DNA Economics

Volume 3

Cost implications of the White Paper proposals

31 May 2016

Costing Model Output report

Final version

ACKNOWLEDGEMENTS

The project team would like to acknowledge the contributions of officials from the Department of Higher Education and Training, National Treasury and other key institutions within the Post School Education and Training system.

AUTHORS

DNA Economics

Mzabalazo Advisory Services

VERSION CONTROL

Name	Version	Comments	Date
Output of the expenditure model of the Post-School Education and Training system	1	First draft submitted to the Interdepartmental task team.	03/03/2016
Volume 3: Cost implications of the White Paper proposals. Costing Model Output report	2	Second draft submitted to the Interdepartmental task team. This draft includes discussion of funding modules.	26/04/2016
Volume 3: Cost implications of the White Paper proposals. Costing Model Output report	Final	Second draft submitted to the Interdepartmental task team. This draft includes discussion of funding modules.	31/05/2016

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

1 INTRODUCTION

1.1 Introduction

The White Paper on Post-School Education and Training sets out a vision of the post-school education system in 2030. In addition, it provides a number of policy targets and objectives. This expenditure model investigates the likely financial costs of meeting these targets to the institutions that deliver and support education and training in the system and considers the sensitivity of these costs to a wide variety of cost and performance factors. In the current fiscal environment, where resources are constrained, the expenditure model, along with a robust implementation plan, will assist Government to make the decisions and trade-offs needed to realise the intent and objectives of the White Paper.

The expenditure model consists of three distinct modules for the three primary public sector of the post-school education and training system with the associated White Paper enrolment targets given in Table 1 below[1]:

- Technical and Vocational Education and Training (TVET) colleges (Section 2)
- Universities (Section 3)
- Community Colleges (Section 5)

Table 1: Summary of enrolment targets in the White Paper on Post School Education and Training

Sector	Actual	Target (2030)	% change
TVET	706 000*	2 500 000	255%
Community colleges	265 000^	1 000 000	277%
University	937 000*	1 600 000	71%

Source: DHET (2014)
*Baseline years differ: ^ 2011 and *2014*

In addition, a workplace training model (Section 4) model was developed; although the White Paper does not provide overall enrolment targets for workplace training. The sectors are modelled individually given the stark differences between them and the distinct White Paper targets and objectives for each of them. However to allow comparability between the sector modules, the results within each sector are presented within the frame of three high level scenarios:

1) **Status quo scenario**: Illustrates the expenditure implications of meeting the White Paper total enrolment targets, while assuming that all the key cost drivers (e.g. student to lecturer ratios, the mix of enrolments by programme and, throughput rates) remain as they currently are.

[1] It should be noted that the workplace training funded by SETAs that is delivered by private training providers does not fall within the scope of the expenditure model. However these costs will be explicitly considered and discussed in the Funding Options phase of the project.

Effectively this scenario looks at the costs of increases to student access, while keeping the key input factors that might affect quality the same

2) **Full policy scenario**: Illustrates the implications of not only meeting White Paper enrolment targets, but additionally considering changes to the cost drivers and input factors that are likely to improve quality. The changes in these factors are informed both by the White Paper and NDP, as well as the results of interviews carried out by the project team with policymakers
3) **Mixed scenario**: Given funding limitations, it might not be possible to meet the full White Paper enrolment targets or implement all the interventions to improve quality that were considered under the full policy scenario. This scenario therefore shows the possible implications of less ambitious increases in enrolments and input factors; effectively representing a mix between attempts to increase access and improve quality.

It should be noted that given the relatively open-ended nature of many objectives in the White Paper and the absence of detailed plans and strategic goals in many cases, these draft scenarios were in many cases left to the subjective judgement of the project team. They will therefore need to be discussed and debated in depth with the Project Steering committee to ensure that they provide an accurate depiction of current strategic plans and objectives.

For all the scenarios considered, inflation is assumed to be 6.2%, based on estimates provided by National Treasury. For the university sector, an additional 1.8% real inflation is assumed, in recognition of the above CPI increases in higher education costs in recent times.

1.2 The relationship between expenditure and throughput

Strategic planning for the PSET system should involve considering the trade-offs that exist between increasing student access to the system (enrolments) and increasing quality (throughput rates and employability of graduates). These trade-offs exist because initiatives or interventions that attempt to improve quality are often associated with increased costs per student.

Ideally, an expenditure or costing model should therefore dynamically adjust throughput rates in response to changes in model input parameters and cost assumptions. In practice, however, the relationship between expenditure and throughput is highly complex; particularly since the effectiveness of an intervention depends strongly on the context in which it is delivered, the exact design of the intervention and the quality of implementation of that intervention; all of which goes far beyond simply the costs of that intervention. Indeed, higher expenditure is not a panacea. Hanushek[2] remarks in the context of school education

> *"Eager to improve quality and unable to do it directly, government policy typically moves to what is thought to be the next best thing – providing added resources to schools. Broad evidence from the*

[2] (Hanushek, 2002)

> *experience in the United States and the rest of the world suggests that this is an ineffective way to improve quality."*

Much of the literature on the determinants of throughput rates focus on the characteristics of students that exhibits strong correlates to performance. For example, one study[3] of the University of KZN finds that the "*key determinants of student success are total matriculation points, matriculation Maths and English I scores, and having English as home first language*". While this study does recognize the role of exogenous factors such as the institutional environment and learning infrastructures, it concludes that "these determinants of student success are not straightforward measures of student quality as they are the sum of complex and multifaceted factors". The student characteristic factors determining drop-out rates often also differ from those affecting pass rates - with these factors further varying by the subject studied[4] - which complicates the creation of a model of such factors.

As pre-existing student characteristics and knowledge levels are critical in determining success, post-school education institutions have limited control over the degree to which throughput rates can be improved (without lowering pass rate standards). However, by understanding the specific challenges faced by students, interventions can be designed to address these challenges. These include greater levels of student support (either financial or in terms systems and infrastructure), creating a conducive living and learning environment as well as the creation of foundational or bridging courses (or extending the duration of programmes). It is likely that no single one of these interventions will succeed in isolation and they should hence not be seen as mutually exclusive options with independent effects on performance.

The costing modules presented in this document therefore do not explicitly model the relationship between cost drivers (and other inputs) and throughput rates; as estimates of this relationship are unlikely to be reliable. Instead, the user is given the option to adjust both the input parameters and the throughput rates exogenously, and thereby can consider what size of throughput rate improvement would be required to justify the costs of a certain intervention. This provides a useful tool with which to consider not only the long term costs of an intervention or policy, but also a basis against which to assess cost effectiveness given the potential improvements in throughput rates that might result.

In this context, the full policy and mixed scenarios considered in this model assume changes to key cost parameters / drivers (e.g. student to lecturer ratios or the proportion of students in residences) under the assumption that while such changes would increase costs, they could also result in improvements in student performance.

1.3 Outline and scope

Given the size and complexity of the PSET system and the uncertainties that exist with regards to what the system might look like in 2030, a great number of assumptions were made in the creation

[3] (Bokana & Tewari, 2014)
[4] (Araque & Roldan, 2009)

of these models. All of these assumptions are not discussed here, but instead are outlined in the Costing Model Manual document that was created to accompany this document. In particular, the manual explains the different assumptions, methodologies and functionalities present in each of the modules that make up the full expenditure. These documents should therefore be read in parallel, but are kept separate to ensure that this document can focus the attention of the user on the results of the model.

The costing model therefore does not model whether funding will be available for these levels of expenditure or where this funding could originate from. The next phase of the project (Volume 4: Funding and Financing Options) explicitly attempt to answer these questions both qualitatively and quantitatively; the results of which are contained in a separate document.

Sections 2 to 4 provide descriptions of the results within each of the sectors (TVET, Community Colleges and Universities) through the analysis of each of the main scenarios described above. Section 5 provides a summary of the results at the aggregate PSET system level and discusses the main findings and next steps based on the model outputs.

Real vs Nominal prices

This report presents both real and nominal prices, based on an inflationary assumptions of 6.2%. Nominal prices are calculated by adding this level of inflation to all cost estimates produced by the models. Real figures show all costs in 2014 prices; i.e. all future costs are discounted by the assumed inflation rate of 6.2%. Real prices are therefore directly comparable over time. This generally makes real figures easier to digest and interpret, since it can be difficult to contextualise nominal figures in 2030. The results will therefore mostly be analysed and discussed in real terms.

2 TVET COLLEGES

2.1 Introduction

2.1.1 Background to the TVET sector

Technical Vocational Education and Training (TVET) colleges (previously referred to as Further Education and Training, or FET, colleges) aim to provide educational opportunities to those who either do not qualify for tertiary education or who feel they require vocational training with direct application to the workplace. According to the National Development Plan (NDP), the sector has a critical role to play in the development of practical, employable skills and, hence, the reduction of youth unemployment and skills shortages in the country. This is reflected in the White Paper target to increase enrolments in public TVET colleges from approximately 400,000 in 2011, to 639,618 in 2013 (DHET, 2015) to 2.5 million in 2030 (DHET, 2013). There are currently 50 public TVET colleges in the country, with over 250 campuses.

2.1.2 Scope of the TVET module

The assumptions made and calculations performed by the TVET expenditure module is discussed in detail in the accompanying Costing Module Manual; and are not repeated here in the interest of space. This section however provides a brief overview of what is covered by the model and the main functionality available to the user.

The TVET expenditure module models expenditure within public TVET colleges between 2014 and 2030. The model outputs aggregate cost, enrolments and performance variables for the sector as a whole based on a number of input assumptions that can be amended by the users. The following expenditure elements are included in the model:

- Colleges' current (i.e. operational) expenditure annum over time (excluding residence expenditure)
- Colleges' infrastructure expenditure over time (excluding residence expenditure)
- The total residence infrastructure and residence current (i.e. operational) expenditure

In addition, the model tracks the number of headcount enrolments, Full-Time Equivalent (FTE) enrolments, certifications (passing a single level of a programme) and graduates (passing all levels of a programme). These calculations are based on enrolment or graduate targets as well throughput rates; all of which can also be adjusted by the user. By modelling both expenditure, enrolment and performance figures, the model provides a number of efficiency estimates for the sector; in particular the unit cost per graduate by programme.[5]

The default assumptions for model parameters and the relationships between them is based on the revenue and expenditure analysis performed in the previous phase of this project, as well as the

[5] Note that the number of graduates could only be estimated for NC(V) and NATED, as reliable enrolment and performance data is not available for other programmes.

targets and policy intents articulated in the White Paper. In many cases the White Paper does not supply detailed guidance on the value.

2.1.3 Key input variables

The model allows the user to change a number of input parameter and assumptions; most of which are located or accessible from the Dashboard. This allows the user to investigate the impact of changes to these key parameters; as illustrated through the scenario analysis presented. Figure 1 below provides a screenshot of the main variables that can be adjusted by the user.

Figure 1: Screenshot of the key input parameters

INPUTS & ASSUMPTIONS

Select pre-set scenario	Status Quo / Full Policy / Mixed		
Inflation	CPI	6.2%	Click to convert output to Real
Enrolment options	Target Enrolments (2030)	2 500 000	Calculate Enrolments to reach graduate target
	Graduate Target (specify target here)	100 000	
Growth, programme and performance options	Enrolment Growth Scenario	1. Current Growth Plan	
	Programme Mix Scenario	2. User defined	Click to change Programme mix
	Throughput rate scenario	2. User defined	

Cost & Performance Assumptions		Scenario (2030)	Current (2014)
Performance (Throughput rates)	NC(V) Throughput Rate	20.0%	10.6%
	NATED Throughput Rate	50.0%	25.8%
Student:Lecturer FTE ratio	Student:Lecturer FTE ratio: NC(V)	13.0	19.6
	Student:Lecturer FTE ratio: NATED	25.0	33.6
Direct Costs	Direct Costs: NC(V) - 2014 prices	R12 000	R1 699
	Direct Costs: NATED - 2014 prices	R5 000	R1 216
Mode of delivery	% of enrolments in Distance Learning	10%	0%
Residences	Bed capacity as % of enrolments	20.0%	1.5%

2.1.4 Overview of scenarios

Table 2 below outlines the differences between the three scenarios that are considered in the subsequent sections for TVET colleges. The first scenario (status quo), assumes that the 2.5 million enrolment target is achieved, but that all the key cost and performance input factors in the model, including the mix of programmes, stays the same. The second scenario (full policy) also assumes the full enrolment targets is met, but additionally assumes that a number of input factors change. While the White Paper does highlight the need to improve quality in the system, it does not explicitly articulate in detail how quality improvement might occur and the likely scale of changes to key input factors. Therefore, the project team have made these parameter value choices based on the views expressed during the interviews conducted with DHET staff during the project. The third and final scenario (mixed) assumes a growth rate in enrolments of only 3% (this is assumed to be an achievable level of increases to real funding) and assumes that the key input factors do adjust in attempt to improve quality, but that they do adjust as much as they do in the full policy scenario.

Table 2: TVET input assumptions by scenario

Parameter	Programme	Status Quo Scenario	Full Policy Scenario	Mixed Scenario
Target enrolments	All programmes	2 500 000	2 500 000	1 000 000
Throughput rates	NC(V)	10.6%	20.0%	20.0%
	NATED	25.8%	50.0%	50.0%
Student : Lecturer FTE Ratio	NC(V)	19.6	13	13
	NATED	33.6	25	33.6
Programme mix	NC(V)	22.3%	20.0%	20.0%
	NATED	69.1%	5.0%	5.0%
	Occupational	0.6%	30.0%	30.0%
	Foundational / Bridging courses	0.3%	15.0%	15.0%
	Skills Programmes / Modules of Employable Skills	4.6%	5.0%	5.0%
	Higher Certificate	0.3%	25.0%	25.0%
	Other	2.9%	0.0%	0.0%
Direct costs	NC(V)	R1 699	R12 000	R12 000
	NATED	R1 216	R5 000	R1 216
% in Distance learning	All programmes	0.0%	10.0%	10.0%
Residences %	N/A	1.5%	20.0%	10.0%

2.2 Status quo scenario

The purpose of this scenario is to illustrate the expenditure implications of meeting the White Paper total enrolment targets, while assuming that all the key cost drivers (e.g. student to lecturer ratios, the mix of enrolments by programme and, throughput rates) remain as they currently are. Effectively this scenario looks at the costs of increases to student access, while keeping the key input factors that might affect quality the same.

Table 3: TVET status quo scenario outputs

TVET Current expenditure	2014	Status Quo (2030) - Real	Status Quo (2030) - Nominal
Total current spending (R'm)	R8 606	R27 268	R69 170
Number of enrolments (all programmes)	706 403	2 500 000	2 500 000
Number of FTEs (all programmes)	334 910	1 202 913	1 202 913
Spending per FTE	R25 696	R22 669	R57 502
Number of graduates	56 690	199 818	199 818
Residences: Total current spending (R'm)	R120	R451	R1 131
TVET Infrastructure expenditure	**2014**		
TVET infrastructure spending required by 2030 (R'm)	N/A	R106 042	R188 097
Residences infrastructure expenditure required by 2030 (R'm)	N/A	R3 833	R6 799

In this and subsequent sections, both the real (in 2014 prices) and nominal prices are provided (based on an inflationary assumption of 6.2% per annum. However, the analysis will discuss real prices, as these numbers are more easily digestible and comparable, whereas a nominal figure in 2030 can be difficult to contextualise.

Under this scenario, using the assumptions set out in Table 2, total current spending within public TVET colleges (excluding residence costs) increases from R8.6 Billion in 2014 to R27.3 Billion in 2030 in real terms. This represents a 217% real increase (average annual growth rate of 7.5%) in current expenditure relative to a 254% increase (average annual growth of 8.2%) in student enrolments. Spending per FTE reduces slightly in real terms due to economies of scale from the large expansion to enrolments.

Given the increases in enrolments, in real terms an additional R106 Billion would also have to be spent on TVET infrastructure over the next 16 years; or on average R7.6 Billion per annum. This large requirement is driven by the rapid growth in enrolments, but importantly also the assumption that two thirds of new enrolments will have to be accommodated on new campuses. During interviews DHET officials indicated that the capital infrastructure costs associated with expanding an existing campus is typically only a third of new infrastructure costs; so this figure could be reduced substantially if expansions are primarily made within existing campuses.

Current annual spending on TVET residences increases by 370% over the period from R0.12 Billion to R0.451 Billion. It should be noted however that accurate values of the number of students in residences and the expenditure of these residences within TVET[6] was not available to the project team. Hence these estimates should be treated with caution. The infrastructure requirement for the projected increase in students requiring residence accommodation leads to an approximate infrastructure spending requirement of R3.8 Billion between 2016 and 2030 in real terms.

2.3 Full policy scenario

This scenario illustrate the impact of not only meeting White Paper enrolment target of 2.5 million, but additionally considering changes to the cost drivers and input factors that are likely to improve quality. In the TVET context, the relevant input factors that could affect throughput rates that are considered are principally (a) reductions in student lecturer ratios, (b) greater direct costs (textbooks, consumables etc.), (c) an increase in foundational / bridging programmes and (d) an increase in the proportion of students accommodated in residences. In addition, the programme mix is amended quite dramatically to match the policy intent articulated by DHET officials during interviews to increase the proportion of occupational programmes within the sector to better align TVET colleges to the needs of employers and the employed. Table 2 provides a detailed outline of the input factor adjustments considered.

Table 4: TVET full policy scenario outputs

TVET Current expenditure	2014	Status Quo (2030) - Real	Status Quo (2030) - Nominal
Total current spending (R'm)	R8 606	R103 254	R268 221
Number of enrolments (all programmes)	706 403	2 500 000	2 500 000
Number of FTEs (all programmes)	334 910	1 913 200	1 913 200
Spending per FTE	R25 696	R53 969	R140 195
Number of graduates	56 690	65 828	65 828
Residences: Total current spending (R'm)	R120	R9 164	R23 993
TVET Infrastructure expenditure	**2014**		
TVET infrastructure spending required by 2030 (R'm)	N/A	R194 024	R344 854
Residences infrastructure expenditure required by 2030 (R'm)	N/A	R112 392	R242 730

[6] The proportion of students housed in residences was assumed to be 1.5% based on estimates from the DHET that less than 2% of students are housed in residences. However the current operational costs of residences was also not available, and hence it was assumed that residence costs per FTE in TVET are equivalent to the costs in university residences.

Under this scenario, using the assumptions set out in Table 2, total current spending within public TVET colleges (excluding residence costs) increases from R9.04 Billion in 2014 to R103.2 Billion in 2030 in real terms. This represents a 1041.5% real increase (average annual growth rate of 16.4%) in current expenditure relative to 254% increase (average annual growth of 8.2%) in student enrolments. Note that under the status quo scenario real current expenditure increased by 217% (compared to a 1041.5% increase), which shows the substantial effect of assumed changes to input factors. The input factor change that has the most substantial effect on the increase in total current costs is the change to the programme mix to lower the proportion of students in NATED programmes (from 69% of total enrolments to only 5%) and increase the proportion of students in occupational and higher certificate programmes (from approx. 0.6% to 30%). Occupational and higher certificate programmes are typically substantially more expensive than NATED programmes; particularly since NATED Engineering programmes only run over a trimester with limited practical teaching, whereas occupational and higher certificate programmes often have longer durations and / or contain a greater practical component. Note that as a result of these changes to the programme mix, the number of FTEs increases by 471.3% while the number of enrolments increases by only 254%.

Given the increases in enrolments, an additional R194 Billion would also have to be spent on TVET infrastructure over the 15 years. This compares to an infrastructure requirement of R106 under the status quo scenario. This difference can be largely explained by the changes to the programme mix; with the reduction in NATED enrolments reducing the enrolment to FTE ratio from 2.08 to 1.31 between the status quo and the full policy scenarios. A lower ratio means that there are a greater number of FTEs in the system (for a given level of enrolments), which directly increases the capital infrastructure requirements necessary.

The area where the differences between the status quo and full policy scenarios are most dramatic is within residence expenditure, both in terms of infrastructure and current expenditure. Under the status quo scenario it is assumed that only 1.5% of FTE students are accommodated in residences; whereas under the full policy scenario this changes to an ambitious 20% (roughly in line with the current level within Universities). Current annual spending on TVET residences therefore increases almost 7 500% over the period from R0.12 Billion to R9.2 Billion. Similarly, the infrastructure requirement for the projected increase in students requiring residence accommodation leads to an approximate infrastructure spending requirement of R112 Billion between 2016 and 2030 in real terms, compared to the equivalent figure of R3.8 Billion under the status quo scenarios. Substantially increasing the proportion of students in residences while simultaneously increasing enrolments by a large amount is therefore likely to result in a particularly large funding burden.

2.4 Mixed scenario

Given budget limitations, it might not be possible to meet the full TVET enrolment targets or implement all the interventions to improve quality that were considered under the full policy scenario. This scenario therefore assumes that the White Paper enrolment target of 2.5 million in 2030 - which would require annual enrolment growth of around 8.2% - is not met. As performance levels in the sector are currently very low - with, for example, only approximately 10.6% of NC(V)

students completing all three levels within 6 years – it could jeopardise quality even further if the expenditure per student in real terms were to be reduced due to high enrolment growth. In particular, it is highly unlikely that funding could be expected to increase by more than 8.2% annually in real terms for 15 years; which suggests that a substantially lower growth rate should be considered. In this scenario we have therefore assumed an enrolment growth rate of only 2.2% per annum; leading to an enrolment figure of 1 million, rather than 2.5 million.

It is also sensible to consider other interventions that could improve the sector, either in terms of throughput rates or the degree to which colleges provide students with the skills in demand by industry. Therefore, this scenario also assumes changes to some of the key input factors (e.g. lecturer to student ratios, student programme mix etc.) and exogenously assumes higher throughput rates. TVET branch officials within the DHET have suggested that these input factor changes (other than enrolments) should match those under the full policy scenario, as shown in Table 2 above.

Table 5: TVET mixed scenario outputs

TVET Current expenditure	2014	Mixed scenario (2030) Real	Mixed scenario (2030) Nominal
Total current spending (R'm)	R8 606	R40 194	R103 123
Number of enrolments (all programmes)	706 403	1 000 000	1 000 000
Number of FTEs (all programmes)	334 910	768 665	768 665
Spending per FTE	R25 696	R52 291	R134 158
Number of graduates	56 690	29 850	29 850
Residences: Total current spending (R'm)	R120	R1 841	R4 820
TVET Infrastructure expenditure	**2014**		
TVET infrastructure spending required by 2030 (R'm)	N/A	R52 253	R93 369
Residences infrastructure expenditure required by 2030 (R'm)	N/A	R21 196	R43 800

Under the mixed scenario, total current spending within public TVET colleges (excluding residence costs) increases from R8.6 Billion in 2014 to R40.2 Billion in 2030 in real terms. This represents a 367% real increase (average annual growth rate of 10.1%) in current expenditure relative to 42% increase (at an annual growth of 2.2%) in student enrolments. Note that under the status quo scenario real current expenditure increased by 219% (rather than 367% here). Thus, despite the far lower enrolment growth target considered under the mixed scenario, total costs still are still higher than the status quo scenario due to the increases in unit costs and reductions in the FTE to Enrolment ratio.

As mentioned for the full policy scenario, the input factor assumptions (other than enrolments) that most substantially increases expenditures is the assumed change to the programme mix. Under

the mixed scenario, the proportion of students in NATED programmes (from 69% of total enrolments to only 5%) and increase the proportion of students in relatively expensive occupational and higher certificate programmes (from approx. 3.1% to 30%).

Given the increases in enrolments, an additional R52.3 Billion would also have to be spent on TVET infrastructure before 2030. This compares to an infrastructure requirement of R106 Billion under the status quo scenario. This difference can be largely explained by the substantially lower enrolment growth rate, although the increases in the Enrolment to FTE ratio reduces the size of the difference. The difference does however highlight the high costs of infrastructure expansion and hence that enrolment planning has to be done in an integrated manner based on reliable estimates of both current and infrastructure expansion costs.

The mixed scenario provides significantly higher estimates than the status quo scenario for residence expenditure. Under the status quo scenario it is assumed that only 1.5% of FTE students are accommodated in residences; whereas under the mixed scenario an assumption of 10% is made (relative to 20% full policy Scenario). Current annual spending on TVET residences therefore increases 1 434% over the period from R0.12 Billion to R1.8 Billion. Similarly, the infrastructure requirement for the projected increase in students requiring residence accommodation leads to an approximate infrastructure spending requirement of R21.2 Billion between 2016 and 2030 in real terms, compared to the equivalent figure of R3.8 Billion under the status quo scenarios.

2.5 Summary

Table 6 provides a summary of the real (2014 prices) values of the key outputs in 2030 for the TVET sector. The TVET sector scenarios show the widest variance of the three sectors considered in this document between the different scenarios. This is explained largely by three factors.

1) The rapid enrolment growth (from approx.. 0.7 million to 2.5 million, at 8.2% per annum) that is envisioned in the White Paper – and hence assumed under the status quo and full policy scenarios – whereas the mixed scenario assumes only a 2.2% annual growth rate in enrolments. New infrastructure expenditure that result for rapid enrolment growth are substantial, and could even be understated if construction inflation is consistently larger than CPI over the period or if substantial expenditure is required to upgrade and maintain existing infrastructure beyond what is provided for within the TVET funding model
2) The impact of changing the mix of programmes presented by colleges. In particular, interviewed DHET officials suggest that the TVET sector is expected to deliver a far greater proportion of occupational and higher certificate programmes. The enrolment growth in these relatively expensive programmes is expected to coincide with a reduction in the proportion of students enrolled in NATED programmes. As NATED programmes are mostly just theoretical in nature and are only a trimester or semester in duration, this results in substantially increased total costs.

3) It should be noted that the exact nature, duration and mix of TVET programmes in future is subject to a large amount of uncertainty, as efforts are currently underway within the DHET to review the current programme offering.

Table 6: TVET outputs summary across all scenarios

TVET Current expenditure	2014	Status Quo (2030) - Real	Full Policy Scenario (2030) - Real	Mixed scenario (2030) Real
Total current spending (R'm)	R8 606	R27 268	R103 254	R40 194
Number of enrolments (all programmes)	706 403	2 500 000	2 500 000	1 000 000
Number of FTEs (all programmes)	334 910	1 202 913	1 913 200	768 665
Spending per FTE	R25 696	R22 669	R53 969	R52 291
Number of graduates	56 690	199 818	65 828	29 850
Residences: Total current spending (R'm)	R120	R451	R9 164	R1 841
TVET Infrastructure expenditure	**2014**			
TVET infrastructure spending required by 2030 (R'm)	N/A	R106 042	R194 024	R52 253
Residences infrastructure expenditure required by 2030 (R'm)	N/A	R3 833	R112 392	R21 196

As discussion in Section 0, the model does not assume a dynamic relationship between cost input factors (or interventions) and throughput rates; given the tremendously complex and uncertain nature of the relationship and the lack of reliable estimates of such relationships. However, the model does allow the user to change throughput rates exogenously and to focus the model towards a specific graduate target rather than an enrolment target.

3 COMMUNITY COLLEGES

3.1 Introduction

3.1.1 Background to the CET sector

There are nine community education and training colleges (CETCs) in South Africa located in each province and comprising a total of 3276 public adult learning centres (PALC) spread across the provinces. As of 1 April 2016 these PALCs have been reconstituted as Community Learning Centres (CLCs) and form part of the provincial community colleges. The colleges provide general education and training certificate (GETC) programmes and the national senior certificate (NSC). In addition, a few CLCs are providing some skills programmes which are mainly funded by SETAs and delivered through private training providers.

The CLCs are mainly operating from public school premises with a few that are located at NGO sites. Some CLCs have partnerships with The White Paper on PSET articulates many weaknesses with regard to the current provisioning of AET due to, among other things, insufficient resources, inadequate staffing, weak infrastructure and poor articulation. These institutions are essentially operating part time, around 14:00 after normal school hours and closing late. As a result the approximately 300,000 learners enrolled per year have not achieved good progression.

3.1.2 Scope of the CET Module

The analysis of expenditure of the provincial education departments (PEDs) that used to be responsible for AET before 1 April 2016 has revealed some drivers of expenditure. The community college module projects expenditure in the community college sector over time, and is informed by a number of specific assumptions and community college plans. Some of these plans are articulated in the National Policy on Community Colleges (2015) which analyses the CET landscape and proposes Community Colleges as a new institutional type that is envisaged to play a pivotal role in contributing to improved levels of educational attainment among youth and adults. In addition, the National Norms and Standards for Funding Community Education and Training Colleges provide guidance on future CET landscape as well as how funding will be undertaken to the new CET structures that are to be established. The Draft Policy on Staffing Norms for CETCs also provides some guidance and assumptions on the proposed post provisioning norms and the minimum number of learners per class. Using these expenditure assumptions, total cumulative expenditure over time is estimated.

3.1.3 Key input variables

The CET module allows the user to change a number of input parameter and assumptions; most of which are located or accessible from the Dashboard. In addition to the input parameters and assumptions on the dashboard, the other assumptions can be adjusted to build different scenarios. This allows the user to investigate the impact of changes to these key parameters; as illustrated through the scenario analysis presented. Figure 1 below provides a screenshot of the main variables that can be adjusted by the user.

Figure 2: Screenshot of the key input parameters

INPUTS & ASSUMPTIONS

Inflation	CPI	Nominal	6.2%

Enrolment Options		2014	Status quo (2030)	Full Policy (2030)	Mixed (2030)
Enrolment scenarios	Target Enrolments	262 621	1 000 000	1 000 000	249 670
	Occupational % enrol	2.9%	3%	35%	25%

Cost and Performance Assumptions		2014	Status quo (2030)	Full Policy (2030)	Mixed (2030)
Performance	AET Throughput %	17.5%	17%	20%	17%
Student:Lecturer ratio	All enrolments	18.0	18	23	23
Direct Costs	Direct Learner Cost	R525	214	3 600	2 600

Funding Dashboard | Single College Dashbard | Change Programme Mix

3.1.4 Overview of the scenarios

There are three scenarios that have been developed for estimating the cost of CET up to 2030. First is the status quo scenario which assumes that the White Paper target of 1000,000 enrolments in the CETCs is achieved by 2030. Apart from achieving this target all key input variables are assumed to remain unchanged. In other words, the scenario estimates the cost of expanding access to CET over time to meet the White Paper target but that all the key cost and performance input factors in the model, including the staffing/learner ratios, direct costs and mix of programmes, stays the same.

The second scenario (full policy) attempts to achieve the White Paper target enrolments but in addition considers other policy imperatives for improving the CET sector. As already highlighted, the CETCs have a numerous historical weaknesses and the White Paper together with the Policy on Community Colleges proposes measures to improve the quality of provision and the design of the sector as a whole. However this is a sector in transition and some of these proposals are still being discussed in the Departmental committees established by DHET to shape the CET sector of the future. The scenario thus makes assumptions some of which were made by the project team based on the views expressed during the interviews conducted with DHET staff during the project. The third and final scenario (mixed) assumes a growth rate in enrolments of only 6.8% and achieves enrolment of 750,000 by 2030. The scenario assumes that the key input factors are

mostly similar to those in the full policy scenario except where variations to full policy and status quo are made.

Table 7: Community college input assumptions by scenario

Parameter	Description	Status quo	Full Policy Scenario	Mixed Scenario
2030 Target enrolments	The number of head count enrolments to be reached in 2030	1 000 000	1 000 000	750 000
Throughput rate	The cumulative number of graduates at the end of the cohort's maximum time period.	18%	20%	18%
New infrastructure need	The proportion of additional college enrolments requiring new infrastructure build	0%	50%	15%
Student: Lecturer ratio	The number lecturers per enrolled student	18	23	23
Occupational programme proportion	The proportion of learners enrolled on occupational programmes	3%	35%	25%

3.2 Status quo scenario

This scenario meets the White Paper enrolment targets of 1000,000 learners by 2030. The scenario assumes that the key cost drivers remain as they currently are. This means the cost drivers such as student lecturer ratios, proportion of qualification enrolments and lecturer salaries remain as they currently are. This scenario effectively increases the number of enrolled learners with the current input costs.

Table 8: Community Colleges status quo scenario outputs

Community Colleges	2014	Status quo Scenario (2030) Real	Status quo Scenario (2030) Nominal
Total Enrolments	262621	1000,000	1000,000
Total Spending (R'm)	R1,844	R5 668	R14 840
Total number of graduates	35,230	125 713	125 713
Total Cumulative Spending (R'm)	N/A	R58 526	R111 453
Infrastructure Spending (R'm)	N/A	R0	R0
Cumulative Infrastructure Spending (R'm)	N/A	R0	R0
Average Spending per FTE	R7 159	R5 780	R15 132
Average Spending per graduate	R63 667	R50 591	R132 455

Based on input parameters discussed above the spending on Community Colleges increases from R 1.84 billion in 2014 to R 5.7 billion by 2030 in real terms. The 216% increase in spending by 2030 is necessitated by the increase in enrolments by 280% from 262 621 to 1 million. Given that there are no additional expenditure with throughput rates remaining in the same proportion as those in 2014, out of 1000,000 enrolments only 122,722 people are completing their learning in 2030 resulting in average spend per graduate of R 46 933 in real terms. In 2014 the average spend per graduate is R52 640 and the slight decrease is as a result of the economies of scale and the higher actual number of people enrolled in skills programmes. Taking into account inflation at 6.2% over time, in nominal terms the cost of per graduate increases to R118 101. The scenario is based on current lecturer ratios to student ratio of 18.

This scenario assumes no spending in additional infrastructure. Currently the CLCs are located primarily in public schools and it is assumed that this continues and there are no additional costs for building any infrastructure for the colleges. In other words, as the enrolments expand additional public schools or other public infrastructure is identified for use as CLCs and this attracts no additional costs as is the case in the status quo.

3.3 Full policy scenario

This scenario meets the White Paper targets, but additionally changes the cost drivers that are intended to increase quality. The programme mix for this scenario changes significantly from the current general adult education and training focus to include skills programmes that enable improvement in employability. The scenario assumes that community colleges will be able to attract increased proportions of learners who have no schooling and those with some basic schooling. Additionally there is an assumption that the increased focus on the National Senior Certificate for Adults will result in more learners enrolling.

Table 9: Community Colleges full policy scenario outputs

Community Colleges	2014	Full Policy Scenario (2030) Real	Full Policy Scenario (2030) Nominal
Total Enrolments	262621	1000,000	1000,000
Total Spending (R'm)	R1,844	R10 343	R26 756
Total number of completions	35,230	341,249	341,249
Total Cumulative Spending (R'm)	N/A	R99 528	R190 377
Infrastructure Spending (R'm)	N/A	R1 351	R3 331
Cumulative Infrastructure Spending (R'm)	N/A	R20 266	R34 000
Average Spending per FTE	R7 159	R14 365	R37 161
Average Spending per graduate	R63 667	R70 293	R179 581

Under this scenario total spending increases by 407% from R 1.84 billion in 2014 to R 10.1 billion by 2030. Under the scenario, spending on learner and teacher support material (LTSM) is increased to address the current weaknesses in terms of provision of the LTSM across the sector.

Additionally the student to lecturer ratio is increased from 18 under status quo scenario to average of 23 to align with the draft norms for CET that proposes increased minimum class sizes. The full policy scenario also factors in the proposed post provisioning norms that normalises the number of posts in line with enrolments per CETC. All these changes together with the 280% increase in enrolments results in the 407% increase in spending in real terms.

Although there is significant increases in spending, there is throughput rates of learners is expected to increase just slightly under the full policy scenario. The change in programme mix by increasing skills programmes proportion from 3% to 35% by 2030 results in the number of graduates increasing from 32,320 in 2014 to 341,249 by 2030. This is specifically because scenario assumes that the introduction SETA type occupational programmes which yield higher certification rates will lead to this increase in completion of learning programmes. The average spending per graduate under this scenario decreases from R52,640 in 2014 to R29,603in real terms in 2030 as a result of higher throughput rates necessitated by a change in programme mix. The skills programmes being introduces are expected to be shorter programmes that will cost less to run.

The full policy scenario also assumes that due to the nature of a revised programme offering towards the skills programmes, there will be a move away from the traditional public school based CLCs into building standalone community college campuses to accommodate occupational offering a result there is infrastructure spending. The cost of infrastructure is based on average marginal cost of building and equipment as FTE enrolments increase. Under this scenario it is estimated that 50% of additional learners per year require infrastructure build. By 2030 this amounts to R 1.27 billion and cumulatively between 2016 and 2030 the total infrastructure requirements amount to R 19 billion in real terms.

3.4 Mixed scenario

Given budget limitations, it might not be possible to meet all targets or all proposed interventions to improve quality. This scenario would assume not meeting the full policy targets. The number of enrolments is capped at about 750,000 whilst the proportion of occupational programmes is also reduced. This assumes a 6.8% annual increase in enrolments up to 2030. There is less spending on infrastructure as compared to the full policy scenario. The scenario also assumes a slightly lesser throughput rates as compared to the full policy scenario.

Table 10: Community Colleges mixed scenario outputs

Community Colleges	2014	Mixed Scenario (2030) Real	Mixed Scenario (2030) Nominal
Total Enrolments	262 621	750 000	750 000
Total Spending (R'm)	R1 844	R6 649	R17 130
Total number of completions	35,230	204 662	204 662
Total Cumulative Spending (R'm)	N/A	R68 605	R128 699
Infrastructure Spending (R'm)	N/A	R301	R742
Cumulative Infrastructure Spending (R'm)	N/A	R4 517	R7 558
Average Spending per FTE	R7 159	R11 082	R28 549
Average Spending per graduate	R63 667	R63 249	R160 991

Under this scenario, current spending increases by 247% from R 1.84 billion to R 6.47 billion by 2030 in real terms. This is necessitated by the 186% increase in enrolments to 750 000 as well as increases in spending in direct costs. The scenario assumes that about 25% will be in occupational programmes and as a result there will be an increase in throughput given that these programmes tend to yield higher throughput rates. The average spending per graduate decreases from R52 640 in 2014 to R31 765 by 2030 as a result of improved throughput rates and increased enrolments on shorter skills programmes. As compared to the full policy scenario, this scenario assumes lesser spending on building infrastructure.

3.5 Summary

The CET sector has traditionally been under resourced and treated differently under provincial administration. There is a general lack of accessible provisioning as tuition is usually accorded limited hours due to operating mainly from public schools. The fact that the PALCs have not traditionally employed full-time staff and are staffed through short-term contracts has created a lack of stability and adequate opportunities for effective tuition. With learners not receiving adequate learning materials and lecturers often having to pay for support materials from their own pocket, the situation is not conducive for effective learning. Under these circumstances it is impossible that quality provision can be achieved without significant spending in the basics.

Table 11: Community colleges outputs summary across all scenarios

Community Colleges	2014	Status quo Scenario (2030) Real	Full Policy Scenario (2030) Real	Mixed Scenario (2030) Real
Total Enrolments	262621	1000,000	1000,000	750 000
Total Spending (R'm)	R1,844	R5 668	R10 343	R6 649
Total number of completions	35,230	125 713	341,249	204 662
Total Cumulative Spending (R'm)	N/A	R58 526	R99 528	R68 605
Infrastructure Spending (R'm)	N/A	R0	R1 351	R301
Cumulative Infrastructure Spending (R'm)	N/A	R0	R20 266	R4 517
Average Spending per FTE	R7 159	R5 780	R14 365	R11 082
Average Spending per graduate	R63 667	R50 591	R70 293	R63 249

Under the status quo scenario in real terms the spending per FTE learner is about R 6200 which basically means the current expenditure patterns with his cost of employments continue with low spending on the LTSM and other goods and services necessary for effective tuition. In the full policy scenario the average spending per FTE more than doubles and taking into account the increased investment in the improvement of provision in the sector. In the mixed scenario, although the White Paper target is not achieved, it is assumed that this enables the CET sector to expand access at a slower pace whilst improving the quality of provision. The

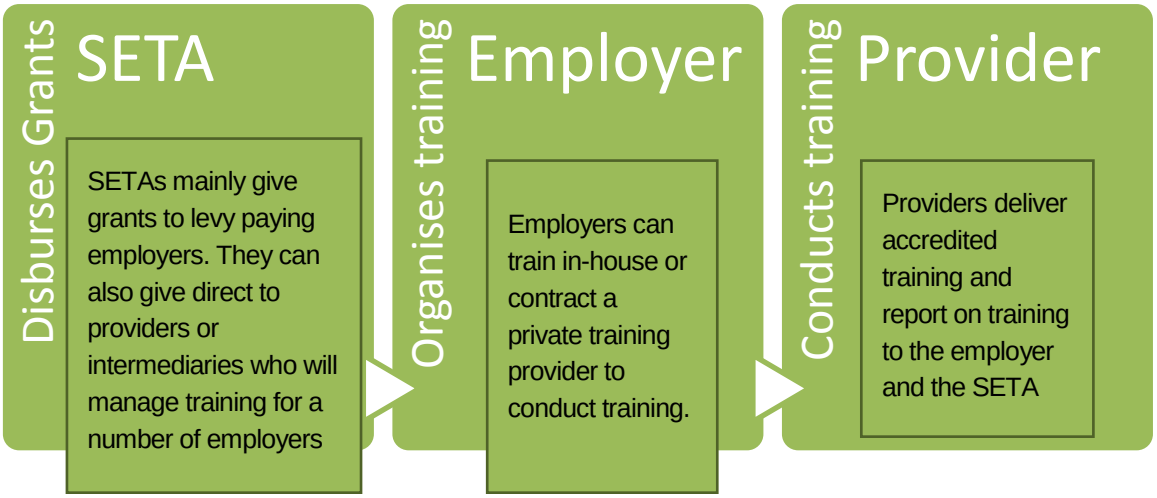
4 WORKPLACE TRAINING

4.1 Introduction

4.1.1 Background to workplace training system

As documented in the expenditure analysis (volume 2 of the work for this project) there are 21 Sector Education and Training Authorities (SETAs) and the National Skills Fund (NSF) that disburse grants derived from the Skills Development Levy (SDL). The amount of money collected through the levy is currently approximately R15billion. Of this amount 10% (R1.5b) is spent on administration, 20% (R3b) on grants to employers for submission of training plans and reports to SETAs, 20% (R3b) goes to the National Skills Fund and 50%[7] (R7.5b) is available for grants to be allocated to support skills development and projects in support of sector skills plan implementation.

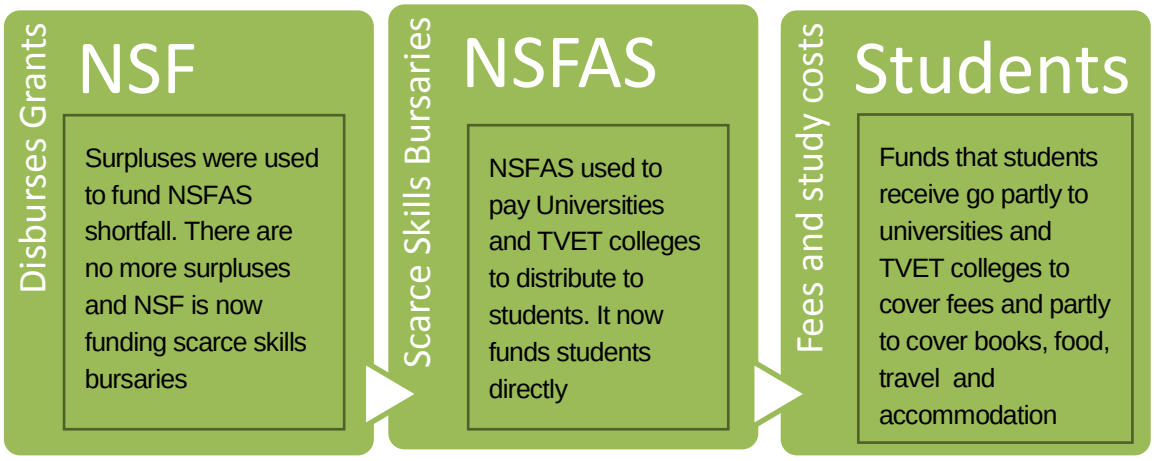
Of the total amount of R15b around 40% (R6 billion) is classified as "discretionary" funding – SETAs have discretion to spend it in support of Sector Skills Plan (SSP) implementation. This is done by allocation grants to employers and training providers. Most of the grants have traditionally gone to employers who then either train in-house or contract private training providers to train for them. In recent years the Department of Higher Education and Training has been encouraging SETAs to form partnerships with public universities and TVET colleges to deliver skills training. The following diagram shows the way funds flow from SETAs.



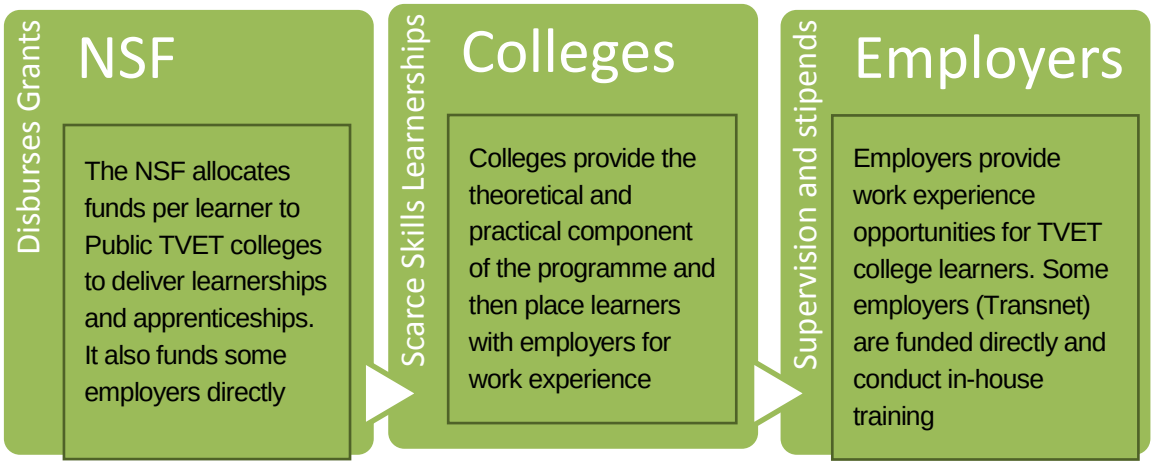
SETAs and the NSF are not training institutions. They do not provide training, rather they facilitate and fund training. The R15 billion is part of the discussion on the funding of PSET in the sense that through various channels it funds, or contributes towards, post school education and training. Specifically it funds training for workers – both employed workers and new entrants into the labour

[7] These are rounded figures. Spending in 2015/16 may be more than R15 billion (possibly as much as R15.6m), but the figure of R15b is a reasonable estimate and is an easy figure to work with and present percentages. There is 0.5% being paid to the QCTO and a small percentage is paid to SARS to collect the levy. These amounts have been ignored for the purpose of the overall analysis.

market. Currently some funds are being used (either directly from SETAs or via the NSF) some learners in the public PSET system. However of that R15b only around R6 billion can be viewed as available to fund parts of PSET because the rest is allocated to other purposes. The following diagram shows how funding is flowing from the NSF to PSET.



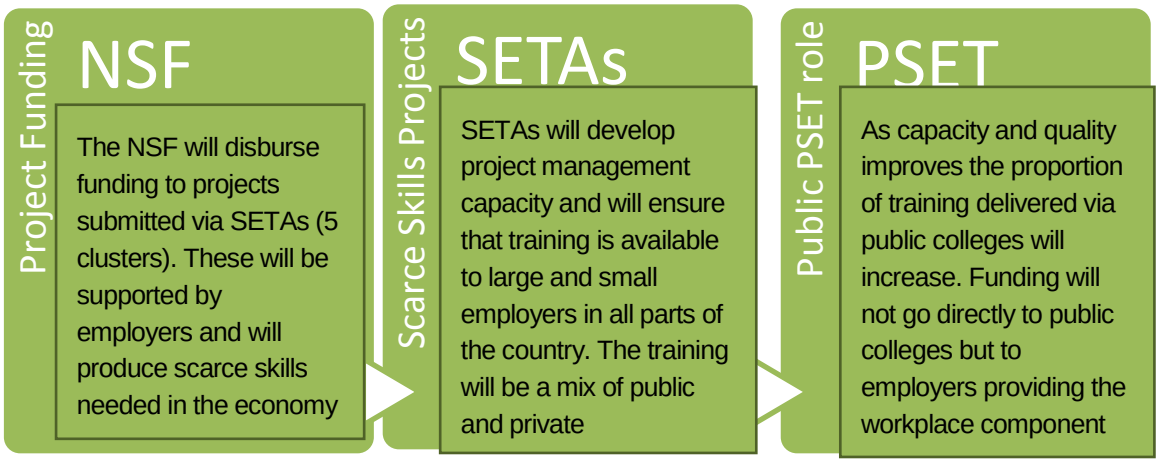
NSF also allocates funds to employers and public TVET colleges.



As can be seen traditionally SETAs have funded employers to conduct training mainly through private providers. Research on SETA spending between 2005 and 2010 (Ministerial Committee on SETA functioning and performance 2011) showed that some 95% of SETA funding for training went to private providers. DHET has attempted to change this during the period from 2012 (Grant Regulations) and 2015. There has been some change in the pattern of spending but the alignment of skills development funding with public PSET remains patchy and skewed in favour of private provision. The intention of the SETA Landscape proposals is to ensure closer partnerships between skills development and public PSET institutions.

It is possible to spend SDL funds in a manner that supports the public PSET system. A key challenge for both Universities and TVET colleges is the practical and workplace component of the training. Many public training institutions lack both the institutional capacity needed for practical training and the access to employers and workplaces needed for work experience. The PSET White Paper envisages a much closer working relationship between the public education and training institutions than currently exists and this means looking carefully at how funds are currently allocated and how they could be redirected to enable that closer relationship.

Under the SETA Landscape proposals the flow of funds is likely to be as follows:



The assumption is that the centralisation of funds will go ahead and that SETAs (via clusters as proposed in the SETA Landscape paper) will continue to play an important role in project managing scarce skills development. Projects will be approved on the basis of criteria that will include: the relevance of projects to meet scarce skills needs; engagement with public PSET institutions; evidence of private sector support and funding; PPPs etc. In other words the funding mechanism itself will leverage and mobilise funds and partnerships and improved quality. As quality and capacity increases so too will the proportion of occupational training delivered by the public system increase.

4.1.2 Scope of the Workplace Training module

The model takes the current year (2015/16) and shows how the funds flow and the possibilities within the SETAs and NSF to fund education and training in various parts of the PSET system.

The following expenditure elements are included in the model:

- The Admin component
- Mandatory grants paid back to employers
- Discretionary grants paid to employers and providers to deliver training
- The NSF component of 20% and how it is spent
- The model then examines the current policy proposal that transfers an additional 40% currently managed by SETAs to the NSF and the possible implications on the flow of funds within the PSET system.

4.1.3 Key input variables

The model allows the user to change a number of input parameter and assumptions; most of which are located or accessible from the Dashboard. This allows the user to investigate the impact of changes to these key parameters; as illustrated through the scenario analysis presented. Figure 1 below provides a screenshot of the main variables that can be adjusted by the user.

Figure 3: Screenshot of the key input parameters

Inputs and Assumptions

Occupational Grant Value		R 45,000
Mixed Programme funding Mix	User Defined	

	Status quo	Full Policy	Mixed
NSF Allocation to Learnerships	61%	0.0%	0.0%
Workplace Grants for TVET	0%	70%	30%
CET Skills Programmes funded by NSF	4%	50%	30%
TVET Occupational funded by SETAs	5%	5%	5%
CET Skills Programmes funded by SETAs	1%	10%	10%

It has been suggested that there may be a third “middle way” with agreement being reached on different percentages to the two set out. It is not possible to speculate on that. Currently there is the status quo and the proposals in the SETA Landscape Gazette. This will require legislation. If the Minister decides not to go ahead with the proposals then the likelihood is that the status quo will prevail. Either the transfer of 40% from SETAs to the NSF occurs or it does not. It is completely open to discussion how the 40% is spent once it has been transferred to the NSF and in the following sections the various options are explored.

4.1.4 Overview of scenarios

Table 2 below outlines the differences between the three scenarios that are considered in the subsequent sections for SETAs and NSF. The first scenario (Status Quo), assumes that the skills system remains the same. The second scenario (Full White Paper) assumes the full integration of the SETAs and the NSF into the public education and training system, including the integrated funding model that is being proposed. The third and final scenario (mixed) assumes that the current trend of increased collaboration between SETAs and the NSF and public PSET institutions continues and that some level of integration is achieved. The table below provides a breakdown of the SDL to the different institutions and focal areas for funding.

Table 12: TVET Input Assumptions by scenario

Parameter	Description	Status Quo Scenario	Full Policy Scenario	Mixed Scenario
Administrative costs	The costs of skills development institutions	10%	10%	10%
Mandatory Grant to employers	The amount that is paid to employers on submission of a workplace skills plan and annual training report	20%	20%	20%
Allocation to the NSF	The amount allocated to the NSF to support education and training to those not benefiting from employer training	20%	60%	60%
Discretionary grants to employers	The grants allocated by SETAs and the NSF to fund training	50%	10%	10%

4.2 Allocation of Skills Development Levy

4.2.1 Projected 2030 income and its allocation within the system

The SDL revenue is projected over time using the GDP growth rates (projection growth) and historical growth rates. In 2014 there was about R 13.8 billion in SDL revenue that was allocated to SETAs and the NSF. In terms of the legislated proportions in which the SDL has to be allocated to the NSF and the SETAs, the NSF received approximately 20% or R 2.76 billion whilst the rest of the 80% went to the 21 SETAs which was further broken down in to the administration portion, mandatory and discretionary grants. By 2030 using the projection scenario there will be about R 62 billion in total revenue in nominal terms. However, in real terms the available SDL revenue is projected to be R 28.7 billion.

Table 13: SDL Revenue projections

	Projection (GDP) 2030		(Historical) 2030		
	Nominal	Real	Nominal	Real	2014
Total SDL Revenue	**R 62,727**	**R 28,697**	**R 86,603**	**R 39,620**	**R13,839**
Admin	R 6,586	R 3,013	R 9,093	R 4,160	R1,453
Mandatory Grants	R 12,545	R 5,739	R 17,321	R 7,924	R2,768
Discretionary Grants	R 31,050	R 14,205	R 42,869	R 19,612	R6,850
NSF	R 12,545	R 5,739	R 17,321	R 7,924	R2,768

There are proposals to in the SETA Landscape proposals issued by the DHET to adjust the way in which SDL revenue is allocated. Should these changes take effect 40% of the SDL will be taken away from the SETA discretionary funds and given to the NSF. That effectively means only 10% of the SDL will be left with the SETAs to cover discretionary grants whilst the NSF will be managing approximately 60% of the SDL. In real terms, the NSF will increase from R 2.77 billion in 2014 to R 17.2 billion whilst the SETA discretionary funds will decrease from R 6.8 billion in 2014 to R 2.7 billion.

Table 14: SDL Revenue projections with proposes SETA Landscape adjustments

	Projection (GDP) 2030		(Historical) 2030		
	Nominal	Real	Nominal	Real	2014
Total SDL Revenue	**R 62,727**	**R 28,697**	**R 86,603**	**R 39,620**	**R13,839**
Admin	R 6,586	R 3,013	R 9,093	R 4,160	R1,453
Mandatory Grants	R 12,545	R 5,739	R 17,321	R 7,924	R2,768
Discretionary Grants	R 5,959	R 2,726	R 8,227	R 3,764	R6,850
NSF	R 37,636	R 17,218	R 51,962	R 23,772	R2,768

4.2.2 National Skills Fund

It is anticipated that the allocation of an additional 40% of the SDL to the NSF will be ring-fenced for PIVOTAL programmes. The following table sets out the allocation of the NSF funds (20% of the SDL) towards different activities. Currently the NSF spends about 38.5% of various training programmes whilst 34% is transferred to the NSFAS as scarce skills bursaries. There is some 9%

that is allocated towards capacity building of the PSET system and 16% for infrastructure build in the PSET system. The status quo scenario for the 20% of the SDL under the management of NSF assumes these current (2014) proportions. Under the full policy scenario it is assumed that going broadly a third of the 20% will be devoted to skills development programmes, a third to bursaries and another third to capacity development which includes human development as well as infrastructure, research and advisory and the NSF administration.

Table 15: NSF funding allocation assumptions

Allocation of funding towards NSF activities	Status Quo	Full Policy	Mixed
Training programmes	38.50%	33.00%	33.00%
Scarce Skills University Bursaries	34.10%	33.00%	25.00%
Capacity Building	9%	17%	20%
Infrastructure	16%	16%	18%
Research and Advisory	2%	1%	2%
Admin	0.20%	1%	2%

Based on the assumptions in the table above the following two tables set out the available revenue to the NSF as well as how it is allocated to different spending areas. In nominal figures the amount of money allocated to different programmes is as R 12.5 billion under the status quo scenario. Under this scenario it is assumed that the SETA landscape transferring 40% of the SDL does not take effect. Under the full policy and mixed scenarios the transfer of the 40% of the SDL increases the total revenue to R 37.6 billion. This effectively means there is an additional R 25 billion under the management of the NSF for PIVOTAL programmes in 2030 in nominal terms.

Table 16: NSF funding scenarios in nominal terms

	2030			2014
	Status Quo	Full Policy	Mixed	
NSF Revenue	**R 12,545**	**R 37,636**	**R 37,636**	**R2,768**
Admin	R24	R84	R251	R5
Training Programmes	R 4,828	R 4,140	R 4,140	R1,080
PIVOTAL Programmes	R0	R 25,091	R 25,091	R0
Scarce Skills University Bursaries	R 4,282	R 4,140	R 3,136	R958
Capacity Building	R 1,140	R 2,091	R 2,509	R255
Infrastructure	R 2,062	R 2,007	R 2,258	R461
Research	R210	R84	R251	R47

In real terms the total revenue increases to R 17 billion under the full policy and mixed scenarios as a result of the additional R 11.4 billion allocation for PIVOTAL programmes.

Table 17: NSF funding scenarios in real terms

	2030			2014
	Status Quo	Full Policy	Mixed	
NSF Revenue	**R 5,739**	**R 17,218**	**R 17,218**	**R2,768**
Admin	R11	R38	R115	R5
Training Programmes	R 2,209	R 1,894	R 1,894	R1,080
PIVOTAL Programmes	R0	R 11,479	R 11,479	R0
Scarce Skills University Bursaries	R 1,959	R 1,894	R 1,435	R958
Capacity Building	R521	R957	R 1,148	R255
Infrastructure	R943	R918	R 1,033	R461
Research	R96	R38	R115	R47

The funding of capacity building in the PSET system is expected to more than double from R 255 million in 2014 to R 521 million in 2030 under the status quo scenario in real terms. Under the full policy scenario more funding of R 957 million is made available for capacity building by 2030 and this could support the CET and TVET sectors. Under the mixed scenario, funding available for bursaries is reduced to increase funding for capacity building and infrastructure. There will have to be a prioritisation process to determine where capacity building is needed most and what additional infrastructure is needed in order to determine the most appropriate and feasible way of allocating the 20% of the SDL managed by the NSF.

4.3 Number of Funded Learners

The SDL currently funds learners on various learning programmes both through the SETAs and the NSF. The NSF has prioritised the funded of occupational programmes and is currently allocating about 61% of its training budget on learnerships. Historically the NSF funded the NCV and NATED learners in TVET colleges but that commitment is coming to an end.

4.3.1 Current Scenario

The current scenario assumes that the 40% discretionary funds currently located in SETAs does not transfer to the NSF. This effectively means the NSF has to decide how it allocates its training programmes budget towards various skills programmes. In the status quo scenario it is assumed that the NSF will continue to allocate the more funding towards learnerships whilst some TVET (NCV and NATED) will be funded too. The skills programmes will be funded at the current proportion of 18% of the training programmes allocation.

Under the full policy Scenario, the allocation of NSF training programmes funds towards learning interventions (third of 20%) would go mainly towards funding of the workplace component occupational programmes whilst skills programmes will continue to be funded at 18% of the

available allocation. This scenario assumes that the NSF stops subsidising NCV and NATED learners in TVET colleges. In the mixed scenario, some learnerships are still funded in addition to workplace component of the occupational programmes.

Table 18: NSF funding of assumptions for learning programmes

Proportion of NSF Learners	Status Quo	Full Policy	Mixed
NCV Business	1%	0%	0%
NCV Technical	1%	0%	0%
NATED (N1-N3) (Foundational)	4%	0%	0%
NATED (N4-N6)	3%	0%	0%
Learnerships	61%	0%	20%
Internships	6%	6%	10%
Apprenticeships	6%	6%	6%
Occupational (Workplace)	0%	70%	46%
Skills Programmes	18%	18%	18%

In the status quo scenario it is assumed that the SETAs will continue to fund more learnerships (46%) and a multitude of skills programmes (26%). Internships (11%) for students qualifying from the PSET system will continue to be funded as currently. Assuming that 40% of the SDL revenue does not transfer to the NSF, under the full policy scenario the assumption is that SETAs will prioritise the funding of workplace component of the occupational programmes (41%) and will still fund a large proportion of skills programmes (23%). Currently the capacity of the public system to deliver these is not great, but the expectation is that the capacity will increase over time. In the mixed scenario there is a balanced mix of funding towards learnerships, internships, apprenticeships and occupational programmes at 20% each.

Table 19: SETA funding assumptions for learning programmes

SETA Learning Intervention Funding	Status Quo	Full Policy	Mixed
Learnerships	46%	0%	20%
Internships	11%	20%	20%
Apprenticeships	11%	11%	20%
Occupational (Workplace)	0%	41%	20%
Skills Programmes	26%	23%	15%
Bursaries	5%	5%	5%

4.3.2 SETA Landscape Scenario

The SETA landscape scenario assumes that the 40% of the SDL is transferred to the NSF. The assumption is that the NSF now has an additional 40% which will all be spent on PIVOTAL programmes. This enables a review of how the 20% of the SDL is allocated. The allocation of the current training programmes funds of NSF (20%) of SDL towards learning interventions.

Table 20: NSF funding assumptions for learning programmes under SETA Landscape

Proportion of NSF Learners	Status Quo	Full Policy	Mixed
NCV Business	1%	0%	0%
NCV Technical	1%	0%	0%
NATED (N1-N3) (Foundational)	4%	0%	0%
NATED (N4-N6)	3%	0%	0%
Learnerships	61%	0%	0%
Internships	6%	0%	0%
Apprenticeships	6%	0%	0%
Occupational (Workplace)	0%	0%	0%
Skills Programmes	18%	100%	100%

The proposal here is that if the 40% of the SDL in the NSF is mainly targeted at PIVOTAL programmes to address industry needs the traditional role of the NSF (namely to fund training for those that cannot access employer training) will be reasserted. A key target audience will be the NEETs, and so the training funded from this 20% will be mainly modules of employable skills to enable unemployed people to obtain work or earn a livelihood from a small business or cooperative. In other words, a third of the 20% of the SDL under the full policy and mixed scenario is allocated to the CET sector for skills programmes.

The allocation of the 40% of the SDL transferred from the SETA discretionary funds will be entirely on occupationally directed training. The major shift will be that learnerships will be absorbed into occupational programmes.

Table 21: SETA funding assumptions for learning programmes

Allocation of funding towards NSF activities	Status Quo	Full Policy	Mixed
Learnerships	46%	0%	20%
Internships	11%	20%	20%
Apprenticeships	11%	11%	20%
Occupational (Workplace)	0%	41%	20%
Skills Programmes	26%	23%	15%
Bursaries	5%	5%	5%

4.3.3 Learner number projections

Based on assumptions set out in the current and SETA landscape scenarios, the table below sets out the estimated numbers of learners that will be funded from the SDL using the more conservative projections based on GDP.

Table 22: Estimated number of learners that will be funded from the SDL

	2030			2014
	Status quo	Full Policy	Mixed	
Total Funded Learners	**495 122**	**502 962**	**452 473**	**288 235**
NCV Business	254	-	-	149
NCV Technical	447	-	-	262
NATED (N1-N3) (Foundational)	2 979	-	-	1 745
NATED (N4-N6)	1 597	-	-	935
Learnerships	162 277	-	57 589	94 482
Internships	44 070	69 546	71 986	25 644
Apprenticeships	11 863	10 111	18 597	6 903
Occupational (Workplace)	-	114 056	57 589	-
Skills Programmes	256 750	295 235	234 993	149 417
Scarce Skills University Bursaries	14 884	14 014	11 719	8 699

4.3.4 Learner number projections: Historical growth (12.07%)

The table below uses the more optimistic growth projections based on what has been the increase in income historically.

	2030			2014
	Status quo	Full Policy	Mixed	
Total Funded Learners	**681 765**	**693 660**	**623 650**	**288 235**
NCV Business	351	-	-	149
NCV Technical	617	-	-	262
NATED (N1-N3) (Foundational)	4 113	-	-	1 745
NATED (N4-N6)	2 204	-	-	935
Learnerships	223 463	-	79 331	94 482
Internships	60 671	95 884	99 164	25 644
Apprenticeships	16 332	13 941	25 618	6 903
Occupational (Workplace)	-	157 250	79 331	-
Skills Programmes	353 483	407 244	324 039	149 417
Scarce Skills University Bursaries	20 530	19 340	16 168	8 699

5 UNIVERSITIES

5.1 Introduction

South Africa has 26 public universities comprised of 11 Traditional Universities, 6 universities of Technology and 9 Comprehensive Universities. Through the analysis of expenditure in the university sector, we were able to identify specific drivers of expenditure. The university expenditure module projects these expenditure drivers over time based on specific assumptions that were largely based on departmental and university planning and historical data. The relationships between these drivers of expenditure and specific expenditure elements (operational, academic staff and operational staff, infrastructure and residences expenditure) were then used to project total expenditure over time.

The most pertinent driver of expenditure is student enrolment. This is also the most explicit target in the PSET White Paper which states that enrolment should reach 1.6 million by 2030. Other more vaguely mentioned targets in the White Paper that, if reached, will have a significant effect on expenditure, include intended increased enrolment at a PhD level and in distance-learning programmes. Furthermore the National Development Plan indicates that 75% of academic staff should have PhDs by 2030 and the Report on the Ministerial Committee for the Review of the Provision of Student Housing at South African Universities mentions providing 50% of students in South Africa with housing.

The table below shows three distinctly different scenarios for which this report presents the results. The status quo scenario assumes that the university sector reaches the enrolment target as set out in the white paper, but inputs remain unchanged from what they were in 2014. In addition to also reaching the enrolment target, the full policy scenario also reaches the other White Paper, NDP and departmental targets for academic staff qualification, student housing and types of enrolment. Finally, in the mixed scenario, enrolments continue to grow at the same rate as the DHET's 2007 – 2019 enrolment plan, meaning that by 2030, there will be approximately 1 335 711 students enrolled in South African Universities. The parameter values are somewhat moderated from the full policy scenario, but still show some improvement from the status quo. A more in-depth discussion on each of the scenarios is presented in their respective sections.

Table 23: Universities input assumptions by scenario

Parameter	Description	Status Quo Scenario	Full Policy Scenario	Mixed Scenario
2030 Target enrolments	The number of head count enrolments to be reached in 2030	1 440 000	1 440 000	1 163 139
% academic staff with PHD	The percentage of academic staff have Doctorate degrees	43%	75%	55%
% PHD enrolment	The percentage of all enrolled students enrolled in PhD programmes	1,85%	5%	3%
% in Distance learning	The percentage of all enrolled students enrolled in distance-learning qualifications	43%	40%	37%
Residences 2030 bed capa	The number of available residences beds as a percentage of total enrolment	23.80%	50%	40%
Throughput rate	The cumulative number of graduates at the end of the cohort's maximum time period.	0%-point improvement	8%-point improvement	4%-point improvement

5.2 Status quo scenario

The purpose of this scenario is to illustrate the expenditure implications of meeting the White Paper total enrolment targets, while assuming that all the key cost drivers (e.g. student to lecturer ratios, academic staff qualifications, student qualifications mix, through put rates and residences bed capacity) remain as they currently are. Effectively this is scenario looks at the costs of increased volumes and access, while keeping the key input factors that might affect quality the same.

Table 24: Universities status quo scenario outputs

Current spending	2014	Status quo (2030) - Real	Status quo (2030) - Nominal
University current spending (R millions)	R49 868	R97 667	R251 516
Number of FTEs	683 013	984 138	984 138
Current spending per FTE	R73 012	R99 242	R255 570
Number of graduates	174 037	243 635	243 635
Spending per Graduate (R'000)	R286 537	R400 876	R1 032 346
Residences current spending (R millions)	R3 052	R6 353	R14 018
Infrastructure		**Status quo (2030) - Real**	**Status quo (2030) - Nominal**
University infrastructure spending required by 2030 (R millions)		R14 309	R24 764
Residences infrastructure expenditure required by 2030 (R millions)		R15 847	R28 161

Under this scenario, using the assumptions set out in Table 23, total current spending at universities increases from R51.6 Billion in 2014 to R93.8 Billion in 2030 in real terms. This represents an 82% real increase (average annual growth rate of 3.8%) in current expenditure relative to a 60% increase (average annual growth of 3%) in FTE student enrolment. Current spending per FTE therefore increases from R75 517 to R85 822 over the period. As throughput rates remain constant under this scenario and spending per FTE increase, cost per graduate increases from R296 367 in 2014 to R341 541 in 2030. These increases in unit and total current spending are wholly explained by the increased resource requirement resulting from increased student enrolment numbers and the assumed 1.8% real inflation in the PSET sector. Given the increases in enrolments, an additional R18.1 Billion would also have to be spent on university infrastructure over the 15 years.

Current annual spending on university residences more than doubles over the period from R3.04 Billion to R6.35 Billion. This assumes that 23.8% of students are provided with university accommodation as was the case in 2010. The infrastructure requirement for the projected increase in students requiring accommodation due to the increased enrolment and fixed proportion will cost approximately R22.4 Billion over the period.

5.3 Full policy scenario

The purpose of this scenario is to illustrate the expenditure implications of meeting the White Paper total enrolment target as well as all the input factor targets set out in other government policy. Therefore, in addition to reaching 1.6m headcount enrolments by 2030, 75% of academic staff have PhD degrees, 50% of enrolled students are housed in university residences and there is an increase in the proportion of students enrolled at PhD level and in distance-learning programmes. Effectively this is a scenario that looks at the costs of increasing access and at the same time

reaching the policy targets for other factors that might influence quality. The specific values of parameters are presented in Table 23 while the associated model outputs are presented below.

Table 25: Universities full policy scenario outputs

Current spending	2014	Full Policy scenario (2030) - Real	Full Policy scenario (2030) - Nominal
University current spending (R millions)	R49 868	R118 364	R304 815
Number of FTEs	683 013	984 138	984 138
Current spending per FTE	R73 012	R120 272	R309 728
Number of graduates	174 037	355 090	355 090
Spending per Graduate (R'000)	R286 537	R333 337	858 418
Residences current spending (R millions)	R3 052	R11 435	R29 449
Infrastructure		**Full Policy scenario (2030) - Real**	**Full Policy scenario (2030) - Nominal**
University infrastructure spending required by 2030 (R millions)		R14 309	R24 764
Residences infrastructure expenditure required by 2030 (R millions)		R68 477	R121 684

Under this scenario, total current spending at universities increase from R51.6 Billion in 2014 to R119 Billion in 2030 in real terms. This represents a 131% real increase (average annual growth rate of 5.4%) in current spending relative to a 60% increase (average annual growth of 3%) in FTE student enrolments. Current spending per FTE student therefore increases by 3% per year from R75 517 per FTE student in 2014 to R108 787 in 2030.

It is clear that university specific current spending increases substantially more under this scenario than under the status quo scenario. One reason for the difference is the significantly higher number of academic staff members with PhDs required to reach the 75% proportion in 2030 as per the NDP target. Another reason is the higher proportion of students enrolled in resource-intensive PhD qualifications. Moderating the increase in current spending is the increase in the proportion of students enrolled in distance learning programmes which generally have a lower resource requirement per student.

Compared to current spending per FTE, current spending per graduate increases only slightly as the increase in expenditure is partially mitigated by improved sector efficiency (higher percentage of graduates per headcount enrolment). This is due to the improved throughput rate under this scenario. While FTE student enrolments increase at an average annual rate of 2.3% over the period, the number of yearly graduates increase by 5.2% showing significant efficiency improvement in the sector.

One of the most striking figures in Table 25 is the expected infrastructure investment requirement created by the increased proportion of students to be housed in university residences. In 2010, there was residences space for 23.8% of university enrolled students. Under the status quo scenario above it was assumed that in 2030, residence capacity would still be able to cater for the

same proportion of students. Under this scenario, 50% of students utilise university residences by 2030. With the growth in the enrolment numbers along with the growth in this proportion, it is expected that approximately R81.9 Billion in residences infrastructure investment in real terms would be required over the period. The requirement for university infrastructure investment remains the same as in the status quo scenario, as the enrolment numbers for 2030 have not changed.

Given the increases in enrolments, an additional R28.1 Billion would also have to be spent on university infrastructure over the 15 years.

5.4 Mixed scenario

The purpose of this scenario is to illustrate the expenditure implications when the White Paper's enrolment target is not reached but enrolment grows according to the DHET's University Enrolment Plan 2007-2019. If the growth trajectory planned between 2012 and 2019 is maintained, university enrolment would reach 1 336 771 by 2030. In terms of inputs, moderated targets were chosen that fall somewhere in between the status quo and the full policy target scenario. The specific values of parameters are presented in Table 23 while the associated model outputs are presented below.

Table 26: Universities mixed scenario outputs

Current spending	2014	Full Policy scenario (2030) - Real	Full Policy scenario (2030) - Nominal
University current spending (R millions)	R49 868	R89 394	R230 210
Number of FTEs	683 013	794 923	794 923
Current spending per FTE	R73 012	R112 456	R289 601
Number of graduates	174 037	237 810	237 810
Spending per Graduate (R'000)	R286 537	R375 906	968 044
Residences current spending (R millions)	R3 052	R7 389	R19 029
Infrastructure		**Scenario (2030)**	**Scenario (2030)**
University infrastructure spending required by 2030 (R millions)		R5 954	R10 245
Residences infrastructure expenditure required by 2030 (R millions)		R32 941	R58 536

Under this scenario, total current spending at universities increases from R51.6 Billion in 2014 to R88.1 Billion in 2030 in real terms. This represents a 71% real increase (average annual growth rate of 3.4%) in current expenditure relative to a 36% increase (average annual growth of 1.4%) in FTE student enrolments. Current spending per FTE student increases by 1.9% per year from R75 517 per FTE student in 2014 to R108 787 in 2030.

Compared to the other two scenarios, university specific total annual current spending increases the least over the period in the Mixed scenario. Even though there were increases in the expenditure driving inputs and outputs, the decrease in the total headcount enrolment target had a substantial moderating effect on total current expenditure and also the total number of graduates.

Compared to current spending per FTE, current spending per graduate increases only slightly as the increase in expenditure is partially mitigated by improved sector efficiency. This is due to the improved throughput rate under this scenario as compared to the status quo scenario. While FTE student enrolments increase at an average annual rate of 1.4% over the period, the number of yearly graduates increase by 2.7% showing significant efficiency improvement in the sector, although less than in the full policy target scenario in which throughput rates were even better.

Although less intimidating than in the full policy target the expected infrastructure investment requirement created by the increased proportion of students to be housed in university residences is still significant at R42.4 Billion in real terms. Under this scenario, 40% of students utilise university residences by 2030.

The requirement for university specific infrastructure investment is less than both other scenarios due to the lower enrolment target in this one. Given the enrolments, an additional R10.2 Billion would have to be spent on university infrastructure over the 15 years.

5.5 Summary

The enrolment targets set by the White Paper are ambitious. If university sector enrolments grow according to DHET's enrolment planning, as in the mixed scenario, it is 263 289 head count enrolments short in 2030. Given that the primary driver of expenditure in the system is enrolment, it is not surprising that even when there are increases in the proportion of academic staff with PhD qualifications and the proportion of enrolments in PhD programmes, the mixed scenario, with lower enrolment numbers, still requires lower levels of annual current spending than in the status quo scenario. In contrast, the full policy scenario current spending requirement is significantly higher than the other scenarios. This shows us the large expenditure implications to the sector from simultaneously increasing access (enrolments) and improving those factors that might improve quality.

Table 27: Universities outputs summary across all scenarios

Current spending	Status quo (2030) - Real	Full Policy scenario (2030) - Real	Mixed scenario (2030) - Real
University current spending (R millions)	R97 667	R118 364	R89 394
Number of FTEs	984 138	984 138	794 923
Current spending per FTE	R99 242	R120 272	R112 456
Number of graduates	243 635	355 090	237 810
Spending per Graduate	R400 876	R333 337	R375 906
Residences current spending (R millions)	R6 353	R11 435	R7 389
Infrastructure	**Status quo (2030) - Real**	**Full Policy scenario (2030) - Real**	**Mixed scenario (2030) - Real**
University infrastructure spending required by 2030 (R millions)	R14 309	R14 309	R5 954
Residences infrastructure expenditure required by 2030 (R millions)	R15 847	R68 477	R32 941

The difference in current spending between the scenarios illustrate the trade-off inherent to the sector. With a constrained budget, within this expenditure model, policy makers will have to choose between access (an enrolment target) and increasing those input factors that might improve quality. Some potential quality improvement factors, such as the quality of basic and secondary education, fall beyond the control of the university sector. Nevertheless, universities might be able to mitigate these factors in the future by, for example, introducing well thought out bridging courses or time-extended degree programmes. These interventions, along with the improvements of the factors in the model, will however, as shown, increase total expenditure and expenditure per FTE student.

In terms of university infrastructure, the model assumes that current infrastructure will be expanded along with the increase in enrolments. There is therefore no difference between the university infrastructure required under the status quo and full policy scenarios, as the enrolment targets are the same in both scenarios. The smaller enrolment target in the Mixed scenario leads to a smaller infrastructure requirement. Therefore, besides current spending, the university infrastructure investment requirement is also directly affected. Inadequate infrastructure can severely hamper student performance and the funding available for this type of investment will therefore have to be taken into account when future enrolment planning and targets are set.

Current spending on residence is influenced by total enrolment and the proportion of those students for which there is expected to be accommodation in 2030. According to a student housing report in 2011, there was university bed space for 23.8% of enrolled students in 2010. An updated report is not available, but it is assumed in the scenarios above that the proportion was still 23.8% in 2014. The status quo scenario assumes this proportion remains consistent, the full policy scenario assumes it increases to 50% and the Mixed scenario assumes it increases to 40%. The increase in enrolment along with the increase in this proportion leads to a substantial increase in current spending for student accommodation and an enormous infrastructure investment requirement. As there is a potential relationship between student socio-economic conditions and performance, it is possible that increasing the proportion of students in quality residences might affect performance positively. This, once again, shows us the possible trade-off between access and performance within a constrained budget. In the case of residences infrastructure, the private sector is likely to play a significant role and therefore, even if the infrastructure requirement is large, public-private-partnerships could alleviate the pressure on public funding.

Increasing enrolments at the rates suggested by the White Paper will increase expenditure significantly even while keeping the structure of the sector unchanged. If, as the White Paper suggests, quality and access should be improved simultaneously, the expenditure implications are enormous, even with the relatively conservative estimate of our full policy scenario. It is therefore important for priorities to be clearly set and articulated, so that future decisions are made objectively taking every trade-off into account.

6 SUMMARY AND NEXT STEPS

6.1 Aggregate PSET estimates

To fully contextualise and interpret the scenarios discussed within each sector above, this section considers the system-wide expenditure implications of these outputs. Table 28 below presents the aggregate figures across universities, TVET and community colleges in real (2014) prices.

Table 28: Aggregate PSET model results

Institution	Enrolments in 2030		Total current spending including residence (R'm) 2030 (Real)		Total infrastructure expenditure 2016 to 2030 (R'm - including residences) (Real)	
Status Quo Scenario						
Community Colleges	1 000 000	20%	R5 668	4%	R0	0%
TVET	2 500 000	51%	R27 719	20%	R109 875	78%
Universities	1 440 000	29%	R104 020	76%	R30 156	22%
Total (Status Quo)	**4 940 000**		**R137 408**		**R140 031**	
Full Policy Scenario						
Community Colleges	1 000 000	20%	R10 343	4%	R20 266	5%
TVET	2 500 000	51%	R112 418	45%	R306 417	75%
Universities	1 440 000	29%	R129 800	51%	R82 786	20%
Total (Full Policy)	**4940000**		**R252 560**		**R409 469**	
Mixed Scenario						
Community Colleges	750 000	26%	R6 649	5%	R4 517	4%
TVET	1 000 000	34%	R42 035	29%	R73 449	63%
Universities	1 163 139	40%	R96 784	67%	R38 894	33%
Total (Mixed)	**2913139**		**R145 468**		**R116 860**	

Source: Costing Model Calculations

If all three sectors reach their White Paper enrolment targets, but, structurally the system remains consistent over the time period, current spending in the sector increases from R64.7 Billion in 2014 to R141.2 Billion in 2030, in real terms. Although university expenditure is, by a significant margin, the most significant current expenditure component in 2014 and 2030, university expenditure relative to the community and TVET colleges decreases over time as the enrolments increase at a much faster rate in the latter sectors. The much greater increase in enrolments in TVET however also leads to a significantly greater infrastructure investment over the period than at universities.

Under the full policy scenario, total sector expenditure is R218.2 Billion. This is 54.5% more than under the status quo scenario. The impact of the inputs reaching their policy targets by 2030 is most pertinent in the colleges' sector with both TVET Colleges and Community Colleges spending double what they would if the status quo scenario was continued.

The full policy scenario estimates required infrastructure investment to be R390 Billion over the period; a tremendous increase relative to the status quo scenario. Universities infrastructure requirement is over R100 Billion, mostly driven by the need for additional student housing. The

TVET colleges' infrastructure investment requirement is even more staggering at R265 Billion; driven mostly by enrolment growth and by having a greater proportion in students in residences. Community colleges has less of an infrastructure requirement as there is no need for accommodation at these institutions. Even though these values seem high, investment into student accommodation infrastructure can be shared between the public and the private sector through Public-Private-Partnerships which will relieve the pressure on public funding.

The Mixed scenario, which assumes headcount enrolment in all three sectors grow at more modest rates, but there are still some changes to the current levels of key input parameters that might influence performance. Even with these parameter changes, due to the lower enrolment numbers, TVET colleges and universities are estimate to incur less current expenditure than when the input parameters remain constant but he enrolments reach target. A clear illustration of the trade-offs that exist in the sector and the possibilities for skewed incentives when enrolment targets are blindly chased and the budget is constrained. As infrastructure is also mostly driven by enrolments, the lower target under this scenario means that the estimated infrastructure requirement is also less than either of the previous two.

6.2 Next steps

This document has provided an overview of the results of the long term expenditure model of the Post-School Education and Training system. The three scenarios selected for this purpose was based on policy documentation and interviews conducted with DHET officials. However, a large amount of subjectivity was still used to define these scenarios. The project team will work with the project steering committee to refine these scenarios to best illustrate the current strategic thinking around the future of the PSET system.

The next phase of the project involves considering the funding of these expenditure levels, including a qualitative investigation of the options and a formal funding module for each sector and each of the key funding sources in the sector. Once these funding models have been created they will be dynamically linked to the expenditure models discussed in this document to form an integrated view of the future expenditure and costs within the system.

REFERENCE LIST

Araque, F., & Roldan, C. S. (2009). *Factors influencing university drop out rates.*

Bokana, K., & Tewari, D. (2014). *Determinants of Student Success at a South African University:.*

Hanushek, E. (2002). *The long-run importance of school quality.*

Van der Berg, S. (2007). *Apartheid's enduring legacy: Inequality in education.*

DNA Economics
Making economic sense of common problems