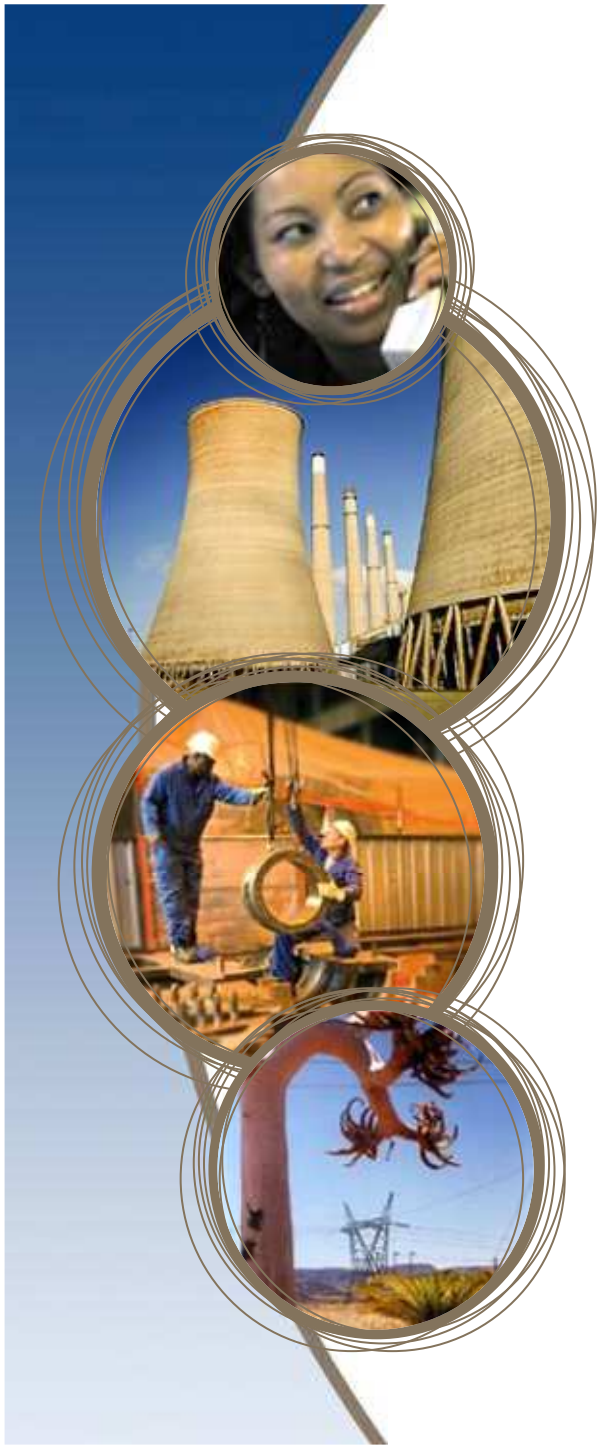


Primary Energy Division

Skills in the Mining and Minerals Sector (Coal subsector)

South African Colliery Managers' Association

Presented by: Arno Els

25 September 2009

Content

- Introduction
- South African Coal production (2008 – 2018)
- Summary: Sector Plans for the Mining and Minerals Sector
  - (Mining Qualifications Authority)
  - National information
- Focus on the Coal Subsector
- Manpower implications due to requirement to increase coal production
- Conclusion

Introduction / Background

"It is however, exceptionally difficult to come up with authoritative figures or even estimates with regard to skills shortages or demand for engineering professionals"

Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009

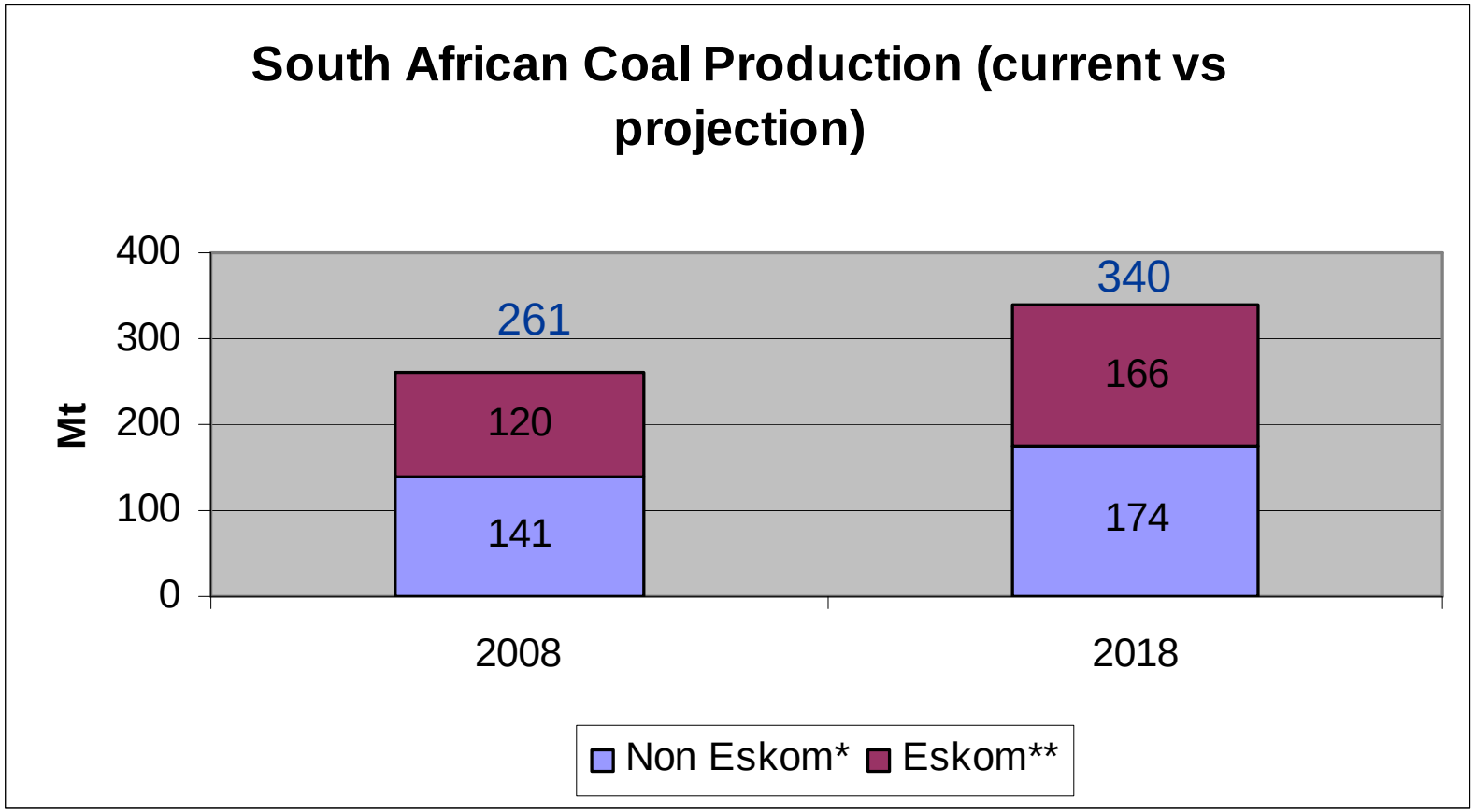
Introduction / Background

- An analysis was conducted to confirm if indeed a shortage of manpower may be evident, and if so, to what extend and in what category(s) of mining related skills (specifically coal subsector)
- Obtain input from SACMA
- Provide input into National Coal Energy Forum

Terminology: Coal Mining is a subsector within the Mining and Minerals Sector

South African Coal production (2008 – 2018)

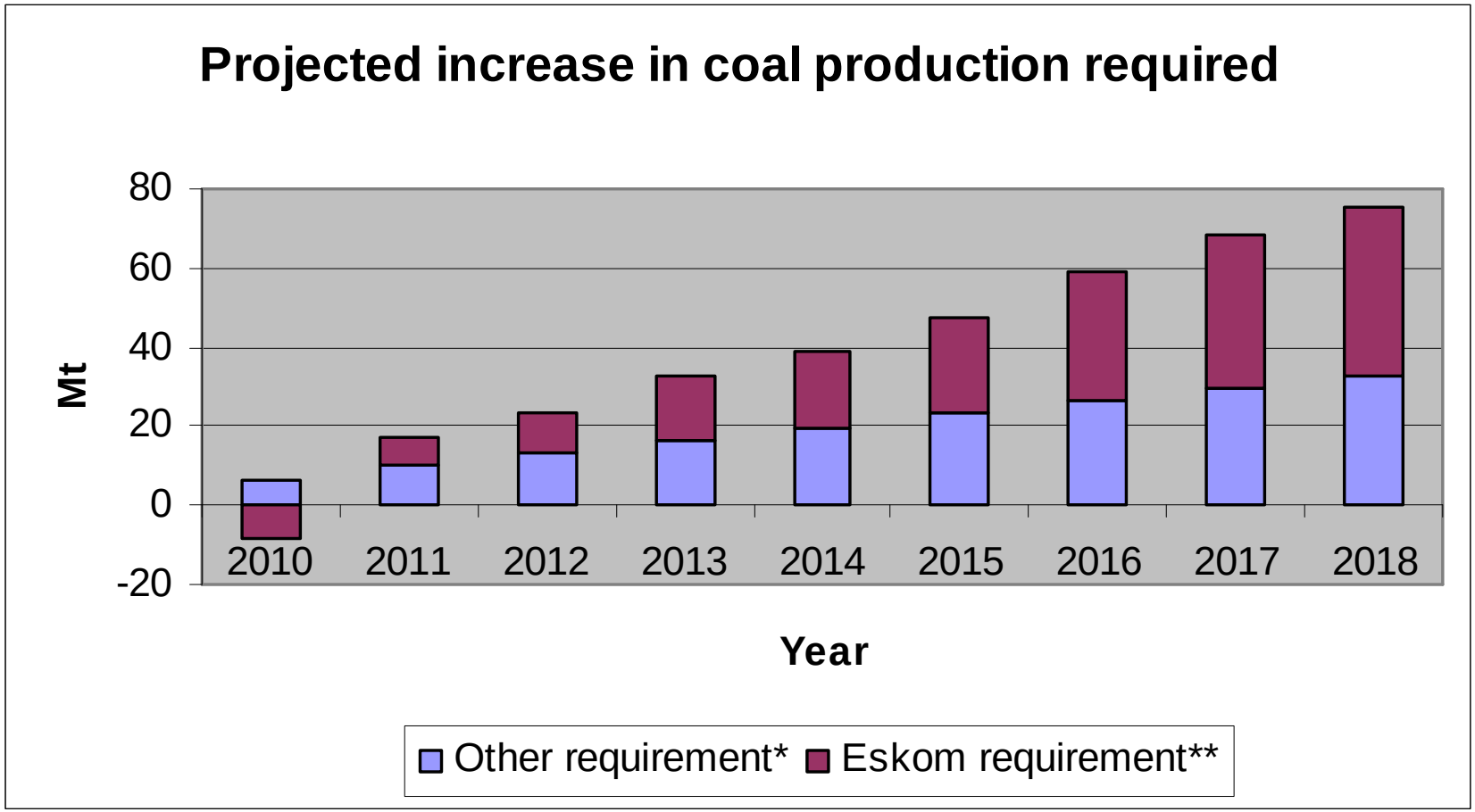
South African Coal production



30% increase in coal production required from 2008 to 2018
Eskom coal requirement increases by 38% during this period

Non Eskom*: Includes all other Sectors and exports
Eskom**: Depending on burn requirements as per ISEP
Source: McKinsey & Company and Letsema Consulting

South African Coal production



Non Eskom*: Includes all other Sectors and exports
Eskom**: Depending on burn requirements as per ISEP
Source: McKinsey & Company and Letsema Consulting

Mining Qualifications Authority (MQA)

High level summary of pertinent points pertaining to the Sector skills plan for mining and minerals sector (2005 – 2010)

In order to obtain more detailed information pertaining to the Mining subsector, the Sector skills plan for mining and minerals sector (2005 – 2010) was studied and analysed in order to extract relevant information

Source: skills plan for the Mining and Minerals Sector, as published by the Mining And Qualifications Authority (2005 – 2010) – updated 31 August 2008

Summary of pertinent points

- **Supply of Skills**
  - Surplus labour in Sector available (mostly unskilled)
  - The number of higher education qualifications awarded is not sufficient
  - The uptake of learnerships in the Sector is “disappointing” - linked to the downturn / downscaling in the Sector. Learnerships should be increased for the long-term needs of the Sector and the Country
  - The skills shortages are mostly in the following occupational categories:
    - Technicians and Associated Professionals
    - Trade Workers (and learnerships as the pipeline)
    - Professionals

Source: skills plan for the Mining and Minerals Sector, as published by the Mining And Qualifications Authority (2005 – 2010) – updated 31 August 2008

Summary of pertinent points

Summary of supply of skills according to occupational category (selected categories)		
Occupational Group	**Current employment**	**Skills available in the labour market**
Legislators, Senior Officials, Managers and Owner Managers	Under-representation of HDIs including women	Limited number of people with combination of industry, technical and managerial skills
Professionals	Under-representation of HDIs including women	General shortage No/very low unemployment (no spare capacity)
Technicians and Associated Professionals	Under-representation of HDIs including women	General shortage No/very low unemployment (no spare capacity)
Trade Workers	Very few workers employed	General shortage
Plant and Machine Operators and Assemblers	Mainly African men Large-scale use of migrant labour	Over supply Large numbers of unemployed experienced workers available
Labourers and Related Workers	Mainly African men Large-scale use of migrant labour	Over supply Large numbers of unemployed experienced workers available

Source: skills plan for the Mining and Minerals Sector, as published by the Mining And Qualifications Authority (2005 – 2010) – updated 31 August 2008

Mining and Minerals sector

Scare skills in the Mining and Minerals sector (selected occupations)			
Category	**Occupation**	**Total**	**% of scare skills**
Senior Officials / Managers		**284**	**3**
	Production / Operations Manager (Mining)	284	
Professionals / Technicians and related		**1702**	**21**
	Electrical Engineer / Technologist	170	
	Mechanical Engineer / Technologist	194	
	Civil Engineer	60	
	Mining Engineer / Technologist	237	
	Geologist	245	
	Surveyor	137	
	Electrical Engineering Technician	141	
	Mechanical Engineering Technician	79	
	Mining Technician	432	
	Environmental	7	
Trade Workers		**2247**	**28**
	Diesel Motor Mechanic	509	
	Welder	179	
	Fitter / Fitter & Turner	565	
	Millwright	381	
	Electrician	613	
Machinery Operators and Drivers		**1523**	**19**
	Miners	345	
	Crane / hoist / lift operators	69	
	Truck Drivers	80	
	Drillers	1029	
All other categories combined		**2396**	**N/A**
Total		**8152**	

Source: Sector skills plan for the mining and minerals sector – Updated 31 August 2008

SCARCE SKILLS DEFINITION:

Scarce skills refers to occupational categories for which employers cannot find suitably qualified and/or experienced candidates. Scarcity can arise as a result of factors such as geographical location, employment equity consideration and an overall shortage of a particular skill in the labour market

National Scare skills picture

Scare skills: Mining / Minerals sector and National (selected occupations)				
		Scare Skills		
Category	**Occupation**	**Mining & Minerals Sector**	**National List**	**Mining & Minerals Sector as % of total**
Senior Officials / Managers	Production / Operations Manager (Mining)	284	3130	9
Professionals / Technicians and related	Electrical Engineer / Technologist	170	2485	7
	Mechanical Engineer / Technologist (Nat list included Industrial)	194	12665	2
	Civil Engineer	60		
	Mining Engineer / Technologist	237	295	80
	Geologist	245	335	73
	Surveyor (Nat list includes Civil and Quality)	137	2940	5
	Electrical Engineering Technician (Nat list includes Draughting)	141	5145	3
	Mechanical Engineering Technician (Nat list includes Draughting)	79	255	31
	Mining Technician	432		
	Environmental	7		
Trade Workers	Diesel Motor Mechanic (Nat list includes all automotive)	509	4205	12
	Welder	179		
	Fitter / Fitter & Turner	565	8340	7
	Millwright	381	1945	20
	Electrician	613	5315	12

Source: Sector skills plan for the mining and minerals sector – Updated 31 August 2008
National Master Scarce Skills List for South Africa 2008, Department of Labour

Conclusion: Mining and Minerals Sector in general (skills focussed)

- Shortage of skills is currently mostly evident in the following Occupational groups:
  - Management
  - Professional
  - Technicians
  - Artisans / Trade Workers
- Racial composition of workforce (transformation is not happening at a fast enough pace)
- The current supply of manpower does not meet the current requirement
  - Universities
  - Universities of Technology
  - Apprentice training / Learnership training

Source: skills plan for the Mining and Minerals Sector, as published by the Mining And Qualifications Authority (2005 – 2010) – updated 31 August 2008

Focus on the Coal Subsector

Manpower implications due to requirement to increase coal production

Manpower requirements due to projected increased coal production

Projected increase in manpower numbers for the coal subsector

- Total manpower within the subsector to increase by approximately 16% (from approximately 60 000 employees to 69 500) by 2018

- **Projected growth in certain occupational categories**
  - Legislators, Senior Officials, Managers and Owner Manager (additional 200 required by 2018)
  - Professionals / Technicians and Associated Professionals (additional 200 required by 2018)
  - Craft and related Trade workers (additional 800 required by 2018)
  - Miners (additional 1300 required by 2018)
  - Semi-skilled / unskilled (additional 7000 required by 2018)
  - Apprentices and section 18 (1) learners (pipeline for Trade workers)

Skills per Occupational category

Legislators, Senior Officials, Managers and Owner Manager

- Projected additional resources required (demand)

Additional demand: Managers

Additional 188 Managers required for the period 2009 - 2018

Source:
McKinsey & Company and Letsema Consulting
Primary Energy Division team analysis

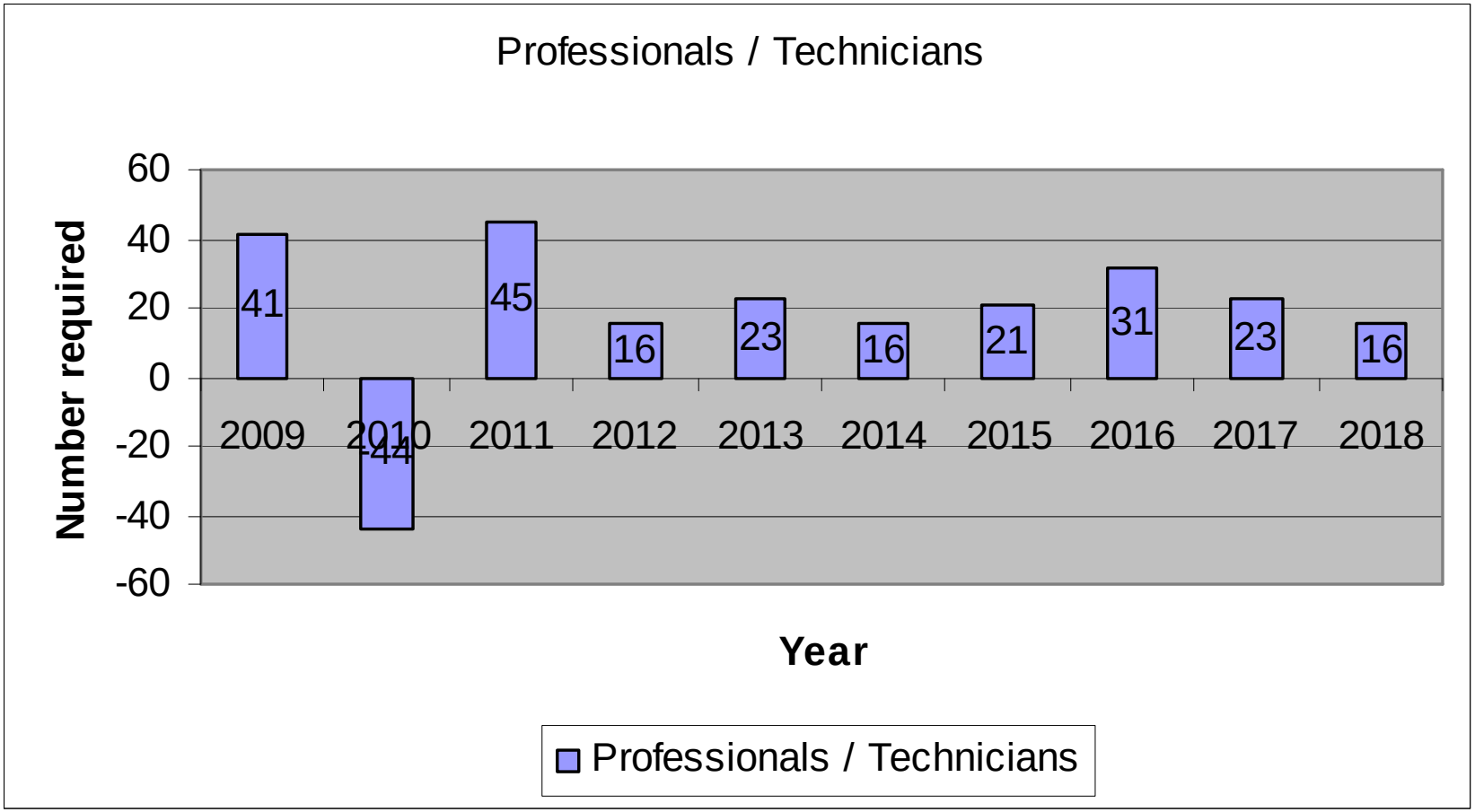
Skills per Occupational category

Professionals / Technicians and associated professionals

- Projected additional resources required (demand)

Additional demand: Professionals / Technicians and associated professionals

Additional Professionals / Technicians required per annum



Additional 188 Professionals / Technicians required for the period 2009 - 2018

Source:
McKinsey & Company and Letsema Consulting
Primary Energy Division team analysis

Additional resources required: Professionals / Technicians and associated professionals

Additional Professionals / Technicians required per annum

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Professional / Technician and associated	**41**	**-44**	**45**	**16**	**23**	**16**	**21**	**31**	**23**	**16**
Mettalurgists	3	-4	4	1	2	1	2	2	2	1
Geologists	5	-5	5	2	3	2	3	4	3	2
Mining Engineers	14	-15	15	5	8	5	7	11	8	5
Mechanical	8	-8	8	3	4	3	4	6	4	3
Industrial	2	-2	2	1	1	1	1	1	1	1
Elec H/C	6	-7	7	2	3	2	3	5	3	2
Elec L/C	2	-2	2	1	1	1	1	1	1	1
Environmental	2	-2	2	1	1	1	1	2	1	1

Additional 188 Professionals / Technicians required for the period 2009 - 2018

Source:
McKinsey & Company and Letsema Consulting
Primary Energy Division team analysis

Supply Chain Analysis

Current / future skills available / required (supply): Professionals / Technicians and associated professionals

Current scenario

- General shortage in the specified disciplines (previous slide)
- Under-representation of HDIs* including women
- Mining subsector not attractive to graduates / diplomats

Sources of supply / general

- Higher education institutions – supply is not sufficient
- Limited students with Mathematics and Science at school
- High demand of these resources / skills in other Sectors
- New entrants supported by bursaries

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining And Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
* Historically Disadvantaged Individuals

Summary: Projected supply from Tertiary Institutions (Un and Universities of Technology)

2007 degrees / diplomas conferred

- Total Engineering – 7236
  - Mining related – 243
  - Electrical related – 2315
  - Mechanical related – 1033
  - Industrial related – 594

The supply of Engineering related resources into the South African market place is limited

Source:

Hemis Systems DET
Team analysis

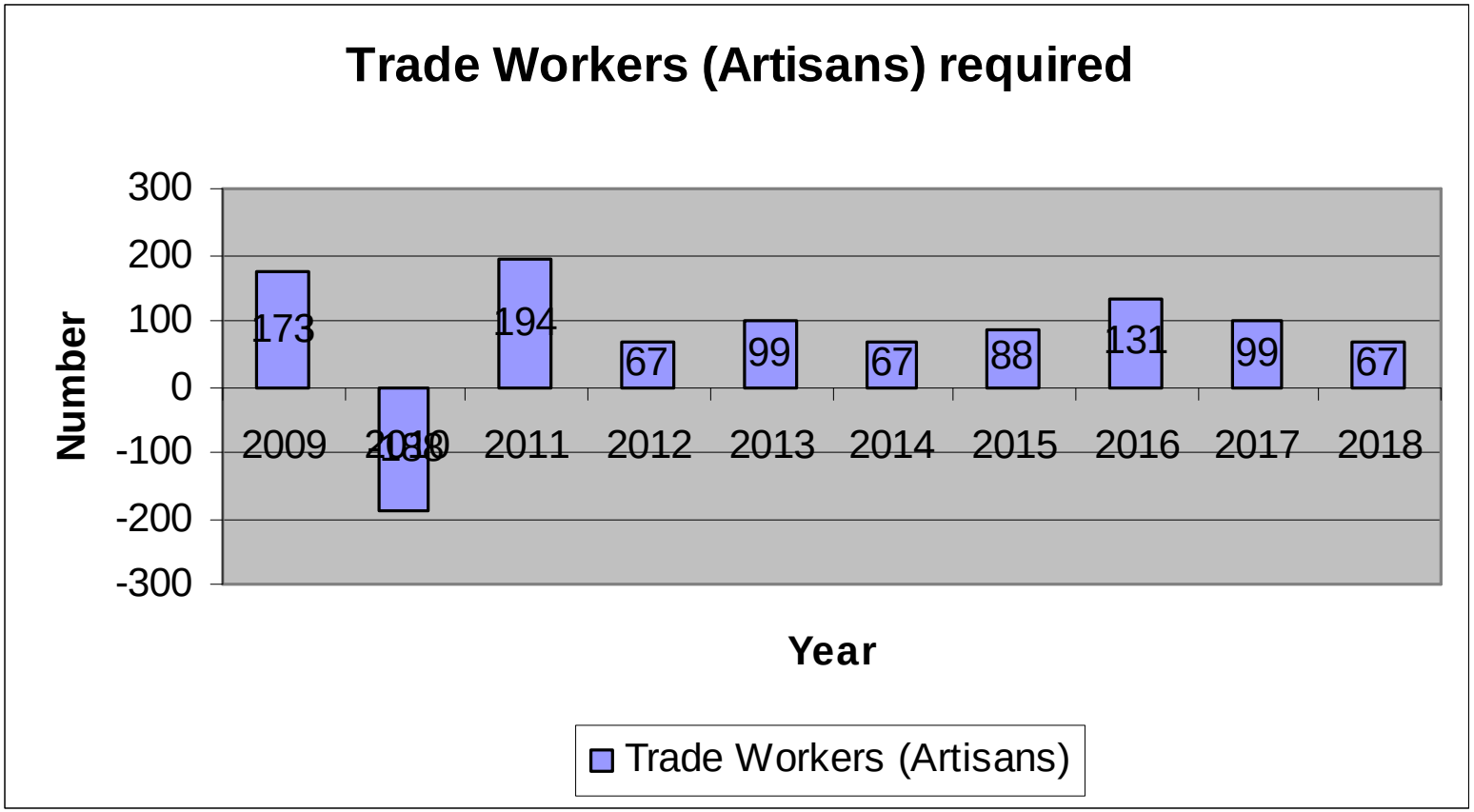
Skills per Occupational category

Craft and related Trade workers

- Projected additional resources required (demand)
- Current / future skills available / required (supply)
- Recommendations

Additional demand: Craft and related Trade workers

Additional Trade Workers (Artisans) required per annum



Additional 800 required for the period 2009 - 2018

Source:
McKinsey & Company and Letsema Consulting
Primary Energy Division team analysis

Additional demand: Craft and related Trade workers

Additional Trade Workers (Artisans) required per annum Breakdown per discipline

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Trade Workers (Artisans)	**173**	**-188**	**194**	**67**	**99**	**67**	**88**	**131**	**99**	**67**
Fitters / Fitter & Turners	52	-56	58	20	30	20	26	39	30	20
Electricians	35	-38	39	13	20	13	18	26	20	13
Boilermakers / Welders	12	-13	14	5	7	5	6	9	7	5
Instrument Mech's	12	-13	14	5	7	5	6	9	7	5
Diesel Motor Mechanics	28	-30	31	11	16	11	14	21	16	11
Millrights	35	-38	39	13	20	13	18	26	20	13
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018

Additional 800 required for the period 2009 - 2018

Source:
McKinsey & Company and Letsema Consulting
Primary Energy Division team analysis

Current / future skills available / required (supply): Craft and related Trade workers

Current scenario

- General shortage is being experienced
- Emigration of skills increased (loss to South Africa)
- Intake of learnerships within the coal subsector decreased for 2009 (specific reference to CTC, who is currently the largest training centre within the coal subsector)
- Transition from Apprenticeships to Learnerships stifled supply
- Long training periods inhibit responsiveness
- Administrative requirements from the MQA impact on process efficiencies
- Students with Mathematics and Science (SG Level) at school – impacts supply
- **Sources of supply / general**
  - Learnership / Apprenticeship Training Centres – supply is not sufficient
  - Currently the Training Centres do have “spare capacity” of approximately 350 learnerships per annum
  - High demand of these resources / skills in other Sectors

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining
And Qualifications Authority (2005 – 2010) – updated 31 August 2008
Chamber of Mines
Coal Training College
Team analysis
* Historically Disadvantaged Individuals

Current / future skills available / required (supply): Craft and related Trade workers

- Do to disparate systems, it is extremely difficult to obtain a National picture pertaining to current supply of skills
- The current shortage of skilled Trade workers emphasise the magnitude of the shortage within South Africa:
  - Motor Mechanic: 4205
  - Welder: 179
  - Fitter / Fitter & Turner: 8340
  - Millwright: 1945
  - Electrician: 5315

Source: National Master Scarce Skills List for South Africa 2008, Department of Labour

Thank you

Recommendations: Managers

- Create active awareness of potential mining careers at secondary school level
- Establish close relationships with bridging units at University level
- Tertiary education graduates / diplomats
  - Pipeline of candidates needs to increase
- Companies to ensure Employment Equity plans for junior and senior management levels
- Employment Equity (women)
  - Mining Companies to ensure appropriate plans are in place
  - Work-life balance flexibility

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009

Recommendations: Managers

- Human Capital Development and Retention Strategies
  - Mentorship / internship planning
    - Mining Houses to ensure more effective programmes are in place
  - Career planning
    - Mining Houses to ensure more effective programmes are in place
    - Dual-career paths
  - Remuneration
    - Total packages and scarce-skills allowances
- Management development courses
  - Mining Houses to implement more effective programmes to assist with Management development

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009
* Historically Disadvantaged Individuals

Recommendations: Managers

- "Opening up of immigration"
  - Current SA policies and practices does not make it easy to immigrate
  - Recruitment of retired engineering professionals
    - Mentors and training graduates
- Recruitment of expatriates
  - Enhance / support current initiatives
- Enhance our employer brand / occupational brand

Please refer to section on Professionals / Technicians and associated professionals as these categories are the feeding area for Managers

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009
* Historically Disadvantaged Individuals

Recommendations: Professionals / Technicians and associated professionals

- Align supply and demand – higher subsidies to Universities and Universities of Technology pertaining to scarce skills
- Develop standardised model of selection
- Engineering to be promoted as a discipline at Higher Education level
- Increase investment (bursaries - with an effective monitoring of progress mechanism)
- Ensure students have additional support (tutors etc)

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009
* Historically Disadvantaged Individuals

Recommendations: Professionals / Technicians and associated professionals

- Review curricula to better align to needs of the workplace
- Engineering to be promoted as a discipline at Higher Education level
- Programmes required at Higher Education / Tertiary Education level to improve maths / science proficiency
- More Corporate programmes required to promote maths / science
- Improve quality of staff and student to staff ratios

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009
* Historically Disadvantaged Individuals

Recommendations: Professionals / Technicians and associated professionals

- Encourage learnerships at Company level
  - Opportunity for experiential training in order to graduate
- Encourage ECSA registration
- Corporates to ensure effective programs to assist in the transition from study to work
- Develop a capability transfer / knowledge transfer framework from older engineering professionals to younger ones

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009
* Historically Disadvantaged Individuals

Recommendations: Professionals / Technicians and associated professionals

- Create active awareness of potential mining careers at secondary school level
- Establish close relationships with bridging units at University level
- Employment Equity (women)
  - Mining Companies to ensure appropriate plans are in place
  - Work-life balance flexibility

Source:

Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009

Recommendations: Professionals / Technicians and associated professionals

- Human Capital Development and Retention Strategies
  - Mentorship / internship planning
    - Mining Houses to ensure more effective programmes are in place
  - Career planning
    - Mining Houses to ensure more effective programmes are in place
    - Dual-career paths
  - Remuneration
    - Total packages and scarce-skills allowances
  - Management development courses
    - Mining Houses to implement more effective programmes to assist with Management development

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009
* Historically Disadvantaged Individuals

Recommendations: Professionals / Technicians and associated professionals

- "Opening up of immigration"
  - Current SA policies and practices does not make it easy to immigrate
  - Recruitment of retired engineering professionals
    - Mentors and training graduates
- Recruitment of expatriates
  - Enhance / support current initiatives
- Enhance our employer brand / occupational brand

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009
* Historically Disadvantaged Individuals

Recommendations: General Education

- Number of high quality Grade 12 learners (with maths and science) to be increased:
  - Improved numeracy with appropriate curricula
  - Number of teachers to be increased and salaries reviewed (mathematics and science)
  - Improve infrastructure
  - Create awareness of the engineering profession
  - Identify black competent learners at a early stage and assist then with better educational opportunities (e.g. better schools)

Source:
Skills plan for the Mining and Minerals Sector, as published by the Mining and Qualifications Authority (2005 – 2010) – updated 31 August 2008.
Team analysis
Engineers in a Developing Country, Renette du Toit and Joan Roodt, HSRC Press, 2009
* Historically Disadvantaged Individuals

Recommendations: Craft and related Trade workers

- Significant increase in learnerships are required in all sectors
  - Currently additional training capacity is available within the coal subsector and learners should be appointed (funding of these learners seems to be a matter that requires attention)
- Employers needs to be incentivised to increase learnerships
- Trades as a profession needs to be marketed within South Africa
- Human Capital Development and Retention Strategies
  - Mentorship / internship planning
    - Mining Houses to ensure more effective programmes are in place
  - Career planning
    - Mining Houses to ensure more effective programmes are in place

Conclusion

- Supply cannot meet demand requirements and will impact on economic growth (current short term view may be different currently)
- SA skills in demand world wide (especially mining)
- Recruitment of competent staff outside of South Africa should be considered

Questions / Enquiries

- Arno Els
  - Arno.els@eskom.co.za
  - 082 897 5976
- mediadesk@eskom.co.za

Thank you