National Accounts

Environmental Economic Accounts

Mineral Accounts for South Africa: 1990–2010

Discussion document: D0405.2
March 2013

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Abbreviations and acronyms

Amplats	Anglo American Platinum
DMR	Department of Mineral Resources
GDP	Gross domestic product
Implats	Impala Platinum
MPRDA	Minerals and Petroleum Resources Development Act
PGMs	Platinum group metals
R	South African Rand
R/kg	Rand per kilogram
RRR	Real rate of return
SARS	South African Revenue Service
SBI	Sustainable Budget Index
SDR	Social Discount Rate
SEEA	System of Integrated Environmental and Economic Accounts
SNA	System of National Accounts
Stats SA	Statistics South Africa
USGS	United States Geological Survey

please scroll down

Key findings

The overall mining production (extraction) has gradually decreased over the years under review in this document. Total mineral sales in December 2010 amounted to R302 175 million, of which 81% of sales were for gold, platinum group metals (PGMs), coal and iron ore[1]. In 2010, there were 498 141 employees in the mining and quarrying industry with earnings of R74 226 million[1].

Physical accounts

South Africa's mineral industry, based mainly on gold, coal, PGMs and iron ore production (extraction), has made an important contribution to the national economy.

In 1990, the total gold production (extraction) was 605 tons, declining by 69% to 189 tons in 2010. This decline in gold production led to a decline in the total volume sold. During 2010, the total volume sold for gold was 184 tons valued at R53 093 million. At this current extraction rate, proven gold reserves of 6 000 tons[2] are estimated to last for 32 years from 2010 due to a decrease in closing stock.

During 1990, the production (extraction) of PGMs in South Africa was at 142 tons and increased to 287 tons in 2010, which is a 102% increase in 20 years. The PGM total sales value was at R73 787 million in 2010. At the same rate of extraction as in 2010, proven PGM reserves are expected to last for another 244 years.

In 1990, coal production (extraction) was 175 million tons and in 2010, production (extraction) increased by 46% to 255 million tons. The total volume sold increased with 38% from 185 million tons in 1990 to 255 million tons in 2010. In 2010, coal became the second largest component of the South African mining industry, following platinum with a total value of sales of R73 203 million. The estimated number of years to depletion for proven coal reserves in 2010 was 118 years. Coal resource reserves were 30 156 million tons in 2010, amounting to about 4% of the world's total[3].

The country's production (extraction) of iron ore was 36 million tons in 2002, and it increased to 59 million tons in 2010, which amounts to a 64% increase in 20-year period. The total volume sold increased with 66% from 35 million tons in 2002 to 58 million tons in 2010. In 2010, the iron ore total value of sales was R43 419 million. The estimated number of years to depletion for proven iron ore reserves in 2010 was 25 years.

Resource rent and monetary accounts

The output (sales) for gold increased from R18 994 million in 1990 to R53 093 million in 2010 with an average annual increase of R1 705 million. Intermediate consumption increased from R6 069 million in 1990 to R12 426 million in 2010. Gold mineral asset value for closing stock at 3%, 5% and 11,7% for annual values showed a declining trend for the period 1990 to 2010. The asset value for closing stock at 3%, 5% and 11,7% remained positive in 2010, implying that the industry was economically viable in that year.

PGM output (sales) increased from R5 164 million in 1990 to R73 787 million in 2010 with an average increase of R3 431million from 1990 to 2010.
Intermediate consumption for PGMs increased from R1 652 million in 1990 to R43 652 million in 2010. The closing stock for PGMs at 3%, 5% and 11,7% at annual values was positive in 1990, and started fluctuating from 1992, having negative figures until 2000, and again began to rise and fall, but dropped to negative values for 2009 and 2010.

Coal output (sales) increased from R8 173 million in 1990 to R73 203 million in 2010 with an average increase of R3 252 million from 1990 to 2010. Intermediate consumption of coal increased from R2 080 million in 1990 to R33 764 million in 2010. The closing stock for coal for remained positive from 1990 to 2010 for the 5-year moving averages at discount rates of 3%, 5% and 11,7%.

The output (sales) for iron ore increased from R5 314 million in 2002 to R9 931 million in 2006. The output (sales) continued to climb and reached R43 419 million in 2010 with an average annual increase of R4 233 million. The intermediate consumption of iron ore was R1 187 million in 2002 and increased to R2 792 million in 2010.

User-cost method

The income component (X) for gold at a real rate of return (RRR) of 11,7% remained negative for the 13-year period from 1990 to 2002. The RRR fluctuated with a positive trend during 2003 and 2004, and then it declined for 5 years from 2005 to 2009, ending positively in 2010. The income component in 1990 was -R510 million, increasing to R6 269 million in 2010. The capital reinvestment component increased from -R38 million in 1990 to R187 million in 2010. The capital depreciation factor increased from 7% in 1990 to 9% in 2003 and decreased to 3% in 2010.

The income component (X) for PGMs at an RRR of 11,7% fluctuated over the 20-year period from 1990 to 2010. The income component in 1990 was R523 million, decreasing to -R14 483 million in 2010. The capital reinvestment component remained at zero, followed by the capital depreciation factor with a zero percentage point.

The income component (X) for coal at an RRR of 11,7% fluctuated over the 9-year period, but remained positive from 1990 to 1998. It then became negative between 1999 and 2004, but showed a positive figure in 2001. During 2010, the income component ended positively after a decline between 2002 and 2004. The income component in 1990 was R2 127 million, increasing to R7 503 million in 2010. The capital reinvestment component remained at zero from 1990 to 2010, followed by the capital depreciation factor remaining at a zero percentage.

The income component (X) for iron ore at an RRR of 11,7% declined from 2002 to 2004, and started to increase from 2005 to 2010. In 2002, the income component was R1 041 million, after which it decreased to R590 million in 2004, and then increased to R30 816 million in 2010. The capital reinvestment component at 11,7% fluctuated within a 3-year period from 2002 to 2004, then increased from 2005 until 2010. The capital reinvestment factor increased from R3 million in 2002 to R1 850 million in 2010, remaining positive throughout the 9-year period.

1. Introduction

The mining sector is one of the cornerstones of the economy in South Africa. The mining industry contributes to economic activities, the development of sustainable job opportunities as well as foreign exchange earnings. These natural resources are extracted by the mining industry for different economic activities. The mining sector contributes about 18% to the country's corporate tax receipts. Even though the mining activities consume 15% of the national electricity, the sector still contributes more than 95% towards the country's electricity generation[4].

The main gold producing area is concentrated in the Witwatersrand Basin. This mineral accounts discussion document is the seventh edition in the series produced by Statistics South Africa (Stats SA) for the reference period 1990 to 2010. The compilation of mineral accounts follows the System of National Accounts (SNA) principles, and the information is presented in the form of physical, monetary as well as resource rent accounts. The results in this document are also presented by using the El-Serafy's User-cost method in table format. Geographical representations of the active mines in South Africa are shown in the document. Stats SA uses the System of Integrated Environmental and Economic Accounts (SEEA) framework as the guideline in the compilation of the mineral accounts[5].

Section 2 presents the importance of mineral accounts in South Africa. Section 3 presents the updated physical accounts for South Africa where the production (extraction) rate and years to depletion are shown. In section 4, the resource rent accounts are presented along with a summary of the results. In section 5, the monetary accounts are presented with monetary values of South Africa's proven gold, PGM, coal and iron ore reserves. The monetary accounts are developed with the resource rent accounts as its basis. Section 6 focuses on the concept of sustainability and the approaches on how to measure sustainability with the El-Serafy's User-cost method[6].

2. The importance of mineral accounts for South Africa

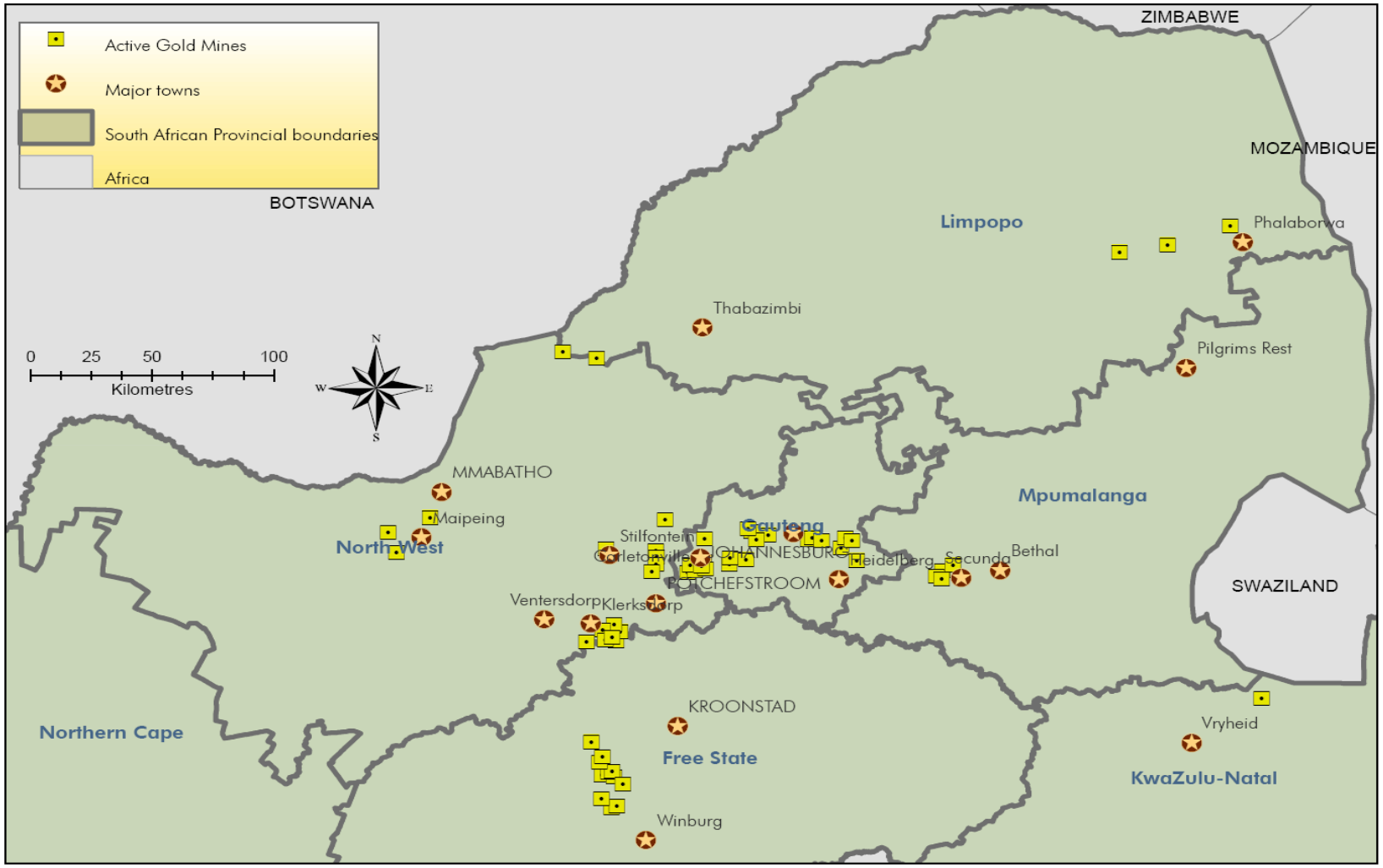
The mineral accounts can be used to derive several valuable indicators of sustainability for policy-makers. Mining has been the main driving force behind the history and development of South Africa's economy. Mining continues to support and stimulate growth and development in the country. Mining companies contribute extensively to South Africa's tax base. Rail, road and port development is spurred on by the development of new and extended mining operations. New towns are established in mineral rich areas and attract investment into the economy. South Africa holds a major economic and physical presence on the African continent regarding mining[7]. In the past 100 years, mining has been the mainstay of the economy and has contributed significantly to the industrial development of the country. In the past 10 years, the development of export-oriented value-added processing aluminium, ferro-alloys, steel, and titanium industries has become an important component of the mineral economy of South Africa. The development of these value-added industries along with an expansion in coal exports and an increase in PGM prices has helped compensate for the declining contribution of gold in the economy. Owing to the high cost of deep gold mining in South Africa and the decline in the world market price for gold, gold export earnings have dropped. It is estimated by the Chamber of Mines that in 2009, around R200 000 million was added to the local economy through the intermediate and final product industries that used minerals produced by South Africa's mines[7].

Map 1 illustrates the geographical positions of active gold, PGM, coal, and iron ore mines in South Africa. The majority of mining activities occur in Gauteng, Free State, Mpumalanga, North West and KwaZulu-Natal. Map 2 illustrates the location of active gold mines in South Africa, of which most are located in Gauteng. Map 3 illustrates the location of active PGM mines in South Africa, predominantly in North West and Limpopo. Map 4 illustrates all the active coal mines in South Africa, mostly located in Mpumalanga. Map 5 indicates the location of active iron ore mines in the country, mostly in Limpopo. From these geographical maps, it is shown which provinces and towns engage in mining activities[8].

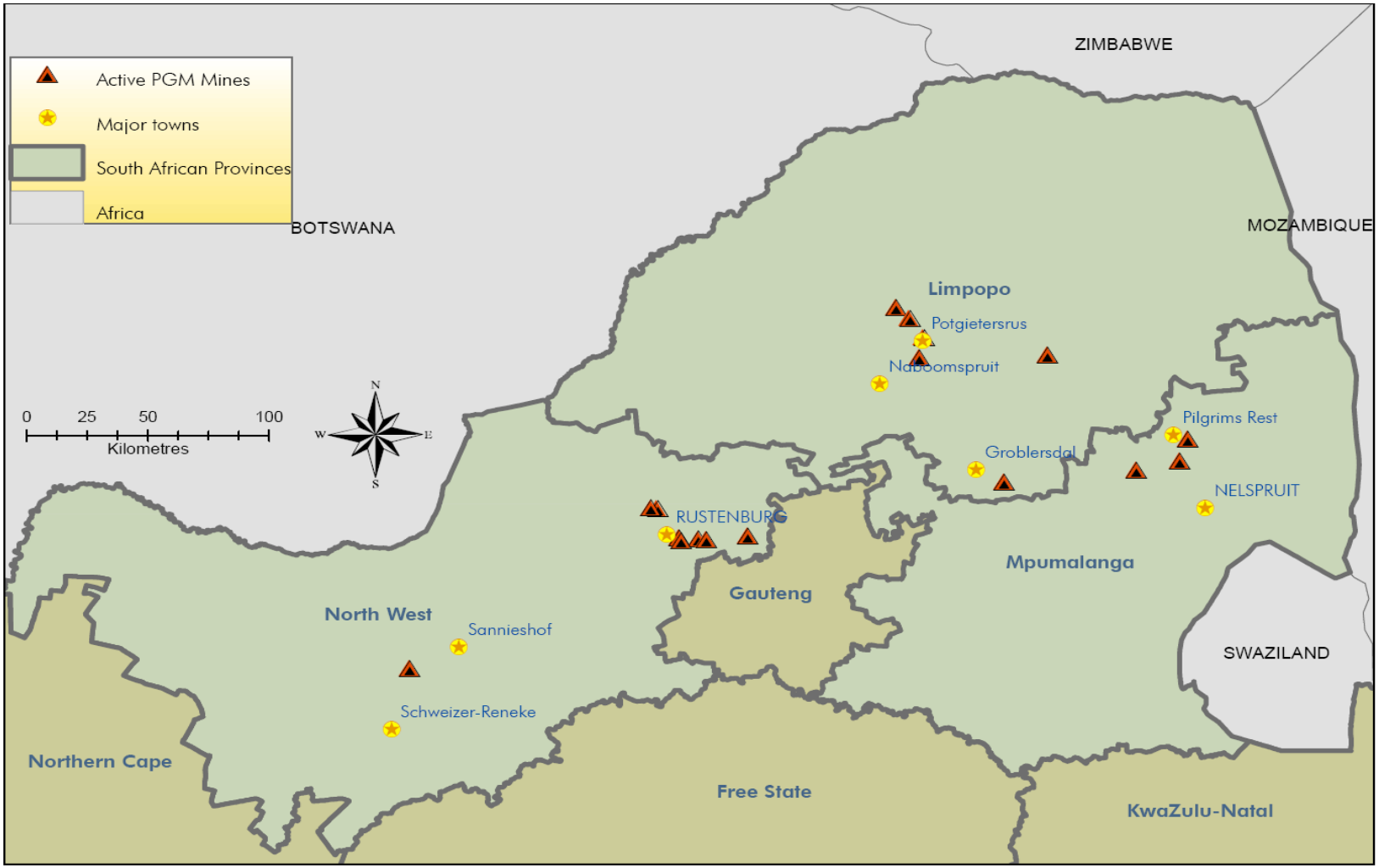
Through mineral accounts it is possible to measure the sustainability of these resources through depletion rates. This information provides a picture to government who has to make strategic plans around economic growth. Some minerals, such as gold, are increasingly difficult to exploit due to the great depths from which the ore needs to be extracted and the associated cost of extraction. If the resources are depleted or are no longer economically viable to extract, the mines could close down, impacting on the economy, society and infrastructure. The calculation of physical volumes of minerals and the years left to depletion is provided by the mineral accounts. Resource rents provided by mining activities, the portion of these rents that should be re-invested to maintain a constant stream of income (capital component), or the residual amount that can be consumed as current income (income component) form part of the calculations in the mineral accounts.

Map 1: Active gold, platinum group metals, coal and iron ore mines in South Africa[8]

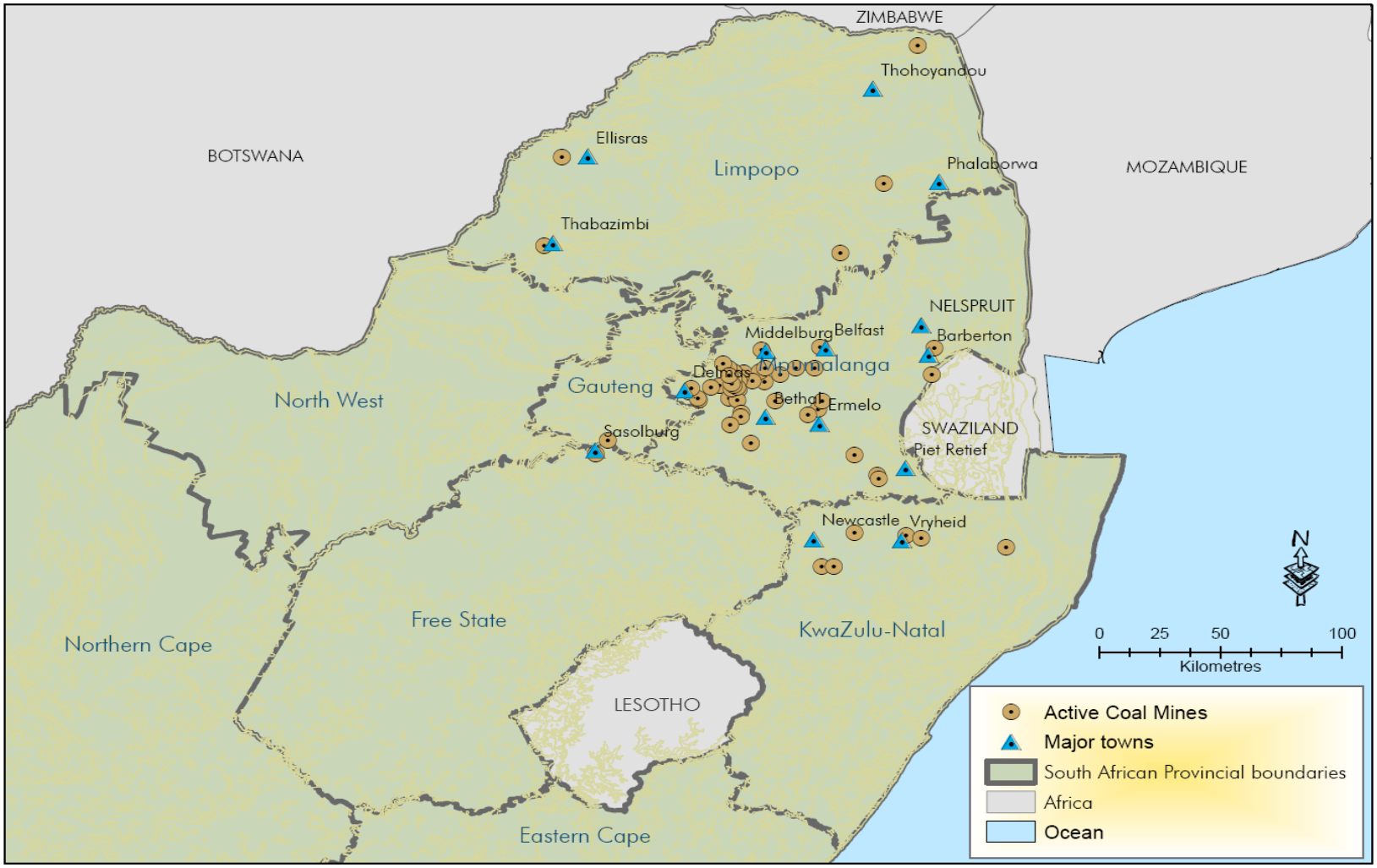
Map 2: Active gold mines in South Africa[8]



Map 3: Active platinum group metals mines in South Africa[8]



Map 4: Active coal mines in South Africa[8]



Map 5: Active iron ore mines in South Africa[8]

3. Physical accounts for the South African mining industry

Physical accounts provide information on mineral volume changes. This section presents the updated physical accounts for gold, PGMs, and coal for the reference period 1990 to 2010, and for iron ore for the reference period 2002 to 2010. The physical accounts consist of the following components: opening stock; production (extraction); closing stock (sub-soil assets); total volume sold; net change in inventories; closing stock (including inventories); and years to depletion of the particular mineral. These different components enable the monitoring of the physical volumes of mineral resources.

3.1 Gold

South Africa was the world's largest gold producer until 2007, when China overtook South Africa to become the largest producer of gold. According to the South Africa's Mineral Industry[2] (SAMI), South Africa stopped its almost decade-long trend of falling gold production. During 2010, China continued to remain the leading gold-producing nation, followed by Australia, the United States, Russia and South Africa. South African proven gold reserves decreased from 31 000 tons to 6 000 tons in 2010 as estimated by the United States Geological Survey (USGS)[2], making South Africa the second largest holder of proven gold reserves in the world. Australia is ranked number one, Russia ranked third, and the United States of America was ranked fourth[4].

The South African mineral industry is export-oriented. Physical accounts for gold are presented in Table 1. Table 1 indicates that the rate of production (extraction) of gold has declined throughout the 20-year period from 1990 to 2010. In 1990, the total production (extraction) was 605 tons, declining by 69% to 189 tons in 2010. The total volume of gold sold also continued to decline with 69% over the same period from 596 tons to 184 tons, with the years to depletion estimated at 32 years in 2010 (refer to Figure 1).

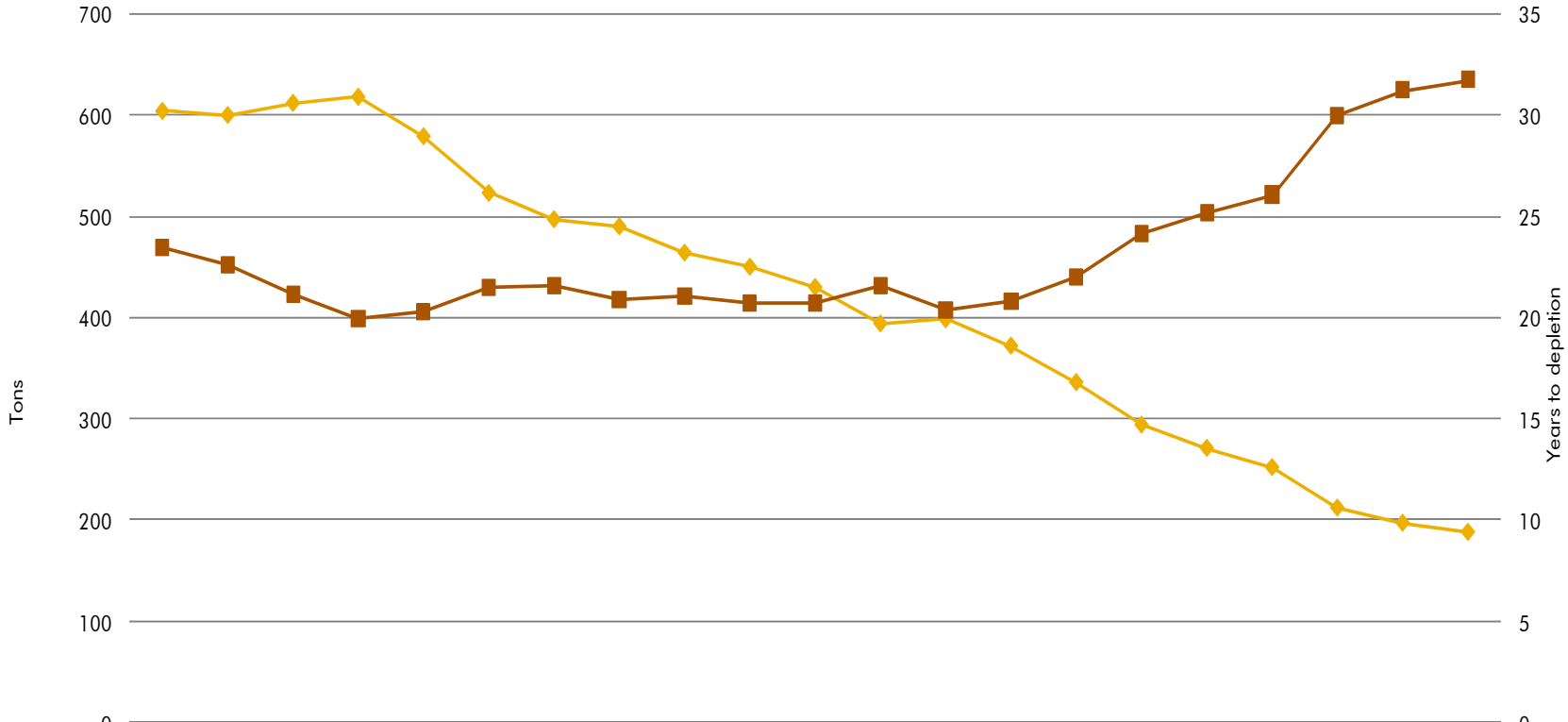
South Africa's gold production (extraction) decreased by 5% from 198 tons in 2009 to 189 tons in 2010 due to the global economic crisis in 2009, which resulted in a declining demand for commodities. Employment in the gold mining sector also declined from 159 925 employees in 2009 to 157 091 employees in 2010[1].

Table 1: Gold: physical accounts for South Africa, 1990–2010[1]

Year	Opening stock	Production (extraction)	Discoveries	Other volume changes	Closing stock (sub-soil assets)	Total volume sold	Net changes in inventories	Closing stock (including inventories)	Years to depletion
	Tons								
1990	14 802	605	0	0	14 197	596	9	14 206	23
1991	14 197	601	0	0	13 596	601	0	13 596	23
1992	13 596	613	0	0	12 983	613	0	12 983	21
1993	12 983	619	0	0	12 364	619	0	12 364	20
1994	12 364	580	0	0	11 784	580	0	11 784	20
1995	11 784	524	0	0	11 260	524	0	11 260	21
1996	11 260	498	0	0	10 762	496	2	10 764	22
1997	10 762	491	0	0	10 271	508	-17	10 254	21
1998	10 271	465	0	0	9 806	465	0	9 806	21
1999	9 806	451	0	0	9 355	455	-4	9 351	21
2000	9 355	431	0	0	8 924	406	25	8 949	21
2001	8 924	395	0	0	8 529	387	8	8 537	22
2002	8 529	399	0	0	8 130	396	3	8 133	20
2003	8 130	373	0	0	7 757	376	-3	7 754	21
2004	7 757	337	0	0	7 420	347	-10	7 410	22
2005	7 420	295	0	0	7 125	270	25	7 150	24
2006	7 125	272	0	0	6 853	283	-11	6 842	25
2007	6 853	253	0	0	6 600	243	10	6 610	26
2008	6 600	213	0	0	6 387	199	14	6 401	30
2009	6 387	198	0	0	6 189	187	11	6 200	31
2010	6 189	189	0	0	6 000	184	5	6 005	32

Notes: Discoveries = 0 due to confidentiality in the mining industry.
Where figures have been rounded, discrepancies may occur with totals.

Figure 1: Gold: production (extraction) and years to depletion, 1990–2010[1]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production (extraction)	605	601	613	619	580	524	498	491	465	451	431	395	399	373	337	295	272	253	213	198	189
Years to depletion	23	23	21	20	20	21	22	21	21	21	21	22	20	21	22	24	25	26	30	31	32

Calculations: Statistics South Africa.

3.2 Platinum group metals

Anglo American Platinum (Amplats) is the world's largest platinum and palladium producer. Other major producers in the country are Anooraq, Impala Platinum (Implats), Northam Platinum, Aquarius Platinum and Lonmin[4]. PGMs constitute six components, which include platinum, palladium, rhodium, ruthenium, iridium and osmium. They are divided according to their densities into a heavier category (platinum, iridium and osmium) and a lighter group (palladium, rhodium and ruthenium). The PGM production (extraction) increased from 271 tons in 2009 to 287 tons in 2010 (refer to Table 2).

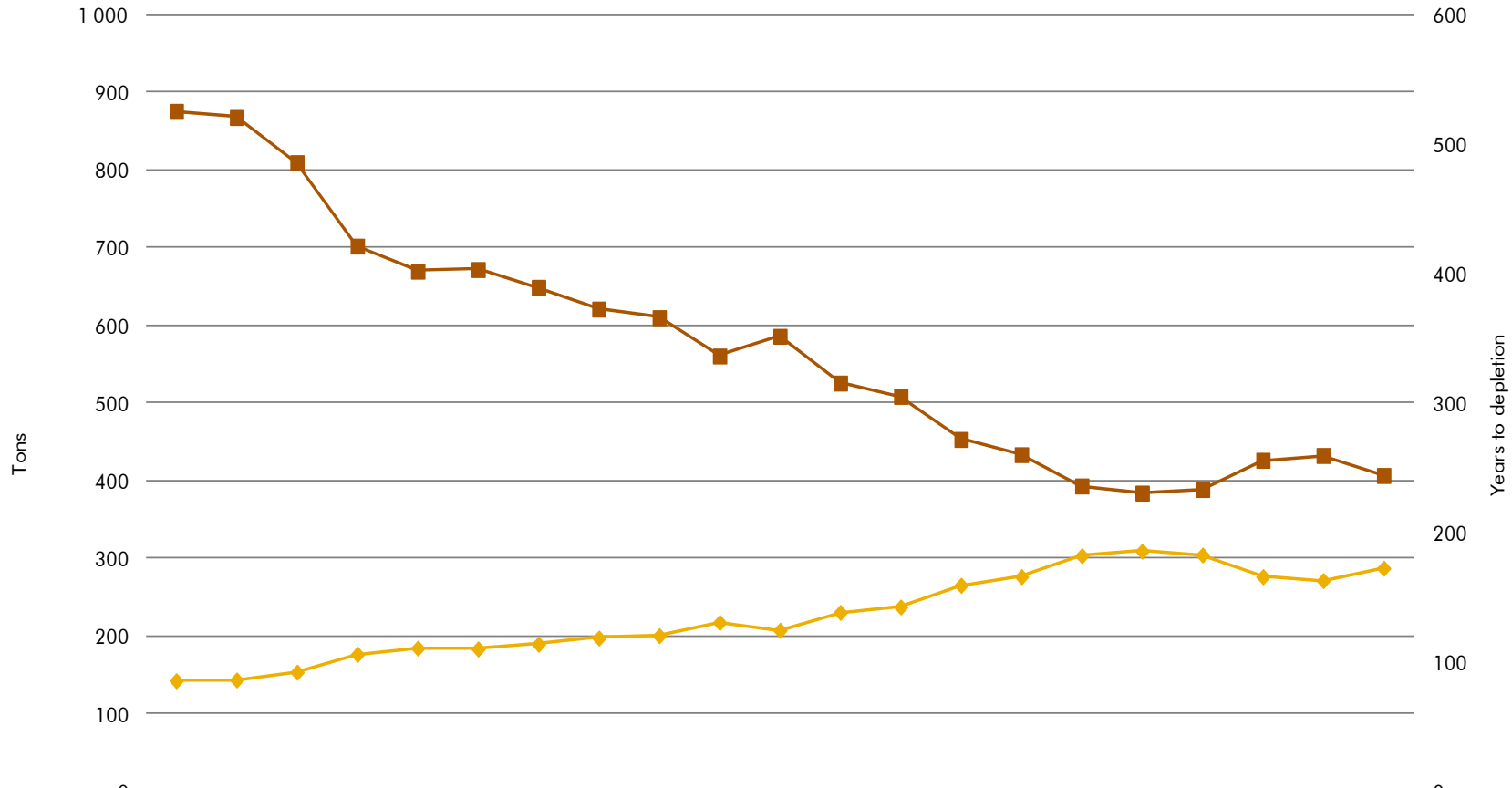
In 1990, PGM total volumes sold was 136 tons and increased to 251 tons in 2009 (refer to Table 2). The demand for platinum went down in 2009, affecting the sales for the next year and resulting in a 3% decrease in total volumes sold to 244 tons in 2010. Figure 2 illustrates that increases in production (extraction) resulted in a decrease in the years to depletion. In 1990, South African PGMs were estimated at 525 years to depletion. In 2010, the years to depletion decreased to an estimated 244 years, which is a 54% decrease in the 20-year period (refer to Table 2 and Figure 2).

Table 2: Platinum group metals: physical accounts for South Africa, 1990–2010[1]

Year	Opening stock	Production (extraction)	Discoveries	Other volume changes	Closing stock (sub-soil assets)	Total volume sold	Net changes in inventories	Closing stock (including inventories)	Years to depletion
	Tons								
1990	74 749	142	0	0	74 607	136	6	74 613	525
1991	74 607	143	0	0	74 464	141	2	74 466	521
1992	74 464	153	0	0	74 311	137	16	74 327	486
1993	74 311	176	0	0	74 135	154	22	74 157	421
1994	74 135	184	0	0	73 951	162	22	73 973	402
1995	73 951	183	0	0	73 768	175	8	73 776	403
1996	73 768	189	0	0	73 579	184	5	73 584	389
1997	73 579	197	0	0	73 382	187	10	73 392	372
1998	73 382	200	0	0	73 182	194	6	73 188	366
1999	73 182	217	0	0	72 965	199	18	72 983	336
2000	72 965	207	0	0	72 758	199	8	72 766	351
2001	72 758	230	0	0	72 528	193	37	72 565	315
2002	72 528	237	0	0	72 291	208	29	72 320	305
2003	72 291	265	0	0	72 026	241	24	72 050	272
2004	72 026	276	0	0	71 750	260	16	71 766	260
2005	71 750	303	0	0	71 447	259	44	71 491	236
2006	71 447	309	0	0	71 138	266	43	71 181	230
2007	71 138	304	0	0	70 834	258	46	70 880	233
2008	70 834	276	0	0	70 558	223	53	70 611	256
2009	70 558	271	0	0	70 287	251	20	70 307	259
2010	70 287	287	0	0	70 000	244	43	70 043	244

Notes: Discoveries = 0 due to confidentiality in mining industry.
Where figures have been rounded, discrepancies may occur with totals.

Figure 2: Platinum group metals: production (extraction) and years to depletion, 1990–2010[1]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production (extraction)	142	143	153	176	184	183	189	197	200	217	207	230	237	265	276	303	309	304	276	271	287
Years to depletion	525	521	486	421	402	403	389	372	366	336	351	315	305	272	260	236	230	233	256	259	244

Calculations: Statistics South Africa.

3.3 Coal

The Emalahleni coalfields in Mpumalanga are the most important source of South Africa's coal mines. The bituminous coal and other anthracite resources can also be found in the Karoo Basin that extends through Mpumalanga, KwaZulu-Natal, Free State, and in Limpopo. During 2010, the production (extraction) of coal was 255 million tons, making South Africa the seventh largest coal producing country in the world[4].

Coal production (extraction) increased steadily over the years until 2010 (refer to Table 3 and Figure 3), with export sales also increasing from 1990 until 2000, after which started to fluctuate from 2001 until 2010. South Africa is ranked number eight in the world due to the amount of proven coal reserves (30 156 million tons[4].)

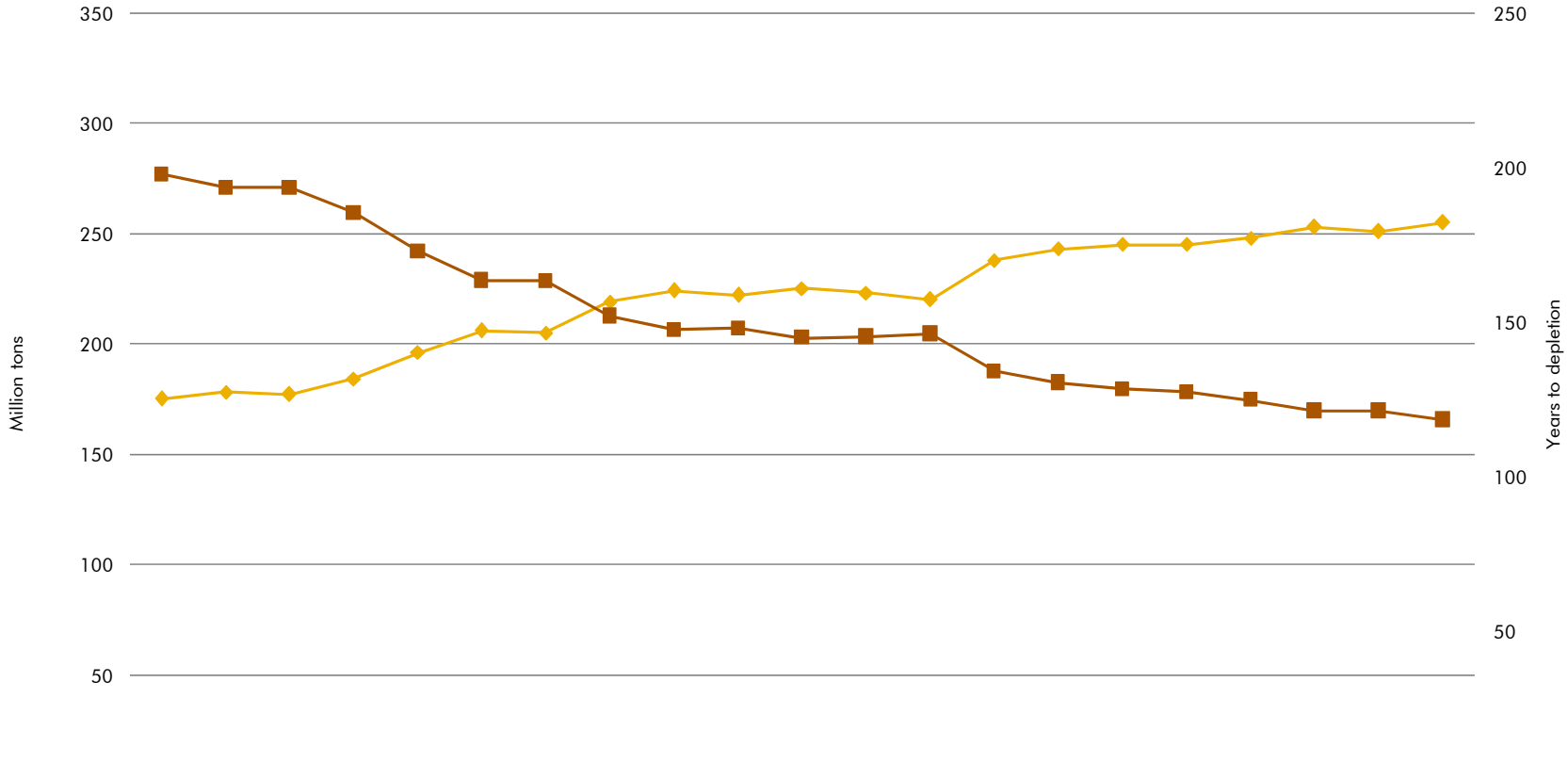
During 1990, coal production (extraction) was 175 million tons. In 2010 the production (extraction) increased to 255 million tons, representing an increase of 46% over the period 1990–2010 (refer to Table 3). An increase in production (extraction) has resulted in the estimated years to depletion decreasing by 40% over the 20-year period. In 1990 there were an estimated 198 years to depletion and in 2010, the estimated years to depletion decreased to 118 years. Domestic sales increased from 185 million tons in 2009 to 188 million tons in 2010[1].

Table 3: Coal: physical accounts for South Africa, 1990–2010[1]

Year	Opening stock	Production (extraction)	Discoveries	Other volume changes	Closing stock (sub-soil assets)	Total volume sold	Net changes in inventories	Closing stock (including inventories)	Years to depletion
	Million tons								
1990	34 788	175	0	0	34 613	185	-10	34 603	198
1991	34 613	178	0	0	34 435	182	-4	34 431	193
1992	34 435	177	0	0	34 258	179	-2	34 256	194
1993	34 258	184	0	0	34 074	184	0	34 074	185
1994	34 074	196	0	0	33 878	194	2	33 880	173
1995	33 878	206	0	0	33 672	206	0	33 672	163
1996	33 672	205	0	0	33 467	206	-1	33 466	163
1997	33 467	219	0	0	33 248	217	2	33 250	152
1998	33 248	224	0	0	33 024	224	0	33 024	147
1999	33 024	222	0	0	32 802	222	0	32 802	148
2000	32 802	225	0	0	32 577	225	0	32 577	145
2001	32 577	223	0	0	32 354	221	2	32 356	145
2002	32 354	220	0	0	32 134	227	-7	32 127	146
2003	32 134	238	0	0	31 896	241	-3	31 893	134
2004	31 896	243	0	0	31 653	247	-4	31 649	130
2005	31 653	245	0	0	31 408	245	0	31 408	128
2006	31 408	245	0	0	31 163	246	-1	31 162	127
2007	31 163	248	0	0	30 915	250	-2	30 913	125
2008	30 915	253	0	0	30 662	258	-5	30 657	121
2009	30 662	251	0	0	30 411	245	6	30 417	121
2010	30 411	255	0	0	30 156	255	0	30 156	118

Note: Discoveries = 0 due to confidentiality in mining industry.
Where figures have been rounded, discrepancies may occur with totals.

Figure 3: Coal: production (extraction) and years to depletion, 1990–2010[1]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production (extraction)	175	178	177	184	196	206	205	219	224	222	225	223	220	238	243	245	245	248	253	251	255
Years to depletion	198	193	194	185	173	163	163	152	147	148	145	145	146	134	130	128	127	125	121	121	118

Calculations: Statistics South Africa.

3.4. Iron ore

Iron ore is one of the main ferrous minerals produced in South Africa. The country is regarded as the largest producer of chromium and vanadium ores[4]. It produces significant iron and manganese ores, and is a supplier of manganese alloys, ferrosilicon and silicon metal. Iron ore mining is located in the Bushveld Complex, around the Transvaal Supergroup. The iron ore resources amount to 0,9% of the world's total, making South Africa number 9 in the world ranking for the production of iron ore[4]. The international crude and stainless steel manufacturing industries consume 90% of the ferrous minerals, driving the demand of these minerals[4].

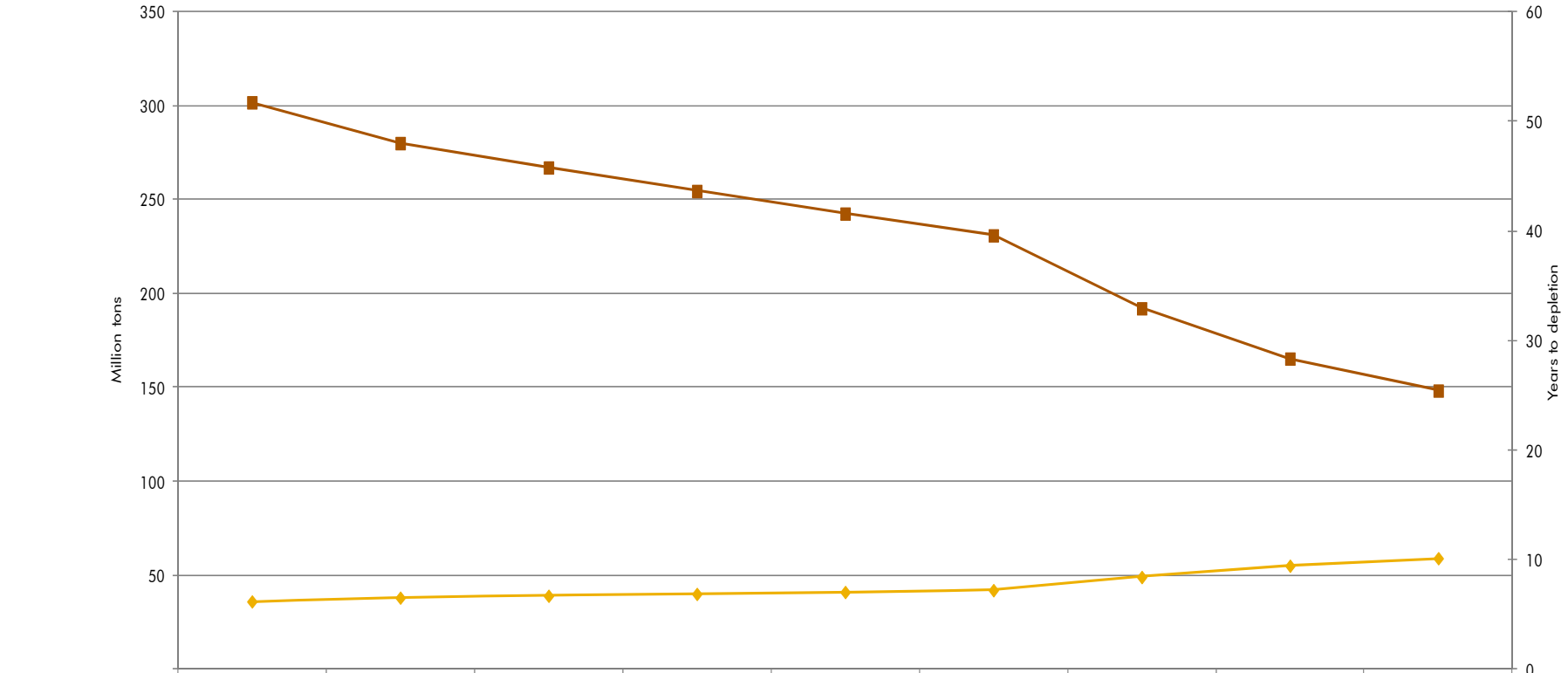
During 2002, iron ore production (extraction) was 36 million tons. In 2010, the production (extraction) increased to 59 million tons, representing an increase of 64% over the 9-year period (refer to Table 4). An increase in production (extraction) has caused the years to depletion to decrease by 52% over the 9-year period under review. In 2002 there were an estimated 52 years to depletion, and in 2010, the estimated years to depletion decreased to 25 years. Domestic sales increased from 8 million tons in 2009 to 11 million tons in 2010[1].

Table 4: Iron ore: physical accounts for South Africa, 2002–2010[1]

Year	Opening stock	Production (extraction)	Discoveries	Other volume changes	Closing stock (sub-soil assets)	Total volume sold	Net changes in inventories	Closing stock (including inventories)	Years to depletion
	Million tons								
2002	1 899	36	0	0	1 863	35	1	1 864	52
2003	1 863	38	0	0	1 825	36	2	1 827	48
2004	1 825	39	0	0	1 786	37	2	1 788	46
2005	1 786	40	0	0	1 746	39	1	1 747	44
2006	1 746	41	0	0	1 705	39	2	1 707	42
2007	1 705	42	0	0	1 663	43	1	1 662	40
2008	1 663	49	0	0	1 614	44	5	1 619	33
2009	1 614	55	0	0	1 559	53	2	1 561	28
2010	1 559	59	0	0	1 500	58	1	1 501	25

Notes: Discoveries = 0 due to confidentiality in the mining industry.
Where figures have been rounded, discrepancies may occur with totals.

Figure 4: Iron ore: production (extraction) and years to depletion, 2002–2010[1]



	2002	2003	2004	2005	2006	2007	2008	2009	2010
Production (extraction)	36	38	39	40	41	42	49	55	59
Years to depletion	52	48	46	44	42	40	33	28	25

Calculations: Statistics South Africa.

4. Resource rent accounts for the South African mining industry

The economic value of the mineral resources itself is measured by the resource rent. The resource rent is an extra economic return over and above the costs of extraction, and indicates the abundance or scarcity of a resource. The resource rent is used to calculate the value of the stock of a resource, which is necessary for an economic assessment of the state of natural capital and decisions about resource management[9]. The recovery of the resource rent by the government is essential for sustainable management of both renewable resources like fisheries, and non-renewable resources, such as minerals. In some countries, certain natural resources like minerals belong to the state, but in South Africa, private enterprises are granted leases by government, permitting them to extract mineral deposits over a specified period in return for the rent repayment. These payments are often described as royalties, but they are essentially rents that accrue to owners of the assets in return for putting them at the disposal of other institutions for a specified time. From an economic perspective, sustainable and equitable resource management requires that the resource rent be recovered by the government through appropriate taxes and used for the benefit of the country and its citizens[9].

This section discusses resource rent calculations for South Africa's gold, PGM, coal and iron ore industries (refer to Tables 5–8), how much rent government should collect, and what the resource rent should be used for. The resource rent tables show output (sales), intermediate consumption, compensation of employees, unit rent, resource rent, and other calculations for 1990 to 2010. The Social Discount Rates (SDR) that are used in the resource rent calculation in this discussion document are 3%, 5% and 11,7%.

This section also provides a summary of resource rent values in the mining industry in South Africa, specific to each mineral and the relevant year. Negative resource rent values may be an indication that during that specific period it was not economically viable for mines to sustain their production (extraction) rates.

4.1 Gold

Table 5 presents the resource rent and other calculations for 1990 to 2010 at current prices. Gold output (sales) increased from R18 994 million in 1990 to R53 093 million in 2010. Figure 5 shows how gold output (sales), intermediate consumption and consumption of fixed capital followed a similar trend. Resource rents at 3%, 5% and 11,7% have increased for the years 1990 to 2010. The negative resource rents are presented at 11,7% SDR from 1990 to 2009 except for 2003 and 2004; and climbed to R 6 456 million in 2010.

Table 5: Gold: resource rent and other calculations for South Africa, 1990–2010[1, 10, 11]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Rand million										
Output (sales)	18 994	19 296	19 513	23 239	24 953	23 465	26 468	24 905	24 295	24 915	25 190
Intermediate consumption	6 069	7 511	8 232	9 314	10 870	11 579	12 102	12 508	12 226	12 558	11 876
Compensation of employees											
Total	6 720	6 849	6 940	7 217	7 612	8 292	8 807	9 613	9 372	9 100	9 846
Male	6 585	6 701	6 795	7 068	7 462	8 107	8 602	9 390	9 164	8 902	9 623
Female	135	148	145	149	150	185	205	223	208	198	224
Consumption of fixed capital	2 069	2 331	2 567	2 808	3 090	3 382	3 661	3 948	4 125	4 370	4 734
Opportunity cost of capital											
SDR 3%	1 201	1 318	1 411	1 499	1 595	1 693	1 779	1 862	1 875	1 917	2 002
SDR 5%	2 002	2 196	2 352	2 498	2 659	2 822	2 964	3 103	3 125	3 195	3 337
SDR 11,7%	4 684	5 139	5 503	5 845	6 221	6 604	6 937	7 261	7 313	7 477	7 808
Rent											
SDR 3%	2 935	1 288	363	2 401	1 786	-1 481	119	-3 026	-3 304	-3 030	-3 268
SDR 5%	2 135	409	-578	1 402	723	-2 610	-1 067	-4 267	-4 554	-4 308	-4 603
SDR 11,7%	-548	-2 534	-3 729	-1 945	-2 840	-6 391	-5 039	-8 425	-8 742	-8 590	-9 074
Unit rent (R/kg)											
SDR 3%	4 852	2 142	592	3 880	3 080	-2 826	238	-6 162	-7 105	-6 719	-7 583
SDR 5%	3 528	681	-943	2 265	1 246	-4 980	-2 143	-8 690	-9 794	-9 553	-10 680
SDR 11,7%	-905	-4 216	-6 083	-3 142	-4 896	-12 197	-10 119	-17 159	-18 800	-19 047	-21 054
Unit rent (R/kg) 5-year moving average											
SDR 3%	4 852	3 497	2 529	2 866	2 909	1 374	993	-358	-2 555	-4 515	-5 466
SDR 5%	3 528	2 104	1 089	1 383	1 356	-346	-911	-2 460	-4 872	-7 032	-8 172
SDR 11,7%	-905	-2 560	-3 735	-3 586	-3 848	-6 107	-7 287	-9 503	-12 634	-15 464	-17 236

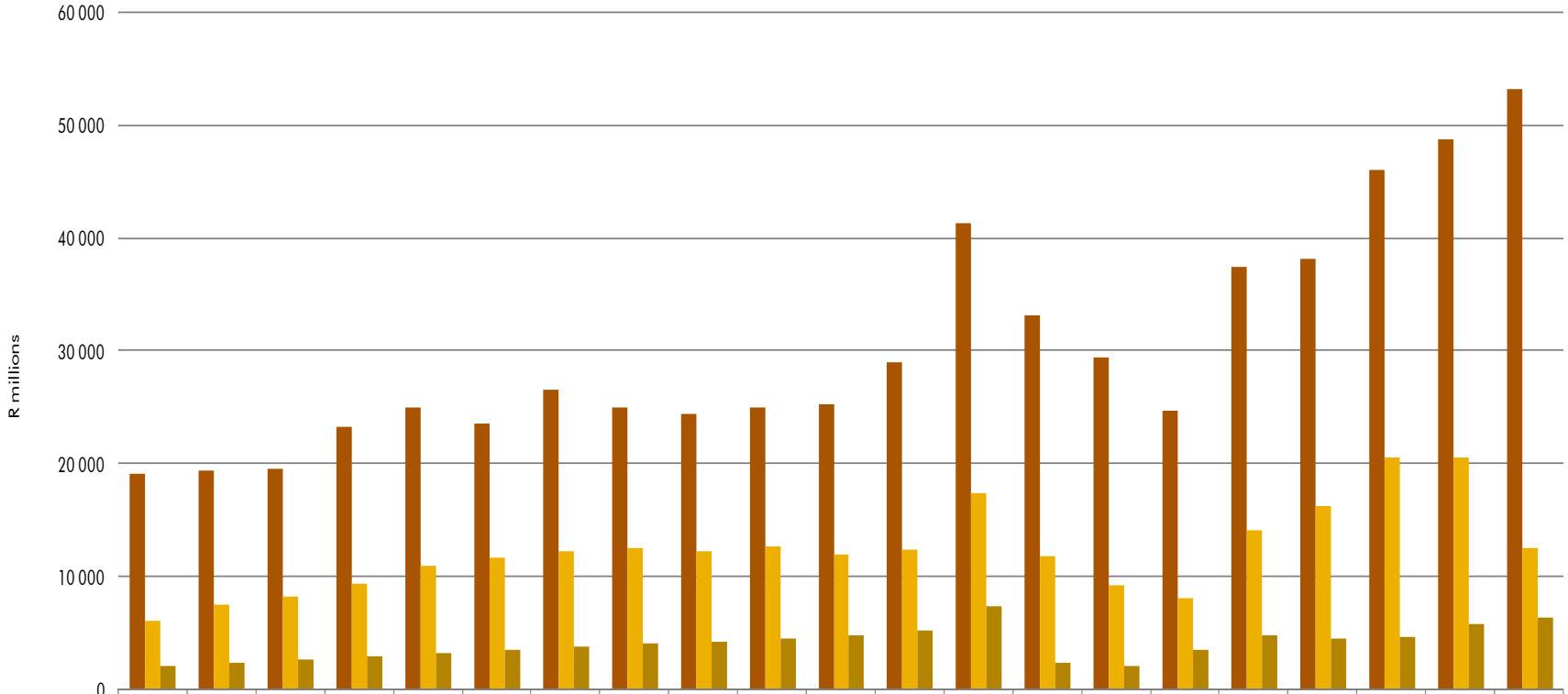
Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 5: Gold: resource rent and other calculations for South Africa, 1990–2010 (concluded)[1, 10, 11]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
						Rand million				
Output (sales)	28 904	41 222	33 053	29 330	24 601	37 443	38 036	45 992	48 696	53 093
Intermediate consumption	12 358	17 353	11 765	9 133	8 077	13 965	16 115	20 409	20 544	12 426
Compensation of employees										
Total	10 904	11 324	12 496	12 610	12 153	12 865	14 506	15 960	17 371	19 878
Male	10 674	11 081	12 219	12 320	11 787	12 435	13 958	15 248	16 339	18 481
Female	230	243	277	289	367	430	549	712	1 032	1 397
Consumption of fixed capital	5 113	7 292	2 309	2 049	3 442	4 658	4 391	4 539	5 797	6 242
Opportunity cost of capital										
SDR 3%	2 087	2 976	1 019	904	1 232	2 078	1 726	2 345	1 998	2 075
SDR 5%	3 478	4 960	1 698	1 507	2 053	3 464	2 877	3 908	3 330	3 458
SDR 11,7%	8 959	12 777	3 973	3 526	4 805	8 106	6 731	9 144	7 791	8 091
Rent										
SDR 3%	-1 557	2 278	5 464	4 635	-303	3 877	1 298	2 740	2 985	12 473
SDR 5%	-2 948	294	4 785	4 032	-1 124	2 491	147	1 177	1 654	11 090
SDR 11,7%	-8 430	-7 523	2 510	2 013	-3 876	-2 151	-3 707	-4 059	-2 808	6 456
Unit rent (R/kg)										
SDR 3%	-3 943	5 708	14 649	13 752	-1 027	14 252	5 129	12 863	15 078	65 993
SDR 5%	-7 464	737	12 828	11 964	-3 811	9 158	581	5 525	8 352	58 675
SDR 11,7%	-21 341	-18 856	6 728	5 973	-13 138	-7 908	-14 654	-19 057	-14 182	34 159
Unit rent (R/kg) 5-year moving average										
SDR 3%	-6 302	-3 928	423	4 517	5 828	9 467	9 351	8 994	9 259	22 663
SDR 5%	-9 236	-7 351	-2 826	1 477	2 851	6 175	6 144	4 683	3 961	16 458
SDR 11,7%	-19 480	-19 820	-14 714	-9 710	-8 127	-5 440	-4 600	-9 757	-13 788	-4 329

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Figure 5: Gold: output, intermediate consumption and consumption of fixed capital, 1990–2010[1, 10, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Output (Sales)	18 994	19 296	19 513	23 239	24 953	23 465	26 468	24 905	24 295	24 915	25 190	28 904	41 222	33 053	29 330	24 601	37 443	38 036	45 992	48 696	53 093
Intermediate consumption	6 069	7 511	8 232	9 314	10 870	11 579	12 102	12 508	12 226	12 558	11 876	12 358	17 353	11 765	9 133	8 077	13 965	16 115	20 409	20 544	12 426
Consumption of fixed capital	2 069	2 331	2 567	2 808	3 090	3 382	3 661	3 948	4 125	4 370	4 734	5 113	7 292	2 309	2 049	3 442	4 658	4 391	4 539	5 797	6 242

Calculations: Statistics South Africa.

4.2 Platinum group metals

The resource rent and other calculations for PGMs are presented in Table 6 from 1990 to 2010 at current prices. PGM output (sales) increased from R5 164 million in 1990 to R73 787 million in 2010. From 1998 to 2000 there was an increase in output (sales) from R11 930 million to R27 095 million. From 2001, output (sales) increased steadily from R33 371 million to R91 353 million in 2008. During 2009, the output sales decreased to R57 782 million, but increased again to R73 787 in 2010. Intermediate consumption for PGMs increased from R1 652 million in 1990 to R43 652 million in 2010.

Figure 6 shows PGM output (sales), intermediate consumption and consumption of fixed capital. Intermediate consumption increased from R1 652 million in 1990 to R2 935 million in 1994. From 1995, intermediate consumption increased on an annual basis to R22 542 million in 2005. From 2006, the intermediate consumption increased from R30 382 million to R43 652 million in 2010. Resource rents fluctuated from 1990 to 2010, ending with negative figures at 3%, 5% and 11,7%.

PGM export sales revenue increased from R53 459 million in 2009 to R65 894 million in 2010[1], showing a 23% increase within one year. This increase led to a raise in the overall revenue of the sector. During 2010, the number of employees decreased with 1%, moving to 181 969 employees compared to 184 163 employees in 2009. The average earnings in 2010 were R26 703 million in salaries and wages[3].

Table 6: Platinum group metals: resource rent and other calculations for South Africa, 1990–2010[1, 10, 11]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
						Rand million					
Output (sales)	5 164	5 692	4 678	5 189	5 810	6 573	7 486	8 510	11 930	14 887	27 095
Intermediate consumption	1 652	1 935	1 637	2 243	2 935	3 631	4 246	5 237	7 446	10 237	14 708
Compensation of employees											
Total	1 505	1 658	1 901	2 111	2 241	2 522	2 725	2 979	3 444	3 740	4 373
Male	1 472	1 631	1 869	2 079	2 199	2 471	2 664	2 920	3 364	3 653	4 278
Female	32	27	33	33	43	51	61	59	80	88	96
Consumption of fixed capital	568	683	608	623	697	920	1 048	1 362	2 028	2 531	4 606
Opportunity cost of capital											
SDR 3%	310	398	327	311	349	460	524	596	954	1 191	2 168
SDR 5%	568	626	561	571	639	789	823	1 021	1 551	1 935	3 522
SDR 11,7%	917	1 091	990	1 047	1 132	1 216	1 255	1 395	1 925	2 385	3 624
Rent											
SDR 3%	1 130	1 018	204	-100	-412	-961	-1 057	-1 664	-1 943	-2 812	1 240
SDR 5%	872	790	-30	-359	-703	-1 290	-1 356	-2 089	-2 540	-3 556	-115
SDR 11,7%	523	326	-458	-836	-1 195	-1 717	-1 788	-2 463	-2 914	-4 006	-216
Unit rent (R/kg)											
SDR 3%	7 956	7 116	1 332	-568	-2 240	-5 252	-5 590	-8 446	-9 716	-12 958	5 991
SDR 5%	6 138	5 524	-197	-2 042	-3 819	-7 048	-7 175	-10 606	-12 698	-16 388	-553
SDR 11,7%	3 682	2 276	-2 997	-4 748	-6 496	-9 382	-9 458	-12 502	-14 568	-18 460	-1 043
Unit rent (R/kg) 5-year moving average											
SDR 3%	7 956	7 536	5 468	3 959	2 719	78	-2 464	-4 419	-6 249	-8 393	-6 144
SDR 5%	6 138	5 831	3 822	2 356	1 121	-1 516	-4 056	-6 138	-8 269	-10 783	-9 484
SDR 11,7%	3 682	2 979	987	-447	-1 656	-4 269	-6 616	-8 517	-10 481	-12 874	-11 206

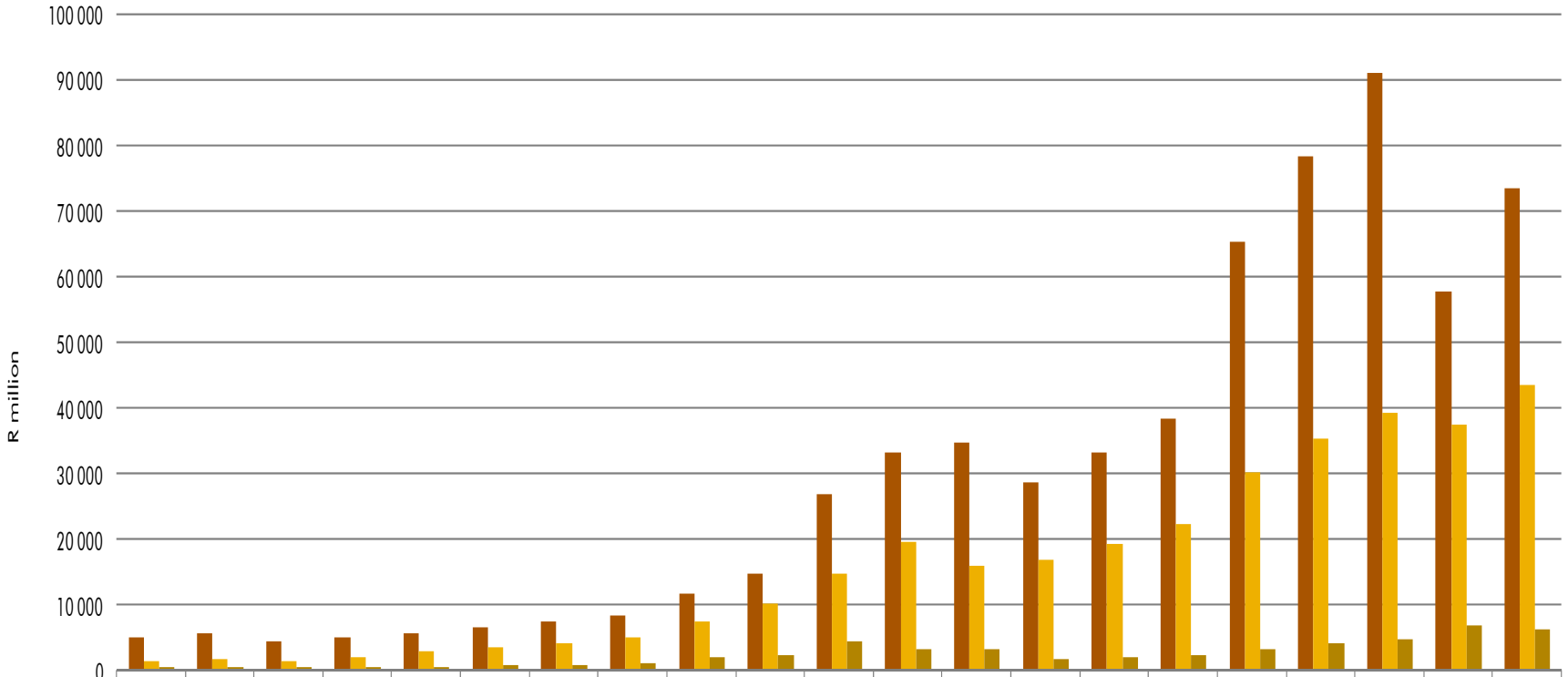
Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 6: Platinum group metals: resource rent and other calculations for South Africa, 1990–2010 (concluded)[1, 10, 11]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Rand million									
Output (sales)	33 371	34 829	28 824	33 313	38 451	65 444	78 414	91 353	57 782	73 787
Intermediate consumption	19 748	16 205	17 014	19 487	22 542	30 382	35 580	39 511	37 548	43 652
Compensation of employees										
Total	4 915	5 937	7 243	9 064	11 358	12 585	18 341	23 344	24 879	26 703
Male	4 806	5 783	7 022	8 743	10 925	11 953	17 376	21 843	23 070	24 608
Female	109	154	221	321	432	633	965	1 501	1 810	2 095
Consumption of fixed capital	3 295	3 439	1 782	2 060	2 428	3 357	4 118	4 727	7 120	6 218
Opportunity cost of capital										
SDR 3%	1 212	1 265	839	970	1 090	1 226	1 470	2 132	2 867	2 999
SDR 5%	2 060	2 150	1 398	1 616	1 816	2 043	2 450	3 553	4 778	4 999
SDR 11,7%	4 463	4 658	3 272	3 782	4 249	4 781	5 732	8 314	11 181	11 697
Rent										
SDR 3%	4 201	7 983	1 946	1 733	1 033	17 894	18 906	21 639	-14 632	-5 785
SDR 5%	3 353	7 098	1 386	1 086	307	17 076	17 926	20 218	-16 543	-7 785
SDR 11,7%	950	4 590	-488	-1 080	-2 126	14 338	14 643	15 457	-22 946	-14 483
Unit rent (R/kg)										
SDR 3%	18 265	33 684	7 342	6 277	3 410	57 908	62 190	78 401	-53 993	-20 158
SDR 5%	14 578	29 950	5 231	3 935	1 013	55 263	58 967	73 252	-61 045	-27 125
SDR 11,7%	4 130	19 368	-1 840	-3 912	-7 018	46 402	48 169	56 002	-84 671	-50 464
Unit rent (R/kg) 5-year moving average										
SDR 3%	-1 373	7 053	10 465	14 312	13 796	21 724	27 425	41 637	29 583	24 870
SDR 5%	-5 134	2 978	6 563	10 628	10 941	19 078	24 882	38 486	25 490	19 862
SDR 11,7%	-8 489	-2 115	431	3 341	2 146	10 600	16 360	27 929	11 777	3 088

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Figure 6: Platinum group metals: output, intermediate consumption and consumption of fixed capital, 1990–2010[1, 10, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Output (Sales)	5 164	5 692	4 678	5 189	5 810	6 573	7 486	8 510	11 930	14 887	27 095	33 371	34 829	28 824	33 313	38 451	65 444	78 414	91 353	57 782	73 787
Intermediate consumption	1 652	1 935	1 637	2 243	2 935	3 631	4 246	5 237	7 446	10 237	14 708	19 748	16 205	17 014	19 487	22 542	30 382	35 580	39 511	37 548	43 652
Consumption of fixed capital	568	683	608	623	697	920	1 048	1 362	2 028	2 531	4 606	3 295	3 439	1 782	2 060	2 428	3 357	4 118	4 727	7 120	6 218

Calculations: Statistics South Africa.

4.3 Coal

The resource rent and other calculations for coal are presented in Table 7 for 1990 to 2010 at current prices. Coal output (sales) increased from R8 173 million in 1990 to R73 203 million in 2010. Figure 7 shows intermediate consumption increased from R2 080 million in 1990 to R12 410 million in 2000. The intermediate consumption increased from R15 026 million in 2001 to R33 764 million in 2010[1].

Resource rents at 3%, 5% and 11,7% fluctuated from 1990 to 2010. Negative resource rents for coal at 11,7% were observed for 1999, 2000, 2002, 2003 and 2004. The local coal price was R194 per ton and export sales were R553 per ton in 2010[1]. Domestic sales increased by 2% year-on-year to 188 million tons in 2010[1].

Consumption of fixed capital for 1990 was R534 million, and it has increased to R6 617 million in 2010. Most of the country's coal is currently mined in the Highveld, Emalahleni and Ermelo coalfields located in Mpumalanga. Coal output (sales) decreased from R74 810 million in 2008 to R73 203 million in 2010. Coal export sales increased by 19% from R31 007 million in 2009 to R36 747 million in 2010, while domestic sales increased by 6% from R34 443 million in 2009 to R36 456 million in 2010[1].

Table 7: Coal: resource rent and other calculations for South Africa, 1990–2010[1, 10, 11]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
	Rand million										
Output (sales)	8 173	8 785	9 424	9 714	10 353	12 818	14 891	16 287	18 024	17 681	20 039
Intermediate consumption	2 080	3 237	3 816	4 684	5 106	6 221	7 287	7 997	9 085	10 081	12 410
Compensation of employees											
Total	2 130	2 441	2 082	1 884	2 021	2 371	2 782	3 204	3 523	3 831	4 287
Male	2 046	2 344	2 010	1 821	1 949	2 288	2 687	3 095	3 399	3 698	4 127
Female	84	97	71	62	72	83	95	109	124	133	161
Consumption of fixed capital	534	645	728	814	911	1 019	1 145	1 269	1 377	1 508	1 708
Opportunity cost of capital											
SDR 3%	334	401	442	481	526	574	633	686	729	780	873
SDR 5%	557	668	736	802	876	956	1 056	1 144	1 215	1 301	1 455
SDR 11,7%	1 303	1 562	1 723	1 876	2 051	2 238	2 470	2 676	2 842	3 043	3 404
Rent											
SDR 3%	3 096	2 062	2 356	1 851	1 789	2 633	3 044	3 132	3 310	1 481	760
SDR 5%	2 873	1 795	2 062	1 531	1 438	2 251	2 622	2 674	2 825	961	178
SDR 11,7%	2 127	900	1 075	456	264	970	1 208	1 142	1 197	-782	-1 771
Unit rent (R/kg)											
SDR 3%	17 689	11 583	13 313	10 061	9 126	12 783	14 850	14 299	14 778	6 670	3 379
SDR 5%	16 416	10 083	11 649	8 319	7 338	10 926	12 790	12 210	12 610	4 327	793
SDR 11,7%	12 153	5 057	6 074	2 480	1 347	4 707	5 891	5 213	5 344	-3 523	-7 872
Unit rent (R/kg) 5-year moving average											
SDR 3%	17 689	14 636	14 195	13 162	12 355	11 373	12 027	12 224	13 167	12 676	10 795
SDR 5%	16 416	13 250	12 716	11 617	10 761	9 663	10 204	10 317	11 175	10 573	8 546
SDR 11,7%	12 153	8 605	7 761	6 441	5 422	3 933	4 100	3 927	4 500	3 526	1 010

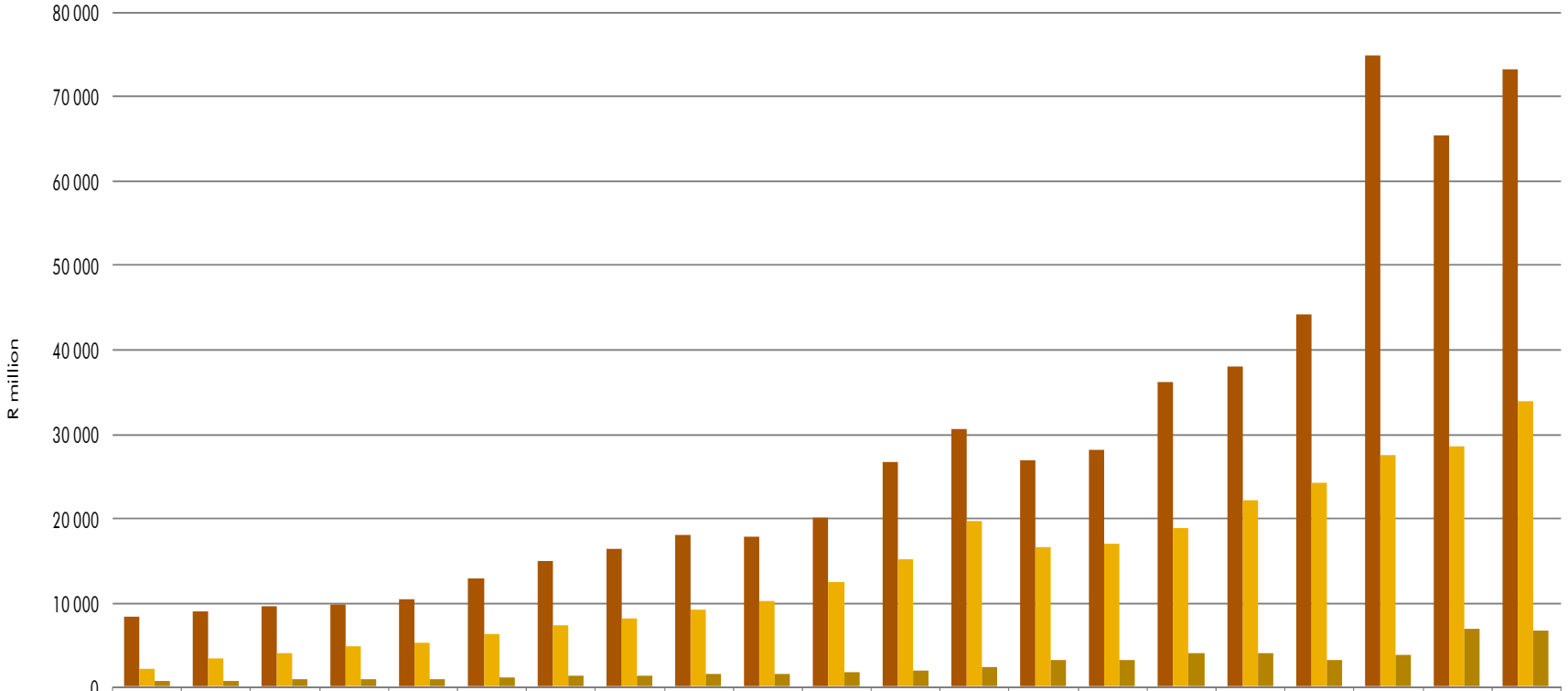
Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 7: Coal: resource rent and other calculations for South Africa, 1990–2010 (concluded)[1, 10, 11]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Rand million									
Output (sales)	26 596	30 468	26 734	28 139	36 033	37 867	44 166	74 810	65 449	73 203
Intermediate consumption	15 026	19 589	16 539	16 830	18 864	21 986	24 183	27 455	28 541	33 764
Compensation of employees										
Total	4 451	4 468	5 481	5 863	6 482	7 270	8 692	11 021	12 815	14 132
Male	4 293	4 289	5 252	5 582	6 156	6 855	8 107	10 194	11 717	12 751
Female	158	180	229	281	326	415	585	826	1 098	1 381
Consumption of fixed capital	1 909	2 187	2 996	3 154	3 879	3 968	3 162	3 709	6 820	6 617
Opportunity cost of capital										
SDR 3%	786	900	644	678	758	726	808	1 375	2 616	2 868
SDR 5%	1 309	1 500	1 074	1 130	1 263	1 211	1 346	2 292	4 360	4 780
SDR 11,7%	4 518	5 176	2 513	2 645	2 956	2 833	3 150	5 362	10 201	11 186
Rent										
SDR 3%	4 423	3 324	1 074	1 613	6 051	3 916	7 322	31 251	14 657	15 821
SDR 5%	3 900	2 725	645	1 161	5 545	3 432	6 783	30 334	12 914	13 909
SDR 11,7%	691	-952	-794	-353	3 852	1 810	4 979	27 263	7 072	7 503
Unit rent (R/kg)										
SDR 3%	19 836	15 108	4 513	6 640	24 696	15 986	29 523	123 520	58 396	62 043
SDR 5%	17 491	12 385	2 708	4 779	22 633	14 009	27 352	119 897	51 448	54 545
SDR 11,7%	3 099	-4 327	-3 337	-1 453	15 724	7 387	20 077	107 760	28 175	29 424
Unit rent (R/kg) 5-year moving average										
SDR 3%	11 793	11 954	9 901	9 895	14 159	13 388	16 271	40 073	50 424	57 894
SDR 5%	9 486	9 521	7 541	7 631	11 999	11 303	14 296	37 734	47 068	53 450
SDR 11,7%	452	-1 456	-3 192	-2 778	1 941	2 799	7 680	29 899	35 824	38 564

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Figure 7: Coal: output, intermediate consumption and consumption of fixed capital, 1990–2010[1, 10, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Output (Sales)	8 173	8 785	9 424	9 714	10 353	12 818	14 891	16 287	18 024	17 681	20 039	26 596	30 468	26 734	28 139	36 033	37 867	44 166	74 810	65 449	73 203
Intermediate consumption	2 080	3 237	3 816	4 684	5 106	6 221	7 287	7 997	9 085	10 081	12 410	15 026	19 589	16 539	16 830	18 864	21 986	24 183	27 455	28 541	33 764
Consumption of fixed capital	534	645	728	814	911	1 019	1 145	1 269	1 377	1 508	1 708	1 909	2 187	2 996	3 154	3 879	3 968	3 162	3 709	6 820	6 617

Calculations: Statistics South Africa.

4.4 Iron ore

The resource rent and other calculations for iron ore are presented in Table 8 for 2002 to 2010 at current prices. Iron ore output (sales) increased from R5 314 million in 2002 to R43 419 million in 2010. Figure 8 shows intermediate consumption increased from R1 187 million in 2002 to R2 792 million in 2010.

Resource rents at 3%, 5% and 11,7% are positive from 2002 to 2010. In 2002, the rent at 3% started fluctuating until 2005, and then increased from 2006 until 2010. At 5% and 11,7% the rent for iron ore is observed to follow the same trend as that of 3% with positive figures from 2002 until 2010. Rent at 5% and 11,7% both fluctuated from 2002 to 2005 with increases from 2006 to 2010.

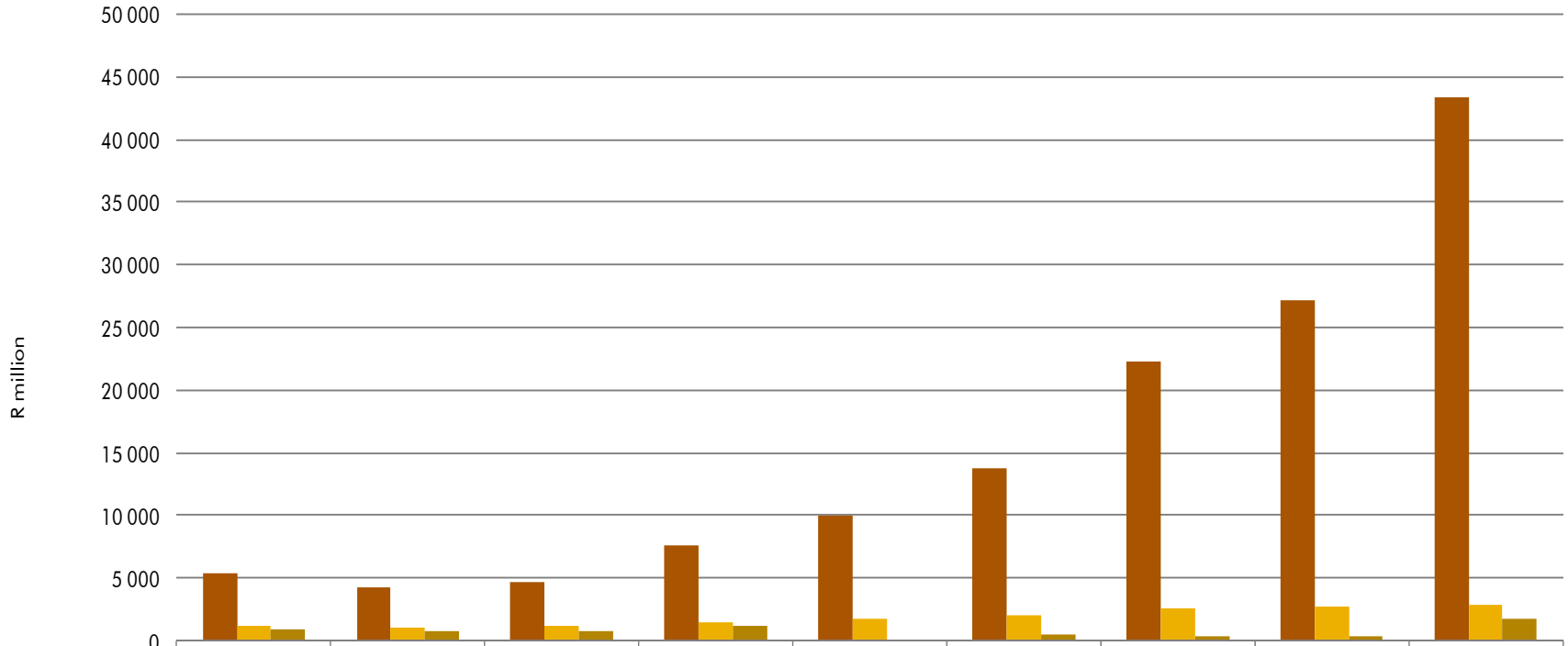
The iron ore resources amount to 1% of the world's total, making South Africa number 9 in the world ranking for the production of iron ore[4]. Iron ore consumption of fixed capital for 2002 was R1 000 million, and it has increased to R1 744 million in 2010. Iron ore export sales increased by 59% from R25 243 million in 2009 to R40 148 million in 2010[1].

Table 8: Iron ore: resource rent and other calculations for South Africa, 2002–2010[1, 10, 11]

	2002	2003	2004	2005	2006	2007	2008	2009	2010
					Rand million				
Output (sales)	5 314	4 191	4 585	7 520	9 931	13 756	22 242	27 132	43 419
Intermediate consumption	1 187	1 011	1 152	1 387	1 703	1 934	2 567	2 596	2 792
Compensation of employees									
Total	458	524	575	624	684	1 362	1 668	2 178	3 037
Male	423	480	529	572	626	1 260	1 519	1 912	2 672
Female	35	43	46	52	57	102	148	266	365
Consumption of fixed capital	1 000	789	863	1 190	97	508	378	338	1 744
Opportunity cost of capital									
SDR 3%	416	328	359	321	61	133	139	239	815
SDR 5%	694	547	599	535	102	222	232	399	1 359
SDR 11,7%	1 624	1 281	1 401	1 252	238	519	544	933	3 179
Rent									
SDR 3%	2 252	1 539	1 636	3 998	7 387	9 818	17 490	21 781	35 030
SDR 5%	1 975	1 320	1 396	3 784	7 346	9 730	17 397	21 621	34 486
SDR 11,7%	1 045	587	594	3 067	7 210	9 433	17 085	21 087	32 666
Unit rent (R/kg)									
SDR 3%	62 560	40 501	41 942	99 942	180 164	233 769	356 930	396 010	593 728
SDR 5%	54 850	34 740	35 800	94 592	179 172	231 658	355 034	393 112	584 516
SDR 11,7%	29 024	15 442	15 227	76 668	175 850	224 586	348 680	383 402	553 656
Unit rent (R/kg) 5-year moving average									
SDR 3%	62 560	51 530	48 334	61 236	85 022	119 263	182 549	253 363	352 120
SDR 5%	54 850	44 795	41 797	54 996	79 831	115 192	179 251	250 713	348 698
SDR 11,7%	29 024	22 233	19 898	34 090	62 442	101 555	168 202	241 837	337 235

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Figure 8: Iron ore: output, intermediate consumption and consumption of fixed capital, 2002–2010[1, 10, 11]



	2002	2003	2004	2005	2006	2007	2008	2009	2010
Output (Sales)	5 314	4 191	4 585	7 520	9 931	13 756	22 242	27 132	43 419
Intermediate consumption	1 187	1 011	1 152	1 387	1 703	1 934	2 567	2 596	2 792
Consumption of fixed capital	1 000	789	863	1 190	97	508	378	338	1 744

Calculations: Statistics South Africa.

5. Monetary accounts for the South African mining industry

This section focuses on the monetary accounts for South Africa's gold, PGM, coal and iron ore mining industries. The results from the resource rent calculations in section 4 were used in the compilation of the monetary accounts. The negative resource rent values are carried through to the monetary accounts. The discussion into the negative resource rent values presented in section 4 is important for the monetary accounts, as it looks at how the fluctuating mineral prices will have an effect on the value of mineral assets represented in the monetary accounts. If there are negative resource rents, this may present negative values for the mineral asset.

Monetary accounts are presented both in current values (the rent calculated for each year) and using a 5-year moving average. The 5-year moving average is used to reflect the fact that mineral prices fluctuate within one year and therefore the current value of mineral assets is not always best represented by the unit rent in any single year[9]. In 2010, PGM group metals became the largest component of South Africa's mining industry by sales value, with total output (sales) of R73 787 million; coal became the second largest component by sales value, with total output (sales) of R73 203 million, followed by gold at R53 093 million[1]. The value of primary mineral local sales increased by 20% from R65 098 in 2009 to R77 949 million in 2010[1]and primary mineral exports sales increased by 27% from R176 838 million in 2009 to R224 225 million in 2010[1].

5.1 Gold

Monetary accounts for gold in South Africa are shown in Tables 9 and 10, with opening stock, depletion, revaluation and closing stock in rand values. The values are represented by 3%, 5% and 11,7% SDR values. Table 9 was calculated in annual unit rent figures and Table 10 was calculated with unit rents in 5-year moving averages[1].

Opening stock in 1991 for annual units was R48 945 million, R29 105 million and -R4 332 million at 3%, 5% and 11,7% SDR values respectively. The opening stock fluctuated between 1991 and 2010. On an annual basis from 1990 to 1996, the closing stock has shown a decrease of 96% at 3% SDR, and remained negative for the five-year period. At 5% SDR, the closing stock declined by 69% from 1990 to 1994. It remained negative from 1990 to 2002 at 11,7% (refer to Table 9 and Figure 9). On a 5-year moving average, closing stock has increased by 78%, 68%, and 57%, at an SDR of 3%, 5% and 11,7% respectively from 1990 to 2010 (refer to Table 10 and Figure 10). At an annual year average, the asset value at 3% and 5%, started increasing from 2002 and remained positive until 2010 except in 2005 (refer to Table 9 and Figure 9). Figure 9 shows that the asset value for closing stock was negative for the period 1990 to 2010 at 11,7%[1].

Table 9: Gold: monetary accounts for South Africa, annual 1990–2010[1, 11]

Year	Opening stock			Depletion			Revaluation			Closing stock		
	Rand million											
	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%
1990	-	-	-	2 935	2 135	-548	-	-	-	48 945	29 105	-4 332
1991	48 945	29 105	-4 332	1 288	409	-2 534	-29 305	-24 046	-13 018	20 927	5 468	-19 884
1992	20 927	5 468	-19 884	363	-578	-3 729	-15 662	-12 334	-5 199	5 628	-7 444	-28 811
1993	5 628	-7 444	-28 811	2 401	1 402	-1 945	27 664	23 504	15 957	35 693	17 462	-14 799
1994	35 693	17 462	-14 799	1 786	723	-2 840	-10 595	-9 092	-4 069	26 885	9 093	-21 707
1995	26 885	9 093	-21 707	-1 481	-2 610	-6 391	-48 610	-40 382	-21 459	-23 206	-33 899	-49 557
1996	-23 206	-33 899	-49 557	119	-1 067	-5 039	24 955	21 060	15 468	1 868	-13 905	-39 129
1997	1 868	-13 905	-39 129	-3 026	-4 267	-8 425	-45 353	-36 413	-17 340	-46 510	-54 585	-64 894
1998	-46 510	-54 585	-64 894	-3 304	-4 554	-8 742	-1 271	609	6 162	-51 086	-58 530	-67 474
1999	-51 086	-58 530	-67 474	-3 030	-4 308	-8 590	7 822	7 992	10 041	-46 294	-54 846	-66 023
2000	-46 294	-54 846	-66 023	-3 268	-4 603	-9 074	-305	913	5 386	-49 867	-58 536	-69 711
2001	-49 867	-58 536	-69 711	-1 557	-2 948	-8 430	26 934	23 081	12 700	-24 490	-38 404	-65 441
2002	-24 490	-38 404	-65 441	2 278	294	-7 523	56 563	41 813	15 409	34 351	3 703	-57 555
2003	34 351	3 703	-57 555	5 464	4 785	2 510	43 822	52 516	74 347	83 637	61 004	19 301
2004	83 637	61 004	19 301	4 635	4 032	2 013	-14 369	-11 941	-5 615	73 902	53 095	15 698
2005	73 902	53 095	15 698	-303	-1 124	-3 876	-78 753	-67 536	-42 660	-5 154	-15 566	-30 837
2006	-5 154	-15 566	-30 837	3 877	2 491	-2 151	69 134	48 320	15 735	67 857	35 245	-17 253
2007	67 857	35 245	-17 253	1 298	147	-3 707	-45 905	-33 275	-8 960	23 249	2 117	-29 921
2008	23 249	2 117	-29 921	2 740	1 177	-4 059	27 699	14 794	543	53 688	18 088	-33 437
2009	53 688	18 088	-33 437	2 985	1 654	-2 808	3 339	6 134	12 999	60 012	25 875	-23 246
2010	60 012	25 875	-23 246	12 473	11 090	6 456	180 602	137 700	70 324	253 087	174 665	53 534

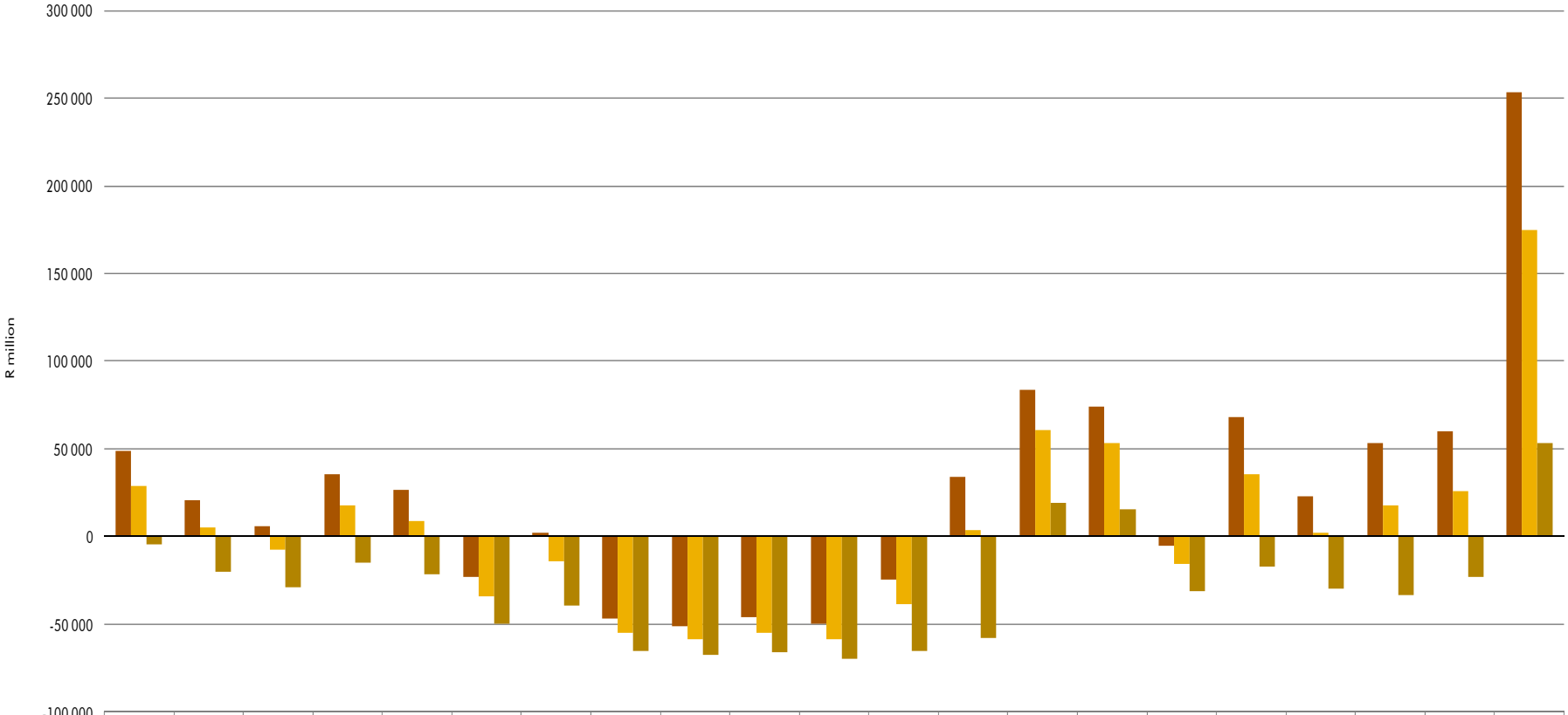
Calculations: Statistics South Africa.
Note: Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.

Table 10: Gold: monetary accounts for South Africa, 5-year moving average 1990–2010[1, 11]

Year	Opening stock			Depletion			Revaluation			Closing stock		
	Rand million											
	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%
1990	-	-	-	2 935	2 135	-548	-	-	-	48 945	29 105	-4 332
1991	48 945	29 105	-4 332	2 102	1 265	-1 539	-16 886	-13 463	-6 206	34 161	16 907	-12 076
1992	34 161	16 907	-12 076	1 550	667	-2 289	-11 670	-8 975	-3 323	24 041	8 599	-17 689
1993	24 041	8 599	-17 689	1 774	856	-2 220	556	1 205	3 015	26 372	10 660	-16 893
1994	26 372	10 660	-16 893	1 687	786	-2 232	-2 666	-1 557	2 063	25 393	9 890	-17 063
1995	25 393	9 890	-17 063	720	-181	-3 200	-14 833	-12 064	-4 550	11 280	-2 355	-24 812
1996	11 280	-2 355	-24 812	494	-454	-3 629	-3 995	-3 101	263	7 780	-5 910	-28 179
1997	7 780	-5 910	-28 179	-176	-1 208	-4 666	-10 306	-8 335	-3 093	-2 702	-15 453	-35 938
1998	-2 702	-15 453	-35 938	-1 188	-2 266	-5 875	-14 479	-11 398	-3 531	-18 370	-29 116	-45 344
1999	-18 370	-29 116	-45 344	-2 036	-3 171	-6 974	-10 703	-8 086	-1 287	-31 109	-40 373	-53 605
2000	-31 109	-40 373	-53 605	-2 356	-3 522	-7 429	-2 482	-895	3 964	-35 947	-44 791	-57 069
2001	-35 947	-44 791	-57 069	-2 489	-3 648	-7 695	-712	918	5 029	-39 149	-47 521	-59 735
2002	-39 149	-47 521	-59 735	-1 567	-2 933	-7 908	17 078	13 501	7 145	-23 638	-36 953	-60 498
2003	-23 638	-36 953	-60 498	158	-1 054	-5 488	25 893	24 566	23 776	2 413	-13 441	-42 210
2004	2 413	-13 441	-42 210	1 522	498	-3 272	20 337	19 498	19 961	24 273	6 555	-25 521
2005	24 273	6 555	-25 521	1 719	841	-2 397	3 251	4 247	8 843	29 243	11 642	-19 075
2006	29 243	11 642	-19 075	2 575	1 680	-1 480	13 256	10 444	8 686	45 074	23 766	-11 869
2007	45 074	23 766	-11 869	2 366	1 554	-1 164	-5 053	-2 939	3 640	42 387	22 382	-9 392
2008	42 387	22 382	-9 392	1 916	998	-2 078	-6 765	-8 048	-5 649	37 538	15 332	-17 119
2009	37 538	15 332	-17 119	1 833	784	-2 730	-2 519	-3 844	-2 750	36 852	12 272	-22 599
2010	36 852	12 272	-22 599	4 283	3 111	-818	45 779	33 610	16 633	86 914	48 993	-6 784

Calculations: Statistics South Africa.
Note: Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.

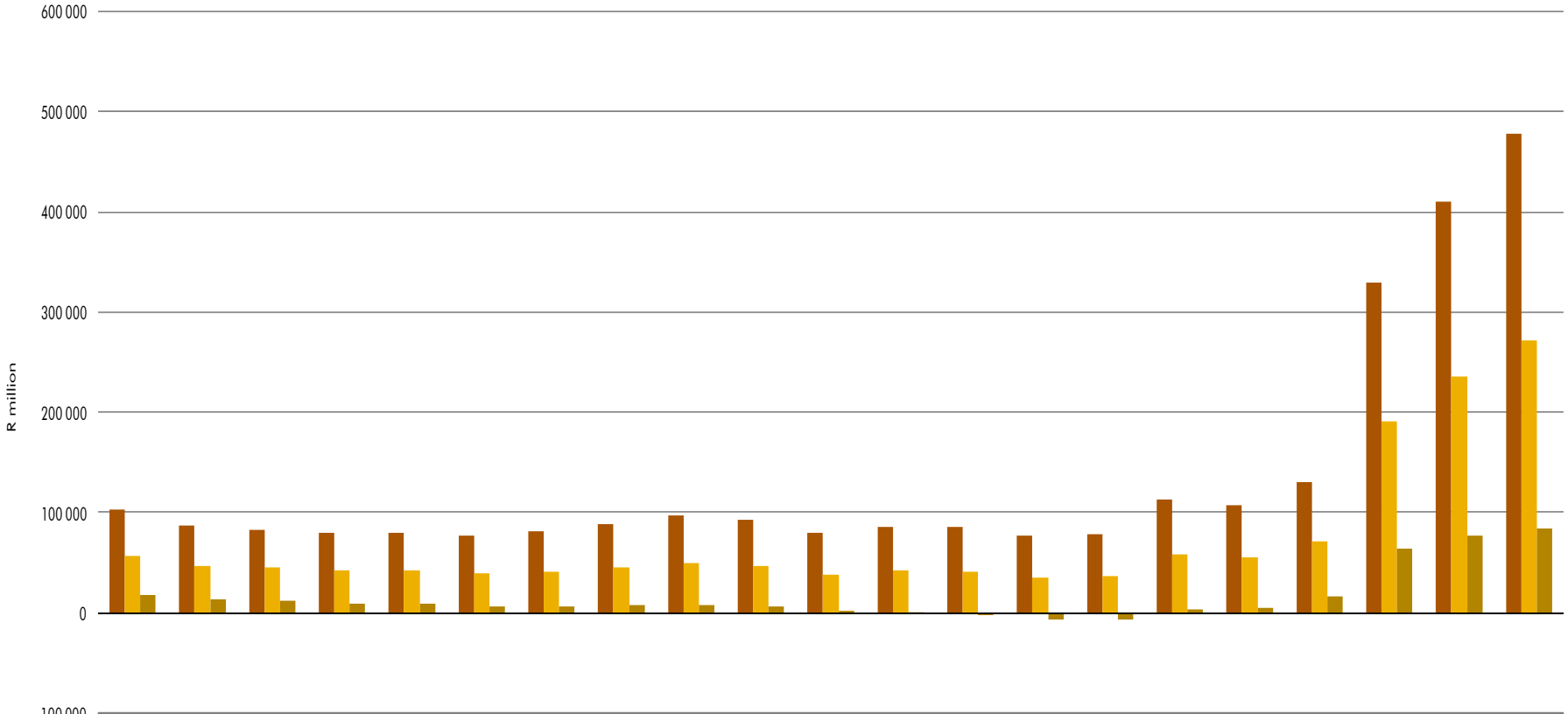
Figure 9: Gold: value of annual closing stock, 1990–2010[1, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Closing Stock 3%	48 945	20 927	5 628	35 693	26 885	-23 206	1 868	-46 510	-51 086	-46 294	-49 867	-24 490	34 351	83 637	73 902	-5 154	67 857	23 249	53 688	60 012	253 087
Closing Stock 5%	29 105	5 468	-7 444	17 462	9 093	-33 899	-13 905	-54 585	-58 530	-54 846	-58 536	-38 404	3 703	61 004	53 095	-15 566	35 245	2 117	18 088	25 875	174 665
Closing Stock 11,7%	-4 332	-19 884	-28 811	-14 799	-21 707	-49 557	-39 129	-64 894	-67 474	-66 023	-69 711	-65 441	-57 555	19 301	15 698	-30 837	-17 253	-29 921	-33 437	-23 246	53 534

Calculations: Statistics South Africa.

Figure 10: Gold: value of 5-year moving average closing stock, 1990–2010[1, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Closing Stock 3%	102 887	86 556	83 476	80 386	80 229	77 475	81 524	88 231	97 058	92 614	79 844	86 455	86 496	77 054	78 446	113 013	106 792	131 134	328 549	410 137	477 170
Closing Stock 5%	57 453	47 165	45 011	42 744	42 174	39 798	41 824	45 160	50 026	46 908	38 424	42 272	41 858	35 842	37 023	58 684	55 273	70 748	190 418	235 641	271 745
Closing Stock 11,7%	18 177	13 091	11 741	10 129	9 083	6 925	7 183	7 351	8 615	6 690	1 943	862	-2 738	-6 493	-5 769	4 065	5 861	16 278	64 653	76 854	84 050

Calculations: Statistics South Africa.

5.2 Platinum group metals

Tables 11 and 12 present the monetary accounts for PGMs in South Africa. The tables show opening stock, depletion, revaluation and closing stock in rand values. The values are represented by 3%, 5% and 11,7% SDR values. Table 11 was calculated in annual unit rent figures and Table 12 was calculated with unit rents in 5-year moving averages.

Opening stock in 1991 was R37 658 million, R17 431 million and R4 469 million at 3%, 5% and 11,7% SDR values respectively (refer to Table 11). Opening stocks have decreased from 1992 to 2002 and fluctuated until 2010. On the 5-year moving average, the opening stock fluctuated from 1992 to 2010 (refer to Table 12 and Figure 12).

The closing stock for PGMs for the 3%, 5% and 11,7% SDR values fluctuated from 1991 to 2010. From 2000, the closing stock for PGMs at 3% recovered up to 2008, then declined to a negative figure from 2009 to 2010 (refer to Figure 11 and Table 11).

Table 11: Platinum group metals: monetary accounts for South Africa, annual 1990–2010[1, 11]

Year	Opening stock			Depletion			Revaluation			Closing stock		
	Rand million											
	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%
1990	-	-	-	1 130	872	523	-	-	-	37 658	17 431	4 469
1991	37 658	17 431	4 469	1 018	790	326	-4 755	-2 422	-2 013	33 920	15 799	2 782
1992	33 920	15 799	2 782	204	-30	-458	-27 332	-16 371	-6 242	6 792	-602	-3 919
1993	6 792	-602	-3 919	-100	-359	-836	-10 023	-6 225	-2 389	-3 330	-7 187	-7 143
1994	-3 330	-7 187	-7 143	-412	-703	-1 195	-9 995	-6 163	-1 877	-13 737	-14 052	-10 215
1995	-13 737	-14 052	-10 215	-961	-1 290	-1 717	-17 341	-10 455	-2 742	-32 040	-25 797	-14 674
1996	-32 040	-25 797	-14 674	-1 057	-1 356	-1 788	-2 122	32	1 183	-35 218	-27 120	-15 278
1997	-35 218	-27 120	-15 278	-1 664	-2 089	-2 463	-18 582	-12 579	-3 308	-55 464	-41 789	-21 050
1998	-55 464	-41 789	-21 050	-1 943	-2 540	-2 914	-7 363	-6 464	-939	-64 770	-50 793	-24 902
1999	-64 770	-50 793	-24 902	-2 812	-3 556	-4 006	-26 142	-16 776	-5 331	-93 724	-71 125	-34 239
2000	-93 724	-71 125	-34 239	1 240	-115	-216	133 823	68 949	32 610	41 339	-2 291	-1 845
2001	41 339	-2 291	-1 845	4 201	3 353	950	94 476	65 995	9 013	140 015	67 057	8 118
2002	140 015	67 057	8 118	7 983	7 098	4 590	118 076	67 809	26 524	266 075	141 963	39 233
2003	266 075	141 963	39 233	1 946	1 386	-488	-203 187	-115 624	-42 912	64 833	27 725	-4 167
2004	64 833	27 725	-4 167	1 733	1 086	-1 080	-8 841	-7 090	-3 981	57 725	21 721	-9 228
2005	57 725	21 721	-9 228	1 033	307	-2 126	-24 350	-15 891	-6 821	34 408	6 137	-18 175
2006	34 408	6 137	-18 175	17 894	17 076	14 338	543 488	318 307	126 386	595 790	341 520	122 549
2007	595 790	341 520	122 549	18 906	17 926	14 643	14 854	-932	-12 036	629 549	358 514	125 156
2008	629 549	358 514	125 156	21 639	20 218	15 457	69 728	25 619	-8 506	720 917	404 350	132 107
2009	720 917	404 350	132 107	-14 632	-16 543	-22 946	-1 193 789	-718 670	-305 279	-487 505	-330 863	-196 118
2010	-487 505	-330 863	-196 118	-5 785	-7 785	-14 483	300 584	182 951	86 814	-192 706	-155 697	-123 787

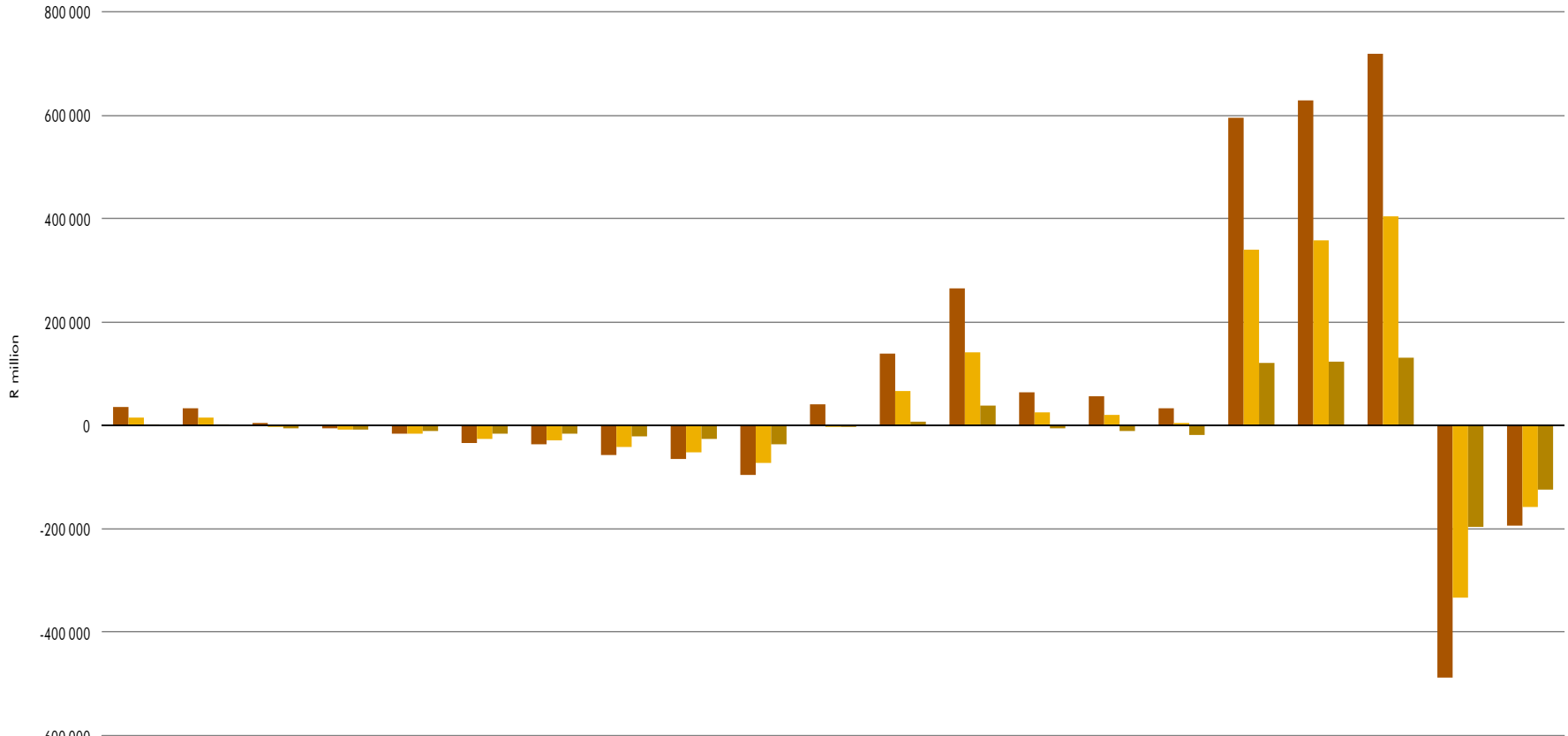
Calculations: Statistics South Africa.
Note: Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.

Table 12: Platinum group metals: monetary accounts for South Africa, 5-year moving average 1990–2010[1, 11]

Year	Opening stock			Depletion			Revaluation			Closing stock		
	Rand million											
	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%
1990	-	-	-	1 130	872	523	-	-	-	37 658	17 431	4 469
1991	37 658	17 431	4 469	1 078	834	426	-2 814	-1 588	-1 254	35 922	16 676	3 641
1992	35 922	16 676	3 641	837	585	151	-8 872	-5 567	-2 501	27 887	11 694	1 291
1993	27 887	11 694	1 291	697	415	-79	-5 357	-3 816	-1 884	23 226	8 292	-672
1994	23 226	8 292	-672	500	206	-305	-7 049	-4 374	-1 628	16 678	4 125	-2 605
1995	16 678	4 125	-2 605	14	-277	-781	-16 219	-9 397	-3 291	473	-5 550	-6 678
1996	473	-5 550	-6 678	-466	-767	-1 250	-15 529	-9 016	-2 760	-15 521	-15 332	-10 688
1997	-15 521	-15 332	-10 688	-871	-1 209	-1 678	-12 628	-7 642	-1 975	-29 020	-24 183	-14 341
1998	-29 020	-24 183	-14 341	-1 250	-1 654	-2 096	-11 389	-7 240	-1 479	-41 659	-33 077	-17 916
1999	-41 659	-33 077	-17 916	-1 821	-2 340	-2 794	-17 223	-11 382	-3 168	-60 703	-46 799	-23 877
2000	-60 703	-46 799	-23 877	-1 272	-1 963	-2 320	19 584	9 498	6 371	-42 391	-39 264	-19 826
2001	-42 391	-39 264	-19 826	-316	-1 181	-1 952	32 182	16 830	5 092	-10 524	-23 615	-16 687
2002	-10 524	-23 615	-16 687	1 672	706	-501	64 567	37 023	12 905	55 715	14 114	-4 283
2003	55 715	14 114	-4 283	2 773	1 739	114	33 922	18 933	5 145	92 410	34 786	976
2004	92 410	34 786	976	3 950	2 933	922	35 249	20 947	5 983	131 609	58 667	7 881
2005	131 609	58 667	7 881	4 180	3 315	650	3 416	4 322	-2 974	139 205	66 304	5 557
2006	139 205	66 304	5 557	6 713	5 895	3 275	77 595	45 704	19 163	223 513	117 903	27 995
2007	223 513	117 903	27 995	8 337	7 564	4 974	45 778	25 812	9 540	277 628	151 279	42 509
2008	277 628	151 279	42 509	11 492	10 622	7 708	93 744	50 540	15 666	382 863	212 441	65 883
2009	382 863	212 441	65 883	8 017	6 908	3 192	-123 769	-81 194	-41 797	267 111	138 155	27 278
2010	267 111	138 155	27 278	7 138	5 700	886	-36 505	-29 846	-20 590	237 744	114 009	7 574

Calculations: Statistics South Africa.
Note: Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.

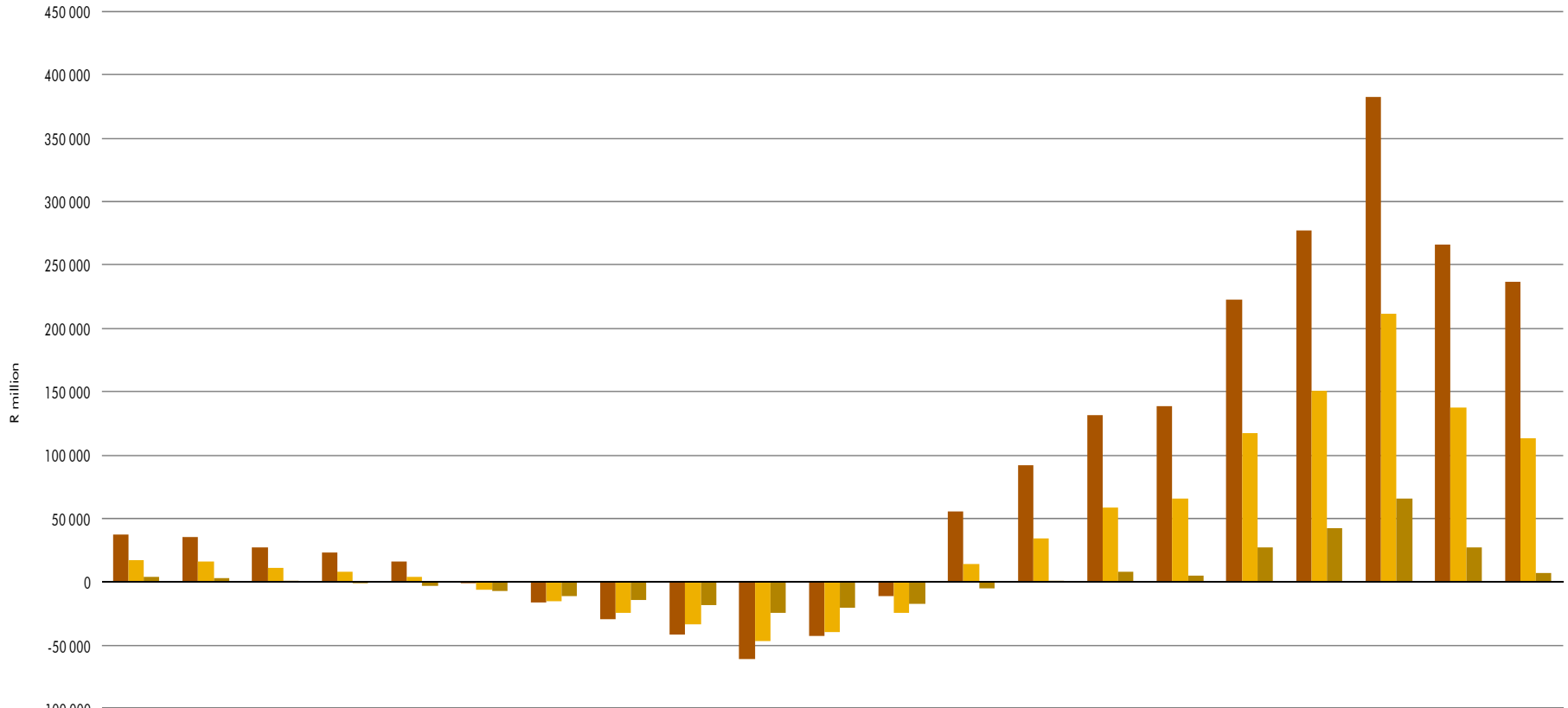
Figure 11: Platinum group metals: value of annual closing stock 1990-2010[1, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Closing Stock 3%	37 658	33 920	6 792	-3 330	-13 737	-32 040	-35 218	-55 464	-64 770	-93 724	41 339	140 015	266 075	64 833	57 725	34 408	595 790	629 549	720 917	-487 505	-192 706
Closing Stock 5%	17 431	15 799	-602	-7 187	-14 052	-25 797	-27 120	-41 789	-50 793	-71 125	-2 291	67 057	141 963	27 725	21 721	6 137	341 520	358 514	404 350	-330 863	-155 697
Closing Stock 11,7%	4 469	2 782	-3 919	-7 143	-10 215	-14 674	-15 278	-21 050	-24 902	-34 239	-1 845	8 118	39 233	-4 167	-9 228	-18 175	122 549	125 156	132 107	-196 118	-123 787

Calculations: Statistics South Africa.

Figure 12: Platinum group metals: value of 5-year moving average closing stock, 1990–2010[1, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Closing Stock 3%	37 658	35 922	27 887	23 226	16 678	473	-15 521	-29 020	-41 659	-60 703	-42 391	-10 524	55 715	92 410	131 609	139 205	223 513	277 628	382 863	267 111	237 744
Closing Stock 5%	17 431	16 676	11 694	8 292	4 125	-5 550	-15 332	-24 183	-33 077	-46 799	-39 264	-23 615	14 114	34 786	58 667	66 304	117 903	151 279	212 441	138 155	114 009
Closing Stock 11,7%	4 469	3 641	1 291	-672	-2 605	-6 678	-10 688	-14 341	-17 916	-23 877	-19 826	-16 687	-4 283	976	7 881	5 557	27 995	42 509	65 883	27 278	7 574

Calculations: Statistics South Africa.

5.3 Coal

Tables 13 and 14 present the monetary accounts for coal in South Africa. The tables show opening stock, depletion, revaluation and closing stock in rand values. The values are represented by 3%, 5% and 11,7% SDR values. Table 13 was calculated in annual unit rent figures and Table 14 was calculated with unit rents in 5-year moving averages.

The closing stock for coal on annual averages has shown negative figures at 11,7% in both closing and opening stock. These fluctuations are seen from 1990 to 2010 (refer to Table 13 and Figure 13). The closing stock from 1990 to 2010 on a 5-year moving average (refer to Table 14 and Figure 14) remained positive at the discount rates of 3% and 5%.

Table 13: Coal: monetary accounts for South Africa, annual 1990–2010[1, 11]

Year	Opening stock			Depletion			Revaluation			Closing stock		
	Rand million											
	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%
1990	-	-	-	3 096	2 873	2 127	-	-	-	102 887	57 453	18 177
1991	102 887	57 453	18 177	2 062	1 795	900	-36 446	-23 355	-11 384	68 502	35 893	7 693
1992	68 502	35 893	7 693	2 356	2 062	1 075	7 430	3 279	421	78 289	41 234	9 189
1993	78 289	41 234	9 189	1 851	1 531	456	-18 689	-12 156	-5 745	61 451	30 609	3 900
1994	61 451	30 609	3 900	1 789	1 438	264	-3 974	-3 288	-1 908	59 266	28 759	2 256
1995	59 266	28 759	2 256	2 633	2 251	970	25 179	13 992	5 061	87 078	45 002	8 287
1996	87 078	45 002	8 287	3 044	2 622	1 208	10 538	4 798	827	100 660	52 422	10 321
1997	100 660	52 422	10 321	3 132	2 674	1 142	-582	-1 647	-1 706	103 210	53 449	9 757
1998	103 210	53 449	9 757	3 310	2 825	1 197	2 413	175	-723	108 933	56 448	10 231
1999	108 933	56 448	10 231	1 481	961	-782	-61 681	-38 212	-16 133	48 732	19 197	-6 685
2000	48 732	19 197	-6 685	760	178	-1 771	-24 500	-15 811	-6 682	24 992	3 564	-15 138
2001	24 992	3 564	-15 138	4 423	3 900	691	116 009	70 479	20 354	145 425	77 943	5 907
2002	145 425	77 943	5 907	3 324	2 725	-952	-39 434	-26 220	-13 091	109 314	54 448	-8 136
2003	109 314	54 448	-8 136	1 074	645	-794	-75 268	-42 220	2 143	35 121	12 873	-6 788
2004	35 121	12 873	-6 788	1 613	1 161	-353	15 902	9 153	4 124	52 637	23 187	-3 017
2005	52 637	23 187	-3 017	6 051	5 545	3 852	138 436	81 958	32 091	197 123	110 691	32 926
2006	197 123	110 691	32 926	3 916	3 432	1 810	-73 531	-45 618	-19 268	127 509	68 505	15 468
2007	127 509	68 505	15 468	7 322	6 783	4 979	103 099	60 066	22 110	237 930	135 354	42 557
2008	237 930	135 354	42 557	31 251	30 334	27 263	743 535	439 350	163 198	1 012 715	605 038	233 018
2009	1 012 715	605 038	233 018	14 657	12 914	7 072	-552 396	-360 380	-179 647	474 977	257 572	60 443
2010	474 977	257 572	60 443	15 821	13 909	7 503	20 574	5 829	-3 817	511 373	277 310	64 129

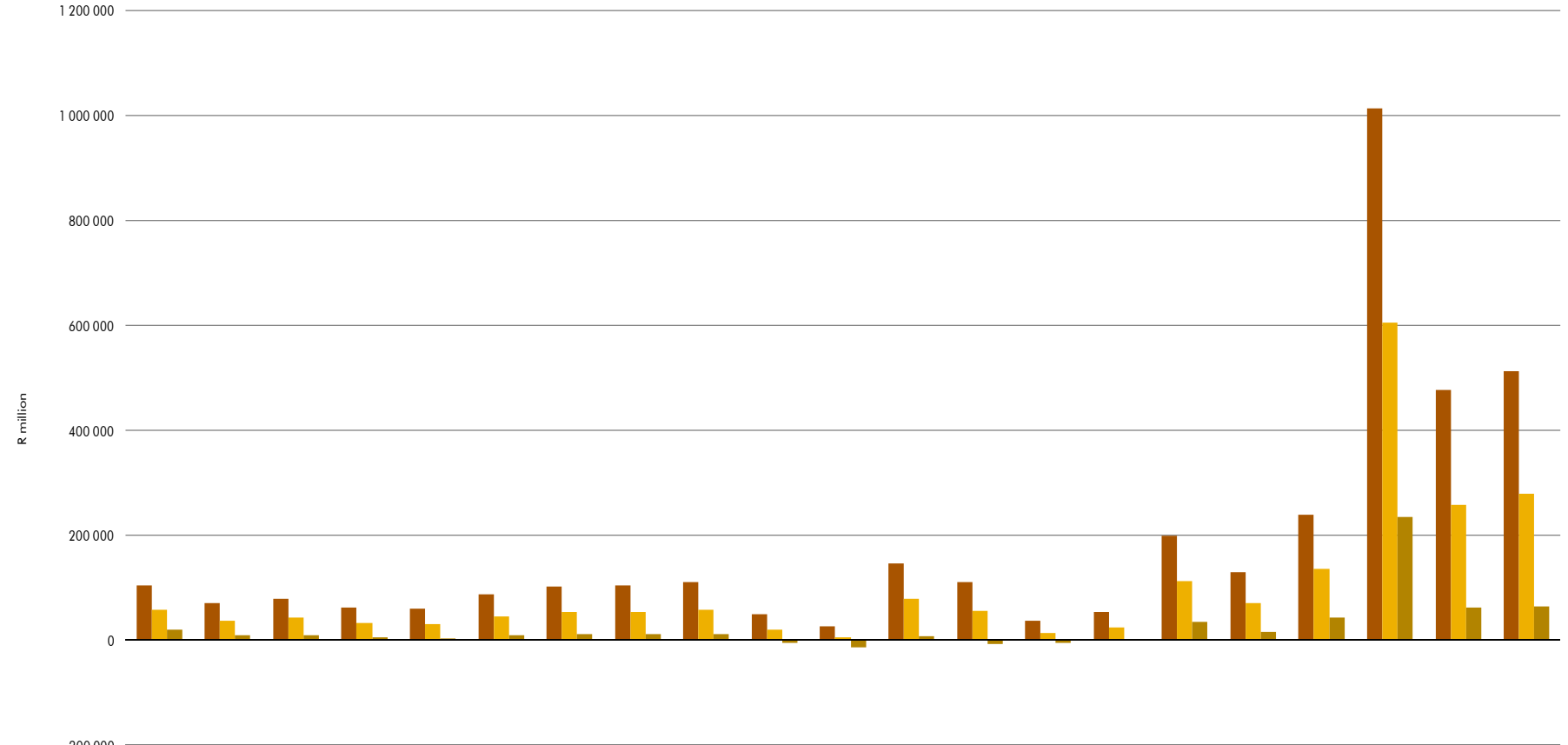
Calculations: Statistics South Africa.
Note: Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.

Table 14: Coal: monetary accounts for South Africa, 5-year moving average 1990–2010[1, 11]

Year	Opening stock			Depletion			Revaluation			Closing stock		
	Rand million											
	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%
1990	-	-	-	3 096	2 873	2 127	-	-	-	102 887	57 453	18 177
1991	102 887	57 453	18 177	2 605	2 358	1 532	-18 936	-12 646	-6 618	86 556	47 165	13 091
1992	86 556	47 165	13 091	2 513	2 251	1 374	-5 592	-4 404	-2 723	83 476	45 011	11 741
1993	83 476	45 011	11 741	2 422	2 137	1 185	-5 512	-4 404	-2 797	80 386	42 744	10 129
1994	80 386	42 744	10 129	2 421	2 109	1 063	-2 578	-2 680	-2 109	80 229	42 174	9 083
1995	80 229	42 174	9 083	2 343	1 991	810	-5 097	-4 366	-2 969	77 475	39 798	6 925
1996	77 475	39 798	6 925	2 465	2 092	840	1 583	-66	-582	81 524	41 824	7 183
1997	81 524	41 824	7 183	2 677	2 259	860	4 031	1 077	-692	88 231	45 160	7 351
1998	88 231	45 160	7 351	2 949	2 503	1 008	5 877	2 363	256	97 058	50 026	8 615
1999	97 058	50 026	8 615	2 814	2 347	783	-7 258	-5 465	-2 708	92 614	46 908	6 690
2000	92 614	46 908	6 690	2 429	1 923	227	-15 199	-10 407	-4 975	79 844	38 424	1 943
2001	79 844	38 424	1 943	2 630	2 115	101	3 981	1 733	-1 182	86 455	42 272	862
2002	86 455	42 272	862	2 630	2 095	-320	-2 589	-2 508	-3 279	86 496	41 858	-2 738
2003	86 496	41 858	-2 738	2 356	1 795	-760	-11 798	-7 811	-2 996	77 054	35 842	-6 493
2004	77 054	35 842	-6 493	2 405	1 854	-675	-1 013	-673	1 399	78 446	37 023	-5 769
2005	78 446	37 023	-5 769	3 469	2 940	476	31 099	18 721	9 359	113 013	58 684	4 065
2006	113 013	58 684	4 065	3 280	2 769	686	-9 501	-6 180	1 110	106 792	55 273	5 861
2007	106 792	55 273	5 861	4 035	3 545	1 905	20 306	11 930	8 513	131 134	70 748	16 278
2008	131 134	70 748	16 278	10 138	9 547	7 564	187 277	110 123	40 811	328 549	190 418	64 653
2009	328 549	190 418	64 653	12 656	11 814	8 992	68 931	33 409	3 209	410 137	235 641	76 854
2010	410 137	235 641	76 854	14 763	13 630	9 834	52 270	22 474	-2 637	477 170	271 745	84 050

Calculations: Statistics South Africa.
Note: Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.

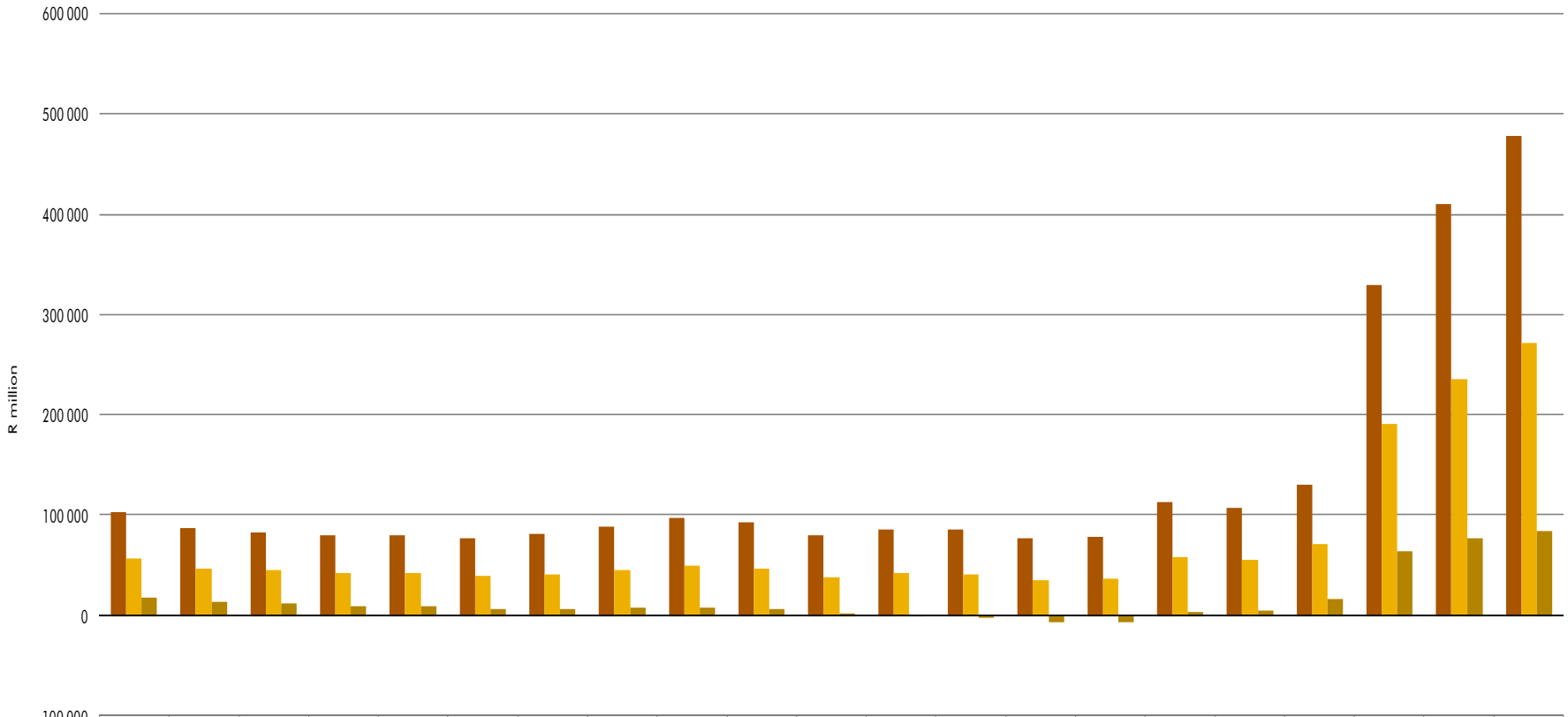
Figure 13: Coal: value of annual closing stock 1990–2010[1, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Closing Stock 3%	102 887	68 502	78 289	61 451	59 266	87 078	100 660	103 210	108 933	48 732	24 992	145 425	109 314	35 121	52 637	197 123	127 509	237 930	1 012 715	474 977	511 373
Closing Stock 5%	57 453	35 893	41 234	30 609	28 759	45 002	52 422	53 449	56 448	19 197	3 564	77 943	54 448	12 873	23 187	110 691	68 505	135 354	605 038	257 572	277 310
Closing Stock 11,7%	18 177	7 693	9 189	3 900	2 256	8 287	10 321	9 757	10 231	-6 685	-15 138	5 907	-8 136	-6 788	-3 017	32 926	15 468	42 557	233 018	60 443	64 129

Calculations: Statistics South Africa.

Figure 14: Coal: value of 5-year moving average closing stock, 1990–2010[1, 11]



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Closing Stock 3%	102 887	86 556	83 476	80 386	80 229	77 475	81 524	88 231	97 058	92 614	79 844	86 455	86 496	77 054	78 446	113 013	106 792	131 134	328 549	410 137	477 170
Closing Stock 5%	57 453	47 165	45 011	42 744	42 174	39 798	41 824	45 160	50 026	46 908	38 424	42 272	41 858	35 842	37 023	58 684	55 273	70 748	190 418	235 641	271 745
Closing Stock 11,7%	18 177	13 091	11 741	10 129	9 083	6 925	7 183	7 351	8 615	6 690	1 943	862	-2 738	-6 493	-5 769	4 065	5 861	16 278	64 653	76 854	84 050

Calculations: Statistics South Africa.

5.4 Iron ore

Tables 15 and 16 present the monetary accounts for iron ore in South Africa. The tables show opening stock, depletion, revaluation and closing stock in rand values. The values are represented by 3%, 5% and 11,7% SDR values. Table 15 was calculated in annual unit rent figures and Table 16 was calculated with unit rents in 5-year moving averages. The closing stock and opening stock for iron ore for 2002 to 2010 has shown a positive trend for both annual and 5-year moving averages (refer to Figures 15 and 16).

Table 15: Iron ore: monetary accounts for South Africa, annual 2002–2010[1, 11]

Year	Opening stock			Depletion			Revaluation			Closing stock		
	Rand million											
	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%
2002	-	-	-	2 252	1 975	1 045	-	-	-	58 811	36 330	8 901
2003	58 811	36 330	8 901	1 539	1 320	587	-21 454	-13 783	-4 497	38 896	23 867	4 991
2004	38 896	23 867	4 991	1 636	1 396	594	-91	-329	-541	40 440	24 935	5 044
2005	40 440	24 935	5 044	1 678	3 784	3 067	54 466	37 960	17 891	96 584	66 678	26 002
2006	96 584	66 678	26 002	4 098	7 346	7 210	73 516	53 581	27 792	174 198	127 605	61 004
2007	174 198	127 605	61 004	7 567	9 730	9 433	43 975	29 066	9 175	225 740	166 400	79 612
2008	225 740	166 400	79 612	11 455	17 397	17 085	125 593	94 386	45 515	362 787	278 183	142 212
2009	362 787	278 183	142 212	19 631	21 621	21 087	29 498	24 154	9 103	411 917	323 958	172 402
2010	411 917	323 958	172 402	23 365	34 486	32 666	181 642	131 773	57 369	616 923	490 218	262 436

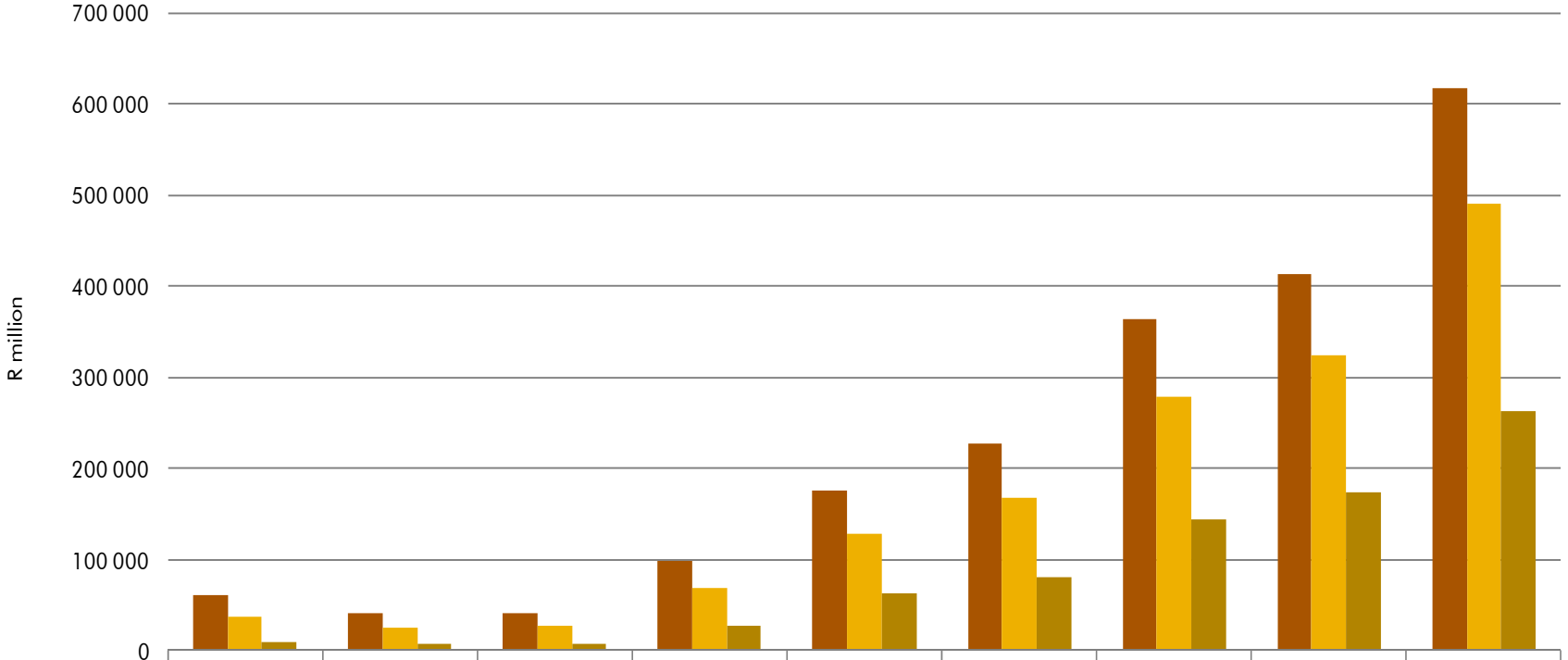
Calculations: Statistics South Africa.
Note: Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.

Table 16: Iron ore: monetary accounts for South Africa, 5-year moving average 2002–2010[1, 11]

Year	Opening stock			Depletion			Revaluation			Closing stock		
	Rand million											
	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%	3%	5%	11,7%
2002	-	-	-	2 252	1 975	437	-	-	-	58 811	36 330	3 739
2003	58 811	36 330	3 739	1 958	1 702	327	-11 281	-7 257	-1 272	49 488	30 775	2 795
2004	49 488	30 775	2 795	1 885	1 630	303	-4 769	-3 294	-510	46 604	29 111	2 587
2005	46 604	29 111	2 587	2 449	2 200	258	10 125	7 456	-643	59 178	38 766	2 202
2006	59 178	38 766	2 202	3 486	3 273	222	19 542	14 815	-524	82 206	56 855	1 900
2007	82 206	56 855	1 900	5 009	4 838	165	27 952	21 050	-653	115 167	82 743	1 412
2008	115 167	82 743	1 412	8 945	8 783	201	61 432	48 924	104	185 545	140 450	1 717
2009	185 545	140 450	1 717	13 935	13 789	216	64 060	52 370	-87	263 540	206 610	1 846
2010	263 540	206 610	1 846	20 775	20 573	265	81 561	65 261	158	365 876	292 444	2 269

Calculations: Statistics South Africa.
Note: Non-availability of data is indicated by a dash (-).
Where figures have been rounded, discrepancies may occur with totals.

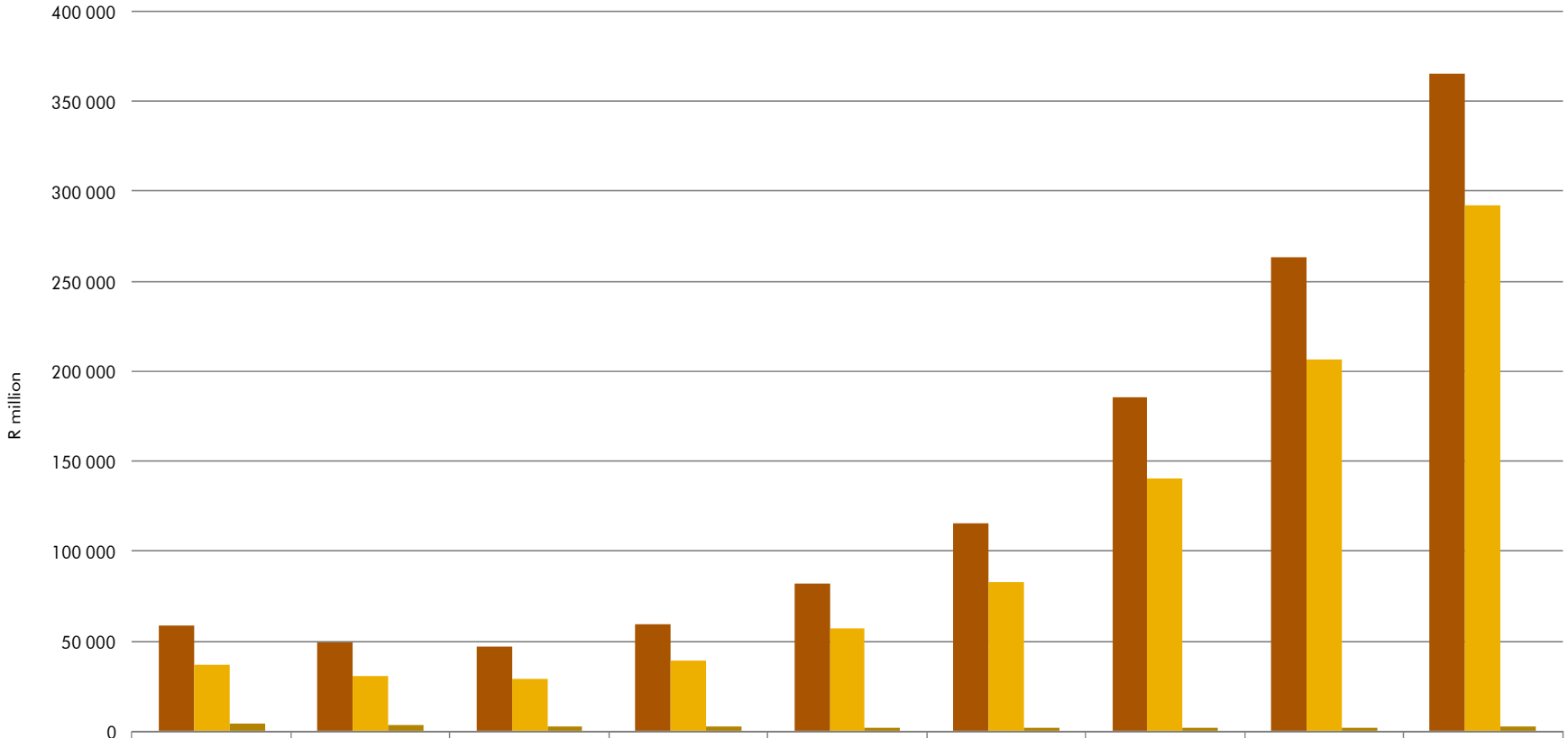
Figure 15: Iron ore: value of annual closing stock 2002–2010[1, 11]



	2002	2003	2004	2005	2006	2007	2008	2009	2010
Closing Stock 3%	58 811	38 896	40 440	96 584	174 198	225 740	362 787	411 917	616 923
Closing Stock 5%	36 330	23 867	24 935	66 678	127 605	166 400	278 183	323 958	490 218
Closing Stock 11,7%	8 901	4 991	5 044	26 002	61 004	79 612	142 212	172 402	262 436

Calculations: Statistics South Africa.

Figure 16: Iron ore: value of 5-year moving average closing stock, 2002–2010[1, 11]



	2002	2003	2004	2005	2006	2007	2008	2009	2010
Closing Stock 3%	58 811	49 488	46 604	59 178	82 206	115 167	185 545	263 540	365 876
Closing Stock 5%	36 330	30 775	29 111	38 766	56 855	82 743	140 450	206 610	292 444
Closing Stock 11,7%	3 739	2 795	2 587	2 202	1 900	1 412	1 717	1 846	2 269

Calculations: Statistics South Africa.

6. Sustainability of minerals in South Africa

This section discusses concepts of sustainability and the implications for approaches to measuring sustainability. Sustainable management of mineral resources requires that resource rent be reinvested in other activities that will generate income after the mineral resources are exhausted. Sustainability in mining refers to the transition from mining to other activities that could replace it, once the mineral resources are depleted. The South African government and mining industry bears a responsibility to ensure the transformation of mineral wealth into other forms of wealth. This transformation requires establishing taxes to recover resource rent and commitment to reinvest the rent.

There are guidelines for reinvesting mineral rent; however, there is no specific rule to determine the amount of rent that must be reinvested. The El-Serafy Rule specifies the minimum amount that must be reinvested in order to maintain wealth. There are three ways in which natural capital can be transformed into other forms of wealth.

1. Natural resources must be managed to maximise the generation of resource.
2. Resource rent must be recovered by an agent capable of reinvesting it.
3. Resource rent must be used for productive investments.

Sustainability requires non-decreasing levels of capital stock over time, or, at the level of the individual, non-decreasing per capita capital stock. Indicators of sustainability could be based on the value of total assets for every period, or by the change in wealth, i.e. consumption of capital (depreciation) in the conventional national accounts. For a proper measure of sustainability, all assets should be included in such an indicator: manufactured capital, natural capital and human capital. In the past, only manufactured capital was recorded in the SNA, but the recognition of the importance of natural capital has led to the expansion of the asset boundary to include this asset. Human capital has not been included because there is no agreement about how to measure it[12].

To encourage sustainability, fees should be set high enough to recover the rent generated at the most profitable, sustainable level of production (extraction), so that it becomes unprofitable for companies to harvest at levels that deplete the resource stock. The Sustainable Budget Index (SBI) is used to indicate how much of the mineral revenues are used for capital expenditures, including spending for human capital[12]. The SBI[a] value of one or less is interpreted to mean that current government consumption is sustainable because it is financed entirely out of revenues other than from minerals, and all the revenue derived

[a] SBI = Spending/Revenue

from mineral resources is used for public investment. An SBI value greater than one means that consumption relies partly on the revenues from mineral resources that are fiscally unsustainable[12].

6.1 Resource rent collection

The collection of rent usually comes about through negotiation between the resource owner and the resource user. Rent can be a fixed sum, or a variety of mechanisms including auctions, royalties and taxes. When designing a rent collection mechanism, it is important to take into account a number of considerations, such as:

- Avoiding or minimising economic distortions is a key issue for rent recovery that affects the quantity or value of the output so that it is no longer efficient.
- A poorly designed rent collection mechanism can negatively affect innovation. For instance, consider an immature industry that could not pay rent based on competing existing uses. Attempting to collect rent could prevent this immature industry from developing because, at least initially, costs may be very high and only the potential to generate and capture rent would justify development. In this situation, government might choose to forego rent for a period of time with the prospect of collecting rent in the future. Or government could use a resource rent tax or accounting profits royalty, effectively sharing the profits and the risk with a developer.
- There may be cases in which rent recovery would be unfair to the resource user. The resource rent is collected for different reasons, e.g. to ensure a return on investment, to avoid inefficient allocation and to achieve ethical objectives.

6.2 Resource rent applications

For resources that are owned by private individuals, there is no constraint on how rental income is spent. However, where the government owns and manages a resource on behalf of the public, in principle there is no reason why rental income should be used only in relation to the resource or activity being charged for. If the government owns mineral resources, which is a public resource, the rent should be used in a way that provides maximum benefit to the public. Rent recovery from non-renewable resources such as minerals could be used for developing renewable alternatives. Resource rent is also collected to enable investment that will enhance the welfare of the future generations. Section 3(1) of the Minerals and Petroleum Resources Development Act (MPRDA), 2002 (Act No. 28 of 2002) states that mineral resources must provide a benefit to all South Africans, and the Minister must ensure the sustainable development of South Africa's mineral and petroleum resources within the framework of the national environmental policy, while promoting economic and social development[12].

6.3 El-Serafy's User-cost method

The User-cost method is a measure of sustainable use of minerals. It divides resource rent into two components, namely:

- Capital component – part of resource rent that needs to be reinvested to maintain a constant stream of income; and
- Income component – residual amount that can be consumed as current income.

The results of the El-Serafy's User-cost formula[6] are presented in Tables 17, 18, 19 and 20 for gold, PGMs, coal and iron ore respectively. The calculations used 3%, 5% and 11,7% SDR/RRR[b].

With a decrease in the income component, less of the revenue from gold mining has to be invested to maintain a constant stream of income. With a decrease in the capital component, less of the revenue from mining can be consumed as current income. The reverse is true if there is an increase for the income or capital components.

The income component (X) for gold at an RRR of 11,7% increased over the 20-year period from 1990 to 2010. In Table 17, the income component in 1990 was -R510 million, increasing to R6 269 million in 2010. The capital reinvestment component increased from -R38 million (1990) to R187 million (2010). The capital depreciation factor in 2010 was at about 3%[2, 11].

The income component (X) for PGMs at an RRR of 11,7% fluctuated over the 20-year period from 1990 to 2010. In Table 18, the income component in 1990 was R523 million, and this decreased to -R14 483 million in 2010. The capital reinvestment component remained unchanged at zero. The capital depreciation factor remained zero from 1990 to 2010[2, 11].

The income component (X) for coal at an RRR of 11,7% increased over the 20-year period from 1990 to 2010. In Table 19, the income component in 1990 was R2 127 million, increasing to R7 503 million in 2010. The capital reinvestment component remained zero from 1990 to 2010. The capital depreciation factor was zero from 1990 to 2010[2, 11].

The income component (X) for iron ore at an RRR of 11,7% decreased from 2002 to 2004, but increased in 2005 and continued to increase until 2010 (refer to Table 20). In 2002, the income component was R1 041 million; decreasing to R590 million in 2004, then increasing to R30 816 million in 2010. The capital reinvestment component at 11,7% fluctuated within a 3-period from 2002 to 2004, then gained a significant increase from 2005 until 2010. It was followed by the capital depreciation factor also increasing from 2002 to 2010, remaining positive throughout the 9-year period[2, 11].

[b] SDR is the same as RRR as shown in El-Serafy's User-cost formula.

Table 17: Gold: income and capital component of resource rent 1990–2010[2, 11]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
						Rand million					
Income component (X)											
Rent consumed as income (RRR 11,7%)	-510	-2 342	-3 402	-1 753	-2 568	-5 849	-4 617	-7 667	-7 969	-7 804	-8 241
Rent consumed as income (RRR 5%)	1 619	307	-426	1 018	527	-1 932	-791	-3 137	-3 355	-3 160	-3 374
Rent consumed as income (RRR 3%)	1 957	851	236	1 545	1 154	-968	78	-1 966	-2 151	-1 965	-2 119
Capital component (R-X) Reinvestment											
Remaining rent invested (RRR 11,7%)	-38	-192	-327	-192	-271	-543	-423	-758	-773	-786	-834
Remaining rent invested (RRR 5%)	515	102	-152	384	196	-677	-276	-1 130	-1 199	-1 148	-1 229
Remaining rent invested (RRR 3%)	978	436	126	856	633	-513	41	-1 059	-1 153	-1 065	-1 149
						Percentage					
Capital depreciation factor (R-X)/R (%)											
Percentage of reinvestment (RRR 11,7%)	6,94	7,56	8,76	9,88	9,55	8,49	8,39	8,99	8,84	9,15	9,19
Percentage of reinvestment (RRR 5%)	24,14	24,90	26,24	27,40	27,07	25,95	25,84	26,49	26,33	26,66	26,69
Percentage of reinvestment (RRR 3%)	33,32	33,88	34,84	35,65	35,42	34,63	34,55	35,02	34,90	35,13	35,16

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 17: Gold: income and capital component of resource rent 1990–2010 (concluded)[2, 11]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
						Rand million				
Income component (X)										
Rent consumed as income (RRR 11,7%)	-7 721	-6 809	2 281	1 851	-3 625	-2 026	-3 512	-3 917	-2 722	6 269
Rent consumed as income (RRR 5%)	-2 186	215	3 512	3 005	-860	1 927	115	956	1 358	9 146
Rent consumed as income (RRR 3%)	-1 019	1 472	3 546	3 046	-203	2 628	887	1 940	2 137	8 965
Capital component (R-X) Reinvestment										
Remaining rent invested (RRR 11,7%)	-708	-714	228	162	-250	-125	-196	-142	-86	187
Remaining rent invested (RRR 5%)	-762	79	1 273	1 026	-265	564	32	221	296	1 943
Remaining rent invested (RRR 3%)	-538	806	1 918	1 589	-100	1 248	410	800	848	3 508
						Percentage				
Capital depreciation factor (R-X)/R (%)										
Percentage of reinvestment (RRR 11,7%)	8,40	9,50	9,10	8,05	6,46	5,80	5,28	3,50	3,05	2,90
Percentage of reinvestment (RRR 5%)	25,86	27,01	26,61	25,46	23,53	22,63	21,88	18,80	17,87	17,52
Percentage of reinvestment (RRR 3%)	34,56	35,38	35,10	34,28	32,87	32,20	31,62	29,19	28,42	28,12

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 18: Platinum group metals: income and capital component of resource rent 1990–2010[2, 11]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
						Rand millions					
Income component (X)											
Rent consumed as income (RRR 11,7%)	523	326	-458	-836	-1 195	-1 717	-1 788	-2 463	-2 914	-4 006	-216
Rent consumed as income (RRR 5%)	872	790	-30	-359	-703	-1 290	-1 356	-2 089	-2 540	-3 556	-115
Rent consumed as income (RRR 3%)	1 130	1 018	204	-100	-412	-961	-1 057	-1 664	-1 943	-2 812	1 240
Capital component (R-X) Reinvestment											
Remaining rent invested (RRR 11,7%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Remaining rent invested (RRR 5%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Remaining rent invested (RRR 3%)	0,00	0,00	0,00	0,00	0,00	-0,01	-0,01	-0,03	-0,04	-0,14	0,04
						Percentage					
Capital depreciation factor (R-X)/R (%)											
Percentage of reinvestment (RRR 11,7%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Percentage of reinvestment (RRR 5%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Percentage of reinvestment (RRR 3%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 18: Platinum group metals: income and capital component of resource rent 1990–2010 (concluded)[2, 11]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
	Rand million									
Income component (X)										
Rent consumed as income (RRR 11,7%)	950	4 590	-488	-1 080	-2 126	14 338	14 643	15 457	-22 946	-14 483
Rent consumed as income (RRR 5%)	3 353	7 098	1 386	1 086	307	17 076	17 926	20 218	-16 543	-7 785
Rent consumed as income (RRR 3%)	4 200	7 982	1 945	1 732	1 032	17 874	18 887	21 628	-14 625	-5 781
Capital component (R-X) Reinvestment										
Remaining rent invested (RRR 11,7%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Remaining rent invested (RRR 5%)	0,00	0,00	0,00	0,00	0,00	0,23	0,21	0,08	-0,05	-0,05
Remaining rent invested (RRR 3%)	0,38	0,97	0,63	0,80	0,97	19,81	19,27	11,30	-6,85	-4,28
	Percentage									
Capital depreciation factor (R-X)/R (%)										
Percentage of reinvestment (RRR 11,7%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Percentage of reinvestment (RRR 5%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Percentage of reinvestment (RRR 3%)	0,01	0,01	0,03	0,05	0,09	0,11	0,10	0,05	0,05	0,07

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 19: Coal: income and capital component of resource rent 1990–2010[2, 11]

	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
						Rand million					
Income component (X)											
Rent consumed as income (RRR 11,7%)	2 127	900	1 075	456	264	970	1 208	1 142	1 197	-782	-1 771
Rent consumed as income (RRR 5%)	2 873	1 795	2 062	1 530	1 438	2 250	2 621	2 672	2 822	960	178
Rent consumed as income (RRR 3%)	3 087	2 055	2 349	1 844	1 778	2 612	3 020	3 097	3 269	1 462	750
Capital component (R-X) Reinvestment											
Remaining rent invested (RRR 11,7%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Remaining rent invested (RRR 5%)	0,19	0,14	0,16	0,18	0,31	0,77	0,91	1,62	2,12	0,71	0,15
Remaining rent invested (RRR 3%)	8,92	6,75	7,69	7,73	10,74	20,83	24,23	34,83	41,86	18,54	10,38
						Percentage					
Capital depreciation factor (R-X)/R (%)											
Percentage of reinvestment (RRR 11,7%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Percentage of reinvestment (RRR 5%)	0,01	0,01	0,01	0,01	0,02	0,03	0,03	0,06	0,08	0,07	0,09
Percentage of reinvestment (RRR 3%)	0,29	0,33	0,33	0,42	0,60	0,79	0,80	1,11	1,26	1,25	1,37

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 19: Coal: income and capital component of resource rent 1990–2010 (concluded)[2, 11]

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
					Rand million					
Income component (X)										
Rent consumed as income (RRR 11,7%)	691	-952	-794	-353	3 852	1 810	4 979	27 263	7 072	7 503
Rent consumed as income (RRR 5%)	3 897	2 722	644	1 159	5 535	3 425	6 768	30 252	12 879	13 866
Rent consumed as income (RRR 3%)	4 364	3 280	1 054	1 580	5 917	3 827	7 142	30 405	14 260	15 355
Capital component (R-X) Reinvestment										
Remaining rent invested (RRR 11,7%)	0,00	0,00	0,00	0,00	0,00	0,00	0,01	0,04	0,01	0,02
Remaining rent invested (RRR 5%)	3,28	2,19	0,93	2,01	10,63	6,91	15,45	81,80	34,88	43,26
Remaining rent invested (RRR 3%)	59,89	43,73	20,07	33,61	133,78	89,14	179,30	845,58	396,99	465,74
					Percentage					
Capital depreciation factor (R-X)/R (%)										
Percentage of reinvestment (RRR 11,7%)	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Percentage of reinvestment (RRR 5%)	0,08	0,08	0,14	0,17	0,19	0,20	0,23	0,27	0,27	0,31
Percentage of reinvestment (RRR 3%)	1,35	1,32	1,87	2,08	2,21	2,28	2,45	2,71	2,71	2,94

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

Table 20: Iron ore: income and capital component of resource rent 2002–2010[2, 11]

	2002	2003	2004	2005	2006	2007	2008	2009	2010
					Rand million				
Income component (X)									
Rent consumed as income (RRR 11,7%)	1 041	584	590	3 042	7 138	9 316	16 650	20 209	30 816
Rent consumed as income (RRR 5%)	1 828	1 204	1 261	3 382	6 492	8 498	14 492	17 285	26 749
Rent consumed as income (RRR 3%)	1 851	1 239	1 300	3 135	5 715	7 493	12 695	15 203	23 803
Capital component (R-X) Reinvestment									
Remaining rent invested (RRR 11,7%)	3	3	4	24	72	117	435	878	1 850
Remaining rent invested (RRR 5%)	146	116	135	402	854	1 231	2 905	4 336	7 737
Remaining rent invested (RRR 3%)	401	300	336	863	1 672	2 325	4 795	6 577	11 227
					Percentage				
Capital depreciation factor (R-X)/R (%)									
Percentage of reinvestment (RRR 11,7%)	0	0	1	1	1	1	3	4	6
Percentage of reinvestment (RRR 5%)	7	9	10	11	12	13	17	20	22
Percentage of reinvestment (RRR 3%)	18	19	21	22	23	24	27	30	32

Calculations: Statistics South Africa.
Note: Where figures have been rounded, discrepancies may occur with totals.

7. Conclusion

South Africa holds the world's largest natural proven reserves of gold, PGMs, chrome ore and manganese ore, and the second-largest proven reserves of zirconium, vanadium and titanium. The mineral resources measured in these accounts are gold, PGMs, coal and iron ore as they are the major contributors to South Africa's mining industry to the Gross domestic product (GDP).

The mining and quarrying industry employed 498 141 people in 2010, with a total earnings of R74 226 million[1]. The gold, PGM, coal and iron ore mining industry was responsible for 88% of South Africa's mining labour force[1]. The PGMs are found in the Bushveld Complex, associated with copper, chromium and vanadium-bearing titanium-iron ore[4]. South Africa has the world's largest resources of PGMs (88% of world total), manganese (80% of world total), chromium (72% of world total) and gold (40% of world total).

Mineral resources need to be sustainably extracted in order to prolong their depletion period and the economic benefit from the extraction thereof. The resource rents need to be reinvested to ensure sustainable alternatives to the mining industry. Rent recovery from non-renewable resources could be used for developing renewable alternatives. The South African Revenue Service (SARS) records the mineral resource royalties that have been collected since March 2010 under the MPRDA. This would facilitate analysis and comparison of such data with the resource rent calculations in the future. The importance of minerals has been highlighted earlier in this document, one aspect of which is the positive contribution towards the GDP. The minerals account is to be updated periodically, based on data availability from the Department of Mineral Resources (DMR).

8. References

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9. Glossary

Term	Description
Account	An account is a tool which records, for a given aspect of economic life, (a) the uses and resources or (b) the changes in assets and the changes in liabilities and/or (c) the stock of assets and liabilities existing at a certain time; the transactions accounts include a balancing item which is used to equate the two sides of the accounts (e.g. resources and uses) and which is a meaningful measure of economic performance in itself.
Compensation of employees	Compensation of employees is defined as the total remuneration, in cash or in kind, payable by an enterprise to an employee in return for work done by the latter during the accounting period. Compensation of employees does not include any taxes payable by the employer on the wage and salary bill. Note that in this report, compensation of employees will not be equal with other figures published by Stats SA because such figures are adjusted to benchmarking levels done in 1999, whereas figures in this report are not adjusted.
Constant prices	Constant prices are obtained by directly factoring changes over time in the values of flows or stocks of goods and services into two components reflecting changes in the prices of the goods and services concerned and changes in their volumes, i.e. changes in 'constant price terms'.
Consumption of capital	Consumption of fixed capital is a cost of production. It may be defined in general terms as the decline, during the course of the accounting period, in the current value of the stock of fixed assets owned and used by a producer as a result of physical deterioration, normal obsolescence or normal accidental damage. It excludes the value of fixed assets destroyed by acts of war or exceptional events such as major natural disasters, which occur very infrequently.
Current prices	A fundamental principle underlying the measurement of gross value added, and hence GDP, is that output and intermediate consumption must be valued at the prices current at the time the production takes place.
Bauxite	Bauxite is an aluminium ore and is the main source of aluminium.
Depletion	The depletion of natural deposits covers the reduction in the value of deposits of subsoil assets as a result of the physical removal and using up of the asset. The changes recorded here are the negative counterparts of gross additions to the level of exploitable subsoil resources that result from reassessments of exploitability, because of changes in technology or relative prices.
Fixed assets	Fixed assets may have been purchased in the past at times when both relative prices and the general price level were very different from prices in the current period. In order to be consistent with the other entries, consumption of fixed capital must be valued with reference to the same overall set of current prices as that used to value output and intermediate consumption.

Term	Description
Fixed assets or inventories	Subsoil assets are different from the stocks of fixed assets and inventories, the major difference being that the process of production has created them. Although they are neither fixed assets nor inventories, they present characteristics of both. The 1993 SNA assumes that all receipts generated from the use of natural assets can be recorded as income, specifically as part operating surplus. The implicit assumption is that assets are not exhaustible and therefore no deductions from the receipts are necessary.
Intermediate consumption	Intermediate consumption consists of the value of the goods and services consumed as inputs by a process of production, excluding fixed assets whose consumption is recorded as consumption of fixed capital. The goods or services may be either transformed or used up by the production process. Some inputs re-emerge after having been transformed and incorporated into the outputs. Other inputs are completely consumed or used up. Intermediate consumption includes the rentals paid on the use of fixed assets.
Mineral exploration	Mineral exploration consists of the value of expenditures on exploration for petroleum and natural gas and for non-petroleum deposits; it includes pre-license costs, license and acquisition costs, appraisal costs and the costs of actual test drilling and boring, as well as the costs of aerial and other surveys, transportation costs, etc. incurred to make it possible to carry out the tests.
Monetary accounts	Accounts expressed in monetary terms, using only currency as the unit of measure. Monetary is to be taken as synonymous with 'economic value' as understood in economic theory.
National accounts	National accounts are a coherent, consistent and integrated set of macro-economic accounts; balance sheets and tables based on a set of internationally agreed concepts, definitions, classifications and accounting rules. National accounts provide a comprehensive accounting framework within which economic data can be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policy-making.
Natural Resource Accounting	Natural Resource Accounting is an accounting system that deals with stocks and stock changes of natural assets, comprising biota (produced or wild), subsoil assets (proved reserves), water and land with their aquatic and terrestrial ecosystems. It is frequently used in the sense of physical accounting as distinguished from monetary (environmental) accounting.
Natural resources	Natural assets (raw materials) occurring in nature that can be used for economic production or consumption. The naturally occurring assets that provide use benefits through the provision of raw materials and energy used in economic activity (or that may provide such benefits in future) and that are subject primarily to quantitative depletion through human use are subdivided into four

Term	Description
	categories: mineral and energy resources, soil resources, water resources and biological resources.
Non-renewable natural resources	Exhaustible natural resources such as mineral resources that cannot be regenerated after exploitation.
Opportunity cost	In the System, the cost of using, or using up, some existing asset or good in one particular process of production is measured by the amount of benefits that could have been secured by using the asset or good in alternative ways. Opportunity cost is calculated with reference to the opportunities foregone at the time the asset or resource is used, as distinct from the costs incurred at some time in the past to acquire the asset.
Ore	Rock with an enrichment of minerals that can be mined for profit.
Proved reserves	Such estimated quantities of mineral deposits, at a specific date, as analysis of geological engineering data demonstrates with reasonable certainty to be recoverable in the future under the same economic and operational conditions.
Physical accounting	Natural resource and environmental accounting of stocks and changes in stocks in physical (non-monetary) units, for example, weight, area or number. Qualitative measures, expressed in terms of quality classes, types of uses or ecosystem characteristics, may supplement quantitative measures. The combined changes in asset quality and quantity are called volume changes.
Rent/royalties	The owners of assets, whether private or government units, may grant leases to other institutional units permitting them to extract such deposits over a specified period of time in return for the payment of rents. These payments are often described as royalties, but they are essentially rents that accrue to owners of the assets in return for putting them at the disposal of other institutional units for specified periods of time and are treated as such in the System. The rents may take the form of periodic payments of fixed amounts, irrespective of the rate of extraction or, more likely, they may be a function of the quantity or volume of the asset extracted.
Revaluation	Revaluation is the positive or negative holding gain accrued during the accounting period to the owners of financial or non-financial assets and liabilities.
Satellite accounts	Satellite accounts provide a framework linked to the central accounts and which enables attention to be focused on a certain field or aspect of economic and social life in the context of national accounts: common examples are satellite accounts for the environment, tourism or unpaid household work.
Stocks	Stocks are a position in, or holdings of, assets and liabilities at a point in time and the SNA records stocks in accounts, usually referred to as balance sheets, and tables at the beginning and end of the accounting period. Stocks result from the accumulation of prior transactions and other flows, and

Term	Description
	they are changed by transactions and other flows in the period (note that stocks of goods are referred to as 'inventories' in the SNA).
Subsoil assets	Subsoil assets are defined in the 1993 SNA as proven resources of mineral deposits located on or below the earth's surface that are economically exploitable, given current technology and relative prices. Subsoil assets consist of coal, oil and natural gas reserves, metallic mineral reserves and non-metallic mineral reserves. The SEEA adopts the same definition as the SNA. Subsoil assets are classified according to: -The degree of geological certainty; and -The degree of economic feasibility of the reserves. The boundary between discovered and undiscovered reserves fluctuates as a result of exploration and development, differing geological conditions and technological improvements. The degree of economic feasibility on the other hand categorises the resource as economic, marginally economic and sub-economic; according to the relationship between prices and extraction costs and technological exploitability.
System of Integrated Environmental and Economic Accounting	Satellite system of the System of National Accounts (SNA) proposed by the United Nations for the incorporation of environment concerns (environmental costs, benefits and assets) into national accounts.
Taxes	Taxes are compulsory, unrequited payments, in cash or in kind, made by institutional units to government units. They are transfers because the government provides nothing in return to the individual unit making the payment, although government may use the funds raised in taxes to provide goods and services to other units, either individually or collectively, or to the community as a whole.
System of National Accounts	The revised system adopted worldwide for conventional economic (national) accounting (Commission of the European Communities and others, 1993).