



how & why?

“Scientists discover the world that exists, engineers create the world that never was”
Theodore Von Karman, Aerospace Engineer.

Over the past six months, engineers, young and old have been busy building municipal infrastructure that never was! The project to pair retired engineers with students requiring experiential training and unemployed graduates is addressing many national goals, the most important two being service delivery and skills development. Forty three seniors, forty five graduates and eighty four students have been deployed in more than seventy municipalities to augment the technical structures or fill gaps where there is no technical staff. Over R500m has been spent since February, with some R100m worth of projects completed by the 30 June 2006

MIG deadline. The team also helped with the completion of some forty MIG applications to beat the 31 August 2006 deadline.

The project was conceived and is being managed jointly by SAICE (the South African Institution of Civil Engineering) and SABTACO (the South African Black Technical and Allied Careers Organisation). The acronym ENERGYS (Engineers Now to Ensure Roll-out by Growing Young Skills) says it all. No project is too big or too small for the team. They have applied their ENERGYS to delivering bulk infrastructure, operations and maintenance (with many of the students taking the responsibility for operating treatment works in the absence of trained staff), developing solid waste sites, building houses, amenities and carrying out infrastructure audits in order to

develop backlog reports. These activities are in support of the list of deliverables defined at the outset, which included accelerating the delivery of MIG projects; planning and initiation or delivery of capital projects; rehabilitation of services; curbing losses and enhancing revenue.

The performance of the teams is such that the project has been extended in its present form to 31 March 2007. The list of deliverables has been extended in many provinces to include updating of organograms to appoint more technical staff where required; developing job specifications and interviewing and populating structures; and carrying out backlog studies in terms of the need for both new basic services and rehabilitating failing or failed services. These activities will be carried out in order to motivate for more funding to restore and develop services, and establish sustainable structures and systems for the future. The extended project will also reach more municipalities, particularly in the Free State, Gauteng and those nominated to receive additional support.



As the project addresses the concerns of many stakeholders we are fortunate to have the continued support of National Department of Local Government (dplg), Department of Water Affairs and Forestry (DWAF) and the Gauteng Department of Local Government (GDLG) as the funders of the project.

Another key contributor is the Local Government Sector Education and Training Authority (LGSETA). Through the provision of stipends for experiential training, many students will eventually graduate with their National Diplomas, a dream that has eluded them due to the lack of experiential opportunities.





CHALLENGES AND GAPS

Thank you IMESA!

At the last ENERGYS workshop it was decided that the entire team - seniors, graduates and students should attend the IMESA conference in Soweto in October 2006. This conference, organised by the Institution of Municipal Engineering of Southern Africa is the annual catalyst for new directions and technologies to be introduced into civil engineering service delivery in local government.

The topics being covered this year were considered to be so relevant to today's challenges that it was felt that all should be present. Not only would they get up to date, but hopefully the experience would inspire the students and graduates to choose municipal engineering as their future career. The more than sixty exhibits would also give the young people an opportunity to understand the materials and equipment being used in local government.

Cap in hand the ENERGYS management team approached IMESA for subsidised rates in order for the whole team to attend. Not only did IMESA offer an excellent subsidy, but they made a dedicated bus available for the graduates and students and have also made a dedicated room available in the venue for the ENERGYS team to host a parallel workshop whilst the IMESA AGM is taking place.

Thank you IMESA for your great support!



At the senior's workshop held in May, a list of gaps and challenges was identified as follows:

1. The right person for the job (qualification, experience etc)
2. Define correct structures/functions
3. Improve O & M
4. Emphasise faster and firmer decision making at council level
5. Reduce interference
6. Confirm acting posts and restore morale
7. More energetic revenue generation & collection
8. Simplify/improve IDP and other processes
9. Spend audit to ensure funds are being correctly utilized
10. Outsource much more
11. Supply chain management review
12. Empower councilors in terms of infrastructure
13. Make better use of time
14. MIG – one size does not fit all
15. More money from Treasury!

Seniors have since devoted time to many of the above, and have created streamlined supply chain documents; determined backlog figures to motivate for more funding for both new infrastructure and to rehabilitate neglected infrastructure; delivered councillor orientation lectures; carried out interviews to select additional experienced staff; and have continued with planning, loss reduction and enhanced revenue collection campaigns.

However in these subsequent months, they have also identified other problems which need addressing, the most vexing of which relate to housing. The housing targets and expenditure in municipalities assume that there is sufficient bulk infrastructure and staff to manage the quality role out of these projects. Unfortunately this is not the case, as few municipalities have planned for vastly increased treatment plants, waste sites or ring roads etc and few have sufficient, if any building inspectors to monitor the processes. The seniors are now incorporating the housing projects into their master planning exercises and in several municipalities, building students have been deployed with a view to training them to assist with housing inspections.

WE NEED YOU!

STUDENTS AND GRADUATES: Civil Engineering students and graduates required in the North West and Free State Provinces, Westonia, Metsweding, Midvaal and Sedibeng (Gauteng) as part of a capacity building project. Students requiring experiential training should have a minimum of S3, and graduates a minimum of a national diploma.

This programme provides a once in a lifetime opportunity to obtain workplace training in the Municipal Engineering Sector, under the guidance and mentorship of senior engineers with extensive engineering experience. Please e-mail your CV to energys@ally.co.za. Only short-listed candidates will be contacted.

DRIVER'S LICENSES: Please help - you can play a crucial role in the career development of students and graduates. There is a dire need for them to acquire their driver's licenses and we appeal to all municipalities who are part of the project to assist us on this matter.

RETIRED SENIOR ENGINEERS: We need to place seniors in many rural areas. The immediate need is Burgersfort and Leboakgomo as well as other areas in Limpopo. Please forward your CV's for all areas to energys@ally.co.za if interested.

'Women's Build' – Gauteng girls build RDP houses in Orange Farm

From the 14 to 18 August 2006 the Gauteng female students participated in the 'Women's Build' 2006. An event coinciding with Women's Day, the build celebrated women's contributions to the development of the country and in particular the achievements of women in the housing sector. Participants included Women in Housing, Thubelisha Homes, the NHBC, many funders and of course the intrepid ENERGYS team. This event was hosted by the Gauteng Department of Housing

Report by Ziphezhinle Ntanzu and Reneilwe Mmatli from Kungwini

We were part of a group of seven girls in the Gauteng ENERGYS team who were invited to celebrate Women's Day by participating in the building of the second twenty five of the fifty houses built as the pilot in the Department of Housing's Orange Farm Project.

When we got on site, much of the work was done on the first house to which we were assigned. The floor slab, brick laying and window frames were installed and the bagwash on the external walls was complete. We had to assist with mixing mortar, plastering of walls, painting of walls, window frames and door frames, placing roof beams and reinforcing beams, placing roof sheeting, and placing the cornice. The mixing of mortar was hard at first, but through a lot of determination and enthusiasm, we finally managed to get the hang of it. The plastering and painting were fun.

Throughout the week we did research on the house and found that it was under-priced, resulting in the use of inferior material. The reinforcement of the roof beams was done after plastering instead of being done before the process of plastering and bagwash, which will result in future damage to the wires (reinforcement) and cracking of bricks. The gradient of the sewer pipes was insufficient to allow proper flow of effluent.

We were also taken to other houses, which had been started that week. So we had a chance to lay bricks and watch a concrete pour.

Besides the bad weather we managed to do what was required of us. After a week of sleeping on the floor and with aching backs, we realised that we had much to be grateful for as we left with much needed experience, we met new people and made friends.

We all got there with no experience of building, but left the place with knowledge that building is an essential field to understand and the experience gained will be of value to our careers.



Report by Caroline Maphanda from Randfontein

The purpose of the project is to provide better houses for old people (In our Lifetime) living in shacks or informal settlements.

The project consisted of 25 houses, which had to be built in five days. The floor areas were 36m². The brickwork was already completed on the house that was given to us and we had to do plastering, painting and roofing. We learnt a great deal about each of these processes during the week, getting our hands dirty and using every muscle in our bodies.

As part of the project we needed to measure all the quantities and compare them with those specified on the drawings, but we could not do this comparison as no plans were available on site.

Leonard Le Roux taught us a lot about what was wrong with the house design so that we will know what to look out for in future.

Conclusion

During the course of the five days of the project I learned that building is not all about having completed the job, but also thinking about the people that will be using the structure on a daily basis. My participating in the project was a great challenge and I enjoyed every moment, even if we had some problems that I reckon was due to a lack of communication. I hope to see this as a continued practice in future as it gives women some confidence to know they don't only belong in the kitchen, but also in the construction industry.

I would recommend that the NHBC insists on contractors keeping plans on site. This will enable anyone coming to inspect the buildings to check that the contractors are doing the right thing - building quality houses.

SPOTLIGHT ON PARTICIPATING MUNICIPALITIES

DISTRICT:

Eastern Cape

Cacadu
Amathole
Alfred Nzo
Ukhahlamba

Free State

Xhariep

Gauteng

Sedibeng
Metsweding
West Rand

KZN

Ugu
Zululand

Limpopo

Sekhukhune

Northern Cape

Kgalagadi
Frances Baard
Pixley ka Seme

North West

Central
Bophirima
Bojanala
Southern

Western Cape

Eden
Central Karoo

LOCAL:

Gauteng

Sedibeng

Emfuleni
Midvaal
Lesedi

West Rand

Mogale
Merafong
Randfontein
Westonaria

Metsweding

Kungwini
Nokeng Tsa Taemane

Limpopo

Sekhukhune

Greater Marble Hall
Elias Motsoaledi
Greater Tubatse
Fetakgomo

Mpumalanga

Bohlabela

Bushbuckridge

Northern Cape

Kgalagadi

Ga-segonyana

Frances Baard

Phokwane

What's happening in

Seventy-one municipalities at both a district and local level are receiving some form of support from this project.

2006 FLOOD DAMAGE

On 3 and 4 August 2006, the whole of the Southern Cape experienced torrential rains that set back service delivery projects as a result of the need to attend to the severe disruption to existing services. Most of the region registered 200-300 mm of rain within 48 hours, whilst Kou-Kamma, the worst hit, recorded 400mm in the same period. The municipalities and many of our teams are now confronted with attending to these problems.

Cacadu DM

In the Cacadu District, assessment of the damage in the region yielded many problems including:

- Roads were washed away, mainly due to the lack of basic storm water drainage provision to protect the layer works from saturation and erosion. This is typical of basic road designs, the parameters of which urgently need to be reviewed,
- Railway lines undermined,
- Water supply pipes were exposed and burst in certain areas,
- A dam burst,
- Septic tanks overflowed,
- Many roads are pitted with potholes and deep gullies,
- Stormwater pipes collapsed due to increased bearing pressure causing large holes in the roads,
- Roofs were blown off,
- Bridges collapsed,
- River beds were widened and scouring threatens the integrity of several more bridges, and
- Roads were waterlogged and impassable for long periods, with some roads still reported as being under water.

Pixley Ka Seme DM

The area of Pixley Ka Seme District (De Aar) did not experience such excessive localised damage but the high rainfall has contributed to the further deterioration of the road network. The road base has now been worn away in many areas, leaving no excess material to fill / cover localised potholes and low areas. This will add to the daunting maintenance task faced by the district who lament only having eight graders (with an average age of 24 years) to attend to 8 400 km of gravel roads!

Eden DM

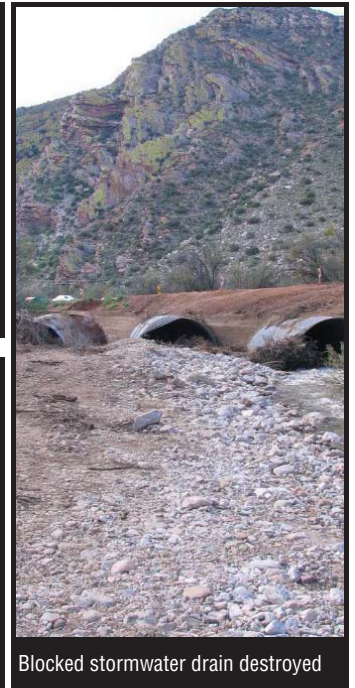
The Eden District Municipality where the senior Tom De Kock was overseeing construction to repair flood damage that occurred in December 2004 was also affected. Fortunately the structures being rebuilt showed very minor signs of damage, confirming the adequacy of the redesign and quality of workmanship. The most notable damage occurred on the N2 in the Kaaimans River area, where a classic text book slip-circle collapse occurred, causing damage to three lanes of the National Road.

Central Karoo DM

In Prince Albert, much of the damage could have been avoided had a comprehensive storm water maintenance programme been in place. Culverts



Road damaged in floods



Blocked stormwater drain destroyed



Collapsed bridge due to floods

were blocked, bridge piers were unprotected, and drains were full of vegetation causing similar destruction to that reported in Cacadu.

Amathole, Alfred Nzo and Ugu DM

The greater part of the former Transkei area, north of the Kei River, also suffered. Damage was most notable along the length of the N2 National Road, especially in the areas around Qumbu, Tsolo, Mount Ayliff and between Harding and Port Shepstone, where a length of the N2 subsided, forcing the road closure and setting up of a temporary bypass.

Other severe effects of the heavy rainfall were the collapse of traditional mud houses that have withstood the elements for many years, in many cases with serious injuries to the inhabitants. Two deaths were attributed to injuries sustained by collapsing structures.

Another common result of the floods was the contamination of natural water sources in the rural areas where adequate water provision and distribution of treated water have not yet been provided to communities.

Lessons learnt

It was also reported that in certain cases river bed clearing projects had exacerbated the situation! Where alien vegetation has been removed it is important to replace it with fast growing indigenous vegetation to prevent erosion and increased runoff. Where alien trees had been felled, the trunks had not been cleared from the area, resulting in a large number of logs being swept downstream, leaving a trail of destruction behind!

Sadly flood damage, which requires significant funds for repairs, has diverted the attention of several seniors and graduates from service delivery. To prevent such extensive damage in the future much more attention must be given to regular drain cleaning and comprehensive design of stormwater drainage.

OUR MUNICIPALITIES:

PRINCE ALBERT LM

Ashley America, a graduate, writes:

I arrived in the beautiful Karoo town of Prince Albert on 25 June 2006, as part of the ENERGYS project. To date I have been involved in various projects that cover a wide range of civil engineering disciplines. My current project involves the restoration and maintenance of the sewage treatment plant as the functioning of the current facility is not effective in treating the effluent intake. Having been assigned a smaller municipality my portfolio of activities includes two additional satellite villages, Leeu Gamka, approximately 80 km northeast of Prince Albert and Klaarstroom, which is located 60 km southeast of the town.

I am under the guidance and mentorship of Mr. Peter de Villiers (Senior Engineer) who assigns various tasks within the civil engineering framework that I have to execute, with the objective of accelerating service delivery coupled with my own development as technologist. The Prince Albert municipality renders a service to a population of about 11 000 across the three towns. The livelihood of all three towns and their inhabitants are farming and agriculture with Prince Albert considered the town with the most economic potential, as tourists flock here in numbers during the open season to visit the Swartberg Pass.

Prince Albert recently experienced a flood that threatened the welfare of the town's infrastructure. The water treatment plant was under serious



threat of being swept away by the strong river current; a large section of the main road suffered some damage and a river crossing lost its foundation. This, as expected, had a huge impact on the composition of my work load as I was responsible for the planning and design of the repair work needed to restore the services and infrastructure affected by the flood.

After doing a full assessment of the damages I have since recommended that a gabion structure be constructed that would serve as protection for our water treatment works, rebuilding the river crossing bridge foundation by hand packing small rocks below the bridge deck and pumping cement mortar between the voids, as well as gabions to provide additional support.

Furthermore I have also been able to establish that a set of corrugated iron pipes fitted in the structural layers of the main road to safely divert the river, was blocked with vegetation resulting in the river level rising and flooding the town. The cleaning and maintenance of the pipes have since commenced following my recommendations.

I am steadily developing as a technologist and acquiring the appropriate skills for my chosen profession. This is largely due to my involvement with the ENERGYS project and the mentorship.

AMATHOLE DM

Projects reviewed:

The senior, Johan Koekemoer and his students were asked to assess the work done against payments made for 10 MIG projects that were being undertaken in the 2005/06 financial year. Time frames did not allow for a 'forensic audit' to be carried out but substantiation had to be on the basis of an inspection and confirmation that the work for which payment is claimed had in all probability been carried out satisfactorily. The process took two weeks during which time the students learnt an enormous amount as a result of interacting with their senior throughout the period.

Although it was not intended to carry out a forensic audit, problems encountered on all projects were such that a list of concerns were documented as follows:

- Few consultants appointed employed registered engineering professionals, had experience in the field or were members of recognised bodies for their profession such as SAACE.
- No drawings were available for any of the access road projects. It is not clear how certain critical factors, such as maximum gradient of roads or positioning of stormwater culverts, were decided on without drawings.
- No project was assessed where the consultant could produce site measurements agreed between the contractor and consultant as actual work done!
- Very few payment certificates had all the supporting documentation.



attached for work done by others e.g. invoices for materials on site or laboratory testing for compaction.

- Few projects had authorisation from DEAT; either in the form of an Exemption or a Record of Decision; licences from DWAF in the case of bridges and culverts in water courses or certificates from structural engineers in the case of structures.
- The number of sessions and the ease with which these are submitted and accepted by municipalities is of major concern. The question must be asked as to why the consultants or contractors were appointed if they could not do the work.
- Due to lack of capacity most certificates submitted were automatically signed off and paid without any inspection or measurement on site.
- Contractors acceded to community demands to move or omit many critical elements such as stormwater drains or side throw-out drains.
- All projects were being constructed using yellow machines whilst the community looked on. The lack of manual labour performing construction tasks is unacceptable.

Discussions with other seniors reveal that these observations are not unique to Amathole. Experienced capacity in each municipality is clearly needed to control and ensure quality solutions are being delivered in time and at the right price throughout local government.



Enhancing the Caravan Park in Eden By Michael Xelani

Currently I am doing experiential training at Eden District Municipality. This municipality is situated in the Southern Cape area centering around George. I am involved in a project in the Swartvlei Caravan Park. This park is situated next to Sedgfield and nearby there are beautiful places like the Swartvlei Lakes for fishing. It is also surrounded by bushes but fortunately amenities such as pharmacies, cafés and restaurants are nearby.

The caravan park has capacity for 156 caravans and 100 of the sites have electricity. My involvement in this project is to make the caravan park more attractive by applying engineering skills and logic. As a technician student I see this project as a challenging one because it gives me the opportunity of using my theoretical knowledge in practice. It also exposes me to many ways of applying technical skills in civil engineering.

I have had a chance of doing survey which was successful and I also managed to do cost estimates for the whole project on my own. Mr Gunter Erhardt, my mentor, also gave me the task of phoning contractors for prices. I've noticed from this that I am gaining more self confidence and my communication skills are improving. I believe working with municipalities is a good opportunity for civil engineering graduates who are still new in the industry and a great experience for trainee students. I really appreciate the ENERGYS TEAM for providing this project and wish that it may continue for future civil engineering students.

Randfontein Local Municipality evaluates the fire-fighting network

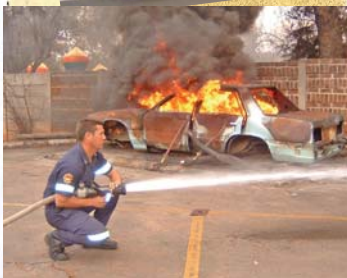
A project, which caught the attention of the ENERGYS monitoring and evaluation team during their recent visit to the Randfontein Local Municipality (RLM) was the assessment of the status of municipal fire-fighting infrastructure with specific attention to the street located hydrants and associated pipework. Concerns were raised about the network condition after a recent fire. Further it has been recognised that the network must be in tip top condition for the 2010 World Cup events.

Vincent Mabuda, a graduate, was set the task of evaluating the network. His main aim is to determine the general fire-fighting readiness of hydrants, their visibility and distances from each other, necessary colour markings (e.g. red for hydrants, green with yellow bends for water supply valves etc.) and corresponding location on the street infrastructure drawings.

He decided on a sample approach in evaluating the street fire-fighting infrastructure, owing to the large size of RLM urban area. His objective is to compile a sample assessment for each representative land use area accounting for the physical and colour status of hydrant installations, problems encountered and possible solutions to enable the RLM to better budget for reactive and eventually also proactive maintenance of the street situated fire-fighting installations.

Vincent also consulted with the West Rand District Municipality based fire-brigade which is operating in the RLM area and gathered from the discussions that there are typically a few critical (i.e. fire sensitive) areas within each municipality (e.g. schools, hospitals, old age homes, certain factories, sport grounds, etc.) where the hydrant readiness and location must comply with the fire-fighting regulations at any given time.

Although Vincent's task is in its final compilation stage, he regrets that he did not have a suitable GPS device at his disposal, which could help in collating the office and field information on the hydrants. He will recommend to the RLM that they should acquire such equipment for future investigations of a similar nature, to locate specific components of municipal infrastructure.



Teaching talent discovered

Many seniors have expressed their concern at the limited understanding that their students and graduates display in many engineering principles and have taken it upon themselves to become teachers and lecturers.

- In Zululand District Municipality, Brad Rutherford has developed a complete set of notes for all disciplines. He lectures all students and graduates weekly, sets them homework, which he marks and comments on the following week.
- In Mogale, Francois Olivier has been giving weekly 'project management' lectures to students and staff.
- Chris Schutte has also been giving his students 'project management' training in Marble Hall and Elias Motsoaledi.
- Mike Church has started a learning programme with seven students and one graduate from both Mogale and Randfontein in an attempt "to fill in the gaps in their Technikon education". This entails a two-hour session once a week. More time may need to be allocated as they progress.
- Eddie van der Heiden in Mafikeng has developed a detailed survey course and is ensuring that all students and graduates are up to speed on survey and measurement.
- Other seniors have been assigning their young people hypothetical projects in order to cover the full planning and design process. Frans Laubscher in Bushbuckridge and Frik Pretorius in Merafong have been task masters setting projects which they mark and comment on to ensure that their charges learn as much as possible about each topic. Say the students in Bushbuckridge, "Now we are starting to experience the value of internship far more than our expectations. Our one year experience will be compared with someone who has three years experience because of our mentor. There is a lot we are gaining from him".
- Other seniors conduct weekly review sessions where they discuss problems encountered and possible solutions with their young people.
- Yet others have been taking their students on weekly site visits to projects being handled by others to expose them to the range of disciplines and stages in the project life cycle.

Over and above these formal approaches the seniors spend much time with their protégés explaining what they must do, problems encountered on site, etc. Norman Angel, an official from Eden recalled the wonderful sight of "Oom Tom (de Kock) sitting on a culvert, legs swinging, flanked by site staff looking over his shoulder as he sketched a solution to a problem they had encountered".

We are discovering a valuable latent talent in our seniors, which must be harnessed to the full!



A light-hearted view of the loves, lives and dreams of the team in Merafong by Frik Pretorius

There are four students, one graduate and two seniors in Merafong.

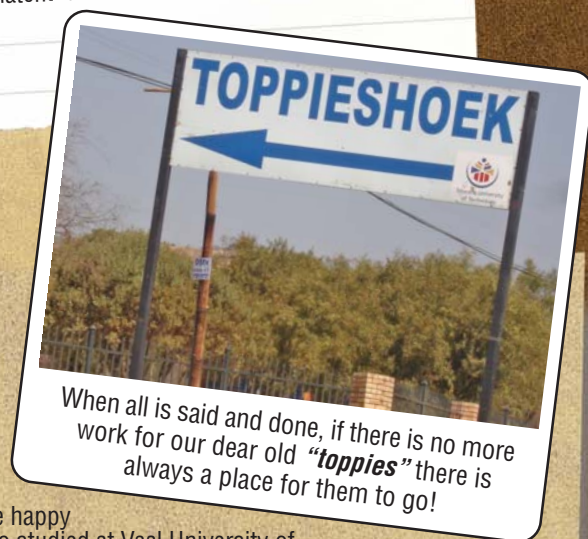
Pomolo is the eldest and he married a Bloemfontein lady in July. We are happy for their marriage and wish them a long and happy life together! Pomolo studied at Vaal University of Technology with Bafana, who is an old Sebokeng dweller. Together they represent the electrical engineering component of the ENERGYS team in Merafong. They are still wondering what sins they had committed which got them involved in so much sorting and filing. Soon they will have the opportunity for better experiences closer to home. Thanks for bearing it out Guys, you are solid gold!

Tsatsi, Thulani and Mcabango are the specialists in cemetery design. They have been hugging the place – testing the bedding, surveying every sprout and ant heap for lack of topography. Planning, designing and building the resting place of the future. Their field books look impressive, and their levels closed, thanks to Excel, or is their bright thinking gained from their favourite meals. Mcab is particularly impressed with the Merafong girls and their cooking, so, he buys the food. Tsats test-drives the menu and Thulani does the eating – some core business for you!

Soon all of this will be history, Guys, your hard and smart work will be rewarded! The pay will go up, and those houses you have designed for Meratex will be yours, even if Mcabango will have his estate overlooking the Umfoloz. Of course Tstatsi will have his back home in Mafikeng, Thulani hugs a grand mansion in Houghton, Mazibuko parks his M5 next to the Vaal while he negotiates a huge new deal with Ally on the latest PDA-model, and Pomolo plays with his kiddos in Bloem!

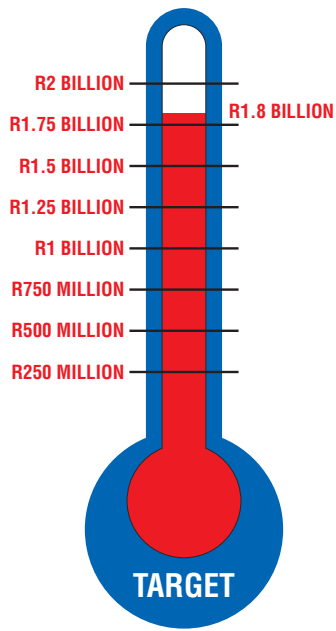
...and Theuns and Frik, old and grey, happily receive their stipends from their five sons every month, thanking the ENERGYS' Admin Team for great support – and Ally for a great opportunity!

This is the Merafong team, doing exceptional work and living high values – on their way up to be engineers for South Africa!



When all is said and done, if there is no more work for our dear old "toppies" there is always a place for them to go!

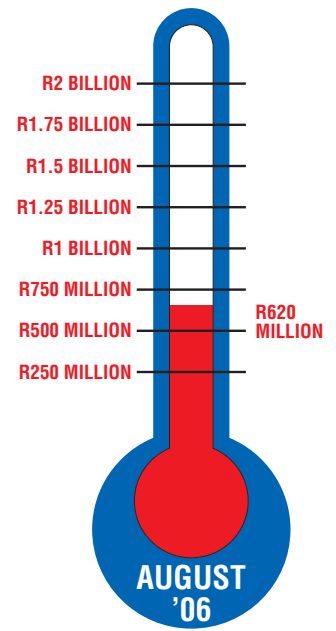
ENERGYS PROJECT BAROMETER



The project barometer shows values of the projects being managed, savings and improved income, and indicates what we collectively expect to achieve.

To the end of August 2006 - 520 projects to the value of R1.8bn had been identified as requiring some sort of attention or management from the team and R620m had been spent in rolling these projects out, many of which had been stuck when the teams arrived. The projects include 120 water, 100 sanitation, 102 roads and 70 planning projects.

We need your monthly project percentages so that we can monitor progress. We have along way to go!!!



Designed and produced by Gemini Concepts +27-53-306-3229



ENERGYS CONTACT DETAILS

A SAICE /SABTACO CAPACITY BUILDING PROJECT IN COLLABORATION WITH dplg, GDLG and LGSETA

P O BOX 73285
FAIRLAND
2030

26 Weltevreden Road,
NORTHCLIFF Ext 9

Phone: +27-11-476-4100
Fax: +27-11-678-7518

e-mail: energys@ally.co.za



Deon Slabbert (left) handing over AllyCAD to Mr Mzwandile Gwandano (middle), Ikwezi's Technical Manager



Seniors receive AllyCAD for their municipalities.