Roundtable on Sustainable Platinum Group Metals
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Proceedings of the Second Roundtable on the Sustainable Production and Use of Platinum Group Metals – Brussels, December 12, 2007

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The Roundtable on Sustainable Production and Use of Platinum Group Metals is an Initiative of Milieukontakt International (Amsterdam, The Netherlands) and Dr. Reinier de Man, sustainable business development (Leiden, The Netherlands). Its goal is to promote a fact based discussion among experts and stakeholders and to provide a platform for cooperation initiatives. It is supported by a grant from the Dutch Ministry of Housing, Spatial Planning and the Environment.

6	Alexey Grigoriev (International Socio-Economic Union)	The Sustainability of Norilsk Nickel's PGM Production
7	Stuart M. Levit (Center for Science in Public Participation / Earthworks)	Sourcing Responsible Platinum Group Metals
8	Christian Hagelüken (Umicore)	Material Flows of Car Related PGM (presentation in separate PDF file)
9	Matthias Buchert (Öko-Institut)	The Case of Car Exports through the Hamburg Port
10	Armin Reller (Augsburg University)	Strategies for a Sustainable Utilisation of PGMs (selected slides only)
11	Hans-Sierd Pietersen (European Commission)	EU Raw Materials Initiative
12	Doreen Rodrigo (EEB)	A Targeted Strategy on Resource Use: From a Symptom Approach to a System Approach

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Second Roundtable on the Sustainable Production and Use of Platinum Group Metals – Brussels, December 12, 2007

Roundtable Program

Amsterdam, December 4, 2007

Dear Madame / Sir,

With this letter we would like to give you an update on the Second International Roundtable on Sustainable Production and Use of Platinum Group Metals (PGM), which will take place at the headquarters of **Toyota Motor Europe,** Avenue du Bourget 60, 1140 Brussels, Belgium on December 12, 2007.

The goal of the Roundtable is to discuss the challenges for creating a more sustainable use of these scarce noble metals. During the first Roundtable, which took place in December 2005, the focus was on Russian platinum production. During this Roundtable, we will have contributions from South Africa and North America as well.

The morning program will focus on benchmarks for the sustainability of platinum mining. We will have contributions from South Africa, Russia

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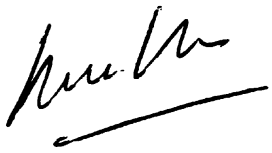
and North America. NGO representatives will give their views on the situation as a basis for discussion.

In the afternoon, we will go into opportunities for better recycling of platinum group metals from automobile catalyst converters. A concrete case-study on car exports from the Hamburg sea port will be used as a basis for discussion. After a discussion on the car industry's potential reponsibilities, EU officials, national government representatives and NGOs will give express their views on the future direction of policies on strategical resource issues and life cycle responsibility.

We are looking forward to seeing you in Brussels on December 12, 2007.

Yours Sincerely,



Dr Reinier de Man
on behalf of the Platinum Group Metals Round Table International Committee

Dr*. Michael Angrik, Umweltbundesamt, Dessau*
Dirk Bosteels, AECC, Brussels
Dr. Matthias Buchert, Öko-Institut, Freiburg
Dr. Christian Hagelüken, Umicore, Hanau
Jean Philippe Hermine, Renault, Paris
Alexey Kiselev, GP Russia, Moscow
Gabriele Randlshofer, IPA Munich
Prof Dr Armin Reller, University Augsburg
Arne Richters,Toyota, Brussels
Michael Steel, consultant to Johnson Matthey, London

PROGRAM

Toyota Motor Europe, Avenue du Bourget 60, 1140 Brussels, Belgium on December 12, 2007, 10:00 – 18:00

WELCOME AND INTRODUCTION	
10:00	Welcome by Dr Stephen Stacey, General Manager Government and Technical Affairs, Toyota Chairman's introduction
MORNING SESSION: MINING AND PROCESSING	
10:15	Sustainability Issues in the South African PGM Mining Industry: • An Industry view, by Francis Petersen, Anglo Platinum • An NGO view by John Capel, Benchmarks Foundation
11:00	Sustainability Issues in the Russian PGM Mining Industry • An industry view, by Norilsk Nickel • An NGO view by Alexey Grigoriev, SEU Moscow
11:45	Sustainability Issues in the North American Mining Industry • An industry view, Gabriele Randlshofer, International Platinum Association Munich • An NGO view by Stu Levit, Earthworks, Montana USA
12:15	Discussion
12:45	Lunch

(*) to be confirmed

AFTERNOON SESSION: CLOSING THE PGM LOOP (The case of car catalysts)	
13:45	Material Flows of Car-related PGM, by Dr Christian Hagelüken (Umicore)
14:05	The Case of Car Exports through the Hamburg Port, by Dr Matthias Buchert (Öko-Institut)
14:30	Sustainable Use of PGM: the Car Industry's Responsibility. • Introductory remarks by Prof Dr Armin Reller (*) • Discussion
14:50	The position of government and NGOs: • EU policy on ELV and producer responsibility, statement, NN. • The environmental NGO position, statement by Doreen Fedrigo, EEB, Brussels. • National perspectives: short statements by o Dr Wendenburg, Federal Environment Ministry (BMU) Berlin and o Dutch Environmental Ministry (VROM) The Hague (*).
16:00	Discussion
16:50	Chairman's summary
17:00	drinks and informal discussions

(*) to be confirmed

PGM MINING INDUSTRY:
IMPROVE SUSTAINABILITY, IMPROVE TRANSPARENCY

1. The participants agreed that it is highly valuable to discuss the different situation in the different major mining countries (South Africa, Russia, US/Canada) and their different paths towards sustainable production. They also agreed that differences in development should not primarily be used for pinpointing at weaknesses at certain production sites but rather as a starting point for mutual learning and exchange of ideas between the different mining companies.

2. It was agreed that it is important to develop a set of simple environmental and social indicators that allow for comparison and benchmarking. They will function as a common reference for improving sustainability in the PGM mining industry. In addition, they will help the mining industry communicate their sustainability achievements along the supply chain.

3. The question was asked, who should be responsible for formulating the sustainability indicators. Certainly the PGM producing companies, coordinated by their association IPA, should play a major role. By providing a multi-stakeholder input, the PGM Roundtable could substantially contribute to their credibility.

4. Most participants felt the need for making the PGM mining industry's sustainability transparent through the entire supply chain and that this would require a certain level of traceability. No concrete models were discussed, but it was acknowledged that this is not an easy task.

5. Roundtable participants expressed the need for improving corporate reporting on the mining companies' sustainability issues. There appear to exist too many disparities between company reports and realities on the ground. Third party verification should play a more prominent role in the future.

RECYCLING CATALYTIC CONVERTERS:
'MINE THE CARS', DEVELOP INFRASTRUCTURE

6. The information brought to the Roundtable convincingly showed that incomplete recycling of PGMs in cars is the largest single contributor to leakage from the PGM cycle. PGM increasingly contained in car electronics is adding to PGM contained in the catalytic converter and is even more difficult to recycle. There are good reasons for the Roundtable to continue focusing on the car industry.

7. PGM contained in electronics is the second most important source of PGM loss as a result of an extremely low recycling rate. Quantitatively it is far less important than the leakage from incomplete car recycling, however. Possibly, the Roundtable could address PGM in electronics at a later point of time.

8. There was agreement that used catalytic converters should be regarded as a PGM resource in the first place and not as waste. Catalytic converter scrap has a much higher PGM content than PGM containing ores. Recycling PGM not only helps to save scarce natural resources. It is also much more energy efficient than PGM production from ores.

9. In the near future, the quantity of PGM potentially available from decommissioned cars will rapidly increase. Roundtable participants emphasised the huge opportunity for 'mining' PGM from these cars, provided that the logistical infrastructure is in place and end-of-life (EOL) cars and catalysts are effectively fed into an appropriate industrial recycling chain.. Given the high economic value of PGM, there is a strong business case for developing this infrastructure on a global scale as soon as possible. Creating more transparency on material flows of used and EOL cars and catalysts and the actors involved is a crucial requirement in this context

CAR MANUFACTURERS:
LOOK AT PGM AS STRATEGIC MATERIALS, REQUIRE SUSTAINABILITY INFORMATION

10. It was recognised that a centrally important issue for car manufacturers will be the secure supply of PGM (among many other natural resources). Especially when new technological developments, either within the car industry (e.g. fuel cells) or in other sectors (e.g. electronics) require large quantities of PGM, supply security and price volatility can present serious problems.

11. There was no agreement on the precise role car manufacturers could play in promoting sustainable PGM mining. Although it was recognised that they cannot possibly assume a direct responsibility for mining issues, many felt that (at least for primary PGM supplies) car manufacturers should require from their PGM and/or catalytic converter suppliers basic information about the identity of PGM producers and their sustainability performance.

12. There was no agreement either on the role car manufacturers could or should play in taking responsibility for PGM recycling at the end of their cars' life. Ideas about changed ownership structures (lease instead of ownership) were brought forward, there was no agreement on how desirable and effective these could be in practice. The car manufacturers stressed the need for global solutions.

GOVERNMENT (INCLUDING EU AND UNEP):
PGM ROUNDTABLE HIGHLY RELEVANT WITHIN CURRENT POLICIES

13. Different existing and developing EU policies (in the framework of the EU's sustainable development strategy and the 6th Environmental Action Programme) are focusing on waste prevention, recycling and sustainable product design, for example:

    a. The thematic Strategy on Waste Prevention and Recycling,

    b. The thematic Strategy on the Sustainable Use of Natural Resources,

    c. The Sustainable Consumption and Production Action Plan.

14. It was recognised, also by the EU/government participants, that, in the PGM value added chain, the PGM Roundtable can make an important contribution to realising resource efficiency and waste prevention and recycling goals as put forward by these policies.

15. It was emphasised that, in many if not most areas, optimisation of sustainability of the production and use of PGM is beyond the legislative power of the EU and member countries. However, more needs to be done in terms of enforcement of legislation, e.g. in the field of securing ELV-directive compliant recycling plants or preventing illegal exports of scrap cars out of the EU. The Roundtable's approach, based on a voluntary agreement between stakeholders rather than legislation, was welcomed as an alternative or in any case as complementary to the efforts of EU and national policies.

16. At the roundtable meeting, government representatives expressed their (non-binding) willingness to support the roundtable's initiative in the near future.

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CHAIRMAN'S INTRODUCTION

history, program,
envisaged outcomes

Trigger (2002-2003)

- Studies by German Oeko-Institute:
  - gigantic pollution by Russian PGM mining
  - contradiction: clean car ←→ dirty metals
- Hypothesis
  - possibility of a profitable partnership between mining industry, automobile industry & others
  - beneficial to the environment and to business interests

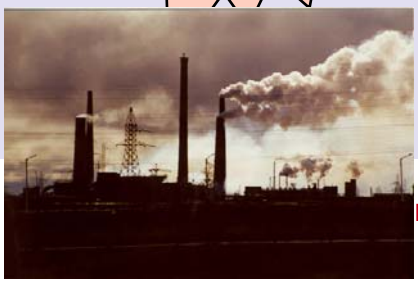
The Issues

3. PGM dispersion into environment

PGM mining → processing → catalytic converter production → automobile manu-facturing → retail + consump-tion → end-of-life

PGM recovery

1. ecological and social problems



2. loss of strategically important metals

The First Roundtable (2005)

- Discussion issues
  - Sustainability of PGM
    - Production (Russia): improvement recognised
  - Demand and Supply tensions
    - no immediate scarcity
    - future tensions likely
  - End of Use / Recycling
    - problems recognised
    - no agreement on solutions
  - Dispersion during Use
    - acute risks not clear
    - guidance by precautionary principle

- Objectives after 2005 Roundtable
  - production: include South Africa and North America
  - more high level support from mining/processing companies, automobile industry and government (national, EU)

The International Committee

ROUNDTABLE ON SUSTAINABLE PLATINUM GROUP METALS

Dr Michael Angrick	Umweltbundesamt Dessau
Dirk Bosteels	AECC
Dr. Matthias Buchert	Öko-Institute
Dr. Christian Hagelüken	Umicore
Jean Philippe Hermine	Renault
Alexey Kiselev	GP Russia
Gabrielle Randlshofer	International Platinum Association
Prof Dr Armin Reller	University Augsburg
Arne Richters	Toyota
Michael Steel	consultant to Johnson Matthey

Roundtable Participants

	2005	2007
	19	*37*
Mining / processing	6	5
Automobile industry	3	8
Government	1	6
NGOs	5	11
Research / Consultants	4	7

Today's Program

ROUNDTABLE ON SUSTAINABLE PLATINUM GROUP METALS

10:00	Welcome & Introduction	12:45	Lunch
MORNING SESSION MINING AND PROCESSING		AFTERNOON SESSION CLOSING THE PGM LOOP	
10:15	South Africa Francis Petersen, Anglo Platinum John Capel, Benchmarks F.	13:45 14:05	Christian Hagelüken, Material Flows Matthias Buchert, Hamburg Port case study, discussion
11:00	Russia Mike Steel (Johnson M.) Alexey Grigoriev (SEU)	14:30	Armin Reller: the car industry's interests and responsibilities discussion
11:45	Gabriele Randlshofer (IPA) Stu Levit (Earthworks)	14:50	The positions of governments and NGOs - NN: EU policy on ELV - Doreen Fedrigo, EEB - Dr Wendenburg, BMU Berlin - and others
		16:00	Discussion: Ideas for action Chairman's summary drinks

Rules of the Game

- This meeting's character
  - open exchange of ideas, facts, visions, ...
  - it is not about: defending positions, negotiating political support, etc.

- Chatham House Rule
  - "When a meeting, or part thereof, is held under the Chatham House Rule, participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed"

SUSTAINABLE PLATINUM

1. OVERVIEW

This document is intended to provide a very brief summary of some of the salient corporate social responsibility (CSR) initiatives amongst the four main platinum producers in South Africa. For a more detailed account of exactly what each individual platinum producer is doing with respect to CSR, the reader is referred to the various companies' sustainable development reports, all of which are available on the companies' internet sites.

South Africa supplies 78% of the World's platinum. In 2007, South Africa supplied 5.22 million ounces of platinum out of a total World supply of 6.66 million ounces. The majority of this platinum is mined form the Bushveld Igneous Complex (BIC) situated in the North West, Limpopo and Mpumalanga provinces of South Africa (Figure 1).

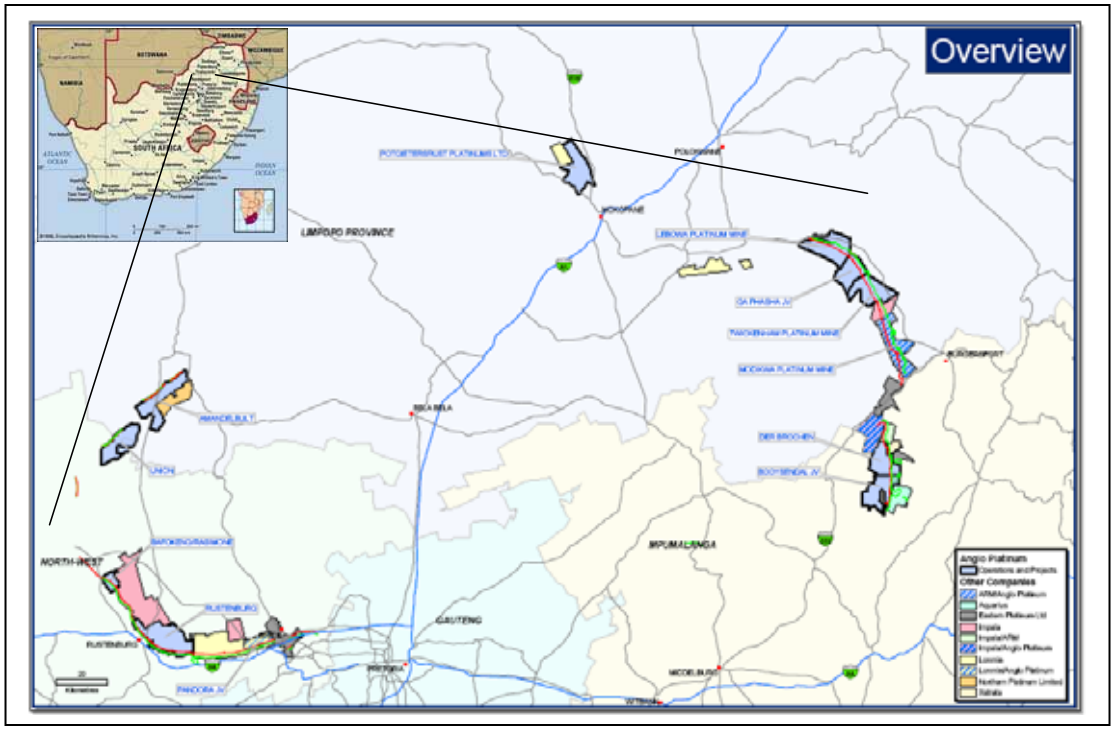


Figure 1:- Map showing the extent of the Bushveld Igneous Complex

There are a number of mining companies actively mining and exploring for platinum in the BIC. Figures 2, 3 and 4 contain detailed maps showing the location of the main platinum producers. Anglo Platinum operations are marked in blue, Impala in pink, Lonmin in light yellow and Northam in orange.

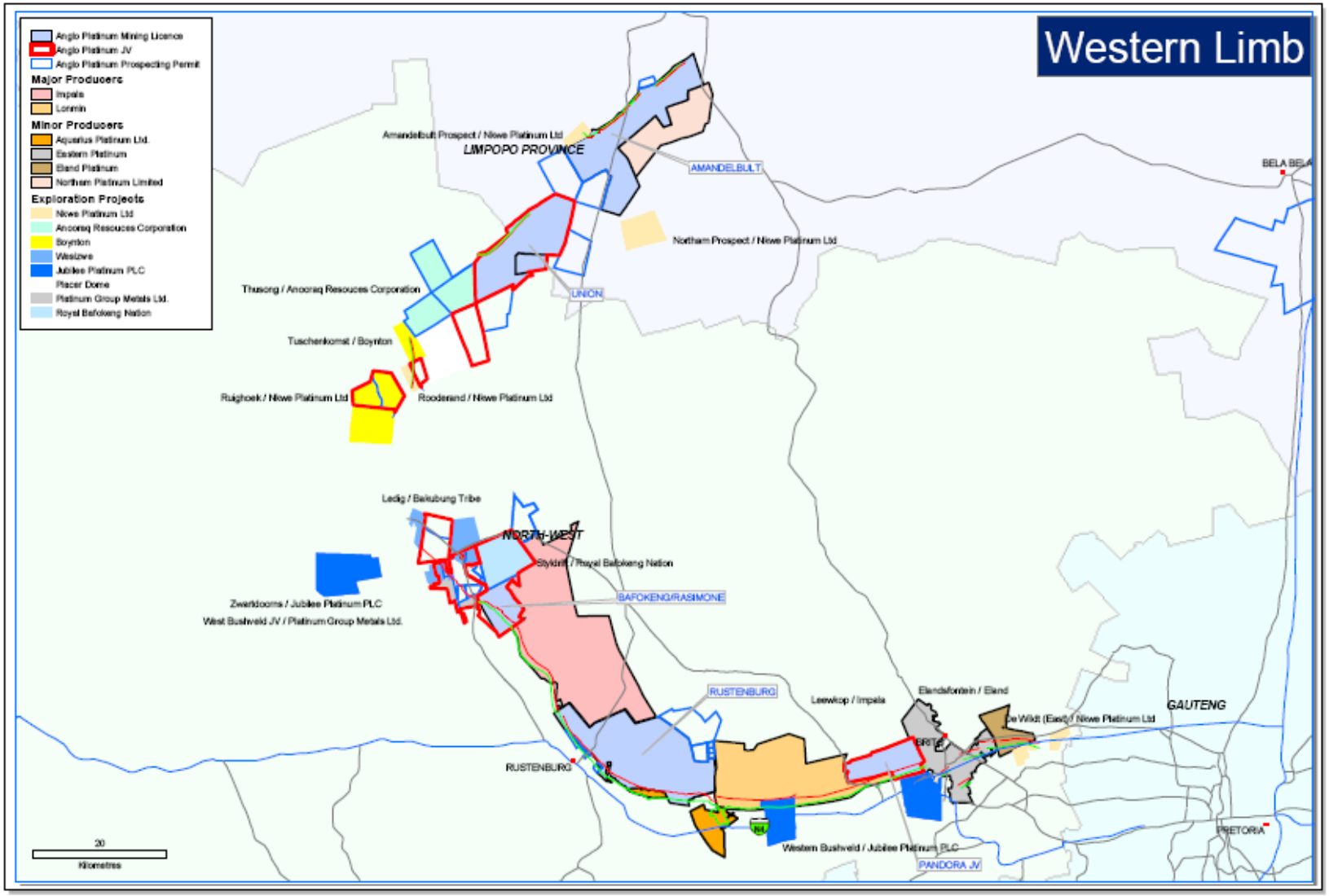


Figure 2:- Map showing the Western Limb mining operations in the BIC.

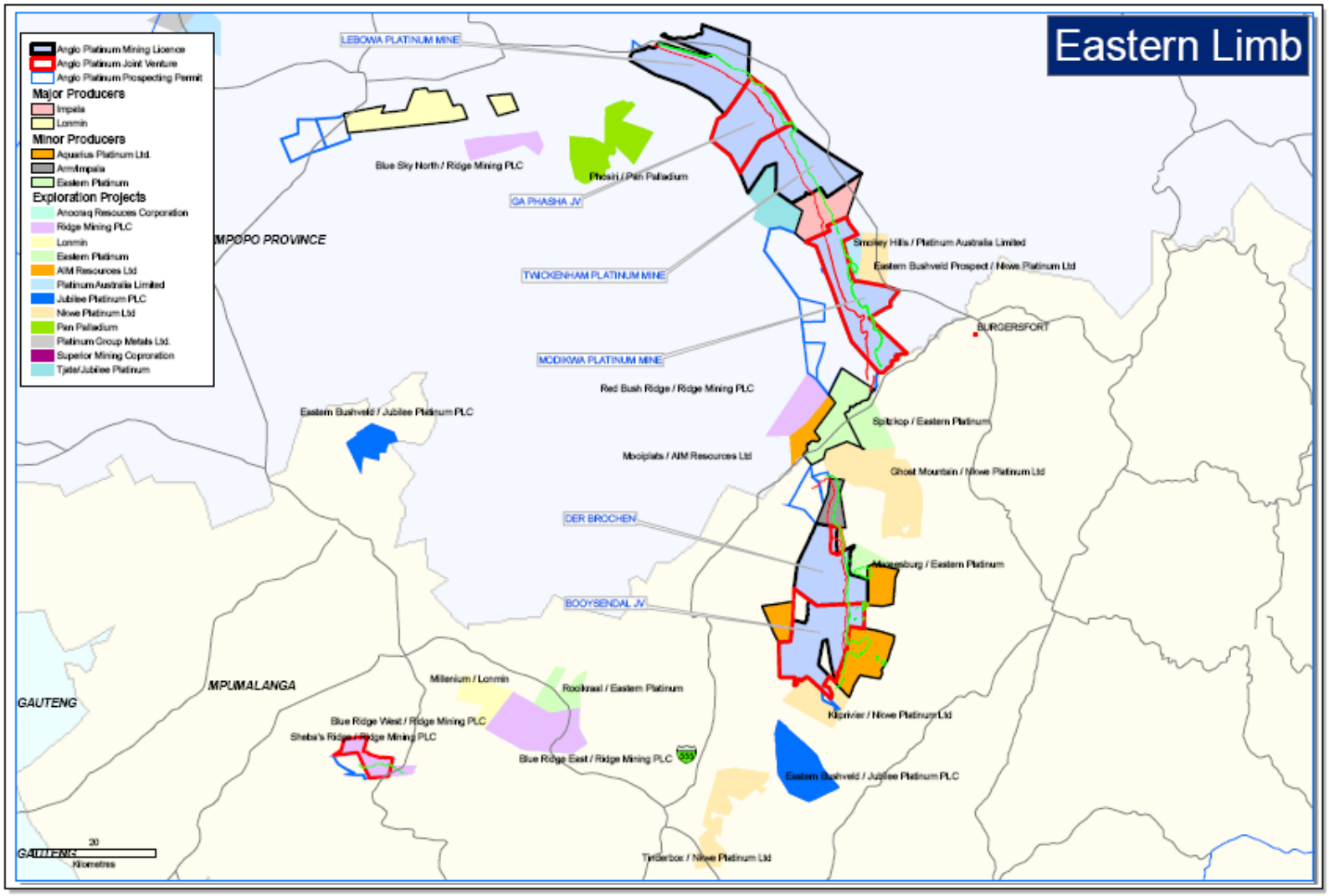


Figure 3:- Map showing the Eastern Limb of the BIC

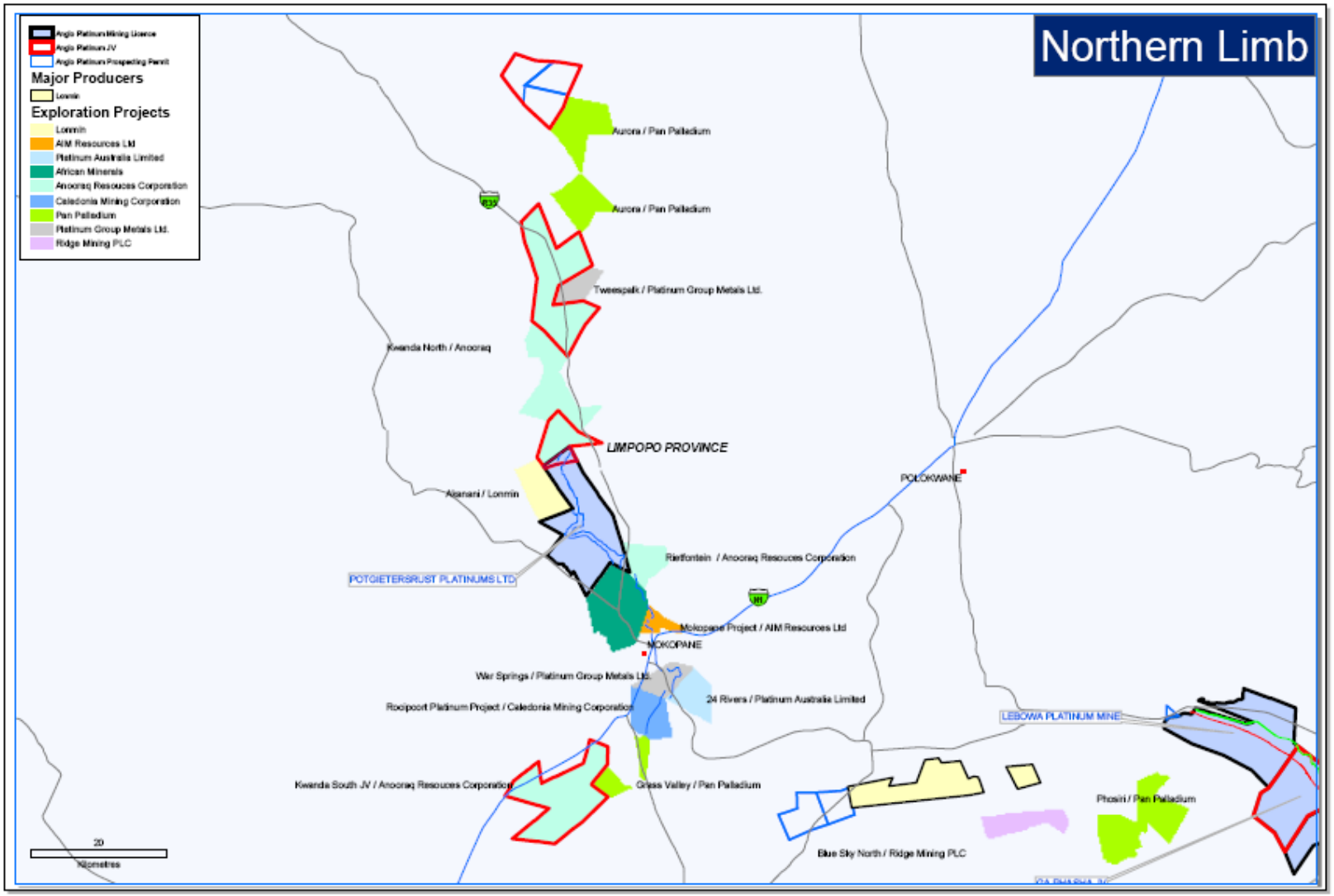


Figure 4:- Northam limb of the BIC

Platinum supply and demand

('000 oz)		2006	2005
Supply			
South Africa		5 430	5 115
Russia		895	890
North America		365	365
Others		310	280
Total supply		7 000	6 650
Demand			
Autocatalyst:	gross	4 380	3 820
	recovery	(830)	(770)
Jewellery		1 740	1 965
Industrial		1 760	1 660
Investment		(30)	15
Total demand		7 020	6 690
Movement in stocks		(20)	(40)

Source: Johnson Matthey

Figure 5:- Platinum supply & demand.

Salient features of global supply and demand of platinum are shown in Figure 5.

The platinum producers produce a suite of metals including palladium rhodium, ruthenium, osmium, gold, copper nickel and cobalt. This summary report only contains information about platinum production.

Table 1 lists the main platinum producers in order of 2006 ounces produced and reflects historical production back to 2000. From the table it is evident Anglo Platinum, Impala Platinum (Implats), Lonmin and Northam are the top four producers. All data provided in the rest of this summary report relates only to these top four producers.

HISTORIC PLATINUM PRODUCTION - SOUTHERN AFRICAN PRODUCERS							
	2000	2001	2002	2003	2004	2005	2006
Anglo Platinum	**1814.2**	**2044.1**	**2170.1**	**2219.0**	**2438.3**	**2453.2**	**2816.5**
Rustenburg	630.8	719.1	800.9	802.2	861.1	822.1	942.0
Amandelbult	570.8	679.3	711.0	634.6	605.6	548.9	647.8
Union	288.8	280.4	284.7	313.2	319.6	310.1	327.2
PPRust	194.1	211.1	165.3	188.9	196.0	200.5	185.5
Lebowa	72.2	89.1	102.0	105.1	113.6	110.0	109.2
BRPM 50%	57.5	65.1	81.1	88.8	168.3	188.4	240.6
Modikwa 50%	-	-	25.1	86.2	114.0	128.2	145.6
Kroondal 50%	-	-	-	-	-	90.0	148.3
Marikana 50%	-	-	-	-	-	-	12.8
WLTR	-	-	-	-	57.1	55.0	49.0
Mototolo 50%	-	-	-	-	-	-	8.5
Implats	**1199.0**	**1291.7**	**1387.0**	**1673.1**	**1974.0**	**1876.8**	**1897.7**
Impala (Lease Area)	1020.0	1002.4	1025.0	1040.0	1090.0	1114.6	1125.3
Marula	-	-	-	-	12.9	28.9	48.4
	179.0	289.3	362.0	633.1	871.1	733.3	721.0
Lonmin	**659.8**	**716.7**	**757.5**	**932.9**	**916.8**	**913.6**	**987.0**
Marikana (Westplats EastPlats)	659.8	716.7	757.5	932.9	916.8	902.0	938.0
Limpopo (Messina)	-	-	-	-	-	11.6	49.0
Northam	**190.4**	**171.6**	**162.2**	**199.6**	**205.6**	**200.0**	**222.0**
Northam	190.4	171.6	162.2	199.6	205.6	200.0	222.0
Aquarius	**18.5**	**33.0**	**50.0**	**58.0**	**82.6**	**125.5**	**214.0**
Kroondal 50%	18.5	33.0	50.0	51.5	60.9	93.5	126.0
Marikana 50%	-	-	-	6.5	21.7	31.0	30.0
Everest	-	-	-	-	-	-	54.0
CTRP	-	-	-	-	-	1.0	4.0
Eastplats / Barplats	**-**	**14.5**	**37.9**	**23.8**	**2.0**	**6.0**	**36.5**
CRM	-	14.5	37.9	23.8	2.0	6.0	36.5
ARM	**-**	**-**	**25.1**	**95.8**	**122.9**	**137.8**	**157.6**
Modikwa 50%	-	-	25.1	86.2	114.0	128.2	145.6
Nkomati	-	-	-	9.6	8.9	9.6	12.0
Mimosa	**-**	**-**	**-**	**23.4**	**47.9**	**64.0**	**69.0**
Mimosa	-	-	-	23.4	47.9	64.0	69.0
Zimplats	**-**	**-**	**-**	**79.9**	**82.7**	**85.0**	**89.0**
Zimplats	-	-	-	79.9	82.7	85.0	89.0

Table 1:- Platinum production from South African mines over the past 6 years

Table 2 below summarises the ore reserves held by the main platinum producers.

COMPARATIVE ORE RESOURCE TABLE – SOUTHERN AFRICAN PRODUCERS	AS AT	TONS (Mt)	GRADE (g/t 4e)	Pt (Moz)
Anglo Platinum	**Dec 06**	**6196.7**	**3.81**	**390.4**
Rustenburg		369.1	6.0	40.9
Amandebult		322.6	6.2	38.1
Union		243.2	5.8	26.6
PPRust		2399.4	2.0	65.8
Lebowa		488.8	6.3	45.5
BRPM 50%		206.4	5.2	20.8
Modikwa 50%		222.5	4.3	14.6
Kroondal 50%		0.5	6.1	0.1
Marikana 50%		2.8	3.7	0.2
Twickenham		307.9	5.6	27.9
Der Brochen		506.5	4.7	41.8
Booysendal 50%		401.4	4.8	34.2
Mototolo 50%		8.9	3.9	0.6
Ga Pasha %		215.8	6.1	19.5
Boikgantsho 50%		140.5	1.3	3.1
Pandora 42.5%		67.2	4.1	5.1
Sheba's Ridge 35%		271.1	0.8	3.8
WBJV		22.1	4.3	1.8
Implats	**Jun 06**	**690.0**	**6.8**	**88.2**
Impala (Lease Area)		548.8	7.2	74.3
Marula		104.3	6.2	11.4
Two Rivers 45%		36.9	3.8	2.5
Lonmin	**Sep 06**	**1408.0**	**4.7**	**114.6**
Marikana (WestPlats EastPLats)		793.2	4.9	75.0
Limpopo (Messina) Phl		183.0	4.6	13.6
Akanani		364.6	4.4	20.8
Pandora 42.5%		67.2	4.1	5.1
Mvelaphanda		**520.2**	**5.0**	**46.5**
Northam	**Jun 06**	95.1	5.9	10.5
Pandora	**Sep 06**	23.7	4.1	1.8
Booysendal 50%	**Dec 06**	401.4	4.8	34.2
Aquarius	**Jun 06**	**88.4**	**4.5**	**7.3**
Kroondal PSA1		30.3	5.9	3.2
Marikana PSA2		18.4	4.9	1.7
Everest		39.7	3.3	2.4
ARM		**267.5**	**4.2**	**17.6**
Modikwa 50%	**Dec 06**	222.5	4.3	14.6
Two Rivers 55%	**Jun 06**	45.0	3.8	3.0
Eastplats/Barplats	**Jun 06**	**474.6**	**4.2**	**31.6**
CRM		89.7	4.4	7.6
Kennedy's Vale		384.9	4.2	23.9
Ridge Mining		**554.8**	**1.0**	**9.9**
Blue Ridge		51.1	3.2	2.9
Shebas Ridge 65%		503.7	0.8	7.0
Anooraq	**Dec 06**	**356.3**	**4.2**	**22.6**
Ga Pasha 50%		215.8	6.1	19.5
Boikgantsho 50%		140.5	1.3	3.1
Platmin/Boyntons		**81.2**	**4.4**	**6.8**
Pilanesburg		68.6	4.4	5.8
Loskop		12.6	4.4	1.0
Mimosa	**Jun 06**	**128.3**	**4.1**	**7.9**
Zimplats	**Jun 06**	**1567.1**	**4.1**	**87.2**
Platinum Group Metals (PTM) – WBJV	**Dec 06**	**22.1**	**4.3**	**1.8**
Eland Plats	**Dec 06**	**165.4**	**4.1**	**13.3**
Afplats - Leeuwkop	**Jul 06**	**427.0**	**3.9**	**29.9**

Table 2:- Ore reserves of the South African producers

Based on 2006 production rates, as shown in Table 1, and publicly announced ore reserves, as listed in Table 2, it is evident that the South African life of these operations is as follows:-

- Anglo Platinum - 138 years
- Impala Platinum - 46 years
- Lonmin Platinum - 116 years
- Northam - 209 years

Clearly the industry has extensive resources and therefore can make a valuable contribution to South Africa's development over an extended period of time.

2. Corporate Social Responsibility Challenges

The South African platinum mining industry is facing a number of corporate social responsibility challenges. Given South Africa's apartheid past, there is a legacy of under development that has resulted in significant levels of unemployment, illiteracy and resultant poverty. Communities around many of the platinum mining operations in the BIC are the most underdeveloped and poverty stricken in the Country. This is more prevalent on the eastern limb of the BIC around the likes of Lebowa, Modikwa and Everest Platinum mines.

This section of the summary document details the typical stakeholder engagement activities of the industry, summarises the direct economic contribution the four main platinum producers are making to the South African economy, lists the key challenges associated with addressing safety, health, environment and community issues.

2.1. Stakeholder Engagement

The platinum industry engages with a wide cross section of stakeholders. Table 3 is a summary table listing the industries key stakeholders and modes of engagement.

Stakeholder Category	Modes of Engagement
Investors	Meetings, results presentations, annual reports, circulars, media, index questionnaires.
Employees	Meetings, group functions, internal publications , intranet and e-mail.
Trade Unions and Associations	Partnership structures and task teams.
Customers and industry bodies	Meetings, written and telephonic correspondence.
Business Partners	Meetings, written and telephonic correspondence.
Major Contractors	Contract meeting, written and telephonic correspondence.
Major suppliers	Contract meeting, written and telephonic correspondence
Communities	Public open days, formal meetings with community leaders, news letters, interested and affected party meetings, written and telephonic correspondence.
Governmental Bodies	Formal meetings, presentations, document submissions, consultations, written and telephonic correspondence.
Non- Governmental Agencies – including social and environmental groups.	Contractual meetings, workshops, informal meetings, written and telephonic correspondence.
Educational Institutions	Meetings, workshops, reports and other written and telephonic correspondence.

Table 3:- Typical stakeholder groups the platinum producers interact with.

2.2. Economic Contribution

The total value add[1] of the four main platinum producers to the South African economy in 2006 was R53.4[2] billion out of an industry total of R120 billion[3].

The platinum industry paid direct taxes (over and above employee and other taxes) to the tune of R5.9 billion and employed some 165 000 people, of these 107 000 are fulltime employees and the remainder are contractors. The industry has in recent years overtaken gold as the biggest foreign exchange earner for South Africa. South Africa's GDP in 2006 was R450 bn and the total value add from the mining industry was R120 bn.

2.3. Safety

The industries safety performance is unacceptable. In 2006, 42 workers lost their lives in mining related accidents, 18 at Anglo Platinum, 12 at Impala, 6 at Lonmin and 5 at Northam.

The LTIFR in the industry varies with Lonmin and Anglo Platinum both recording LTIFRs in the region of 2.5. Both Impala and Northam are less at 0.7 and 1.48 respectively. This is deemed to be attributed to different definitions being applied to lost time injuries..

[1] Salaries, wages and other benefits net tax + taxes and other to government + providers of capital + re-invested in the Group.
[2] Average exchange rate in 2006 R6.77 to the US$.
[3] The South African Chamber of Mines Sustainability and Transformation Report 2007.

The table below shows some more recent benchmarking of safety performance between Anglo Platinum, Lonmin and Impala.

	Jul-Dec 2005	Jan-Jun 2006	Jul-Dec 2006	Jan-Jun 2007
Anglo Platinum				
Fatalities in the half year		8	10	18
Fatality rate per million ounces		5.93	7.41	13.33
Fatalities in financial reporting year			18	
Fatality rate per million ounces			**6.67**	
Fatality rate per 200 000 hours			**0.019**	
LTIFR per 200 000 hours reported			2.52	
Impala				
Fatalities in the half year	5	2	7	6
Fatality rate per million ounces	9.09	3.64	12.73	10.91
Fatalities in financial reporting year		7		13
Fatality rate per million ounces		**6.36**		11.82
Fatality rate per 200 000 hours		**0.02**		
Fatalities in year corresponding to AP reporting year			9	
Fatality rate per million ounces			8.18	
Fatality rate per 200 000 hours			0.017	
LTIFR per 200 000 hours reported			0.79	
Lonmin				
Fatalities in the half year		4	2	
Fatality rate per million ounces		8.33	4.17	
Fatalities in financial reporting year			6	
Fatality rate per million ounces			**6.25**	
Fatality rate per 200 000 hours calculated			**0.038**	
LTIFR per 200 000 hours reported			2.5	

Table 4:- Safety benchmarking between Anglo Platinum, Impala and Lonmin

The route causes of the industries poor safety performance are multi-faceted and are associated with, *inter alia*, non adherence to rules and procedures, poor ground conditions resulting in rock falls, literacy levels, social conditions and failure of equipment and machinery. There is no single solution and any approach to addressing safety needs to be multi faceted itself.

The industry is doing a lot to address its safety performance. Various forums, such as the Bushveld Safety Forum, have been established where the industry discusses safety issues on a collaborative basis. The industry is typically addressing safety through both a technical and value based approach. Details of some of the typical engineering solutions that are being applied to improve safety performance are shown in the case study in Figure 6.

More recently there has been a shift in the approach of some of the mining houses to address what have typically been known as the "soft issues" that could lead to an improved safety performance. These have typically been clustered as "adaptive solutions" to improve safety and include alignment of values, behaviour based safety and creating a caring and "connected" work environment between management and workers.

ENGINEERING SOLUTIONS TO BE APPLIED TO IMPROVE SAFETY PERFORMANCE

Anglo Platinum has committed to eliminating or minimising the hazards associated with the people/machine interface through the development and use of better technology, enhanced monitoring and enforcement. Various other interventions are under way at our operations to reduce the number of incidents associated with various agencies to save lives. By agency these include:

Transport

Locomotive proximity devices, which warn drivers of other locomotives nearby, are being installed to assist with collision avoidance. All operations will have these devices installed early 2007.

Locomotive guard cars will ensure that guards are seated in well-constructed cars at the opposite end of each train at all times while the train is in motion. The guard will be able to sound a siren should any dangerous condition be encountered, which will indicate to the driver to stop. White and red lights will be fitted to each locomotive and guard car. The white light shines in the direction of travel, with the red at the rear and a flashing red when standing. The complete installation of guard cars and lights is expected by the third quarter of 2007.

The fixed roll-bar system on air loaders has proven unsatisfactory and will be replaced with two retractable arms that can be adjusted to prevent the loaders from toppling. All operations are currently installing these stabilising arms for completion by March 2007.

BRPM has implemented a pilot system that will reduce accidents caused by trackless vehicles colliding with people due to poor visibility. If successful, the system will be implemented at all operations.

Many accidents occur when drivers of heavy machinery equipment cannot see or detect vehicles close to their own vehicles. Cameras and monitors to show blind spots, radar detectors around haul trucks and rotating amber lights, LED indicator lights and additional signs are being installed on all dump trucks and drill rigs. In addition, driver fatigue monitors, reverse mode cameras and bull bars are on order to be installed by March 2007.

Winches

Anglo Platinum is continuing to install systems at winching operations to allow any person to signal to the operator at any point along the installation to stop the winch. Two commercially available devices are being tested. Regulations were passed in December 2005 legislating such systems and therefore Anglo Platinum is compliant with legislation.

Mud rush

Two main interventions have been identified to reduce accidents from mud rushes. These include moving operating controls 15 metres away from the box, or a Spillminator box, which operates with two independent doors. Over 600 Spillminator boxes have been installed to date at Amandelbult mine with great success. These boxes are easy to install, have rock-bolted bulkheads and conform to SANS 10208. By mid-2009, all operating boxes in the Group will be upgraded to this standard.

Other

New upgraded and enhanced conveyor fire detection and suppression devices are being installed in a programme scheduled for completion in three years.

To reduce noise exposure and electrical power consumption, electric stope drills are undergoing extensive testing and pilot implementation for Anglo Platinum to reach its commitment of reducing noise-induced hearing loss to less than 10% by the end of 2008. In addition, the Brakspruit shaft will be testing various equipment to operate electric drilling machines traditionally operated by compressed air.

Extension of the business case is also currently being established for centralised blasting Group-wide.

Anglo Platinum will be investing R400 million in these safety initiatives over the next three years.

Figure 6:- Details of some engineering solutions being applied to improve safety

2.4. Environment

The four main platinum producers are all ISO 14001 certified and have been for the past two years.

Sulphur Dioxide

The single biggest environmental issue the industry has had to address in recent years is how to reduce sulphur dioxide (SO_2) emissions from smelting process. The average daily SO_2 emissions recorded in 2006 were 17 t/day from Anglo Platinum's Waterval Smelter, 29 t/day from Impala and 7,9 t/day Lonmin. All three of the main producers have installed different technology to reduce emissions with Anglo Platinum going for a new converting process known as the ACP, whereas both Lonmin and Impala have chosen to continue with PS technology and install off gas scrubbing plants.

ACP – A Case Study

Anglo Platinum's Waterval Smelter was emitting excessive levels of sulphur dioxide (SO_2) into the atmosphere from its PS converters (see photo below) in the early part of 2001-2002. A technological solution had to be found how to reduce SO_2 emissions to levels well below legal requirements whilst greatly increasing overall production.

Figure 7:- Photograph of emissions prior to ACP and a typical PS converter

A team of Anglo Platinum engineers and metallurgists embarked on world wide search for the best means of reducing sulphur emissions from pyro-metallurgical processes. No one technology was able to provide the solution Anglo Platinum needed. After design modifications, Anglo Platinum chose an Ausmelt type technology that was modified and called the Anglo Platinum Converting Process. A schematic of the converter is shown in Figure 8. Feed in the converter is through a lance system and the vessel remains completely enclosed allowing for maximum off gas capture.

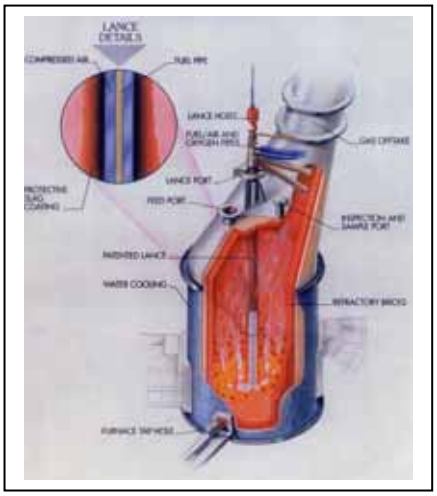


Figure 8:- Schematic of the ACP converter

This process was commissioned during 2003, 2004 and 2005 and is achieving the desired results with SO_2 emissions having being reduced from approximately 220 tonnes per day on average to less than 16 tonnes per day, or 0.002 tons/oz produced. See graph in Figure 9.

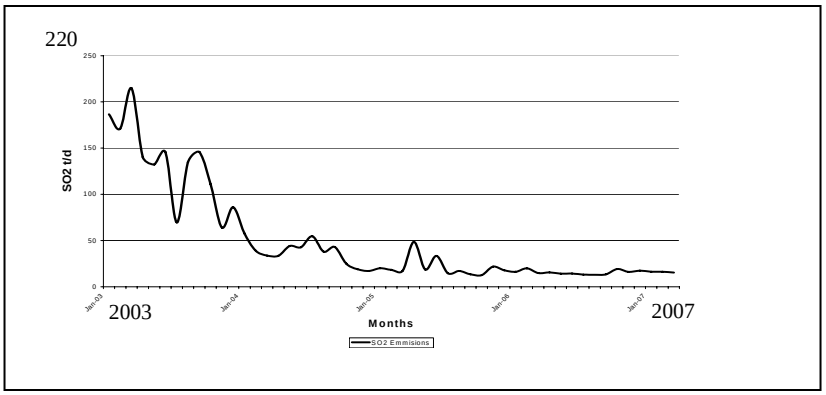


Figure 9:- Graph showing reduced SO_2 emissions from Waterval Smelter

Climate Change and Greenhouse Gas Emissions

Climate change issues are growing in significance. Whilst the platinum industry is not a major emitter of direct greenhouse gas emissions, its secondary emissions are substantial. In 2006 the industries' greenhouse gas emissions were 9.4 million tons CO_2 equivalent. The three main platinum producers are all signatories to the Department of Minerals and Energy's Energy Efficiency Accord which requires industry to reduce energy consumption by 15% by 2015, with 2004 being the baseline year. By improving energy efficiency the platinum producers will reduce greenhouse gas emissions as typically 90% of all CO_2 emitted by platinum producers are associated with secondary emissions from the use of electricity. Figure 10 is a schematic showing typically where Anglo Platinum uses energy in the platinum mining and refining process and shows the amount of CO_2 emitted. From the figure it is evident that Anglo Platinum emitted 5.91 Mt of CO_2, which equates to 2 tons of CO_2 per ounce of platinum produced (Includes direct and indirect emissions of CO_2).

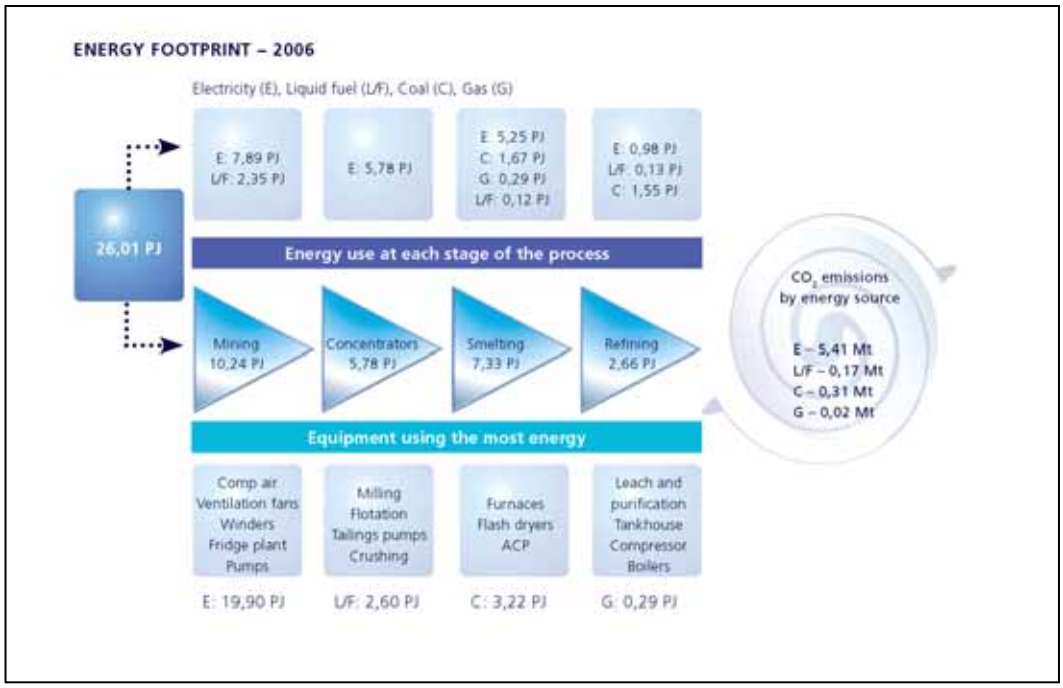


Figure 10:- Schematic showing Anglo Platinum's 2006 energy footprint.

The platinum producers typically have energy efficiency projects underway to reduce energy consumption and some of the key Anglo Platinum projects are summarised below:-

- Compressor project at Amandelbult saving 5.5 MW instantaneous power and a total of 75 978 GJ
- Electric drilling (uses 0,12 kWh/meter versus 8kWh/metre for pneumatic drilling)
- Low energy lighting at Amandelbult has saved an estimated 2.1 MW at pilot level. Total savings will be about 2.4% of the mines energy account
- Solar water heating at Mototolo change house

Further details of these and other projects are included in the case study below.

ENERGY SAVING

Compressed air

Compressed air is a major source of energy in an underground mine and, as a result, pneumatically driven ancillary equipment, such as chainsaws, dewatering pumps, loaders and drills, has been introduced over the years, increasing the dependency on compressed air. Compressors operate at a rate from 25 000 m³/hour, consuming 2,2 MW of power, to 210 000 m³/hour, consuming 15 MW of power, to maintain an average system pressure of 500 kPa.

HVAC International, a registered energy services company, is installing a remote-controlled supervisory control and data acquisition system to optimise energy use. The objective of this system is to optimise Eskom (the national energy utility) tariffs by running compressors during off-peak periods, as well as saving energy by running the optimum number of compressors at any time. The system will also facilitate improved compressed air operating pressure by starting the required machines in time as predicted by the system. A pilot study at Amandelbult section has yielded potential savings of 5,5 MW of instantaneous power, depending on the compressor running time saved. This system will be rolled out at Rustenburg section in 2007, followed by Amandelbult section and Lebowa.

Assuming a saving of six hours per day during the week and a 24-hour saving on weekends yielding 2 814 hours saved per year, this would translate to 75 978 GJ saved and approximately R3,2 million saved.

Electric drilling

Anglo Platinum drills approximately 50 million blast holes per annum to access and extract the ore bodies. In 1998, AngloGold contracted Hilti to develop an electric drill as a replacement for compressed air drills. Following extensive prototype development and testing, the electric drill has finally proven a viable replacement for the pneumatic drill. While the drilling rate is similar to that of the pneumatic drill, the electric drill dramatically reduces noise levels and eliminates the need for oil lubrication. Electric drilling is also vastly more energy efficient in comparison with compressed air drilling (0,12 kWh/metre drilled for electric drilling, compared with 8 kWh/metre drilled for pneumatic drilling).

Rollout of the electric drill is in progress at Townlands and Brakspruit shafts in Rustenburg, and for the Brakfontein (Lebowa) and Twickenham projects. At Amandelbult, excellent production figures have already been achieved in sections using electric drilling. The rollout plan for 2007 involves expanded use of electric drills where compressed air supply pressures and volumes are problematic, as well as where it makes economic sense.

Low-energy lighting

Anglo Platinum has identified low-energy lighting as a means to contribute to the energy-saving target as committed to internally. Initially, conversion from incandescent lamps to compact fluorescent lamps and from conventional switch-start fluorescent lamps to fluorescent lamps with electronic control gear, was envisaged. Voltex, a registered energy services company, had a better solution, the Voltex Mine Light (VML), an industrial-quality compact fluorescent light.

A pilot rollout was done at Amandelbult mine, and a total power saving of 2,1 MW was measured. Some 30 640 lamps were fitted underground, which all burn 24 hours per day, resulting in a meaningful energy saving of 2,4% of the mine's energy account. Lamp replacement at all mines will begin early in 2007 initially with Lebowa, Union and BRPM. Expected energy saving for Anglo Platinum is over 1%.

Water Use

The industry is also a major user of water and in 2006 used 74.3 million m^3 of water. There are numerous programmes to increase recycling by amongst other things using grey water. For example Anglo Platinum and Impala recently concluded agreements with the Rustenburg Local Municipality to take 60 Ml/day of purified sewerage effluent for use in the concentrator plants.

2.5. **Health**

Noise Induced Hearing Loss

One of the major issues the industry is facing with respect to employee health relates to noise induced hearing loss (NIHL). In 2006 1339 new cases of NIHL were compensated. There are various initiatives to eliminate NIHL by 2013 including machine silencing, technology replacements and improvements in personal protective equipment to reduce employee exposure.

HIV/AIDs

The HIV/AIDs pandemic remains a major concern for the industry. All producers have VCT programmes with the uptake varying. Anglo Platinum achieved 48% testing and 75% counselling in 2006, whereas Impala and Lonmin were only able to achieve 20 %and 16% respectively.

The total number of industry employees on ART at the end of 2006 was 3367. Prevalence rates appear to be in the order of 20% of employees HIV positive. The total number of employees across the industry on wellness programmes at the end of 2006 was 7442.

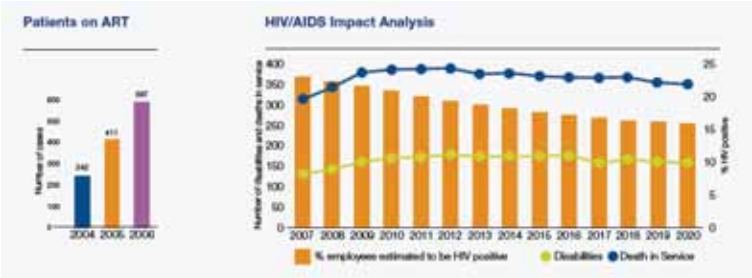
LONMIN'S HIV/AIDS PROGRAMME

HIV poster campaign promotes VCT and ART

HIV is a serious disease with wide-spread socio-economic ramifications. In South Africa, where the public debate concerning treatment options is ongoing, we remain committed to minimising the spread and impact of the pandemic and associated opportunistic diseases to both our employees and the communities that host our operations. Lonmin considers HIV/AIDS as a serious but manageable risk and for a number of years has adopted a series of proactive programmes that promote preventative and treatment measures. We aim to work in partnership with stakeholders to deliver cost-responsible health-care which will meet the needs of our employees, their dependants and the GLC. We track critical milestones, to ensure that we achieve this outcome.

Business Risk Monitoring

We continue to monitor the HIV risk on the sustainability of the business and conducted an update on the HIV/AIDS impact analysis that was performed in 2003. The analysis enables us to compares our experience to industry peers and determines the impact of HIV on the long-term sustainability of the operations. The results presented in the graph below, conclude that the disease does not pose a significant threat to the long-term sustainability of our operations. The relatively low proportion of HIV/AIDS related costs as a fraction of labour cost does not pose a risk to the business.



Awareness & Education

Routine education on TB, STIs, HIV and ART is provided to all employees at the annual mine induction. This is reinforced by awareness campaigns conducted at the operations throughout the year. A campaign will typically provide materials and further education on these diseases at an information booth, and will involve a local artist, sports star, leader or HIV project group to present a visual display such as industrial theatre or a talk on the issues. All awareness campaigns are equipped to facilitate and provide easy access to VCT and are extended to community members.

Voluntary Counselling and Testing (VCT)

In 2004, we undertook to test 100% of our workforce for HIV by 2010. In 2005, 1,615 employees (representing 8% of the workforce) were tested followed by 3,236 in 2006. This progress is encouraging and indicates an increase of more than 10%. We will continue to improve access to counselling and testing facilities and to focus on encouraging employees to be aware of their HIV/AIDS status.

Anti-Retroviral Therapy (ART)

The Lonmin ART programme has presented some excellent results since inception in January 2004. To date, 898 persons have been offered treatment on the programme and we have exceeded our target of having 550 patients on the ART programme by end of the 2006 financial year. The challenge remains to monitor and manage the number of patients that voluntarily discontinue treatment, through active follow-up and counselling. Currently each year around 12% of patients that enter the programme have voluntarily discontinued treatment.

2.6. **Communities**

The industry has made a significant contribution to communities that surround the mines. In 2006 the industry spent R 115 million on socio-economic development projects. These projects ranged from providing new schools to building community infrastructure such as roads.

The mining companies have ensured that their socio-economic development projects integrate with local economic development programmes of the local municipality through the integrated development planning process. BenchMarks recently reported that the industry often confuses CSR with philanthropy. It is the industries view that this is largely not the case and the social and environmental considerations of the business are integrated with key operational decisions and structures. Readers are referred to the work by:-

- Hamann, R. (2004). Corporate social responsibility, partnerships, and institutional change: The case of mining companies in Rustenburg, South Africa. In Natural Resources Forum 28 (2004 Pgs 278-290).
- Hamann, R. and Bezuidenhout, A. (2003). Case study of corporate social responsibility in the South African Mining Sector.

Anglo Platinum has also responded to BenchMarks about certain in accuracies in their report. These have been communicated to BenchMarks and are included in Appendix 1 of this document for reference.

Typical areas where the mining companies' focus their socio-economic spend include:-

- Infrastructure: contributing to the sustained improvement of physical infrastructure in underdeveloped areas.
- Education: supporting the development of quality education centres and improvements in mathematics, science and English-language teaching and learning at primary and secondary schools.
- Health and welfare: supporting initiatives geared at enhancing government's delivery of primary healthcare and welfare services to the underprivileged sector.

- Small donations: contributing to charitable causes, sport and community development events.
- Community capacity-building: supporting initiatives to improve the skills of community members and their organisations.
- Small, medium and micro enterprise development: supporting programmes intended to promote entrepreneurship in mine communities and labour sending areas.

An example of one of the education projects is detailed in the case study on the next page.

ANGLO PLATINUM SCHOOLS PROJECT (APSP)

Anglo Platinum believes the greatest opportunity to effect meaningful socio-economic development comes from making investments in our youth. In 2006, Anglo Platinum spent R12,3 million on education projects. The exact developmental impacts of these projects need to be assessed from time to time as part of the APSP. Accordingly, Anglo Platinum is assessing the impact of the company's financial contributions to the schools project. It is important that we determine whether our investments are having a significant impact on the academic performance of learners within our sphere of influence.

The APSP is divided into six core areas: learner enrichment, capacity building, educator sponsorship, infrastructure/materials support, special programmes and bursaries.

The approach is twofold: the short-term approach, which is learner-centred through the learner enrichment programme, and the long-term approach, which is educator-centred through the educator sponsorship programme, and infrastructure and material support.

The learner enrichment programme takes learners identified as either top performers or high-potential candidates and offers them specialised courses to assist in their academic development. The most significant of these projects is the Edumap project that enrolled 40 learners into a one-year residential learning academy to raise their level of academic excellence to meet Anglo Platinum's bursary requirements. Over the last three years, 60 learners have been involved in the programme, achieving 58 higher-grade maths passes with 27 distinctions and 60 higher-grade science passes with 15 distinctions, as well as 12 Anglo bursaries.

The educator capacity building programme intends to improve the overall skill levels of educators and administrators in our local schools. The aim is to achieve quality learning in maths, sciences and technology.

These two project areas have been designed to work in concert with one another to increase the number of learners from traditionally under-resourced schools, within our sphere of influence, reaching higher levels of education and ultimately improving the skills base from which we source our workforce.

A comparison of learner results between schools in the Rustenburg and Lebowa areas shows different results. Children in the Lebowa area have not been offered the same level of instruction as children in the Rustenburg area. Moreover, the infrastructure, facilities and material are lacking in the Lebowa area.

Findings such as this led us to re-evaluate the objectives of APSP, our investments in education and the focus areas thereof.

In order to gain access to the platinum bearing ore there are occasions where communities need to be relocated. One such relocation is currently underway at Ga Puka and Ga Sehaolelo at PPL Mine. There has also been a previous resettlement at PPL involving the Ga Pila community. Details of these resettlements are included in the case study below.

Resettlement projects receiving media attention in 2006

There was much negative media publicity for Anglo Platinum during 2006 due to our alleged heavy-handed approach to dealing with local communities. The issues that attracted the most attention included the resettlements of Ga Puka and Ga Sekhaolelo to the Amoede farm and previous resettlement of Ga Pila to the Sterkwater farm, both near PPRust mine. The resettlements became necessary as mining activities encroached on the communities and Anglo Platinum was concerned about the safety of residents.

After an extensive consultation process involving various government departments, community leaders and members, it was agreed that the new townships to be developed would include roads, services, schools, churches, businesses and recreation facilities. The two resettlements will see approximately 1 700 households moved into houses of similar size to the existing dwelling and each household would receive a resettlement allowance. The approximate cost to be incurred during the resettlements is R800 million. In addition, the new communities will benefit from grazing and agricultural

Existing village

land on adjacent properties, job creation and skills development through the use of local SMMEs in construction. Bursaries have also been made available for local students' tertiary education. Planning for these resettlements was conducted in accordance with the requirements of South African legislation, the Chamber of Mines resettlement guide, the World Bank guidelines and the new safeguard policies for resettlement.

Despite this, some relocated occupants of the new houses at Sterkwater have become dissatisfied with the maintenance of services. Anglo Platinum handed over the responsibility for maintenance of services at Sterkwater to the local municipality on completion of construction and the relocation. It would appear that capacity constraints within the municipality have meant that service provision has become somewhat erratic at times and has led to the residents, who do not receive an adequate response from the municipality, blaming Anglo Platinum.

Anglo Platinum has learnt from this relocation experience. The Group is working very closely with local municipalities to ensure there is capacity to maintain service delivery before responsibility is handed over. In future, the Group will also ensure that post-resettlement monitoring programmes, management plans and consultative forums are established to deal with post-relocation grievances and issues.

New houses – Ga Pila

New houses – Ga Puka

3. CONCLUSION

This summary report has summarised some of the key sustainability challenges the four main platinum producers, including Anglo Platinum, Impala Platinum, Lonmin Platinum and Northam, are addressing in South Africa.

The industry is undoubtedly having a significant positive economic impact on the South African economy with a total value add in 2006 of R53,4bn (total mining industry value add in South Africa is R120 bn) and more than 150 000 people employed directly by the industry.

There are however a number CSR challenges that the industry faces, these include:-

- Dramatically improving the industries safety performance;
- Continuing to reduce sulphur dioxide emissions through the deployment of new technology;
- Improving energy efficiency by 15% by 2014 (2004 baseline year) in order to amongst other things reduce CO_2 emissions and reduce the industries impact on climate change;
- Ways of improving water efficiency and increased salt loadings;
- Health issues with respect to noise induced hearing loss and HIV/AIDs; and
- Community development.

A few case studies that typify what the industry is doing have been included in the report. More detailed information is included in each of the main platinum producers sustainable development reports, all of which are available on the companies' internet sites.

Reinier de Man and Milieukontakt International – Platinum safety – second Roundtable – Input by the Bench Marks Foundation. Mr. John Capel.

Contents

1. Introduction

‘South Africa’s top companies are aware of the effect of climate change but are failing to translate this into action, (Ingl, 2007, p. 1) This is the introductory paragraph to a front page article in Business Day on 23 November 2007.

On 22 November 2007 the Carbon Disclosure Project (CDP) released its findings. The project was an attempt to measure the response of top South African Companies to climate change.

On 27 November 2007 after yet another round of severe floods in the Western Cape and numerous destructive storms in Gauteng a banner in Beeld news paper screams ‘Klimaat-krisis is hier nie net ’n woord’(‘Climate Crisis is not just a concept, it is here’) (Steyn, 2007, p. 2) .

The same edition of Beeld reports that there is ‘Concern over safety of the Vaal River’ (Tempelhoff, 2007, p. 19). The Vaal River is the key water resource in the heartland of the industrial province of South Africa, Gauteng. Environmentalists have warned that several other rivers are also under threat, The Mooi River and Wonderfontein Spruit (gold mining), The Steelpoort river, the Olifants river, the Heks river (platinum mining), the Loskop dam, its catchment area and downstream.

From these headlines it is clear that South Africa is facing an environmental crisis involving both air and water. South Africa is responsible for more than 94% of Africa’s air pollution. It receives less than 50% of the global average in rainfall. It is a country that is severely stressed when it comes to water. It is, according global scientific opinion one of the countries that will suffer most from global climate change and yet, if the above reports are to be believed, the corporate sector in general and the mining sectors seems largely unconcerned.

This paper will use Anglo Platinum as a case study, generally also referring to other platinum producers. The information contained here is in the public domain and much of it is drawn directly from the reports published by Anglo Platinum in particular and other

corporate in the industry in general. Anglo Platinum is focused on because it is the biggest platinum producer in South Africa and as such it sets the standards for other mining corporations. Anglo should also be commended for the production of very good reports relating to its mining activities in the country and for being prepared to engage in public discussion about the more negative aspects of mining.

It must be understood that the statistics will reflect a national context, simply because local emission figures are not available. In the national context the carbon disclosure figures might well create the impression that the impact of platinum mining on the atmosphere is minimal. However, information gleaned from health practitioners in areas such as the platinum producing area of Rustenburg indicates that local impact is severe. This anomaly results from a complete lack of capacity by local authorities to monitor the environmental impact of industry in general and of mining in particular (Van Wyk, 2007, p. 23).

The paper will focus on the impact of mining on the atmosphere, through the release of gases and particulates, stemming from smelting operations and from waste facilities such as slimes dams, and infrastructure such as roads.

It will then turn to water showing that the extensive water needs by Platinum mines has local, regional and international implications, involving not only South Africa but also its neighbours.

Finally the paper will conclude with a discussion of work place safety arguing that there is a close link between work place fatalities in the industry and the rising global prices for commodities such as platinum.

1. Greenhouse gas emissions

The main constituent of greenhouse gas emissions from the Anglo Platinum is carbon dioxide (CO_2). Just over 91% of carbon dioxide emissions are indirect due to imported electricity.

In response to the Carbon Deposit Project Question, “Section A – 1 Climate Change Risks, Opportunities and Strategy Question 1(a)(i) – Regulatory risks, ‘for this question, please state the time period and where possible the associated financial implications. What commercial risks does climate change present to your company including regulatory risks associated with current and/or expected government policy on climate change e.g. emissions limits or energy efficiency standards?’”

Anglo Platinum responded with,
“Low regulatory risk at present - Anglo Platinum operations are all located in South Africa, currently a non-annex B country. The risk would increase should South Africa be reclassified in any Kyoto extension.

Anglo Platinum has signed up to the Energy Efficiency Accord between the Government of South Africa, Department of Minerals and Energy and the signatories. The accord requires a final energy demand reduction target for industry and mining sector as a whole of 15% by 2015” (Responding corporation: Anglo Platinum, 2007)

Many environmentalists would argue that South Africa should be reclassified given that ‘South Africa also contributes more to global warming than nearly any economy in the world if CO_2 emissions are corrected for both income and population. Greenhouse gas emissions are 20 times higher than even the United States by that measure and the emissions have been worsening over the last decade’ (Bond, 2004). Furthermore Anglo Platinum in its response evades the question about financial implications of compliance, surely if they are serious about meeting the 15% reduction by 2015 their answer would state the annual reduction tranches the annual cost implications of such reductions and the cumulative cost implications over the period. Noting the rapid and massive expansion of Anglo operations in Limpopo given the current global boom it is unlikely that Anglo will be able to meet the national regulatory targets. Should

South Africa be reclassified in terms of the Kyoto agreement Anglo will simply be in trouble.

2.1 Indirect emissions from imported electricity

Indirect carbon dioxide emissions due to imported electricity from the national grid by Anglo Platinum increased from ***4, 94 million tons in 2005 to 5, 41 million tons in 2006, an increase of 10%.*** Anglo Platinum claims that the conversion factor to calculate CO_2 emissions from electricity purchased was changed from 0,963 to 0,978 by Eskom, applied to all the 2006 CO_2 data, accounts for 2% of the increase in CO_2 emissions (Anglo Platinum, 2007). ***However, noting Anglo's response to the CDP survey above it is difficult to see how it will meet its regulatory obligations if it is registering at least an 8% per annum increase currently, and given the impact of the commodity boom and increases in production to meet this boom.***

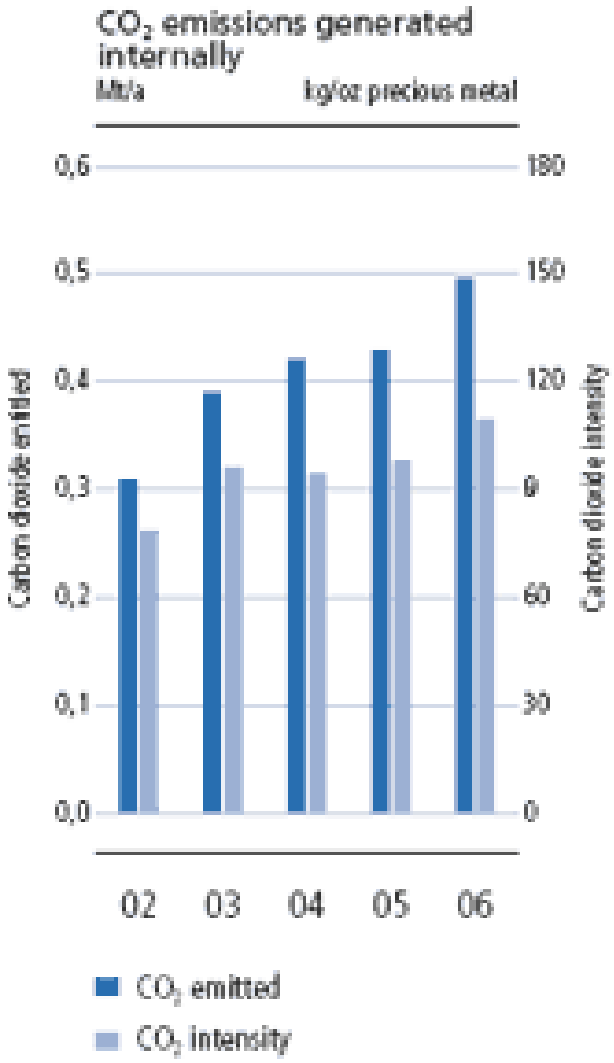
Indirect CO_2 emissions from imported electricity per ounce of precious metal in concentrate increased from 1 117 kg in 2005 to 1 186 kg in 2006. Indirect CO_2 emissions from imported electricity per refined ounce of precious metal decreased by 4% from 1 036 kg in 2005 to 995 kg in 2006. ***We are therefore not seeing a decline in emissions but an increase. This is only logical given the massive increase in platinum mining activity as a result of the current mining boom. At the local level in the platinum producing area where five or six other corporate also operate mines and smelters the cumulative impact must be considerable. The only evidence for this cumulative impact comes from a rapid increase in respiratory disease in communities in the area*** (Van Wyk, 2007) ***– pointing to a serious short coming in the Kyoto protocols, the prescripts of which focuses on industries individually and cumulative impact nationally rather than locally per clusters of corporate operations per industry.***

2.2. Direct emissions from Anglo Plat operations

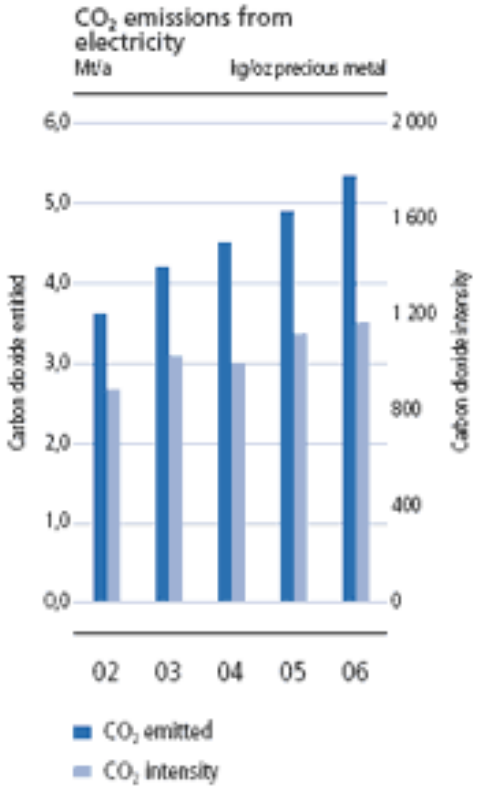
Carbon dioxide emissions generated internally from processes and fossil fuel use increased 15% from 433 kilo tonnes in 2005 to 496 kilo tonnes in 2006. This is primarily

due to increased use of fuel (6%) and coal (14%). ***The increased use of fuel relates to vehicles used to transport coal and platinum ore to smelters. 15% represents a very significant increase and can be related to increases in operations as well as in production to take advantage of the commodity boom.***

Direct CO_2 emissions from operations per ounce of precious metal in concentrate increased from 98 kg in 2005 to 109 kg in 2006. Direct CO_2 emissions from operations per refined ounce of precious metal increased by 91 kg in 2005 to 93 kg in 2006 (Anglo



Platinum, 2007).



Source for Graphs: (Anglo Platinum, 2007)

2.3. Persistent organic pollutants

The key persistent organic pollutants for Anglo Platinum are **polychlorinated biphenyls (PCBs),** dioxins and furans. ***The Stockholm Convention requires that equipment containing PCBs must be phased out by 2025.*** Any PCBs recovered in the interim from such equipment must be treated and eliminated by 2028. Current *in situ* equipment, such as transformers and capacitors, may remain in place and operational as long as all reasonable steps are taken to prevent leaks. Some of Anglo Platinum's transformers still contain PCBs. ***According to Anglo Platinum these will be phased out to ensure compliance with the Stockholm Convention (Anglo Platinum, 2007),***

however stating that this will happen, while giving no hint as to time frames, targets or methodology is extremely problematic and worrying.

However, without independent verification and monitoring this cannot be confirmed, and the Department of Minerals and Energy (DME) by own admission lacks capacity for effective health and safety monitoring.

2.4 Sulphur dioxide emissions

Sulphur dioxide (SO_2) is emitted from Waterval, Mortimer and Polokwane smelters and from RBMR. ***Total SO_2 emissions (stack and fugitives) increased 8% from 15, 21 kilo tonnes (kt) in 2005 to 16, 38 kt in 2006. SO_2 emissions at Polokwane smelter increased by 63% from 4, 15 kt in 2005 to 6, 78 kt in 2006 (the smelter was off-line for three months in 2005 for a furnace rebuild). Anglo Platinum's reports are silent on the impact of these extraordinarily huge increases in SO_2 emissions on surrounding communities, farmers etc. The problem stems from the fact that the environmental reports and the social responsibility reports are done in silos. The social responsibility report focuses on Anglo Platinum's largesse to communities rather than on the impact of its operations on them.***

Anglo Platinum claims that SO_2 emissions from its Waterval smelter decreased by 24% from 21 tons per day in 2005 to 16 tons per day in 2006. SO_2 emissions from Waterval smelter now account for only 35% of Group emissions. ***The decline in the Waterval emissions may be ascribed to the fact that Anglo Platinum has decreased operations here as a result of the proximity of this smelter to the wealthy suburbs such as Bergsig in Rustenburg and the fact that air sampling at Bergsig in 2005 found the SO_2 levels far in excess of what is acceptable (Van Wyk, 2007). The public outcry by the wealthier more powerful residents probably forms an important factor in the reduction of emissions at this smelter.***

Anglo Platinum claims that SO_2 emissions from the smelters have met all provincial scheduled process permit targets and have elicited positive comments from NGOs and the regulator. ***The Benchmarks study, the 'Policy Gap' has shown that local and***

provincial government in Rustenburg and the North West Province is either highly compromised or lacks capacity to effectively monitor SO_2 emissions (Van Wyk, 2007). The same research has found that many NGOs, funded by mining corporate may be considered sweetheart NGOs.

The SO_2 emissions per total refined ounce of precious metal decreased by 3% from 3, 19 kg/ounce precious metal in 2005 to 3, 06 kg/ounce precious metal in 2006.

The Rustenburg regional environmental department's ambient air quality monitoring network currently comprises seven stationary monitoring stations. All stations continually record SO_2, particulate matter with an aerodynamic diameter of less than 10 microns (PM10) and meteorological data. The results of these measurements are used in dispersion models to predict air quality conditions under various production scenarios.

Anglo Platinum claims that the results show a significant decrease in ambient SO_2 levels since 2005. While there were no exceedances of the daily average SO_2 guideline during 2006 (13 in 2005), ***there were three exceedances of the hourly SO_2 guideline of 134 parts per billion; two at Waterval and one at Klipfontein monitoring stations*** (Anglo Platinum, 2007). ***If this information proves to be accurate the Bench Marks Foundation can register the improvement as a direct result of the positive impact of its report, The Policy Gap. However, given the lack of independent monitoring capacity we only have the word of Anglo Platinum and a very compliant Department of Environmental Affairs and Tourism on this matter.***

According to Anglo's reports, at Polokwane smelter, four ambient monitoring stations have been in operation since 2002 and a further two were commissioned in November 2006. There were no exceedances of SO_2 guidelines recorded during 2006.

2.5. Particulate emissions

Particulate emissions from point sources

While Anglo Platinum reports that the particulate emissions from point sources reduced by 31% year on year due to additional air emission abatement equipment commissioned in 2006, monitoring of **ambient fine particulate (PM10)** concentrations is now done at seven monitoring stations, up from three, ***there were 300 exceedances of four-band scale evaluation criteria for dust deposition the daily average guideline in 2006*** (Anglo Platinum, 2007).

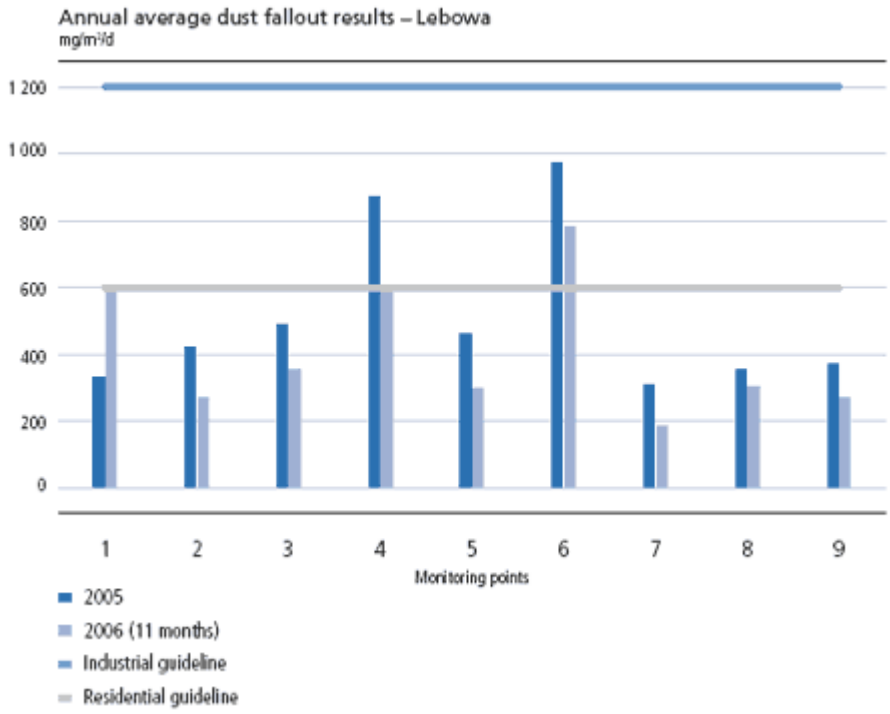
The Paardekraal and Mfidikwe monitoring stations, which are not close to the process plants or concentrators, recorded most of the **high PM10 concentrations**. The most significant sources of PM10 at Paardekraal are ***the tailings dam, unpaved roads, crushers and coal burning***, while the key source at Mfidikwe appears to be ***domestic coal burning*** which is linked to early-morning and late-evening winter periods. ***The 'Policy Gap' established a clear link between the living out allowance for migrant workers, sub-contracting, and informal settlements, many without electricity, where foreign mine workers have been reduced to being shack dwellers dependent of coal and wood or energy*** (Van Wyk, 2007).

Dust fallout

Dust fallout at Anglo Platinum's operations is monitored using an **ASTM International measurement system** to determine monthly average fallout concentrations. **These are compared to proposed guidelines for dust deposition as described in the South African National Standards (SANS) 1929: 2005, Edition 1.1.**

Although most dust fallout may be associated with dust generated at tailings dams, other sources – such as crusher plants and gravel roads – are also key contributors. Pre-control and post-control risk assessments, completed annually for tailings dams, indicate four dams with a high potential to generate nuisance dust. Three are at Rustenburg section and one each at Lebowa.

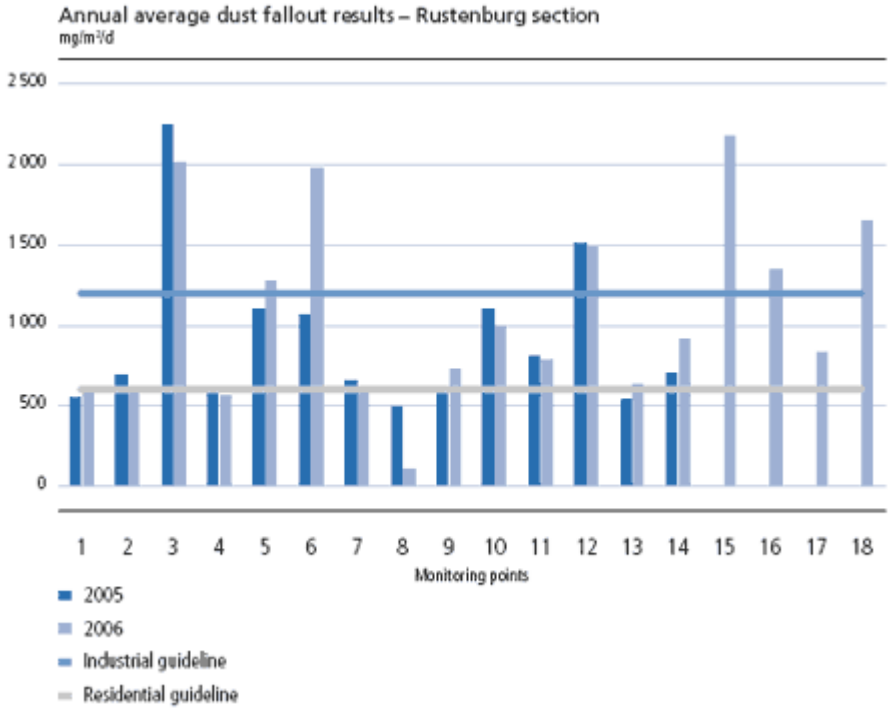
The average 2006 dust fallout decreased at all monitoring stations when compared to 2005 except for one (Anglo Platinum, 2007). ***Bench Marks notes the improvement with regard to dust fallout from Anglo's operations and would like to believe that this improvement together with more detailed reporting in the 2006 report over previous year may be attributable to the impact of the Policy Gap report. However, what the Anglo report lacks is any reference to the content of the dust from tailings dams. Tailings dust contains all the heavy metals including uranium and is extremely dangerous in terms of both respiratory diseases and cancer.***



(Source: (Anglo Platinum, 2007)

Dust fallout monitoring is conducted in the Rustenburg Platinum Mines (RPM) lease area at 17 sites, four of which are classified as residential sites (2, 4, 13 and 14), while the remaining 13 sites are classified as industrial. Three new industrial sites were added to the network at the end of March 2006, while one site was relocated (Anglo Platinum, 2007).

A comparison of results for 2005 and 2006 for residential areas shows that the Klipfontein offices (point 13) and Klipfontein village (point 14) have slightly ***higher dust levels*** during 2006, at just above the residential guideline. This is due to increased activity in the area due to the Klipfontein ***tailings dam*** remining and Kroondal opencast mining. ***Dust fallout at seven industrial sites is above the guideline values due to their proximity to crushers, tailings dams; haul roads and shafts (Anglo Platinum, 2007)***. Noting the close proximity of Kroondal to the town of Rustenburg itself and the relatively high population density of the area this is a matter of concern.



(Source: (Anglo Platinum, 2007)

3. Water

Water use at Anglo Platinum is divided into water used for primary activities; water used for non-primary activities and internally recycled water. Primary activities include all water used to produce the products of the Group, from mining to refining. It excludes domestic and recreational use. Internally recycled water is also excluded from the water used for primary activities parameter.

3.1 Impact of Mining on Water

- **Underground water resources are threatened by the pumping out of water from aquifers for mine safety and by the perforation of dykes, which changes the direction of water courses and the level of the water table, this impacts on boreholes, wells and springs. The North West Province, Limpopo and Mpumalanga are all water stressed provinces. The pumping out of underground water could also result in the development of fissures.**
- **Acid Mine Drainage impacts on surface water, especially where tailings dams and rock waste facilities are located in close proximity to streams and rivers. This destroys the aquatic life and makes the water unusable for human consumption.**
- **Mines consume huge quantities of water leading to an imbalance in water consumption. i.e. local communities get deprived of natural water sources which they have used for centuries. When water is commodified as a solution local communities are deprived of the resource as they cannot afford to pay for it.**

3.2. Case Study: The Damming (Commodification) of Water in Limpopo an Mpumalanga

Anglo Platinum has teamed up with the Department of Water Affairs and Forestry (DWAF), and other mining companies active in the eastern limb of the Bushveld Complex in Limpopo, to secure essential water resources for its operations to construct dams in this water scarce area so as to facilitate mining. ***Local communities, South African National Parks and key NGOs have protested the construction of these dams, but to no avail. They have argued that the project violates national and international laws and pits ministries against each other.***

“It will boil down to which department has the most political clout,” according to Nick King, executive director of the Endangered Wildlife Trust (EWT), which rejects the dam building project. “Water affairs’ mandate is the delivery of water, environmental affairs

must conserve the resource base and SANParks protects biodiversity" (Macleod, 2006). ***The Department of Environmental Affairs submissive to its 'senior' department (Minerals and Energy) backed down in agreeing to the construction of the dams, despite the opposition of environmental groups.***

Construction started on the De Hoop dam in April 2007, following the final go-ahead from the Department of Environmental Affairs and Tourism in October 2006 after a lengthy appeal process. ***Despite all Anglo's claims to be environmentally concerned it never considered withdrawing from supporting the construction of these dams as profits come first. The appeals focused mainly on the impacts of damming on downstream users and ecosystems. Downstream users include farmers and traditional communities. The dams will deprive them of water.***

DWAF will spend some R5 billion on constructing the De Hoop dam and associated infrastructure. Anglo Platinum will sign a memorandum of agreement with the department and the other mining companies stipulating that costs incurred to construct the dam will be repaid over a 20-year period through an agreed escalated water tariff. While Anglo Platinum and the government claim that the dam will service more than 21 mining companies and approximately 1 million people in several towns and rural communities in Limpopo, including Polokwane and Mokopane, ***EWT in its appeal against the dams asked "How will domestic supply be guaranteed? No evidence is provided that local communities will receive water, let alone be able to pay for it."*** (Macleod, 2006)

Construction is expected to be completed by 2011 with the De Hoop dam fully operational by 2015. Based on the growth pattern for mines in the area, Anglo Platinum has projected a shortfall of water in the De Hoop dam by 2012/13, as the dam will still be in the filling phase. Anglo Platinum is therefore considering building a dam on Richmond farm as an additional water source, both to alleviate the projected shortage and for long-term water provision to the mine. An environmental impact assessment is under way and focus group meetings with stakeholders are being held to mitigate

concerns on the proposed dam and ensure all concerns and impacts are appropriately managed. ***These consultative meetings with communities and those affected by mining are largely ceremonial as the outcomes of such meetings are not binding. These meetings are also problematic given that there is usually a severe imbalance of knowledge, power and resources, with poor, often semi literate and powerless communities having to face off some f the wealthiest and most powerful mining corporations in the world. The Ga Mawela community has voiced its disapproval of the dam's construction*** (Anglo Platinum, 2007).

Potable water is sourced from parastatal utilities. Non-potable water use at managed operations is low and comes from various raw-water sources. ***The key supplier of non-potable water in the eastern limb is the Lebalelo pipeline, for which water is extracted from the Olifants River. As noted elsewhere environmentalists are extremely concerned about the impact of mining on the Olifants River.*** Grey water is sourced from municipal sewage plants to supply process water to some operations, notably PPRust and Rustenburg section. No surface water is used by any operation. Rainwater collected in the open pit at PPRust and used is, however, included in the surface water parameter. The groundwater parameter includes groundwater from boreholes used for primary and non-primary activities, as well as fissure water from underground operations where this can be measured (Anglo Platinum, 2007).

Anglo Platinum claims that there are no water sources or related ecosystems (such as Ramsar-listed wetlands) or habitats are significantly affected by the Group's extraction and use of water, however Vera Ribeiro, coordinator of the Mozambican environmental NGO Geasphere, expressed concern not only about the quantity of downstream water on the Mozambican side, but that chemical pollutants and heavy metals from mining would affect water quality (Macleod, 2006). The Steelpoort River feeds into the Olifants River which in turn flows into Mozambique.

Ironically, the EWT added, environmental affair's own research had identified the Sekhukhuneland region as one of nine national conservation priority areas

because of its high biodiversity and ecosystems service value. At least 20 species of plant found nowhere else on Earth will be flooded by the 1 700ha dam, along with at least 20 animal and reptile species already threatened with extinction (Macleod, 2006).

4. Work Place health and safety

The rapid increase in the Platinum price in 2007 continuing an upwards trend that has lasted for more than five years has also seen a dramatic increase in the number of workplace fatalities during 2007. The only source of information for these fatalities at the moment is the newspapers. Current annual reports would reflect the 2006-07 financial year and not the 2007-08 financial year. However concern about work place fatalities in the mining industry has led to a call by President Thabo Mbeki for a safety audit of mining in the country (Brown, 2007). Platinum mines have experienced the same upward trend in mining fatalities in the 2007-08 as gold.

What most of the media failed to pick up on is that the mines inspectorate of the Department of Minerals and Energy (DME) is severely strained by the fact that in the Medium Term Budgetary Policy Statement, the National Treasury cut the budget for promotion of mine health and safety to R121.85m. The bulk of the R3m was re-allocated to the DME's electricity and nuclear programme and the remainder to administration (Seccombe A. , 2007).

A further problem is that the Chamber of Mines closed down the Chamber of Mines Research Organisation (Comro) some 15 years ago, for which a primary task was to address safety issues on the mines through basic and applied research (Coldwell, 2007).

At a meeting with the Bench Marks Foundation in October, senior managers committed themselves to improved safety at Platinum mines (Mathews, 2007, p. 17). Such commitments are viewed very sceptically by the National Union of Mine Workers who accuse the mining corporations of putting profits before people in an industry which 'Where death is a corporate norm,' (Baleni, 2007, p. 32).

According to May Hermanus at the Centre for Sustainability in Mining South Africa's mine workers are the worst paid in the industrial sector, which is an inverse situation to other countries where mine workers are paid much better than in other industries. The average mineworker earns between R2500 to R3500 per month. She notes that deep level mining is extremely dangerous, and that these risks added to low worker morale as a result of poor pay (Faul, 2007), bad living conditions (in informal settlements) and dangerous working conditions makes for poor mine safety standards. One may add to this recipe for disaster the rapidly rising commodity prices for minerals in general and platinum in particular to complete the underlying causes of poor mine safety.

5. The Challenges

- The rural and informal sector communities lack the skills to take advantage of the platinum boom that is taking place on their land:
    - They lack the knowledge base to understand the potential impact of mining on their land, the air that they breath and their water resources;
    - They lack the skills and experience to negotiate effective compensation for the loss of land and the loss of their traditional mode of production;
    - They do not understand the opportunity costs or benefits of mining.
- The rural and informal sector communities are malnourished. They have a very poor nutritional profile and they are therefore prone to disease.
- The current response to HIV and AIDS is largely reactive and treatment oriented. Pro-active measures do not go much further than ABC advocacy. The most effective interventions must include improving the nutritional and economic status of communities.
- Mines currently engage with local, provincial and national governments in developing their social and labour plans (required by the mining legislation and the Charter) to align themselves with Integrated Development Plans, Local Economic Development Plans (IDPs & LEDs). Communities are often excluded from these processes.
- These challenges could be turned into labour intensive, profitable opportunities that could give rural and poor communities a share of the wealth generated by

the platinum boom, should mining companies engage more meaningfully with communities.

6. Suggested Solutions

6.1. Introduction

Mines should stop seeing communities as irritants impeding progress and profits. Mining Corporate Social Responsibility programmes should go beyond being propaganda tools for showcasing corporate largesse and should instead be meaningful and sustainable engagements with communities that could become an opportunity for both the corporate and the community to develop a more meaningful and environmentally sound relationship. Environmental challenges and community challenges cannot be separated the problems of the environment and that of communities should be viewed as an integrated challenge requiring integrated solutions.

6.2. Air

- ✓ **Communities could be engaged to monitor and report on issues of air quality. Thus communities could manage dust roads used by mining trucks and vehicles to control dust levels.**
- ✓ **Unused surface mine land could be used for a variety of intensive crop production, including vegetable, bio-fuel and other income generating plants (**economically profitable trees and shrubs including pomegranates (medical); Jatropha (fuel) and legumes such as the Gwar Bean (mining) and Aloes (medical)..
- ✓ **Communities can be engaged to grass or vegetate tailings dams and facilities.**
- ✓ **Communities can observe and report high dust or smoke levels.**
- ✓ **The mines should move away from using organic fuels in energy consumption as well as in the smelting processes. The mines can be a catalyst in supporting community involvement in the new bio-energy strategy of government by assisting communities to move away from wood and coal burning in informal settlements and by supporting communities in becoming involved in production of bio fuel crops.**

POTENTIAL BIO FUEL PROJECT

Shack dwellers are faced with an added exposure to respiratory ailments due to paraffin, coal and wood smoke inside shelters due to a lack of electricity

- The mines and traditional authorities avail unused and under-utilised land for the development of Jatropha plantations. The seed of this plant contains 40% oil which can be crushed and turned into bio-diesel. The mines consume huge quantities of diesel and can give communities guaranteed off-take agreements. Surplus diesel can also be used to generate electricity for informal settlements;
- For every 1000ha planted 300 jobs are created;
- For every 100ha a bee project to assist with pollination, producing honey, wax and jobs is developed. There is currently a shortage of honey in the world;
- A by product is glycerine which is used in the manufacturing of soap.
- Jatropha plantations need to be protected against veld-fires.
- The community could be mobilised to harvest grass. The grass should be properly harvested and cut and selected into grass for fodder, for thatching, for weaving and for blind manufacturing. That warehouses and a factory be established for processing grass. This will remove the grass, the cause of veldt fires, annually, thus reducing the risk of veldt fire to the Jatropha plantations. Weld fires represents a serious challenge to agriculture in all the platinum producing provinces

- ✓ Smoke emanating from the smelters in the area has seen an 80% increase in respiratory diseases. Mining corporations should study the program and (Swiss) technology adopted by Lafarge Cement in burning waste instead of coal. This technology is extensively applied in Switzerland. The mines are satisfied with merely adhering to international pollution protocols and agreements instead of creatively addressing the issues. The fact that local medical practitioners indicate that 80% of patients they see on a daily basis suffer from respiratory ailments should be a major cause for concern. Consuming the waste generated by mining towns instead of coal could also give rise to a labour intensive waste management solution for the area."
- ✓

6.3. Water

- The base of tailings dams from which toxic seepage occurs and stream beds affected by seepage be planted with reeds by surrounding communities, which could be harvested for weaving, blind and furniture manufacturing, thatching and export. The reeds absorb the dangerous heavy metals and chemicals seeping from dams, cleaning the water that goes back into the surface water system.

- At the moment the residents of informal settlements such as Freedom Park defecate in the veldt or in pit latrines. Defecating in the veldt in close proximity to surface water streams poses a cholera or diarrhoea risk. Defecating in pit latrines poses a similar risk (note recent events in Delmas (2005). Mines could engage with communities in informal settlements to introduce ablution facilities that will see the human biological waste be concentrated in bio-gas pits that generate bio-gas for domestic consumption. This will reduce the dependence on coal, wood and paraffin and reduce respiratory problems in the communities.

6.4 Waste Management

Currently waste management is a huge cost to mines. Mining corporations should investigate turning at least some waste manage costs into income opportunities for both the mine and communities:

- ✓ **Huge rock waste dumps of partially crushed stone covering potential agricultural land could become a source of income for communities given that most of the formal towns located within the platinum producing areas are experiencing a building boom**

7. Conclusion

This paper has briefly summarised some of the environmental impacts and challenges that communities face as a result of mining. It has tried to show that these challenges could become opportunities for both communities and mining companies. To realise this mining social responsibility programmes must begin to address the actual impact of mining on communities. The suggested strategy represents a community development approach that will accrue in the following benefits

- ✓ Job creation
    - Every project proposed is labour intensive. 40 000ha of Jatropha trees will create in excess of 12 000 jobs
    - People will find job opportunities beyond mining.

Economic Diversification

- All the projects integrate and interrelate and cover activities from the primary through to tertiary activities
- Investment in bio-fuel production will help diversify the economy away from being a mono-economy

✓ Improved Community Health

- The projects address the negative impacts of mining in the area and turn them into positive opportunities that will improved the natural, social and economic environment
- The income status of communities will improve and the will be able to afford health care and treatment
- The nutritional status of communities will improve making them more resistant to disease.

✓ Improved Community Skills

The sustainable use of a mineral resource requires that the corporations involved consider issues relating to their operations that go way beyond mining for the sake of profits and also beyond the perimeter fence of their operations. Thus environmental impact does not stop at the perimeter fence; such impacts affect communities in the immediate vicinity of the operations and often hundreds of miles beyond. Water, air and land are part of the global commons, i.e. they belong to the entire humanity and cannot be commoditized, and must be used responsibly by all. If we are able to pass very stringent anti smoking laws because we are concerned for the health of the public in general and that of individuals in particular, we should surely be equal stringent, if not more with corporate polluters.

While mines engage with communities in consultation over EIAs, and with Local Government over social and labour plans, those being consulted should not only be made aware of the opportunity benefits of mining but also of the opportunity costs of mining to communities for which they will never be compensated.

This paper skimmed the surface of the complex environmental, social, economic, health and safety and political issues resulting from platinum mining and because of time constraints have been left unsaid. Hopefully this event is but the start of much more public engagement with corporate in the industry that will lead to a more sustainable future for all South Africans.

Perhaps then we will be able to move away from the starling headlines that this paper started with.

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THE SUSTAINABILITY OF NORILSK NICKEL'S PGM PRODUCTION

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Paper presented to the Second Roundtable on Sustainable Platinum Group Metals, Brussels, December 12, 2007.

1. Norilsk Nickel

1.1 THE IMPORTANCE OF THE NORILSK NICKEL COMPANY FOR OF THE PLATINUM GROUP METALS AND NICKEL WORLD MARKETS

The Joint Open Stock Company 'Mining and Metallurgical Company Norilsk Nickel' (in further text NN) has two main operating divisions in Russia: the Polar Division, located in Siberia (Krasnoyarsk kray – Taimyr Peninsula) and Kola MMC, located in European part of Russia (Murmansk oblast – Kola Peninsula). Norilsk Nickel (NN) is the world's largest producer of nickel and palladium; nr. 4 in platinum production, and number 10 in copper production.

In 2007, Norilsk Nickel produced 3.1 million ounces palladium. South African Angloplat produced 1.4 million ounces (number 2 in the world) and Impala 0.6 million ounces (number 3 in the world).

In 2007, the largest world producers of platinum were South African Angloplat (2.5 million ounces of platinum), Impala (1.3 million ounces) and Lonmin (753 thousands ounces). The Russian company Norilsk Nickel kept the fourth position in the world: 740 thousand ounces[1]

In 2007, palladium supply to the world market was 8.3 million ounces, palladium demand was 6.6 million ounces. During the same year, platinum supply was 6,7 million ounces, demand was 6.9 ounces.[2]

In 2007, 4.9 million ounces of palladium, produced by 3 largest companies were equal to the 59% of the world supply of this metal. Palladium, produced by "Norilsk Nickel" in 2007 was enough to satisfy 47% of world demand.

The same strong concentration exists in platinum market. Platinum supply to the world market was 6,7 million ounces in 2007. The four largest platinum producers were responsible for 5.3 million ounces, nearly 80% of world supply. "Norilsk Nickel", however, is controlling only 13% of the world platinum market.

The world's largest palladium and platinum users are the producers of auto catalytic converters, which are used for cleaning car exhaust gases.

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[1] source http://www.nornick.ru/_upload/listrec_lang/filename_document1_97.pdf Norilsk Nickel Russian Miner: Global Player BMO Global Metals&Mining Conference – Hollywood, Florida, February 25-28, 2008

[2] Platinum 2007 Interim Review, Johnson Matthey, November 2007 (http://www.platinum.matthey.com/uploaded_files/Int2007/full_int_07.pdf

1.2 THE IMPORTANCE OF NICKEL AND PGM

In 2007, Norilsk Nickel also produced 295 thousand tonnes of nickel (number 1 in the world). Other main nickel producers are: Canadian CVDR Inco (Compania Vale do Rio Doce) (248 thousand tonnes), Australian BHP Billiton (176 thousand tonnes), Canadian Xstrata (116 thousand tonnes), and Chinese Jinchuan (110 thousand tonnes).[3]

Worldwide 1446 thousands tonnes of nickel were produced in 2007[4]. Five largest producers control more than 60% of the nickel delivery on World market, where "Norilsk nickel" keep first position with 20%. The largest nickel consumer (nearly 25% of the World market) is China, where this metal used for production of the stainless steel. According to forecasts, Chinese nickel demand will be very strong during the coming years.[5] These figures are important for our discussion and understanding of some aspects of the Norilsk Nickel environmental policy.

In the past, platinum group metals (PGM) were secondary products as compared to nickel, cobalt and copper, which were mostly used by the Soviet military complex. But, in the end of 1990s, technological developments have made NN's PGM production globally important, particularly for electronics, the automobile sector, and for advanced energy technologies (fuel cells). As a result, the importance of PGM for NN's income increased and the importance of nickel and copper declined during 1990s. In 2000 the contribution of precious metals (primarily PGM) metals to the company's overall revenue was 46%. In that year, nickel contributed 36% only.

During the subsequent years, the role of nickel and copper substantially increased again, whereas that of platinum and palladium declined. Sharp increase of demand and prices for nickel have led to a situation in 2006, in which this metal is providing 54% of all NN revenues. Copper keeps the second position (24%) and PGM are only on the third place (21%).

2. Norilsk Nickel and SO_2

Norilsk Nickel's activities have many negative effects on the environment and on human health. NN's environmental problems, related to the tailings storage, water pollution, emissions of the toxic heavy metals in the air etc. are well known. This paper is limited to

[3] source: http://www.nornick.ru/_upload/listrec_lang/filename_document1_97.pdf Norilsk Nickel Russian Miner: Global Player BMO Global Metals&Mining Conference – Hollywood, Florida, February 25-28, 2008

[4] http://www.abareconomics.com/interactive/ac_sept07/htm/nickel.htm

[5] http://www.eurekareport.com.au/iis/iis.nsf/ak/kNnG7i?opendocument.

NN's most important problem: SO_2 emissions, which have very serious health effects on people living in the Norilsk industrial area and which cause serious damage to local vegetation.

NN's smelters are located in Norilsk city in Siberia and in the Murmansk region (Monchegorsk, Nickel-Zapolyarny). The Norilsk industrial region is the largest single SO_2 emission source in the world with an annual production of around 2 million tonnes of SO_2. This affects the life and health of 130,000 people living in Norilsk city.

As a result of SO_2 emissions, forests in the vicinity of Norilsk have been affected: an area of 5,4 thousand km^2, whereas on 2,8 thousand km^2 trees have died completely. Dead treads have been registered up to a distance of 150 km from the city. Lichens, which are highly sensitive to SO_2 air pollution, have been affected over an even wider territory, which covers some ten thousands of km^2.

Also NN's smelters at the Kola Peninsula are heavily polluting the atmosphere, though not at such a huge scale as in Norilsk. Large scale forest dieback has been registered in the vicinity of Monchegorsk. Emissions by NN's smelters, located closely to the Norwegian-Russian border give rise to serious issues related to trans boundary air pollution.

3. Causes of NN's SO_2 emission problem

3.1 HIGH SULFUR CONTENT IN THE ORE USED

Norilsk Nickel's ore base is located in the vicinity of Norilsk city. There are three types of ore: 'rich', 'cupriferous' and 'disseminated' ore.

- 'Rich ore' contains 2-16% of nickel, 2-25% of copper, 2-100 g platinum group metals per tonne. It also has a very high sulphur content: up to 23%.
- 'Cupriferous ore' contains 0.5-2.0% of nickel, 1-15% of copper, 5-50 g platinum group metals per tonne, and middle sulphur content (up to 10%).
- 'Disseminated ore' contains 0.2-1.0% of nickel, 0.3-2% of copper, 2-10 g platinum group metals per tonne, and low sulphur content (up to 2-5%)[6]

Another source[7] gives a similar picture regarding nickel, copper and PGM concentrations and also provides important information about stock of these metals.

[6] Source http://www.rannoreko.ru/p19aa1.html

[7] http://www.rannoreko.ru/p16aa1.html

Type of ore	Content			Stock %			
	Ni %	Cu%	PGM g per t	Ore	Ni	Cu	PGM
Rich	3.2	4.6	10.8	10.5	42.0	32.3	20.8
Cupriferous	0.88	3.32	9.82	7.3	8.0	16.3	13.3
Disseminated	0.48	0.92	4.34	82.2	50.0	51.4	65.9

As is shown in the above table, 'disseminated ore', even with its rather low key metal content (7 times less nickel than in 'rich ore', nearly 4 time less copper than in 'rich ore' and 2.5 time less PGM), contains the highest proportion of the metals stock: 50% of nickel, 51% of copper and 66% of PGM. Currently, NN is mostly interested in usage of rich ore, even though it has a five times higher sulphur content. Containing a lower sulphur concentration and relatively not so poor, as PGM is concerned, 'disseminated ore' is not so attractive with respect to nickel and copper, which recently were providing 75% of NN's revenue. When the stock of 'rich ore', which is only 10% by volume, will be exhausted, the company will need to extract a higher amount of ore from deep underground mines. It will also sharply increase the need for ore enrichment and, consequently, it will make the present problem of dumping tailings seven times more serious than it is today already.

Most probably, the transition to the increased use of 'disseminated ore' will be gradual and will take a long time. Information from the Norilsk Nickel 2006 Annual report[8] shows that the company can mostly use "rich ore" with a very high sulphur content for at least 20 years.

In 2020[9] NN's ore mining capacities will reach 20.5 million tonnes per year: 7.5 million tonnes of rich ore, 5,5 million tonnes of cupriferous ore and 7.5 million tonnes of ingrained ore. This development may help to reduce the smelters' sulphur emissions.

3.2 LOW EFFICIENCY OF THE ORE ENRICHMENT, PROCESSING AND AIR TREATMENT EQUIPMENT

After ore enrichment, the sulphur/copper ratio in NN is 1.2 times higher than in similar foreign plants. The sulphur /nickel ratio is even 1.5-1.8 times higher. This is the result of using outdated and low efficiency ore enrichment technologies[10] and, to some extent,

[8] http://www.nornick.ru/upload/report2006.pdf

[9] http://www.expert.ru/printissues/siberia/2005/24/24si-30-01/

[10] According to (http://www.rannoreko.ru/p19aa1.html)

peculiarities of the Norilsk ores. They are rich in pyrrotite (a mineral which contains iron and sulphur) content, which does not only contain nickel, but also has high PGM concentrations. Formerly, pyrrotite tailings with a low nickel content, but rich in PGM, were sent to a dump and were stored.

In 1970s, the new 'Nadezhda" metallurgical plant was constructed for improvement of the ore enrichment process and usage of the pyrrotite. It was the third, most modern smelter, located in Norilsk industrial area (others were the Nickel and Copper smelters, constructed earlier, after Second World War). However, this factory was not equipped with a full scale air treatment system, and installed facilities work now well and in full capacities .

For example, the equipment for producing elementary sulphur from SO_2 emitted to the air by Nadezhda smelter has a capacity of 235 thousand tonnes of sulphur per year. In 1989, 211 thousand tonnes of elementary sulphur were produced. But in the following years, this system was temporarily closed down due to 'problems with proper equipment work'.

The problem of increasing sulphur emissions from the third Norilsk smelter was partly resolved by constructing a high chimney and by locating this plant outside the city territory. Nevertheless, it remains the largest sulphur emitter, even if it is Norilsk's most modern smelter today. Annual emissions of SO_2 from these factories calculated in form elementary sulphur are follows[11]:

- Nadezhda plant : 420-430 thousand tonnes of sulphur
- Copper plant– 340-350 thousand tonnes of sulphur
- Nickel plant – 250-260 thousand tonnes of sulphur

If the air treatment equipment on Nadezhda would work properly, it would allow for a 50% reduction in sulphur emissions from this plant.

The 'Copper plant' has a rather modest air cleaning system, which, according to specifications, can produce 80 thousand tonnes of sulphur. The majority of the SO_2 from 'Copper plant' is being emitted into the atmosphere without any treatment.

Both 'Nadezhda' and 'Copper plant' emit 'strong' SO_2 gases (concentration more than 30%). There are quite efficient technologies for clean it.

[11] According to http://www.rannoreko.ru/p19aa1.html

The 'Nickel plant' is generally emitting 'weak' SO_2 gases (concentration 10% or less), which makes cleaning extremely difficult and expensive. According NN's plans, the 'Nickel plant' will be closed down in the future and production will be moved to the 'Nadezhda combine' and the 'Copper plant', which will be reconstructed.

The smelting process of the enriched ore in these plants is outdated. Such old technologies are not being used anywhere else in the world. NN can compete with foreign companies only because of very low costs of energy, materials and labour, and high allowable levels for air and water emissions. Old technology leads to a high level of air and water pollution, high energy demand, losses of the metals, low efficiency of workforce and equipment.

In the following table, we benchmark NN's SO_2 emissions to those of world leaders in production of PGM (AngloPlatinum) and nickel (CDVR Inco), based on 2006 figures (results are rounded).

	Norilsk Nickel	Anglo Platinum	CDVR Inco
Platinum and palladium (million once)	4.0	2.6	No
Nickel production (thousand tonnes)	250	No	250
SO_2 emissions (thousand tonnes)	2000	16	350
SO_2 emissions (kg) for 1 ounce of platinum and palladium produced	500	6	No
SO_2 emissions (kg) for 1 tonne of nickel produced	8.0	No	1.4

One of NN's first promises to close down the Copper plant and move production to the upgraded Nadezhda and Nickel smelters by 2005, was made in 1999 by "Interros"[12]. But this promise was not kept. During 2003-2004 these obligations were postponed for many

[12] Interros controls NN (http://www.interros.ru/magazine/1999-02/subject/nickel/?print=yes)

years. At the moment, NN has promised to finish reconstruction of the its plants and solve huge sulphur dioxide emission only in 2015.[13]

4. The Lack of Economic and Regulatory Incentives

4.1 EXCEEDING THE PERMISSIBLE SO_2 CONCENTRATION LEVEL – HIGH PERMISSIBLE SO_2 EMISSIONS LEVEL

The ***Permissible level*** (PL) of polluting substances in the air of populated places, approved by Ministry of public health in 2003 for SO_2 is 0,5 mg per m^3 of air once-only, and 0,05 mg per m3 of air for period of 24 hours.[14]

According to company data, the level of annual SO_2 emissions from Norilsk based plants is around 2 million tonnes. This figure has not been independently verified, but is being used officially, also as a basis for state statistics.

In Russia, results of air pollution measurements are often not available. In this situation, the authorities base their calculations on emission inventories to assess the influence of different emissions on the health of the local population. In the case of Norilsk city, where SO_2 emissions are 2 million tones per year, middle SO_2 concentrations, not exceeding PL will be achieved only on distance 75 km from sources of the emissions. As mentioned before, the Nickel and Copper plants are located inside the Norilsk city boundaries, and – the 'Nadezhda combine' - at 10 km from Norilsk City.

According to calculations, the SO_2 concentration in Norilsk city can exceed the once-only PL by 30 times under certain meteorological conditions, i.e. reach 15 mg per m^3, which obviously leads to serious negative health effects. These official pollution limits are applied for PL of SO_2 concentration in air for humans only. Obviously the sensitivity of trees and other vegetation (for example lichens) is higher. But this issue is not being addressed by existing Russian regulations.

At this moment, the requirement to stay below the once-only SO_2 PL is the main legal tool by which NN can be forced to reduce its SO_2-emissions. According to calculations, this result can be achieved, if the emission level will decrease from about 2 million tonnes of

[13] http://www.nornick.ru/_upload/listrec_lang/presentation_eco_07%5B1%5D.ppt.

[14] Source: Предельно допустимые концентрации (ПДК) в атмосферном воздухе населенных мест. Гигиенические нормативы ГН 2.1.6.1338-03 утверждены 21.05.2003 Главным Государственным санитарным врачом Российской Федерации Г.Г.Онищенко.

SO_2 per year at present to 425 thousand tonnes of SO_2 per year. This level is called ***Limit of permissible emissions - LPE***[15].

Official documents, which prove LPE for Norilsk industrial area, are not publicly available (for example via Internet). They have not been available for public discussion with local population or NGOs.

According to the Decree of the Government of the Russian Federation 'About payment for environmental pollution' of 12.06.2003'[16], the company must pay US$ 5.1 for emitting 1 tonne of SO_2 within LPE. If it exceeds this amount of emissions, the company must pay 25 times more (US$ 127 per tonne of SO_2). Because achieving the LPP takes time, the government is using for this period ***Temporarily permitted emissions – TPE***, for which 5 times more has to be paid than for permissible pollutions, e.g. 25 US$ per tonne of SO_2 emissions. This system creates increasing financial pressure on the company, which can choose to take the decision to pay, or to take measures to reduce emissions. The time frame for the use of different limits is negotiated between the company and the governmental agencies. This process is not transparent.

Norilsk Nickel is often referring to the "approved program for reaching LPE to the 2015 'Project of Limits of permissible emissions' (LPE Project)[17]. The official text of this document, however, is not publicly available and it is not clear by whom and how this document was approved, and what were the reasons for such a long time frame.

According to some publications, which refer to this document, and official statements by company representatives[18], NN can have TPE 1950 thousand tonnes of SO_2 until 2009 , in 1831 thousand tonnes 2009-2011, 1294 thousand tonnes in 2011-2015 and in 2015 the company must achieve the ***Limit of permissible emissions,*** which is equal to 425 thousand tonnes of SO_2 per year.

If the company will be within temporarily permitted emissions in 2004-2009, NN will annually pay 41 million US dollars for that. If NN will not reduce their emissions, however, the payments will increase to the 54 million US dollars during 2009-2011, and to 66 million

[15] Предельно допустимые выбросы – ПДВ

[16] Source: Постановление Правительства РФ о плате за загрязнение окружающей природной среды №344 от 12.06.03

[17] Source in Russian: 'утвержденная программа достижения ПДВ к 2015 г. «Проект нормативов предельно допустимых выбросов (ПДВ.

[18] http://www.rannoreko.ru/p16aa1.html, http://www.nornick.ru/_upload/listrec_lang/presentation_eco_07%5B1%5D.ppt

US$ in 2011-2015, and after 2015 they will increase substantially: to 198 million US dollars per year. If the company will reach the Limit of permissible emissions in 2015, it will only pay approximately 2 million US$ annually.

Such a 'soft' and gradual system of payment for severe air pollution does not create any serious economical motivation for NN to fix the problems of the severe air pollution from their plants (for more details, see next part).

4.2 PRESENT LACK OF ECONOMIC INCENTIVES

The NN owned project design institute 'Gipronickel', together with the company, has made an analysis of the possibilities to reconstruct the plants with the use of modern technologies. The analysis shows that measures to solve the environmental problems are available in principle, but they will require costly investments. According to the assessments, investments in the order of 700-900 million US$ would be needed in this case. However, in the context of present price levels for materials and energy in Russia, such a reconstruction does not appear to be economically feasible, even if it would be technologically and financially possible.

In the existing economic, legal and social situation, it will be more profitable for NN to pay for emissions until 2015 at least. As mentioned above, the investment costs for reconstructing the plants are in the order of 700-900 million US$. Keeping in mind inflation and the usual project cost underestimation, they may reach 1-1.5 billion US$.

At this moment, the recovery of the 1 tonne of sulphur from SO_2 will cost approximately 100 US$ to NN. For the required 70-80% reduction from the recent level, this means at least 70 million US$ operational cost per year. Investments in the order of 1-1,5 billion US$ needed to tackle the SO_2 emission problem will lead to additional expenses of 70 million US$ per year. For reducing sulphur dioxide emissions by 70-80% NN will have total additional annual costs of about 150 million US$. According to Temporarily permitted emissions (TPE scheme, presented in previous part), the annual costs for continuing the annual SO_2 emission at a level of 1950 thousand tonnes will be in the range of 40 to 70 million US$ only until 2015.

Measures that will lead to a substantial decline of Norilsk's SO_2 emissions will become economically feasible after 2015 only, when the 'pollution as usual' scenario will cost them 197 million US$.

4.3 HUGE PROFIT BUT MODEST INVESTMENTS IN POLLUTION CONTROL

Norilsk Nickel's financial resources are many times higher than the 1-1.5 billion US dollars that are needed for drastically reducing their SO_2 emissions. In 2006 alone NN's income increased to 11,6 billion US dollars from 7.2 billion US$ in 2005. To a major extent, this was linked to the dramatic increase in world metal market prices. NN and affiliated companies share prices also showed formidable growth in 2006: 60%. In 2007, it

increased by an additional 40%. These events have resulted in at least 20 billion US$ value increase of NN's assets. On the basis of 9 month production and financial results, also 2007 will be very strong from a financial point of view.

This huge financial flow was not used for resolving Norilsk's acute environmental problems, however. It was used to purchase new nickel companies, portfolio diversification (energy, finance, insurance, real estate, etc.), dividend payment and the development of politically driven projects, etc.

An Example: NN purchased Canadian LionOre in the middle of the 2007. For this purpose financing 6.0 billion US$ was organized by a group of 26 Banks under leadership of BNP Paribas and Société Générale (*) Corporate&Investment Banking. Among members of the banks consortium are Bayerische Hypo- und Vereinsbank AG, BTMU (Europe) Limited (*), Calyon (*), ING Bank (*), Natixis, Sumitomo Mitsui Finance Dublin Ltd, Bayerische LandesBank, Dresdner Bank AG (*), Rabobank, The Royal Bank of Scotland, BBVA Ireland, Mizuho Corporate Bank Nederland (*), Scotiabank (*). Banks marked with a (*) sign in this list have adopted the 'Equator Principles': a financial industry benchmark for determining, assessing and managing social and environmental risk in project financing. They should know, however, that the huge credit costs will not be paid from LionOre's revenues, but rather from the sale of metals, produced in NN's Russian smelters under environmentally conditions, that are not acceptable anywhere in the civilized world.

But is was not end of the story. In 2007, as part of the privatization of the former state energy monopoly RAO UES, NN purchased the energy company OGK-3. Total cost of this purchase exceeded 5 billion US$. These energy stations are located in southern part of Siberia and in European part of the Russia and are not connected with Norilsk industrial area. Again NN's huge profits were not used for fixing its acute environmental problems.

The 11 billion US$, used for buying LionOre and OGK-3, were 7-10 times higher, than the investments which are required for reconstructing Norilsk's smelters and 150 times higher annual costs of the air cleaning measures required.

NN spent 70 million US$ on activities related to the protection of atmosphere in 2006; which resulted in a decline in SO_2 emissions of 1-3% per year. In 2003, SO_2 emissions from Norilsk smelters were 1960 thousand tonnes, 2011 thousand tonnes in 2004; 1955 thousand tonnes in 2005; 1939 thousand tonnes in 2006.

There was only a minor increase in the amount of sulphur extracted from SO_2 emissions in the same time period. 157 thousand tonnes extracted were extracted in 2002. In 2007 it increased to 194 thousand tonnes. Not more than only 20% of total SO_2 emissions were neutralized by air cleaning equipment on Norilsk's smelters. Most of this gas was emitted to the atmosphere through tall chimneys.

There is no reason to believe that NN will a change their ongoing strategy: to implement minor improvements and keep rather active in their environmental PR at the same time.

4.4 ABSENCE OF EFFICIENT STATE CONTROL

Absence of effective economic motivation for reducing sulphur dioxide emissions for NN plants is linked with the absence of state control on the actual level of SO_2 pollution in Norilsk and the health protection for the city's inhabitants.

The State environmental monitoring system is monitoring air pollution in 229 Russian cities on a regular basis, using 629 measurement stations, Surprisingly, without any explanation, the measurement of air pollution in Norilsk was 'temporarily stopped' in 2005. The last figures based on the state monitoring system were produced in 2004. Even here there are serious doubts about the quality of these data[19].

According to this official report, cases were registered in 37 Russian cities, in which air pollution by single pollutant exceeded PL by more than 10 times. Norilsk was not included in this list, however. 43 cities were mentioned in which air pollution is high as a result of multiple pollution. Norilsk was included in this list due to the high phenol and benzopyrene content, but not because of SO_2.

According to the 2004 State Report, the SO_2 pollution situation in Russian cities looks generally good, with average SO_2 concentrations far below PL. In 2004, the official SO_2 emissions from Norilsk plants were 2068 thousand tonnes of SO_2. In 2004 2,1 billion Roubles were spent (around 70-80 million US Dollars) for measures aimed at reducing air pollution in the Norilsk industrial region.

According to the State Report for 2005, air pollution above 10 PL was registered only in 22 cities, compare to the 37 in 2004. Norilsk again was not included in this list. According to the results of measurements, the mean SO_2 concentration in the air of the Russian cities declined by 12% in 2005 as compared to 2004

In 2005, NN spent 3,2 billion Roubles (around 120 million US dollars) on measures for reducing air pollution. As a result, the amount of SO_2 emissions in Norilsk only slightly declined from 2,069 thousand tonnes to the 2,008 thousand tonnes. Nevertheless, the efficiency of the air cleaning system in Norilsk was extremely low. In 2005, only around 15% of all SO_2 emissions - 347 thousand t of SO_2 in Norilsk - were treated with an efficiency of 70%. Most SO_2 went directly into the atmosphere. As a partial resolution of the acute air pollution problem in Norilsk city, the copper plant (with is located within city territory) was equipped with a new 150 m high chimney. The result was that cases of extremely high air pollution in Norilsk city occurred less frequently, but the pollution was spread over a larger area.

[19] Source: State report about State and protection of environmental in Russian Federation in 2004

In the State report for 2006 (latest available), there is similar situation with lists of heavily polluted Russian cities. The report stated that the average concentrations of sulphur dioxide in Russian cities decreased with 22%, and the amount of SO_2 emissions for Russia as a whole declined with 5% between 2002 and 2006. Any precise figures about sulphur dioxide pollution in the air of Norilsk industrial area are absent, however.

NN runs its own corporate air pollution monitoring system, but does not publish any results of these measurements. However, the NN company is regularly using this monitoring system as an instrument to communicate air quality improvements in press releases to the media. Results of these measurements are not verified by any independent body and not published in publicly available sources.

5. The Real Pollution Situation in Norilsk, Citizen Protest and Company PR

5.1 THE REAL SO_2 POLLUTION SITUATION

The statements in NN's press releases are often in conflict with the facts published in the local mass media, in public comments or blogs. In summer 2007, Norilsk smelters had to stop their operations many times, because of extreme air pollution situations. Local people reported the presence of a strong "sulphur smell", problems with breathing, eye irritations of eyes, respiratory problems and the death of tree leaves as a result of SO_2 emissions.

For understanding, what this means in terms of air pollution, we can use official the 'Instruction for secure work on exploration and development oil, natural gas and condensate fields with high sour gas content' approved by governmental Agency Gosgortechnadzor in 2000[20]. According to this instruction, the obvious smell of sulphur appears when the SO_2 concentration is 3 mg per m^3, e.g. 6 times higher than the once-only permissible level. When people sense sulphur smell for 24 hours, one may conclude that the SO_2 concentration exceeds PL by 60 times for 24 hours. When the SO_2 concentration reaches 20-60 mg per m^3, people show irritations in eyes and throat, and start to cough. This indicates that the once-only PL has been exceeded by 40-120 times. A person can endure a concentration of SO_2 120 mg per m3 no more than 3 minutes.

In mass-media reports and blogs, obvious smell of sulphur are being mentioned quite often. It means that situations in which SO_2 concentrations exceed 6 times once-only PL or 60 times PL for 24 hours are quite usual. Sometimes mass media and blogs report a

[20] Source in Russian: Инструкция по безопасному ведению работ при разведке и разработке нефтяных газовых и газоконденсатных месторождений с высоким содержание сероводорода. Утверждена постановление Госгортехнадзора России от 10.04.2000 №20

situation in which 'it is impossible to breathe'. In that case, the SO_2 concentration is at least 40 times higher than once-only PL.

This simple information will give local people the opportunity to understand better what the situation is and to ask questions, why severe air pollution in Norilsk is "not recognized" by the state environmental monitoring system.

5.2 CITIZEN PROTEST

In the summer of 2007 nearly 11 thousand Norilsk inhabitants signed a letter to the authorities, in which serious environmental problems of the city were presented[21] .

Some extracts from this letter:

Many years metallurgical plants of the JOSC 'Mining and Metallurgical Company Norilsk Nickel' emit into the atmosphere, in air, which we and our children breath, more than 2 million tonnes of pollution. It poisons our water and soil, kills our vegetation. It is slowly poisoning us…

Sulphur dioxide, which is the most important polluter with high concentration in the atmosphere leads to chronic lung diseases, irritation of eyes and respiratory tract, is promoting and aggravating chronic gastritis, bronchitis, laryngitis, and can lead to lung cancer.

In interaction with water in the air it creates droplets of the sulphuric acid, which every day burns our lungs, creates rains that kills the vegetation. Because of the heavy air pollution, cancellation of kids walks in day-care centres is usual practice ...

The concentration of harmful substances in the air often exceed the allowable level by more than a factor 10. But we don't know exact figures. Official air quality control by state or city authorities and services is absent. There is a lack of the equipment and the specialists required.

The Norilsk city administration, which has received substantial financial assistance from company and Krasnoyarsk region, doesn't want to resolve this problem. We do not notice any activity of the federal state environmental inspectors either. Environmental monitoring is the exclusive monopoly of the Norilsk Nickel. The company is hiding results of this monitoring, is censoring them and, often simply does not publish this information. Norilsk Nickel has made declarations on the development of the environmental program but these are only declarations.

[21] Source: http://www.forum.msk.ru/print.html?id=343285 http://gazetazp.ru/2007/71/3/

There are no real activities for improving the environmental situation. Instead of investing in additional cleaning systems for improving the environmental situation in the city and its vicinities, Norilsk Nickel is investing in foreign business …

We want to live in favourable environment. For this purpose Norilsk Nickel should be obliged to immediately construct additional cleaning systems and to reduce the metallurgical production level during unfavourable meteorological situations, during which air pollution is affecting the city.

We want to know the state of the environment. For this purpose, a state environmental control service in Norilsk must be created. This service must have the possibility to have influence on the smelter operations, to decrease air pollution in the city, in case in the Permissible level of pollution is being exceeded…

In the middle of September 2007, the deputy Chief of Rosprirodnadzor (State Committee for environmental control) reported about the results of an inspection on how NN is implementing the existing 'Water law'. Severe air pollution problems, as mentioned in the public letter to the authorities were not addressed[22]

5.3 NN IS VERY ACTIVE IN PR WORK.

NN undertakes very active PR work to create a positive environmental and social image. In 2003-2004, 2005, 2006, the company published Social Reports in compliance with GRI. These reports were audited by PriceWaterhouseCoopers and Ernst and Young. They contain many words about environmental plans – but do not show the real scale of NN environmental problems. NN is certified according to ISO 9001:2000 ISO 14001:2004 by UKAS (UK) and Road voor Accreditatie (NL).

NN is active in Global Compact, which mentions the company as example of social and environmental responsibility. In the report 'Russian business and UN Global Compact. Practice of the social responsibility', companies, controlled by 'Interros' holding, which owns NN, were mentioned in 5 examples out of 38 used. Most interestingly, NN was presented as a good illustration of a responsible position with regard to the Global Compact Principle 7, which refers to environmental issues. These conclusions are presented in a report with the UNDP logo on its cover.

NN closely collaborates with the Russian Academy of Science and provides an amount of more than 100 million US dollars to its funding.

[22] Source http://control.mnr.gov.ru/part/?act=print&id=4088&pid=508

6. NN and the Murmansk Region

At the same time, NN shows much more efficient reaction in case when environmental destructive results of its activities are more visible to the mass media and to the general public. The Norilsk owned plants in the Murmansk region are one such example. In contrast to Norilsk, which is a so-called 'closed city' with limitations to visits, not only by foreigners, but also for Russian citizens, the Murmansk situation is more transparent. There are no limits for travelling to Monchegorsk. There are restrictions to visit Pechenga, Zapolyarny and Nickel, which are close to the Russian-Norway border, but the environmental situation there is being monitored from the Norwegian side.

In 1980, the Monchegorsk smelter emitted 383,000 tonnes of SO_2, and the plants, close to the Norway border 207,000 t. In 1993 emission level was 227,400 t and 136,700 respectively. In 2000 it declined to 151,200 t and 45,300 t. In 2005, the Monchegorsk smelter emitted 106.800 t of SO_2 and the smelters, close to the Norway border 40,800 t of SO_2. To some extent this happened because the most 'dirty' technological operations had been concentrated in Norilsk, but also because of a more efficient air treatment system.

In 2005, NN's plants located in the Murmansk region jointly emitted 147,600 t of SO_2. At the same time 161.500 t (50%) were recovered from the air treatment systems, which worked with 91% efficiency. These figures are much higher as compared to those in Norilsk city.

But even these measures are not enough. In summer 2007, due to the unusual meteorological situation areas in the vicinity of the NN smelters located near the Russian-Norway border, extremely high level of SO_2 pollution levels were recorded. Interestingly, the Russian official air quality monitoring system did not register high SO_2 air pollution, whereas the Norwegian measurements showed extremely high concentrations. Later the company explained that the system of operational management, which in case of high air pollution must reduce production levels, or even stop the smelter, had not reacted properly.

7. What to do?

1. There is a need to improve the flow of information about NN's serious environmental problems to the general public and main consumers of NN's products. Most of NN's metal production is sold through or to Europe (60% in 2006). The USA market provides 16%, Asia – 16% (mostly to China and Japan). This means that at least 80% of NN's market can be considered 'environmentally sensitive'. It will be good to see this 'sensitivity' in relation to one of the world's most heavy SO_2 air polluters.

2. For producers and consumers, operating in nickel, copper and platinum metal group markets – there is need for open debate on environmental issues of these sector, also on the fact that some producers are realising their high profitability merely at the cost of severe environmental pollution.

3. Financial and investors structures, which have provided billions of dollars to NN through credits and share purchasing during the last years have not yet properly assessed this company's serious environmental and associated social problems. It looks as if Equator Banks, who have (among other projects) participated in financing NN's purchase of the LionOre, have not properly analysed these projects in relation to the environmental situation around NN's smelters in Russia.

4. There is a need for debate to what extent NN's real environmental problems are being reflected in Social reports, ISO certificates, and Global Compact publications, presentations made by NN and world leading investments companies.

5. There are obvious need for convince Russian authorities:

a. To make public the available text of 'Approved program for reach LPE to the 2015 'Project of Limits of permissible emissions' for Norilsk Nickel.[23]

b. To make public NN's officially approved plans, notably on Projects for reaching Limits of permissible emissions.

c. To make public available results of the state control on implementation of the above mentioned plans.

d. To restore the state monitoring system of the SO_2 and other air pollutants in the vicinity of the NN smelters, especially in Norilsk.

e. To implement an independent audit of NN's emissions and to make the results of this audit publicly available.

f. To give an official answer on questions, related to the severe air pollution in Norilsk, which were formulated in the letter, signed by nearly 11000 Norilsk city inhabitants in summer 2007.

6. There is a need for the development of independent public monitoring of SO_2 pollution, linked to the NN's operations. Simple criteria, based on people sensing SO_2 in the air can

[23] in Russian: 'Утвержденная программа достижения ПДВ к 2015 г. «Проект нормативов предельно допустимых выбросов (ПДВ).

be used. Constant presence of sulphur smell in the air indicates concentration of this pollutant 60 times more than the level permitted by Russian sanitary regulations.

Possible constructive steps on the part of NN:

1. Make the text of 'Approved program for reaching LPE to the 2015 'Project of Limits of permissible emissions' for Norilsk Nickel publicly available.[24]

2. Make NN's officially approved plans, notably on the Project for achieving Limits of permissible emissions, publicly available.

3. Make information, about how this program is implemented, for example in NN corporate Quarterly reports or, at least in the Annual report, publicly available.

4. Take part in roundtable discussions for regular open discussion on the achieved results and existing problems (Russian environmental NGOs already have such process for forest sector, energy, and for some major oil companies).

[24] in Russian: 'Утвержденная программа достижения ПДВ к 2015 г. «Проект нормативов предельно допустимых выбросов (ПДВ).

SOURCING RESPONSIBLE PLATINUM GROUP METALS

Activities in the United States and
International Opportunities and Recommendations

Comments of the Center for Science in Public Participation[1] and Earthworks[2] for:

SECOND ROUNDTABLE ON THE SUSTAINABLE PRODUCTION AND USE OF PLATINUM GROUP METALS
Brussels, Belgium, December 12, 2007

Prepared by Stuart M. Levit,[3] M.S., J.D., The Center for Science in Public Participation

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In recent years the public and mining industry have focused increasing attention on the impacts caused by mining and processing mined materials and concern about reducing impacts from these activities. Many concerns started over awareness about "conflict diamonds" and "dirty gold." Mining companies, non-government organizations (civil society organizations; NGOs), labor groups, community organizations, industry associations, and coalitions have launched studies and campaigns to address the social and environmental problems associated with mining. Like many mines and mining sectors, miners and producers of platinum group metals (PGMs) have considered and undertaken their own studies and activities to develop responsibly sourced PGMs.

This paper is broken into two parts. The first discusses PGM mining in the United States and the second describes emerging initiatives for responsible mining that are relevant to PGMs. Among the key recommendations are that PGM producers face the same issues and problems as, for instance, gold mines and that while PGM producers could seek their own solutions to these problems they may best achieve responsibly sourced materials by joining existing efforts. The Initiative for Responsible Mining Assurance is one of the broadest and most complete of these efforts, includes both the necessary participant sectors and the technical components to serve PGM producers in their pursuit of responsible mining activities.

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[1] http://www.csp2.org. The Center for Science in Public Participation provides objective research, education and technical advice to grassroots groups, non-governmental organizations, regulatory agencies, businesses, and indigenous communities on natural resource issues, especially those related to mining.

[2] http://www.earthworksaction.org/. Earthworks is a non-profit organization dedicated to protecting communities and the environment from the destructive impacts of mineral development, in the U.S. and worldwide.

[3] Stu Levit has an MS in Land Reclamation and is an attorney. He has worked as a reclamation specialist for the State of Montana and as technical and legal counsel for and with Indian Tribes/First Nations and nonprofit organizations.

I. Platinum in the United States

There is only one platinum mine in the United States - the Stillwater Mine, located in Montana, in the northern US Rocky Mountains. This paper therefore focuses on the Stillwater Mine and then on general initiatives regarding developing and monitoring responsible mines.

The Stillwater mine is regulated by both state (Montana) and federal (US) laws.

Federal Law

United States mine regulation is based on a law passed in 1872 plus various more recent federal laws and regulations. The 1872 Mining Act was passed in large part to "open" the western United States to settlement and development.[4] The law gives precedence to mining over all other uses, requires no royalty payments to the government, and contains no environmental protections. Other federal laws partially fill-in the gaps for environmental, worker, and other protection/regulation. However, these laws together create a sometimes complicated, confusing, and incomplete rubric.

Federal non mining-specific laws that impact mining include, but are not limited to, water quality, fish and wildlife, air quality, mine worker safety, historical and cultural preservation, and public participation.

State Law

In addition to federal laws, states have laws that regulate or pertain to mining. The laws of each state are different and specific to that state. There are vast differences between the states, although where the state laws are based on federal law than the state law generally must meet the minimum requirements of the federal law.[5] In addition to the states' laws being individual to each state, the implementation - and efficacy - of these laws is different based on enforcement, funding, politics, and other factors.

As a result, mining regulation is vastly different between the states. For example, New Mexico and Montana have what is generally considered to be more environmentally protective requirements than Nevada or Alaska.

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[4] For a general background into the 1872 mining law, mining in the western United States, and related issues, see the multi-part Seattle Post Intelligencer (newspaper) story at: http://seattlepi.nwsource.com/specials/mining/. The article specific to the 1872 mining law is available at http://seattlepi.nwsource.com/specials/mining/26875_mine11.shtml. In October 2007 the United States Congress passed a bill to reform the 1872 Mining Law. *See* http://uk.reuters.com/article/oilRpt/idUKN0154772920071101 or http://www.helenair.com/articles/2007/11/02/montana/a011102_03.txt. To become law, the bill requires passage of a similar bill in the United States Senate and signature of the President. Many terms, such as royalty provisions will likely be negotiated as part of the legislative process leading to a final bill or law.

[5] An example is the Federal Clean Water Act, which allows states to take "primacy" in enforcing the federal law, so long as the state's law meets specified federal minimums. *See* http://www.epa.gov/region5/water/cwa.htm.

State non mining-specific laws that impact mining include, but are not limited to, water quality, fish and wildlife, air quality, mine worker safety, historical and cultural preservation, public participation, social and economic issues, and bonding.

Stillwater Mine

The Stillwater Mining Company (SMC) develops, extracts, processes, and refines PGMs at its mines located near Nye, Montana and southeast of Big Timber, Montana.[6] The company is a publicly corporation traded on the New York Stock Exchange.[7] It is overseen by a board of directors and chief executive officer.[8] Like many mining companies, Stillwater has undergone many ownership changes and relationships.[9] In 2003 MMC Norilsk Nickel[10] acquired approximately 55% of the company, and the remaining 45% is owned by Stillwater Mining. According to Norilsk Nickel, Norilsk Nickel and Stillwater remain independent producers and world competitors in PGM mining and marketing.[11]

Stillwater Mining Company is one of the world's leading producers of platinum group metals and the only significant primary producer of palladium in the Western Hemisphere. The Company's 28-mile long JM Reef in Montana is the highest grade orebody containing platinum group metals (PGMs).[12] The mine has significant PGM reserves.[13] The Company operates two mines - the Stillwater Mine and East Boulder Mine. Each mine operates its own concentrating plant. SMC operates a smelter, refinery and laboratory at Columbus, Montana to further upgrade the concentrate. These facilities also recycle spent catalyst material to recover platinum group metals.[14]

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[6] For general information and statistics about the company and its mines, see http://www.stillwatermining.com/. Various photos of the Stillwater mine and geology are available at http://www.union.edu/PUBLIC/GEODEPT/hollocher/teaching_petrology/stillwater.htm.

[7] NYSE: "SWC."

[8] The company's governance information is available at: http://www.stillwatermining.com/CorporateGovernance/GovernancePrinciples/GovernancePrincipals.html.

[9] For the mine's general history see http://www.answers.com/topic/stillwater-mining-company?cat=biz-fin.

[10] http://www.nornik.ru/en/.

[11] http://www.nornik.ru/en/production/stillwater/about/. The deal was criticized in the US for various reasons. See http://www.motherjones.com/news/outfront/2004/05/04_406.html.

[12] http://phx.corporate-ir.net/phoenix.zhtml?c=99837&p=irol-IRHome.

[13] As of December 31, 2006, the Company's total proven palladium and platinum ore reserves were approximately 4.8 million tons at an average grade of 0.57 ounce per ton, containing approximately 2.7 million ounces of palladium plus platinum, an increase of 16% in proven ore reserve tonnage from December 31, 2005. The Company's total probable palladium and platinum ore reserves were approximately 37.7 million tons at an average grade of 0.54 ounce per ton, containing approximately 20.3 million ounces of palladium plus platinum, a decrease of 6% in probable contained ounces from December 31, 2005. Combined the Company's total proven and probable palladium and platinum ore reserves were approximately 42.4 million tons at an average grade of 0.54 ounce per ton, containing approximately 23.0 million ounces of palladium plus platinum, a decrease of 4% in total proven and probable contained ounces from December 31, 2005. http://phx.corporate-ir.net/phoenix.zhtml?c=99837&p=irol-SECText&TEXT=aHR0cDovL2NjYm4uMTBrd2l6YXJkLmNvbS94bWwvZmlsaW5nLnhtbD9yZXBvPXRlbmsmaXBhZ2U9NDcwMzE3NyZkb2M9MSZudW09MTA=.

[14] http://www.stillwatermining.com/overView.html.

The palladium rich J-M Reef within the Stillwater Complex was identified in the 1970's. Initial Construction of the Stillwater Mine was completed by 1986 and underground mining commenced. The Stillwater Mine accesses the eastern side of the JM Reef. Since 1998 the Stillwater Mine has been producing over 400,000 ounces of palladium and platinum per year.[15]

The East Boulder Mine accesses the western side of the JM Reef and was initially permitted in 1992. Construction of the East Boulder Mine began in 1999 and commercial production began in 2003. Initial production averaged over a half ounce per ton. In 2002 the East Boulder Mine produced 125,000 ounces of palladium and platinum.[16]

Many of the Stillwater Mine's environmental practices are founded in and determined by the Good Neighbor Agreement (GNA) it developed and implemented in 2000 with local NGOs.[17]

Stillwater Good Neighbor Agreement

Prior to the GNA, Stillwater Mine was frequently recognized as being environmentally proactive. As would be expected, it was criticized for some of its practices but as the GNA's Recitals underscore, the company was well regarded for many of its environmental and social practices. The GNA "codified" some of the company's past practices and established many new ones.

The GNA works thru a cooperative framework of third-party experts, the mining company, and local citizens to: provide for citizen oversight of mining operations to help protect the area's quality of life and productive agricultural land; establish clear and enforceable water quality standards that in some cases are more stringent than state requirements; provide local communities with access to critical information about mining operations and the opportunity to address potential problems before they occur; implement traffic planning to reduce mining traffic on country roads; and sets goals and objectives for environmental technologies.

The GNA is based on the principles that (1) citizens have a right and responsibility to have a say in decisions that affect their lives; (2) sharing information builds trust and reduces misunderstanding; and (3) good community relations and solid environmental performance are good for business. The GNA is a legally binding contract between the mining company and community interests.

Discussion about the Stillwater GNA

In 2004, the Natural Resource Law Center of the University of Colorado School of Law completed an evaluation of GNAs in the US.[18] The Stillwater GNA appears to

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[15] http://www.stillwatermining.com/stillWMine.html.
[16] http://www.stillwatermining.com/eastBoulder.html.
[17] http://www.northernplains.org/files/2005amendedgna. Note that the Stillwater GNA was amended in 2005. The original 2000 agreement is available at: http://www.northernplains.org/ourwork/goodneighbor/files/Good_Neighbor_Agreement.pdf. The amendments largely were largely part of the implementation, effectiveness, and evolution of the 2000 agreement. Descriptions in this section are from the 2005 GNA.

be an effective and successful method of protecting environmental and social resources. It is a complex detailed agreement that required a great deal of time and resources to scope, negotiate, and implement. Based on this report, it is reasonable to conclude that the Stillwater GNA is likely successful because it involves a company with both (1) the will and (2) the resources to address community concerns -- and a community with (1) the capacity and (2) the skill/sophistication to engage the company (including before the GNA process was started), identify issues and concerns, negotiate terms, and the capacity to maintain its participation. The Natural Resource Law Center's report's conclusions about Stillwater GNA being more detailed and far-reaching than many GNAs is important, because it underscores that what happened at Stillwater may not be typical and also that all of the details and components at Stillwater may not be necessary elsewhere.

That the company and community both had the necessary characteristics and resources is potentially unique and the absence or failure of any of these resources could cause the process to fail. That is not to suggest GNAs are not viable or should not be considered. Like any tool, GNAs should be evaluated as an option to determine how well they fit the needs of the participants and resources.

Many of Stillwater's mining and related practices are, at a minimum, considered and/or overseen by the GNA.[19] The mine has generally been considered to employ good environmental practices. Examples of some of the GNA's issues/activities include the following.

Economic Impacts

As described above, individual states in the US exercise great regulatory control over mining. In Montana, the state includes in its permitting processes the need to mitigate economic impacts that a mine will cause to an area. These include social costs (from schools to fire engines) and the impacts that will result when a mine closes. This mitigation eliminates some social concerns. Stillwater's mines are located in rural areas and many if not most miners live in larger towns miles from the mine.

Traffic

A big issue for local residents was the traffic created by commuting miners, not to mention the mine's truck traffic. The GNA required car-pooling and the bussing of miners from nearby towns to the mine sites. This was not without controversy[20] but appears to be largely successful at reducing traffic. The GNA also considered commercial mine traffic and successfully reduced traffic by establishing policies regarding efficiency, timing, and volume. Reducing road traffic was also important to reduce wildlife mortality (and driver injury).

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[18] www.northernplains.org/ourwork/goodneighbor/files/GoodNeighborAgreementsEvaluationReport.pdf. This report did not focus exclusively on the Stillwater GNA but included detailed input from Northern Plains Resource Council, one of the Stillwater GNA signers. Many observations in this section coincide with - or are related to - the findings in that report.

[19] That is not to suggest causation of, or judgment about, the company's participation in the GNA. The company's website barely mentions the agreement.

[20] Many individuals asserted that they had the "right" to drive their own vehicles or objected to the plan for other reasons.

Employment

The company has had issues with employee turnover for many years and has taken numerous steps to maintain its employee force.[21] The company has a reputation for training its employees well, which may fuel some of its turnover by creating a demand for them at other mines.[22] Employee turnover is more likely at least partly because of employee concerns about job stability and pay.[23] The company recently described that it had too many employees leading it to reorganize its workforce - resulting in many employees leaving the mine.[24]

More than 80% of mining at the Stillwater Mine is mechanized, employing ramp and fill mining, sub-level stoping and cut and fill mining.[25] The mine employees have changed union representation a number of times and are currently in Steelworkers Union.[26]

Environment and Public Lands

Environmentally, a particularly beneficial feature of the JM-Reef is that it is essentially barren of sulfide minerals that could cause acid mine drainage. In the northern US Rocky Mountains acid mine drainage may be the greatest mine issue, so its absence at Stillwater removes a host of typical water quality issues - and containment and treatment costs. Nitrates tend to be high in Stillwater tailings, largely as a result of blasting byproducts.

Because the mine is located in public lands, near Yellowstone National Park, wilderness lands, popular and productive fisheries and wildlife habitat, and heavily used hunting, recreational lands, the mine is of great concern to those seeking to protect the area's natural resources. Since the mine's modern inception it has been heavily "watched" and scrutinized. For that reason, it seems fitting that a detailed GNA would be created there. This paper does not seek to discern the cause, but the Stillwater mine is generally considered one of Montana's better mines[27] but all mines present potential environmental issues.[28]

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[21] *See e.g.* http://seekingalpha.com/article/53096-stillwater-mining-company-q3-2007-earnings-call-transcript; http://www.infomine.com/news/headline/welcome.asp?NewsID=67976;

[22] There have been instances where other mining companies have advertised in the local press seeking trained employees.

[23] The majority of turnover occurs among miners and general employees. However, at the end of November Stephen A. Lang, the company's Executive Vice President and Chief Operating Officer announced that he will resign to pursue an opportunity with another mining company. http://phx.corporate-ir.net/phoenix.zhtml?c=99837&p=irol-newsArticle&ID=1082281&highlight=.

[24] The company described its problem as "manpower issues" which appears to be more employees than desired for the mine's economics. *See* http://seekingalpha.com/article/53096-stillwater-mining-company-q3-2007-earnings-call-transcript.

[25] http://www.infomine.com/minesite/minesite.asp?site=stillwater.

[26] In recent years the mine has also been part of the International Brotherhood of Electrical Workers (IBEW) and Paper Allied-Industrial Chemical and Energy Workers International Union (PACE). *See also* http://www.mineweb.com/mineweb/view/mineweb/en/page35?oid=23434&sn=Detail.

[27] See e.g. http://meic.org/mining/mine_cleanup/copy7_of_perpetual_pollution_rule/perpetual-pollution-rule-background.

[28] *See generally* The Framework for Responsible Mining, http://www.frameworkforresponsiblemining.org/docs.html.

Like most mines, the Stillwater will leave behind underground workings with the potential to leach nitrates or other contaminants and a tailings pond that is intended to be left in perpetuity. State of Montana environmental regulators concluded that discharges from the mine would at some point not require water quality treatment but this conclusion remains somewhat controversial.[29]

A key to evaluating Stillwater's mining practices, the GNA, and probably all metals/minerals, is defining what is "responsible" and then defining the standards/criteria against which a mine is evaluated.

II. Responsibly Sourced Platinum Group Metals

Platinum group metals are unique in their environmental application - most notably because they often help reduce emissions and thereby help protect the environment, such as where applied in vehicle emissions scrubbers.[30] However, as a practical matter the impacts from mining PGMs are not substantively different from the impacts from mining non PGM hard rock minerals. PGM mines may be unique in their geology and rarity, but the environmental and social issues and impacts at PGM mines are similar to other hard rock mines and therefore the approaches to dealing with mining impacts at PGM mines should be similar to approaches used at other hard rock mines. Therefore, it is suggested that PGM mines have no technical reasons to separate themselves from other hard rock "responsible mining" initiatives.

Emerging Voluntary Initiatives

Consumers and corporations are increasingly concerned about environmental and social responsibility.[31] The mining industry, which has historically caused great environmental and social impacts, is now often seeking to develop voluntary initiatives. There are many examples of voluntary initiatives. Some of the major initiatives are summarized in Appendix A.

This paper focuses on two of the most comprehensive initiatives: The Framework for Responsible Mining (Framework)[32] and the Initiative for Responsible Mining Assurance (IRMA).[33] The Framework is comprehensive and considers the major

[29] http://www.epa.gov/fedrgstr/EPA-IMPACT/2001/July/Day-27/i18754.htm; http://www.redlodgeclearinghouse.org/stories/stillwater.pdf;

[30] PGMs present a philosophical issue of whether the benefits of PGM applications outweigh the costs of PGM production. By example, how does one weigh the significant environmental degradation (such as to water quality) caused during mining or processing against the environmental benefits (such as to air quality) yielded from application of the processed PGMs? This is complicated by the fact that the locus of environmental degradation caused by mining is likely to be remote, and remote from, the locus of environmental benefit.

[31] How these two items interact is a "chicken-and-egg" question that may be immaterial. What matters in the author's opinion is that there is an increasing trend towards "responsibly sourced" and "responsible" products. Companies have increasing economic and social incentives to become more environmentally and socially responsible. The public and NGOs also have an increasing awareness of false or insufficient corporate activities that seek to appear environmentally or socially responsible but are not ("greenwash").

[32] http://www.frameworkforresponsiblemining.org/index.html.

[33] http://www.responsiblemining.net/index.html.

topics necessary to evaluate a mine for its social and environmental responsibility. The IRMA includes the key components that the author concludes are necessary to establish standards and a verification scheme to evaluate and assure a mine's - or mined product's - social and environmental responsibility. Moreover, IRMA includes participants from the mining, NGO, jewelry, labor, and community sectors - which are all needed for a comprehensive and credible process.

Framework for Responsible Mining

The Framework for Responsible Mining (Framework) is the most comprehensive review of international mining practices and standards to date. It identifies principles, improved standards, and best practices appropriate for hard rock mining. Adoption of key Framework elements would eliminate many of the worst impacts from mining. In addition to mining company practices and activities, it considers the role(s) that are played by jewelry retailers, investors, insurers and nongovernmental organizations (NGOs).

As a result, the Framework provides expert guidance to the mining industry and those working with the mining industry about responsible mining. Jewelry retailers can use the findings to inform sourcing policies for gold and other metals used in jewelry. Investors and insurers can also utilize these new guidelines as they evaluate the conditions to decrease environmental and social risks.

The Framework considers and responds to the potential environmental, human rights, and social impacts associated with large-scale mining projects. It explores state-of-the-art social and environmental practices and emerging trends. Moreover, it recommends improvements where they are justified by science and expert analysis. It seeks to be a comprehensive guide to lay the foundation for complete set of standards that are negotiated and endorsed by a broad group representing interests in mining - affected communities, NGOs, and the mining industry. A key strength of the Framework is that it attends to not only easily solved issues but difficult and "leading edge" concerns. In this way it ensures that comprehensive, concrete, and detailed guidance is available to all sectors.

The Framework draws on existing campaigns, projects, and initiatives including the International Council on Mining and Metals, the Mining Certification Evaluation Project (MCEP—a multi-stakeholder project of WWF-Australia), the World Bank's Extractive Industries Review, as well as other sources and company-specific programs.

Initiative for Responsible Mining Assurance

The Initiative for Responsible Mining Assurance (IRMA) joins the mining, jewelry, labor, community, and NGO sectors to reverse the history of controversy and conflict about mining and develop strategies and systems that add value for all participants and stakeholders. It seeks to build on and improve steps that previous responsible mining efforts have considered or created.

Key components of the IRMA are its inclusion of all relevant sectors and its recognition that third-party verification and certification are essential. It is widely

understood that in-house or contracted second-party assurance protocols are suspect by definition. IRMA seeks to ensure that its results are credible and acceptable to all parties.

Like a Good Neighbor Agreement, the IRMA process recognizes that parties will not always agree but commits to dialogue despite disagreements. It also seeks to recognize, work from, and advance current best practices in the mining sector. The IRMA began as a dialogue and is establishing processes to develop draft standards and verification schemes.

IRMA is not a hypothetical exercise, but rather is establishing standards and a verification scheme that will be employed throughout the product chain from mine to consumer or industrial product - and then to post-consumer recycling. The latest activities include finalizing standards for labor, emergency response, and cyanide management and selecting the next set of standards that will be drafted for adoption. It is also currently developing an initial verification scheme to be tested and implemented.

IRMA participants recognized the complexity and vast size of its undertaking - and sought to advance in small measured steps. It has ongoing steps and phases to ensure that its successes are used to advance the overall process to serve the mining and jewelry industries and the public. The IRMA is not a test or demonstration project - it seeks to develop effective and complete standards and processes to verify and certify responsible mining products.

Its strength lies in its including representatives of mining, jewelry, labor, community, and NGO sectors. Without all of the sectors it is likely that any product would ultimately be deemed biased, unrepresentative, unreliable, and/or suspect. While the participants must judge the initiative along the way, it strives to achieve international multi-sector acceptability thereby ensuring its success.

The strategy, approach and systems initially focused on gold and diamonds but the participants recognized the need for the IRMA to apply to all minerals (or at least all hard rock minerals, including PGMs). While the IRMA may offer PGM mines and producers an effective process, PGM mines and producers may offer to IRMA the PGM mines and producers' valuable and scientifically important expertise. This could yield a synergy that benefits all parties.

Conclusions

- PGM producers face similar issues and problems as most hard rock mines.
- PGM producers have a need to source their minerals and produce their products to ensure they are socially and environmentally responsible.
- Some PGM producers are currently implementing successful responsible mining efforts. Some of the key components the PGM sector should consider are ensuring that its efforts reasonably define "responsible"; that its goals are sufficiently broad and timely; that its efforts include appropriate parties/participants; that its efforts are evaluated by a third party (not beholden to the participant interests); and that the process is open and public.

- The Framework for Responsible Mining may offer PGM miners and producers the necessary framework to consider and evaluate most if not all social and environmental issues regarding PGM mining and production.
- The Initiative for Responsible Mining Assurance may offer PGM mines and producers the necessary partners and technical framework to yield a viable, expedient means to certify a more sustainable, environmentally and socially responsible product.

APPENDIX A

SUMMARIES OF SELECTED RESPONSIBLE MINING EFFORTS

The following summaries seek to provide basic information about selected major responsible mining efforts. The content is exclusively from the sources identified (the organization that created the program/activity). Readers seeking further information should contact the primary sources provided.

- Extractive Industries Review
- Framework for Responsible Mining
- Green Lead Certification
- ICMM Sustainable Development Framework
- Initiative for Responsible Mining Assurance
- International Cyanide Management Code For the Manufacture, Transport, and Use of Cyanide In the Production of Gold
- International Organization for Standardization 14001
- Mining Certification Evaluation Project
- Principles For The Conduct Of Company Operations Within The Minerals Industry In Meghalaya [*DRAFT*]
- Voluntary Principles on Security and Human Rights

Extractive Industries Review

The World Bank Group (WBG) implemented the Extractive Industries Review (EIR) to conduct a comprehensive review of its activities in the extractive industries sector. This was done in response to concerns expressed by a variety of stakeholders, primarily environmental and human rights organizations. The review was a means for the WBG to evaluate its extractive industries investments and some of their impacts. The EIR is an important component to develop WBG direction and policies.

WBG's management indicated that it would continue investments in oil, gas, and mining projects, as these remain an essential part of the development of many poor nations. The management also noted that, as countries develop their resources, WBG capital and expertise can help ensure that such projects meet high environmental, social, and governance standards, and that revenue from the projects is used transparently and effectively.

The central message of the reviews was that while extractive industries investments can contribute to sustainable development, the WBG should further enhance its efforts in several areas: more explicitly identifying and tracking poverty reduction associated with its projects, the overall quality of governance in host countries, broader inclusion of local stakeholders, transparency of revenue management and project documents, and the promotion of renewable energy and cleaner fuel alternatives.

The two key questions posed by the EIR are: (1) How effective has the assistance and investment of the WBG been in helping advance sustainable development through the extractive industries? (2) What should be the future role of the WBG in the extractive industries sector?

The WBG concluded that extractive industries make a significant contribution to sustainable development and poverty reduction. The WBG also recognizes that stakeholders have legitimate concerns about the impact of extractive industries: at the global level, on issues such as climate change and biodiversity; at the country level, regarding the extent to which a heavy economic reliance on extractive industries revenues creates a “resource curse”; and, at the local level, in terms of the impact on the environment and surrounding communities.

The reviews found that WBG involvement in extractive industries has resulted in contributions to sustainable development that have been positive, but not uniformly so, and that the WBG can continue to make positive contributions to sustainable development through various types of involvement in this sector.

There is wide support for WBG involvement in a number of extractive industries-related activities, such as lending for public sector reforms; environmental rehabilitation; gas-flaring reduction; mine-closure investments; investments that increase local ownership or ownership by previously-disadvantaged groups; and investments in efficiency upgrades or projects that shift countries toward using cleaner fuels. There is also considerable momentum for reform, both within the WBG and among external stakeholders. Some of these issues include increased transparency of extractive industries revenue figures, increased local stakeholder consultation, the disclosure of additional project and process information, guidelines

for the use of security forces that protect extractive industries project sites, and raising certain technical standards associated with extractive industries industry operations.

The WBG's Management will continue to study the report and welcome the views of a wide array of stakeholders. Once a draft Management Response is formulated, it will be submitted to the WBG's shareholder nations for further refinement and revision in the next three months or so, first through a meeting of a sub-committee of the Board, the Committee on Development Effectiveness (CODE), and later through a meeting of the full Board of Executive Directors. It is anticipated that a draft Management Response to the EIR will be released following CODE review and discussion.

More about the EIR and WBG is available at: http://www.ifc.org/eir.

The Framework for Responsible Mining

The Framework for Responsible Mining is the result of a call by NGOs, retailers, investors, insurers, and technical experts working in the minerals sector in the minerals sector to create a basis for developing responsible sourcing and investing policies. The framework outlines environmental, human rights, and social issues associated with mining and mined products, and explores state-of-the-art social and environmental improvements, providing recommendations for retailers and others seeking to source or invest responsibly, as well as regulate and encourage responsible mining practices. The Framework (1) outlines environmental, human rights, social, and governmental governance issues associated with mining and mined products; (2) explores state-of-the-art social and environmental improvements; and (3) provides recommendations for governments and government agencies, civil society groups, including NGOs, the mining industry, financial institutions, including public and private banks as well as insurers, and producers, sellers, and consumers seeking investments or assurance that a product is environmentally or socially responsibly produced and sourced precious metals.

Recent examples of "responsibility projects" include sustainable forestry, conflict diamonds, and apparel industry labor practices demonstrate the public's desire for environmental and social responsibility. Mining effects environmental and social change no matter where the mine is located. However, by implementing the best possible standards, most or all negative impacts may be avoided. To date, existing frameworks have not met minimal goals to mitigate environmental and social impacts.

In 2003 the genesis for the Framework evolved out of dialogue that included groups such as the Center for Science in Public Participation (CSP2), Earthworks, World Wildlife Fund (WWF), and concerned businesses such as Tiffany & Co. These interests recognized that environmentally and socially responsible mine products could assuage growing consumer interest and improve business costs for distinguishing themselves from competitors by establishing a verifiable chain of custody for products. Simple compliance with the laws of the countries in which companies operate may not be sufficient to protect the environment or vulnerable communities. Consumers evaluate product accountability and "cleanliness" and social interest groups evaluate compliance with laws, protocols, and customs that protect basic human rights, self-determination, cultural integrity, labor and social rights, and the natural environment. The Framework considers all of these issues to present a balanced, comprehensive starting point for responsible mining.

Other entities are starting to consider similar issues. Three examples include the International Council on Mining and Metals (ICMM, a mining trade association), the Council for Responsible Jewellery Practices (CRJP, an association of diamond, mining, and gold jewelry businesses), and the Mining Certification Evaluation Project (MCEP, a working group comprising mining industry and social interests groups completing a policy research and development exercise evaluating whether independent third-party certification of performance can be applied to the mining sector). These initiatives by themselves don't provide a comprehensive basis to develop environmentally and socially responsible mining standards. The Framework provides the necessary research background to recommend principles for consideration by a broad range of stakeholders interested in promoting responsible

mining. During editing, drafts were reviewed by over twenty experts from NGOs, industry, government, labor, and the research community.

The Framework highlights seven common principles stemming from international agreements which have been incorporated into many domestic jurisdictions around the world. The principles are sustainable development; equity; participatory decision making; accountability and transparency; precaution; efficiency; and polluter responsibility. Special emphasis is placed on women, children, and indigenous and minority groups that are often particularly underrepresented in decision making and are disproportionately impacted by mining activities.

The Framework divides topics/issues into widely accepted practices ("the Norm") and desired future standards ("the Leading Edge"). *The Norm* refers to environmental and social practices that companies commonly adopt to comply with regulations or to ensure more cost-effective site management in industrialized nations (e.g. liners are universally used for ore processing at heap leach mines). *Leading Edge* practices are those that the authors concluded could generate significant environmental and social improvements if implemented. These practices are typically supported by the literature and are often promoted by government agencies; civil society groups, including NGOs; the mining industry; and financial institutions, including public and private banks and insurers.

Four themes organize the Framework. First is determining whether a mine will disturb an area that is so environmentally or socially sensitive that the area should be classified as a "no go" zone. This addresses the need to preserve ecologically and culturally significant areas and to weigh land and resource use options. This is not the only point at which participants could conclude that a mine should not proceed, but this is the functional threshold.

Second, participants must ensure environmentally responsible mine development. This theme facilitates developing widely accepted criteria by which governments, NGOs, and industry can measure the environmental performance—and ultimately the environmental acceptability—of mining projects. Governments could use such criteria to develop unambiguous development and operations standards to condition permits. The public and NGOs could define benchmarks for acceptability and evaluate the operating mines' environmental performance. Mining companies could develop and apply clear guidelines to measure and demonstrate the environmental components of their licenses and compliance.

The Third theme is ensuring that mine development results in benefits to workers and affected communities. This focuses on free, prior, and informed community consent for mining, health and safety provisions; capturing sustainable benefits for all affected peoples; and deliberately considering all individuals in the communities. This underscores that mining can impact individuals and communities outside the mine border and can specially impact indigenous and marginalized peoples.

The Fourth theme explores broader corporate and national governance provisions to ensure that appropriate governance structures are implemented at a national and corporate scale and reporting company progress made toward implementing responsible practices. This includes transparency in revenue payments and other

commitments so companies can be held accountable for progress made against stated commitments.

More information is available at www.frameworkforresponsiblemining.org.

Green Lead Certification

The Green Lead Certification scheme is a proactive product stewardship program based on the sound management of materials and products in the lead life cycle. It is the product of efforts by lead-industry interests ranging across the spectrum of lead production and use.

Three core ground rules found the Green Lead product stewardship scheme.
1. The Green Lead process must be open, honest and transparent. All relevant information, data and audit reports must be available in the public domain for inspection.
2. Third party verification is required to guarantee the credibility of Green Lead Certification.
3. Collaboration and cooperation are required between the lead industry, governments, NGOs, and community groups throughout the product chain.

The Green Lead Process has five principal steps. The first step is to identify and quantify the environmental, safety, health and social impacts associated with lead exposure during the lead life cycle. This includes current performance and historical impacts. The Life Cycle Analysis (LCA) from the European Lead Risk Assessment exercise under the Chairmanship of the Dutch Government are used to ensure a uniform methodology are going to be used to assist with the completion of this first step and identify all potential exposure problems. Because exposure risks and critical elements in the Product Stewardship Life Cycle vary, each sector - and in many cases individual plants - must conduct their own analysis and determine site or operation specific environmental threats and health risks.

The second step is establishing Green Lead Performance Standards/Criteria. This includes developing performance standards/criteria based on the results of LCA and other tools utilized for impact identification. The standards/criteria cover areas of environmental protection, workplace health and safety and community issues associated with lead exposure.

Performance standards for “Green Lead” will reflect international best practice, including the World Wildlife Fund's Certification of facilities for mine sites; the Basel Technical Guidelines for the Environmentally Sound Management (ESM) of ULAB; the environmental management systems advocated under ISO 14001and guidelines outlined for the Occupational Safety, Health Assurance System (OHSAS) 18001 for safety and health management systems.

Where possible, common criteria and international protocols will be applied across all sectors. Examples include lead in blood levels and the transboundary movement of ULAB. All sectors will also need to demonstrate a social responsibility for the industry's workers and local communities. Regarding workers rights and social development, the criteria will be consistent with conventions and recommendations of the UN Office of the International Labour Organization (ILO).

Step three establishes Green Lead Custody Chain Management. Many Environmental Management Systems emphasis the need for Supply Chain Management, and in some cases, such as Forestry Resources management, it is the control wood sourcing that is

the critical element in moving towards sustainable management. In the case of Lead Acid Batteries (LAB), the sourcing of refined lead and bullion from environmentally sound smelters ranks with equal importance to the downstream management of the finished product. This is Custody Chain Management and it means that LAB must only be sold by wholesalers and retailers that participate in schemes to collect ULAB in exchange for new sales to ensure that the lead in batteries remains controlled. This emphasis on Custody Chain Management is NOT a feature of ISO 14001.

The fourth step is Site Remediation Planning, which deals with legacy/historic problems. Companies applying for Green Lead certification may have facilities with legacy issues resulting from unsatisfactory past practices. The program anticipates that some operations currently regarded as part of the "informal sector" will apply for Green Lead Certification after they improve their environmental performance to demonstrate their "formal sector" credentials.

Steps 1 and 2 will identify and quantify remediation issues, if any, and if a Remedial Site Management Program is required, it must be established through consultation with local communities and government agencies. Achieving progress towards remediation plan milestones is a critical factor in Green Lead certification.

Step Five is that Green Lead Audit and Certification Environmental, Occupational Health and Safety Management Systems based on these standards are subject to site inspection and audit for Green Lead certification. Organizations with ISO 14001or OHSAS 18001 or equivalent certification will be exempt from certain sections of the Green Lead audit, but the internal and external dynamics of the LAB life cycle will be thoroughly checked for the sound management of the custody chain.

The Green Lead Audit and Certification criteria will include the following, depending on the nature of the operation.

- Comprehensive risk assessment and the implementation of safe working procedures.
- Control and mitigation measures for any fugitive emissions, discharges or legacy problems.
- Identification and management of environmental and health impacts.
- Compliance with prevailing national and international environmental, health and safety legislation, conventions and protocols.
- Emergency response and evacuation plans.
- Environmental and safety monitoring programs and health surveillance regime
- Chain of custody scrutinized, audited and recorded.
- Continuous improvement and employee development programs.
- Community engagement agenda.
- Open reporting procedures.

The Green Lead Program includes special consideration of and planning for Developing countries to assist with implementation and management.

More information is available at: http://www.greenlead.com.

ICMM Sustainable Development Framework

The International Council on Mining and Metals (ICMM) developed the Sustainable Development Framework so its corporate members could provide leadership to improve their sustainable development performance. ICMM was formed in 2001 to represent leading international mining and metals companies.

The Framework comprises four elements: (1) 10 Principles, supported by (2) Public reporting, (3) Independent assurance, and (4) Sharing good practice. By committing to the four elements, ICMM corporate members seek to provide leadership to improve their sustainable development performance.

The Principles were adopted by Council for implementation in May 2003. The reporting indicators were devised in partnership with the Global Reporting Initiative (GRI) in 2004 through a multi-stakeholder consultation process. ICMM members form the largest industry group that has committed to report in accordance with the GRI framework, the highest standard of reporting. The assurance element was approved by ICMM's Council in May 2006 as a pilot procedure.

Underpinning the Principles, reporting and assurance is the final element of the Framework - sharing good practice. This is done through the publication of good practice guidance documents which are developed in close co-operation with members, promotion of ICMM initiatives at conferences, and a good practice website launched in 2004 in partnership with UNCTAD, UNEP and the UK Department for International Development (DFID) - www.goodpracticemining.org.

The 10 Principles for sustainable development are:

1. Implement and maintain ethical business practices and sound systems of corporate governance.
2. Integrate sustainable development considerations within the corporate decision-making process.
3. Uphold fundamental human rights and respect cultures, customs and values in dealings with employees and others who are affected by our activities.
4. Implement risk management strategies based on valid data and sound science.
5. Seek continual improvement of our health and safety performance
6. Seek continual improvement of our environmental performance.
7. Contribute to conservation of biodiversity and integrated approaches to land use planning.
8. Facilitate and encourage responsible product design, use, re-use, recycling and disposal of our products.
9. Contribute to the social, economic and institutional development of the communities in which we operate.
10. Implement effective and transparent engagement, communication and independently verified reporting arrangements with our stakeholders.

Public Reporting entails a common approach for reporting performance against the 10 Principles. In 2005, the ICMM Council approved the Mining and Metals Sector Supplement and committed corporate members to report to the highest level of

reporting: 'in accordance' with the Global Reporting Initiative (GRI) Guidelines and Sector Supplement.

The GRI Mining and Metals Sector Supplement is intended to be used in conjunction with ICMM's 2002 Sustainability Reporting Guidelines. Together the Guidelines and Supplement provide the basis for ICMM members to report their economic, environmental, human rights and social performance against the 10 Principles. They include specific performance indicators as well as principles for good reporting, such as completeness and materiality. ICMM corporate members aim to report in accordance with the GRI 2002 Sustainability Reporting Guidelines and Sector Supplement within two reporting periods.

Independent Assurance entails third party assurance against both implementation of the 10 Principles, and of the commitment to report "in accordance with" the GRI reporting framework. It is based on two tracks - the two tracks reflect corporate members' two commitments to ICMM. It has staged implementation - this is in recognition that corporate members are currently undertaking different levels of assurance and there is a need for gradual convergence towards a common approach to provide flexibility. Assurance also builds on an existing standard - given the desire to build upon existing initiatives and minimize duplication wherever possible, the Procedure incorporates the underlying principles of the AA1000 Assurance Standard – materiality, completeness and responsiveness. It is intended to be a part of a company's existing assurance activities - this will allow members to integrate the ICMM assurance requirements into their current assurance activities.

The final component, Sharing Good Practices, is based on the conclusion that sustainable development requires participation and engagement by companies, governments and civil society alike. Therefore, ICMM's projects are often carried out in partnership or with input from relevant stakeholders. All projects directly support implementation of at least one of the 10 Principles and the results are shared through publications, workshops and participation in events and conferences.

Access to good practice developed by ICMM and others is through a good practice website, which was developed with the United Nations Environment Programme, the UK Department for International Development and the United Nations Conference on Trade and Development. It is available at www.goodpracticemining.org.

More information about ICMM and the Sustainable Development Framework is available at http://www.icmm.com/sd_framework.php.

THE INITIATIVE FOR RESPONSIBLE MINING ASSURANCE

The Initiative for Responsible Mining Assurance (IRMA) is an ongoing multi-sector effort to develop and establish a voluntary system to independently verify compliance with environmental, human rights and social standards for mining operations. Participants include mining companies, jewelry (or jewellery) retailers, NGOs and trade associations.

IRMA seeks to establish mining operations that are consistent with healthy communities and environments, and that leave positive legacies.

The IRMA participants recognize that there are mining operations that meet this standard and some that do not. They recognize the need to create incentives to promote responsible practice. However, there is currently no mechanism to independently verify operations that are likely to achieve this result or to offer these incentives. IRMA seeks to meet this need.

IRMA seeks to create an independent, third party assurance system to ensure that mines operate in an environmentally and socially responsible manner. IRMA seeks to develop a system with input and support from all key sectors. The following principles would underpin this system:

- Independent verification;
- Fair and equitable distribution of benefits to communities (including Tribes/First Nations) and indigenous peoples) while respecting and protecting their rights;
- Effective responsiveness to potentially negative impacts to the environment, health, safety, and culture;
- Enhancement of shareholder value.

IRMA seeks to build on the an existing foundation of research, tools, and initiatives ranging from The Framework for Responsible Mining, to the ICMM Sustainable Development Framework, to the findings of the Mining Minerals and Sustainable Development project, to the Mining Certification Evaluation Project.

The IRMA is an active project, currently working to meet its goals. For more information on current activities and participants, see http://www.responsiblemining.net/.

INTERNATIONAL CYANIDE MANAGEMENT CODE FOR THE MANUFACTURE, TRANSPORT, AND USE OF CYANIDE IN THE PRODUCTION OF GOLD

The "International Cyanide Management Code For the Manufacture, Transport, and Use of Cyanide In the Production of Gold" (Code) was developed by a multi-stakeholder Steering Committee under the guidance of the United Nations Environmental Program (UNEP) and the then- International Council on Metals and the Environment (ICME).

The Code is an industry voluntary program for gold mining companies. It focuses exclusively on the safe management of cyanide and cyanidation mill tailings and leach solutions. Companies that adopt the Code must have their mining operations that use cyanide to recover gold audited by an independent third party to determine the status of Code implementation. Those operations that meet the Code requirements can be certified and certified operations can use a unique trademark symbol. Audit results are available to the public.

The overall goal of the Code is to improve the management of cyanide used in gold mining and assist in the protection of human health and the reduction of environmental impacts. The Code seeks to reduce the potential exposure of workers and communities to harmful concentrations of cyanide, to limit releases of cyanide to the environment, and to enhance response actions in the event of an exposure or release.

Adoption and implementation of the Code is voluntary. Political jurisdictions lacking comprehensive regulations for the management of cyanide used in gold mining may find provisions in the Code helpful in developing their own regulatory programs.

The code is administered by the International Cyanide Management Institute (ICMI). It is a non-profit corporation with a multi-stakeholder Board of Directors. ICMI's prime responsibilities are to:

- Encourage companies to adopt the Code and bring their operations into compliance with its Principles and Standards of Practice;
- Promote the Code within the gold mining industry and with other stakeholders;
- Develop sources of funding for Institute activities;
- Work with governments, NGOs, financial interests and others to foster widespread adoption and support of the Code; and
- Periodically review the Code and revise it as necessary to improve implementation and incorporate new advances in cyanide management

When a company becomes a signatory to the Code, the company's operations are audited by an independent third-party auditor using its Verification Protocol. The auditor determines if the operation meets the Code's Principles and Standards of Practice and should be certified as being in compliance with the Code. Operations found in full compliance with the Code are certified and a Summary Audit Report and Auditor Credentials Form are posted on the ICMI web site. Operations found in substantial but not full compliance with the Code are conditionally certified and must develop and implement a Corrective Action Plan to achieve full compliance. A Summary Audit Report, Auditor Credentials Form and the Corrective Action Plan are

posted on the ICMI web site. The operation becomes certified once implementation of the Corrective Action Plan is confirmed by the auditor.

Companies with multiple operations can select those they wish to certify as in compliance with the Code. This allows a company to seek certification of most of its operations even if one or more cannot be brought into compliance. The Code web site will list all of a signatory company's operations and indicate which it intends on certifying.

Companies that become Code signatories commit to periodic independent third party audits to determine whether their operations can be certified as in compliance with the Code's Principles and Standards of Practice. Audits will be conducted using Verification Protocols developed by the International Cyanide Management Institute (ICMI) by auditors meeting ICMI criteria. Copies of the Auditing the Code and Auditor Criteria are available to the public on the internet. Audits are conducted for initial certification and at three-year intervals thereafter and include a site inspection and a review of applicable documents and records.

The Code program is voluntary and ICMI does not impose penalties. However, an operation that is not in compliance with the Code's Principles and Standards of Practice would not be certified. Non-compliance at an already certified site would result in its de-certification, and de-certification of the operation would be posted on the ICMI web site.

More information is available at: http://www.cyanidecode.org.

ISO 14001

ISO stands for the International Organization for Standardization, located in Geneva, Switzerland. ISO promotes the development and implementation of voluntary international standards, both for particular products and for environmental management issues. ISO 14000 refers to a series of voluntary standards in the environmental field under development by ISO. Included in the ISO 14000 series are the ISO 14001 EMS Standard and other standards in fields such as environmental auditing, environmental performance evaluation, environmental labeling, and life-cycle assessment. The EMS and auditing standards are now final. The others are in various stages of development.

ISO standards are developed through a voluntary, consensus-based approach. Each member country of ISO develops its position on the standards and these positions are then negotiated with other member countries. Draft versions of the standards are sent out for formal written comment and each country casts its official vote on the drafts at the appropriate stage of the process. Within each country, various types of organizations can and do participate in the process including industry, governments (Federal and State), and other interested parties, including various non-government organizations (NGOs). Existing management activities can be incorporated into a standard.

The ISO 14001 standard requires that a community or organization put in place and implement a series of practices and procedures that, when taken together, result in an environmental management system. ISO 14001 is not a technical standard and as such does not in any way replace technical requirements embodied in statutes or regulations. It also does not set prescribed standards of performance for organizations. The major requirements of an EMS under ISO 14001 include:

- A policy statement which includes commitments to prevention of pollution, continual improvement of the EMS leading to improvements in overall environmental performance, and compliance with all applicable statutory and regulatory requirements.
- Identification of all aspects of the community organization's activities, products, and services that could have a significant impact on the environment, including those that are not regulated
- Setting performance objectives and targets for the management system which link back to the three commitments established in the community or organization's policy (i.e. prevention of pollution, continual improvement, and compliance)
- Implementing the EMS to meet these objectives. This includes activities like training of employees, establishing work instructions and practices, and establishing the actual metrics by which the objectives and targets will be measured.
- Establishing a program to periodically audit the operation of the EMS
- Checking and taking corrective and preventive actions when deviations from the EMS occur, including periodically evaluating the organization's compliance with applicable regulatory requirements.
- Undertaking periodic reviews of the EMS by top management to ensure its continuing performance and making adjustments to it, as necessary.

Examples of potential benefits of an EMS based on ISO 14001 include:

- Improvements in overall environmental performance and compliance
- Provide a framework for using pollution prevention practices to meet EMS objectives
- Increased efficiency and potential cost savings when managing environmental obligations
- Promote predictability and consistency in managing environmental obligations
- More effective targeting of scarce environmental management resources
- Enhance public posture with outside stakeholders

More information is available at: http://www.iso.org/iso/en/ISOOnline.frontpage.

The Mining Certification Evaluation Project

The Mining Certification Evaluation Project (MCEP) was a three year research project to investigate the feasibility of third party certification of environmental and social performance of mine sites. As a research activity, it did not attempt to create a working certification scheme, but to establish a knowledge platform for broader international debate and future efforts.

The project began in 2002 with WWF-Australia responsible for the overall management of the project and an MCEP Working Group formed to direct and contribute to the work program. The group concluded that the credibility and effectiveness of certification schemes in other sectors appeared to hinge on three main issues: governance (what are the key governance issues for a certification scheme in the mining sector?); setting standards (can principles and criteria for acceptable social and environmental performance by mine sites be developed that have broad agreement from the Working Group and meet stakeholder expectations?); and assessment and assurance (can an audit protocol be (a) designed and implemented to test the performance of mine sites against these criteria in a manner that is practical and cost-effective? And (b) utilized in a variety of ecological, socio-economic and cultural settings within Australia and internationally?).

GOVERNANCE

The mining sector attracts a wide range of government regulation and is active in the development and implementation of voluntary private initiatives. A review of mining sector private initiatives indicated a rapid growth in the number of initiatives since the early 1990s involving the industry, NGOs and global institutions. A recent trend emerged towards convergence and co-operation between initiatives. Industry concern for reputation and maintaining a social license to operate appeared to be significant drivers and a number of sector-based initiatives sought processes for independent verification. In this context, there appears to be scope for a scheme for third-party certification of mine sites.

An evaluation of existing certification schemes in other sectors highlighted that the fundamental governance issues for any nascent scheme should include appropriate governance arrangements in five key areas:

1. Structure and procedure: multi-stakeholder involvement; participation in the scheme; decision making; and financial structure;
2. Standards and assessment: scheme's requirements; continuous improvement; review processes; selection and accreditation of certifiers; and combined audits;
3. Certificates: communication; and chain of custody;
4. Dispute resolution: appeals process; sanctions for non-compliance; and sanctions for improper certification;
5. Legal issues: transparency; legal liability; and jurisdiction.

The Working Group used the International Council on Mining and Metals (ICMM) Sustainable Development Framework as an organizing structure to develop the MCEP Principles and Criteria. In developing the MCEP Criteria, the Working Group found that in certain areas, minimum levels of performance could be clearly defined. In many areas, however, the issues were deemed to be more contextual. As a result, the Criteria as a whole represent an amalgam of normative and performance standards,

process guidelines and management systems. The Working Group process and the public comment received indicated that consensus is achievable in most areas, but that a few issues would probably prove more difficult. These included preclusion of particular technologies, such as riverine tailings disposal, references to Indigenous people, and the complex issue of 'free, prior and informed consent'. Also, the issue of whether globally applicable standards allow sufficient flexibility for local context and implementation remained open. Most, if not all, members of the Working Group saw considerable room for improvement in the Criteria, even if agreement on directions for change could not be easily reached.

ASSESSMENT AND ASSURANCE

The MCEP framed assessment and assurance in terms of the development of an audit protocol and process, to be tested at a number of mine sites. Six field trials were conducted as part of the MCEP research: four in Australia, one in New Zealand and one in Brazil. The field trials were designed to evaluate the audit process, not the mine sites per se. The field trials indicated that, on the whole, an assessment process based on the MCEP that is practical, cost-effective, and can be used in a variety of mine site settings, should be achievable.

Each field trial highlighted areas for improvement in the assessment process and pointed to issues that would require further consideration in the creation of a mine site certification scheme. These included balancing the degree of assurance against excessive time on site, weighing up the advantages and disadvantages of a scoring system, and establishing the relative superiority of a global standard or a regional/site standard. The integration of a wide range of issues in one assessment and the emphasis on outcomes, performance, stakeholder engagement and employees was found to be a valuable departure from existing mine site assessments, and one which may require new skills and approaches for auditing teams.

The potential value of certification as a reputation benefit was understood by participating mine sites, but interest lay more in practical outcomes for the site itself, such as guidance for improving performance or rationalizing existing initiatives. Overall, the MCEP trials attested to the difficult balance between a standard that can be universally applied and is adaptable to diverse operating circumstances, but that still offers sufficient detail and robustness to serve an assurance function.

IMPLICATION OF KEY FINDINGS

The implications and strategic tasks for the development of a future mine site certification scheme included:

- Integrating a wider variety of international perspectives in any future process;
- Attracting broadly based support and/or membership for a scheme;
- Establishing a viable funding structure for the governance of a scheme;
- Ensuring compatibility with complementary private initiatives;
- Investigating further the feasibility of globally applicable standards, as opposed to regional or local standards;
- Undertaking more work in areas such as free, prior and informed consent, Indigenous people, any limitations on particular technologies or practices, and the level of prescription in some criteria, particularly in the context of a global standard;

- Finding the balance between the costs of audits and the degree of assurance that can be provided; and
- Developing strategies for the participation of Small and Medium Enterprises (SMEs).

The MCEP established that a mine site certification scheme is feasible. The success of future efforts to create a working certification scheme will largely depend on the efforts of those who choose to champion the idea. A broadly based coalition of stakeholders offers the best prospect for success.

More information is available at: http://www.minerals.csiro.au/sd/SD_MCEP.htm.

Principles For The Conduct Of Company Operations Within The Minerals Industry In Meghalaya [*DRAFT*]

The Meghalaya Peoples Human Rights Council is an independent human rights organization in Meghalaya North East India. It wrote the Draft *Principles for the he Conduct Of Company Operations Within The Minerals Industry In Meghalaya* (the IMR; Draft released July 2006) to provide guidance and direction for mining in India and elsewhere. It is a draft "principles paper" and seeks to be a basis for ongoing discussion.

The IRM begins with frameworks for Corporate Social Responsibility, which are policies of companies towards the rights and interests of Indigenous peoples. In practice, this translates into interactions and negotiations between mining companies and Indigenous peoples. The report identifies six distinct approaches which companies might adopt in relation to the rights and interests of Indigenous peoples in order to provide a starting point for the discussion of a Corporate Social Responsibility framework. This approach is based on acceptance by companies that they cannot continue to operate profitably over the longer term unless they can win support for their operations from the wider society, including Indigenous peoples.

The IRM also focuses on processes addressing resource development on Indigenous land. These Principles address issues such as recognition and respect, Indigenous involvement in environmental management, cultural heritage protection, and the need for developers to respect the integrity of Indigenous decision making processes. A central requirement is that developers obtain the free, prior informed consent of Indigenous communities affected by any development proposal. A central goal is ensuring equity between Indigenous and resource development parties. Primary topics include: recognition; respect; free, prior informed consent; indigenous internal decision making processes; economic development and benefits; independent monitoring and performance benchmarks; indigenous involvement in environmental management; cultural heritage protection; fair resourcing/negotiating/contracting; and human rights principles.

The IRM further focuses on a Human Rights Based Approach to Mining on Indigenous and Tribal Peoples Land. This includes human rights principles that are relevant to developing a sustainable relationship between indigenous people and mining companies. They include racial equality and non-discrimination; effective participation; right to protection and maintenance of culture; and self-determination. The document concludes that mining companies committed to incorporating human rights into policy and practice must move beyond the constraints of existing regulatory regimes that are inconsistent with identified Principles and must develop a consensual relationship with Indigenous people.

Finally, the IRM provides a basic set of principles which should be followed by minerals companies regardless of where they are operating or under what circumstances. The goal is not to provide prescriptive standards for individual projects but instead that the Principles provide definitive guidelines (as opposed to technical standards) which companies should follow, such as the guidelines applying to the management of tailings, waste rock, and acid mine drainage.

The IMR concludes that companies should adhere to the most protective standards available, regardless of the source. The IMR requires public disclosure/community right to know to ensure that all commissioned reports, no matter the author, are available to the public. The IRM also requires that the public have the opportunity to participate in all stages of a mine project. Companies should pay for community participation, including establishing trust accounts to enable community/NGO participation. The public should also have the opportunity to participate in corporate general meetings regarding key matters of public interest. Politically the IMR requires that Companies maintain full transparency in their political, legislative, and related activities. Those lending to companies are required to abide by principles of open and fair conduct.

Companies should abide by all relevant international treaties and codes and internationally binding codes of conduct should be developed for Transnational Corporations. Companies should also implement programs for the employment of the local people, including training and an annual audit to measure programs/employment. Mine employees should appropriate training/cultural awareness and environmental workshops. Employees should be bound by codes of conduct as a condition of employment, with appropriate penalties for breaches.

No relocations should be allowed without free, prior and informed consent of the indigenous peoples concerned and after agreement on just and fair compensation/terms. Further, companies should not operate any project in areas where any forced removals from land have occurred. An applicable standard to relocation conduct is that no affected person, group or community has their standard of living, economic, culture and social cohesion diminished as a result. Companies must recognize indigenous people and their traditional or customary ownership of land especially where a host government does not recognize the legal status of customary land.

The IRM requires that companies ensure that all royalties and compensation agreements are based on international best practice and that terms and conditions maintain highest achievable by landowners regarding for equity, participation, employment, royalties and compensation. Companies should develop and publish a code of practice for exploration and mining negotiations with communities and NGOs. This policy should include community rights to veto or negotiate land use and ensure that all landowners are fully involved in any negotiations concerning activities that could affect their interests. Separate agreements should be required for mining and exploration stages/activities.

The IMR recognizes that small scale mining is a legitimate and valuable part of the minerals industry. It requires that small-scale mining operations be regulated by the government to ensure their safety and social/environmental protection, and to ensure that large companies do not marginalize or force them out of business.

Environmental standards should “aim towards” ever increasing international best practices. This includes complying with existing agreements/standards, which are admittedly not complete, and developing appropriate standards where gaps exist. Key IMR features include establishing baseline monitoring programs at a very early stage; preventing unacceptable riverine tailings disposal and accepting that mining is not

acceptable unless safe and environmentally sound tailings containment is available; mines must ensure that pollution of riverine, ground-water and marine environments does not occur from waste rock dumps.

Companies must ensure that they make a firm commitment to putting various areas off limits to both exploration and mining. These should include all world heritage listed areas, and most areas listed for indigenous cultural reasons. Where possible there should be buffer areas around such parks and reserves. Further, companies should operate to equitably meet the development and environmental needs of present and future generations. Companies must publicly recognize that mining in its basic form of simple extraction of a non-renewable resource cannot be considered sustainable and should not be portrayed as such. Companies should set goals for waste minimization, recycling and life cycle targets for minerals/mineral products.

The IRM establishes that companies not mine high sulphide ore-bodies unless steps are in place to prevent the effects of acid mine drainage (AMD) and that companies should not be involved in the mining, milling or processing of uranium. The IMR establishes best practices and standards for all major aspects of mining and that companies continuously improve their standards/performance.

The IRM also establishes principles of conduct regarding many aspects of human rights and recognizes that all companies should comply with international standards and agreements. This includes special conditions regarding armed conflict, labor activities, and non-discrimination.

The IRM requires independent monitoring, independent auditing, and independent verification and reporting for all standards and components.

Voluntary Principles on Security and Human Rights

The Voluntary Principles on Security and Human Rights (Voluntary Principles or Principles) seeks to assist companies in maintaining the safety and security of their operations within a framework that ensures respect for human rights. The Principles were developed in 2000 and involve the governments of the U.S., U.K., Norway and the Netherlands; extractive and energy companies; and human rights NGOs. The Principles provide guidance for companies on identifying human rights and security risk, as well as engaging and collaborating with state and private security forces. The participants recognized the importance of the promotion and protection of human rights throughout the world and the constructive role business and civil society -- including non-governmental organizations, labor/trade unions, and local communities -- can play in advancing these goals.

Through this dialogue, the participants have developed a set of voluntary principles to guide Companies in maintaining the safety and security of their operations within an operating framework that seeks to ensure respect for human rights and fundamental freedoms. Mindful of these goals, the participants agreed to the importance of maintaining a dialogue and review the Principles to ensure their continuing relevance and efficacy.

The participants acknowledged that security is a fundamental need, shared by individuals, communities, businesses, and governments alike and recognized that security and respect for human rights can and should be consistent. They understood that governments have the primary responsibility to promote and protect human rights; that all parties to a conflict are obliged to observe applicable international humanitarian law; and that the participants share the common goal of promoting respect for human rights, particularly those set forth in the Universal Declaration of Human Rights, and international humanitarian law.

Companies recognized a commitment to act in a manner consistent with the laws of the countries within which they are present, to be mindful of the highest applicable international standards, and to promote the observance of applicable international law enforcement principles, such as the UN Code of Conduct for Law Enforcement Officials and the UN Basic Principles on the Use of Force and Firearms by Law Enforcement Officials), particularly with regard to the use of force. The participants supported voluntary principles regarding security and human rights in the extractive sector, broken into three categories: risk assessment, relations with public security, and relations with private security.

Findings included that the Voluntary Principles are seen as genuinely filling a critical void for companies seeking guidance about managing potential exposure to risks related to their security and human rights practices, especially in countries that are often associated with conflict or alleged abuses. Participation by multi-stakeholders adds credibility but the lack of an audit mechanism may foster the perception among some stakeholders that the Voluntary Principles lack transparency. Most companies had general social responsibility policies in place prior to implementing the Voluntary Principles, but few had specific extant human rights policies. All thought that the Principles needed clearer language and guidance - and that training, implementation guidelines, and host government participation and engagement would be beneficial.

Some companies had taken specific steps to develop or implement programs but most have not set specific timelines for general implementations. Companies are including the Voluntary Principles in at least some of their contracts, particularly with private security providers. For many companies, assessing risks associated with security and human rights is part of a larger risk or impact assessment. Many rely on a variety of different tools and sources of information, including the expertise of local country and regional managers who engage with local stakeholders and NGOs.

The findings identified emerging best practices in implementation, such as incorporating voluntary principles in all private security agreements and risk assessments; government approval of Social Impact Assessments and continued monitoring and/or participation; establishing whistle-blower processes; including The Principles in government agreements with local police; and sharing best practices.

In-country working groups launched in Indonesia and Colombia also made findings regarding Indonesian and Columbian industry and governmental activities. The relationship between government, companies, and NGOs - and the importance of trust between them - played into many of the findings.

More information is available at: http://www.voluntaryprinciples.org.

Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

The Case of Car Exports through the Hamburg Port

Dr. Matthias Buchert,
Öko-Institut e.V, Darmstadt
m.buchert@oeko.de

Second Roundtable on the Sustainable Production and Use of Platinum Group Metals

Brussels, December 12, 2007

Öko-Institut e.V. at a glance...

Independent Non-Profit Organisation founded 1977

based in Freiburg (Germany)

1980 Darmstadt Office

1991 Berlin Office

Membership Organisation with *circa* 3.000 Members

Budget *circa* 7,5+ Mio. Euro per year

95% of budget from projects, 5% fees and donations

Research and Consulting for Governments, Business and Non-Governmental Organisations

approx. 150 projects annually.

Öko-Institut e.V.
Institut für angewandte Ökologie
Institute for Applied Ecology

Optimization of Precious Metals Recycling: Analysis of Exports of Used Vehicles and Used Electrical and Electronic Devices at Hamburg Port

Buchert, M. et al. (Öko-Institut e.V.)
Expert advice by Hagelüken, C. (Umicore Precious Metals Refining),
FZK 363 01 133, commissioned by Federal Environment Agency
February 2007

Motivation for the Case Study

- Growing export streams of used goods (used cars etc.) from Germany
- Export of used cars: mainly as products (not as waste)!!!
- The destination pattern and the details of the material flows are not well known and has to be investigated
- Goods like used cars: valuable mines above ground with a remarkable relevance for resource efficiency

Objectives

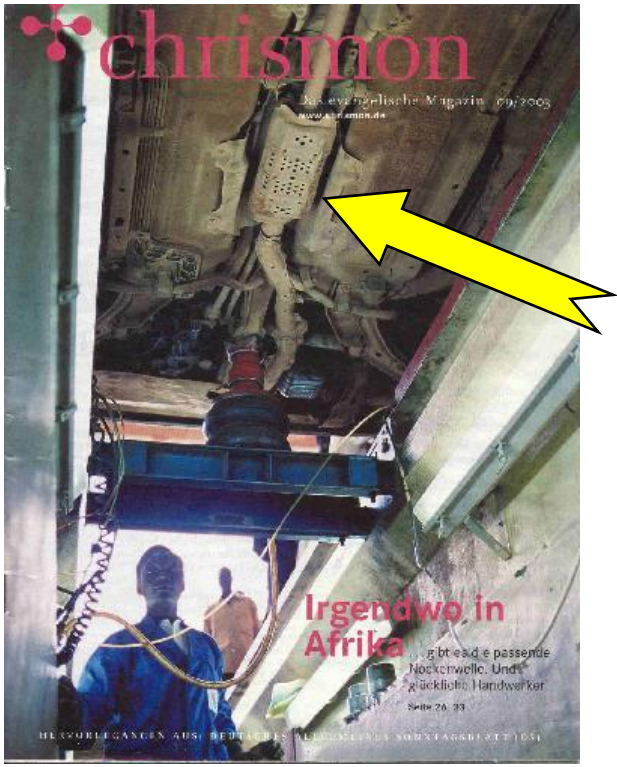
- **Investigation of the export streams from Germany on the seaway of used cars and used EEE-goods as relevant goods with PGM content**
- **Better understanding of the key players (e.g. shipping companies) and the specific market mechanisms**
- **Information about the destination pattern and the details of the material flows**
- **Dissemination of the perspective for market actors like shipping companies to participate in enhanced international recycling co-operation in the future**

Platinum Group Metals (PGM)
- Relevance of Automotive Catalytic Converters

- PGM are essential for automotive catalytic converters
- Global increasing gross demand
- Auto catalysts are the most important application (49% of the global PGM demand in 2004)
- Less than 40% rate for recycling in Germany only (despite high prices); caused by high export flows of used cars
- Secondary PGM offers clear ecological benefits (10 – 100 times lower emissions etc.) compared to primary production (mining)

Problems of PGM Recycling Flows of Consumer Goods

- A fundamental lack of waste management infrastructures and know how in many destination regions
- Insufficient car maintenance, bad road conditions
- High probability for destruction of catalyst
  → emission of ceramic/PGM
  (misfire, bumps on converter ...)
- Inadequate handling of catalysts,
  no emission legislation /-control in place
- Difficult logistical frame conditions



Result: Unacceptable PGM losses

Methodology of the Investigation

- Data from statistics (Foreign Trade Statistics of the Federal Office for Statistics, Germany etc.)
- Secondary literature
- Interviews with identified important actors (Nov. 2006)

Interview Partners (I)

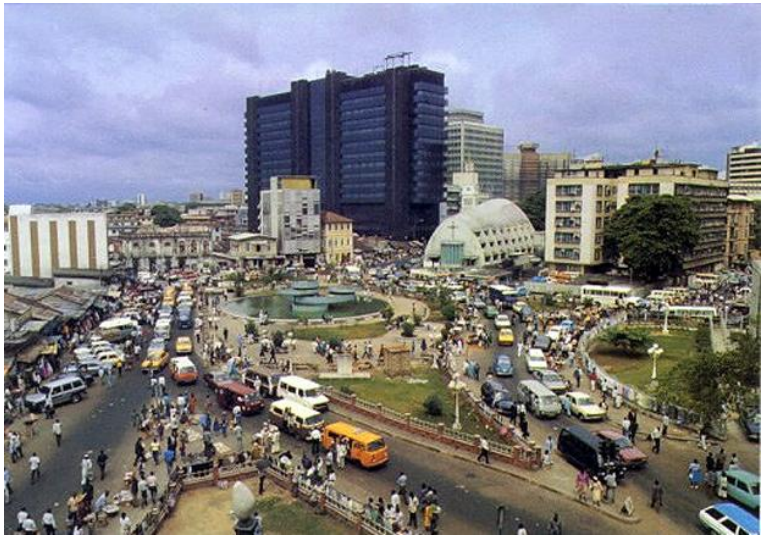
- Federal Office for Statistics, Germany
- Mrs Osyguß: „The international value-added chain of the export of used goods from Germany to West Africa – the used vehicles example", master thesis, Institute for Geography, Hamburg University 2006
- Hellmann Process Management (Osnabrück)
- GRIMALDI Germany GmbH (Hamburg)
- Authority for Urban Development and Environment (Hamburg)

Interview Partners (II)

- Customs Authority (Hamburg)
- Mundial Roro Shipping Services GmbH, (Hamburg)
- Harbour Police Hamburg, (Department for Environment Offences)
- UNIKAI mbH (Hamburg)

Main Destinations for used Cars through the Hamburg Port

- **Most relevant destination:** **West Africa**
- **Next relevant destination:** **Middle East**
- **No significance:** **Latin America**

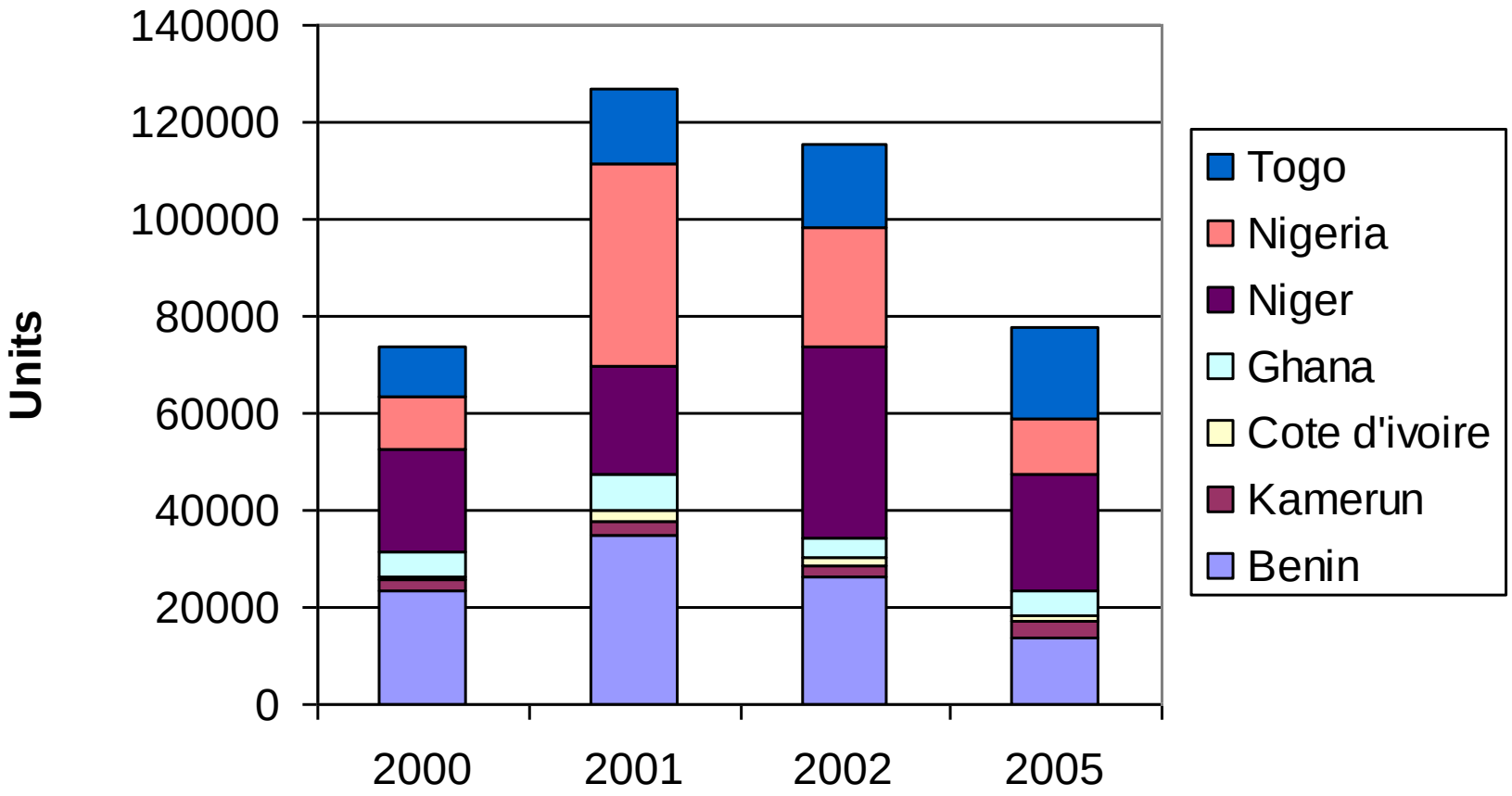


Destination West Africa

Used Cars in the Foreign Trade Statistics

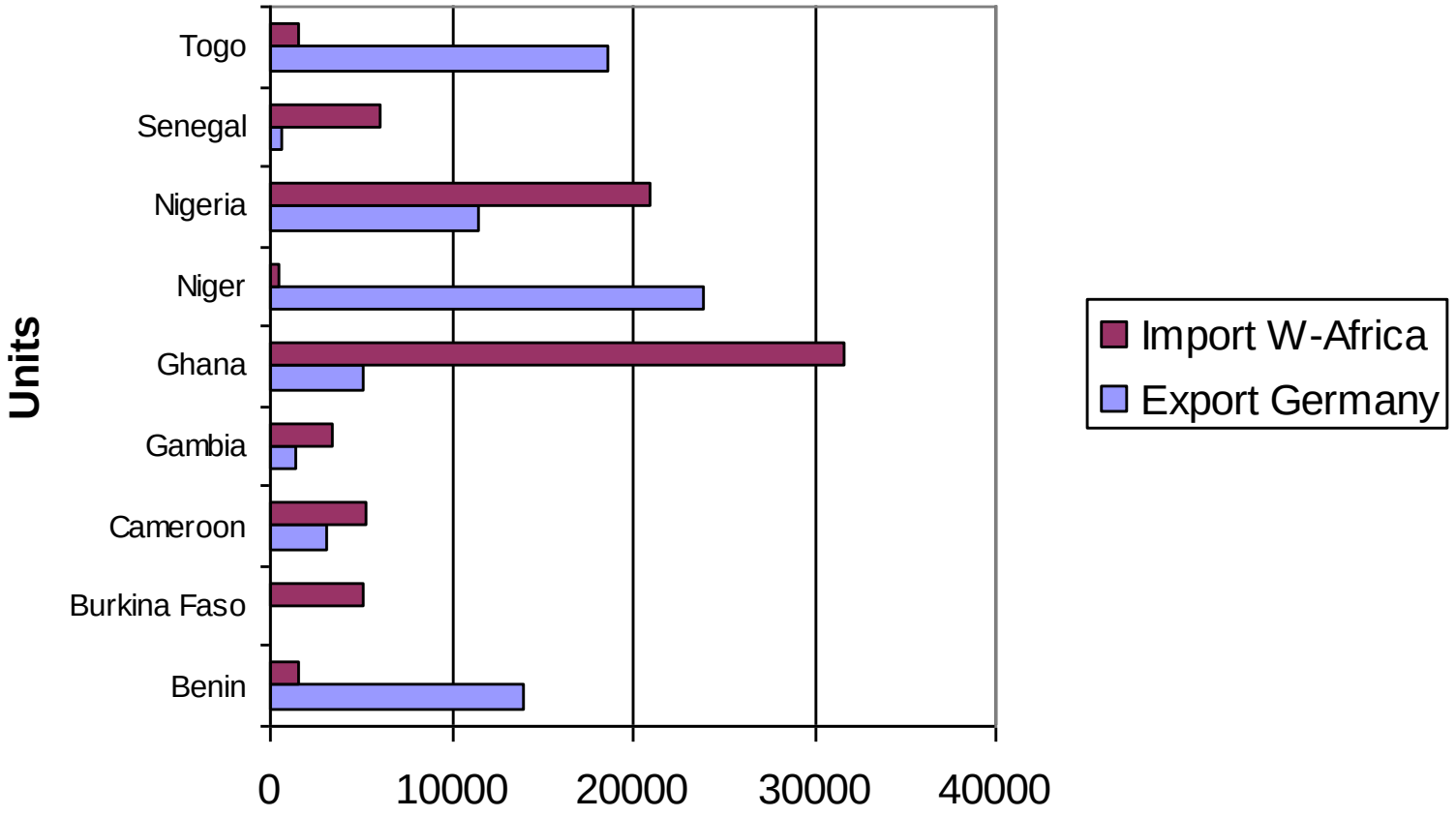
- **Used cars from Germany: data available for seven categories (4 spark ignition engine cat., 3 Diesel cat.)**
- **Extra EU export (Nigeria for instance):**
  Data listed (used cars) for every single export activity with at least 1000€ or 1000kg: data for most used cars are listed
- **Intra EU export (e.g. from Germany to Belgium): most exported used cars are not listed (no private export; commercial exports, if the company has exported a value of more than 300,000 Euro in the previous year**

Export of used Cars from Germany to West Africa



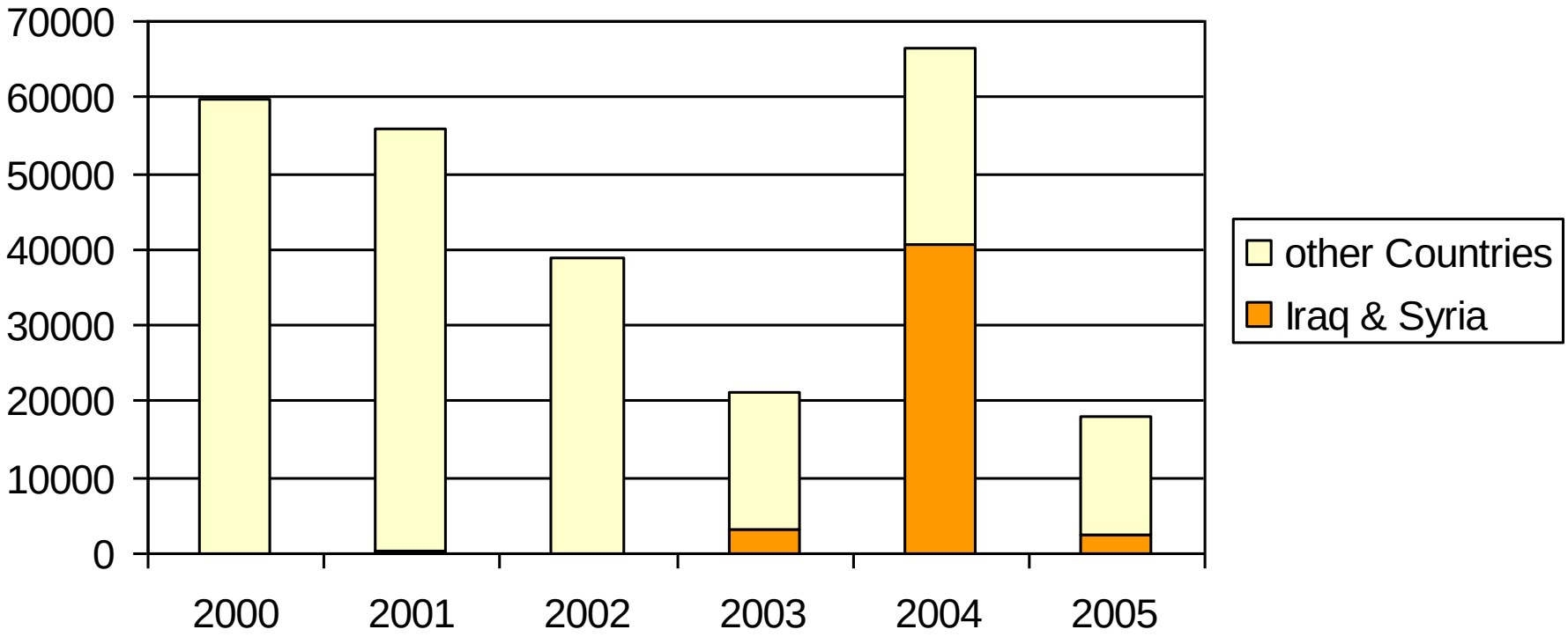
Data: Federal Office for Statistics, Germany; since 2001: import restricted in Nigeria

Export of used Cars from Germany (82000) to and Import from Germany to West Africa (78000)

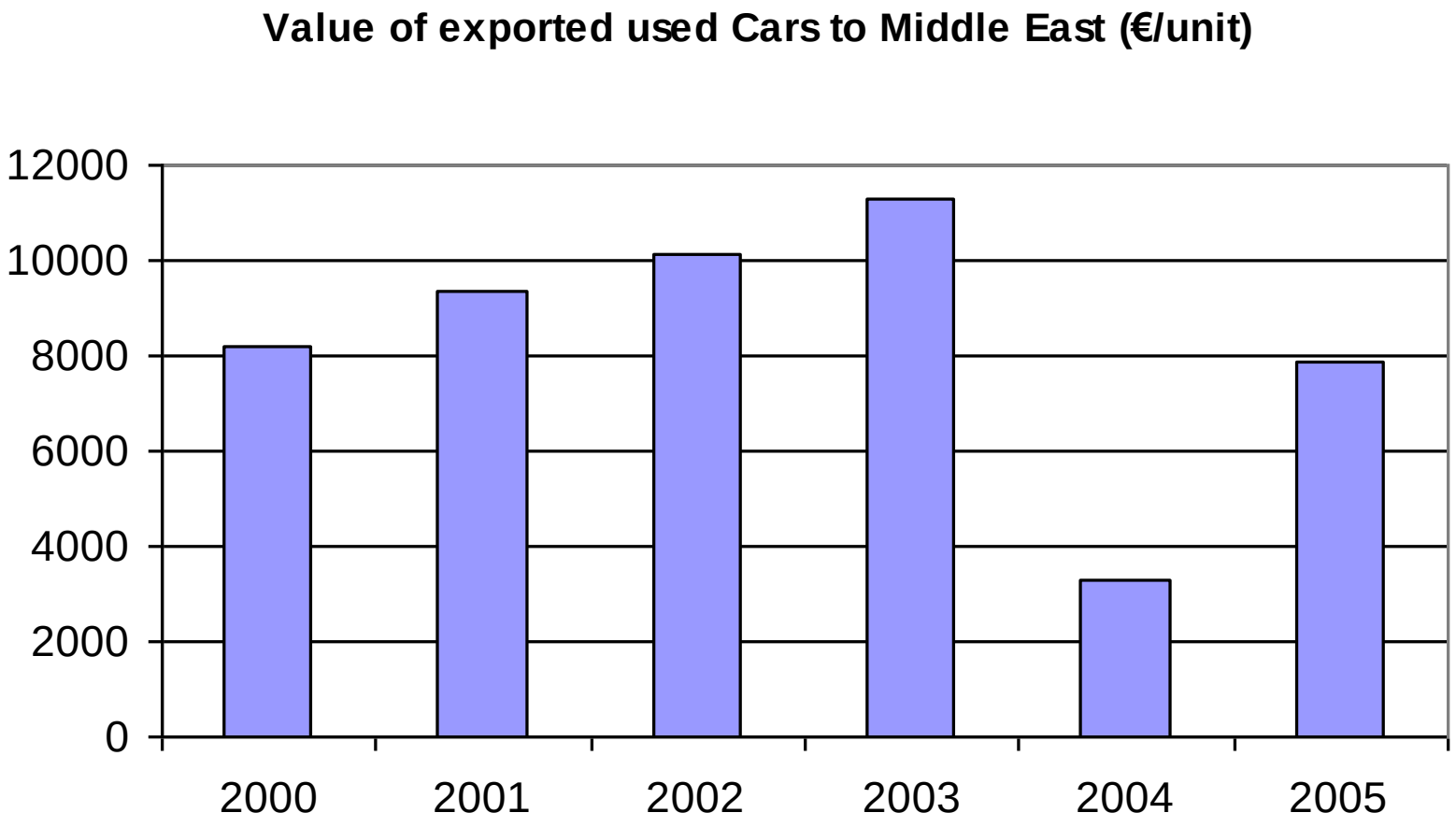


Data: Federal Office for Statistics, Germany and UN-comtrade

Export of used Cars to Middle East



Data: Federal Office for Statistics, Germany



Data: Federal Office for Statistics, Germany

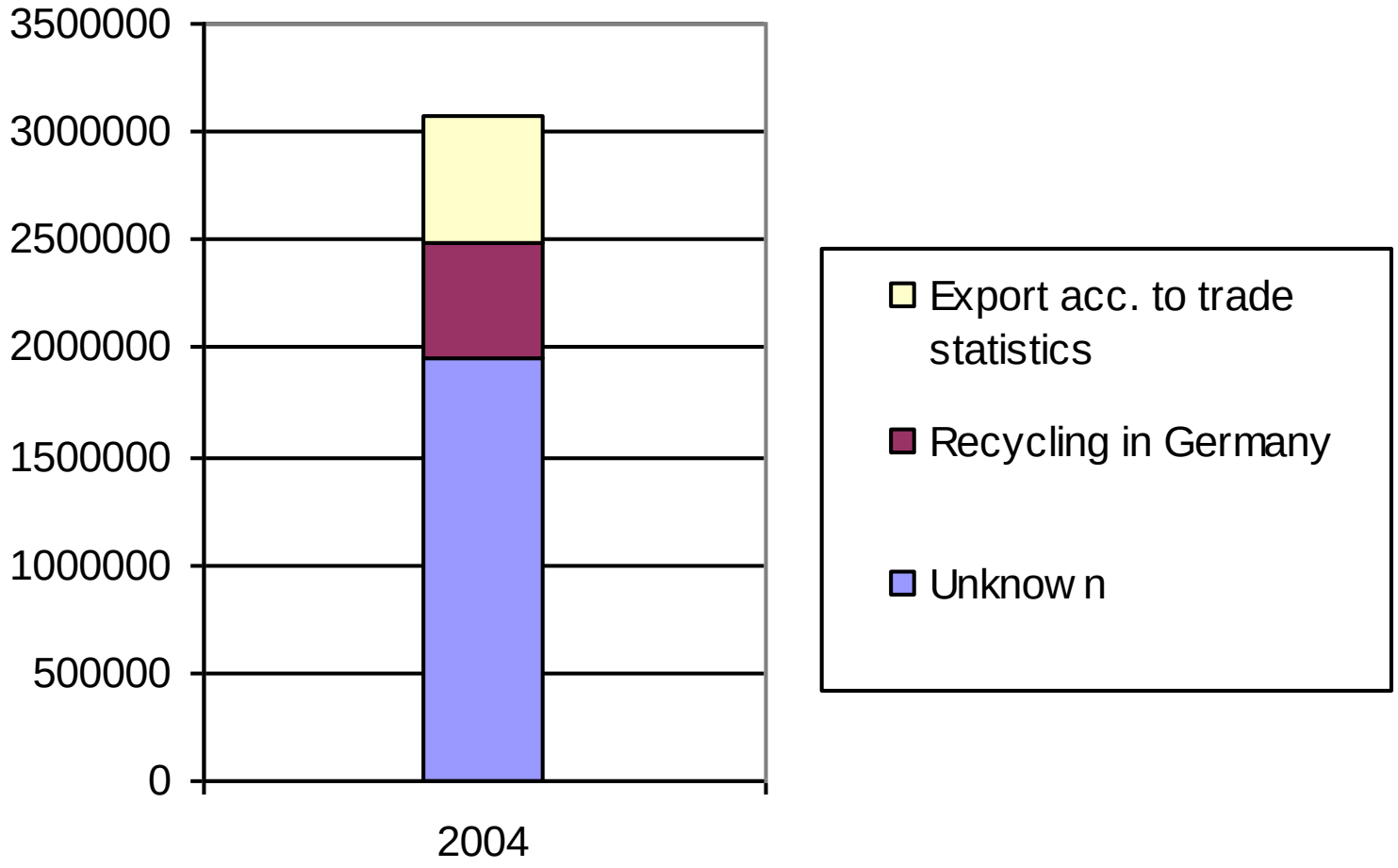
Export of used Cars - Interview Results (I)

- Hamburg = most important seaport in Germany; relevance of Antwerp (Belgium) concerning export of used cars from Germany in the same magnitude (may be even more than from Hamburg)
- Used cars transferred over Hamburg seaport are coming from all over Germany and DK, S, SF, A, I
- Hamburg: 100,000 – 110,0000 cars per year to West Africa
- Hamburg: additional 20,000 cars per year to Middle East (2004 about 80,000 units)
- Hamburg seaport: most important players concerning West Africa: GRIMALDI Line and Abou Mehri; concerning Middle East: Van Uden Line, POL-Levant Line, Mundial RoRo

Export of used Cars - Interview Results (II)

- Bremerhaven seaport: ca. 10,000 additional units per year
- Neustadt/Holstein: German seaport (Baltic sea): destinations Russia and Baltic states: data not yet investigated
- Nigeria = most important final destination in West Africa
- Value per unit of exported used cars to West Africa: 800 – 2,000 Euro
- Shipping companies could be interesting partners for international recycling co-operation in the future (currently ca. 50% free loading capacity on the way back from West Africa!)
- Partners in the destinations are necessary for recycling co-operation

Fate of deregistered vehicles from Germany



Valuable Materials in used Cars – Yearly Potential of 2.5 Million Units

- **Steel:** about 1.3 Million tons
- **Aluminium:** about 180 kilotons
- **Copper, Lead etc.** about 110 kilotons
- **PGM:** about 6.25 tons

Conclusion concerning Export of used Cars

- **Direct export of used cars to non-EU countries are almost listed completely in the Foreign Trade Statistics**
- **Indirect export of used cars to non-EU countries over third states (EU member states like Belgium) are not listed in the most cases**
- **Total export of used cars from Germany (ca. 80% of deregistered vehicles) = about 6.25 tons PGM: means about 30% compared to the total net demand for PGM in Germany per year!**

Recommendations

- **Clarity concerning the rate of net exported used cars out of the EU-25 (now EU-27): How many used cars are exported to destinations outside the EU?**
- **Intensify of the connections with actors at Hamburg seaport (and at further seaports); objective: advanced international recycling streams**
- **Improvement of the data situation concerning used electrical and electronic goods at Hamburg seaport (and at other seaports)**
- **Clear and easy-to handle criteria to distinguish used goods and waste: see "Correspondents Guidelines No 1 – Subject: Shipments of Waste Electrical and Electronic Equipment" – similar guidelines to distinguish ELV and used cars in the future?**

Let us work for future co-operation in an internationally operating and optimized closed-cycle materials economy!

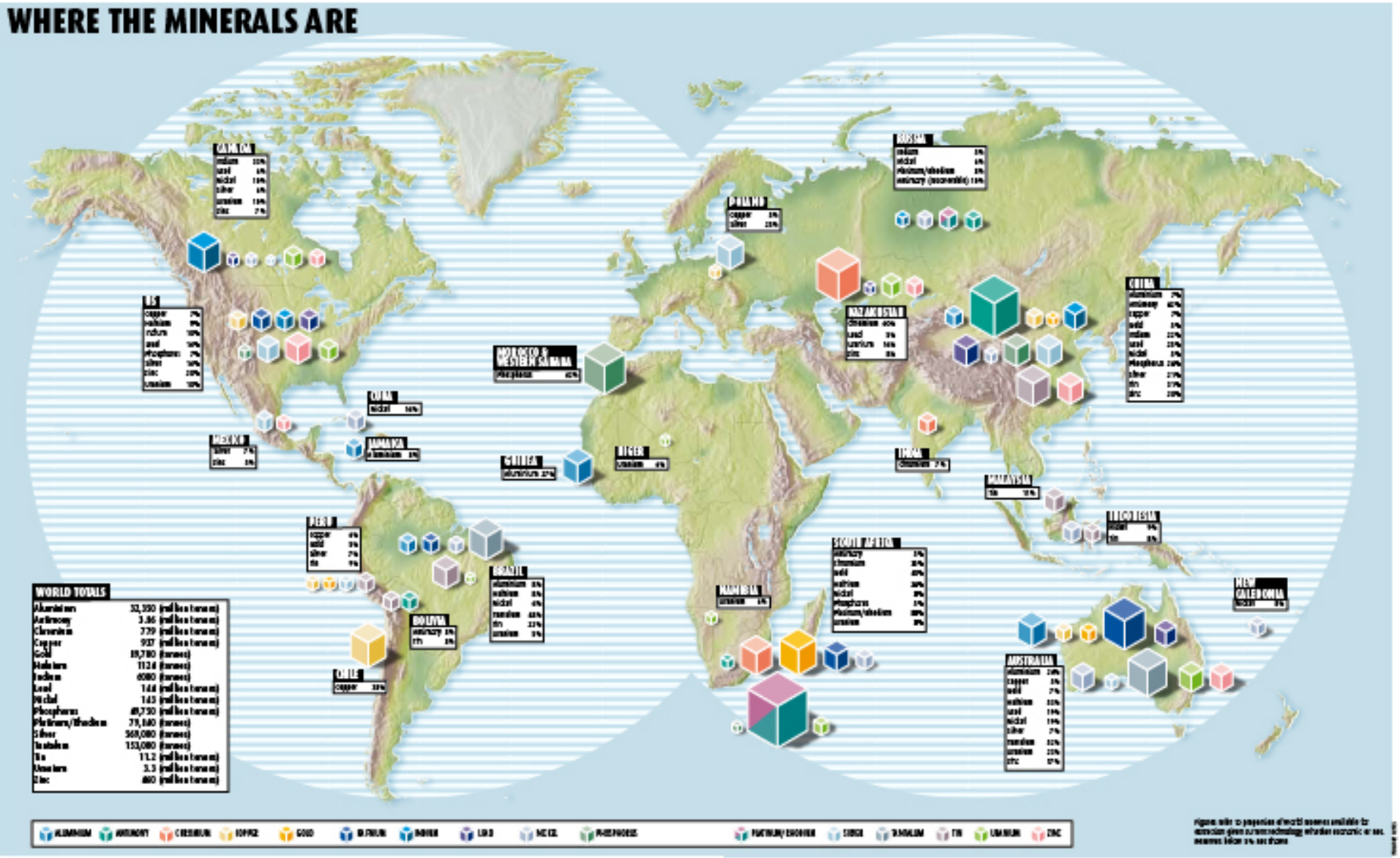
He could be a partner in a material recycling value chain!

Thank you for your attention!

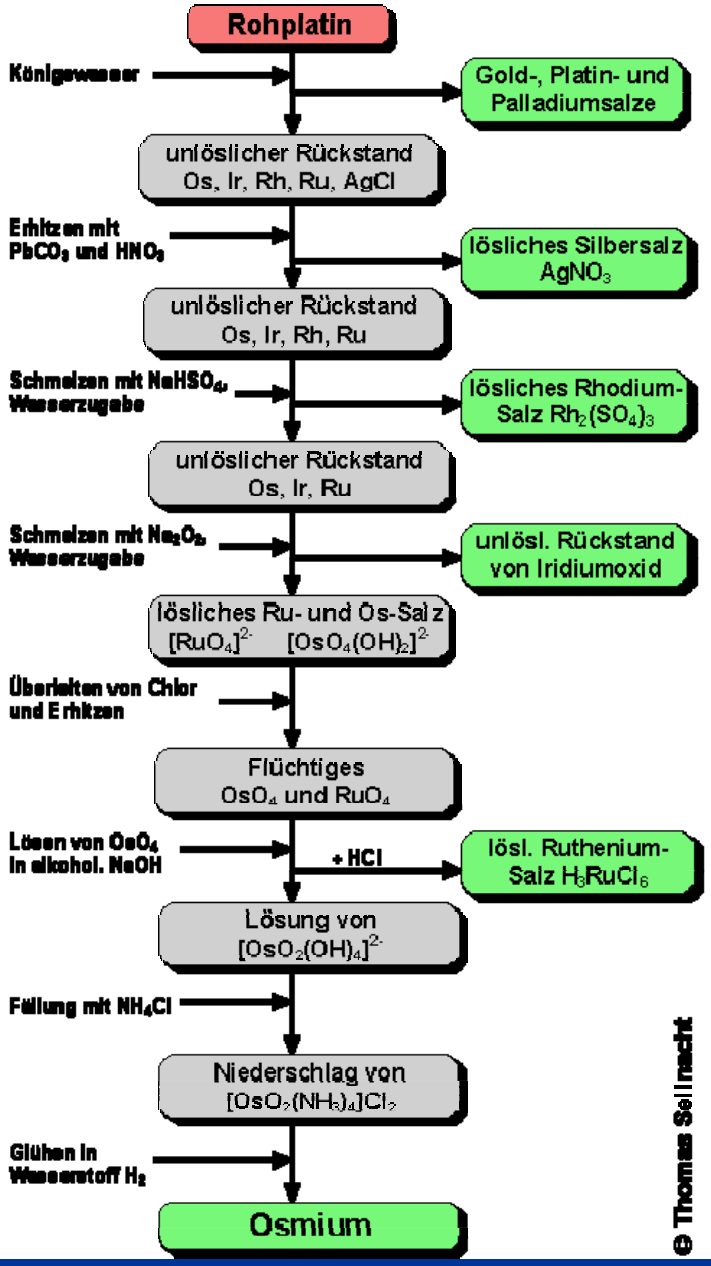
Strategies for a Sustainable Utilisation of PGMs

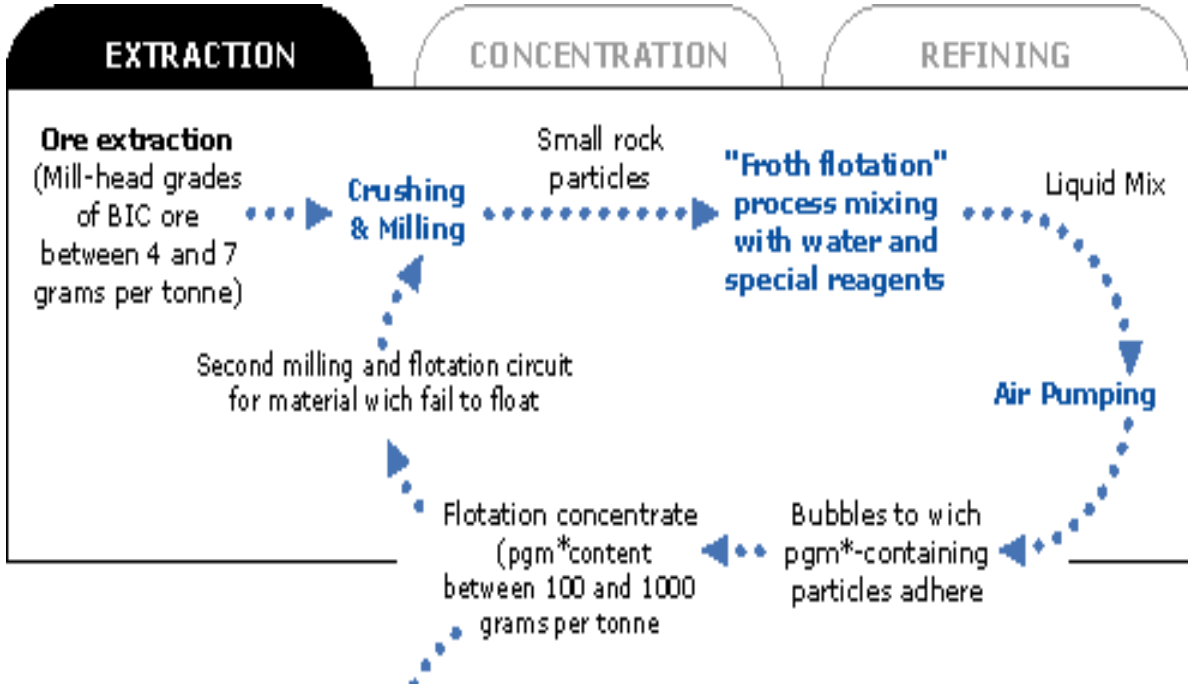
Earth Audit

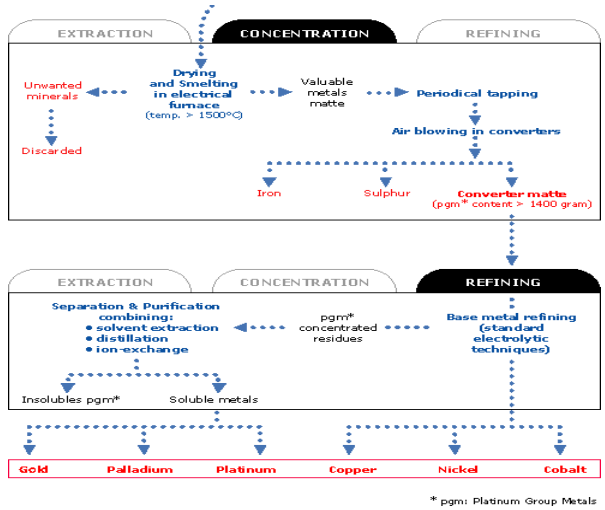
We are using up minerals at an alarming rate. How long before they run out, asks David Cohen


WHERE THE MINERALS ARE
WORLD TOTALS
Aluminium 32,200 (million tonnes)
Antimony 3.86 (million tonnes)
Chromium 739 (million tonnes)
Copper 937 (million tonnes)
Gold 19,700 (tonnes)
Niobium 1124 (tonnes)
Indium 6080 (tonnes)
Lead 148 (million tonnes)
Nickel 145 (million tonnes)
Phosphorus 49,750 (million tonnes)
Platinum/Rhodium 79,580 (tonnes)
Silver 568,000 (tonnes)
Tantalum 153,000 (tonnes)
Tin 11.2 (million tonnes)
Uranium 3.3 (million tonnes)
Zinc 460 (million tonnes)
CANADA
USA
RUSSIA
KAZAKHSTAN
CHINA
INDIA
MALAYSIA
INDONESIA
AUSTRALIA
NEW CALEDONIA
MOROCCO & WESTERN SAHARA
NIGER
NAMIBIA
SOUTH AFRICA
BRAZIL
PERU
BOLIVIA
CHILE
MEXICO
CUBA
JAMAICA
ALUMINIUM
ANTIMONY
CHROMIUM
COPPER
GOLD
NIOBIUM
INDIUM
LEAD
NICKEL
PHOSPHORUS
PLATINUM/RHODIUM
SILVER
TANTALUM
TIN
URANIUM
ZINC

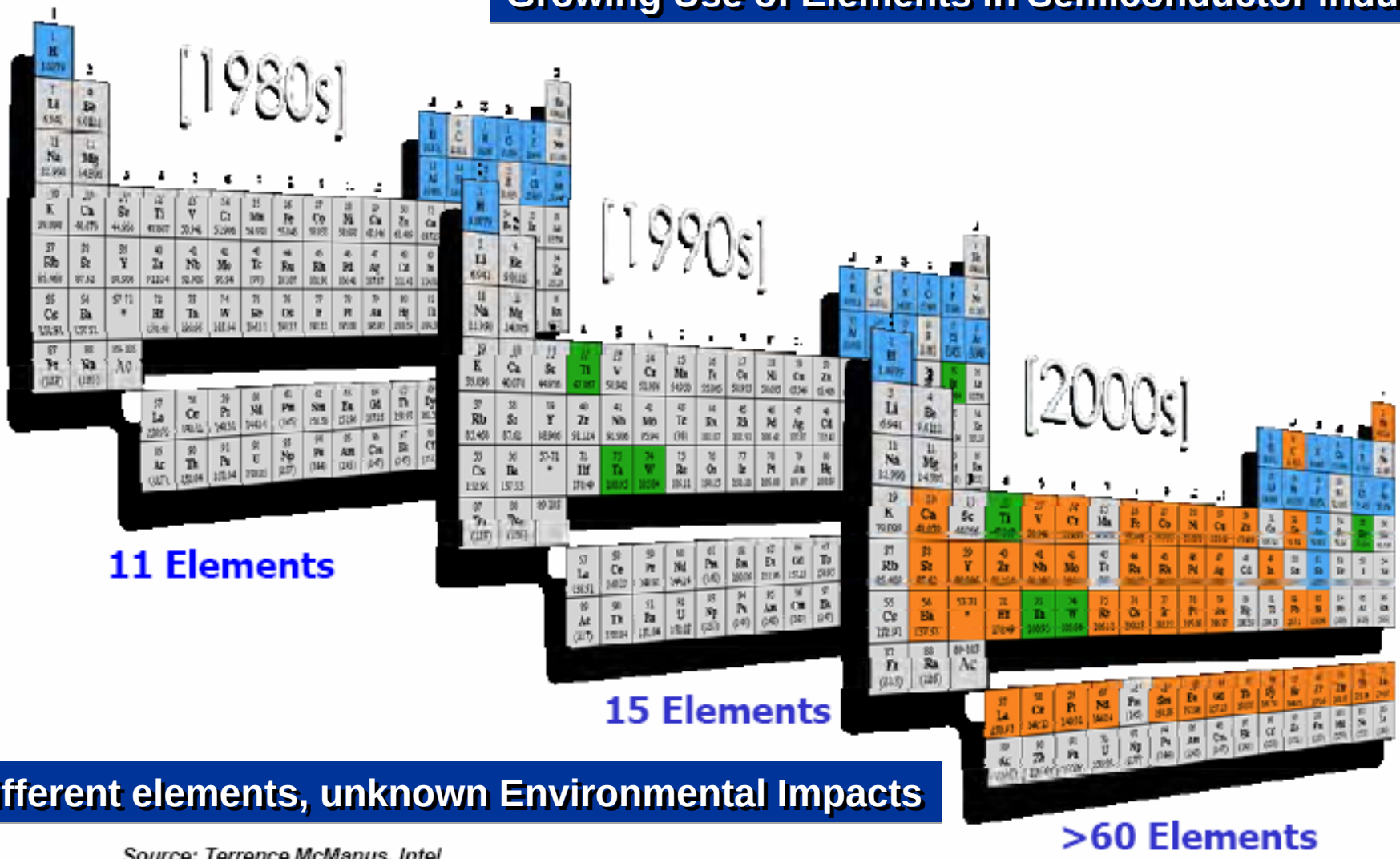
Strategies for a Sustainable Utilisation of PGM







Growing Use of Elements in Semiconductor Industry

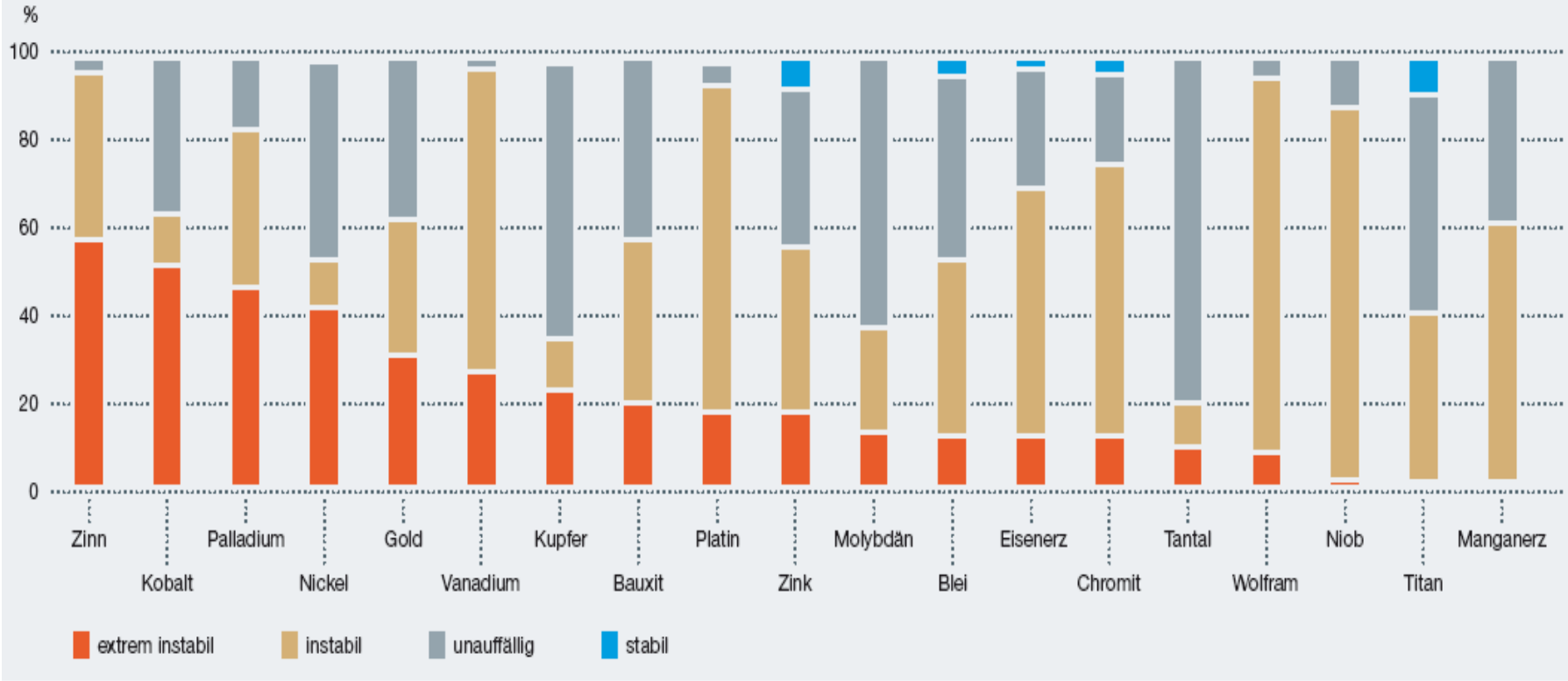


Different elements, unknown Environmental Impacts

Source: Terrence McManus, Intel

Anteil der Förderung metallischer Rohstoffe nach politischer Stabilität der Herkunftsländer im Jahr 2005

basierend auf den *Worldwide Governance Indicators* der Weltbank



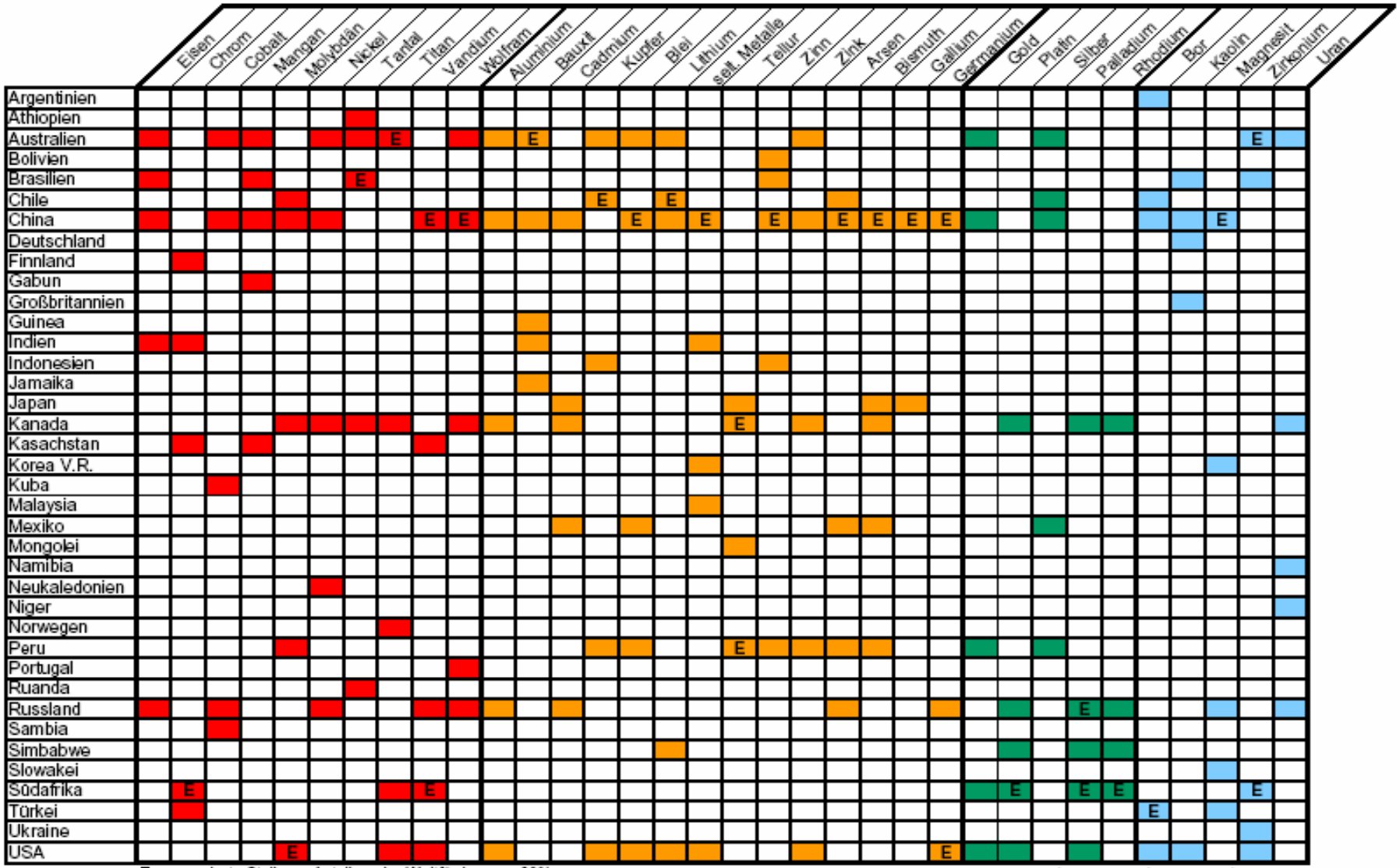
Bundesanstalt für Geowissenschaften und Rohstoffe (BGR); World Bank: Worldwide Governance Indicators 2006

BDI

Staat	Recht auf freie Meinungsäußerung	Politische Stabilität (+Gewaltfreiheit)	Effektivität der Regierung	Regulierungsbestimmungen	Rechtssicherheit	Korruptionskontrolle	Quotient	Gruppe
Australien	93,8	76,9	95,7	96,1	94,8	95,1	92,07	1
Finnland	98,1	99	97,6	97,1	98,1	100	98,32	1
Kanada	94,2	80,3	97,2	94,1	96,2	94,2	92,70	1
Norwegen	98,6	91,8	98,1	90,7	99	96,6	95,80	1
USA	83,7	57,7	92,9	93,7	91,9	89,3	84,87	2
Malaysia	38	58,7	80,6	69,8	65,7	68	63,47	3
Namibia	60,6	75,5	59,2	57,1	56,7	61,2	61,72	3
Slowakei	78,4	76,4	78,2	83,4	61,4	65,5	73,88	3
Südafrika	67,3	44,2	76,8	70,2	58,6	70,9	64,67	3
Türkei	43,3	25,5	64	57,6	55,7	58,7	50,80	3
Argentinien	56,7	44,7	49,3	22,9	35,7	40,8	41,68	4
Bolivien	45,2	17,8	28,4	16,6	20,5	31,1	26,60	4
Brasilien	58,7	43,3	52,1	54,1	41,4	47,1	49,45	4
China	4,8	33,2	55,5	46,3	45,2	37,9	37,15	4
Gabun	22,1	48,6	30,8	33,2	34,8	20,9	31,73	4
Indien	58,2	22,1	54	48,3	57,1	52,9	48,77	4
Indonesien	41,3	14,9	40,8	43,4	23,3	23,3	31,17	4
Jamaika	63,9	36,1	59,7	58,5	33,3	44,2	49,28	4
Kasachstan	19,7	46,2	33,6	36,1	23,8	18,4	29,63	4
Mexiko	52,4	32,7	60,7	63,4	40,5	46,6	49,38	4
Mongolei	53,4	72,1	36,5	42	46,7	37,4	48,02	4
Neukaledoni	k.A.	38,9	41,2	54,6	31,4	4,4	28,42	4
Niger	42,3	34,1	25,1	29,3	21,9	16,5	28,20	4
Peru	51	18,8	36	55,6	26,2	45,1	38,78	4
Ruanda	14,4	27,4	26,3	25,4	34,3	55,8	30,60	4
Russland	24	23,6	37,9	33,7	19	24,3	27,08	4
Sambia	37	56,7	25,6	29,8	31,9	22,8	33,97	4
Ukraine	45,7	37	33,2	32,7	27,1	27,7	33,90	4
Äthiopien	16,8	5,3	31,3	21	30	36,9	23,55	5
Guinea	13,5	6,7	4,3	16,1	5,2	17	10,47	5
Kuba	7,2	49,5	17,5	2,9	19,5	51	24,60	5
Korea V.R.	0,5	38	0,5	0,5	7,6	0,5	7,93	6
Simbabwe	6,7	13,9	3,3	1,5	1,4	3,9	5,12	6

Zuordnung:	1	90 - 100%	3	50 - 75%	5	10 - 25%
	2	75 - 90%	4	25 - 50%	6	0 - 10%

Quelle: Philipp Wagner

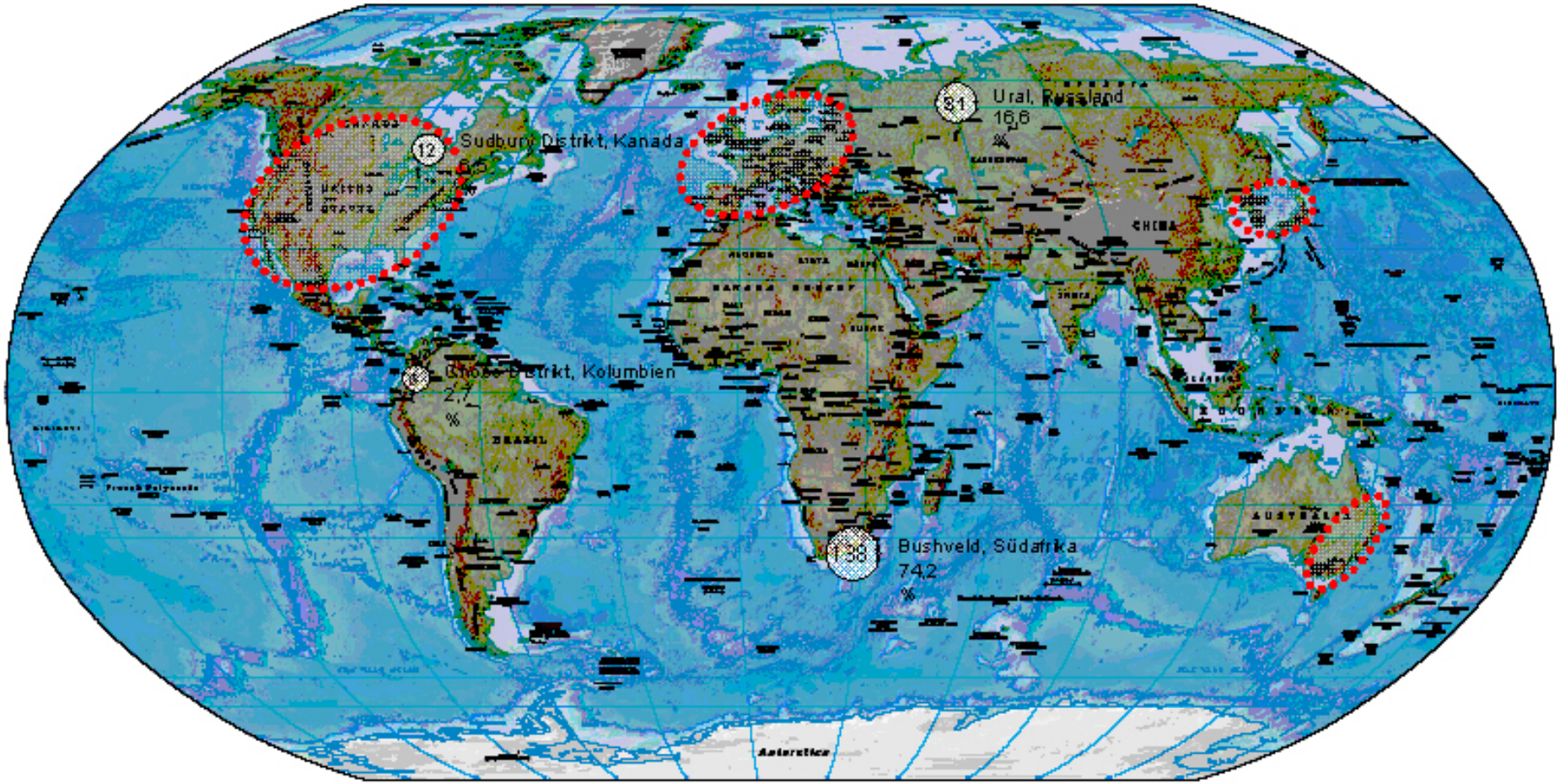


E = exponierte Stellung, Anteil an der Weltförderung >30%

Förderanteile nach Welt-Bergbau-Daten 2007

Problems and Challenges

- Improving eco-efficiency of extraction and production
- Implementing socio-economic standards
- Definition of essential applications, i.e. clarification of competing utilisations
- Minimising dissipation
- Optimising logistics for recycling
- Identifying potential new applications in emerging technologies
- Transparent life cycle (traceability!)



AUSTRALIA Land
Bermuda Autonome Region
Sicily / AZORES Insel / Inselgruppe
★ Hauptstadt des jeweiligen Landes

Hauptverwendungsgebiete von Platin

31 *Name und Region des Abbaustandortes*
Prozentualer Anteil auf dem Weltmarkt
Fördermenge im Jahr

Maßstab: 1 : 35.000.000

Grundkarte: http://www.weltkarte.com/
Entwurf und Kartographie:
A. Reller, S. Meißner

European Commission

Enterprise Directorate-General

EU Raw Materials Initiative

2nd Roundtable on Sustainable Production and Use of Platinum Group Metals, Brussels, 12 December 2007

Hans Pietersen

hans-sierd.pietersen@ec.europa.eu

http://ec.europa.eu/enterprise/steel/index_en.htm

EUROPEAN COMMISSION
DG Enterprise and Industry
Unit G3 Steel, metals, minerals and mineral products

Structure of presentation

1) Introduction NEEI Sector
2) Political background raw materials initiative
3) Objectives initiative
4) Way forward

EUROPEAN COMMISSION
DG Enterprise and Industry
Unit G3 Steel, metals, minerals and mineral products

Non-Energy Extractive Industry in the EU

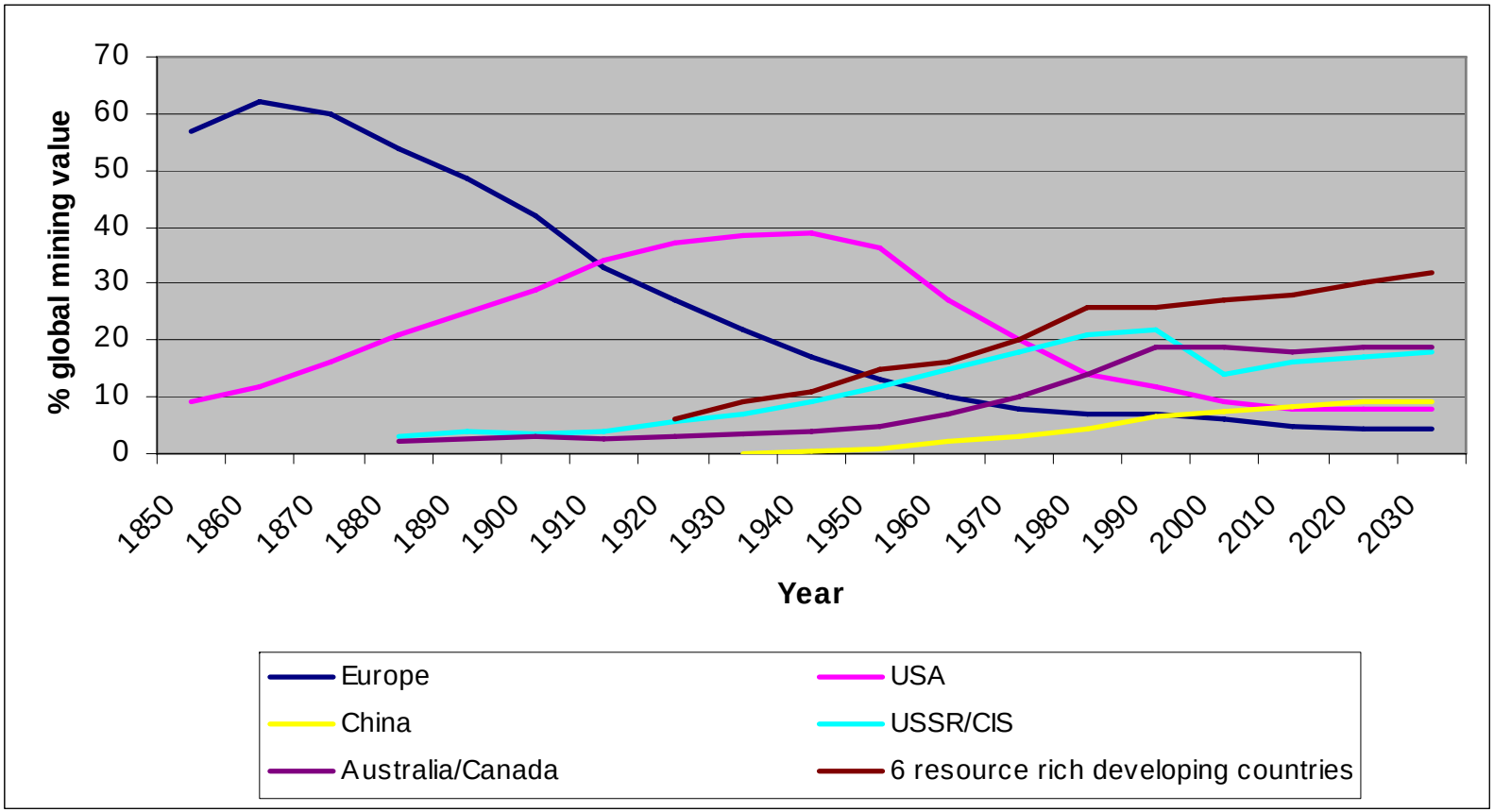
- Turnover: ± 40 billion €
- Employment: ± 250,000
- Contribution to major downstream sectors
  - ..it's everywhere..!
  - > 30% EU GDP
- 3 sub-sectors
  - Construction minerals
  - Industrial minerals
  - Metallic ores

Analysis of the competitiveness of the non-energy extractive industry in the EU; SEC(2007) 227 04-06-2007

EUROPEAN COMMISSION
DG Enterprise and Industry
Unit G3 Steel, metals, minerals and mineral products

2nd Platinum Group Round table, Brussels, Belgium; December2007

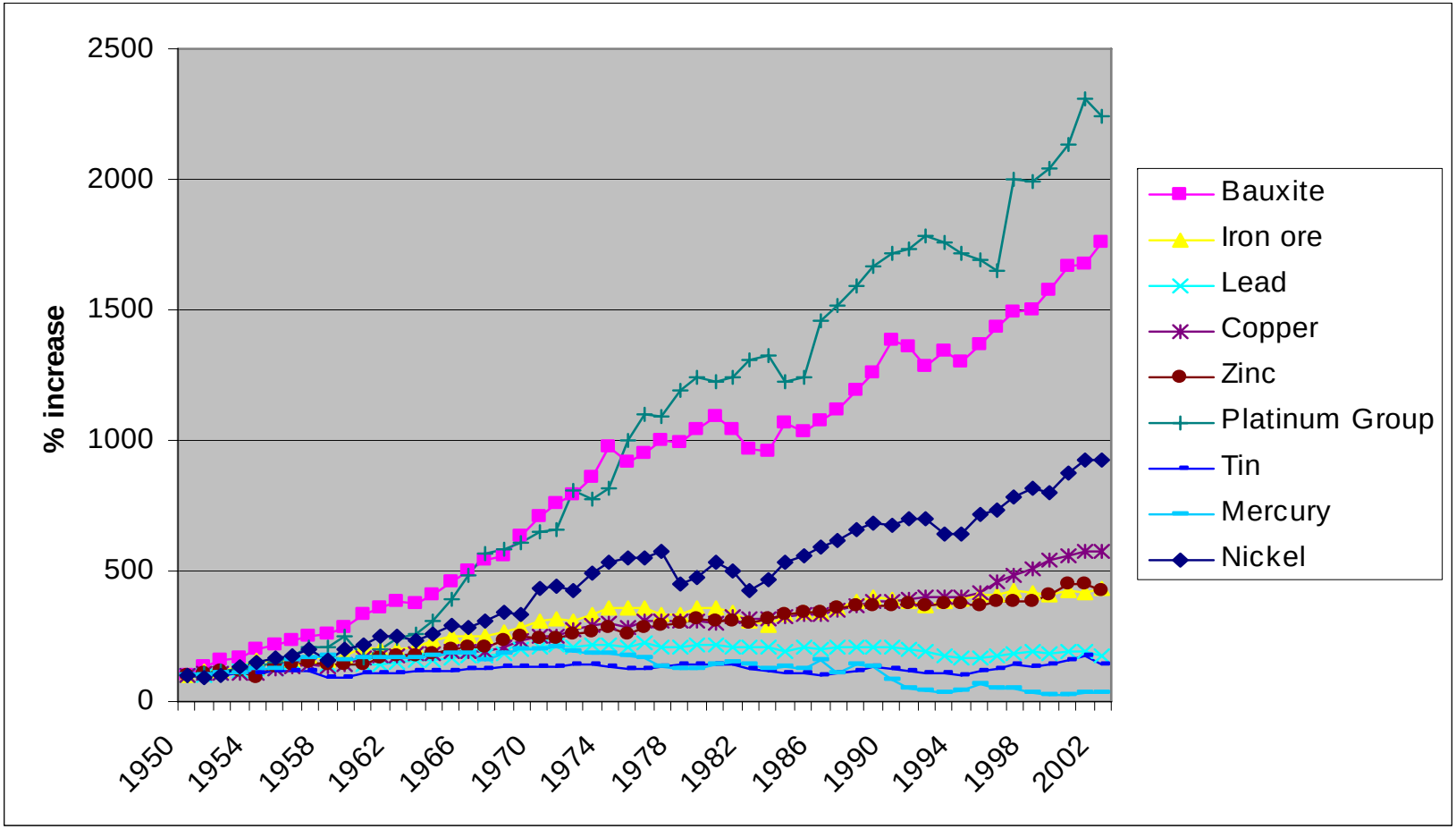
Trends in global mining



EUROPEAN COMMISSION
DG Enterprise and Industry
Unit G3 Steel, metals, minerals and mineral products

2nd Platinum Group Round table, Brussels, Belgium; December2007

Relative change global production of metallic minerals 1950 -2002 (1950=100)



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Ranking three main producing regions for selected metallic minerals (2004)

	First		Second		Third	
Bauxite	Australia	40%	Guinea	12%	Jamaica	10%
Cadmium	Japan	22%	China	20%	Mexico	12%
Chromium	South Africa	53%	Kazakhstan	18%	India	8%
Copper	Chile	37%	USA	8%	Peru	7%
Iron ore	Brazil	23%	Australia	20%	China	14%
Lead	China	30%	Australia	21%	USA	14%
Manganese	China	24%	Gabon	17%	South Africa	13%
Mercury	**EU**	43%	Kyrgyzstan	26%	China	23%
Nickel	Russia	24%	Australia	14%	Canada	14%
Silver	Mexico	16%	Peru	15%	Australia	12%
Tungsten	China	87%	Russia	6%	**EU**	4%
Zinc	China	26%	Peru	14%	Australia	14%

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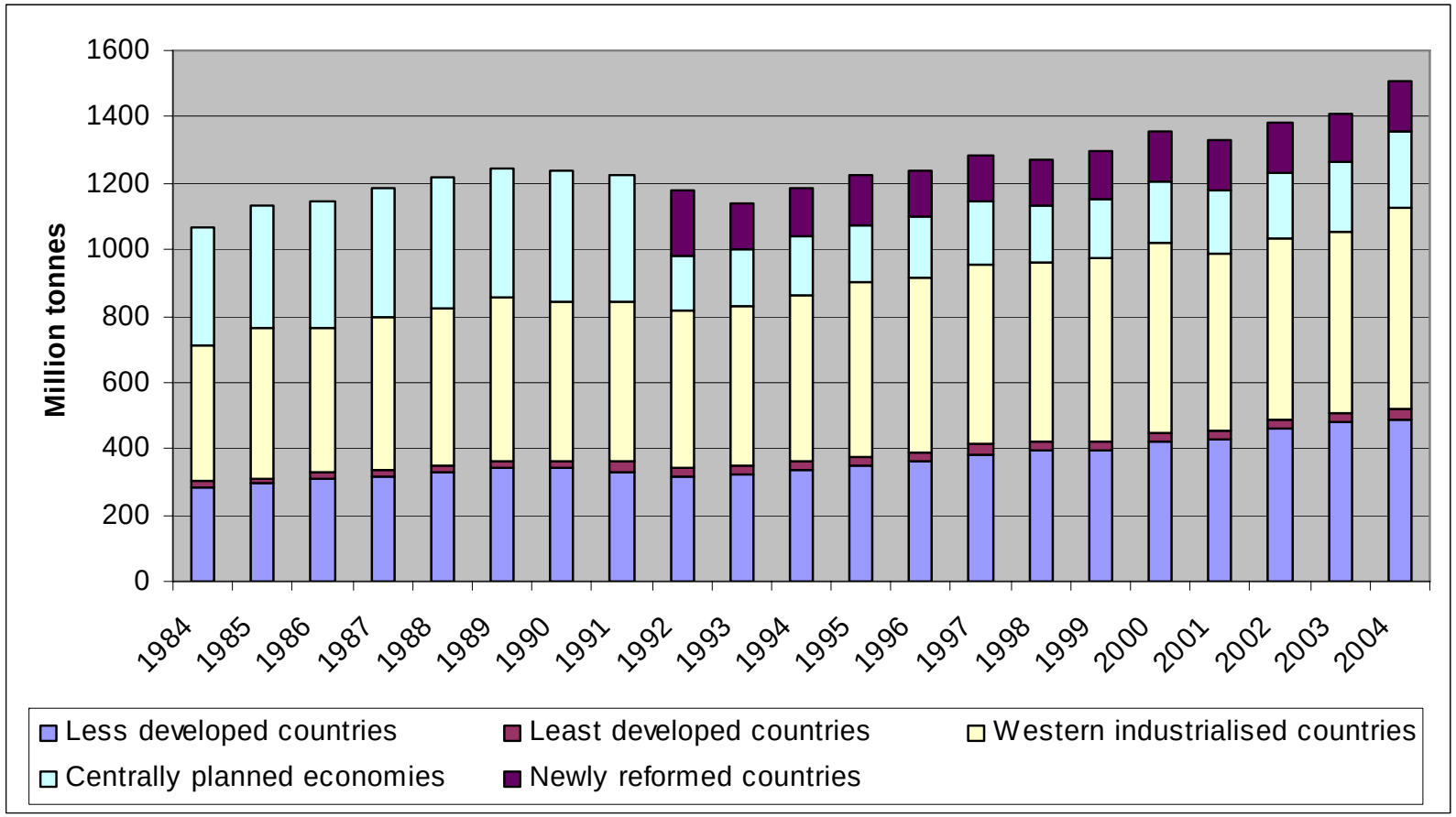
World mine production –

based on developing status of producer country



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Recent phenomena

- Unprecedented price increases metal raw materials
  - Non-energy raw materials WTO index 2.65 (2000-2006)
  - Energy WTO index 2.23
- Notable influence of sovereign funds in mining
- Access to land within EU becoming increasingly difficult
- …..
- …..

- Industry rings the bell!

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Political background
Raw Materials Initiative

Competitiveness Council, 21 May 2007

- *"to develop a coherent political approach with regard to raw materials supplies for industry, including all relevant areas of policy (foreign affairs, trade, environmental, development and research and innovation policy) and*

- *to identify appropriate measures for cost-effective, reliable and environmentally friendly access to and exploitation of natural resources, secondary raw materials and recycling waste, especially concerning third-country markets"*

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Political background

G8 Summit, Heiligendamm, 8 June 2007

- *"Raw materials are a key factor for sustainable growth in industrialised, emerging and developing countries."*
- *"Free, transparent and open markets are fundamental to global growth, stability and sustainable development."*
- *"Increased transparency in the extractive sector is of crucial importance for achieving accountability, good governance and sustainable economic growth worldwide."*

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Political background

4th HLG Report , 11 June 2007

- *"EU and Member States to support the development of a raw materials policy, built on a well operating free and fair global market for raw materials…*
- *using trade policy in particular international multilateral and bilateral agreements to ensure that EU and third countries support open and undistorted markets…"*

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DG-Entr. initiatives

- Press conference Vice-President Verheugen, 5 June: announcement of a Commission raw materials initiative
- Future adoption of a Communication on the competitiveness of the metals industries

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Raw Materials Initiative
General objectives

- To examine the factors that affect the long term sustainable supply of non-energy raw materials to the EU economy
- To ensure a coherent political approach to the questions arising → Communication & actions

1. Increase the sustainable supply of materials from European sources

2. Ensure a sustainable and more transparent supply from 3rd countries

3. Encourage capacity building in developing countries

4. Encourage greater efficiency in the use of resources

5. Establish an adequate knowledge base on raw materials

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Specific objectives - integrated approach

Increase supply from European resources I. Primary II. Secondary III. Wastes	Ensure more sustainable supply from other parts of the world	Make the use of resources more efficient	Capacity building in EU and third countries
Possible actions?: •From waste to resource •Focussed domestic exploration initiatives •Simplify, streamline permitting process • Improve Health & Safety performance through innovation •Stimulate continued availability of a skilled workforce •CSR	Possible actions?: •Use international and bilateral trade agree-ments to ensure global level playing field •Support good governance and anti-corruption initia-tives (e.g. Extractive Industry Transparency Initiative, EITI)	Possible actions?: •Stimulate RTD and innovation •Encourage reuse and recycling •Design For Recycling •Monitor EL product Flows •Improve logistics waste/resource collection	Possible actions?: •Support sustainable policy and institutio-nal reforms in 3rd countries •Align aid with mining investments

Strengthen the "EU Minerals Intelligence"	Monitor and forecast strategic policy and market developments

Raw Materials Initiative Process

- RMSG consultation (begin – end)
- Meetings with International Organisations (Worldbank, etc.)
- Specific requests for information (non-paper fiches)

- Interservice Consultation Group (DEV, EMPL, ENTR, ENV, RELEX, TRADE)

- Various internal discussions (better regulation, biodiversity, Corporate Social Responsibility, Earth observation programme GMES, etc.)

- Public Consultation (Your Voice; early 2008; 8 weeks)

- TAIEX workshops (Knowledge Base, Capacity Building)

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Raw Materials Supply Group

- Raw Materials Supply Group is a stakeholder group comprising industry, environmental NGOs, trade unions, Member States, candidate countries and the Commission
  - Established in the Eighties to discuss the issue of the supply of raw materials
  - In 1993, the Council, invited the Commission to continue its work to reinforce the competitiveness of the sector

- Expert group: consultation, discussion

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Corporate Social Responsibility

- Implementing the partnership for growth and jobs: making Europe a pole of excellence on Corporate Social Responsibility COM(2006)136; 22-3-2006
- CSR "*can play a key role in contributing to sustainable development while enhancing Europe's innovative potential and competitiveness*"
- Commission called "*on the business leaders and other key stakeholders to engage in urgent reflection with political leaders on the medium- and long-term policies needed for sustainability and propose ambitious business responses which go beyond existing minimum legal requirements*"

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Corporate Social Responsibility

- CSR is not a panacea…
- It does not substitute for public policy, but it can contribute to a number of public policy objectives, such as:
  - Better innovation performance, especially with regard to innovations that address societal problems, as a result of more intensive interaction with external stakeholders and the creation of working environments more conducive for innovation;
  - A more rational use of natural resources and reduced levels of pollution, notably thanks to investments in eco-innovation and to the voluntary adoption of environmental management systems and labelling;
  - Greater respect for human rights, environmental protection and core labour standards, especially in developing countries;
  - …

Corporate Social Responsibility

- Proposed actions:

- Consumer information and transparency:
- Consumers play an important role..
- They are expected to exercise critical choice, encourage good products and good companies.
- Consumers lack clear information on the social and environmental performance of goods and services, including information on the supply chain
- Commission & stakeholders will examine need for further voluntary actions to achieve the objectives of transparency…

Way forward

- Major objective of Communication: to give an adequate and coherent visibility to raw materials in the implementation of different policy agendas
- Need to identify policy measures for the:
  - Short term
  - Medium term
  - Long term

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A TARGETED STRATEGY ON RESOURCE USE:

FROM A SYMPTOM APPROACH TO A SYSTEM APPROACH

EEB's involvement in discussions on natural resources takes place within an approach that links natural resources – products – waste, a chain that represents a complex thread of consumption and production. We are also, therefore, very active in the growing policy area of Sustainable Consumption and Production.

In addition to providing key details on the EEB's contribution to natural resources policy discussions, this paper also provides a summary of various EU initiatives addressing natural resources issues, to identify the aims which industry should contribute to achieving. To date, these policy areas are:

- EU Sustainable Development Strategy
- 6th Environmental Action Programme
- Thematic Strategy on the Sustainable Use of Natural Resources
- Thematic Strategy on Waste Prevention and Recycling
- Sustainable Consumption and Production Action Plan

EU SUSTAINABLE DEVELOPMENT STRATEGY

The European Council in 2001 adopted the first EU Sustainable Development Strategy (SDS). This was complemented by an external dimension in 2002 by the European Council in Barcelona in view of the World Summit on Sustainable Development in Johannesburg (2002). However, unsustainable trends in relation to climate change and energy use, threats to public health, poverty and social exclusion, demographic pressure and ageing, management of natural resources, biodiversity loss, land use and transport still persist and new challenges are arising. Since these negative trends bring about a sense of urgency, short-term action is required, whilst maintaining a longer-term perspective. The main challenge is to gradually change our current unsustainable consumption and production patterns and the non-integrated approach to policy-making.

The overall aim of the renewed EU SDS is to identify and develop actions to enable the EU to achieve continuous improvement of quality of life both for current and for future generations, through the creation of sustainable communities able to manage and use resources efficiently and to tap the ecological and social innovation potential of the economy, ensuring prosperity, environmental protection and social cohesion.

The operational objectives and targets on natural resources that are of relevance to the platinum group of metals include:

- *Improving resource efficiency to reduce the overall use of non-renewable natural resources and the related environmental impacts of raw materials use*, thereby using renewable natural resources at a rate that does not exceed their regeneration capacity.
- Halting the loss of biodiversity and contributing to a significant reduction in the worldwide rate of biodiversity loss by 2010.
- *Avoiding the generation of waste and enhancing efficient use of natural resources* by applying the concept of life-cycle thinking and promoting reuse and recycling.

The SDS states that "*The Commission and Member States should build on the EU strategy on the sustainable use of natural resources which should be complemented by a number of targets and measures at EU-level.* The European Environment Agency should give support regarding the

measurement of resource efficiency." **A 3% annual improvement in resource productivity target** is being suggested in the context of the EU's Sustainable Consumption and Production Action Plan.

6TH ENVIRONMENTAL ACTION PROGRAMME

The Sixth Community Environment Action Programme (6EAP) provides the framework for the European Commission's environmental policy until 2012. It requires the production of seven thematic strategies to implement the objectives set within the Programme, one of which is on the sustainable use and management of natural resources. As the mandate for this Strategy the 6EAP identifies various priority actions (see Box 2). Key among these is Article 8, which demands the "*establishment of goals and targets for resource productivity and the diminished use of resources, decoupling the link between economic growth and negative environmental impacts*".

Priority actions to deliver this, of relevance to the platinum group of metals, are:

- *an estimate of materials and waste streams in the Community, including imports and exports for example by using the instrument of material flow analysis;*
- *establishment of goals and targets for resource productivity and the diminished use of resources, decoupling the link between economic growth and negative environmental impacts;*
- *promotion of extraction and production methods and techniques to encourage eco-efficiency and the sustainable use of raw-materials, energy, water and other resources;*

THEMATIC STRATEGY ON THE SUSTAINABLE USE OF NATURAL RESOURCES

At the end of 2005, the European Commission published its Communication on this Thematic Strategy. According to the European Commission, the objective of this strategy is to reduce the environmental impacts associated with resource use and to do so in a growing economy. Focusing on the environmental impacts of resource use will be a decisive factor in helping the EU to achieve sustainable development.

The Commission's Communication on the Thematic Strategy outlined actions to achieve this objective, which were:

- improve our understanding and knowledge of European resource use, its negative environmental impact and significance in the EU and globally,
- develop tools to monitor and report progress in the EU, Member States and economic sectors,
- foster the application of strategic approaches and processes both in economic sectors and in the Member States and encourage them to develop related plans and programmes, and
- raise awareness among stakeholders and citizens of the significant negative environmental impact of resource use

It also proposed the broader integration of life-cycle analysis into policies and, by 2008, the development of indicators to be able to measure productivity gains. At the global level, the EU proposed the creation of an International Panel on the Sustainable use of Natural Resources within the United Nations framework. This panel has been created and recently held its first meeting.

There was much disappointment expressed by the content of this Thematic Strategy, particularly as there were no clear objectives set, it took too long-term an approach and identified mostly data-gathering activities. EEB's response at the end of this document provides more details on our contribution to this discussion.

THEMATIC STRATEGY ON WASTE PREVENTION AND RECYCLING

Also in December 2005, the Commission published its proposal on a Thematic Strategy on Waste Prevention and Recycling. According to the Commission, "EU waste policy has the potential to contribute to reducing the overall negative environmental impact of resource use. Preventing waste generation and promoting recycling and recovery of waste will increase the resource efficiency of the European economy and reduce the negative environmental impact of use of natural resources."

As with the Thematic Strategy on Natural Resources, the focus here was on the introduction of life-cycle thinking into waste policy, and improvement of our knowledge base of the environmental impacts of resource use and waste generation and management. The tools developed through the Natural Resources Strategy would be linked to the objectives of this waste prevention and recycling strategy.

This Thematic Strategy was received with similar disappointment by various stakeholders.

SUSTAINABLE CONSUMPTION AND PRODUCTION ACTION PLAN

As part of the follow-up to the 2002 Johannesburg Summit on Sustainable Development ('Rio+10'), national governments agreed to produce programmes on sustainable consumption and production (SCP) by 2010. Since the Rio Summit in 1992, SCP was formally introduced into the global environmental policy agenda, but with little actual focus on developing programmes addressing these issues. Local Agenda 21 included a chapter on SCP, particularly recognising that unsustainable patterns of both consumption and production needed to be changed.

Following Johannesburg, the European Commission organised a a stakeholder meeting in 2004 to discuss follow-up. It was agreed that a new strategy was not needed since many policies already existed which could be included within an 'action plan'. Since 2006, the Commission has been working on the Action Plan, and this is expected now in April 2008. It will be published as part of a 'package' that includes a Sustainable Industrial Policy Action Plan.

The SCP Action Plan is meant to address 5 key challenges:

1. Leveraging Innovation: stimulating the development and commercialisation of low carbon, energy and resource efficient technologies, products and services
2. Better Products: creating a dynamic internal market for better performing products
3. Leaner and Cleaner Production: increasing the efficiency of EU production
4. Smarter Consumption: changing behaviours
5. Global markets: exploiting first mover advantages and levelling the playing field for industry worldwide

As stated earlier, a notional resource efficiency target of 3% annual improvement is meant to be included in this Action Plan.

EEB's POSITION:

Operational objectives:

1) Aim for **absolute reductions in resource use of a factor 4 by 2030 and a factor 10 by 2050,** as a result of respecting carrying capacity, a more equitable global access to resources and world population growth.

2) Beyond working to reduce general resource use, the EU should **prioritise the most damaging resources** on the basis of their environmental impacts, taking into account total volumes and impacts per kg, and develop total impact reduction targets and policies for each. (i.e. define the top 20.)

3) Improve management and avoid overexploitation, degradation and destruction of renewable natural resources such as fisheries, biodiversity, forestry, water, air, soil and climate. Agree on **sustainable management criteria** and labels for products from agriculture, forestry, fisheries and natural ecosystems, and relate this to the targets under the next points.

4) Achieve **100% green government procurement** in EU and member states by 2010.

5) 12% of goods and food derived from agriculture, forestry, fisheries and natural ecosystems produced and imported in the EU meet **sustainability criteria** by 2010, and 100% by 2030.

6) Improve **eco-efficiency** in all sectors: get more output (service) from each unit of resource used and reduce the total environmental damage (noxious emissions to air, water and soil as well as overexploitation of land and other resources) to negligible levels, by reducing the damage caused by each unit.

7) Producers should provide **information to consumers** on the origin and production methods over the production chain of their products and services, including information on environmental impacts over the life cycle.

20 Key Actions:

1) Within two years establish, with help of independent research institutes, a **list of the top 20 (or more) priority materials** used in the EU which have a relatively large environmental impact due to a combination of their mass flows and impact per kilogram, including biodiversity impacts.

2) Within four years agree on **policy options for each priority resource/material**, depending on the problem analysis including LCA data, an optimal combination of:
   - criteria for sustainable extraction and processing, lowering impacts per kilogram;
   - reduction of use/ increase of productivity of use of the (primary) material, taking global availability and equity into account, lowering kilograms used per capita in the EU;
   - increased substitution, reuse or recycling.

3) Within five years develop adoption for application of **criteria for the sustainable management and harvesting of all major resources** – combined with introducing mandatory labelling of the products/materials derived from these resources.

4) Work on improved and more accessible data. Provide public access to LCA and MFA data bases, and guarantee continuous improvement of databases. Special attention is needed for improving or supplementing LCA for impacts on biodiversity (currently lacking).

5) Give guidance to environmental and other sectoral policies affecting resource use, with **clear targets and timetables**, and proposing the **removal or reform of policies or subsidies** that work against resource productivity.

6) Aim at both the sustainable use and management of both abiotic and biotic resources, paying ample attention to preventing over-exploitation and depletion of biotic resources such as biodiversity, fertile soil, seas and forests inside and outside the EU.

7) Give a strong impulse to our global responsibility to develop sustainable production and consumption patterns, aiming at better fulfilment of needs, if possible through a function-based rather than product-based approach, in an innovative way, with lower and more sustainable use of natural resources.

8) Define **'best practices' for major product groups** related to the top 20 priority resources, with help of the proposed Data Centre, and require chain certification for these product groups.

9) The starting of ambitious programmes for sustainable production and consumption, offering innovative businesses, NGOs and public authorities the opportunity to already work on solutions with impact reduction of a factor 4 to 10 and beyond.

10) Develop **economic instruments** such as: tax shift from labour to resources, energy taxes, virgin material tax, tax deductions for secondary materials, public (and company) procurement awarding tenders for lowest total impact of products/services over the lifecycle. **Implement a concrete and coordinated EU product ecodesign policy.**

11) Develop proposals for public procurement for alternatives for a range of products and services with a significant impact on (sustainable) resource use.

12) Develop proposals for mandatory performance targets for major product groups.

13) Developing, setting and applying criteria for the sustainable management of all major resources – combined with introducing mandatory labelling of the products/materials derived from these resources, starting with resources with highest impacts.

14) Create the obligation systematically to provide information on the lifecycle impacts of all products, including information on sourcing, to the public.

15) Introduce production and processing methods - and life-cycle assessments where appropriate - as guidelines for trade policy.

16) Support developing countries to meet EU standards and labelling requirements so they do not become a *de facto* barrier to trade.

17) Enforce existing legislation to reduce resource use and its impacts.

18) Develop **legislation to drive waste prevention, reuse and recycling** including **product eco-design requirements**, producer responsibility and product reuse and material recycling targets. Aim for zero residual waste (not reused, recycled or composted).

19) Support and spread results of best practices which lead to reduced resource use, cost reduction and other environmental and/or social benefits.

20) Developing National plans and Strategies with objectives, indicators, reporting measures and continuous evaluation activities.