



CENTRE FOR RENEWABLE AND SUSTAINABLE ENERGY STUDIES

Annual Report 2011

Centre for Renewable and Sustainable Energy Studies

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Centre for Renewable and
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Executive Summary

This report provides an overview of the activities, for the 2011 academic year, of the Centre for Renewable and Sustainable Energy Studies (CRSES), which is responsible for the Postgraduate Programme in Renewable and Sustainable Energy Studies, and is coordinated from Stellenbosch University.

The academic programmes commenced in February 2007 with two coursework masters degrees and other existing research masters' and doctoral programmes; in 2008 this was extended by another coursework masters degree. Thirty-eight students received bursaries from the Centre for the 2011 academic year while studying at seven different universities. Eleven bursary students completed their degrees in 2011 and eleven more are expected to graduate in early 2012. Seven postgraduate modules were presented and a number of projects were successfully completed. Five research lectures, covering various topics on renewable and sustainable energy, were presented. Three spokes were identified and recommended for support to SANERI in 2007. Unfortunately, the funding of these spokes were not received in 2010. The total expenditure of DST funds earmarked for the Postgraduate Programme in Renewable and Sustainable Energy Studies in 2011 was R 7,584,715.99 on a total budget of R 7,637,000.00. Thus, a surplus of only R 50 551.26, or just less than 1%, was realised on the approved budget from DST. The total income of the Centre grew by 12.3% to R 11 966 824.44 while overall expenditure rose to R 8 986 954.83. The total reserves in the Centre at the end of 2011 was R 5 439 781.45.

Of the thirty-eight students that received bursaries in 2011, 11 (30%) were black and 15 (40%) female. These fall short of the original targets in the contract, namely 85% black and 45% female students. A number of steps were put in place to address this shortfall from 2010 onwards. In total, over the past 5 years, we have supported 123 students of whom 43 (35%) were black and 40 (33%) female.

With respect to research dissemination, 34 research papers were published in accredited journals and conference proceedings due to the activities of the students and the staff members of the Centre over the last five years.

In terms of supporting and enhancing the RE industry in South Africa, 5 larger research contracting and consulting-type projects were completed in 2011; 7 projects have continued into the 2012 academic year.

In conclusion, the Centre is well positioned to continue with the Programme, and related activities, in 2012 with dedicated staff, motivated students, and a supportive University Management.

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1. Introduction

The Centre for Renewable and Sustainable Energy Studies (CRSES) at Stellenbosch University was established in 2007 to implement the intent of the contract between Stellenbosch University and SANERI/DST, and to manage the Postgraduate Programme in Renewable and Sustainable Energy Studies. The Director of the Centre is Prof Wikus van Niekerk and the Associate Director, from the 1st of September 2009, is Prof Alan Brent. The Centre is currently also involved in a variety of renewable energy projects, from feasibility studies and technology reviews of using solar, wave and wind energy to power a variety of loads, to projects investigating the feasibility of large-scale concentrating solar power plants, as well as the measurement of the available solar resource. In addition to the contract with the DST the Centre is also responsible for other funding streams for renewable energy research and teaching from Sasol and Eskom.

The primary objective of the (DST) Postgraduate Programme in Renewable and Sustainable Energy Studies at Stellenbosch University remains the training of scientists and engineers with the required technical expertise to unlock the country's renewable energy resources on the one hand, and to implement appropriate technology for using renewable energy in a sustainable manner on the other. The academic programme started in February 2007 with thirty students enrolled on the coursework masters degrees and various research degrees. In the 2011 academic year seven postgraduate modules were presented, starting with general modules on renewable energy technology, policies, and finance, as well as specialised modules such as on solar and bio-energy. A total of thirty-eight students received bursaries from DST via the Programme while studying at seven different universities in South Africa in 2011.

This is the sixth annual report of the Centre and spans the period 1 January to 31 December 2011. It represents the fifth full academic year that the Programme has been in place. In this report the various activities of the Centre are presented, some of the challenges are highlighted, and the financial statements of the period 1 January to 31 December 2011 presented.

2. Academic Programmes

The academic programmes that the Centre coordinates currently consist of one postgraduate diploma in engineering (PDE - from 2011), two coursework masters degree programmes, and a variety of research masters' and doctoral degrees. The coursework masters degrees are presented at Stellenbosch University, one in the Department of Mechanical and Mechatronic Engineering as an M.Eng in Mechanical Engineering with an emphasis on RSE, and one in the School of Public Leadership, in the Faculty of Economic and Management Sciences, as a B.Phil/M.Phil programme in Sustainable Development, with an option to specialise in RSE. From 2012 the B.Phil degree is replaced with a postgraduate diploma (PGD) in Sustainable Development. More information on the structure of the PDE, M.Eng and B.Phil/M.Phil programmes can be found in Appendix A and at the following website:

<http://www.crses.sun.ac.za/studies-postgraduate-programmes.php>

The research masters' and doctoral degrees are available in various academic departments at Stellenbosch University, as well as other Universities, in particular the University of Cape Town, University of Pretoria, North West University, University of KwaZulu-Natal, University of Fort Hare, and Nelson Mandela Metropolitan University. Students enrol for the research degree in the relevant academic department and work in that research group while completing their studies. A list of research projects available at the various institutions

cooperating with the Centre can be found at: <http://www.crses.sun.ac.za/research-available-topics-solar.php>

The students that are enrolled for the two coursework masters degrees, as well as some of the research students, meet in a number of renewable and sustainable energy (RSE) postgraduate modules that are presented in a transdisciplinary manner at the Sustainability Institute, which is situated at Lynedoch outside Stellenbosch. These modules are presented in a modular format where the students are required to do some preparatory reading, attend a week of contact sessions, consisting of five and half days at Lynedoch, which includes a group assignment and presentation, and then they have to complete a number of individual assignments and projects to complete the modules. During the week of contact, students participate in lectures, tutorials, group discussions, projects and some site visits. In 2011 seven modules were presented and the numbers of students that participated are listed in Table 1.

All of the modules are registered with the Engineering Council of South Africa (ECSA) so that executive students who attend these courses will receive recognition towards their required continuous professional development (CPD points). The modules were also attended by some of the research students and staff members involved with the Programme to improve their background learning and understanding of RSE.

Table 1: Attendance of RSE Modules for 2011

<u>Module</u>	<u>Presenters</u>	<u>Total</u>	<u>Coursework</u>	<u>Research</u>	<u>Staff</u>	<u>Exec Students</u>
Renewable Energy Systems	Dr Ben Sebitosi & Riaan Meyer	34	28	1	1	4
Renewable Energy Policy	Prof Alan Brent	26	24	1	1	0
Conventional Energy Systems	Richard Haines & Paul Gauché	19	19	0	0	0
Solar energy	Dr Ben Sebitosi & Paul Gauché	36	22	6	1	8
Renewable Energy Finance	Jako Volschenk	43	35	2	2	4
Wind & Hydro	Prof Theo von Backström & Francis Jackson	29	19	4	2	4
Bio-energy	Prof Johann Görgens & Team	20	17	0	1	2

3. Students and Bursaries

In 2011 DST made an amount of R 3 million available for postgraduate bursaries. In total 38 students at 7 different universities in South Africa of whom 11 (30%) were black and 15 (39%) female received bursaries from the Centre:

- Most students progressed well and 11 Masters' students graduated at the end of 2011, and another 9 Masters and 2 PhD- students are expected to graduate early in March/April 2012.
- In 2011 an amount of R 1 820 000 was paid to continuing students and R 1 040 000 to new students.
- An amount of R 130 000 was paid to new bursary students to acquire laptop computers.

A complete list of the students who received bursaries in 2011 is included as Appendix B.

The Centre was informed late in 2011 that from January 2012 these bursaries will be administered by the NRF.

4. Projects

A number of research contract and consulting-type projects were completed in 2011. Table 2 indicates the scope of the more significant projects completed in 2011, while Table 3 provides the details of those projects that are continuing into 2012.

Table 2: Projects completed in 2011

<u>Project Description</u>	<u>Client</u>	<u>Amount</u>
Dynamic material flow analysis of disposal facilities – with the aim to identify waste-to-energy opportunities	City of Cape Town	R 199 500
Renewable Energy Resource assessment	De Beers Marine	R 116 184
Analysis of carbon-based opportunities for Nedcor	Nedbank	R 91 200
Economic evaluation of various energy generation scenarios for off-grid mining operations	Alufer Mining	R 182 767
Expert report on solar resource and PV yield	Italgest	R 92 450

Table 3: Projects continuing into 2012

<u>Project Description</u>	<u>Client</u>	<u>Amount</u>
SWH testing and training	Austrian Development Agency	R 850 000
Solar resource measurement and assessments, Lepalale	Exxaro	R 575 000
Solar resource measurement and assessments, Botswana	Exxaro	R 399 580
Solar measurements in the Northern Cape	AfriDevo	R 670 593
Solar resource measurement equipment and monitoring at Sasolburg	Sasol	R 1 209 951
Assessment of solar and wind energy on future grid expansion	Eskom	R 677 876
Solar measurements: Noupoort	Terra Solar Energy	R 152 038

On these projects both staff of the Centre, as well as other expert consultants in the University and private industry, combined to form strong, multi-disciplinary project teams to execute the technical work. A number of international partners also contacted the Centre to discuss cooperation; examples are the GIZ and the German Development Bank who are interested to partner with the Centre on wind and concentrating solar power projects, and IIASA who want to collaborate to develop regional-scale models to inform renewable energy oriented policy.

The projects undertaken by the Centre range from initial feasibility studies for the deployment of renewable energy, to highly technical studies on specific technologies. The Centre is also regularly requested to assess the concepts of individual entrepreneurs that are referred to the Centre by SANERI, DST, DoE and others. The Sea Renewable Energy turbine system is one of these that may lead to a significant future research project if the current application for funding to the Technology Innovation Agency is successful. A register of these concepts and the responses of the Centre are kept, as requested by SANERI and DST.

Research work on the Stellenbosch Wave Energy Converter is continuing with funds allocated by the University under the Overarching Strategic Plan. In 2011 a new international patent application was approved on this device. This patent extends the application of the original Stellenbosch Wave Energy Converter, or SWEC, to a shore-based unit, and a PhD student is continuing this work.

The Centre is also playing a coordinating and facilitating role in a number of flagship projects:

- South African Wind Energy Training Centre (SAWETC) to establish a research, development, education and training facility in the Western Cape Province for the wind energy sector, with satellite facilities in the Eastern and Northern Cape Provinces.
- Southern African Solar Resource Database project, which will include 10 to 20 ground stations to accurately measure solar radiation, updating satellite derived solar data and establishing expertise in South Africa to interpret and assess the information.
- Small-Scale CSP Demonstration Plant and Research Station, which will be built as a public-private partnership; a proposal has been submitted to the Technology Innovation Agency (TIA).

5. Forums and Awareness Programmes

In order to fulfil the public awareness mandate of the Programme a number of RSE research lectures were again held during the course of 2011. These events were again very successful and well attended. Most of the forums also received additional coverage in the print and radio media. The topics and attendance of the forums are listed in Table 4.

Table 4: Attendance of RSE Special Lectures in 2011

<u>Topic</u>	<i>Smart Grids: Nice solution in search of a problem?</i>	<i>Novel Energy Systems for distributed and mobile power Generation</i>	<i>Solar Space heating –a student design and build project</i>	<i>Off-grid electrification through DC micro grids</i>	<i>Wind Energy and the Hydrogen Economy</i>
<u>Presenter</u>	Dr Phillip Späth, University of Freiburg, Germany	Dr William Lear, University of Florida, USA	Jörn von Grabe, University of München, Germany	Jonathan Hodgson Owner Specialized Solar Systems	Dr S Sherif, University of Florida, USA
<u>Attendees</u>	25	35	25	25	37

The second Post Graduate Renewable Energy Symposium was held from 17 to 18 November 2011 at the Sustainability Institute, and was well attended by students from all over the country. Twenty-one post-graduate students from the University of Pretoria, North West University, University of KwaZulu Natal, Nelson Mandela Metropolitan University, University of Cape Town and Stellenbosch University presented papers. The aim of the symposium was to create a forum for postgraduate students to share their undertaken research. The students' travel and accommodation was sponsored by the Centre from the DST grant. The papers are available on the website: <http://www.crses.sun.ac.za/service-conferences.php>.

In addition to the forums, research lectures and postgraduate symposium, a school outreach project was initiated in 2008. Therese Lambrecht, an experienced project manager with a passion for climate change and renewable energy, developed material on climate change and renewable energy suitable for the grades 6 to 9. The material now consists of a video, PowerPoint presentation, and a workbook. During 2011 a total of 96 schools were reached in the Eastern Cape, Western Cape, and Limpopo Provinces. Through the WESSA: Eco Schools Program the national co-ordinators of 12 schools were reached. A further 240 first year BEd students at Stellenbosch University were also trained.

The Director was invited to attend the African EU Energy Partnership Forum meeting in Vienna in June 2011. The GIZ paid all the expenses for this trip and useful new contacts were made. He also travelled to the UK, Germany and Spain to attend the European Wave and Tidal Energy Conference as well as the SolarPACES conference in Grenada, Spain. During this trip a number of research organisations and renewable energy companies were also visited. He delivered a number of invited lectures such the SANEA lecture in Cape Town, the Solar Power Africa and the Renewable Energy Africa conferences in Johannesburg.

The Associate Director accompanied the Premier of the Western Cape Province on an official visit to Bavaria in Germany; the aim was to identify collaborative research efforts with German counterparts in the renewable energy space. To this end, a formal Memorandum of Understanding has been signed between the Fraunhofer Institute and the Cape Higher Education Consortium. Further, the Associate Director has been tasked, with support of the Hans Seidel Foundation, to compile a renewable energy systems guideline for use by government decision-makers at local municipality level. The Associate Director is now also an invited participant of the parliamentary committee on energy.

Another event where the Programme was represented and promoted was at the COP 17 event in Durban. The Programme was associated with the Cape Town's Climate Change Initiative, but brochures were also placed at the SAPVIA, SESSA and Actom stalls. The Director had the opportunity to appear on the stage with both Minister Manuel and the Deputy Minister of Energy.

6. Spokes and Partnerships

The proposed model for the Programme was that of a hub complemented with spokes. Spokes focus on a particular technology, such as solar or wind energy. A process was undertaken in 2007 where calls were solicited from a number of universities and these were then evaluated by the Management Board of the Programme.

The following three spoke applications were recommended to SANERI at that time:

- *Photovoltaic Research and Teaching* from NMMU and the University of Fort Hare.
- *Solar Thermal Power Generation* from Stellenbosch University and the University of Pretoria.
- *Technologies for Wind Energy* from the University of Cape Town and Stellenbosch University.

Funding of the spokes improved significantly in 2011 with two payments of R 1 million made to each spoke in the first half of the year. There is now more clarity on the future funding of the spokes with each having supplied the DST with a strategic plan for the next five years. Relationships with spokes are well established and remain healthy and, in some cases, such as the Solar Thermal spoke, are being expanded by including a third partner university, namely UKZN.

The Centre was instrumental to negotiate a five-year, R 17.5 million contract with Eskom to become the Centre of Expertise in Renewable Energy Technology, as part of the Eskom Power Plant Engineering Institute (EPPEI). These funds will be mainly used to expand the activities at Stellenbosch University in concentrating solar power (CSP) and wind energy; the two main areas where Eskom see future development in their own generation portfolio. In addition to the CSP activities, wind energy research and training at the Cape Peninsula University of Technology (CPUT) will also be supported as part of the SAWETC.

7. Staff

During 2011 Ms Corli Leonard, Mr Warrick Pierce and Mr Josh Reinecke were appointed as research engineers. Dane Links is a student at Cape Peninsula University of Technology registered for a National Diploma in Electrical Engineering who did his internship at CRSES in 2011 and is now employed on a full-time basis while he is continuing with his B Tech studies on a part-time basis. Dr Ben Sebitosi was promoted to professor in 2011.

The full-time staff complement at the end of 2011 is shown in Table 5.

Table 5: Full-time staff complement in 2011

Position	Incumbent
Director (80% appointment) (M&M)	Prof Wikus van Niekerk
Associate Director and Professor in the SPL	Prof Alan Brent
Professor (M&M)	Prof Ben Sebitosi
Research Engineer	Mr Riaan Meyer
Research Engineer	Mr Warrick Pierce (resigned Dec 2011)
Research Engineer	Mr Josh Reinecke
Research Engineer	Ms Corli Leonard
Admin/Finance Officer	Ms Jos Liebenberg
Research Technician	Dane Links

8. Financial Reporting

In 2011 DST transferred R 7,637,000.00 to Stellenbosch University to support the Postgraduate Programme in Renewable and Sustainable Energy Studies. This amount was made up of the core grant – R 4 037 000, and bursaries – R 3 600 000. The DST funds are all held in a separate account, cost point **11550**, to ensure easy auditing of how the Centred applied these funds according to the existing contract and approved budget. In addition to the DST payments interest to the value of R 131 348.99 accrued in this cost point, as well as repayments of bursaries of R 26 500 from students who did not finish the degrees for which they were registered; to bring the total income for 2011 in cost-point 11550 to R 7,798 267.51.

Table 6 lists the income into cost point 11550.

Table 6: Income received in the DST Postgraduate Programme for Renewable and Sustainable Energy Studies cost point 11550 for 2011

		Budgeted	Actual
DST:		<u>R7 027 000</u>	<u>R 7 637 000.00</u>
	Core Grant	R 4 037 000	R 4 037 000.00
	Bursaries	R 3 000 000	R 3 000 000.00
	SANERI Bursaries		R 600 000.00
Other:		<u>R 0</u>	<u>R 147 984.85</u>
	Interest		R 131 348.99
	Income: Bursary repayments		R 26 500.00
	Total income in cost-point 11550 for 2011		R 7,798,267.51

The budgeted and actual expenses of the funding received from the DST Core Grant and for Bursaries in 2011 are reflected in Table 7.

The major variances in the actual expenditure from the budgeted amounts were for running expenses and computers for students. Under running expenses, the major over-expenditure was for conferences, workshops and travel. Travel expenses of staff include mainly trips to Gauteng to liaise with government departments, Eskom and industry, which are mainly located there. The Centre is also frequently requested to represent Stellenbosch University or the academia in a broader sense at national events.

In total R 7,586,448.74 of the R 7,637,000.00 received from DST was spent in 2011; a surplus of R 50 551.26 was thus realised at the end of 2011. The reserve at the end of the year in this cost-point came to R 2,070 277.86. These funds are kept in reserves to make provision for cash-flow at the start of each academy year as well as to support the continuing bursary students should the DST funding be terminated.

In addition to the DST funding, other sources of funding were further developed in 2011. The one week of contact of the RSE modules at Lynedoch are made available as short courses to industry. In 2011, twenty-seven executive students attended the various modules generating a net income of R 205 205.00. These funds are kept in a separate cost-point, R1111, and the available funds in this cost-point at the end of 2011 were R 792 386.07. The turnover of projects in 2011 grew to just more than R 3,2 million for 2011. The reserves in the Centre, excluding the reserves in the DST cost point (11550) and in the short course cost point (R1111) at the end of 2011, was R 2 261 623. These reserves are required by an agreement with the Department of Mechanical and Mechatronic in order to appoint the full-time staff of the Centre. The total reserves at the end of 2011 came to R 5 439 781.45, which indicates that the Centre is in a very stable and favourable financial position. It should, however, be pointed out that as of 31 December 2011 no signed contract exist between Stellenbosch University and the DST to continue with the Postgraduate Programme in Renewable and Sustainable Energy Studies.

Audited financial statements of the Centre are included in Appendix D. The first set is the consolidated income and expenditure for all the accounts (cost-points) of the Centre. The second set represents only that of cost-point 11550, the cost point in which all the DST funding are received and disbursed

The approved budget for 2012 requires a contribution from the DST of R 7 320 000, namely R 4 170 000 for the Core Grant and R 3 150 000 million for Bursaries. The approved budget for 2012 is shown in Appendix E. From 2012 the bursary portion of the DST funding will be allocated directly to the NRF who will administer the old and new bursary students.

Table 7: Expenditure for 2011 from DST Grant

		Budgeted		Actual	Still Available
1. Staff			R 3,241,000.00	R 3,176,799.12	R 64,200.88
HRST HUB STAFF COST	Acting Director, Admin Ass, Research Ass	R 1,747,000.00		R 2,237,078.80	
HRAC HRCO	Part-time Academics, Academic Staff, Consultants	R 1,494,000.00		R 939,720.32	
2. Running Expenses			R 490,000.00	R 568,681.53	-R 78,681.53
RXTE, RXIT	Telephone, fax and internet	R 65,000.00	R 0.00	R 45,003.00	R 19,997.00
RXST	Stationary and printing	R 25,000.00	R 0.00	R 20,817.49	R 4,182.51
STBU, STCO, STMA, STTR	Travel (Staff Members)	R 80,000.00		R 106,377.54	R -26,377.54
STST, STVA	Travel (Students, Visiting Academics)	R 40,000.00		R 45,347.46	R -5,347.46
RXAD	Advertisements	R 130,000.00		R 124,237.27	R 5,762.73
RXFN, STCF, RXCF, RXWS, RXAF	Conferences and workshops	R 80,000.00		R 133,113.13	R -53,113.13
SCHO	Community Projects	R 70,000.00		R 79,339.52	R -9,339.52
FARE	Office refurbishment & maintenance			R 14,446.12	-R 14,446.12
3. Academic Expenses			R 45,000.00	R 0.00	R 45,000.00
RXCM	Teaching Material & Books	R 45,000.00		R 0.00	R 45,000.00
4. Capital Expenses			R 201,000.00	R 170,961.09	R 30,038.91
CXEQ, CXOF	Office furniture and equipment	R 20,000.00		R 9,056.97	R 10,943.03
CXCF	Classroom furniture	R 10,000.00		R 0.00	R 10,000.00
CXIT	Computers Equipment (Staff)	R 21,000.00		R 31,904.12	-R 10,904.12
CXIS	Computers Equipment (Students)	R 150,000.00		R 130,000.00	R 20,000.00
5. Contingency			R 60,000.00	R 200,007.00	-R 140,007.00
	5% Contingency of total amount	R 60,000.00			
RXWE	Website development & maintenance			R 66,474.00	-R 6,474.00
FABU	Facilities: Building			R 133,533.00	-R 133,533.00
	Total SANERI Core Grant for 2011	Total	R 4,037,000.00	R 4,116,448.74	-R 79,448.74
7. Bursaries			R 3,600,000.00	R 3,470,000.00	R 130,000.00
HRBU	DST Bursary Grant	R 3,000,000.00		R 2,870,000.00	R 130,000.00
	SANERI Bursaries	R 600,000.00		R 600,000.00	R 0.00
	Total DST Bursary Grant for 2011	Total	R 3,600,000.00	R 3,470,000.00	R 130,000.00
	Total DST Grant for 2011	Total	R 7,637,000.00	R 7,586,448.74	R 50,551.26

9. Equity Targets

In the Agreement signed between SANERI/DST and Stellenbosch University the following equity targets were set for the students funded with bursaries over the entire five-year initial term:

- Black (including Indian and Coloured persons): 85%
- Female: 45%

In Section 3 it was reported that these targets have not been met. The following actions were taken to meet these very ambitious targets:

- Advertisements were placed in publications that are widely read in the targeted communities such as the Sunday Times.
- All suitable black candidates were carefully listed and followed-up to ensure that they apply for the available bursaries.
- In some cases additional expenses were incurred to interview suitable candidates or assist with additional funding.

In selecting the successful candidates for the bursaries the criteria that were used to allocate priority to certain candidates are summarised in Table 8.

Table 8: Point system used as selection criteria

Equity		Excellence	
Black Female	3 points	Distinction (75% +)	3 points
Black Male	2 points	Very good (65% to 75%)	2 points
White Female	2 points	Good (55% to 65%)	1 point
White Male	1 point	Poor (less than 55%)	0 points

The two scores were added and all candidates with a total of 4 or more points were typically awarded a bursary in 2011. In addition, some candidates with 3 points were awarded with bursaries if the field of study was deemed important.

The complete list of all the students who were funded with a bursary in 2011 is provided in Appendix B; in Appendix F the allocations for 2012 are provided. The demographics of the students who received bursaries are as follows:

White: 70% Male: 60%
Black: 30% Female: 40%

It is clear that the targets of 85% Black and 45% Female remain a challenge to meet. The current strategy that included personal contact and advertisements in national newspapers, which are widely read in the black community, led to the number of black students to reach 30% for 2011. However, the participation of females increased to 40%. It is clear that the largest constraint on meeting these targets is the demographic profile of the target market; black and female students with a suitable four-year bachelors or honours degree. It is well known that the numbers of black students who participate in tertiary education programmes are still small, and well below these demographic targets. What is even more problematic is that this Programme is a postgraduate programme and that there are very attractive employment opportunities for black graduates in South Africa, mainly driven by the skills shortage and employers trying to meet their own equity targets, which makes it even more difficult to attract black students into the Programme.

A proposal was made to the DST to appoint black interns in 2012 who will then be allowed to study towards a postgraduate degree while they are actively involved in an existing research

programme. Mr Athi Ntisana has been appointed as intern from 1 January 2012 in the Programme and Mr Dane Links, a black male as full-time research technician.

10. Research outputs

The research outputs from the Centre have increased substantially – these are listed in Appendix G – mainly due to the fact that the results of the research of the previous years are now being published. Many of the research students' work has led to international publications and is included in the research outputs of the Centre. During 2011, seventeen papers were published in accredited journals. Seventeen papers were presented at national and international conferences, and subsequently included in those proceedings. A number of papers have already been accepted for 2011 conferences. These numbers reflect the impact of the Centre from an academic/research perspective.

A number of international patents were registered by staff or students associated with the Programme over the last five years. There are also 29 completed masters' theses and 3 doctoral dissertations available on the Programme website:

<http://www.crses.sun.ac.za/research-completed-research.php>

11. Conclusions

A number of objectives have been met in the fifth academic year of the Programme:

- The basic academic, administrative and financial structures were strengthened to execute the contract between Stellenbosch University and DST.
- During 2011, thirty-eight students were supported with bursaries at seven different universities in South Africa.
- Eleven students received their masters' degrees in 2011 with another eleven expected to graduate in March/April 2012 of which two are PhD-students.
- Five research lectures on Renewable and Sustainable Energy topics were organised and well attended.
- The Programme established itself as a national resource for information on renewable energy, which is now also internationally known. This is reflected in the number of papers that have been published in journal and conference proceedings – a total of thirty-four in the 2011 academic year.
- The Centre concluded a contract with Eskom who will fund research and postgraduate training at Stellenbosch University for another five years.

All this has been achieved while maintaining responsible financial management and establishing a sufficient reserve for the Programme to ensure continuing economic viability in the long term.

There were also some challenges to deal with:

- Finding good students, especially black and female students, will remain a challenge for many years to come.
- A new contract for the next period, 2012-2017, was not in place by the end of 2011 and negotiations in this regard are ongoing.

We look forward to a challenging and exciting 2012!

Appendix A: Coursework Masters Programmes

Postgraduate Programme in Renewable and Sustainable Energy Studies		
<p>M.Eng. (180 US credits) Coursework 120 Credits: (1 Math & 2 Adv Mech Eng Modules; 5 RSE Modules, including Sustainable Development Project 60 Credits)</p>	<p><u>Coursework Masters Programmes</u></p>	<p>B.Phil. (120 US credits) M.Phil. (120 US credits) Coursework 120 Credits (8 Modules) (B.Phil.) Project 120 Credits (or 90/60 Credits and 2/4 additional Modules) (M.Phil.)</p>
<p>Engineering:</p> <ul style="list-style-type: none"> <u>Mathematics: One of Linear Algebra or Partial Differential Equations (15 Credits)</u> <p>Take at least two more for M.Eng. from:</p> <ul style="list-style-type: none"> <u>Thermal Energy Systems*</u> Advanced Heat Transfer Advanced Fluid-Dynamics Advanced Dynamics Advanced Strength of Materials Advance Design <p>Take at least two more for M.Eng. from:</p> <ul style="list-style-type: none"> <u>Solar Thermal Energy Systems*</u> Other approved courses <p>Required module from Sustainable Development Programme:</p> <ul style="list-style-type: none"> <u>Sustainable Development (15 US credits)</u> <p><u>Underlined courses are required.</u></p>	<p>Renewable & Sustainable Energy Modules (15 Credits): (Take at least 4 for M.Eng. and B.Phil.)</p> <ul style="list-style-type: none"> <u>Renewable Energy Systems</u> <u>Renewable Energy Policy</u> <p>or</p> <ul style="list-style-type: none"> <u>Renewable Energy Finance</u> <u>Solar Energy (PV and Thermal)</u> <u>Bio-Energy</u> <u>Renewable Energy Finance</u> <u>Wind and Hydro Energy</u> <p><u>Underlined courses are required.</u></p>	<p>Sustainable Development and Planning Modules (15 Credits each):</p> <ul style="list-style-type: none"> <u>Sustainable Development</u> <u>Ecological Design for Community Building</u> <p>(Take at least one more for B.Phil.)</p> <ul style="list-style-type: none"> <u>Leadership and Ethics</u> <u>Globalisation, Governance and Civil Society</u> <u>Applied Economics</u> <u>Corporate Citizenship</u> <u>Complexity Theory and Systems Thinking</u> <u>Biodiversity and Sustainable Agriculture</u> <u>Sustainable Cities</u> <u>System Dynamics Modelling</u> <p><u>Underlined courses are required.</u></p>
<p>Host Department:</p> <p>Department of Mechanical & Mechatronic Engineering</p>	<p>Host departments: Mechanical & Mechatronic Eng., School for Public Leadership, Process Engineering.</p>	<p>Host Department:</p> <p>School for Public Leadership</p>

Appendix B: List of Bursary Students in 2011

	Title	Surname	Name	Degree	Department & University	Supevisor(s)
1	Mr	Joubert	James Rattray	PhD	M&M , SU	Prof JL v Niekerk
2	Ms	Gijjar	Sumetee Pahwa	PhD	SPL, SU	Prof M Swilling
3	Mr	Wakeford	Jeremy	PhD	SPL, SU	Prof M Swilling
4	Mr	Moody	Matthew Peter	BPhil/MPhil	SPL, SU	Prof M Swilling
5	Ms	Trautmann	Christina, K	MScEng	ERC/UCT	Prof H von Blottnitz
6	Mr	Du Plessis	Pieter Coetzee	MScEng	ERC/UCT	Dr Brett Cohen
7	Mr	Hoffmann	Ulwin	MScEng	E&E SU	Prof M Kamper
8	Mr	Du Plessis	Jacques	MScEng	M&M, SU	Prof W v Niekerk
9	Mr	Schenke	Carlo	PhD	Electr & Electron, SU	Prof W Perold
10	Mr	Kotze	Johannes Paulus	PhD	M&M, SU	Prof T v Backstrom
11	Mr	Allen	Kenneth Guy	PhD	M&M, SU	Prof D Kroger
12	Ms	Bergh	Caitlin	MScEng	ERC/UCT	Dr Brett Cohen
13	Ms	Tait	Louise M	MSc	ERC/UCT	Dr G Prasad
14	Ms	Coppez	Gabby	MSc Eng	UCT	Prof SP Chowdhury
15	Ms	Crozier	Jacqueline Louise	MSc	Physics, NMMU	Prof E van Dyk
16	Mr	Beukes	Justin	MCom	Economics, NMMU	Dr M du Preez & Prof E v Dyk
17	Me	Mutepe	Rendani Daphney	MScEng	Mineral & Chem Eng, NWU	Prof S Marx
18	Mr	Baloyi	Hope	MSc	Mineral & Chem Eng, NWU	Prof S Marx
19	Me	Meintjies	Maria Magdalena	MEng	Mineral & Chem Eng, NWU	Prof S Marx
20	Mr	Du Clou	Sven	MSc	Mechanical Eng, UKZN	Mr M Brooks
21	Mr	Stander	Johan Nico	PhD	M&M,SU	Prof G Venter
22	Ms	Njingana	Primrose Nasicelo	MSc	Chemistry, UFH	Dr Kaumba Chinyama/Prof E Meyer
23	Ms	Vossberg	Chyrylyn	MPhil	ERC, UCT	Dr A Marquard
24	Mr	Owen	Michael TF	PhD	M&M, SU	Prof von Backstrom
25	Mr	Gerber	Stiaan	PhD	Elecetrical & Elect, SU	Prof M Kamper/Dr R-J Wang
26	Mr	Graaff	Simon dV	MScEng	M&M, SU	Prof W van Niekerk
27	Mr	Walker	Gregg	MScEng	M&M, SU	Prof T von Backstrom
28	Mr	Kooverij	Bavesh	MScEng	M&M, SU	Prof W van Niekerk
29	Ms	Du Toit	Louise	PhD	Environmental Law, UCT	Prof Glazewski
30	Mr	Nagar	Ravindra	MEng	M&M, SU	Prof J Meyer
21	Ms	Hosking	Jessica	MCom	Economics, NMMU	Prof M du Preez
32	Mr	Gerber	Jaqcues D	MSc	Chemistry, NMMU	Prof E van Dyk
33	Mr	Ahjum	Mogamat Fadiel	MSc(Eng)	ERC, UCT	Dr A Marquard
34	Ms	Clohessy	Chantelle May	MSc	Statistics, NMMU	Dr G Sharp
35	Ms	Malla	Lesego	MSc	ERC, UCT	Prof H von Blottnitz
36	Mr	Solomon	Ramzi	PhD	Electrical Eng, UCT	Prof A Khan
37	Mr	Lilla	Abdurahman Daleel	MSc(Eng)	Electrical Eng, UCT	Prof A Khan
38	Mr	Le Roux	Willem Gabriel	PhD	Mech Eng, UP	Prof J Meyer

Appendix C: List of Graduated Students 2008-2011

The following bursary students graduated in 2008:

Ms L Beviss-Challinor with a MEng (*cum laude*) in Mechanical Engineering, graduation in March 2008
Mr W Kruger with an MPhil, graduation in March 2008

Mr JH du Toit with a BPhil (*cum laude*), graduation in December 2008, continuing with his MPhil in 2009
Ms G Smit with a BPhil (*cum laude*), graduation in March 2008, continuing with her MPhil in 2008,
Ms K Moloto with a BPhil, graduation in March 2008, continuing with her MPhil in 2008

Mr James Joubert with an MScEng (*cum laude*) in Civil Engineering, graduation in March 2008, continuing with his PhD in 2009
Mr R Solomon with an MScEng in Electrical Engineering, graduation April 2008
Mr D Palmer with an MScEng in Process Engineering, graduation December 2008

The following bursary students graduated in 2009

Mr T Gosa with a BPhil, graduation in March 2009, continuing with his MPhil in 2009
Ms C Lagrange with a BPhil (*cum laude*), graduation in March 2009, continuing with her MPhil in 2009
Mr MB Mokheseng with a BPhil, graduation in March 2009, continuing with his MPhil in 2009
Mr N Sibisi with a BPhil, graduation in March 2009, continuing with his MPhil in 2009

Mr M Maliage with a MEng in Mechanical Engineering, graduation in March 2009
Mr K Rautenbach with a MEng in Mechanical Engineering in March 2009
Ms G Smith with an MPhil (*cum laude*) in March 2009
Mr R du Toit with an MPhil in March 2009

Mr J Heyns with an MScEng in Mechanical Engineering in March 2009
Mr W Pierce with an MScEng in Mechanical Engineering in March 2009
Ms E Viljoen with an MScEng in Process Engineering in March 2009

Mr DV Garach with a BEng(Hons) in April 2009, continuing with his MEng in 2009
Ms M Hallquist with a BEng (Hons) in April 2009, continuing with her MEng in 2009
Mr MPM Ntuli with a BEng(Hons) in April 2009, continuing with his MEng in 2009
Mr SM Roux with a BEng(Hons) in April 2009, continuing with his MEng in 2009
Ms L Smith with a BEng(Hons) in April 2009, continuing with her MEng in 2009
Mr JAL Coetzee with a BEng(Hons) in April 2009, continuing with his MEng in 2009
Mr R Suliman with a BEng(Hons) in April 2009, continuing with his MEng in 2009

Ms Refiloe Ntoi with a BPhil, graduation in December 2009
Ms Natalie J Wassung with a BPhil (*cum laude*), graduation December 2009, continuing with her MPhil in 2010

Mr Pholoso Malatji with an MFor in Forestry, graduation in December 2009
Ms Stella Maphiri with an MSc in Forestry in December 2009

Mr Warren Morse with an MScEng, graduation in December 2009

The following bursary students graduated in 2010

Ms Karin Kritzinger with a BPhil (*cum laude*), graduation in March 2010, continuing with her MPhil in 2010
Mr Motala B Mokheseng with an MPhil (*cum laude*), graduation in March 2010
Ms Katlego Moloto with an MPhil, graduation in March 2010

Mr Richard Donkin with a MEng (*cum laude*) Mechanical Engineering, graduation in March 2010

Ms Ilse Botman with an MSc in Forestry, graduation in March 2010
Mr Paul H Ackerman with an MScEng in Mechanical Engineering, graduation March 2010
Mr Kenneth G Allan with an MScEng (*cum laude*) in Mechanical Engineering, graduation in March 2010, he will continue with his PhD in 2010



Mr Johannes P Kotze with an MScEng in Mechanical Engineering, graduation in March 2010, he will continue with his PhD in 2010
 Mr Adriaan Lombard with an MScEng (*cum laude*) in Electrical and Electronic Engineering, graduation in March 2010
 Mr John NF O’Kenny with an MScEng in Industrial Engineering, graduation March 2010
 Mr Ebenezer Prah with an MScEng in Process Engineering, graduation in March 2010
 Mr Abraham van der Merwe with an MScEng in Process Engineering, graduation in March 2010

Ms Nadia Leibbrandt with a PhD, graduation in March 2010.
 Mr Jonathan A Olivier with a PhD, graduation April 2010.
 Mr Nicolas M Thantsha with a PhD graduation April 2010.

Mr Sinethemba A Nongauza with an MSc in Chemistry, graduation in September 2010.
 Ms Tandokazi Y Nquma with an MSc in Chemistry, graduation September 2010.

Mr Stefan T Sager with a MScEng in Electrical Engineering, graduation June 2010.

Mr Matthew P Moody with an BPhil, graduation in December 2010, continuing with his MPhil in 2011.
 Ms Chantal Sasha Langrange with an MPhil *cum laude*, graduation in December 2010.
 Mr Hendrik J du Toit with an MPhil, graduation in December 2010.
 Ms Natalie Wassung with an MPhil, graduation in December 2010.

Mr Thomas J Hugo with an MScEng, graduation in December 2010
 .Ms Mary K Waller with an MSc, graduation December 2010.

The following bursary students graduated 2011

Ms Karin Kritzinger with an MPhil graduation in March 2011.
 Mr Paul B Robinson with an MPhil, *cum laude*, graduation in March 2011.
 Ms Katherine Hyman with an MPhil, *cum laude*, graduation March 2011
 Mr Johannes A Stegmann with an MScEng *cum laude*, graduation in March 2011
 Mr Stiaan Gerber with an MScEng graduation March 2011, continuing PhD in 2011
 Mr Johannes H Potgieter with an MScEng graduation in March 2011, continuing PhD

Mr Greig Menzies with a MCom graduation in April 2011.

Mr Michael Mouzouris with an MScEng graduation July 2011.

Ms Lesego Malla with an MScEng graduation December 2011
 Mr Pieter du Plessis with an MScEng graduation December 2011
 Ms Gabby Coppez with an MScEng graduation December 2011

The following students are expected to graduated in March/April 2012

Mr Moody	Matthew Peter	MPhil
Mr Hoffmann	Ulwin	MScEng
Mr Du Plessis	Jacques	MScEng
Mr Bekker	Nelius	MScEng
Ms Crozier	Jacqueline Louise	MSc
Ms Mutepe	Rendani Daphney	MScEng
Ms Meintjies	Maria Magdalena	MEng
Ms Clohessy	Chantelle	MSc
Ms Tait	Louise	MScEng
Mr Wakeford	Jeremy	PhD
Mr van Zyl	Sewis	PhD

Appendix D: Financial Statement, all cost points



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Statement of Income and Expenditure - CRSES
For the period ending :

	31/12/2011	31/12/2010
TOTAL INCOME	-11 966 824.44	-9 689 883.81
ASSIGNED RESEARCH (TAXABLE)	-1 192 993.04	0.00
CONFERENCE/CONGRESS (NO VAT)	-675 986.00	-249 258.06
DONATION: SPECIAL PURPOSES	-102 500.00	0.00
INCOME FOREIGN EXEMPT	-28 661.26	0.00
INCOME: BURSARY	-3 624 000.00	-2 527 500.00
INCOME: FOREIGN_ZERO RATE	-264 539.42	-840 589.74
INCOME: SUNDRY TAXABLE	-1 709 299.41	-1 943 869.14
INTEREST RECEIVE: INTERNAL ALL	-305 641.79	-245 484.88
PROFIT/LOSS: EXCHANGE RATE DEB	-9 253.81	0.00
PROFIT: EXCHANGE RATE FOREIGN	-440.50	-2 302.90
SALES: TO INTERNAL ORG UNITS	-11 482.82	-50 039.92
SUNDRY INTEREST RECEIVED	0.00	-1 039.17
SUNDRY INCOME: NON TAXABLE	-4 042 026.39	-3 829 800.00
TOTAL EXPENDITURE	8 986 954.83	7 582 610.86
CURRENT EXPENDITURE		
ADVERTISEMENTS: GENERAL	86 022.74	109 616.70
AFFILIATION & REGISTRATION EXP	26 963.85	39 167.22
AUDIOVISUAL EXPENDITURE	270.00	0.00
BURSARY POST GRADUATE	3 696 500.00	2 729 750.00
CELL PHONE AIRTIME	3 461.99	9 356.46
CELL PHONE RENT	5 180.08	5 734.98
CLEARANCE FEE NON-CAPITOL	0.00	550.78
CLOTHING: OTHER	3 385.94	4 470.34
COMPUTER MATERIALS	337 850.34	13 656.47
CONSULTATION FEES	481 772.74	1 374 353.54
CONSUMABLE MATERIALS	47 556.99	50 922.86
COPY AND PRINTING	36 611.97	33 468.37
COURSES	0.00	3 718.00
ENTERTAINMENT: GENERAL	75 702.06	133 597.56
FLOWERS, WREATHS, GIFTS	8 287.16	4 327.36
FOREIGN EXCHANGE LOSS	5 448.37	1 569.50
FOREIGN TRAVEL & SUBSISTENCE	21 798.21	75 118.96
GENERAL VEHICLE EXPENDITURE	25 844.35	0.00
INTEREST PAID: INTERNAL APPOR	408.62	5 987.94
INTERNET NETWORK EMAIL LEVY	19 976.03	8 457.34
IRRECOVERABLE DEBT WRITTEN OFF	0.00	62 763.13
LEVY: SPACE AND FACILITY	25 036.82	0.00
LEVY: SURCHARGE	311 905.68	26 370.96
NON-CAPITALISED BOOKS	0.00	4 400.00
POSTAGE STAMPS AND TELEGRAMS	7 028.83	3 881.65
PRIZES AND MEDALS	4 500.00	4 500.00
PROMOTION MATERIAL	0.00	513.00
RENT OF EQUIPMENT GENERAL	2 290.00	650.00
RENT OF ROOMS	600.00	9 050.00
SERVICES	15 875.00	32 985.22
SMALLER FURNITURE AND EQUIPMEN	13 273.63	13 073.07
SOFTWARE	8 656.88	36 188.05
STATIONERY	17 210.09	17 695.14
SUBSCRIPTION & MEMBERSHIP FEES	3 000.00	0.00





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Statement of Income and Expenditure - CRSES

For the period ending :	31/12/2011	31/12/2010
SUBSCRIPTION BOOKS & MAGAZINES	0.00	3 052.40
SUNDRY EXPENSES	0.00	14 000.00
TELEPHONE INSTALLATION COSTS	2 087.34	394.44
TELEPHONE: CALLS	13 499.60	9 564.15
TELEPHONE: RENT	14 111.62	17 501.59
TOTAL REMUNERATION	2 575 498.25	2 048 992.40
TRAVEL & SUBSISTENCE: DEPARTM	216 371.90	156 378.29
TRAVEL & SUBSISTENCE: NON TEAT	160 099.80	193 603.62
WORKSHOPS	108 173.64	93 228.79
ASSET TRANSACTIONS		
ASSET PURCHASES	604 694.31	230 000.58
OPERATING (SURPLUS) / SHORTFALL FOR PERIOD	-2 979 869.61	-2 107 272.95
FUNDS TRANSFERS	2 130 735.84	1 252 864.03
TRANSFERS FROM	4 668 987.07	1 285 569.03
TRANSFERS TO	-2 538 251.23	-32 705.00
NET (SURPLUS) / SHORTFALL FOR THE PERIOD	-849 133.77	-854 408.92
Plus: ACCUM (FUNDS) / SHORTFALL ON 01/01/2011	-5 078 683.48	-4 224 274.56
ACCUM (FUNDS) / SHORTFALL ON 31/12/2011	-5 927 817.25	-5 078 683.48
Min: BALANCE SHEET ITEMS	488 035.80	352 307.95
CREDITOR PROVISION BALANCING	0.00	-910.00
DEB CONTR-DT SYSTEM	513 278.45	353 217.95
SPACE AND FACILITY CONTROL ACC	-302.78	0.00
SURCHARGE CONTROL	-24 939.87	0.00
FUNDS AVAILABLE ON 31/12/2011	-5 439 781.45	-4 726 375.53


F Majlet

Director: Financial Services



Statements for DST Funds (CP 11550)



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Statement of Income and Expenditure - OSP centre - 11550

For the period ending :

	31/12/2011	31/12/2010
TOTAL INCOME	-7 798 267.51	-6 451 447.74
INCOME: BURSARY	-3 624 000.00	-2 527 500.00
INCOME: SUNDRY TAXABLE	0.00	-8 329.73
INTEREST RECEIVE: INTERNAL ALL	-131 348.99	-85 449.62
PROFIT: EXCHANGE RATE FOREIGN	0.00	-368.39
SALES: TO INTERNAL ORG UNITS	-3 418.52	0.00
SUNDRY INCOME: NON TAXABLE	-4 039 500.00	-3 829 800.00
TOTAL EXPENDITURE	6 082 062.26	5 018 008.32
CURRENT EXPENDITURE		
ADVERTISEMENTS: GENERAL	86 022.74	109 616.70
AFFILIATION & REGISTRATION EXP	26 463.85	29 140.92
AUDIOVISUAL EXPENDITURE	270.00	0.00
BURSARY POST GRADUATE	3 637 000.00	2 638 500.00
CELL PHONE AIRTIME	3 413.99	9 246.46
CELL PHONE RENT	5 180.08	5 734.98
COMPUTER MATERIALS	0.00	10 708.75
CONSULTATION FEES	209 554.45	264 250.54
CONSUMABLE MATERIALS	15 391.71	3 842.26
COPY AND PRINTING	25 053.87	15 177.64
COURSES	0.00	1 368.00
ENTERTAINMENT: GENERAL	24 682.19	46 954.52
FLOWERS, WREATHS, GIFTS	700.99	2 060.97
FOREIGN EXCHANGE LOSS	147.18	32.48
FOREIGN TRAVEL & SUBSISTENCE	16 798.21	53 196.96
INTEREST PAID: INTERNAL APPOR	0.00	5 987.94
INTERNET NETWORK EMAIL LEVY	15 608.32	6 369.46
NON-CAPITALISED BOOKS	0.00	4 400.00
POSTAGE STAMPS AND TELEGRAMS	417.66	1 698.65
PRIZES AND MEDALS	4 500.00	0.00
PROMOTION MATERIAL	0.00	513.00
RENT OF ROOMS	600.00	0.00
SERVICES	12 875.00	32 985.22
SMALLER FURNITURE AND EQUIPMEN	11 939.14	8 738.10
SOFTWARE	1 890.01	2 398.56
STATIONERY	11 512.86	16 522.07
SUBSCRIPTION & MEMBERSHIP FEES	3 000.00	0.00
SUBSCRIPTION BOOKS & MAGAZINES	0.00	3 052.40
SUNDRY EXPENSES	0.00	10 000.00
TELEPHONE INSTALLATION COSTS	1 238.04	394.44
TELEPHONE: CALLS	9 185.76	9 564.15
TELEPHONE: RENT	10 646.81	17 501.59
TOTAL REMUNERATION	1 748 970.80	1 580 291.71
TRAVEL & SUBSISTENCE: DEPARTM	120 905.43	63 299.61
TRAVEL & SUBSISTENCE: NON TEAT	26 101.30	28 105.22
WORKSHOPS	32 273.00	15 849.00
ASSET TRANSACTIONS		
ASSET PURCHASES	19 718.87	20 506.02
OPERATING (SURPLUS) / SHORTFALL FOR PERIOD	-1 716 205.25	-1 433 439.42





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Statement of Income and Expenditure - OSP centre - 11550 For the period ending :	31/12/2011	31/12/2010
FUNDS TRANSFERS	1 493 141.00	1 285 569.03
TRANSFERS FROM	1 493 141.00	1 285 569.03
NET (SURPLUS) / SHORTFALL FOR THE PERIOD	-223 064.25	-147 870.39
Plus: ACCUM (FUNDS) / SHORTFALL ON 01/01/2011	-1 847 213.61	-1 699 343.22
ACCUM (FUNDS) / SHORTFALL ON 31/12/2011	-2 070 277.86	-1 847 213.61
Min: BALANCE SHEET ITEMS	0.00	-910.00
CREDITOR PROVISION BALANCING	0.00	-910.00
FUNDS AVAILABLE ON 31/12/2011	-2 070 277.86	-1 848 123.61

F Majlet

Director: Financial Services



Appendix E: Approved Budget for 2012 – Postgraduate Programme for Renewable and Sustainable Energy Studies

		2011	2012
Staffing			
	Core Staff	R 1 747 000	R 1 810 000
	Academic Staff	R 1 494 000	R 1 600 000
Running Expenses		R 490 000	R 575 000
	Tel, Fax and Internet	R 65 000	R 50 000
	Stationary & Printing	R 25 000	R 25 000
	Advertisement & Website	R 130 000	R 100 000
	Conferences & Workshops	R 80 000	R 80 000
	Travel (Staff)	R 80 000	R 80 000
	Travel (Students & Visiting Acad.)	R 40 000	R 40 000
	Community Projects	R 70 000	R 80 000
	Floor Space Charge		R 120 000
Academic Expenses		R 45 000	R 20 000
	Teaching Material & Books	R 45 000	R 20 000
Capital Expenses		R 201 000	R 165 000
	Office Furniture	R 20 000	
	Classroom Furniture	R 10 000	
	Computer Equipment (Students)	R 150 000	R 150 000
	Computer Equipment (Staff)	R 21 000	R 15 000
Contingency		R 60 000	R 0
	5% of Total	R 60 000	R 0
	Total DST Core Grant (Operating Budget)	R 4 037 000	R 4 170 000¹
Bursaries			
	DST: Continuing Students	R 1 440 000	R 1 600 000
	DST: New Bursaries	R 1 560 000	R 1 900 000
	Total DST Grant for Bursaries	R 3 000 000	R 3 500 000²
	GRAND TOTAL OF DST GRANT	R 7 037 000	R 7 670 000

Notes:

¹ R 3m escalated by 6,5% in 2007, with 11,3% in 2008, 7,1% in 2009, 4,3% in 2010 and with 5% in 2011 as the *actual* and projected annual average CPIX/CPI values.

² This is for the current bursary values, R 100k (doctoral) and R 80k (masters) with 8 new doctoral and 14 new masters' students.



Appendix F: New bursary students for 2012

CRSES New Bursaries for 2012						
Title	Surname	Name	Univ	Proposed Degree	Gender	Equity
Ms	Maxwane	Ziphozihle Ziyanda	UFH	MSc	M	B
Ms	Clohessy	Chantelle	NMMU	PhD	F	W
Ms	Kime	Robyn L	US	MScEng	F	W
Mr	Chewe	Musyani G	UFH	BPhil/Mphil	M	B
Mr	Vanyaza	Sydwello Luvo	CPUT	MSc(Course work)	M	B
Mr	Mokomele	Thapelo	SU	MEng	M	B
Mr	Mouton	Zac	US	MEng	M	W
Mr	Potgieter	Johannes HJ	SU	PhD	M	W
Mr	Bezuidenhout	Lucian JR	NMMU	MSc	M	B
Mr	Magangane	Luyolo N	UCT	MSc(Eng)	M	B
Mr	Njuguna	Alexander K	WITS	BPhil/Mphil	M	B
Mr	Benecke	Mario A	NMMU	MSc	M	W
Mr	Van der Walt	Reghardt James	UP	MScEng	M	W
Mr	Opperman	Adriaan Jacobus	NMMU	MTech	M	W
Mr	Schultz	Ross Dane	NMMU	PhD	M	W
Mr	Ramaru	Tshililo Aubrey	Univ Venda	BPhil/MPhil	M	B
Mr	Wessels	Francois JL	UCT	PhD	M	W
Ms	Crozier	Jacqueline	NMMU	PhD	F	W



Appendix G: Publications of students and staff of the Centre

JOURNAL ARTICLES

2011	
1.	Van Zyl, JM , Van Rensburg, E, van Zyl, WH , Harms, TM , Lynd, LR. A Kinetic Model for Simultaneous Saccharification and Fermentation of Avicel With <i>Saccharomyces cerevisiae</i> , Biotechnology and Bioengineering DOI10.1002/bit.23000, 30 November 2010.
2	Suliman R. , Oxtoby O., Malan AG, and Kok .S, (2011), "Development of strongly coupled FSI technology involving thin walled structures", Proceedings of the 2 nd African Conference on Computational Mechanics – An International Conference – AfriCOMP11, Paper no. 132, Cape Town, South Africa, 5-8 January 2011.
3	Owen, MTF. , Kröger, D. , "An investigation of air-cooled steam condenser performance under windy conditions using CFD", ASME JEGTP, Vol 133, June 2011.
4	Musango JK, Brent AC , 2011. Assessing the sustainability of energy technological systems in Southern Africa: A review and way forward. <i>Technology in Society</i> , 33, 145-155
5	Amigun B, Musango JK, Brent AC , 2011. Community perspectives on the introduction of biodiesel production in the Eastern Cape Province of South Africa: Questionnaire survey results. <i>Energy</i> , 36(5), 2502-2508.
6	Barry M-L, Steyn H, Brent AC , 2011. Selection of renewable energy technologies for Africa: Eight case studies in Rwanda, Tanzania and Malawi. <i>Renewable Energy</i> , 36(11), 2845-2852
7	Musango JK, Brent AC , 2011. A conceptual framework for energy technology sustainability assessment. <i>Energy for Sustainable Development</i> , 15, 84-91.
8	Adeyemo O, Wise RM, Brent AC , 2011. The impacts of biodiesel feedstock production systems in South Africa: An application of a partial equilibrium model to the Eastern Cape social accounting matrix. <i>Journal of Energy in Southern Africa</i> , 22(1), 2-11.
9	Musango JK, Brent AC , 2011. Assessing the sustainability of energy technological systems in Southern Africa: A review and way forward. <i>Technology in Society</i> , 33, 145-155
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