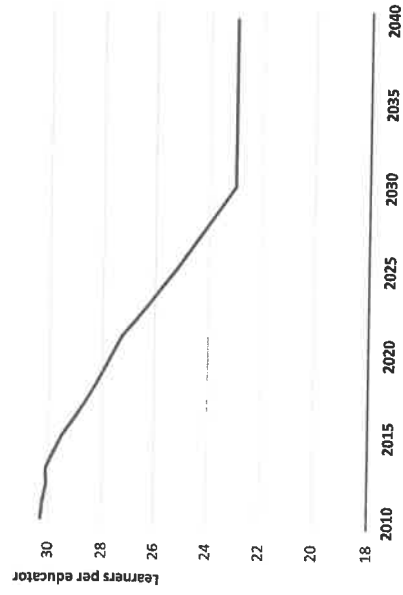


Basic education

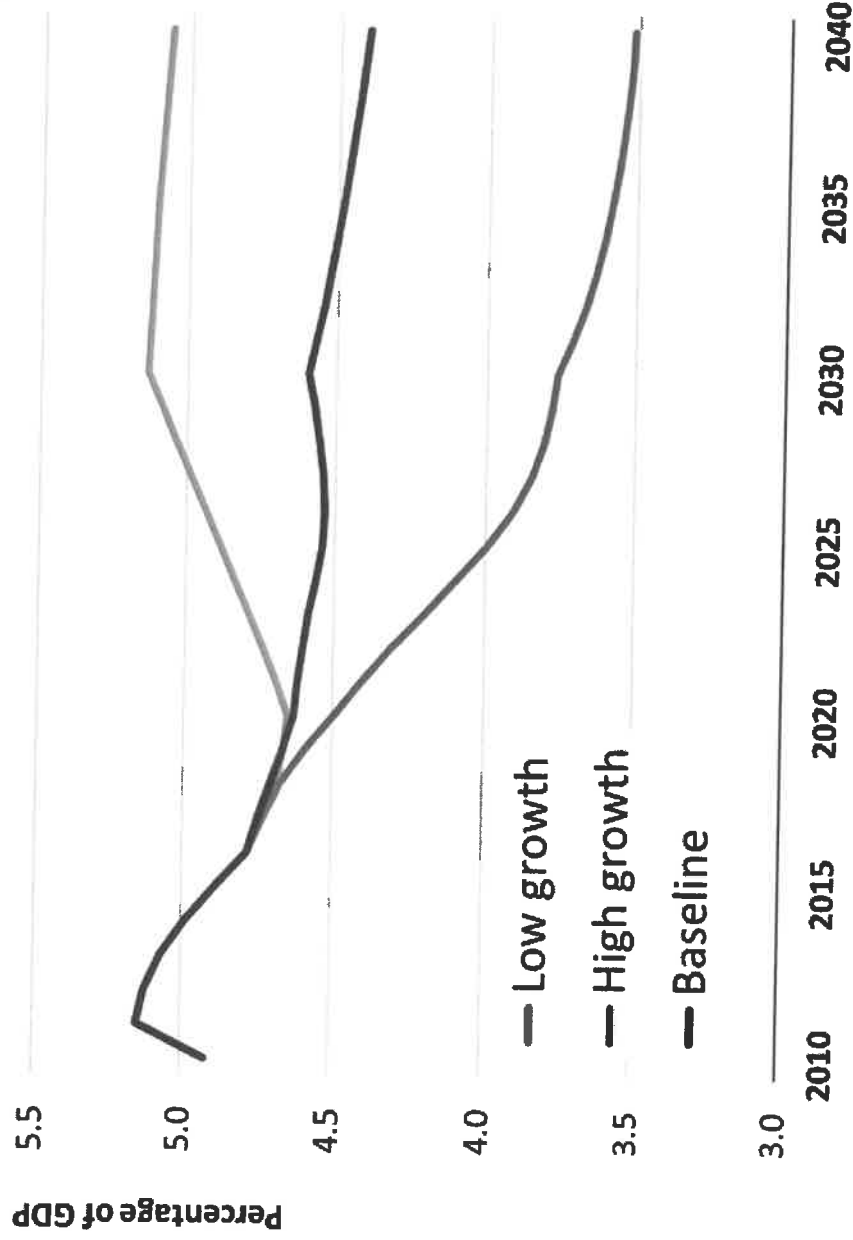
Projected school-age population, 2010 - 2040



Average learner-educator ratio, actual and projected

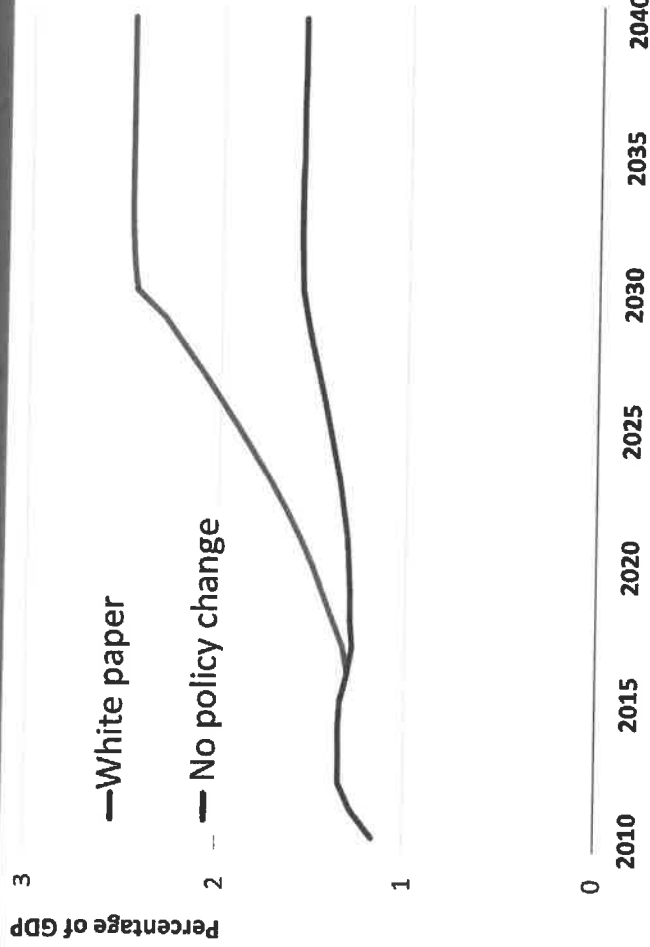


Basic education expenditure in three economic scenarios

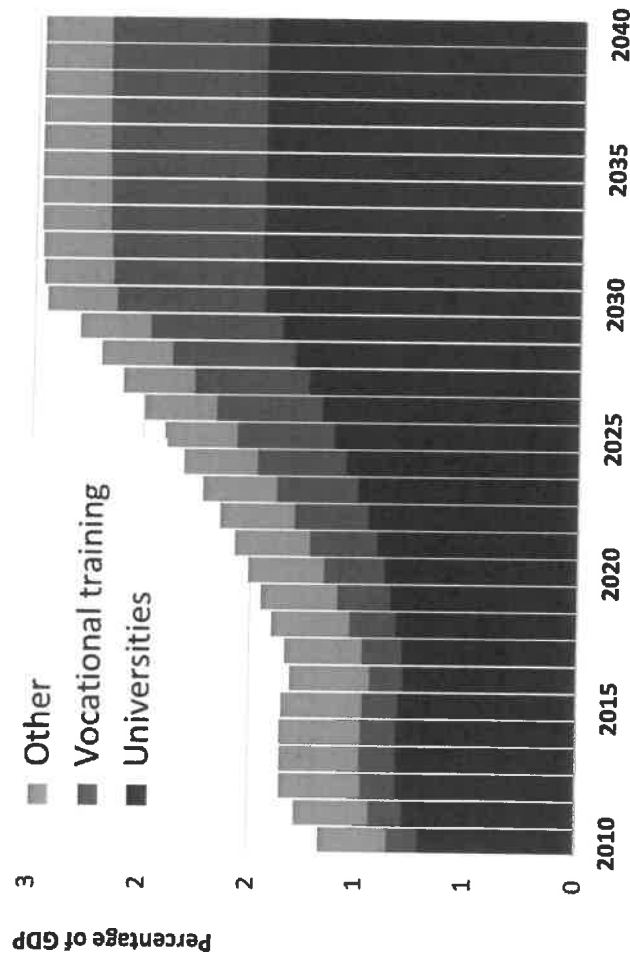


Post-school education

Projected post-school education spending

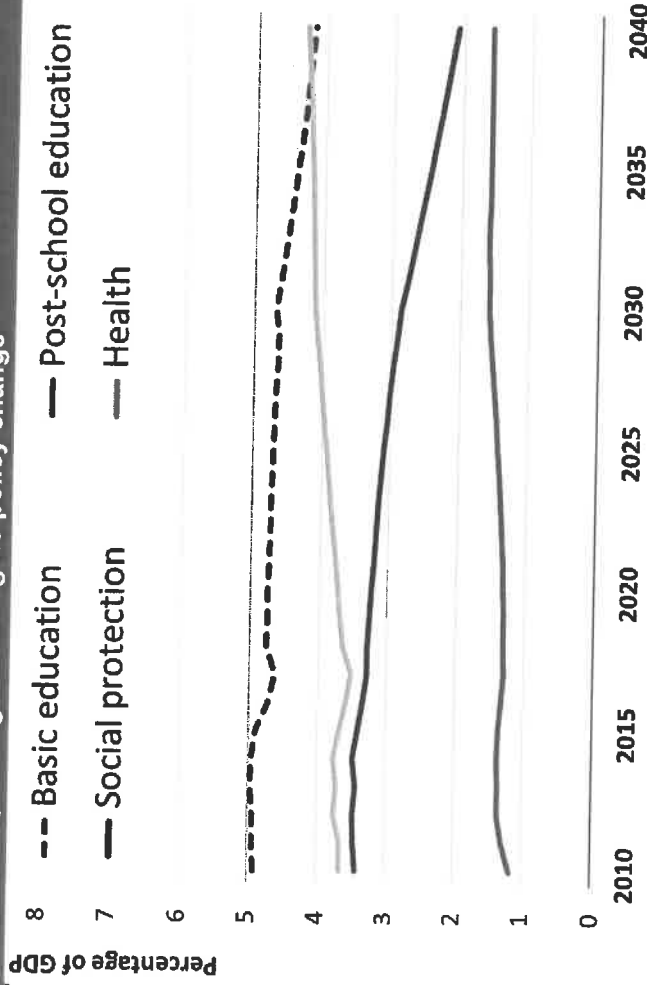


Drivers in growth in spending in the NDP scenario

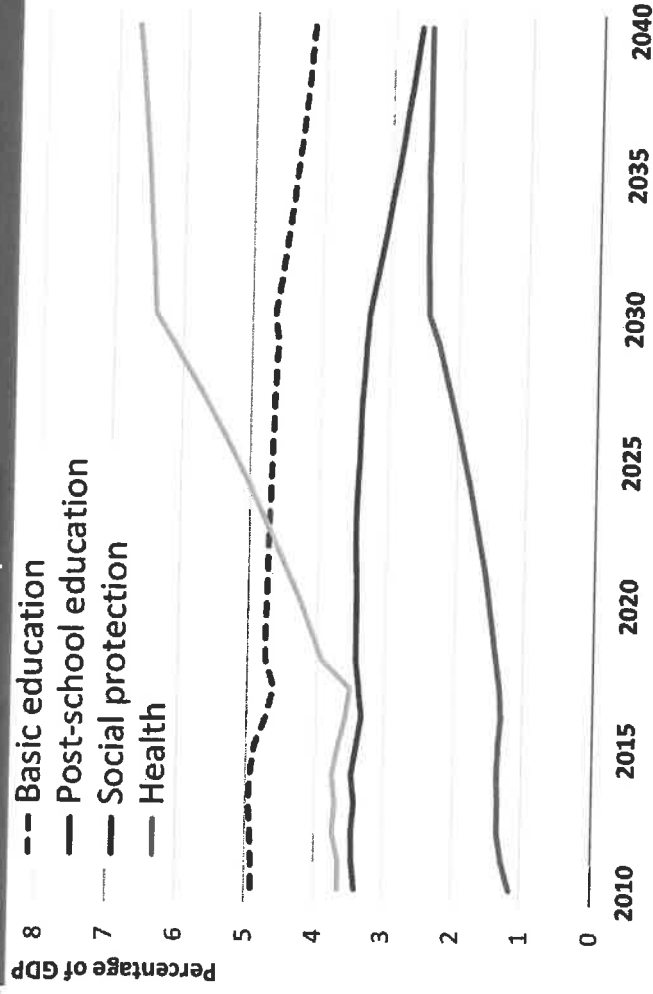


Summary of projections

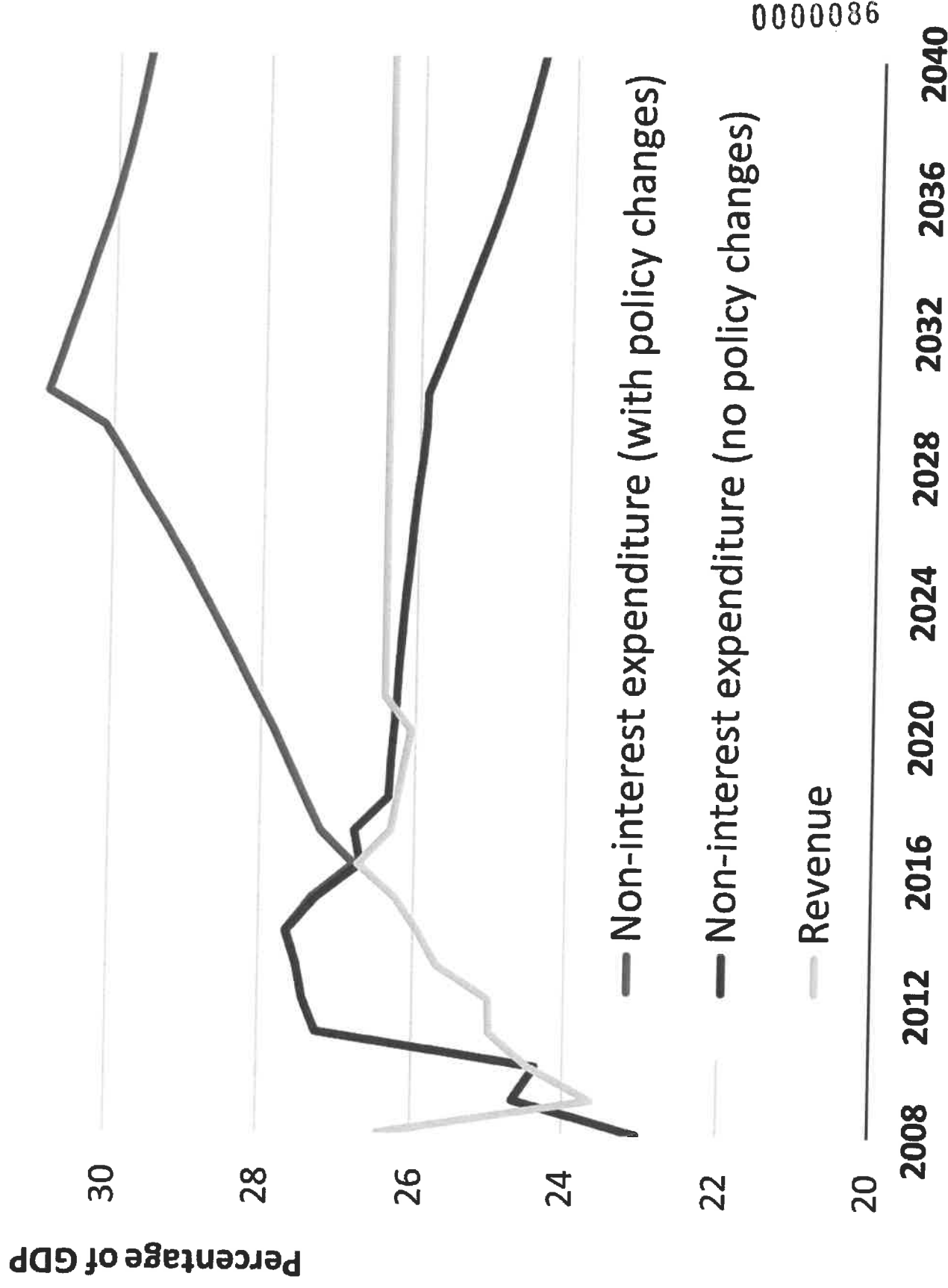
Projected spending assuming no policy change



Projected spending with new policies



Sustainability with and without new policies



Key conclusions

- Current levels of spending are sustainable, provided that real growth remains above 3. In a secular stagnation scenario, social spending will be increasingly difficult to sustain. Faster population growth will also put strain on the fiscus, if not accompanied by higher economic growth.
- Assuming that policy practice remains consistent with recent years:
 - Social grants will not place significant pressure on fiscal sustainability; in fact they could diminish in fiscal importance.
 - Declining school-age population implies the resources currently allocated to basic education will become increasingly sufficient.
 - Demographic pressures on health-care spending and high growth of utilisation will require greater resources to sustain the current level of service provision
- This implies that government can sustain the (current) social wage beyond the medium term projection.
- However, without faster growth, the path of debt-reduction will not be ideal and the country will remain vulnerable to shocks for years to come.

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Key conclusions

- New social policies proposed in the NDP – including NHI, the expansion of vocational training and significant growth of public works employment – will place significant pressure on the fiscus in the coming decades.
- Fiscal sustainability requires that one (or a combination) of the following factors should accommodate structural increases in spending:
 - Acceleration of economic growth
 - Increases in the structural level of taxation
 - Shifting resources from other priorities
- The age-incidence of fiscal policy combined with demographic trends suggest favourable dynamics. However, new spending pressures are most likely to emerge for the young unemployed. Adjustments currently on the public agenda include:
 - Significant expansion of public works
 - Absorbing youth into vocational training
 - Reforms to social grants to include young unemployed.



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Director - General
Department of Energy
Private Bag X96
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Dear *Ms Magubane*

**AGREEMENT BETWEEN THE GOVERNMENT OF THE RUSSIAN FEDERATION AND THE
GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA REGARDING STRATEGIC
PARTNERSHIP AND CO - OPERATION IN THE FIELDS OF NUCLEAR POWER AND
INDUSTRY DEVELOPMENT**

Thank you for the very constructive conversations that we recently had on the agreement being contemplated between South Africa and Russia on nuclear energy.

I am advised that the National Treasury has the following concerns with the agreement:

1. The agreement constitutes procurement and should have been preceded by a fair, equitable transparent, competitive and cost effective procurement process as required by section 217 of the Constitution;
2. The Electricity Regulation Act prescribes the process to be followed prior to the procurement of new generation capacity and same has not been complied with;
3. The legislative framework governing the licensing of nuclear power needs to be addressed before nuclear plant procurement can take place. There are currently conflicts and

AGREEMENT BETWEEN THE GOVERNMENT OF THE RUSSIAN FEDERATION AND THE GOVERNMENT OF THE REPUBLIC OF SOUTH AFRICA REGARDING STRATEGIC PARTNERSHIP AND CO - OPERATION IN THE FIELDS OF NUCLEAR POWER AND INDUSTRY DEVELOPMENT

- inconsistencies between the licensing powers of NERSA, as the electricity regulator, and the Nuclear Energy Regulator under the Nuclear Energy Act which still needs to be resolved;
4. The provisions in the agreement concerning information do not take into account disclosure requirements imposed on the Government and organs of state in terms of domestic law;
 5. The agreement does not appear to be in alignment with the proceedings of the South Africa's National Nuclear Energy Executive Co-ordinating Committee (NNEECC) , the Government's official decision-making body on the nuclear build programme in that:
 - 5.1. The NNEECC has not yet finalised the procurement strategy as the assessment of feasibility considerations is still underway;
 - 5.2. The NNEECC still needs to establish whether the cost of building and financing nuclear will be viable for South Africa. This is an area which is critical to ensure the affordability of nuclear for the country. Research is still being undertaken both under the auspices of the NNEECC, and internally, by my department.
 6. NERSA's Multi-year Price Determination (MYPD3) decision did not make provision for additional capital expenditure beyond the committed build programme, i.e. beyond the completion of the Kusile coal-powered plant. Moreover, Eskom's financial position will remain weak throughout the MYPD3 period, limiting its capacity to access additional funding beyond that which has already been budgeted. Consequently, it is clear that in order to implement a nuclear programme, substantial tariff increases coupled with sizeable capital injections are likely to be required. The economic and fiscal implications of this still have to be quantified and their viability considered.
 7. It is important to ensure that a substantive public consultation process takes place to ensure there is sufficient public support for a nuclear build programme. Our experience (with etolling) suggests that it will be critical for government to demonstrate to the public that due process has been followed, and that all the options, advantages and disadvantages have been carefully weighed up, lest this project provokes the kind of public resistance that has been experienced on other key infrastructure projects.

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AND INDUSTRY DEVELOPMENT

I hope that the concerns of my department can be taken into account and a satisfactory way forward can be found that protects the integrity of the process. Meanwhile, please be assured of the continued support of myself and my department in the quest for seeking sustainable energy generation solutions for the country.

Accordingly, and as per our last discussion, I suggest that we constitute a joint team to collaborate on this big initiative. In this regard, I suggest that you furnish me with the name of the person who is coordinating the initiative in your department so that I can link officials from the National Treasury with the relevant person.



LUNGISA FUZILE

DIRECTOR - GENERAL

Date: 18/10/2013

NUCLEAR NEW BUILD PROGRAMME
Preliminary report
on fiscal and financial implications,
funding models and risk mitigation

9 SEPTEMBER 2015



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Overview

- Key considerations in respect of the programme
- Scope of the funding model and key risks associated with each element
 - Investment cost
 - Electricity tariff
 - Developmental and ancillary objectives
 - Financial structures, contracting models and procurement process
 - Macroeconomic impacts
 - Fiscal context
- Modelling of fiscal implications
- Conclusions and recommendations

Key sources of information

- This preliminary report is based on information and assumptions provided by the Department of Energy, during engagements in the Joint Technical Task Team on the nuclear new build programme. The report reflects the views of National Treasury.
- Key inputs informing this report include the following:
 - The “Deloitte model” commissioned by Department of Energy in 2014 was used to estimate the investment profile of a 9.6GW programme and a 2.4GW programme.
 - The National Treasury’s *Long Term Fiscal Model* was used to estimate the fiscal and economic trajectory against which the project would unfold.
 - The economic impact was modelled using the economic model that has been used by National Treasury when working with the Department of Energy to determine the economic implications of the Integrated Energy Plan (IEP).
 - Inputs were drawn from the reports on benchmarking, costs and financing commissioned by the Department of Energy from KPMG, Ingerop and Deloitte
 - Commercial offerings made during vendor parades were assumed as a guide to the financial programmes and structures, including financial arrangements, interest rates and repayment terms
- **It should be noted that this is a limited information base and that analysis was conducted over a very short period of time. Further work is required before final conclusions are reached.**

KEY CONSIDERATIONS IN RESPECT OF THE PROGRAMME

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Macroeconomic considerations

- The envisaged 9.6GW programme constitutes one of the largest single public investment programmes in South African history.
- Comparatively, the investment that is envisaged constitutes a very large share of national income.
- Relative to South Africa's GDP it will be one of the largest investments in nuclear power undertaken by any country internationally
- It will have material consequences for the country's international financial position and the balance of payments, the balance sheet of the South African government as well as the finances of all South African citizens for decades to come.

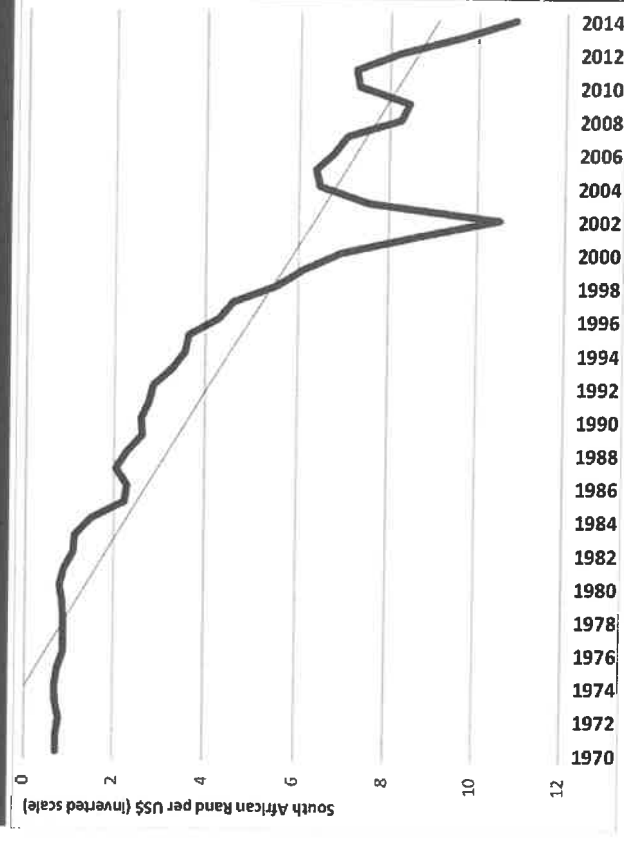
Funding considerations

- South Africans will benefit from the base load electricity supplied by the nuclear power plants as well as from any local industries that develop to supply the programme
- Ultimately, South African tax payers and electricity consumers will pay the full cost of the programme
- Sovereign debt and guarantees will impact directly on the balance sheet of government during the construction phase. If there are doubts about the quality of the assets underlying these liabilities, this will lead to a deterioration in the quality of the public balance sheet.
- Borrowing and financial structuring can enable payments to be smoothed and shift some of the burden onto future generations
- The balance between taxes and user charges has distributional and economic implications
- None of this changes the fact that the final costs will be borne exclusively by South Africans

Foreign liabilities on domestic assets

- A large share of the liabilities will be valued in foreign currency. The imported components of each power station (at least 60%) will need to be offset by
 - Assuming foreign liabilities that need to be repaid
 - Selling domestic assets to foreigners
 - Reducing other imports or raising exports
- The risks arising from the depreciating value of the rand are significant. The programme will incur foreign liabilities to create a domestic asset. The real asset being purchased is a stream of electricity, priced in South African rand.
- Over the last 45 years, the rand has depreciated against the dollar by an average of 4 per cent per years.
- Episodes of extreme volatility are also frequent and can be disruptive for long term financial arrangements.
- The cost of hedging against these risks are prohibitive and it is unlikely that it will be possible to obtain such hedges.

Exchange rate of the rand to the US\$ - 1970 - 2014



Risk profile of the programme (1)

- The nuclear new build programme has the potential to generate significant benefits for South Africa. However, the project is characterised by a number of risks which must be taken into account to ensure that the benefits are actually realised.
- The key to a successful “financial model” for the programme lies in mitigating the risks where possible, but also recognising that some of the risks cannot be mitigated and can only be borne by the sovereign.
- The very large upfront capital cost nuclear power means that:
 - Many of the risks are difficult to diversify since each nuclear power plant comprises a single large project (i.e. this means “putting all your eggs in one basket”)
 - the nuclear power plants are especially vulnerable to risks arising from cost overruns and increases in the cost of capital. If these risks materialise they become locked-in for the lifetime of the project.
 - Hedging, insurance and other instruments to fully mitigate financial risks may not be available or the costs may be prohibitively high
 - There are limits to which the risks can be passed on to the vendor or third parties. South Africans will bear most of costs associated with deviations, overruns, escalations, delays etc.

Risk profile of the programme (2)

- In addition to the risks directly associated with the construction, commissioning and operation of the power plants, the financial programme needs to take seriously the following risks:
 - **Fiscal risk:** the danger that fiscal commitments associated with the project will exceed the national resources, leading to an unwarranted build-up of sovereign debt and/or the crowding out of resources for other critical government policy priorities.
 - **Announcement risk:** The danger that announcements in the respect of the project will lead to adverse market reactions, downward revisions to the South Africa's sovereign credit rating or negative impacts on investor confidence due to investor's perceptions about the financial impact and risks associated with the nuclear programme.
 - **Medium to longer-term economic risks:** Critical factors include the impact on the electricity tariff path, the consequences for security of energy supply during the construction phase of the project, the macroeconomic impacts of the project (for instance on the current account) as well as the broader consequences for the trajectory of South Africa's economic development.
 - **Legal/constitutional risks:** Constitutional and legal frameworks that govern policy development, project appraisal, procurement, and financing are well-developed in the South African environment. Care must be taken to avoid the potential delays that could result from legal or constitutional challenge
 - **Specific risks:** associated with nuclear technology: Catastrophic risks (which may have low likelihood but also have large consequences) and political risks resulting from changing public sentiment towards nuclear technology over several generations of citizens.
- The procurement process, the financial modelling and contracting framework take account of and seek to mitigate these risks as far as possible.

Considerations in respect of the procurement process

- As required by the Constitution government will approach procurement in a manner that is fair, equitable, transparent, competitive and cost-effective.
- Constitutional and legal frameworks that govern policy development, project appraisal, procurement, and financing are well-developed in the South African environment. Care must be taken to avoid the potential delays that could result from legal or constitutional challenge.
- Proceeding to procurement without clarifying the legal environment, could lead to unnecessary delays and costs:
 - The legislative and regulatory provisions with respect to the designation of the owner-operator, the purchaser of electricity and the procuring agency.
 - The entity or vehicle which will assume the role of owner-operator of the nuclear fleet should be established through statute. If the vehicle is majority owned by the state, supporting legislation and listing in terms of the PFMA is a requirement.
 - Other legislation may have to be introduced to set out the process and align the procurement strategy with legal and constitutional prescripts.
- The following supporting documentation is required for the procurement process to meet auditing requirements and pass legal scrutiny, includes the following
 - A feasibility study report
 - A pre-procurement phase report recommending the preferred procurement approach
 - The allocation of resources in the MTEF to finance government's contribution
 - Governance structures appointed by the accounting officer
 - A legally compliant request for proposals developed by a bid specification committee
 - Letter of exemption from the PPPFA regulations where necessary (for instance to support localisation).

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SCOPE OF THE FUNDING MODEL AND RISKS ASSOCIATED WITH EACH ELEMENT

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Scope of the funding model

The following elements of the funding model and their attendant risks need to be engaged holistically in designing the financial programme supporting the investment:

1. Investment cost of the build programme
2. Impact on the electricity tariff path
3. Costs of developmental and ancillary objectives
4. Financing structures, contracting models and procurement processes
5. Macroeconomic impacts
6. Fiscal context and consequences

The constitutional, legal and regulatory framework will interact with and influence the funding model. This has not been fully addressed in the preliminary report.

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Investment costs

- Large upfront investment means significant capital costs for the construction and commissioning of the nuclear power plants.
- The economics of nuclear energy are largely dependent on total investment costs, which includes *construction cost* and *financing costs*
- Key risks to investment costs include:
 - Complexity in construction can lead to higher costs and delays
 - Long construction period and larger capital costs magnify the impact of delays
 - Strict quality control is required during every aspect of construction; failure to comply with very high regulatory standards causes frequent delay. Changes in the regulatory environment can delay approvals.
 - Risk that the performance of the technology is below expectations.
 - Delayed revenues can risk increasing financing cost; increase risk of fluctuating exchange rate.
 - The risk that demand will be lower than anticipated at start of construction, putting future revenues at risk

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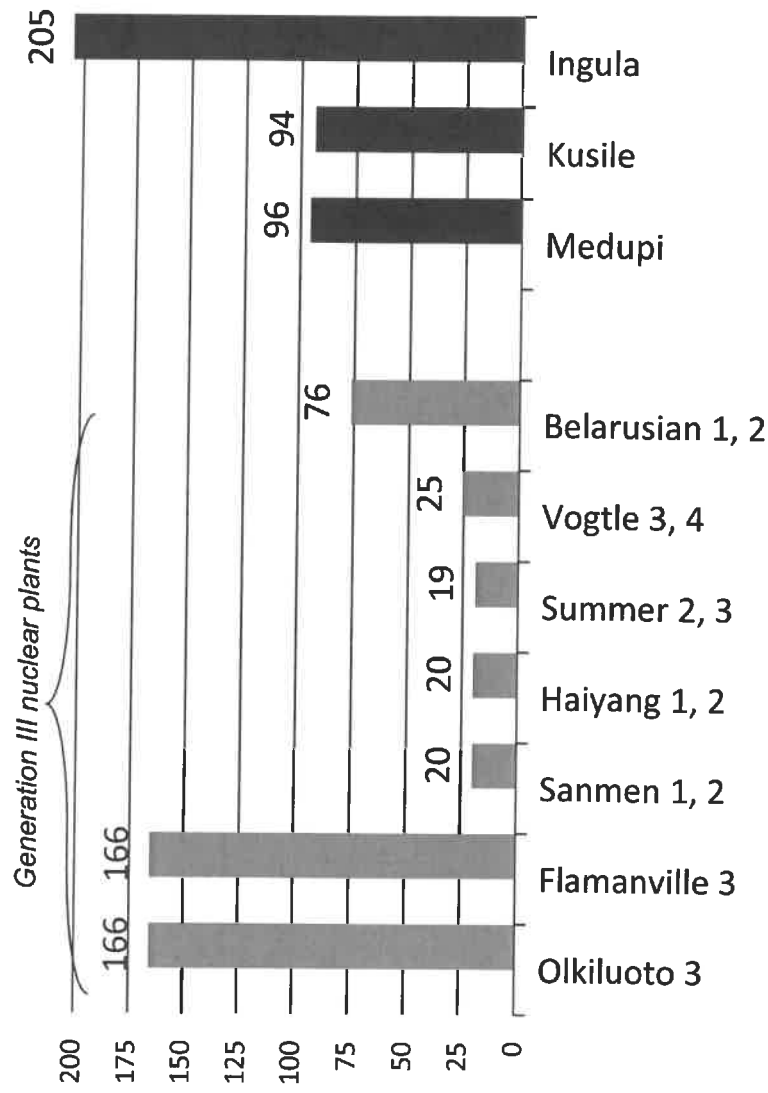
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Risk of cost-overruns on construction is very high

- South African large projects have a record of cost overrun. Overruns on Medupi and Kusile are already close to 100%.
- Poor labour relations, skills shortages and domestic capacity constraints have added significantly to costs
- Costs on first Generation III plants under construction are currently expected to be 70% higher than original forecasts. Final outcomes will only be known on completion.

Estimated % cost overrun

generation III nuclear plants and South African electricity projects



Source: Based on World Nuclear Industry Status Report, 2015

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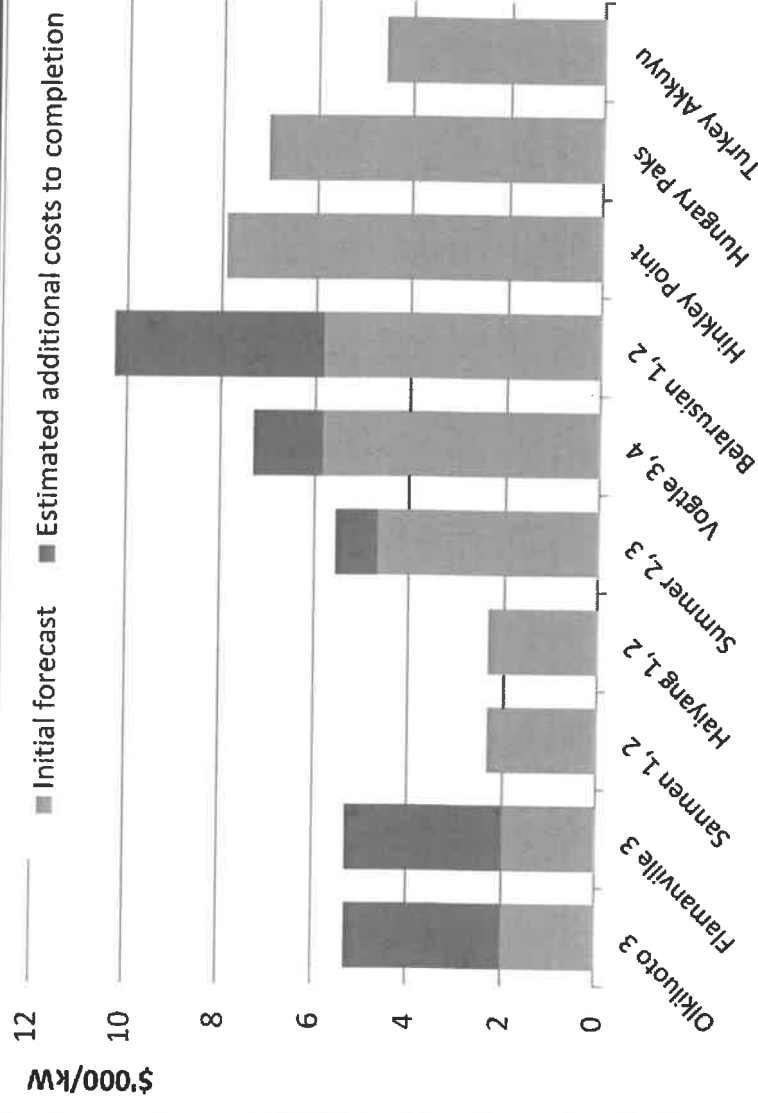
Overnight capital costs are hard to predict in advance

- Overnight capital costs range on from very low \$2500/kw in China, to a higher range of nearly \$8000/kw in Britain and \$10 000/kw in Belarusia.
- Build costs of US\$4918/kW are an optimistic baseline assumption in the South African case.

- The possibility of a cost escalation of at least 50% should be assumed and built into the financial programme, with the possibility of higher cost overruns taken into account.

- A realistic cost range on the first plants is \$5 000/kW - \$10 000/kW**

Overnight capital costs of generation III nuclear technology-
Initial and revised estimates



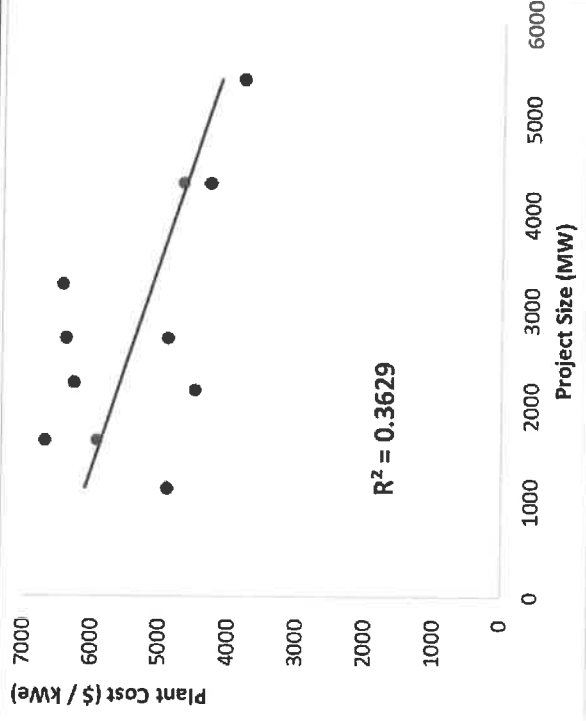
Source: World Nuclear Industry Status Report 2015

Economies of scale or diseconomies of scale?

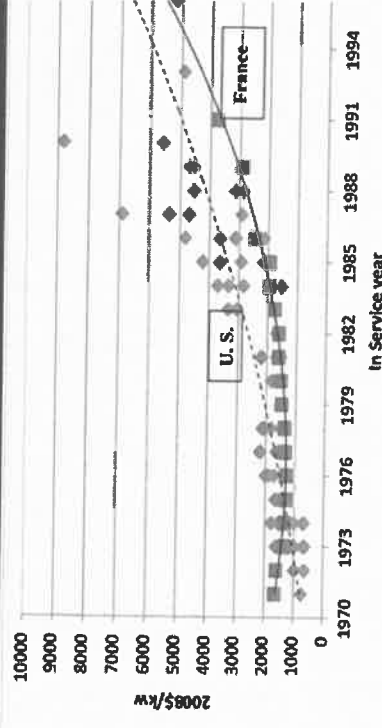
- The Ingerop Report found some correlation between the project size and the overnight capital cost of plants. However, the correlation is weak and based on few data points.
- One study of US and French nuclear build programmes found that the overnight costs of pressurised water reactors increased, despite significant expansion in the build programme over the last 40 years.
- Factors that might lead to cost escalation:
 - Increasing length of construction duration
 - Increasing complexity of nuclear reactors
 - Site-specific deployment makes standardisation difficult
 - Increasingly complex technologies (to accommodate higher safety standards and features)
 - Building large reactors to achieve economies of scale creates large and complex build sites (i.e. diseconomies of scale)

- On the balance of evidence, a rapid learning curve leading to substantial unit cost reduction over the construction of a 9.6GW fleet would be an optimistic assumption.
- This is especially so when the programme seeks to achieve substantial localisation over the course of the programme.

Plant cost as a function of project size (Source: Ingerop report*)



Overnight costs of pressurized water reactors (2008\$)



Mitigating investment-cost risks (1)

- Global experience in nuclear builds show construction risk is very hard to mitigate. Nevertheless, the following factors need to be considered to mitigate risks associated with construction and financing the project.
- **Maintaining an appropriate mix of fixed and floating-rate financing:** Fixing interest rates at current low levels can provide certainty but may come at a relatively higher cost and make it impossible to take advantage of future falls in interest rates
- **Raising local currency financing and exchange rate hedging:** This can mitigate exchange rate exposure, but may be difficult and prohibitively expensive given the large size of the programme
- **Having an equity partner from the private sector invest alongside government:** This can reduce the equity contribution required from government, can assist in harnessing technical expertise and may improve the incentives for ensuring on-time, on-budget completion
- **Timing, sequencing and programming:** Construction can be done over a longer period. The sequencing the building of nuclear power plants to keep the build programme as modular and flexible as possible reduces the strain on resources and technical skills. It also ensures a consistent stream of work to better promote localisation links to the number of units committed.

Mitigating investment-cost risks (2)

- **Human resource planning and labour relations:** Take lessons from Medupi and Kusile, quantify likely skills available and scale programme to suit this. Upfront agreements with trade unions might help avoid some of the delays experienced with Eskom projects
- **Limiting commitments and creating off-ramps:**
 - Limit the number of units committed to, with stop-go decision points based on performance on construction of each unit and impact of other drivers on overall cost relative to affordability thresholds.
 - Government could consider including provision to "walk away" if the costs escalate beyond a certain point, allowing flexibility in electricity mix to take advantage of other energy technologies with declining cost curves. South Korea has a benchmark of 20% cost overruns, which "triggers" a reassessment of project feasibility and whether to continue.
- **Careful contract structuring:**
 - Ensuring strong negotiation when contracting upfront, and allowing sufficient time to conclude complex negotiations. It is essential to have strong negotiators, experienced in nuclear negotiations to ensure that South Africa secures the best possible transaction with opportunities to exit in the event that risks materialise
 - EPC contracting can be used to transfer some construction risk to the vendor to incentivise vendors to be on-time on-budget. However, vendor balance sheets may not be strong enough to bear the risk and there may be disputes over who is responsible and must pay for overruns – ultimately resulting in government bearing the risk.
 - The government team should evaluate design with vendor to limit scope changes (significant cause of cost overruns)

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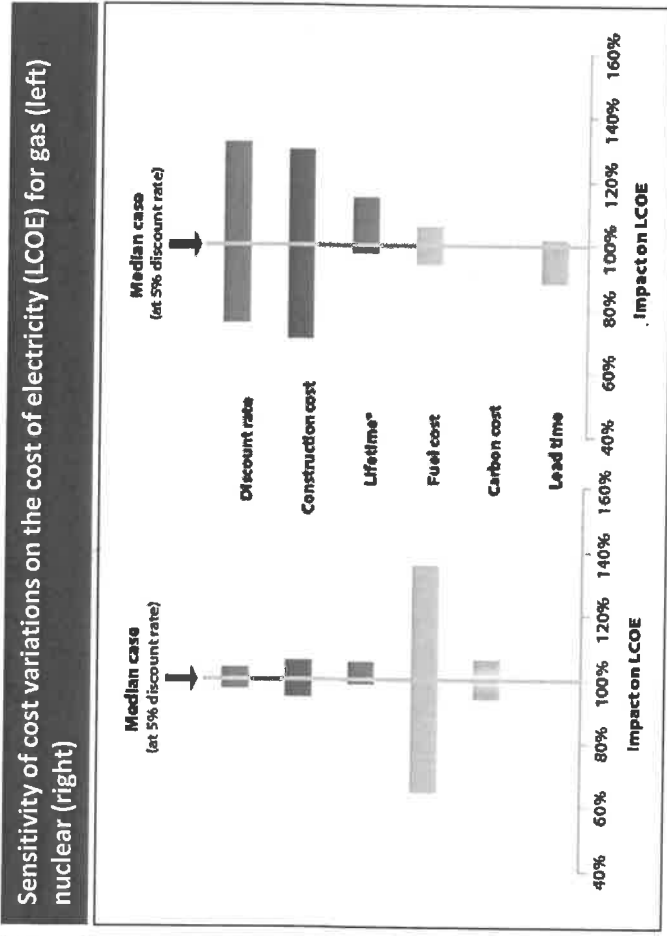
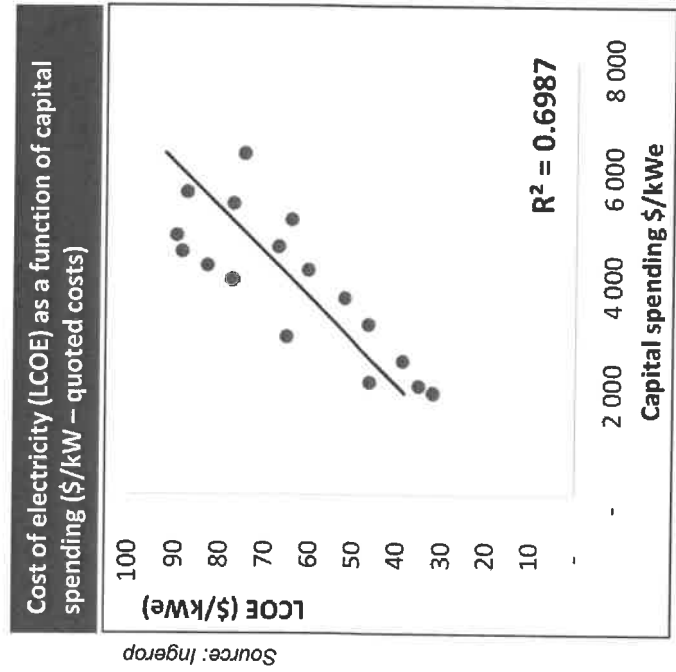


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Investment costs will largely determine the required tariff

- For nuclear energy, the electricity cost is very sensitive to the size of construction and financing costs. Other technologies (e.g. gas and coal) are more sensitive to fuel costs.
- If construction and financing costs are well-contained, nuclear technology is able to generate electricity at a competitive tariff.
- However, if building costs escalate, financing is poorly structured or lead-times are subject to delay the tariff path can exceed that of other technologies.



Investment risks will feed into tariffs

- Robust modelling of the tariff path for different financial structures still needs to be undertaken
- Whatever contracting model or financing structure is chosen, significant increases to tariffs will be impossible to avoid, as prices need to reflect the cost of producing electricity.
- Steep upfront increases will be required if the full financing is to be repaid over 20 years after which the tariff could be reduced or surplus cash would be generated. Alternatively, smoothing the repayment of the financing over a long period allows for some moderation of the tariffs required.
- If the nuclear programme is well managed, with contained construction costs and well structured finance, the impact on the tariff should be acceptable. However, any mistakes in the investment phase will ultimately be locked into the tariff over a very long period. The larger the programme the greater these risks are.
- It is critical to ensure the legitimacy and acceptance of energy build amongst consumers of electricity, learning the lessons of e-tolls. This requires openness and transparency about the trade-offs and risks.
- The financial structure underlying the investment can make a difference:
 - A ring-fenced vehicle (backed by a Power Purchase Agreement) can improve risk mitigation but could result in delayed but steep increases in tariffs.
 - A corporate financing approach (e.g. through on Eskom's balance sheet) results in earlier but more gradual increases

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The tariff path and government subsidies

- Raising electricity tariffs before the plants generate electricity would reduce the burden on the financing burden on the fiscus by making consumers pay “in advance” for future electricity generation. This would be difficult to achieve unless the project is funded on Eskom’s balance sheet.
- Moderating overall level of tariff increases but spreading repayment out over a longer period of time. This will be easier to do with a corporate finance model as the financing and the repayment thereof is not directly linked to the project. Nevertheless, there would still be refinancing risk.
- If government is prepared to subsidize the investment programme (e.g. borrow more and/or forego its return on equity), the tariff path can be moderated. This implies a tax-financed subsidy for the programme.
- The balance between user charges and tax-financed subsidisation has fundamental economic, distributional and fiscal consequences that will need to be considered:
 - Energy-intensive users benefit most from lower tariffs, which negatively impacts on the efficient allocation of resources in the economy.
 - The incentive for users to economise on electricity is undermined.
 - Alternatively, government subsidies could be targeted to relieve the impact on poor consumers as is the case with the current equitable share allocations to finance free basic energy.
 - Any government subsidy will further increase government debt levels and implies higher taxes. Such scenarios have not been modelled.

DEVELOPMENTAL OBJECTIVES

Costs and financing of developmental objectives and ancillary processes

- The programme envisages a number of developmental objectives, beyond the construction of the nuclear power plant for which cost estimates are still to be established.
 - Transmission infrastructure
 - Localisation incentives and subsidies
 - Fuel cycle development
 - Skills development
 - Research and development
 - Interim waste-storage facility
 - Centralised off site long term storage facility (deep geological disposal)
 - Multi-purpose research reactor
 - Expanding NECSA capacity
 - Nuclear liability insurance
 - Decommissioning
 - Regulatory and licensing costs
 - Institutional development
- These costs are likely to be very large, certainly adding billions to the programme. Their impact has not been taken into account in the modelling.

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Two main financing approaches are available

Corporate Finance

Repayment dependent on corporate revenue generating capacity
(MYPD / PPA)

Project Finance

Repayment solely from the free cash flows of the project
(based on PPA)

PRO's

- ✓ Relatively short execution time
- ✓ Low borrowing cost if balance sheet is strong
- ✓ Provides access to a range of funding instruments
- ✓ Allows financing to be repaid over a longer period of time, mitigating tariff impact

- ✓ Repayment terms aligned with cash flows
- ✓ Optimal risk allocation and stricter controls incentivise on-time, on-budget delivery
- ✓ Higher leverage can be achieved
- ✓ Best enables private sector participation

CON's

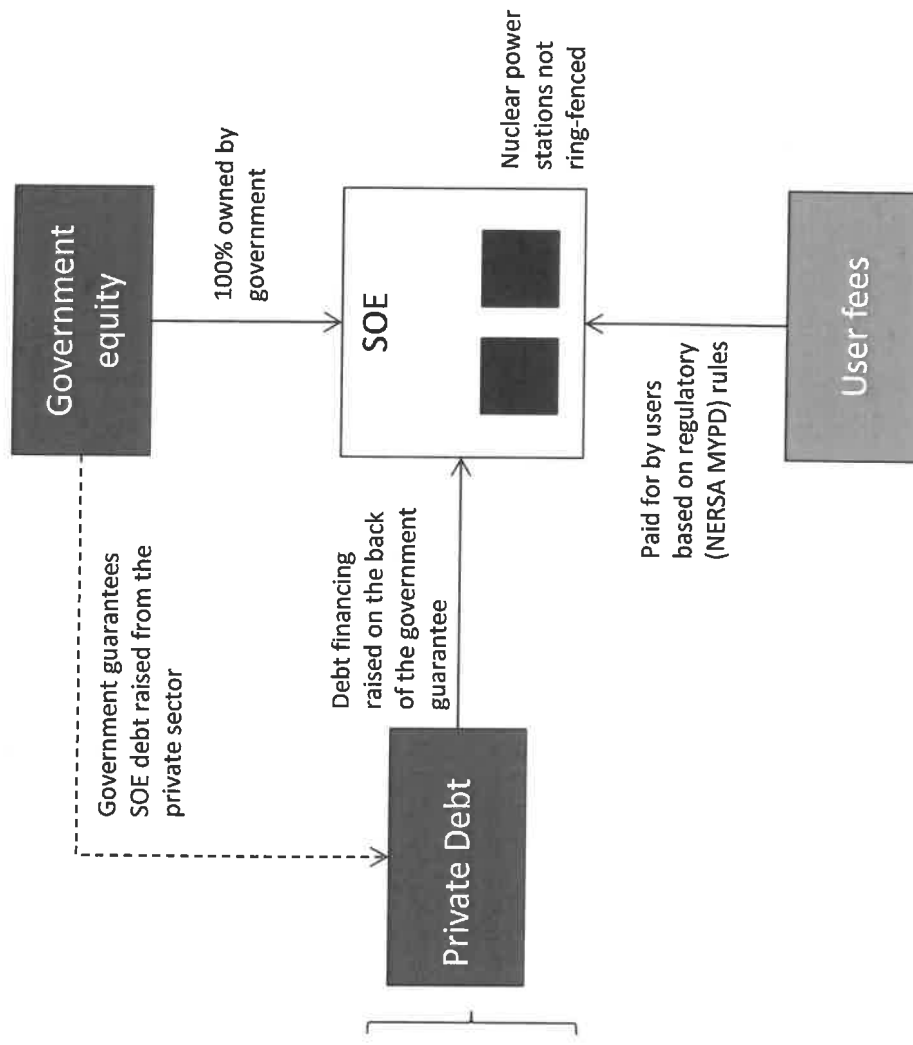
- x Fungibility of money makes it difficult to determine costs of financing the project
- x Lack of direct access to assets for lenders
- x Sub-optimal allocation of risks
- x Lower leverage

- x Higher transaction costs
- x Project finance debt cost often higher & more restrictive (tight financial covenants)
- x High disclosure requirements in relation to proceeds and commercial details

- Financiers have indicated that traditional **non-recourse project financing structure is not viable** for nuclear due to significant risk related to construction
- A range of different structures can be used under each of the approaches, e.g. SPV or JV (with or without Koeberg); TVO model (Finland); Exeltium model (France); BOOT (Turkey); etc.
- Structures can impact the allocation of risk and enable equity investment by the private sector but will not have a significant impact on changing the costs or overall financing requirement or tariff path
- Contracts-for-difference (British) are not relevant to South Africa where the electricity price is regulated

Corporate finance structure

Infrastructure project



- Public sector investors
- Institutional investor or sovereign wealth fund
- Banks
- Export Credit Agencies
- Multilaterals

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Project finance example: Joint venture

Government guarantees of debt or revenues (user fees) will be required

Government

100% owned by government

SOE

Strategic Equity Partner

Other investors

- Public sector investors
- Institutional investor or sovereign wealth fund
- Banks
- Export Credit Agencies
- Multilaterals

≈50%+1 share

Debt financing raised specifically for the project

Private Debt

≈20%

≈30%

Nuclear power stations

Paid for by users on the basis of a PPA

User fees

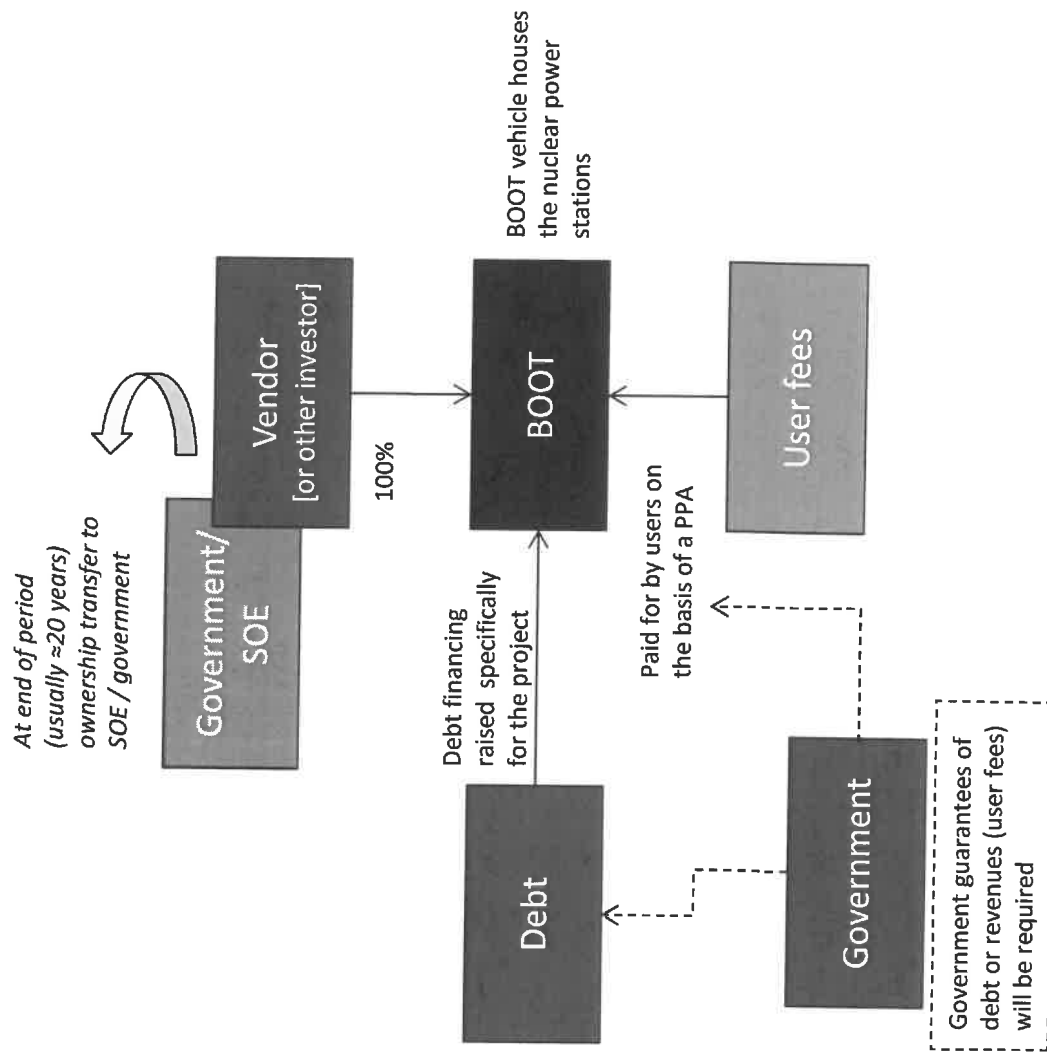
- Public sector equity investors
- Large key customers
- Institutional investor or sovereign wealth fund
- Individual private investors (e.g. via JSE listing)
- BBBEE consortium

The inclusion of Koeberg in the nuclear vehicle can reduce the direct equity investment required from government, but will increase the support required by Eskom as it will weaken Eskom's balance sheet

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BOOT financing structure (Turkey)



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BOOT financing structure (Turkey)

Key elements of the structure

- A ring-fenced BOOT vehicle is established which owns the nuclear power stations and enters into a power purchase agreement (PPA)
- During construction and for an initial operating period (usually around 20 years) the BOOT is owned by the vendor (or other strategic investor/s)
- Financing (debt and equity) is serviced and repaid during the 20 year operating period through the revenues received based on the PPA
- At the end of the operating period, the ownership of the BOOT vehicle is transferred to government (or a designated utility)

Key issues for South Africa

- Recourse from the BOOT to the vendor would be required to ensure that the project continues, even in the event of cost overruns. Vendor will need to have an extremely strong balance sheet or have guarantees from their sovereign to ensure adequate security

Execution time can be a key issue for all project finance structures (e.g. BOOT, TVO, Exeltium) as it can take time to agree the risk sharing and many agreements need to be negotiated.

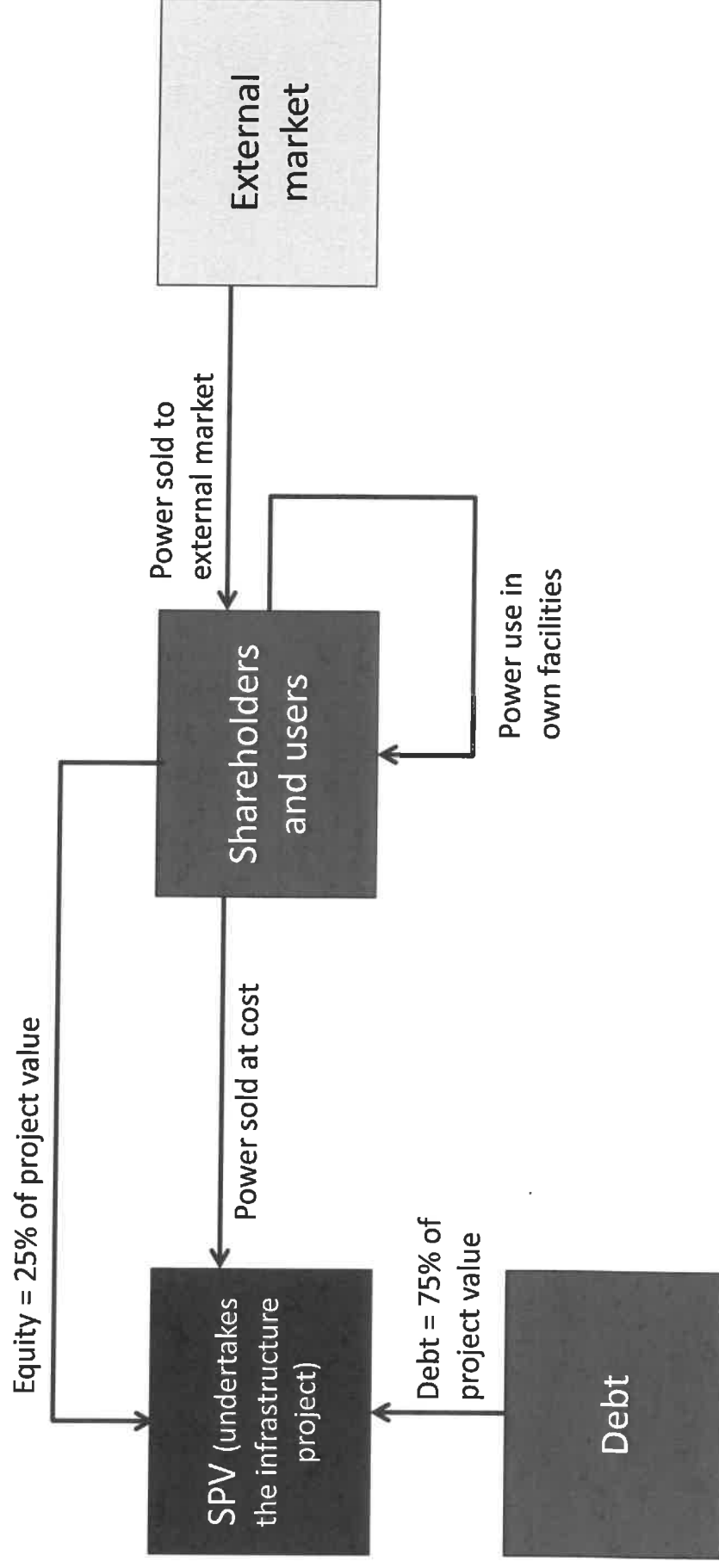
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Cooperative TVO financing structure (Finland)



TVO financing structure (Finland)

Key elements of the structure

- High credit quality owners severally liable for annual costs and committed to off-take electricity produced
- Substantial upfront equity injection committed by the shareholders
- Full turnkey delivery by high credit quality suppliers
- Suppliers jointly and severally liable
- Long term visibility on the electricity price for shareholders
- In Finland, there has been excellent operational performance of the two existing nuclear reactors

Key issues for South Africa

- Ability and willingness of suppliers to provide a fixed price contract – less likely following poor performance on the Finnish project which severely eroded Areva's balance sheet
- Appetite among industrial users for such a structure and the amount of electricity that should be allocated to the scheme – ELUG have indicated that they do not have appetite
- Managing public perception/National Energy Regulator of South Africa (NERSA) and avoiding the creation of an artificial long-term tariff level for a small group of users
- Tax implications for the utility of up-fronting revenues.

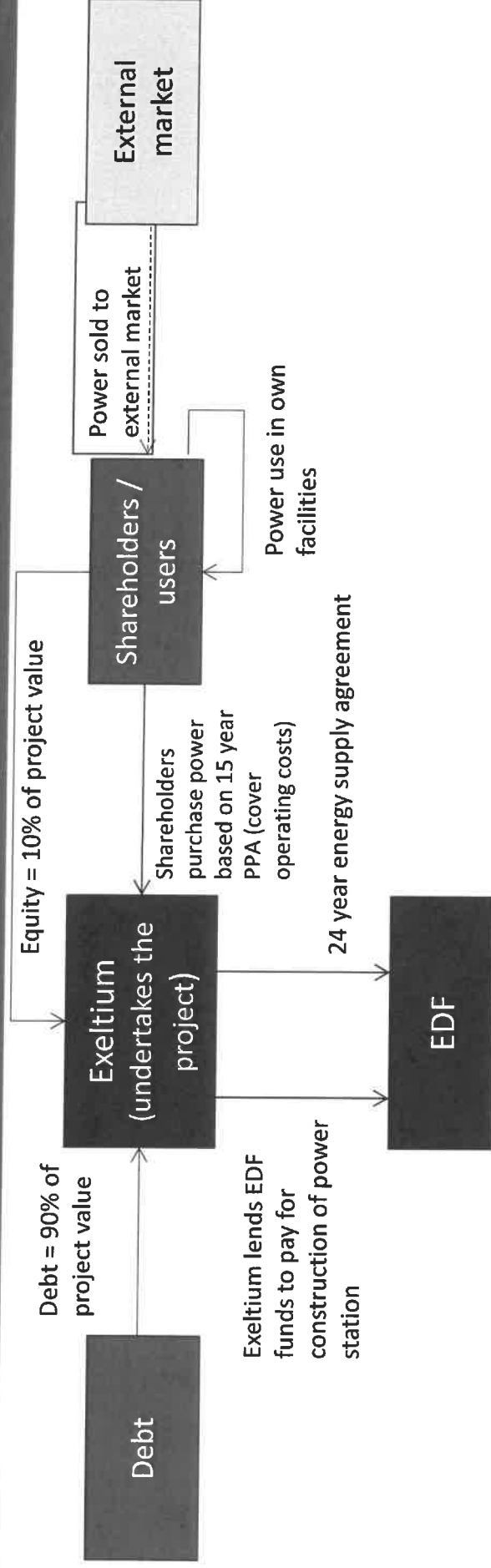
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Exeltium structure (France)



Structure is similar to TVO structure with the major difference being that the exposure is not to the specific nuclear plant.

- Exeltium consortium formed by the six most energy intensive companies who were later jointed by 20 new industrial shareholders
- Exeltium has signed a long term energy supply agreement (PPA) with EDF with prices indexed to nuclear energy prices. EDF uses entire generating portfolio to supply the power.
- Power purchase agreements (take or pay) of not less than 15 years with shareholders of Exeltium (based on operating cost)
- Exeltium and EDF share industrial risks related to EDF nuclear power plants but Exeltium, and its lenders are not taking construction risk or performance risk on the specific nuclear asset

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Financing sources and instruments

- The use of different financing structures (corporate finance / project finance) does not have a significant direct impact on the costs. However, it may have important implications for how risk is managed and incentives aligned with a view to an efficient outcome. Government should be open to considering different structures.
- Export Credit Agency (ECA) financing is likely to be the most cost-effective source to make up the bulk of the debt financing.
- Reliance on ECA financing will limit the extent of localisation as vendor countries seek to support their own exports. As the level of localisation increases, debt financing will increasingly need to be obtained from other sources, including the capital markets, commercial banks and multilaterals.
- Most of the debt financing will be foreign denominated, resulting in an exposure to a depreciation in the exchange rate. Where appropriate local financing should be encouraged.
- Local currency debt, hedging, insurance or other instruments to fully mitigate financial risks may not be available or the costs may be prohibitively high; reinforcing the need for government to limit the size of the initial commitment to retain flexibility to manage this risk.



Comparison of different sources of debt financing

Source	Cost	Repayment period	Currency	Capacity
DFI/MFI	Low cost	• Long repayment period • Repayments can be structured • Can be structured so that no interest/ capital repayment required during construction	• Local DFIs will provide funding in rand • International MFIs may provide some funding in rand, but the bulk will be foreign denominated	Limited capacity (depends on the DFI/MFI)
Commercial bank loan (local or international)	Highest cost	• Short tenor • Repayments can be structured	• Local banks to provide financing in rand • Foreign banks provide financing in foreign currencies	Limited capacity (?)
Export credit agency funding (ECA)	Low cost	• Long repayment period • Repayments can be structured • Can be structured so that no interest/ capital repayment required during construction	• Most commonly financing raised in foreign currency, but possible to raise local currency financing	Large capacity but linked to procurement in source country
Bond issuance (international / domestic)	Market related cost	• 5-10 year tenor most liquid • Repayment on maturity • Interest must be paid even during construction	• Local issuance in rand • Foreign issuance mostly in foreign currencies	Large capacity

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Implications of equity investors alongside government

- Equity investors share risks more directly than debt providers. Involvement of equity investors could assist in gauging the true risk-adjusted costs of the project
- Involving a partner with experience in the construction and operation of nuclear power plants could bring additional technical expertise and better incentivise on time and on-budget delivery
- It will be important to ensure that the partners have the balance sheet strength to be able to be able to inject additional funding in the event that risks materialise
- Equity investment could require that the expected returns from the project are higher:
 - Sufficient assurance would need to be provided through a robust Power Purchase Agreement and regulatory certainty
 - Government will still be required to assume particular risks and provide various guarantees (e.g. termination risk, nuclear disaster risk, security risk and provision of supporting infrastructure)
- Potential investors could include vendors, nuclear operators, domestic and international private sector institutional investors and sovereign wealth funds or large off-takers

Economic risks of long-lead times

- While the economy will shoulder the financial burden of investment for an extended period, the benefits of greater productivity and faster growth will remain unrealised for a decade.
- Large spending commitments are required early on from the fiscus, but tax revenues generated from the programme are uncertain and will only be realised over time.
- In the short to medium term, there is an urgent need to install technologies with a shorter lead time to address pressing energy security requirements. The effects are dynamic and shifts in the energy mix may compromise assumptions and need to be addressed in the IRP update.
- Once committed to the nuclear build, the energy supply landscape could change: costs of different technologies, new baseload and peaking options, large-scale supply possibilities with new technologies. Government's capacity to respond to these changes will be limited by the large upfront capital commitment and relatively long lead times that nuclear requires.
- The energy demand patterns are also uncertain, as energy efficiency, wheeling arrangements, cogeneration and own generation change. Municipalities and provinces are developing their own solutions, whilst going 'offgrid' is becoming an increasing trend
- **Mitigating these risks implies adopting a phased approach to procurement, keeping the programme (and other energy programmes) as modular and flexible, as possible, limiting upfront commitments and allowing for changes of course.**

External imbalances are already large

- Current account deficit, which has been elevated over a sustained period, will be exacerbated during construction, unless offset by a contraction in consumption.
- There will be an imperative to restrain government consumption throughout the build programme. This needs to be considered in the light of other policy imperatives
- A sustained current account deficit will negatively impact on the exchange rate.
- A large share of the liabilities will be valued in foreign currency.
- Contracting foreign debt to pay for the project will result in large financial inflows during construction and large outflows during repayment.
- The imported components of each power station (at least 60%) will need to be offset by
 - Assuming foreign liabilities that need to be repaid
 - Selling domestic assets to foreigners
 - Reducing other imports or raising exports

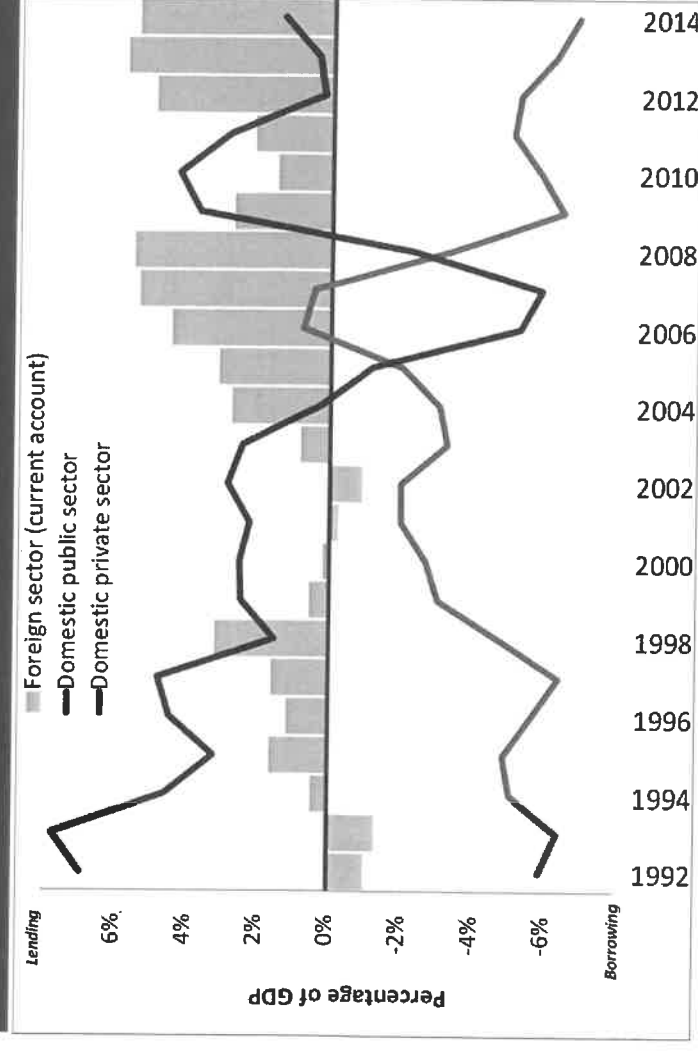
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Borrowing and lending by the public, private and foreign sector in South Africa



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Fiscal implications and consequences

- **Equity contribution:** The fiscus will be required to raise funds to contribute directly to the equity investment in the power plant construction
- **Debt financing:** It has been assumed that the financing for this equity will be raised through the sovereign issuing debt, which will impact on debt-to-GDP ratios and the sovereign credit rating.
- **Guarantees and contingent liabilities:** A requirement for government to explicitly guarantee debt or PPAs is anticipated which will increase government's contingent liability exposure. The perceived risk associated with these guarantees will be critical in determining whether investors regard them as contingent or actual debt obligations.
- **Implicit obligations and fiscal risks:** In addition there are implicit obligations – such as those arising from any catastrophic event cannot be fully mitigated or diversified (e.g. through nuclear liability insurance)
- **Fiscal requirement of secondary objectives:** The full costs of the entire programme, including the costs associated with localisation, skills development, fuel cycle development must be estimated and provided for.
- **Tariff or taxes:** If the tariff is too high, state may be required to shift the burden to taxpayers (need to understand impact on growth, redistribution and incentive structures).

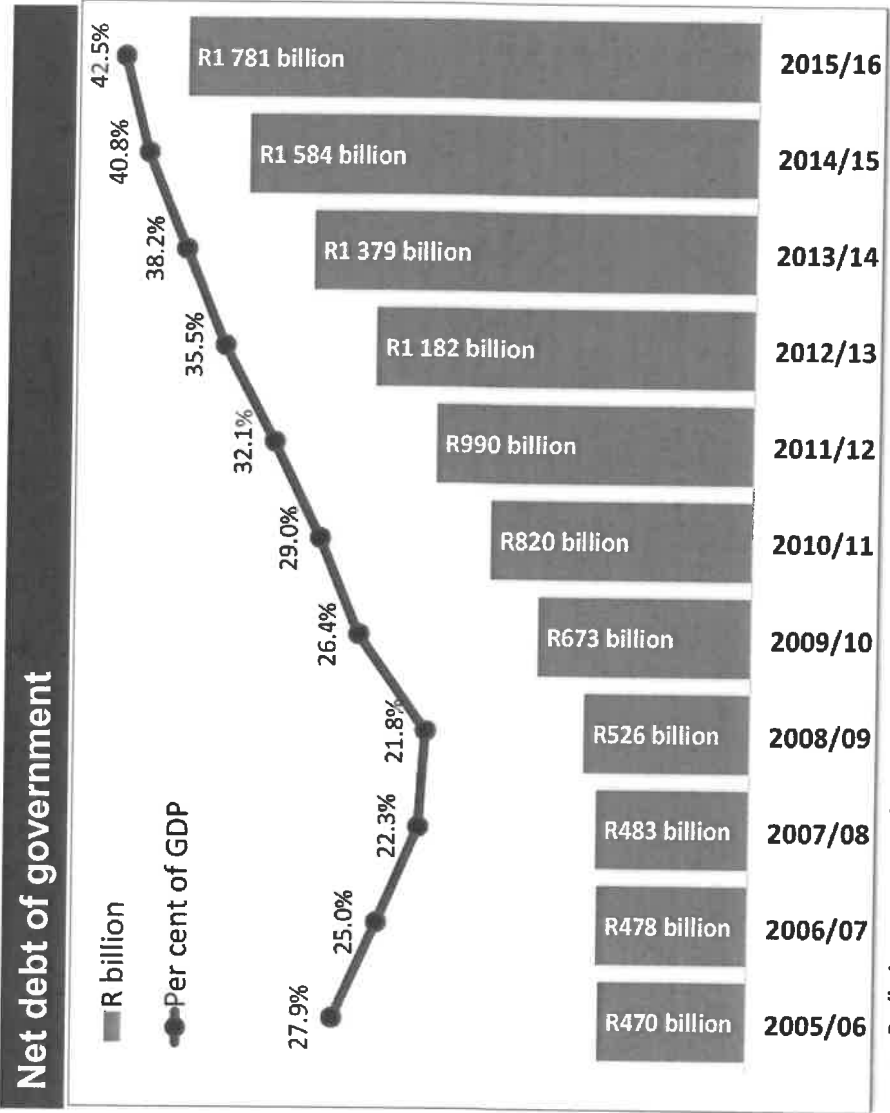
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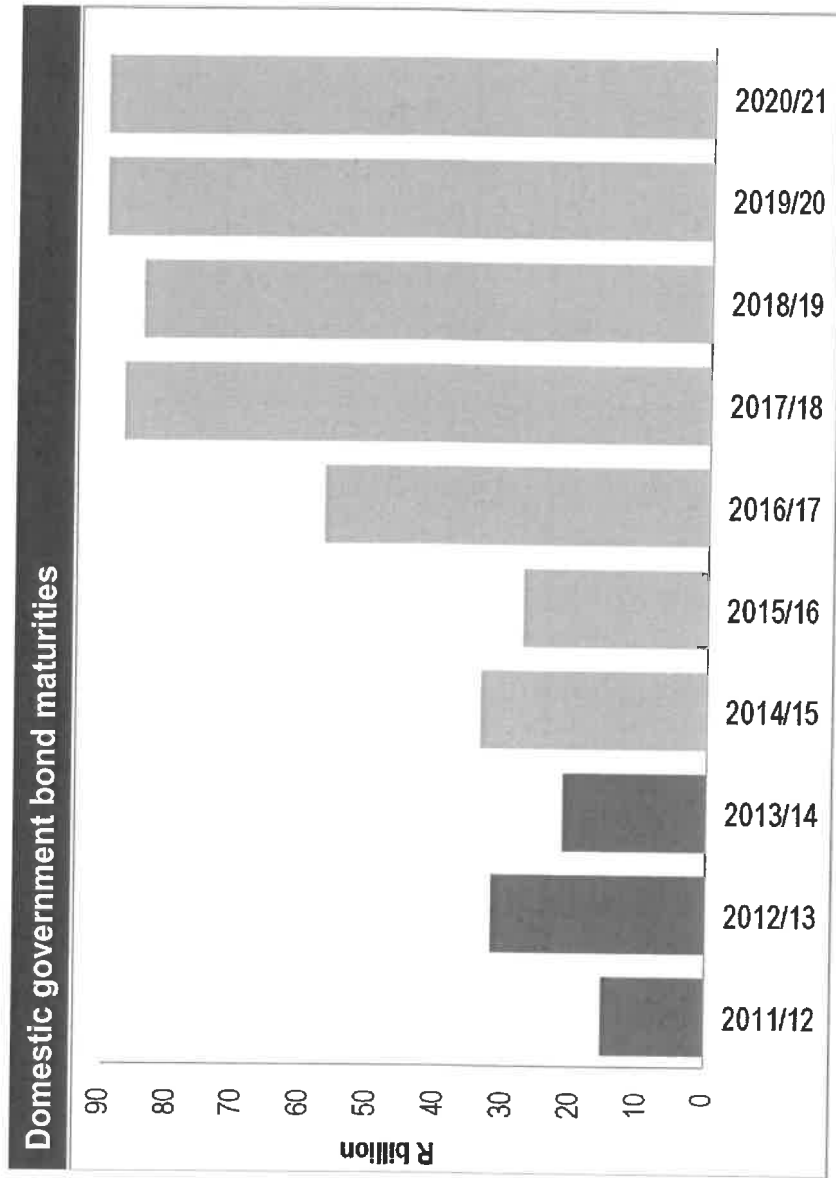
Government debt has not yet stabilised

- Following the financial crisis, growth in debt enabled government to sustain its expenditure and cushion the economy from the global downturn.
- Government's key fiscal objective is to stabilise the debt-to-GDP ratio. Doing so has meant curtailing growth of expenditure, and moderate tax increases.
- It is expected that debt will stabilize between 2017 and 2018



Large debt redemptions loom from 2017/18

- The debt will need to be re-financed, adding to financing risks. Redemptions rise from below R30 billion to above R80 billion as debt issued ten years ago falls due. Large redemptions of debt denominated in foreign currencies also fall due in 2019/20.
- Over and above financing any shortfall between revenue and expenditure, the existing debt will need to be refinanced
- Foreigners own 36% of local currency debt increasing refinancing risk



SA's sovereign rating is under pressure

- Until 2008, South Africa had a better debt position than its peers. Most emerging markets have seen debt levels decline in the last five years, and South Africa's debt is far above the average.
- South Africa's rating has already been downgraded significantly in the last few years.
- Our debt is now rated one notch above "sub-investment grade". If we are relegated into this division many large institutional investors (e.g. pension funds) will be forced to take their money out of the country.
- A ratings downgrade to sub-investment grade will have significant implications for the financing of the government debt.
 - Some investor mandates do not allow for investments into speculative grades/sub-investment grades – and these investors would be forced to divest.
 - Demand for government bonds is likely to decrease and borrowing costs are likely to increase sharply
 - An increase in government borrowing costs will increase borrowing costs throughout the economy

Source: International Monetary Fund, National Treasury; South African data is in fiscal years. Median of Azerbaijan, Brazil, Colombia, India, Indonesia, Kazakhstan, Philippines, Romania, Thailand, Turkey and Uruguay. These are the countries rated Baa2 by Moody's.

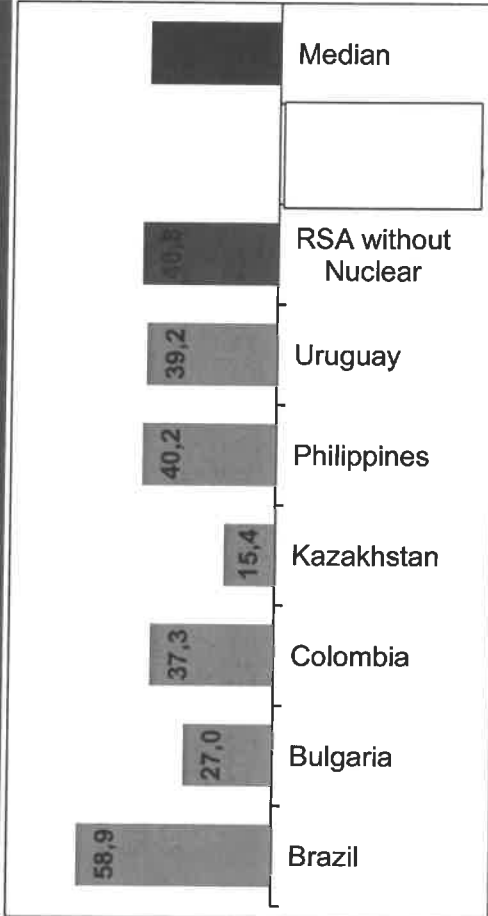


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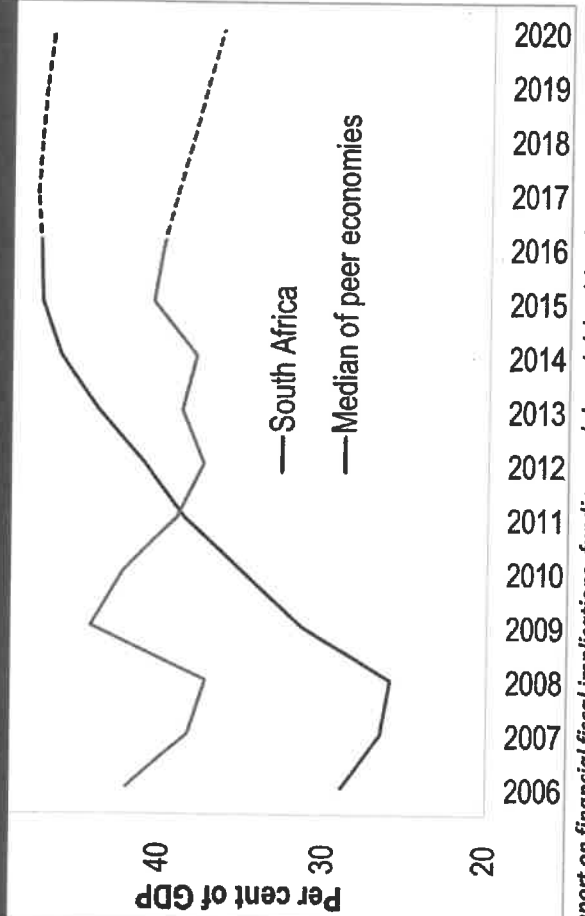
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Debt-to-GDP ratio of BBB rated countries, 2014



South Africa's gross debt-to-GDP ratio compared with peer economies, 2006-2020



New nuclear build programme: Preliminary report on financial fiscal implications, funding models and risk mitigation - 9 September 2015

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Guarantees have consequences for government's balance sheet

- A guarantee is a commitment to take responsibility for a loan in the event of default. Currently issued guarantees amount to about 10 per cent of GDP.
- Guarantees enable borrowing that would otherwise be unavailable to an entity or enable borrowing at lower rates than private lenders are prepared to offer.
- Government takes on the risk that private lenders are not prepared to take on. Therefore, high levels of contingency liabilities lead to an increase in the risk premium on sovereign debt.
- If the net present value of the underlying investment project turns out to be positive (i.e. risks do not materialise), the guarantee need not be called.
- **If the net present value is viewed as negative by the market for whatever reason, investors and rating agencies will view the guarantees as equivalent to debt and penalise the country through sovereign rating downgrades, higher cost of borrowing**

MODELLING OF FISCAL IMPLICATIONS

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Fiscal modelling

- A much more robust and thorough study including detailed analysis of financial, fiscal and economic impacts of the programme is required for more accurate fiscal modelling.
- The current exercise does not substitute for such a study. The aim is to provide broad indications of the impact that the programme might have on the fiscus over the next decade and a half.
- Key modelling elements and sources include the following:
 - The “Deloitte model” commissioned by Department of Energy in 2014 was used to estimate the investment profile of a 9.6GW programme.
 - The National Treasury’s Long Term Fiscal Model was used to estimate the fiscal and economic trajectory against which the project would unfold.
 - The economic impact was modelled using the economic model that has been used by National Treasury when working with the Department of Energy to determine the economic implications of the Integrated Energy Plan (IEP).
 - Inputs were drawn from the reports on benchmarking, costs and financing commissioned by the Department of Energy from KPMG, Ingerop and Deloitte
 - Commercial offerings made during vendor parades were assessed, and elements of the best offerings were assumed as a guide to the ECA-financed components of the financial programme, including financial arrangements, interest rates and repayment terms.

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Fiscal modelling: Assumptions and methods (1)

It was assumed that:

1. The current path of fiscal consolidation achieves its goals, stabilising the debt-to-GDP ratio, and that a tight fiscal stance is maintained over the life of the project. Other guarantees, such as those associated with Eskom's current build programme are not included in the modelling.
2. New policies set out in the MTSF, that are yet to be funded, are not implemented so that the path of spending remains in line with current trends. These include, amongst others, national health insurance, the expansion of vocational training and early childhood development. An alternative assumption is that these policies are fully financed by concomitant tax increases so that they are debt-neutral.
3. The rand continues to depreciate against the dollar in line with the expected inflation differential between South Africa and the USA (4 per cent)
4. The cost of each unit of the nuclear power plants remains constant in \$/kW over the course of the build programme.
5. The tariff on sales received by the operator of nuclear fleet is sufficient to cover operating costs and repay all financing (including government's equity contribution) in the 20 period after commissioning the plants. Tariffs are not raised prior to the commissioning of plants and interest is capitalised during construction.
6. Construction is assumed to commence in 2016, and is scheduled in line with the assumptions of the IRP 2010.

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Fiscal modelling: Assumptions and methods (2)

7. A ring-fenced financial vehicle undertakes the investment (i.e. a project finance structure).
8. For the 9.6GW build local content amounts to 40% for the first two units, 50%, 70% and 80% respectively for the following pairs of units. The ECA-backed share of the programme declines as imported content decreases
9. OECD rules on export credit apply to the financing of the deal (i.e. ECA-financing would support 85% of the imported content and 30% of the value of the imported content for the local content). Terms of the ECA financing are in line with the commercial offerings made during vendor parades.
10. 30% of the costs are funded through equity provided by government. The remaining 70% is funded through debt. The debt and equity drawdowns take place in these proportions as per the funding requirements of the construction programme.
11. Residual debt financing is raised from non-ECA sources, including multilateral development banks, capital markets and private banks, at rates in line with international borrowing rates currently achieved by South African state-owned companies and is repaid over 20 years post the construction period.
12. Government issues guarantees against all debt (dubbed 'nuclear guarantees' in the model). Government's equity contribution is financed with bonds (dubbed 'nuclear debt' in the model)

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Fiscal scenarios

- Full 9.6 GW programme and a smaller initial commitment of 2.4GW modelled
- Scenarios were then constructed in which the cost of the programme (\$/kW) and long run rate of economic growth are varied.
- The intention of the scenarios is to given an indication of the range of possible outcomes.

SCENARIO	COST	ECONOMIC GROWTH
A Low cost, Moderate growth	The cost of the programme is very low (\$5000/kW)	Economic growth returns to its long run average, between 3 and 4 per cent per annum
B Low cost Low growth	The cost of the programme is very low (\$5000/kW)	Economic growth remains at current Reserve Bank estimates of potential output growth (2-3 per cent) over the life of the programme.
C Cost overrun Moderate growth	Cost overruns are 50% resulting in a \$7500/kW cost	Economic growth returns to its long run average, between 3 and 4 per cent per annum
D Cost over run, Low growth	Cost overruns are 50% resulting in a \$7500/kW cost	Economic growth remains at current Reserve Bank estimates of potential output growth (2-3 per cent) over the life of the programme.

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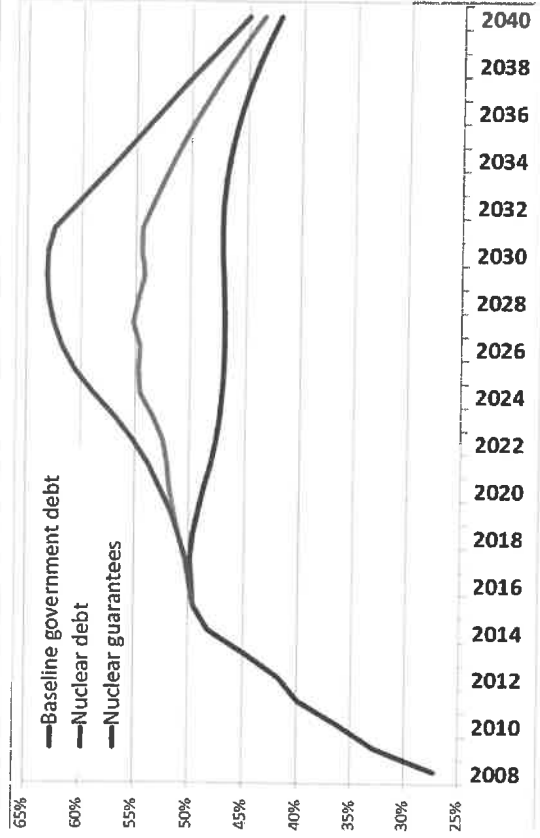
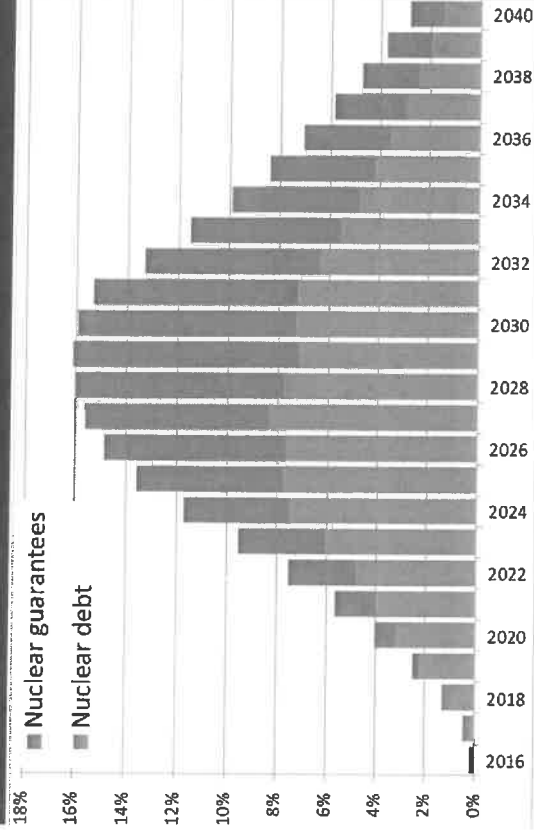


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SCENARIO A: LOW COST, MODERATE GROWTH

- There are no cost overruns on construction (\$5000/kW)
- Economic growth returns to its long-run average, between 3 and 4 per cent per annum
- Nuclear debt peaks at 8.3% of GDP in 2027
- The combination of nuclear debt, nuclear guarantees and baseline debt peaks at 63% of GDP in 2028

Debt, nuclear debt, guarantees as a % of GDP

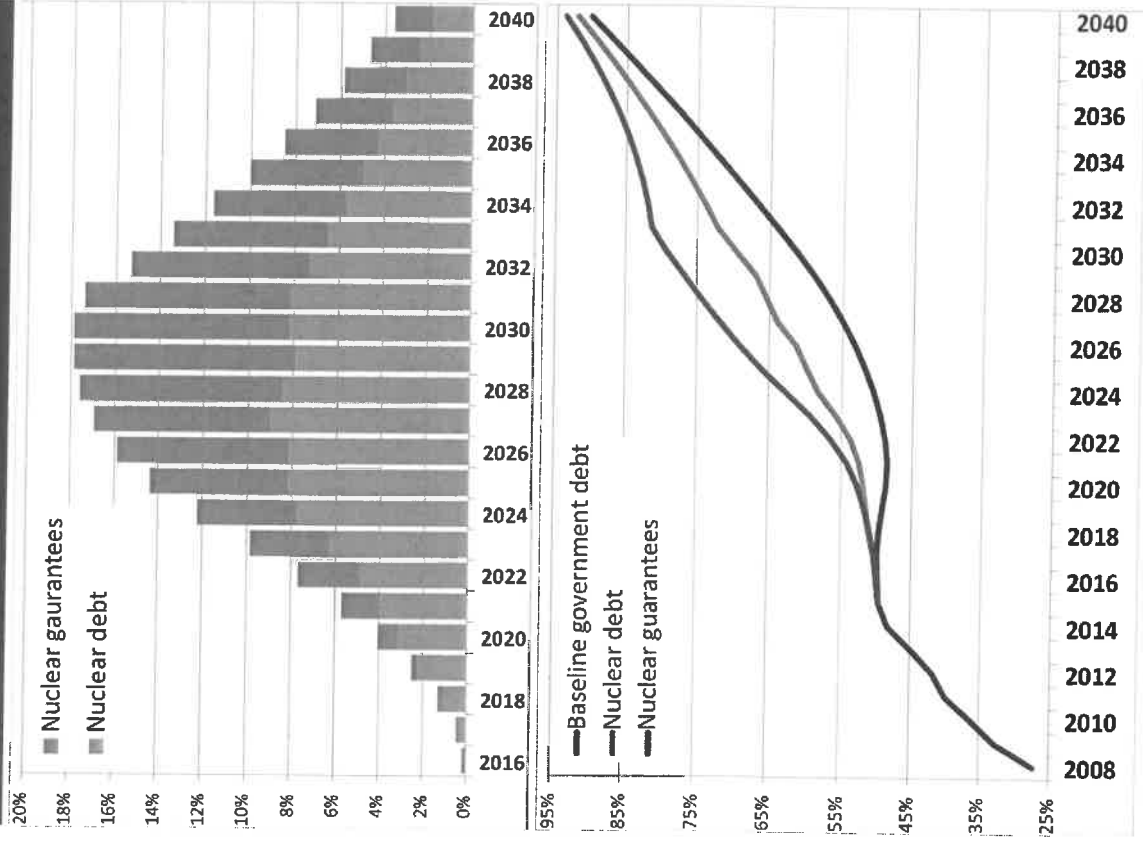


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SCENARIO B: LOW COST, LOW GROWTH

- There are no cost overruns on construction (\$5000/kW)
- Economic growth remains at current Reserve Bank estimates of potential output growth (2-3 per cent) over the life of the programme.
- Nuclear debt peaks at 9% of GDP in 2027
- The combination of nuclear debt, nuclear guarantees and baseline debt results in an unstable debt path, reaching in excess of 75% of GDP in 2030, and continuing to rise.

Debt, nuclear debt, guarantees as a % of GDP



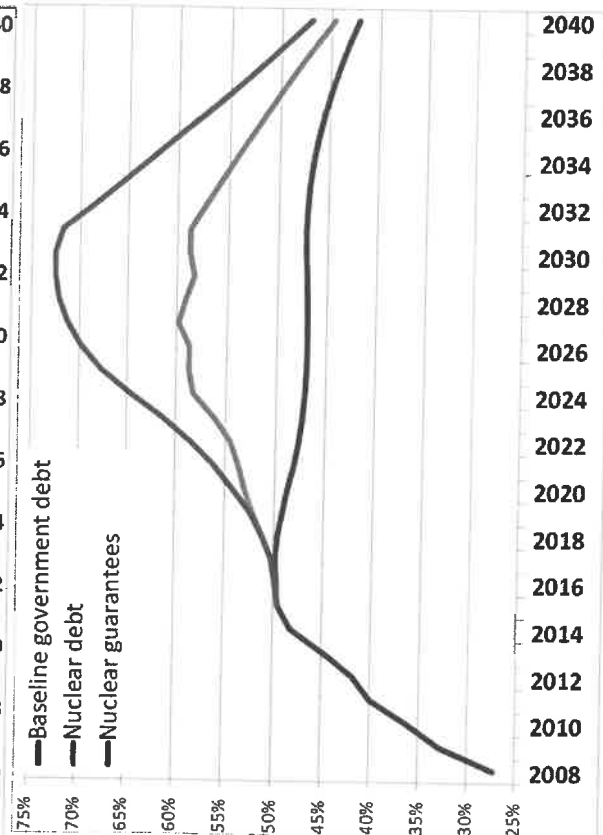
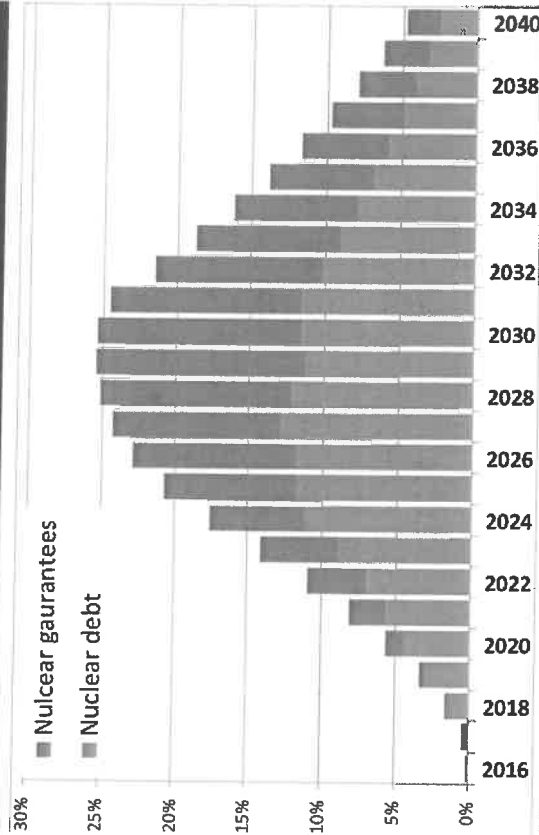
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SCENARIO C: MODERATE COST OVERRUN, MODERATE GROWTH

- Cost overruns are moderate (50%, reaching \$7500/kW)
- Economic growth returns to its long-run average, between 3 and 4 per cent per annum
- Nuclear debt peaks at 13% of GDP in 2027
- The combination of nuclear debt, nuclear guarantees and baseline debt peaks at 72% of GDP in 2029

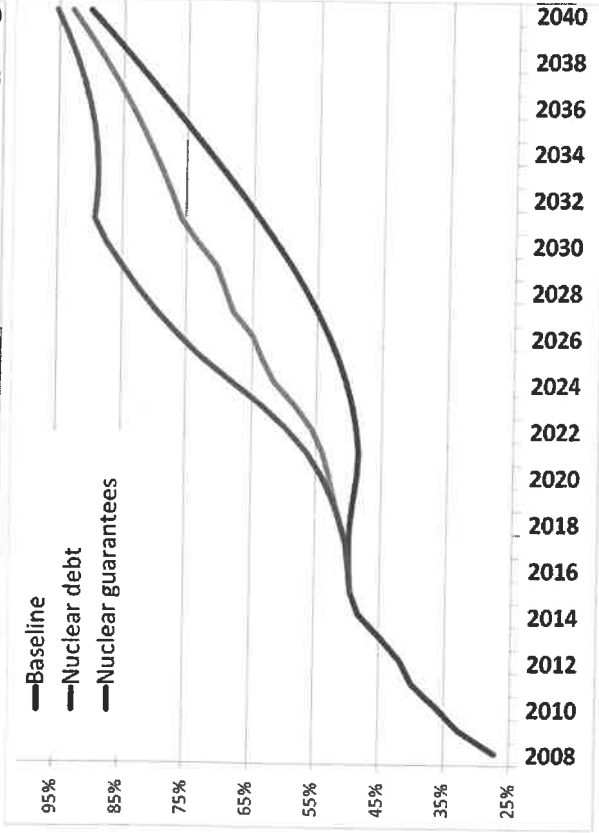
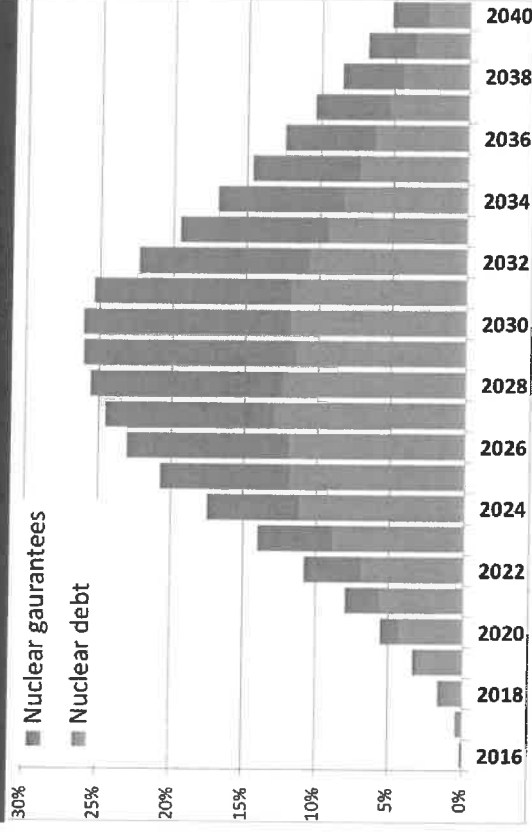
Debt, nuclear debt, guarantees as a % of GDP



SCENARIO D: MODERATE COST OVERRUN, LOW GROWTH

- Cost overruns are moderate (50%, reaching \$7500/kW)
- Economic growth remains at current Reserve Bank estimates of potential output growth (2-3 per cent) over the life of the programme.
- Nuclear debt peaks at 13% of GDP in 2027
- The combination of nuclear debt, nuclear guarantees and baseline debt results in an unstable debt path, reaching in excess of 90% of GDP in 2030, and continuing to rise.

Debt, nuclear debt, guarantees as a % of GDP



Fiscal implications of a 2.4GW programme (1)

- The risk assumed by the fiscus would be far lower if the initial commitment is to two nuclear units (i.e. a 2.4GW build programme).
- Assuming economic growth returns to its long-run average, between 3 and 4 per cent per annum, and that cost overruns can be limited to 50% (i.e. \$7500/kW), the direct debt would peak at 2.6% of GDP.
- Nevertheless, the commitments would still add significantly to government debt, and take new risks onto the public balance sheet, which could result in a sovereign downgrade, particularly if investors and rating agencies view guarantees as equivalent to debt.

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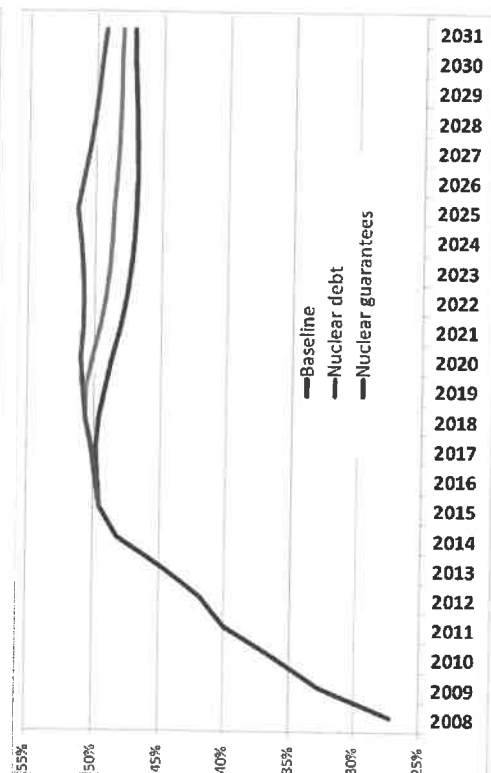
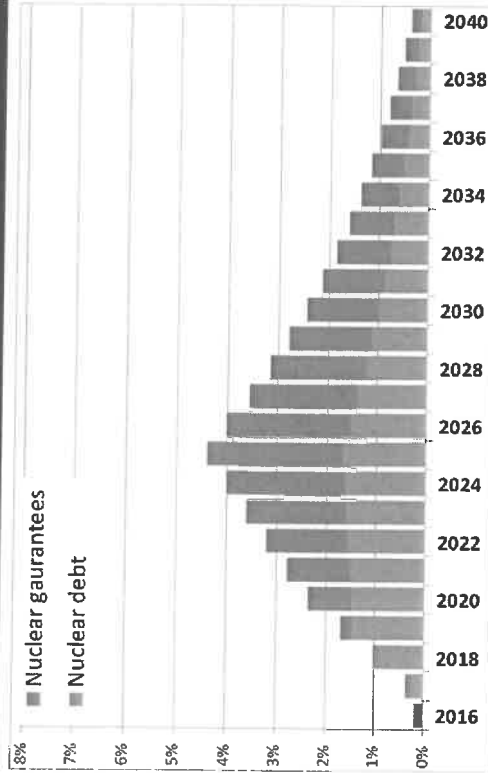
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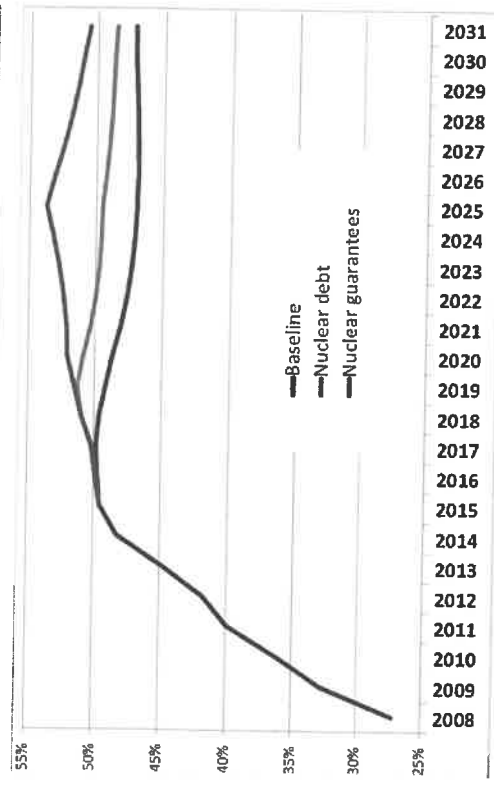
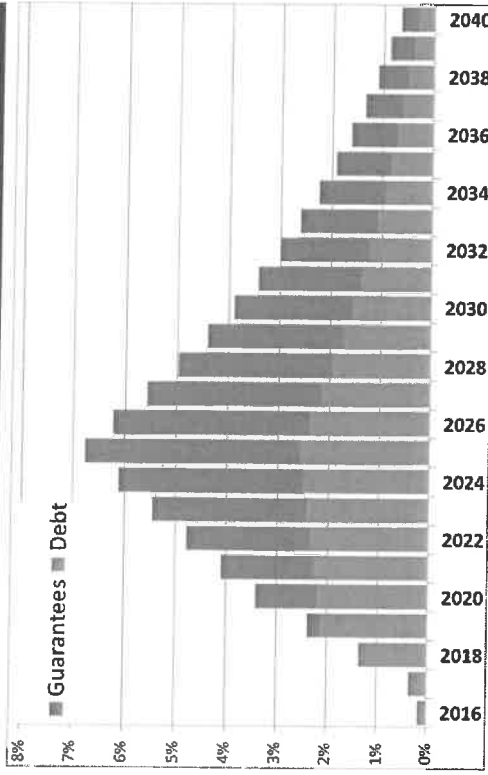
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Fiscal profile of a 2.4GW programme (2)

Profile of fiscal commitments low cost (\$5000/kW)



Profile of fiscal commitments with 50% cost overrun (\$7500/kW)



- The following illustrative estimates summarise the overnight cost in current prices of the build programme depending on the construction cost and different exchange rate scenarios. These estimates do not include finance costs associated with the build.
- These should be considered as broad modelling assumptions, rather than the costs that are likely to emerge from procurement.
- Assuming cost overruns on the baseline \$5000/kW are limited to 50% and the exchange rate will be between R12 and R14 to the dollar, “back of envelope” construction costs estimates will be:

2.4GW programme (R billion overnight)				
Plant cost (\$/kW)	EXCHANGE RATE (R/\$)			
	10	12	14	16
2 500	60	72	84	96
5 000	120	144	168	192
7 500	180	216	252	288
10 000	240	288	336	384

9.6GW programme (R billion overnight)				
Plant cost (\$/kW)	EXCHANGE RATE (R/\$)			
	10	12	14	16
2 500	240	288	336	384
5 000	480	576	672	768
7 500	720	864	1 008	1 152
10 000	960	1 152	1 344	1 536

Conclusions and recommendations

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Summary of funding model

- The elements of the funding model that have been considered in this report include:
 - A ring-fenced special-purpose vehicle finances the project (i.e. a project finance, not corporate finance approach)
 - Equity amounting to 30% of the project cost is provided by government, financed by issuing bonds
 - The remaining 70% is financed as far as possible by ECA-backed debt
 - Government guarantees all debt issued by the SPV
 - Debt is repaid through tariff with increases taking place on commissioning so that all financing can be repaid over a 20 year period, following which tariffs reduce to cover operational costs only.
- These are assumptions used in the model but further deliberation would need to consider alternative assumptions. A set of strategic decisions that would impact on the funding model are detailed below.

Strategic choices in the funding model

- The modelling of fiscal implications was done in terms of the funding model summarised on the previous slide. However, a number of strategic decision points would affect the parameters of the model substantially.
- Each of these needs to be considered in further detail:
 - **Tariff path:** raising tariffs early would reduce fiscal costs by shifting some of the burden to electricity consumers.
 - **Phased or once-off commitment:** Should government commit in advance to the full 9.6GW, or make commitments in a phased manner?
 - **Corporate or project finance:** Should the project be financed on the balance sheet of Eskom or another large state entity, or is the ring-fenced SPV approach preferred?
 - **Equity partner:** Should government go-it-alone as an equity contributor or should an equity partner, prepared to share in the financial reward and risk of the project, be included?
 - **Localisation and ECA-backed finance:** Vendor financing is cheaper and on easier terms, but limits the extent of localisation since vendors seek to promote their exports.
 - **Affordability limits:** What limits should trigger a rethink of affordability and what range of variables should be included in “stop-go” decision making (e.g. exchange rate, economic growth, interest rate, construction cost, lead times, localisation performance...)

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Conditions for affordability

- The key issues in ensuring the project's affordability for the fiscus will include:
 - Returning to a path of faster economic growth.
 - Accepting a constrained path of government consumption expenditure over the life of the project – e.g. wage bill growth will need to be curtailed.
 - Reconsidering the sequencing of other large new policy initiatives, including national health insurance, the white paper on post-school education and training, and social security reform.
 - If government equity must be deployed before 2018, substantial additional pressure will be place on the current MTEF: resources will need to be found within current baselines or government will breach its spending commitments.
 - Ensuring the market perceives the investments underlying the guarantees as sound and viable, so that guarantees are not regarded as debt.
- Even if all of these conditions are met, there remain significant risks associated with an upfront fiscal commitment to a 9.6 GW procurement which cannot be fully mitigated.
- The risks associated with a smaller commitment remain significant, but are more manageable.

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RECOMMENDATIONS (1)

1. Notwithstanding the policy objective of 9.6GW, the South African government should not explicitly commit to contractual obligations beyond at most two units of nuclear power stations.
2. The sequencing and timing of the programme needs to be carefully considered and explicitly articulated in terms of a realistic and logical framework. It is recommended that:
 - a) In order to avoid unnecessary legal delays, the publication of a feasibility study and the conclusion of statutory amendments, including for the legal designation of the owner-operator, purchaser and procuring agencies, should be completed prior to the issuing of a request for proposals.
 - b) In order to mitigate fiscal risks, commitments should not be concluded before the current fiscal consolidation is complete and the debt-to-GDP ratio has stabilised (expected in 2017).
 - c) Government should maintain a high degree of flexibility on the sequencing of subsequent commitments, assessing the progress of implementation on the first commitments, assessing the economic environment and taking account of the fiscal position before re-working the path of investment.
 - d) Spreading the construction out over a longer period of time is likely to result in more consistent use of skills and flow of work promoting localization

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RECOMMENDATIONS (2)

3. Construction contracts should establish clear stop-go decision points based on performance on construction of each unit, and well defined affordability thresholds. Provisions to "walk away" if affordability thresholds are breached should be contracted upfront.
4. Involving a equity partner with experience in the construction and operation of nuclear power plants could bring additional technical expertise and better incentivise on time and on-budget delivery. The participation of equity partners alongside government, including from the South African private sector, would improve sovereign affordability, risk mitigation and effective governance of contractual arrangements.
5. The entity or vehicle which will assume the role of owner-operator of the nuclear fleet should be established through statute. Other legislation may have to be introduced to set out the process and align the procurement strategy with legal and constitutional prescripts.
6. In order to reassure creditors of the viability and soundness of the project and its affordability for the sovereign and consumers, a full feasibility study should be made available for public scrutiny. The feasibility study should assess the costs and benefits of the investment programme as well as the fiscal and financial implications, and be published prior to the conclusion of binding contractual arrangements.
7. The DPME should conduct a thorough Social and Economic Impact Assessment study of the project before the conclusion of binding contractual arrangements.

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