



ENGEN

Refinery

Skills briefing

Parliamentary Portfolio Committee

20 Feb 2007



Agenda

- Objectives of this briefing
- Background
 - Early expansion Projects
 - Engen Clean Fuels 1 Project
- Future Fuels Projects
- Retention of skilled resources
- Nation skills needs assessment Fluor research
- SNF Oil Gas & Chemical Manufacturers Skills Programme
- Ideas on possible solutions
- Q&A



Objectives

- Provide a specific industry perspective on the skills dilemma
- Share how we see a possible path forward
- Share some of the successes that our industry has made with collaboration on skills training and networking together on shutdown/project scheduling
- Our thoughts on how these ideas may be extended across other industries
- Foster further participation with Government on these issues



Background



Original Refinery - 1955



Engen Refinery today



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Refinery Capex History

- Engen has accumulated a wealth of experience in implementing petroleum-related capital expansion projects
- Between 1981 (Alkylation unit installed) and 2005 (recent Clean Fuels Phase 1) the Refinery **has completed seven other major upgrades which have involved substantial investment (> R 3000 mill) and the harnessing of skills and expertise**
- With this background, Engen and it's Engineering Partner have thorough firsthand knowledge of the time and resources needed to successfully complete expansion programmes



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Clean Fuels Phase 1

- Clean Fuels Phase 1 was part of the national initiative to remove lead from petrol and sulphur from diesel
- Engen spent **R280 million** at the Refinery on projects to build the new plant and modifications to existing plant during 2003 - 2005
- These projects enable it to produce products compliant with the new specifications by the beginning of 2006
- A number of lessons were learnt during Phase 1...



Lessons from phase 1

- Engineering and Construction resources are limited due to world economic growth
- We need to make a better game-plan to ensure maximum spending in South Africa
- Strong Engineering milestone review process needed as Engineering resources available to us are relatively inexperienced
- Several of our good construction resources have already left the country in the past several months for “better career prospects”
- Projects can not be built where exact product specification roadmaps are not firm



Lessons from phase 1: What we have changed

- Engineering partner (Fluor-Igoda) has moved several highly skilled young ex project-turbo resources to our site
- Much more rigorous Engineering Milestone process implemented
- Ongoing market surveys to gauge market value of Construction and Engineering resources
- Allow sufficient time to create sustainable capacity and employment through maximising local design manufacture/fabrication and construction opportunities



Future Fuels Projects



Future Fuels Projects

- **Cleaner Fuels Phase 2 (CF2)**
- **Bio Fuels Project (BF)**



Cleaner Fuels Phase 2

- The objective of the Cleaner Fuel programme is to produce fuel that enables motor vehicles to substantially reduce exhaust and other fuel emissions
- The need to make CF1 fuel changes including the removal of lead were clearly apparent
- CF2 is more complex and changes should be driven on a scientific rational approach
- This is to ensure that the changes have a net positive impact on the environment taking all local factors into account
- Engen support reduced emissions = a cleaner healthier environment



CF2 scope

The proposal to introduce changes based on the Euro IV specifications, subject to the rational scientific approach and if justified the following units may have to be built at the Refinery:

- Hydrocracker Unit (MHC)
- Hydrogen Plant
- Benzene reduction Unit
- Sulphur Recovery Unit
- Off site tankage, piping and utilities to support the above units

Together these projects will represent the most challenging programme ever undertaken by the Refinery



CF2 Costs

The estimated costs of some of the key CF2 projects are as follows:

- | | |
|----------------------------------|-----------|
| • Hydrocracker Unit (MHC) | R1800m |
| • Hydrogen Plant | R0 - 400m |
| • Benzene reduction Unit | R60m |
| • Sulphur Recovery Unit | R350m |
| • OBL to support the above units | R500m |



In perspective

- CF1 cost the Refinery

R280-million

- CF2 will cost 10 TIMES AS MUCH

R2.7 – R3.1 BILLION



Phase 2 Concerns

- A minimum of 4 to 5 years is usually needed between declaring final project specifications and completing developments of this size and scope, it is appreciated that the original 2010 expectation has been shifted to 2014 through discussions with the current DME Minister.
- Major equipment for CF2 such as thick-walled vessels and high pressure compressors currently have lead times extended to 3-years
- Timelines may coincide with the large (and growing) number of local and international capital projects as well as the combined push by all refineries to implement Clean Fuels phase 2 projects.



Phase 2 Concerns

- The bottom line is all these capital projects draw on a limited pool of skills and construction/fabrication capacity
- A refinery cannot compromise on skills – skilled work implemented by semi-skilled individuals cannot be relied on. It puts peoples lives at serious risk and could result in substantial environment damage (if things go wrong)
- This begs the question: WHERE WILL THE ENGINEERING/CONSTRUCTION RESOURCES COME FROM?



Bio-fuels

- A fast-track programme aimed at using renewable raw materials to produce petrol and diesel components to supplement fossil fuel resources
- The programme is anticipated to superimpose itself on the already busy CF2 project plan
- Depending on the specifications decided on the implications for the Refinery may be significant involving widespread project input



Bio-fuels benefits

- Clean sulphur-free product
- Import substitution
- Security of supply increased to 40%
- BEE opportunities
- Stimulates job creation



Bio-fuels Challenges

- Agreeing a strategy in time for integration and implementation in the same development envelope as CF2
- Setting parameters that will ensure sufficient consistent quality and quantity of bio product for blending
- Realistic fuel-price structure that will ensure viability for all concerned
- Coping with additional demands on the country's already stretched construction and engineering skills resources during development phases



Retention of skilled resources



Retention of skilled resources

- Replaced 15 experienced Engineering Personnel since 2003 out of a total of 45 – 10 replacements were bursars
- Salaries of *experienced* Engineers and Construction resources have increased by 50% to 100% in the last 3 years
- Training 25 Process Technicians - vacant positions
- 123 new Process Technicians trained since 2000. (Total Refinery complement: 121)
- Average operator experience less than 5 years. It requires 5-8 years to fully qualify.
- Artisan trained since 2003: 42 out of 120.
- About 20 Maintenance trainees
- Last medium sized Turnaround saw us using 600 “first timers” out of 800 total.

Figures quoted includes some retirees



The skills loss areas

- All construction crafts including Engineers, Planners, Surveyors and Inspectors
- Rotating equipment skills
- Engineers : Chemical, Mechanical, Electrical, Control systems
- Operations staff
- Maintenance staff

In short: All crafts required to design, construct and run new plants



The skills loss drivers

- The global village and perceptions of crime, EE and other gossip
 - Middle East
 - Australia
 - Technology suppliers
 - Angola
- Parastatal needs and ambitions. Past lack of investment in people.
- Private sector lack of investment in people
 - Engineers
 - Artisans
 - Operating staff



Outline of Engen's challenges

- Cleaner Fuels Phase 2
 - CF2 projects are 10 times larger than CF 1 projects
 - CF2 competing against R370 billion worth of other SA projects
 - Pressure on all skills, especially: project managers; contract administrators; project engineers; field supervisors; welder; fitters; instrument technicians
 - CF2 introduces leading-edge refining hydrocracker (very high pressure) technology. This requires highly skilled resources
- Bio Fuels Project
 - BF competing against CF2
 - Further pressure on all skills,
 - BF also introduces high tech machinery including gas turbo power generation. This again requires highly skilled resources



Outline of Engen's challenges

- Retention of existing skills
 - National and international investment driven by sustained high oil price has created industry churn (i.e. job-hopping by people lured elsewhere, particularly overseas) attracted by high salaries. Result: **A NET LOSS OF SKILLS!**
 - RSA investment driven by infrastructural reinvestment projects and 2010 is already exacerbating our skills retention problems



Outline of Engen's challenges

- Engineering skills are already under pressure with shortages of:
 - Experienced process engineers
 - Maintenance engineers
 - Operators
 - Instrumentation specialists
 - Construction resources
- Managing the impact of competing SA projects on the refinery capital programme.



Labour Demand Study

Capital Projects 2006/2012



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EXCLUSIVE

Manufacturing skills base set to benefit from R5bn initiative Page 9

FEATURES

Coega IDZ Page 26 Berg Water project Page 40 Durban Port Page 46 Sishen-Saldanha rail Page 52

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Innovative sluice design wins recognition Page 11

Creamer Media's

REAL ECONOMY NEWS WEEKLY

ENGINEERING NEWS

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www.engineeringnews.co.za

ARTISAN ALERT

South Africa faces critical shortage of fitters, turners, welders, boilermakers, sheetmetal workers, toolmakers and much more

▶ 16

Picture by AFP photographer Damien Dore



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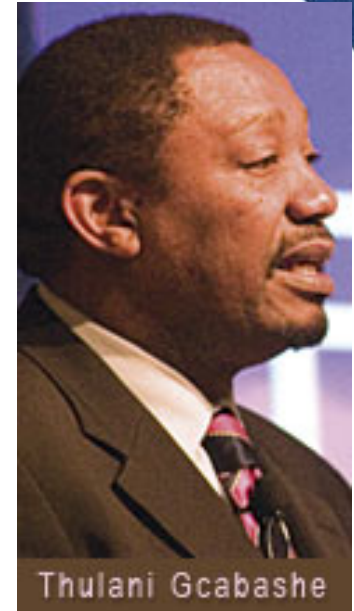
ALSO PUBLISHER OF **MINING WEEKLY** and **POLITY**



Eskom Projects



- ◆ State-owned electricity utility Eskom has approved a scaled-up capital investment programme of R97-billion for the next five years, and has incorporated plans that will more than double its generation capacity over the next 20 years.
- ◆ In the current financial year, the group planned to spend R16-billion, which would embrace, among others, initial work on three recently approved megaprojects, involving expenditure of R41-billion. These projects included a R26-billion coal-fired station, a R9-billion pumped-storage project and R6-billion on transmission-line projects.
- ◆ Delivering the group's annual results in Johannesburg on Thursday, CEO Thulani Gcabashe said that 67%, or R65-billion, of its budget would be spent on increasing the country's generation capacity, 15% on strengthening the transmission network, 16% on distribution, and the balance would be made up by corporate and new business spending, particularly on hydro projects in Mozambique and the Democratic Republic of Congo.





Quote:

“There are insufficient skills in South Africa to fully service only Sasol’s future projects. The recently completed ‘Turbo’ project imported 500 TCN’s”.

Labour Demand Survey on Capital Projects 2006 – 2010/2012



The objective of the study conducted by Fluor SA is to:

- ◆ Assess the likely future level of activity in certain parts of the Southern African construction industry,
- ◆ Assess if the South African industry has the required skilled labour force to undertake those projects that are planned, and
- ◆ Review the training requirements within the industry such that available labour capacity is suitable for future planned projects.
- ◆ Assess other constraints, evaluate solutions

Concerns



Convergence of

- ◆ 2010 FIFA World Cup deadlines (Gautrain, soccer stadia, airports upgrading,...)
- ◆ ESKOM scaled-up investment programme > R 97 Billion
- ◆ Strong Global Demand for Southern Africa Minerals: Botswana DRC, Zambia, Madagascar, Mozambique....
- ◆ Clean Fuels Programme Phase II in SA Petrochem Industry

Other Concerns



Mega Projects

- ◆ Gautrain
- ◆ Coega (Infrastructure, Power Station, Aluminium Smelter,...)
- ◆ New Multi-Product Pipeline
- ◆ Moatize Coal Mine in Mozambique
- ◆ Mmamabula (Botswana) and Matimba II Power Stations
- ◆ Pebble Bed Nuclear Reactor
- ◆ New conventional Nuclear Projects >R200 bn
- ◆ Project Mafutha
- ◆ Transnet Infrastructure Projects

Other Concerns (Cont.)



Resources

- ◆ Average age of artisans in South Africa is 54
- ◆ Skilled people emigrating
- ◆ Skilled South Africans taking on jobs outside Africa
- ◆ Current number of artisans being trained is significantly lower than historically
- ◆ Decreasing Standards, 30% Rework recorded at Sasol.
- ◆ An estimated 50,000 to 60,000 artisans to be developed within next 5 years
- ◆ Thousands of jobless graduates
- ◆ Not enough engineering graduates/diplomates
- ◆ Impact of HIV/Aids pandemic on human resources

Other Concerns (Cont.)



Health – Impact of HIV/Aids

- ◆ Fluor estimate is based on the statistics reported in the South Africa Survey 2004/2005 published by the South African Institute of Race Relations.
- ◆ One of the key statements in the Survey is the following, quote: *‘While the estimates put the prevalence rate among the general population at about 11%, the prevalence in the population between the ages of 15 and 49 is estimated to be 18,8% in 2005.’*
- ◆ *‘The skilled workforce infection rate is estimated at 19 to 25% for the skilled workers and at 27 to 32% for the unskilled workers. (from several sources).*
- ◆ Also provided in the Survey, the AIDS related deaths recorded in the past and forecast for 2006-2010.

Basis



Future Projects

- ◆ Fluor has reviewed what future projects are planned within Southern Africa and categorized into suitable classes.
- ◆ Has researched and determined what projects are potentially planned during 2006 – 2012 and categorised them based on applicable timing as follows:

The following categories are listed:

- ◆ Infrastructure
- ◆ Mining = Minerals Processing Plants
- ◆ Power Stations & Transmission Lines
- ◆ Plants = Petrochemical / Chemical / Paper / Sugar & Pipelines/Refining

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Planned Percentage of Spend per Category

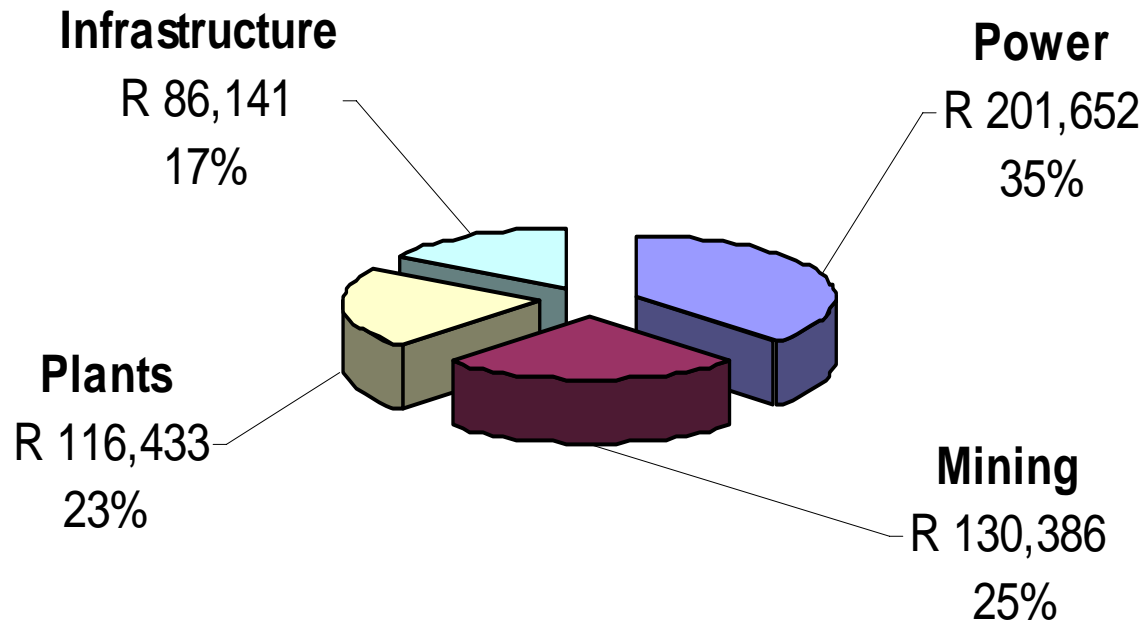


Breakdown by Industry

- Major Projects

All Values in ZAR Million

- Total Investment Cost (TIC)



Process



- ◆ The TIC used for the projects includes the cost for the following phases – Study, Engineering & Procurement, Construction Labour and all equipment, materials and subcontracting activities.
- ◆ **140** Projects with a Total TIC value of over **ZAR 530 billion** have been identified
- ◆ Using past project experience and estimating methods within the Fluor system, the actual labour force requirements can be predicted.
- ◆ Based on the project start and finish dates, a realistic manpower loading within the industries investigated can be prepared for the future.

Methodology



The start of construction, the peak (maximum labour required) and end of construction dates are specified. With this information, manpower a loading can be generated.

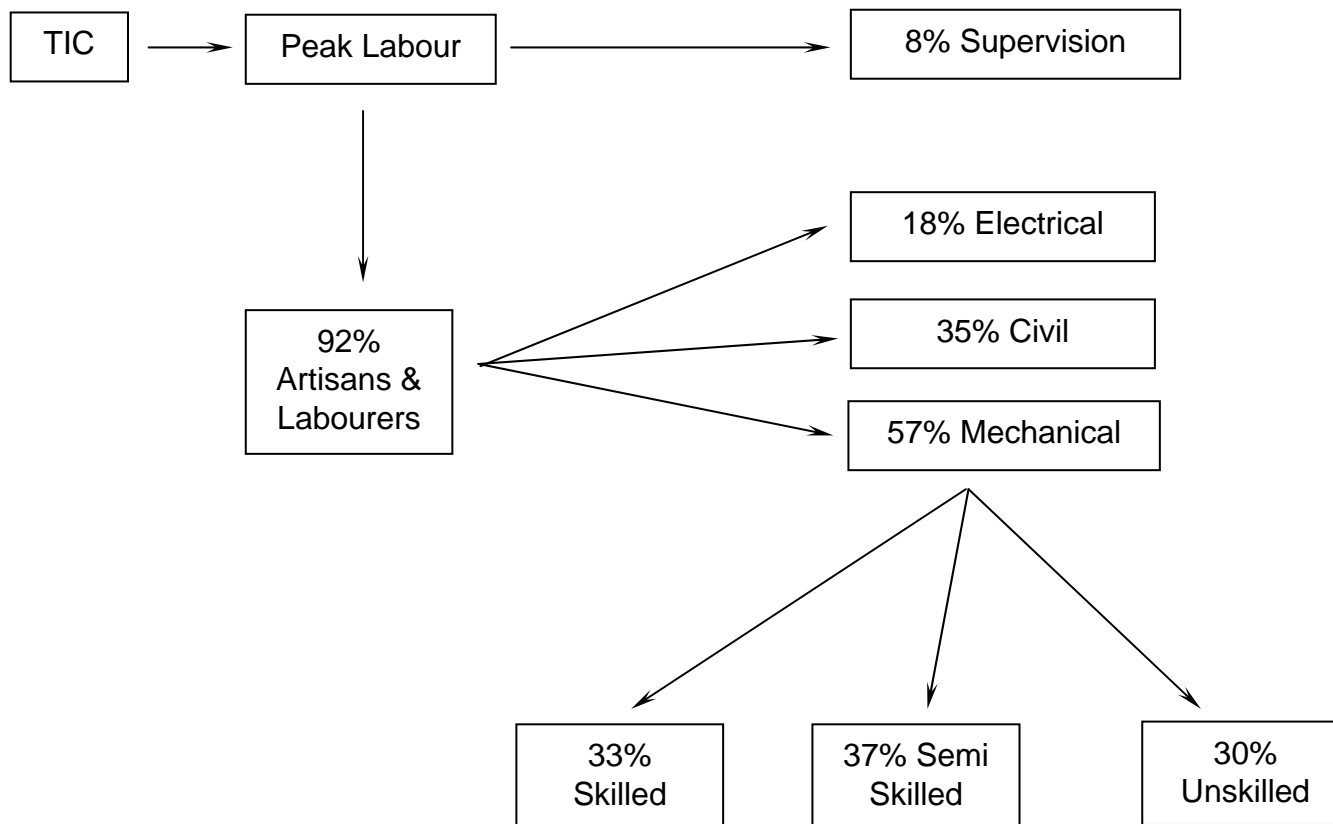
This was completed, analysed and tabulated for the following categories:

- ◆ Total manpower requirement
- ◆ Civil manpower
- ◆ Mechanical and Piping artisans
- ◆ Skilled Mechanical and Piping Artisans
- ◆ Semi Skilled Mechanical and Piping Artisans
- ◆ Unskilled Mechanical and Piping Artisans
- ◆ Electrical and Instrumentation Artisans
- ◆ Construction Supervision
- ◆ Home Office Personnel



Ratios of Manpower Breakdown

◆ The following figure summarises:





Ratios for Site Mobilisation and Demobilisation

The various disciplines are site mobilized at different stages of construction. The following has been used as a basis for all projects, unless information is specifically known:

Mobilization dates:

- Civil : mobilized at start of construction date
- Mechanical : mobilized at 25% of construction period
- Electrical : mobilized at 60% of construction period

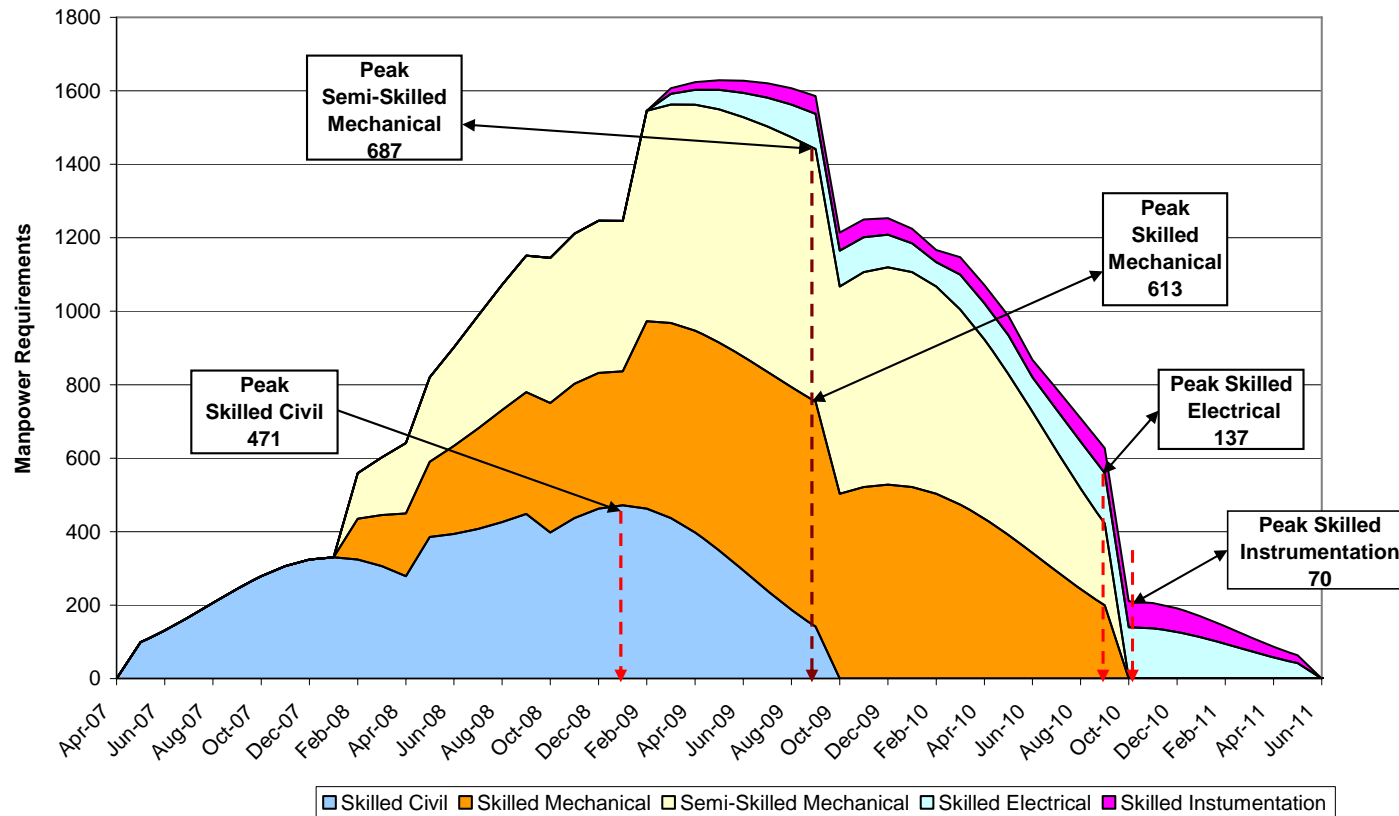
Demobilization dates:

- Civil : demobilized at 45% of construction period
- Mechanical : demobilized at 80% of construction period
- Electrical : demobilized at end of construction date



Typical Curve for a single project

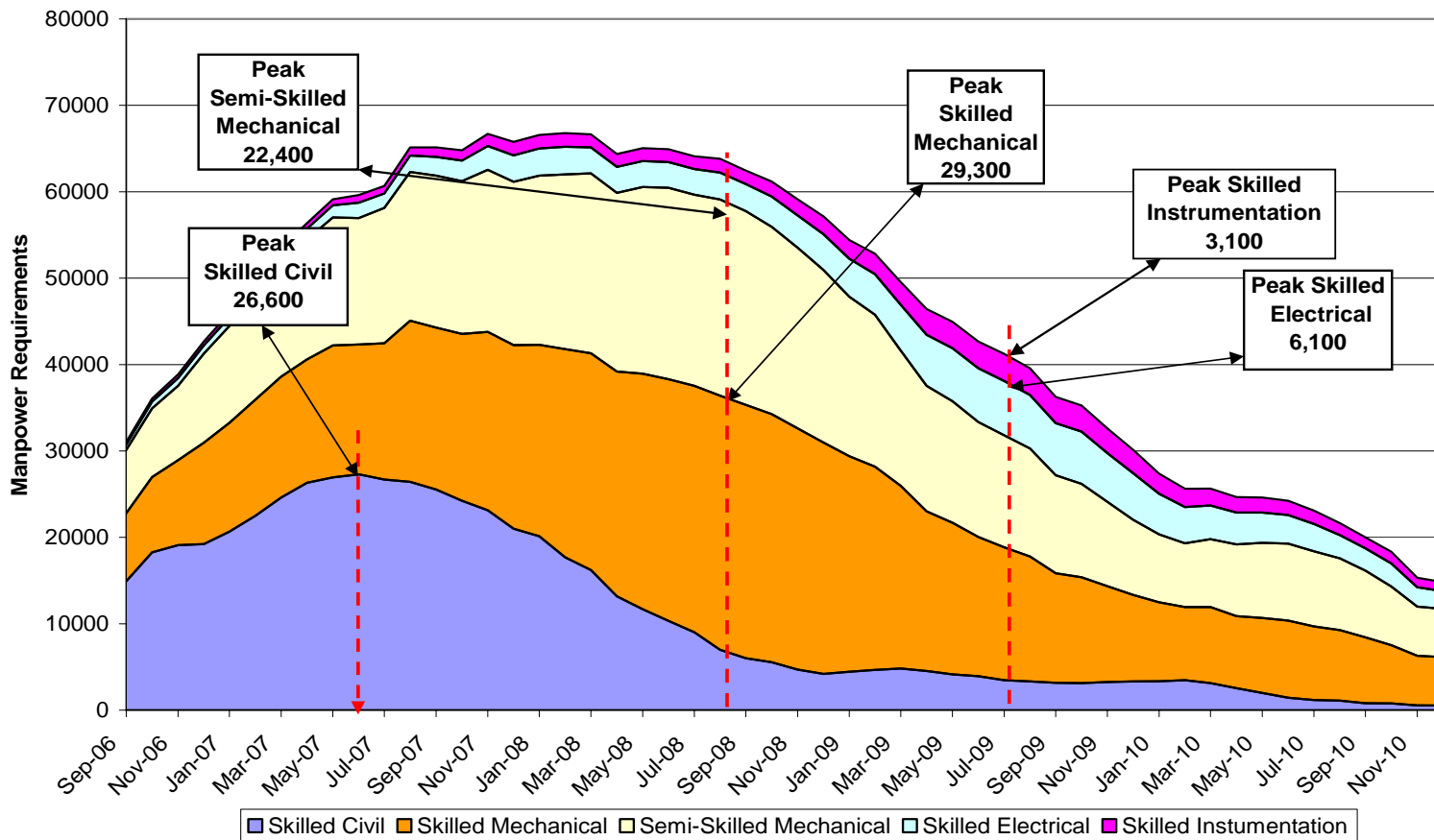
Graph A: Skilled and Semi-Skilled Labour Requirements



Skilled & Semi-Skilled Labour Requirements



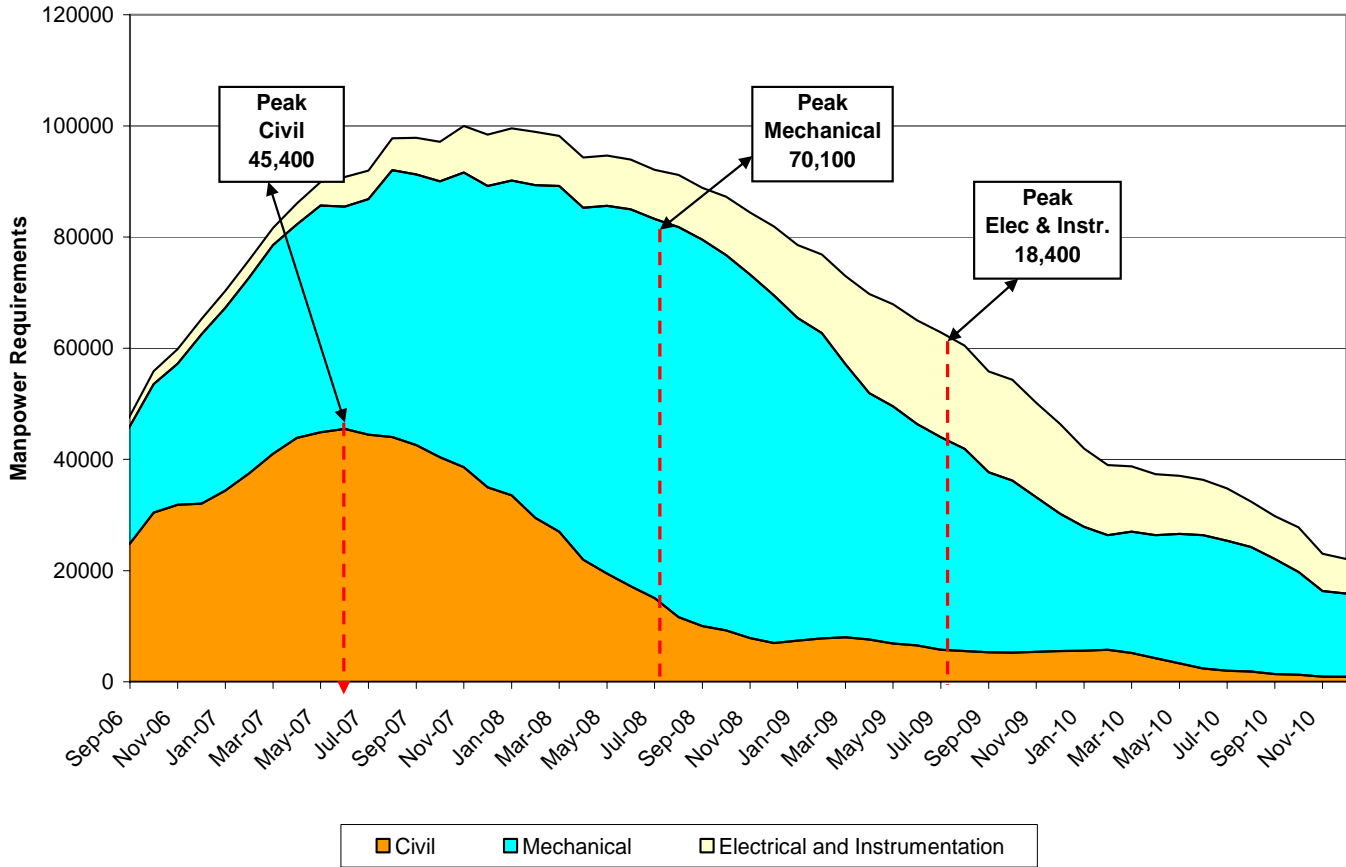
Graph 14: Skilled and Semi-Skilled Labour Requirements (Sep 2006 Study)





Total Labour Requirements by Discipline

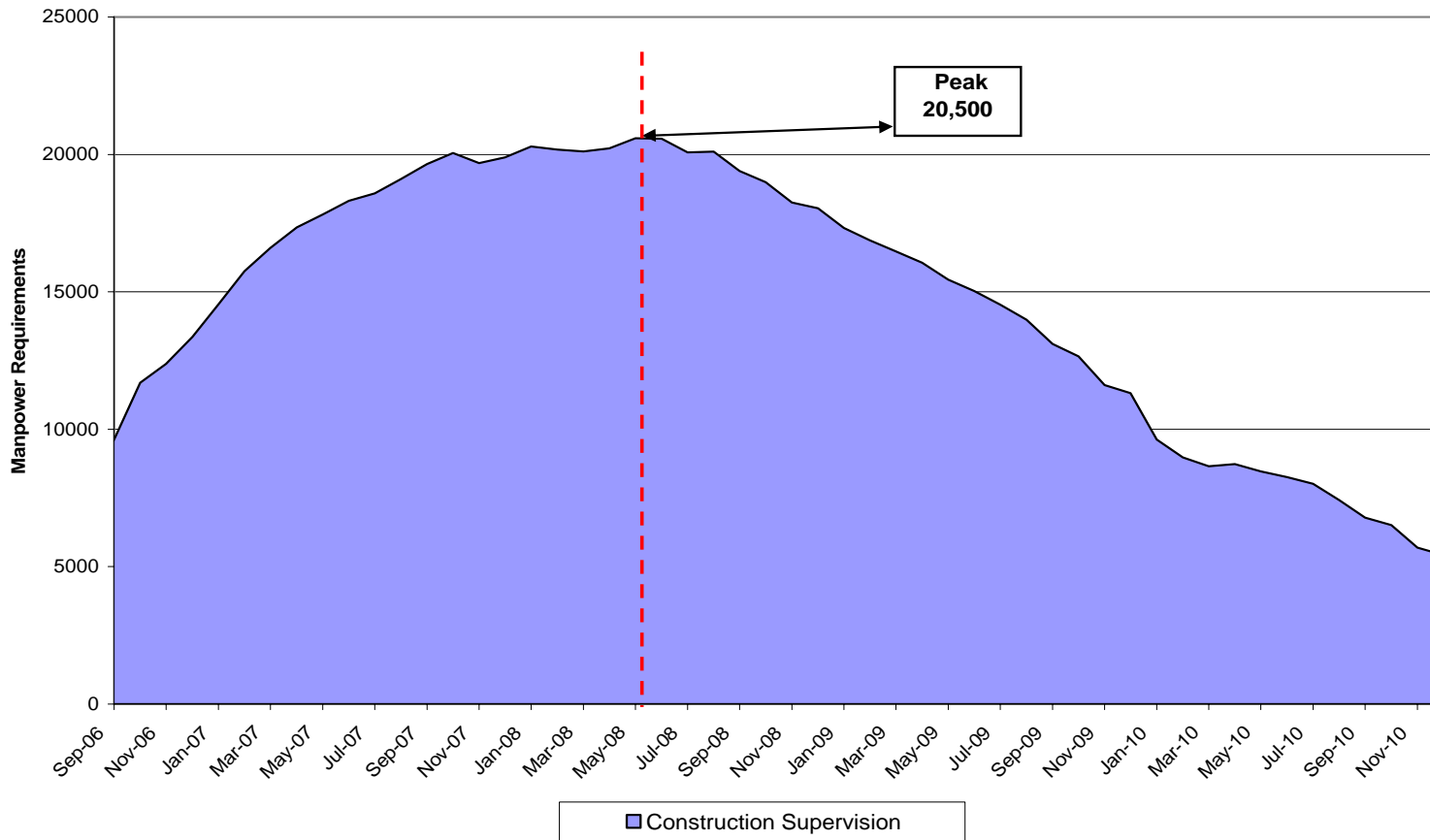
Graph 13: Labour Requirements per Discipline (Sep 2006 Study)
Skilled and Unskilled





Construction Supervision Requirements

Graph 15: Labour Requirements for Construction Supervision (Sep 2006 Study)



Capex by Location

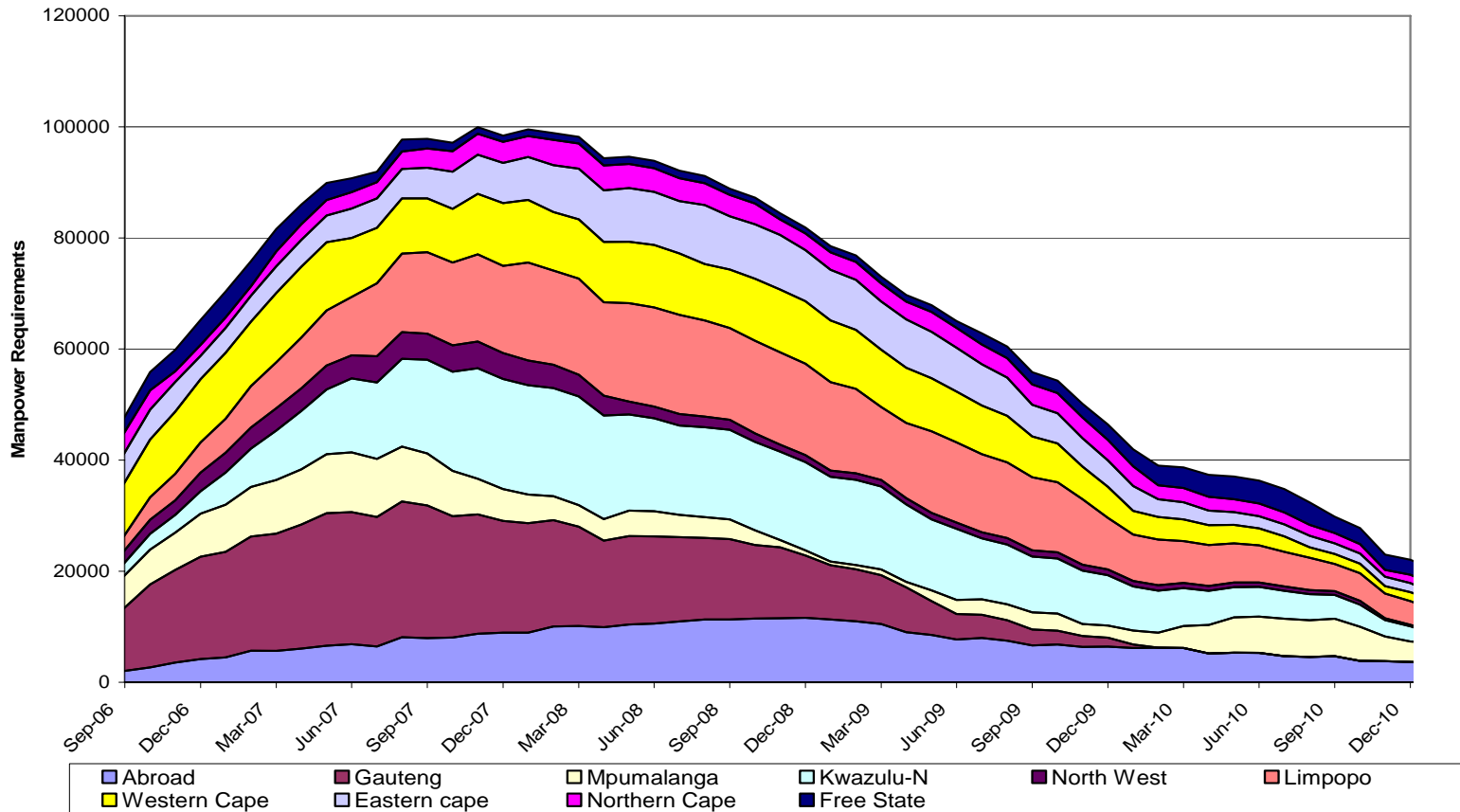


		Capex SA	Capex
Location	Capex	South Africa	Southern Africa
	ZAR m	% of Total	% of Total
South Africa			
Gauteng	43,150	13.2	8.1
Mpumalanga	34,595	10.5	6.5
Kwazulu-Natal	59,858	18.3	11.2
Western Cape	57,122	17.3	10.7
Free State	16,290	4.9	3.0
Eastern Cape	59,400	18.1	11.1
Northern Cape	12,345	3.3	2.3
North West	3,528	1.1	0.7
Limpopo	43,049	13.3	8.0
Sub-Total South Africa	329,337	100	
Other Countries in Southern Africa	205,275		38.4
Total Southern Africa	534,612		100



Labour Requirements By Location

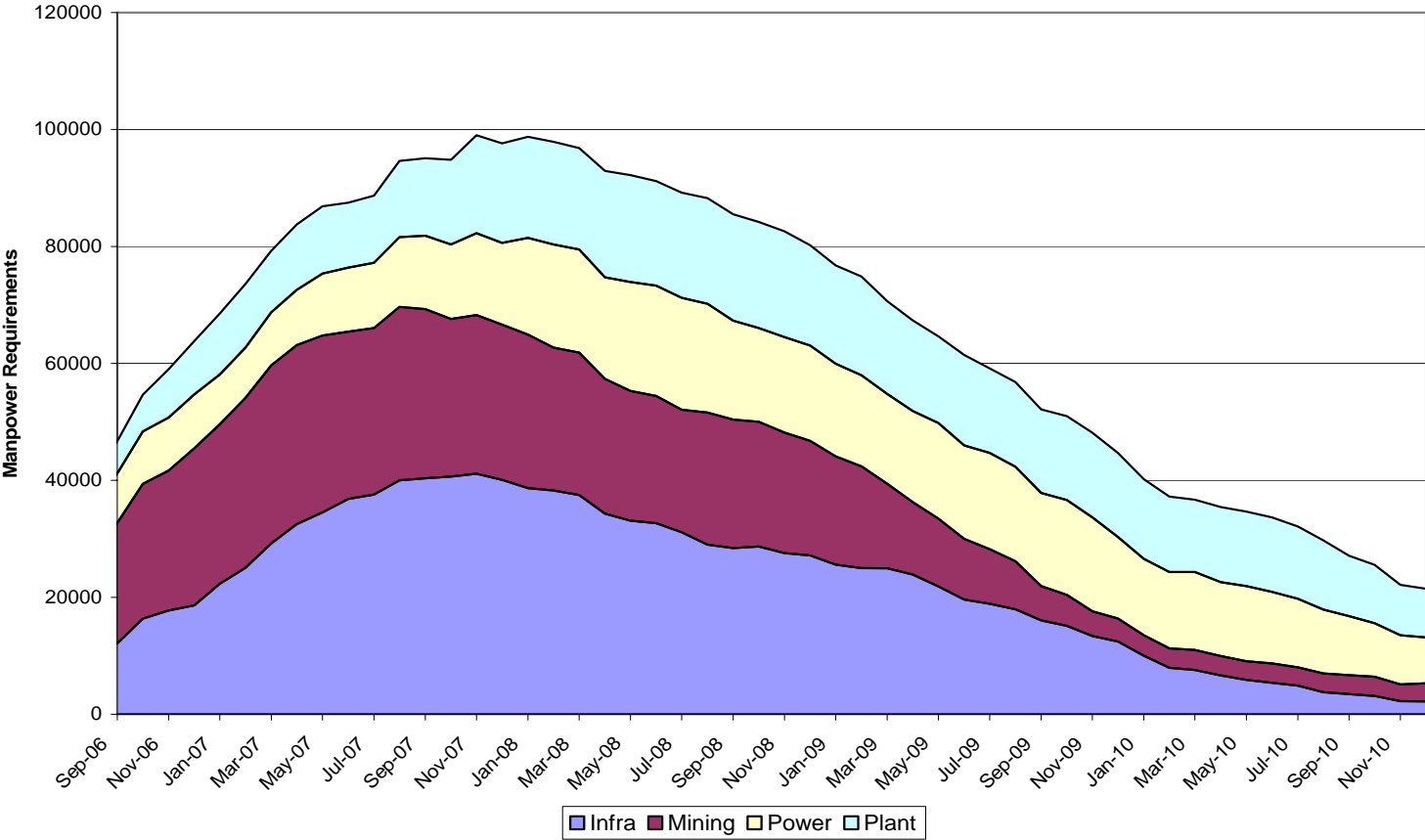
Graph 11: Labour Requirements per Location (Sep 2006 Study)
Abroad = Southern Africa excluding South Africa





Labour Requirements By Industry

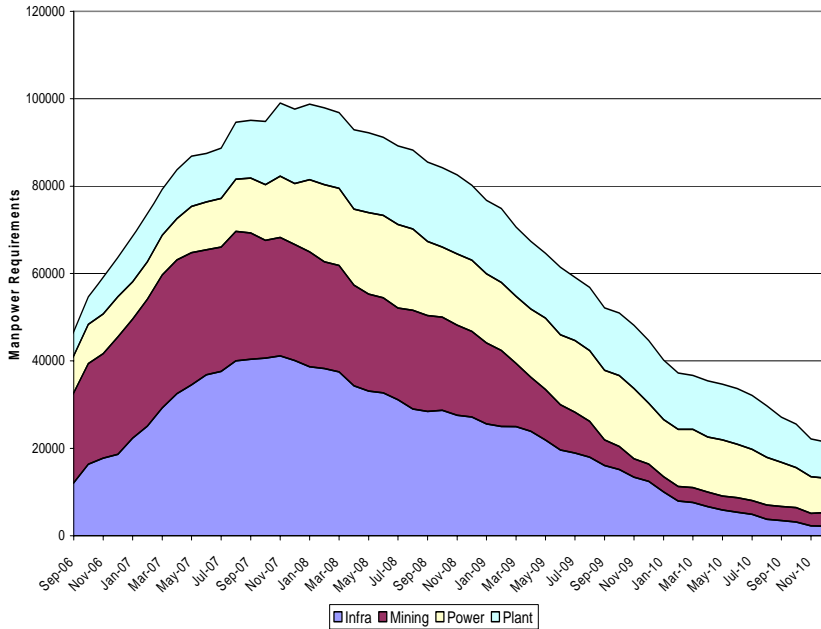
Graph 12: Labour Requirements per Industry (Sep 2006 Study)
Total = Skilled and Unskilled





Additional Constraint - Shutdowns

Graph 12: Labour Requirements per Industry (Sep 2006 Study)
Total = Skilled and Unskilled

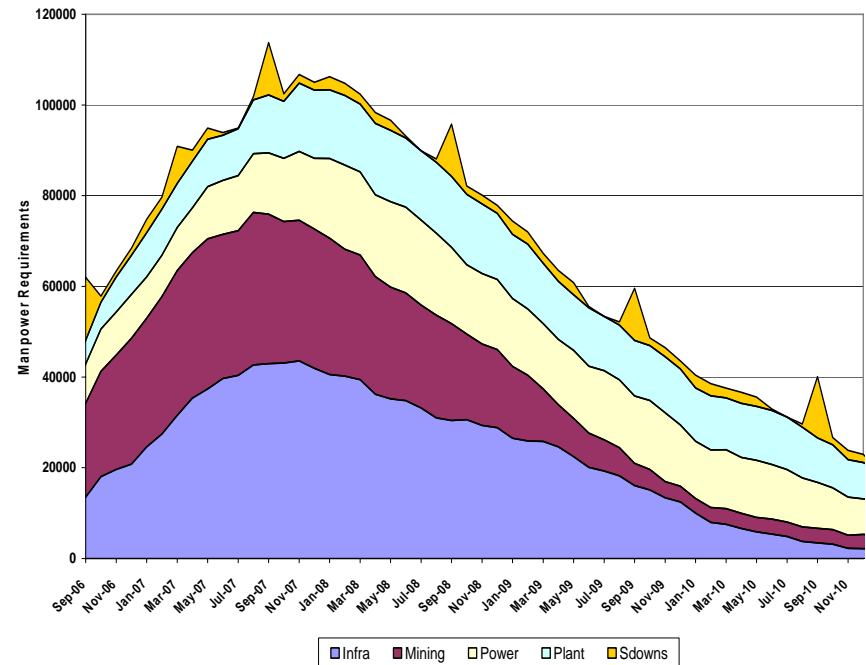


↑
Excluding Shutdowns

Including
Eskom and
Petrochem/Refining
Shutdowns



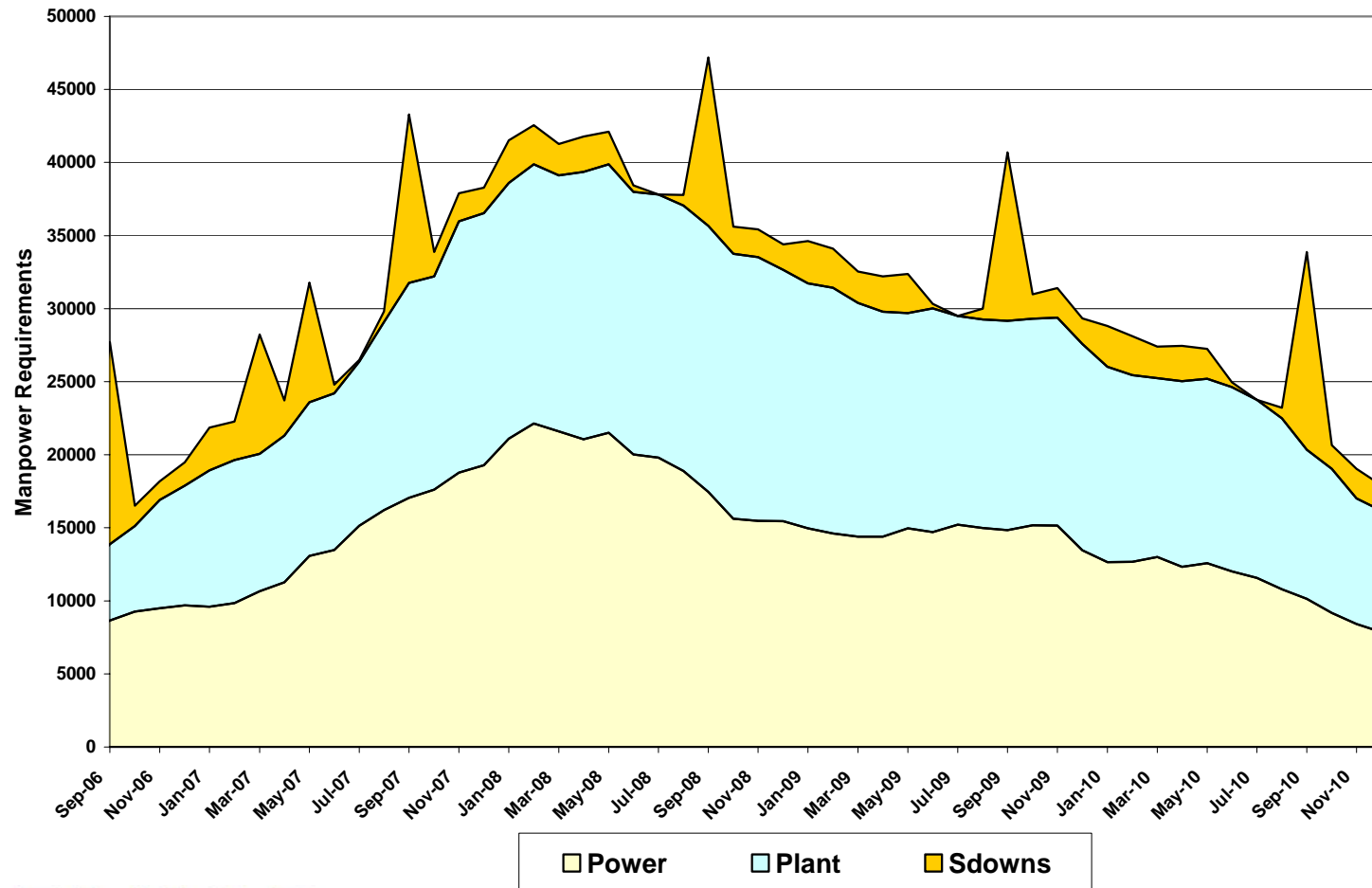
Graph 102: Labour Requirements per Industry (Sep 2006 Study)
Total = Skilled and Unskilled





Shutdowns (Power and Petrochem/Refining Sectors Only)

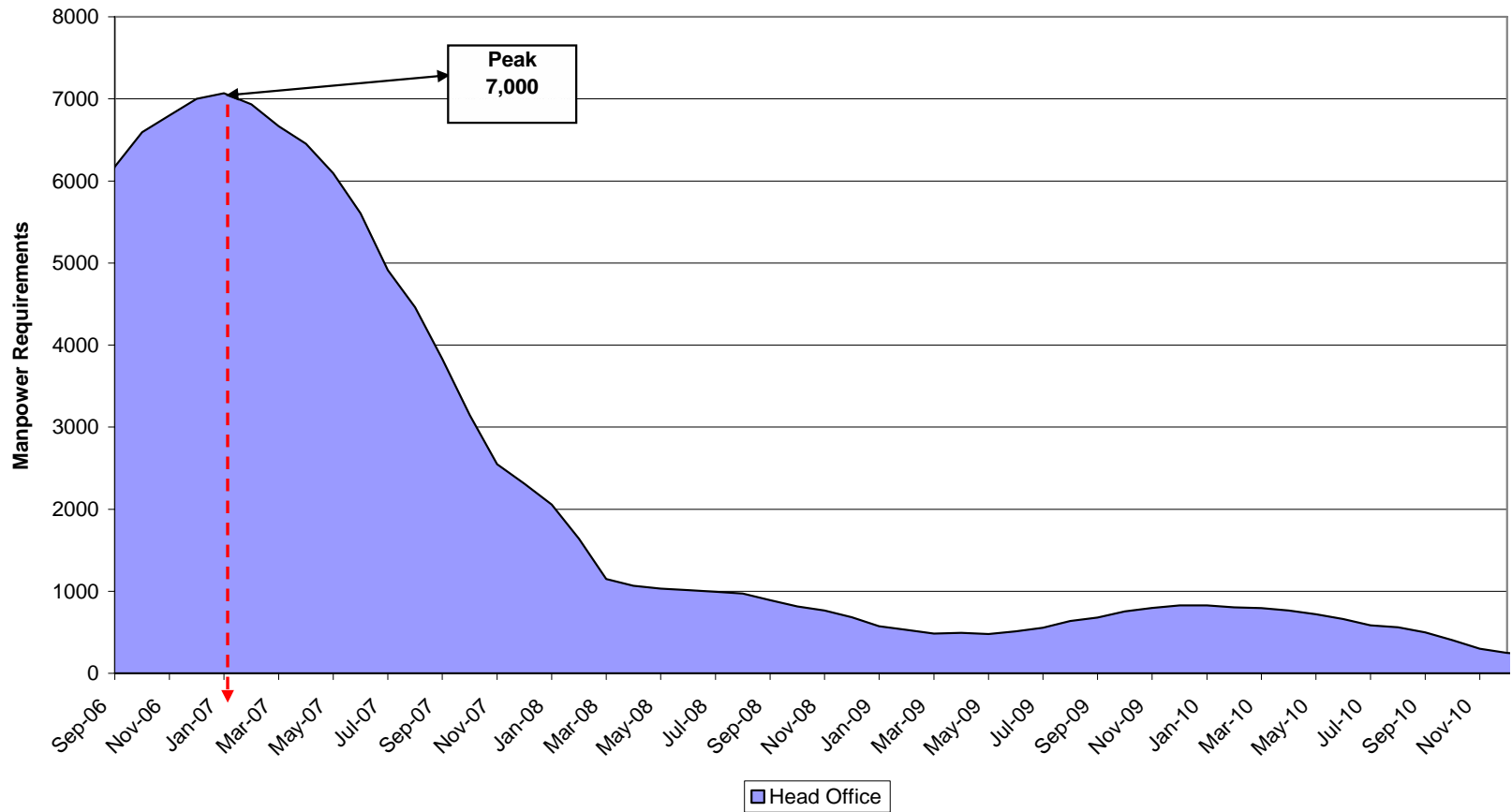
Graph 202: Labour Requirements per Industry (Sep 2006 Study)
Total = Skilled and Unskilled



Engineering and Procurement Personnel Requirements (Home Offices)



Graph 16: Labour Requirements for Home Offices (Sep 2006 Study)



Comparison between March 2003 and September 2006 Studies



	Mar 2003 Study	Mar 2003 Study	Sep 2006 Study	Sep 2006 Study
Discipline	Max Number at Peak	Peak Time	Max Number at Peak	Peak Time
Skilled Civil	16,600	Mar-04	26,600	Jun-07
Skilled Mech & Piping	15,600	Aug-04	29,300	Aug-08
Semi-Skilled Mech & Piping	15,400	Aug-04	22,400	Aug-08
Skilled Electrical	3,100	Mar-05	6,100	Jul-09
Skilled Instruments	1,580	Mar-05	3,100	Jul-09



Training Programmes

- ◆ It is recommended that extensive training programmes are implemented without further delay, in order to increase significantly the number of artisans of all disciplines available during the peak construction period in 2007-2009 and later on
- ◆ *Assuming* that all artisans employed in the period 2002-2006 will still be available, the additional numbers of artisans to be trained can be estimated as follows on the basis of the findings of the present study:

Training Requirements By Discipline



Additional Skilled Artisans to meet the Peak 2007-2009 Requirements

		* Corrected for HIVAIDS
Skilled Civil	10,000	10,211
Skilled Mechanical	13,700	13,990
Skilled Electrical	3,000	3,063
Skilled Instruments	1,520	1,552

Innovative Alternatives



- ◆ Canada has successfully developed a scheme where people with non-technical tertiary education were successfully re-oriented towards the technical field including E&I
- ◆ There is a large number of jobless graduates in South Africa that may be re-directed to technical disciplines

Third Country Nationals (TCNs)



- Large numbers of TCNs will have to be imported to compensate for the shortage, as this was already the case for the Sasol Turbo project.
- It must however be kept in mind that even the pool of TCNs is not unlimited and that other countries in the world (in the Middle-East in particular) are also embarking on huge construction projects.
- It is not believed that this is a long term solution for South Africa

Rescheduling of Projects

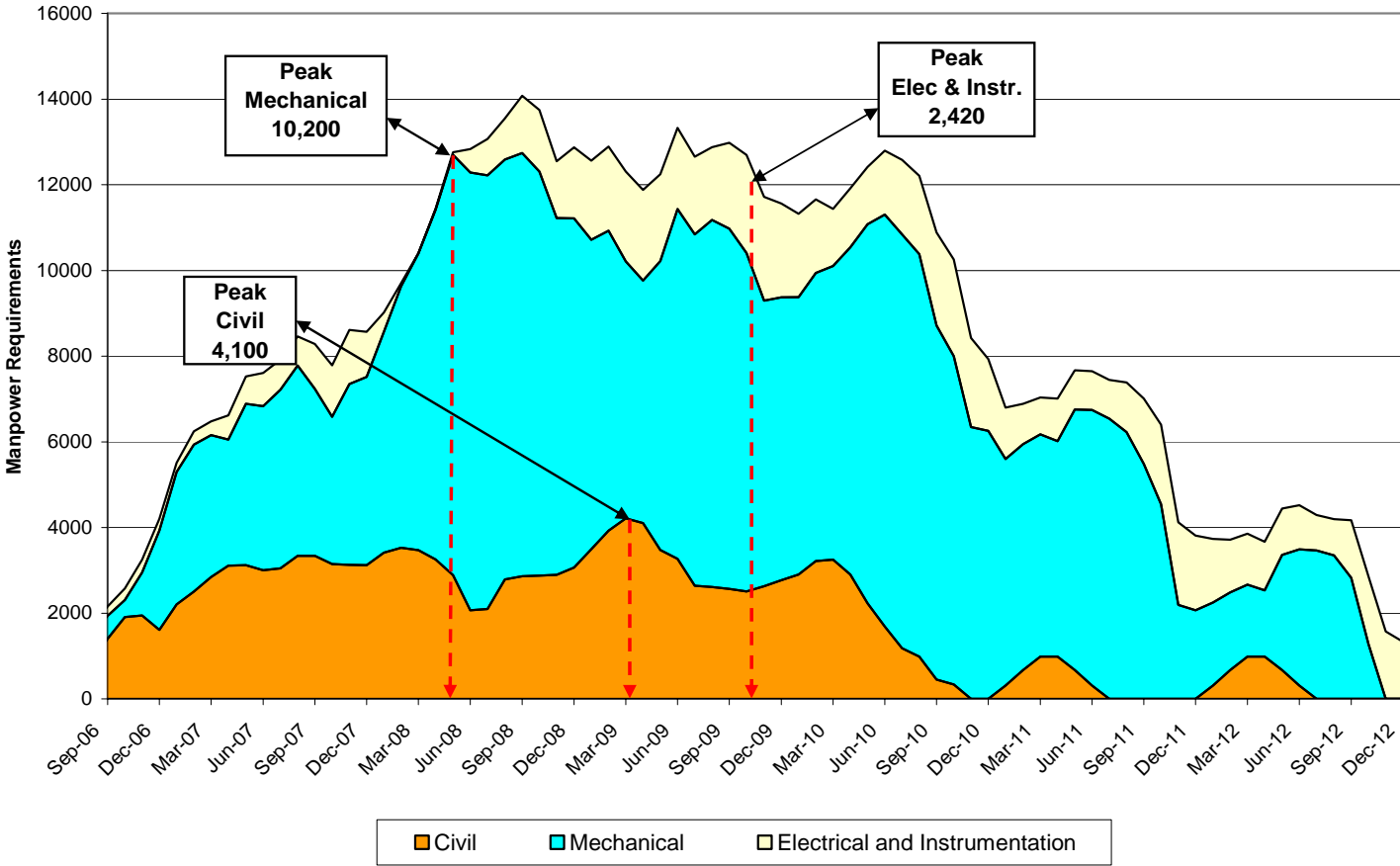


- ◆ All South African petrochemical refineries are expected to implement their Clean Fuels Programme Phase II between 2007 and 2010.
- ◆ Delaying Phase II by 1 to 2 years will provide a breather by displacing the peak manpower requirements for the Petrochemical/Chemical/Pipeline Industry from 2008/2010 to 2010/2012.
- ◆ This is depicted in the Graphs 43 and 63 and the Table available hereafter



Clean Fuels Phase II Original Schedule

Graph 43: Labour Requirements per Discipline (Sep 2006 Study)
Skilled and Unskilled (Petrochem & Chemical Plants & Pipelines Only)





Thank you

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Shutdown Network Forum. Employment and Skills Development Lead Employer. (SNF ESDLE)

Artisan Training Project.

Presentation to the
Parliamentary Portfolio Committee
20th February 2007.

Presented by:



BACKGROUND

- The Shutdown Network Forum
 - Originally between SA petroleum companies
 - Later expanded to include Paper and Pulp, Steel and Energy



What is the SNF about?

Vision

To create value by enabling effective large shutdown execution through the sharing of:

- Real time information
- Best practices
- Resource development

Mission

To create an environment where member companies obtain information to drive excellence in maintenance and construction to mutual benefit by:

- Providing integrated shutdown planning
- Managing resource quality and availability
- Influencing and communicating pertinent legislation
- Facilitating forums for sharing experiences and best practices
- Creating environments for skills development projects

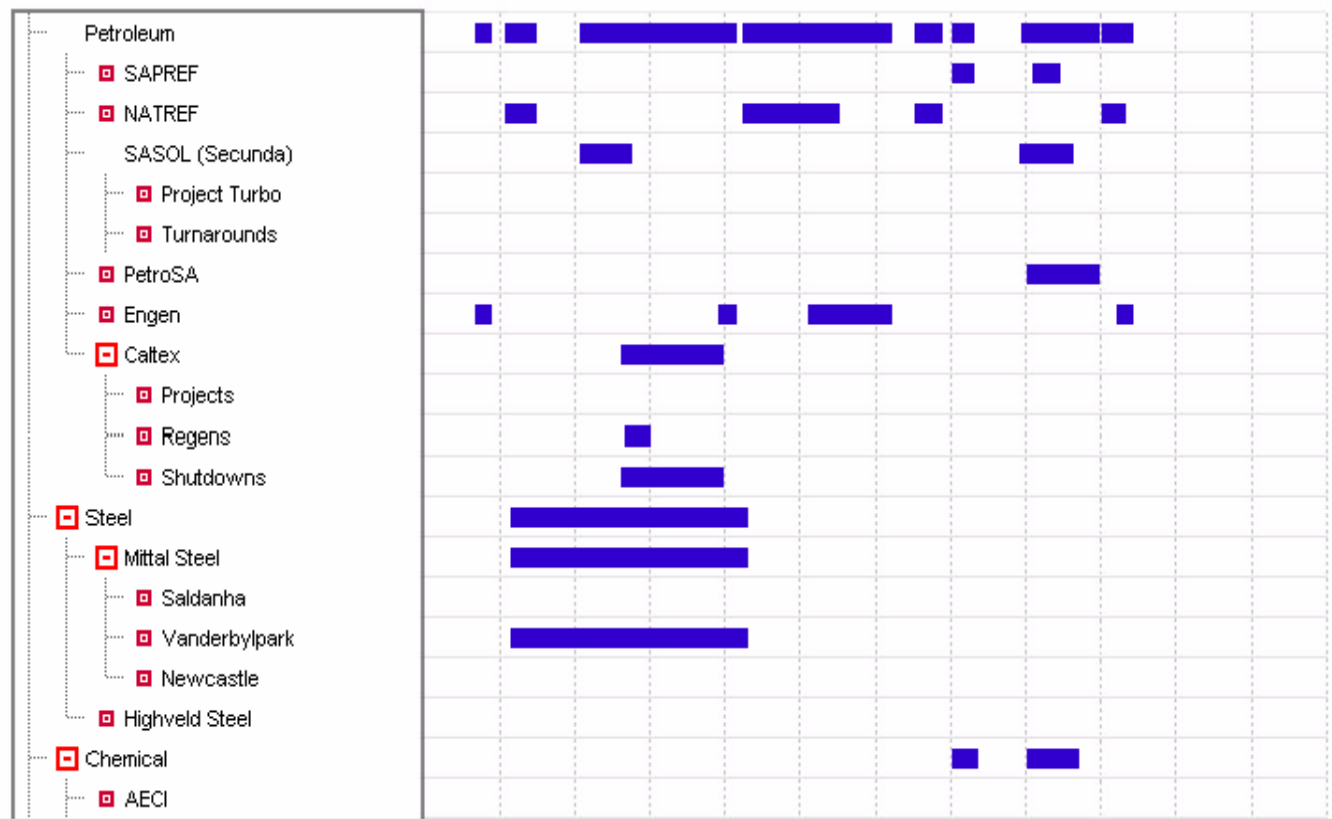


Shutdown Rollout

2007

Plants

Jan Feb Mar Apr May Jun Jul Aug Sep Oct Nov Dec



BACKGROUND

- Widening of Scope
 - Early 2000s, skills shortage evident: quality and quantity
 - Decision to look at training collaboration to meet construction and shutdown needs.
- Quantifying the shortage
 - National Advisory Council for Innovation (NACI 2003)
 - 6000 skilled people short by 2010
 - Focus on:
 1. Electricians
 2. Instrument mechanics
 3. Welders
 4. Boilermakers
 5. Fitters
 6. Riggers



BACKGROUND

- SNF ESDLE established in May 2004
 - Phase 1: R25 million discretionary grant from the CHIETA for 1 000 learnerships at NQF Level 2
 - All six trades catered for.
- 18 training centres across the country
 - Industry related
 - Private
 - FET Colleges



CURRENT STATUS (January 2007)

- Original Intake 1037
- 664 Certificated at Level 2 (64%)
 - Boilermakers 66
 - Electricians 72
 - Fitters 256
 - Instrument Mechanics 22
 - Riggers 29
 - Welders 219
 - TOTAL 664

LESSONS LEARNT

June 2005 Workshop Priorities:

1. Optimise the process
2. Market host employer concept
3. Align objectives
4. Understand the total cost of training
5. Define learnership configuration
6. Quantify learnership costs
7. Align funding
8. Promote SNF Artisan Training activities



CURRENT REALITY

- A set-to-boom economy:
 - KZN/Gauteng corridor
 - ASGISA
 - JIPSA
 - 6% Growth
 - SA Mega Projects



CURRENT REALITY

- JIPSA Estimate (November 2006) of 50000 artisans short by 2010
- National Skills Fund/CHIETA Funding Allocation
 - R30 000 per learnership, irrespective of trade or level.
- Average negotiated quote: R 36 366 (Jan 2006)
 - (5.7 % down on Phase 1 (March 2004) actual costs, allowing for admin and L3 and 4 allowances)
- 29% negotiated reduction. 1 provider has withdrawn all but 1 learnership.



2007 - 2009 PICTURE

- National Skills Fund: R45 million.
- CHIETA R15 million co-funding.
- Net amount R52 million
- 1669 learnerships over the next 3 years
- Equivalent to 556 learners (L2 to L4)



2007 - 2009 PICTURE

- Special funding from Sasol - R140 million before tax concessions.
- 2500 learnerships over the next 3 years
- Equivalent to 833 learners (L2 to L4)



THE BIGGER PICTURE

- JIPSA and the SNF/OG & CM
 - Identify common ground
 - Scarce and critical skills
 - Specifically focus on the six identified artisan trades (boilermakers, electricians, fitters, instrument mechanics, riggers and welders)
 - Alignment of Government, Industry, Organized Labour, Training Providers and other stakeholders.
 - Make the Skills Revolution a reality.



BENEFITS

- National imperative to drastically augment our artisan workforce
- Equip South Africans with skills to become economically active employees
- Knock-on effects
 - Long term employment after construction
 - Expanded supporting infrastructure
 - Social upliftment and prosperity
 - Transport
 - Catering



CONCLUSION

- SNF ESDLE has a winning formula.
- Action plans to effectively address the priorities mentioned earlier have been implemented.
- Move from:

A good project to a GREAT project if we can keep up the momentum.



Possible implications

- Overheated economy – leading to boom and bust situation
- Skills and materials shortages in the construction and engineering sectors
- Outsourcing of work to foreign designers/fabricators/contractors = capital drains and lost employment opportunities & escalating costs
- Spiraling post 2010 unemployment
- Exodus from SA of our best skills
- Exacerbated socio-economic problems
- Post 2010 recession/economic decline



Policy & practice

- The Deputy President's initiative to marry skills to employment opportunities through JIPSA applauded

But...

- Engen Refinery has specific skills requirements in terms of professional engineers and artisans
- CVs supplied of qualified professionals were very carefully scrutinised for refinery requirements e.g. chemical engineers, metallurgists, and contract administrators
- Though well qualified most didn't match our needs & were rejected
- Those that did were recorded on our database



Matriculants

- Engen also received details of 26 “good” Kgetleng matriculants - the refinery is always on the lookout for school leavers with aptitude for mathematics and science
 - They can be trained to be process controllers
 - Of the 26 ten never had the required passes
 - 4 had training in other areas
- and
- 11 matriculants could be suitable for the refinery and will be assessed



Today's Reality

Empty weld shop at DSTT



Seta issues

- Large amount of unspent funds are reported to be available to support National Skills initiatives
- Sufficient to take approx 40 000 people to level 4 skills qualifications
- Good success from SNF Chieta initiative (650 level 2 learnerships in 2005)
- No learnerships in 2006 due to process issues
- R60-million has now been made available for 2007
- Sustainability of programmes are essential



Ideas on possible solutions



Outcomes we need

- Projects that run to agreed timelines
- South African resources employed and grown
- Premier resources kept in the country by ongoing projects
- To retain the good young resources that worked on project Turbo and other Clean Fuels projects in the country
- A high portion of equipment manufactured in South Africa.
- Basis for future exports and medium income job creation.

- To achieve these needs:
 - Firm specifications needed 5years+ before implementation
 - Big projects in the country staggered
 - Firm Biofuels roadmap that comprehends refinery impact, supply balance and specification impacts



Proposed solutions

- Engen propose a 3-point plan...
 - Effective use of training resources
 - Management of scarce skilled resources
 - Scheduling projects to reduce the skills demand shortfall



Proposed solutions

Effective use of training resources.....

- Unlock skills levy contributions (biggest hurdle)
- Candidates available?
- Unrealistic expectations of school leavers
- Forum to align industry needs with tertiary education institutions



Proposed Solutions

Management of scarce skilled resources....

- Registration of skills into a national database (similar to the SNF database)



Proposed Solutions

Scheduling projects to reduce the skills demand shortfall.....

- To use the available skills available in the most efficient manner, by phasing the planned projects in SA to sustain the employment opportunities
- Scheduling of major projects, to allow procurement of specialised equipment to be sourced locally
- Formation of national forums, similar to the SNF concept to manage scarce resources



Engen part of the solution



Thank you

Questions & Answers

