



# **INTRODUCTION OF A NEW MINING COURSE IN NAMIBIA**

Status and Challenges



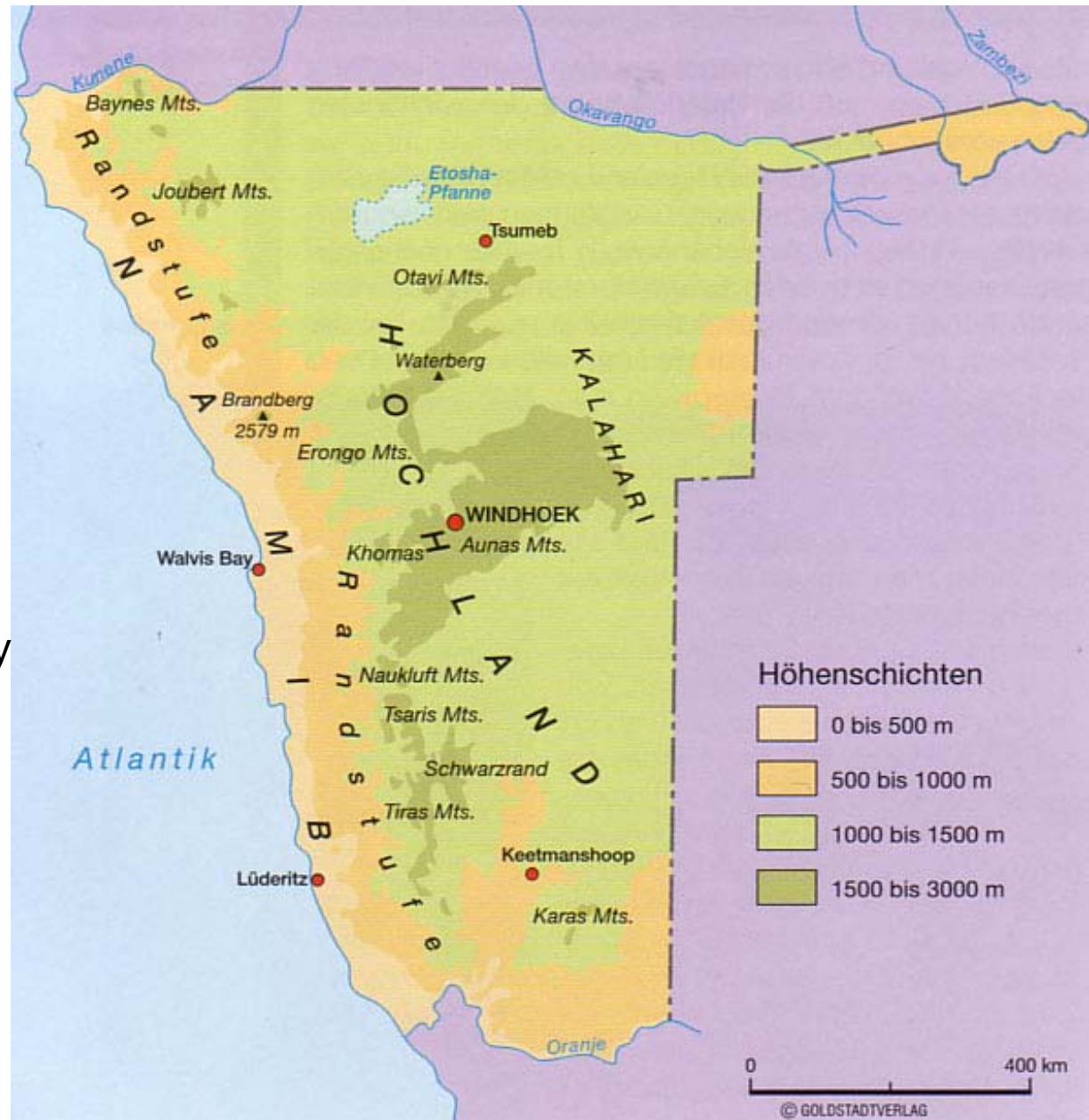
# CONTENTS

- Mining in Namibia
- NUST – Namibia's University of Mining and Technology
- Installation of a new mining course
- Course Content
- Internationalisation
- New Mining Department and GeoCentre



## Republic of Namibia

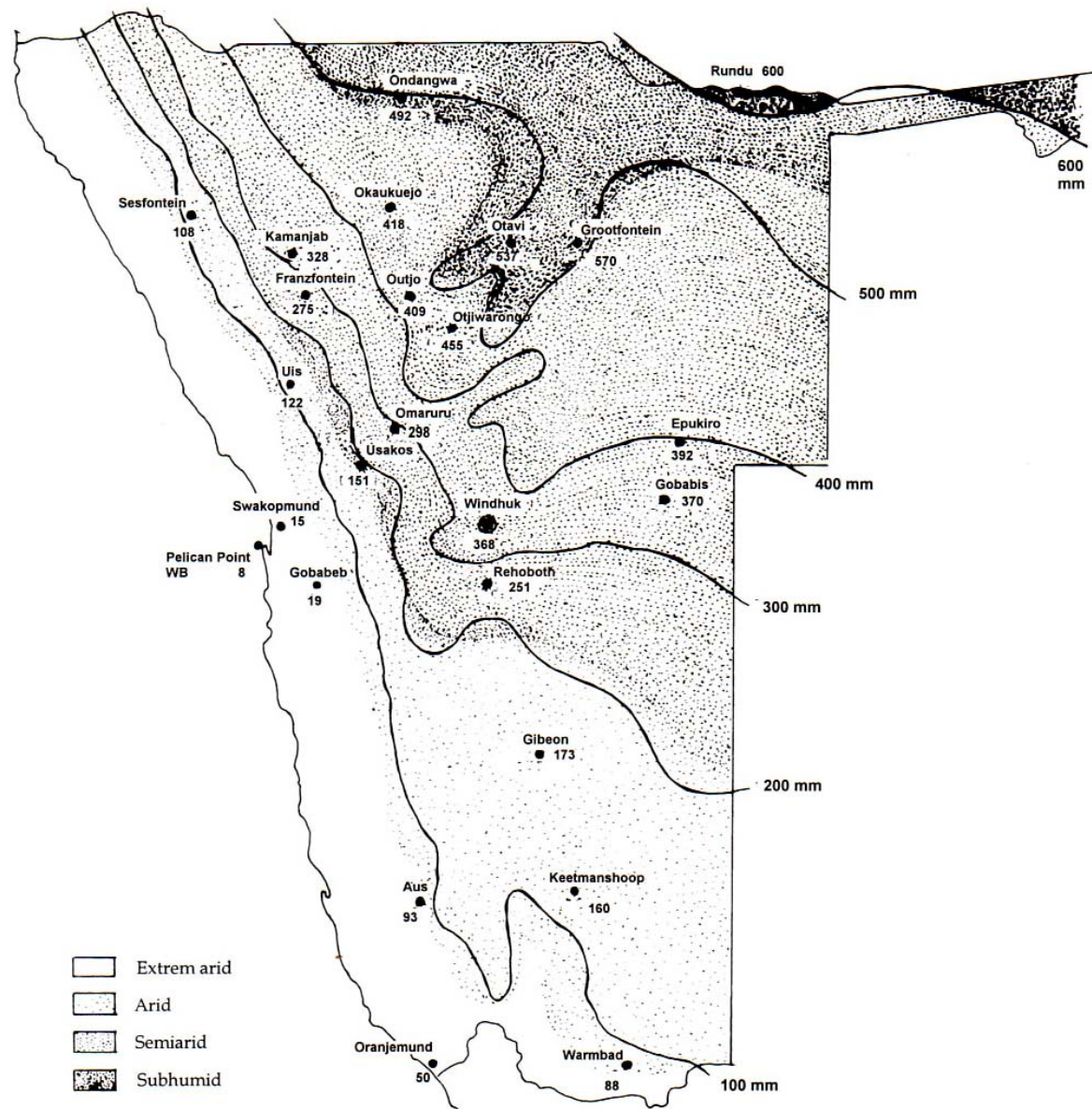
- Area: 825,000 km<sup>2</sup>
- Population: 2,100,000  
(2.3 Persons per km<sup>2</sup>)
- Parliamentarian Democracy  
(since 1990: SWAPO)
- GNP 3,045 Mio \$US
- GDP 2,884 Mio \$US
- Unemployment: 24.8 %
- HIV/AIDS: 21 %



Source: Goldstativ Verlag 2007



# Republic of Namibia



Source: W.H. Barnard





## Mining in Namibia

- 17 mines in 2006
  - Uranium
  - Diamonds
  - Copper
  - Lead-Zinc
  - Gold
  - Fluorite
- 4 new mines in 2007 – 2008
  - Tungsten
  - Tin
  - Tantalite
  - Copper
- 8 more to come until 2010
  - Gold
  - Uranium
  - Phosphate
  - ...

Prof. Dr.-Ing. Helmut Mischo



Society of Mining Professors  
Annual Meeting Aachen 2008

17 May 2008 – No 5

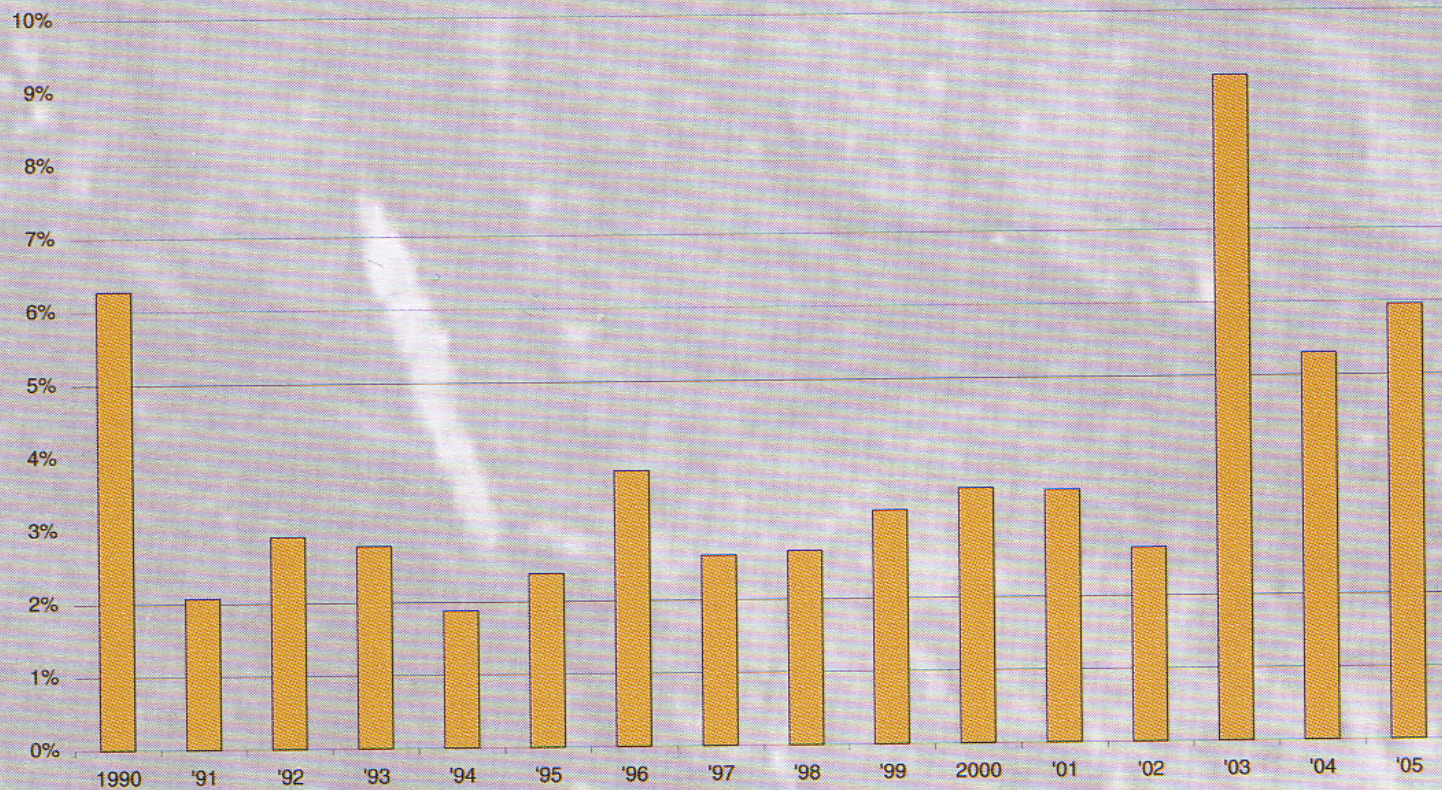
Source: Chamber of Mines Annual Report 2006





# Mining in Namibia

Mining fixed investment as % of GDP (Includes exploration expenditure)

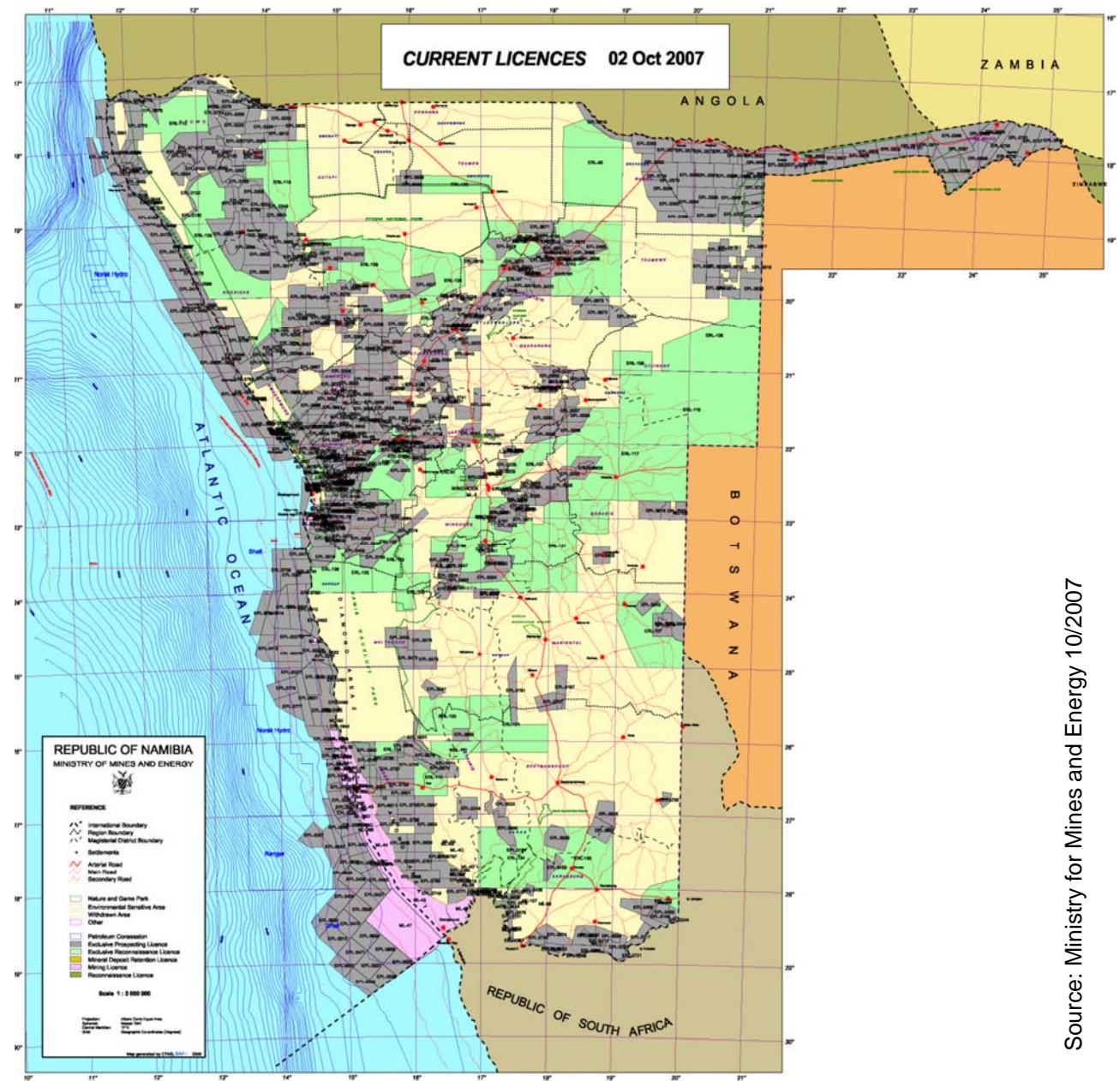


Source: National accounts, Central Bureau of Statistics





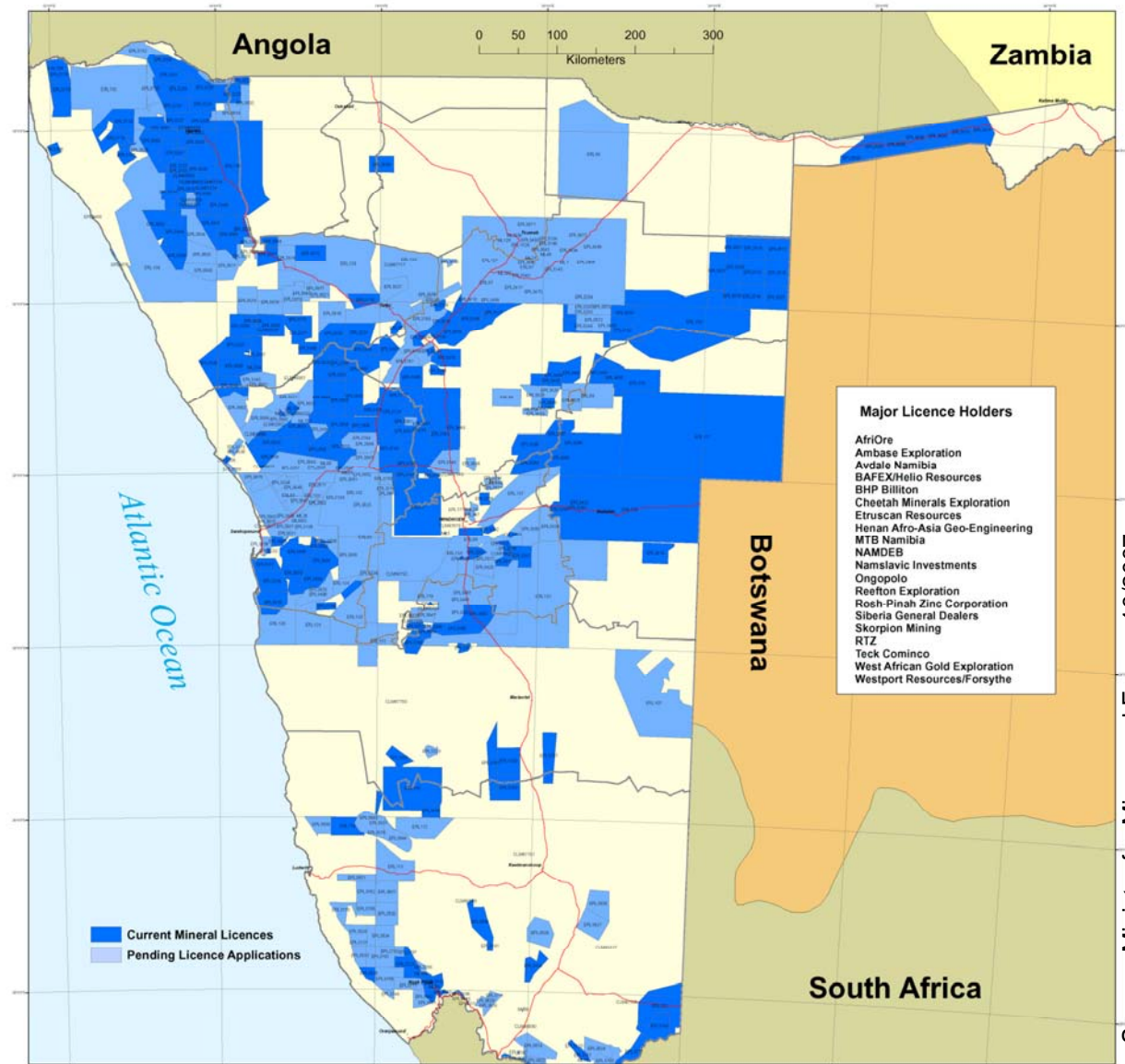
# Current Mining Licenses



Source: Ministry for Mines and Energy 10/2007



# Current Exploration Licenses (here: Base and Rare Metals only)

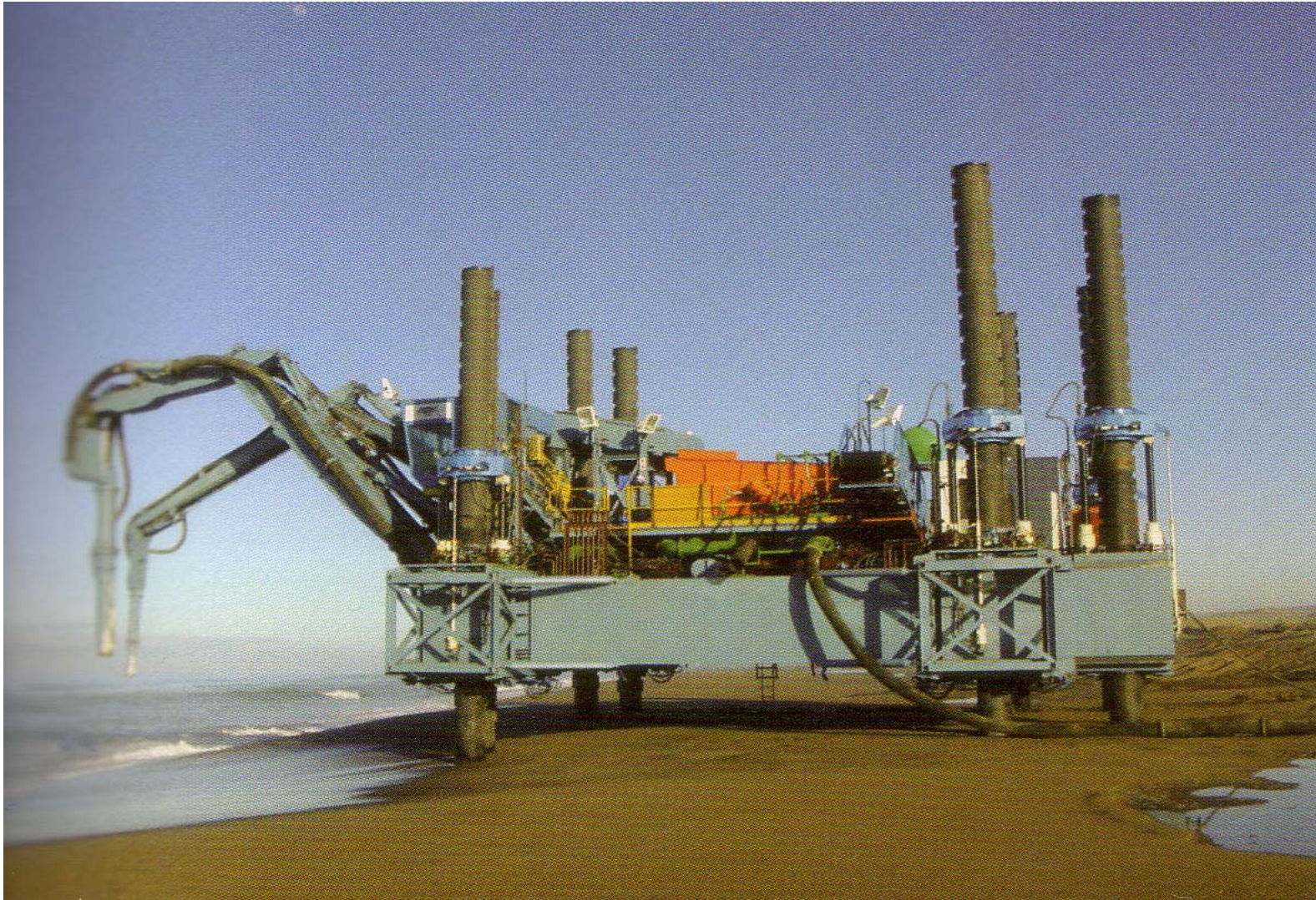


Source: Ministry for Mines and Energy 10/2007





# Diamond Mining near Oranjemund



Source: Chamber of Mines Annual Report 2006





# Okoruso Fluorspar



Source: Chamber of Mines Annual Report 2006





# Rössing Uranium



Source: Chamber of Mines Annual Report 2006



# NUST – Namibia's University of Science and Technology (formerly Polytechnic of Namibia – PoN)



- 1994: Polytechnic Act approved by Parliament
- founded as 2<sup>nd</sup> higher education institution in Namibia to complement University of Namibia (UNAM)
- 2001: First Bachelor degree awarded
- 2002: First award as best “Higher Education Institution” in Namibia
- 2003: Second award as best “Higher Education Institution” in Namibia



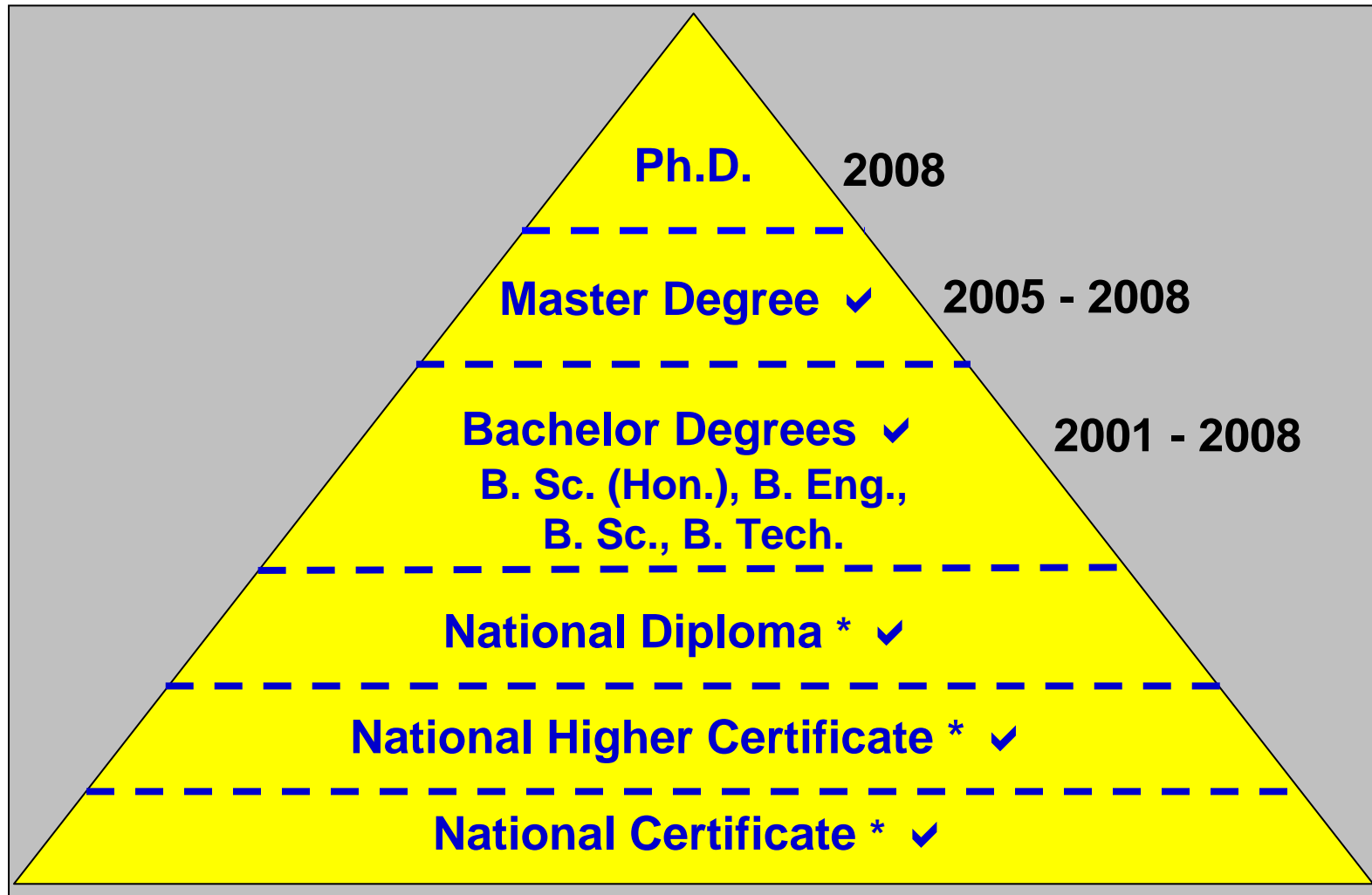


## NUST – Namibia's University of Science and Technology

- 2004: Third award as best “Higher Education Institution” in Namibia; enrolment surpasses 5,000 mark
- 2005: First Master degree programme implemented (Information Technology)
- 2006: Second Master degree programme implemented (International Business Administration); Fourth award as best “Higher Education Institution” in Namibia
- 2007: FIBAA accreditation for Master's of International Business Trade (first in Africa); International agreement on Master's Degree in Comparative Local Governance
- 2008: Enrolment surpasses 8,700 mark; First Master students in information technology graduates;  
Formal recognition as Namibia's University of Science and Technology (NUST)



# NUST – Programme Levels

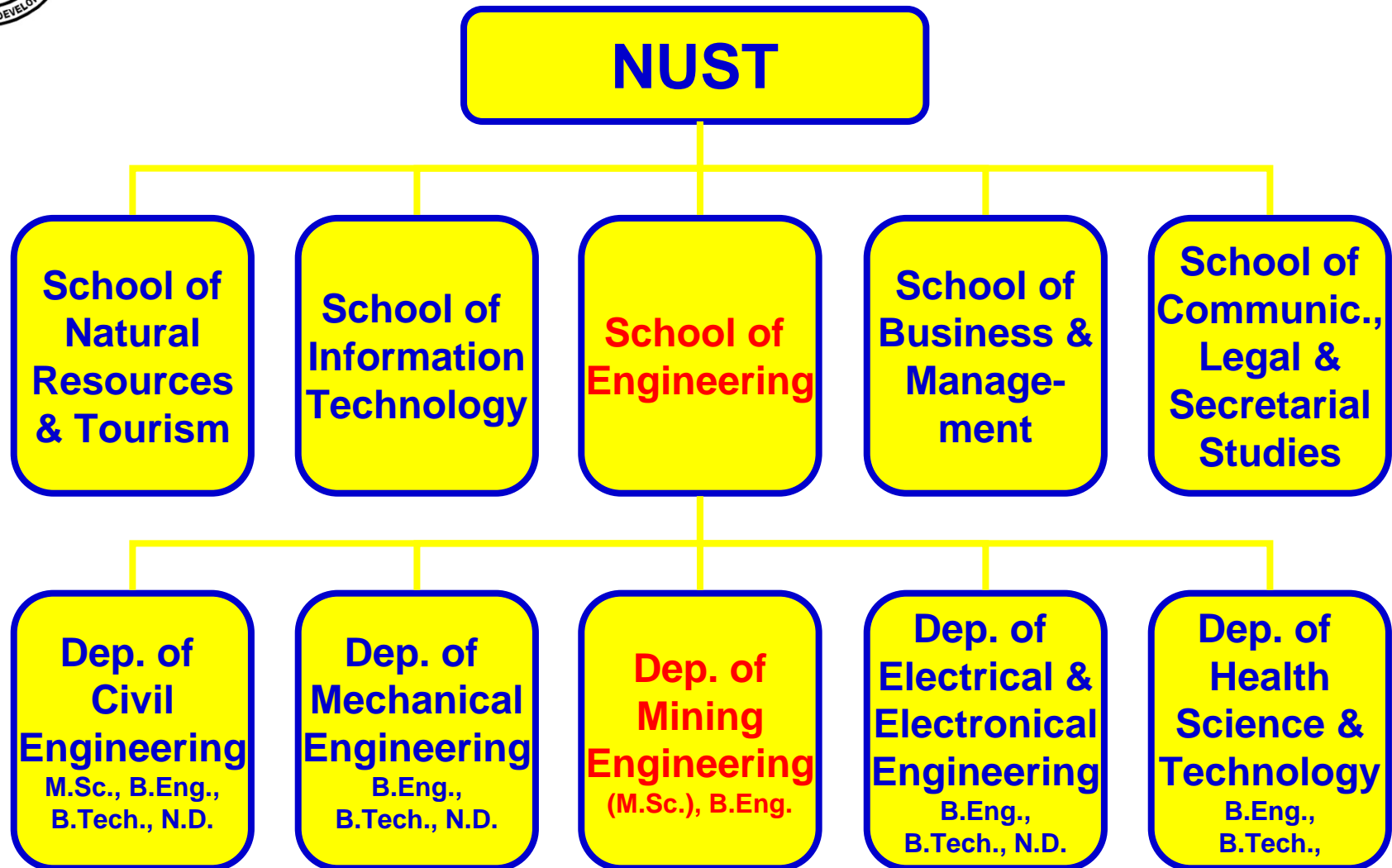


\* partly phasing out as from 2008



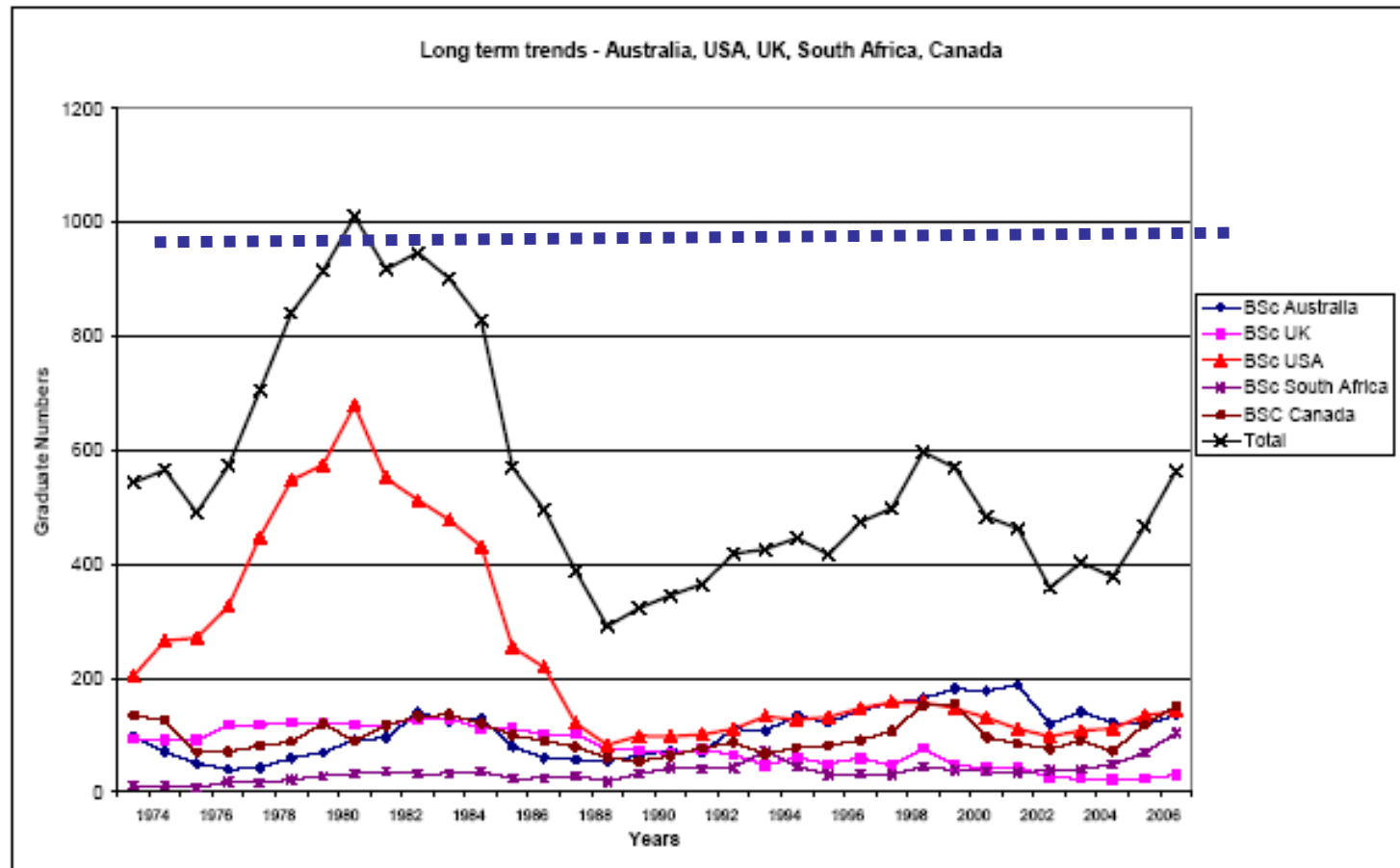


# NUST – Schools





# New Mining Course – Global Supply of Mining Engineers



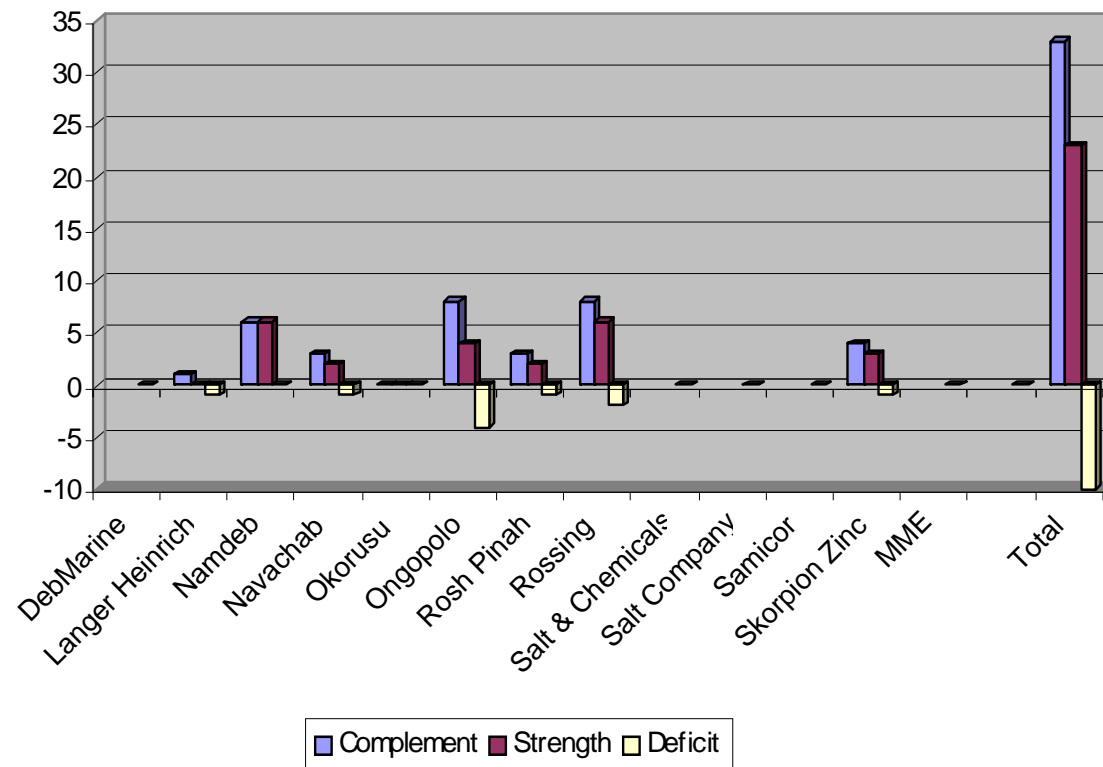
Global Survey of Minerals Industry Universities – Mining Engineering: James Davison: 2004





# New Mining Course— Supply and Demand for Mining Engineers in Namibia

## Industry - Mining Engineers



Source: Skills Needs and Supply Analysis of Existing Mines - Chamber of Mines of Namibia 2007



## Shortfall of Mining Engineers in Namibia

- Worldwide shortage
- Supply from the current sources far below the needs
- Shortfall will increase in the future, with new mines to be opened. Currently the mines are already “poaching”.
- Namibian mining industry competing worldwide for engineers



# Current Status of Mining Engineer Recruitment in Namibia

Mining engineers currently employed in the Namibian mining industry are

- Namibians educated abroad
- Expatriates





## New Mining Course – B.Eng. (Mining)

- 4.5 years professional B.Eng (B.Sc.Hon), based on the traditional mining education programme (4 years + internship)
- Focus on operations in Namibia and neighbouring SADC Countries
  - underground mining (hard rock)
  - surface mining (hard rock, diamonds, dimension stone and sand & gravel)
  - marine mining (diamonds, potentially oil and gas)
- Design figures:
  - Enrolled: 80 – 100 students
  - Graduating: 10 – 15 students each year



## B.Eng. (Mining) – Current Status (I)

- 70 % of the 4.5 years B.Eng. programme already offered within the existing Polytechnic's engineering programme
- Strongly supported by the Namibian Chamber of Mines and the Namibian mining industry
- Strongly supported by the international mining community
- During development and start-up, all other courses will be covered by our partner universities
  - Clausthal Technical University
  - Colorado School of Mines
  - University of the Witwatersrand
  - RWTH Aachen Technical University
  - Other international Universities



## B.Eng. (Mining) – Current Status (II)

- Preparation of entering students met by bridging courses (year 0 studies)
- Polytechnic has successful B.Eng. programmes in Civil-, Mechanical-, Electrical- and Electronical Engineering, providing science and engineering core courses required for Mining Engineering
- Partner universities are assisting in developing the mining programme
- Course development, laboratory establishment, training and teaching under progress
- Clausthal and Colorado School of Mines are already on board, with Aachen and WITS negotiations have been started, other universities are invited to participate





## B.Eng. (Mining) – Current Status (III)

- The mining programme is designed to meet the requirements of National Qualification Agency (NQA) and Engineering Council of Namibia (ECN)
- The mining programme will be accredited by international accreditation institutions – Bologna Process and ABET / Washington Accord
- In collaboration with partner universities, Polytechnic will eventually offer the complete range of mining engineering qualifications, with highly specialised courses on Master's level



# B.Eng. (Mining) – Curriculum (I)

## Comparison of available mining engineering courses

B.Sc. (Hon) Mining Engineering Degree	International B.Sc. Mining Engineering	NUST	
		Existing Courses	New Courses
<b>S1</b>			
ENGINEERING GEOLOGY 1	x		x
MATHEMATICS 1		x	
COMMUNICATION SKILLS		x	
APPLIED MECHANICS 1	x	x	
APPLIED PHYSICS AND CHEMISTRY 1	x	x	
ENGINEERING DRAWING AND DESCRIPTIVE GEOMETRY	x	x	
ENGINEERING PRACTISE		x	
<b>S2</b>			
MATHEMATICS 2	x	x	
PROFESSIONAL COMMUNICATION	x	x	
APPLIED PHYSICS AND CHEMISTRY 2	x	x	
APPLIED MECHANICS 2	x	x	
SURVEYING 1 - BASICS	x	x	
INTRODUCTION INTO BUSINESS MANAGEMENT		x	
ENGINEERING GEOLOGY 2	x		x
<b>S3</b>			
MATHEMATICS 3	x	x	
IT SOLUTIONS FOR ENGINEERS	x	x	
PRINCIPLES OF INFORMATION SYSTEMS	x	x	
INTRODUCTION INTO MINING	x		x
PROFESSIONAL WRITING		x	
SURVEYING 2 - MINING SURVEYING	x	x	
TECHNICAL THERMODYNAMICS	x	x	
<b>S4</b>			
GEOMECHANICS 1 (Soil Mechanics)	x	x	
INTRODUCTION INTO ELECTRICAL ENGINEERING - CONSTRUCTION ELEMENTS	x	x	
INTRODUCTION INTO MECHANICAL ENGINEERING - CONSTRUCTION ELEMENTS	x	x	
MINERAL DEPOSITS	x		x
MATHEMATICS / STATISTICS	x	x	
GIS SYSTEMS	x	x	
CONSTRUCTION MATERIAL SCIENCE 1	x	x	





## B.Eng. (Mining) – Curriculum (II)

Comparison of available mining engineering courses			
B.Sc. (Hon) Mining Engineering Degree	International B.Sc. Mining Engineering	NUST	
		Existing Courses	New Courses
<b>S5</b>			
GEOMECHANICS 2 (Rock Mechanics)	x	x	
MINING LAW AND LICENSES	x		x
INTRODUCTION INTO ELECTRICAL ENGINEERING 2 - DESIGN	x	x	
INTRODUCTION INTO MECHANICAL ENGINEERING 2 - DESIGN	x	x	
MINING METHODS - UNDERGROUND MINING 1	x		x
BUSINESS MANAGEMENT Planning and Control	x	x	
MINING METHODS - SURFACE MINING	x		x
ENVIRONMENTAL ENGINEERING		x	x
<b>S6</b>			
MINING EQUIPMENT - SURFACE MINING	x	x	
EARTH AND ROCK REMOVAL	x	x	
CONVEYING AND HAULING TECHNOLOGY 1	x	x	
MINING METHODS - UNDERGROUND MINING 2	x		x
GEOPHYSICS SYSTEMS	x		x
PROJEKT MANAGEMENT		x	
UNDERGROUND EXCAVATION, DRIFTING AND TUNNELING	x	x	
<b>S7</b>			
SHAFT SINKING	x	x	
MINE PLANNING 1			x
CONVEYING AND HAULING TECHNOLOGY 2	x	x	
MINING EQUIPMENT - UNDERGROUND MINING	x		x
CONSTRUCTION MATERIAL SCIENCE 2	x	x	
MINERAL PROCESSING TECHNOLOGY 1	x		x
MINE ECONOMICS			x
<b>S8</b>			
ENGINEERING PROJECT	x	x	
CLEANER PRODUCTION AND ENVIRONMENTAL PROTECTION	x	x	
MINERAL PROCESSING TECHNOLOGY 2	x		x
MINING METHODS - MARINE MINING, OIL AND GAS	x		x
VENTILATION AND CLIMATISATION OF UNDERGROUND MINES	x		x
HEALTH AND SAFETY PROTECTION IN MINING	x		x
MINE PLANNING 2			x
<b>S9</b>			
MINING ENGINEERING PRACTICE (BSc Hons)	x		x
Minimum of 30 weeks in industry			
<b>TOTAL Number of courses BSc Hons Degree as available today</b>		<b>39</b>	<b>19</b>
<b>TOTAL Number of courses</b>	<b>47</b>	<b>57</b>	



## B.Eng. (Mining) – Major Challenges (I)

- Concerns with Entrance Level of Students
  - Unsatisfactory secondary education
  - Entrance tests in English, Maths and Sciences mandatory
  - Most students to pass a bridging year (failure rate 40%)
- Developing Internship Culture in Local Industry
  - No internship offered to young students (years 0 – 2)





## B.Eng. (Mining) – Major Challenges (II)

- Staff Recruitment
  - Locally no experienced lecturers available
  - Complicated work permit procedure for expatriates
  - Low academic income level at university (high staff turnover)
- Staff Qualification Programme
  - Training abroad to qualify local lecturing staff
- Programme Funding
  - Start-up funding allocated, but funds for annual running costs still under negotiation with industry



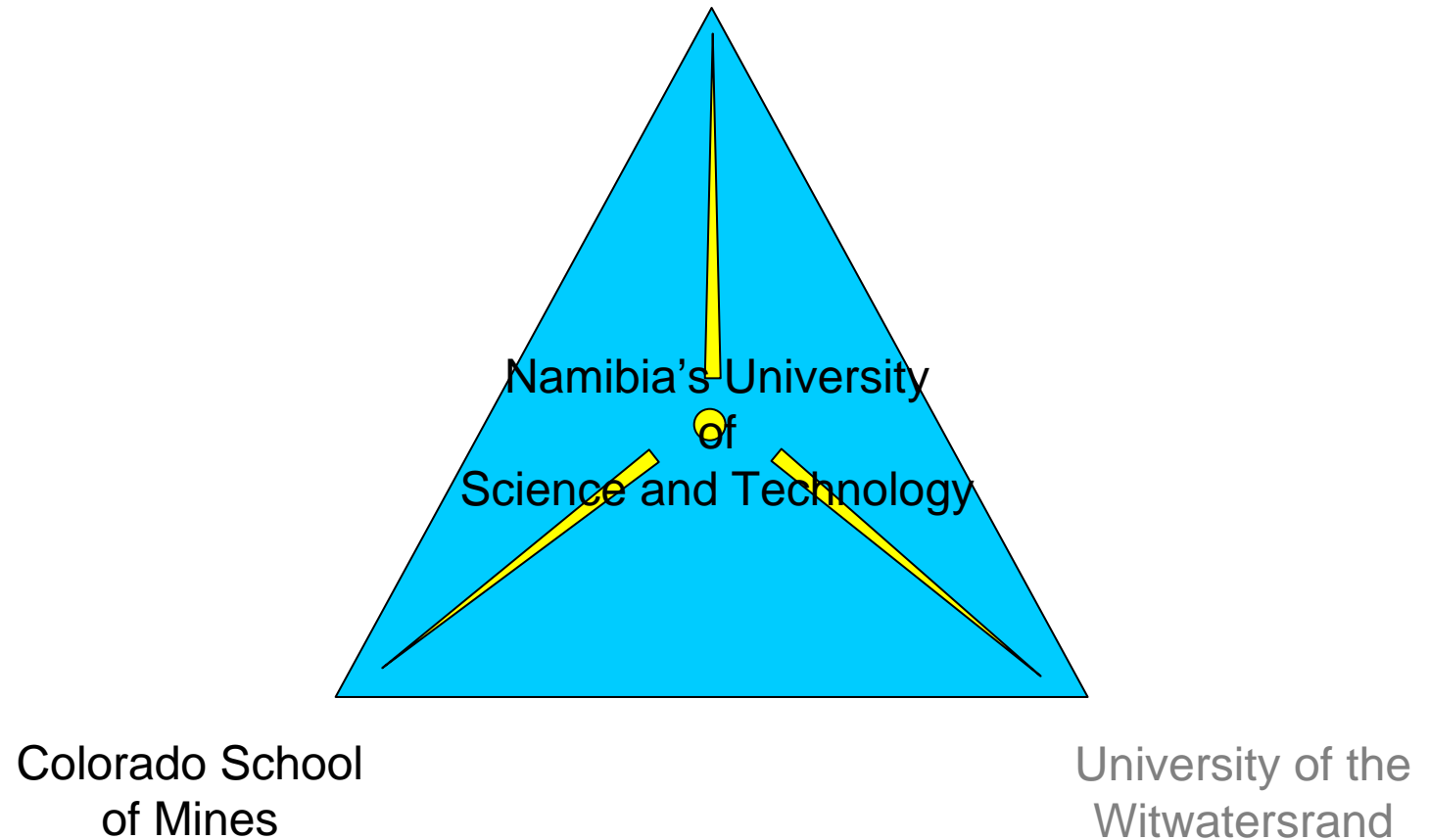
## B.Eng. (Mining) – Time Frame

- Bridging Course (year “0”) is already in place
- Now providing information on the Mining Engineering programme
- January 2009: Starting mining engineering education
- 2014: Graduation of the first class of mining engineers
- New mines coming into production within the next few years will need mining engineers



# International Collaboration

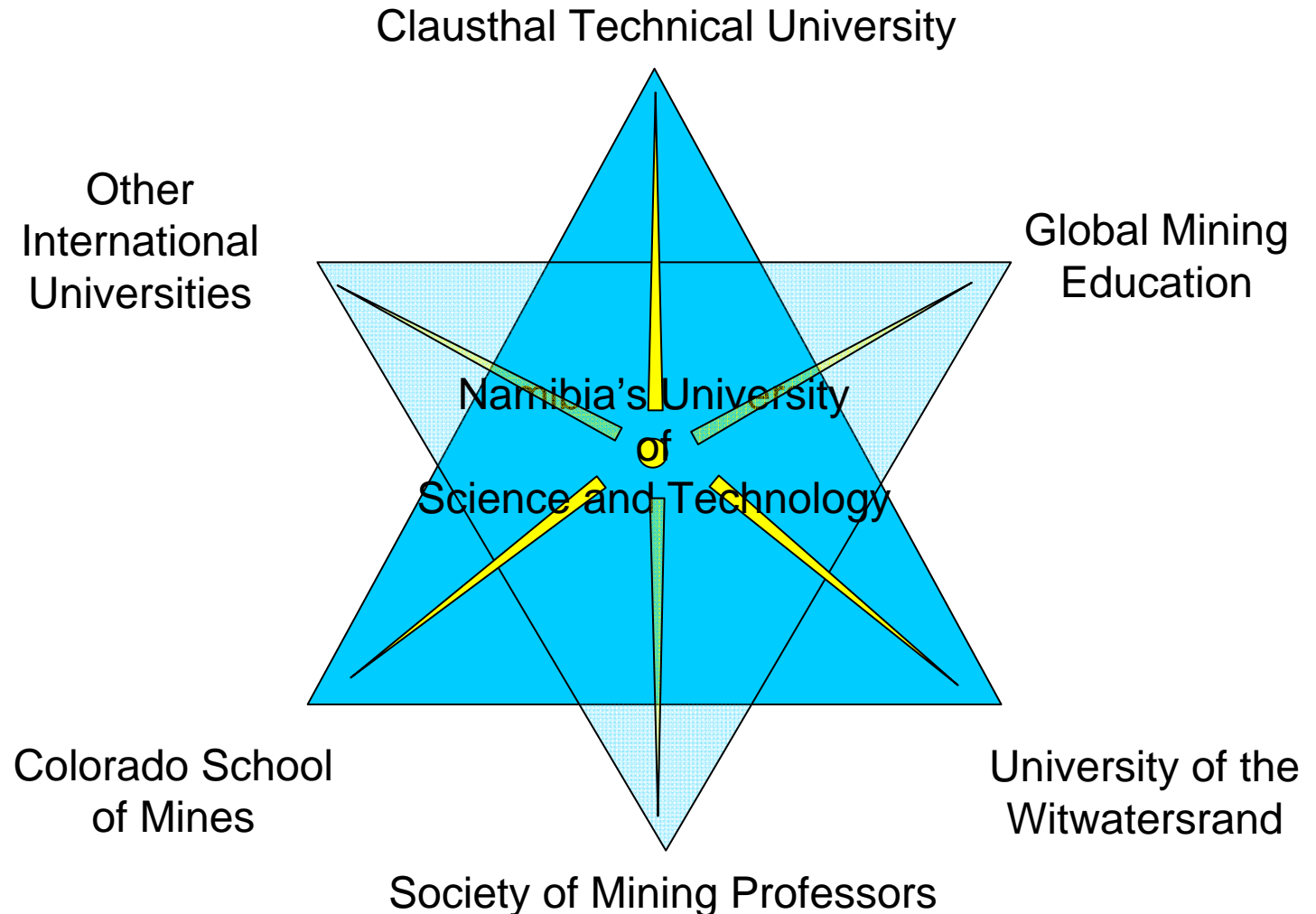
Clausthal Technical University





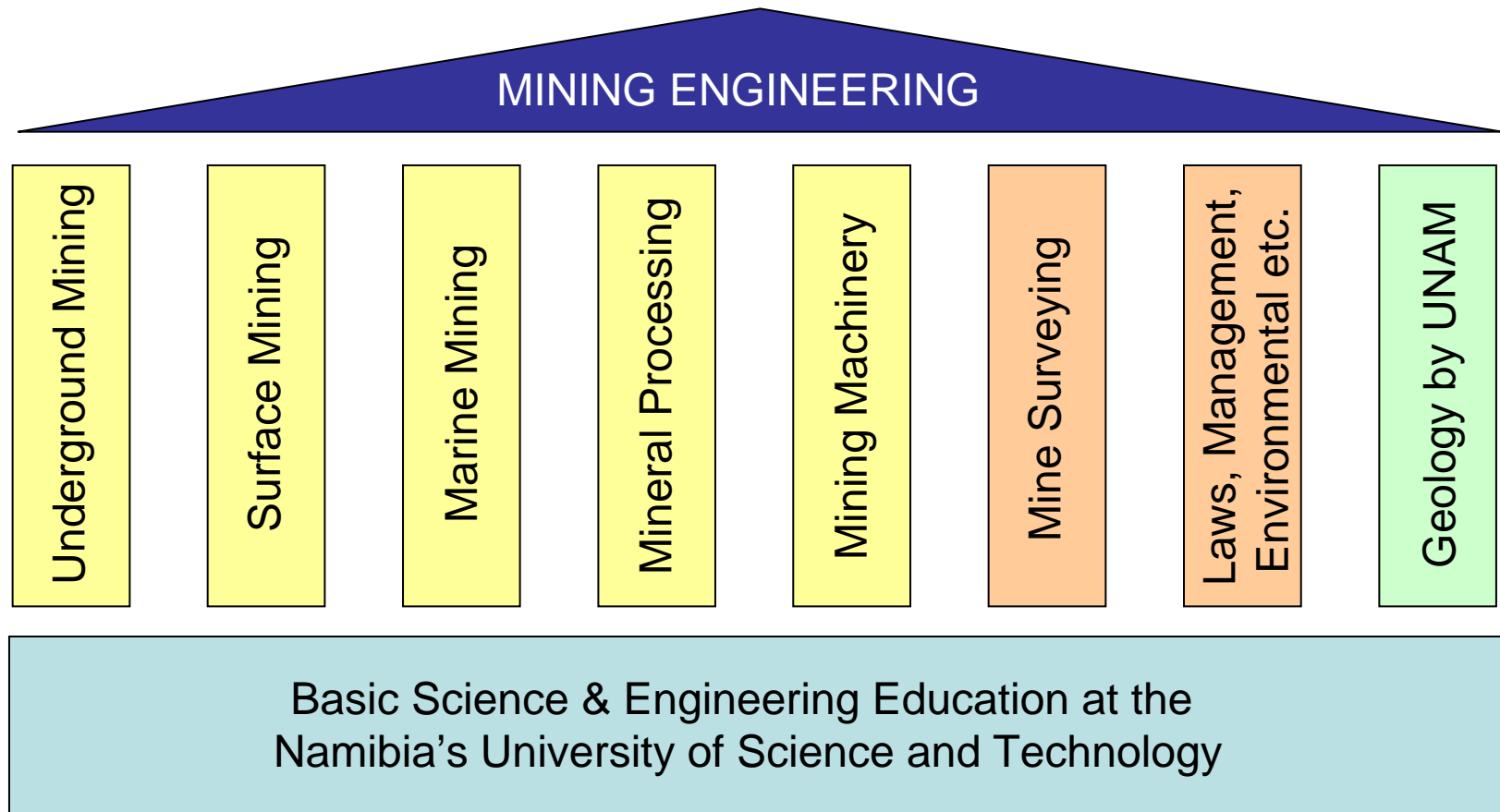


# International Collaboration – Outlook





# Structure of the Department of Mining





## Geo-Centre at NUST



- 1<sup>st</sup> Floor: Classrooms and Mining Laboratories
- 2<sup>nd</sup> Floor: Department of Mining Engineering
- 3<sup>rd</sup> Floor: Geo-Centre

Laying of the Foundation Stone planned for 09/2008





## Engineering Services & Consultancy

- Fully equipped GEO-CENTRE at Polytechnic, funded by German mining company
- Competence and services for the Namibian mining community
  - Mineral Processing
  - Rock Mechanics
  - Mine Ventilation
  - Mining Methods
  - Mine Planning
  - Environmental Engineering



# SWOT: NUST, SoE & DoMin

## Strengths

- no competitors (in Namibia)
- international staff (at NUST)
- excellent reputation in Namibia
- close "industry" ties, bursaries, many projects
- strongly supported by CoM & mining industry
- donor support (CIM + others)
- excellent senior management
- charismatic, visionary Rector
- poor student entrance quality !!!
- research (quantity + quality)
- staff recruitment (at DoMin)
- staff number
- staff qualification

## Weaknesses

## Opportunities

- easy acquisition of donor funds
  - projects, projects, projects
  - international cooperation
- partner in a World Mining Course
- more foreign student recruitments

- insufficient + decreasing GoN funding
- growing competition by RSA universities
  - high staff turnover
- complicated work permit procedure

## Threats



## Conclusion

- Namibian mining industry needs a Namibian mining engineering programme
- Namibia will benefit from a mining engineering programme
- NUST is committed to meeting Namibia's economic development needs
- NUST is committed to developing a mining engineering programme
- NUST is well positioned to start-up and operate a mining engineering programme





## Additional Motivation

- Namibia is the best place in Southern Africa for an additional mining engineering department
- Political stability, accessibility, a functioning COM, existing University of Science and Technology (formerly PoN)
- Mining engineering department in Namibia will benefit the mining industry in the region
- Mining engineering department is important in developing local support for new mining projects in Namibia
- Other Namibian organisations need mining engineers
- Ministry of Mines and Energy is already short on mining engineers



**THANK YOU**

**&**

**GLÜCK AUF!**