

Costing Sustainable Development

Sustainable Development for Mining
Conference 2005

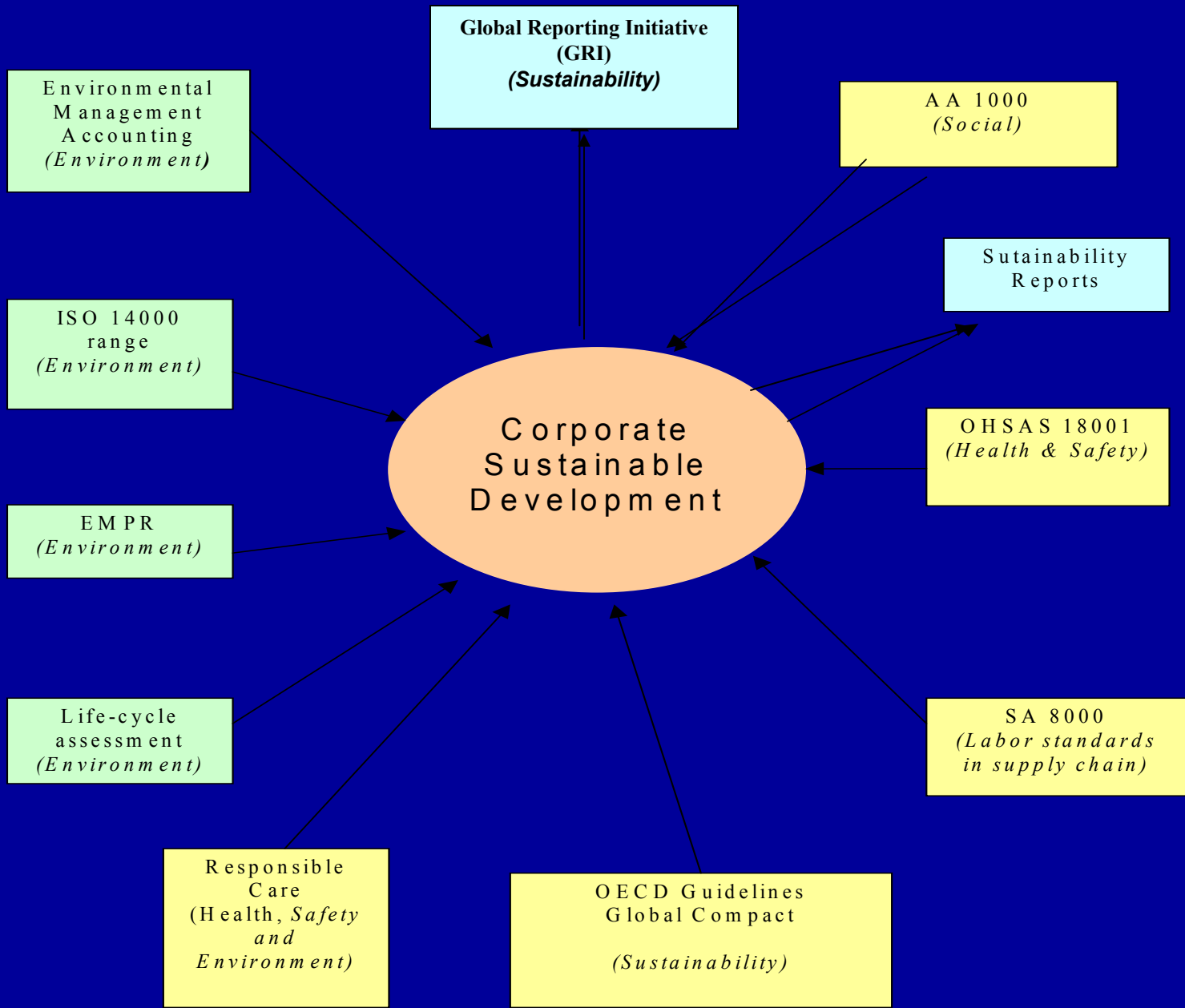
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Table 2.1 Industrial sustainable development indicators. Adapted from BCSDSA (2002d:2).

Economic elements (developing <i>financial capital</i>)	Environmental elements (protecting <i>natural capital</i>)	Social elements (promoting <i>social capital</i>)
Employment creation	Promoting energy and water efficiency	Poverty alleviation
Ensuring competitiveness in global market	Maintaining biodiversity	Provision of education and training
Increasing foreign exchange reserves	Addressing climate change	Reducing crime
Developing skilled workforce	Maintaining air and water quality	Access to housing and basic infrastructure
Maximising natural resource productivity	Minimising waste and pollution	Protecting consumer rights and interests
	Preventing/remediating land contamination	Ensuring health and safety in the workplace
	Promoting use of renewables	Promoting community health



Three dimension interactions

- Economic activities can cause social impacts;
- Social impacts can lead to economic benefits and costs;
- Social opportunities and problems can accompany environmental impacts;
- Environmental issues can include social benefits and costs; and
- Economic activities can have environmental impacts.

Three basic challenges

The World Coal Institute (Australian (b), 2003:1) recognises and accepts the challenges of sustainability. In addressing the challenges of sustainable development, three basic and inter-related objectives must be met:

- **Economic security and prosperity;**
- **Social development and advancement;**
and
- **Environmental sustainability.**

What is EMA?

- **Environmental Management Accounting (EMA)** is the
 - identification, collection, estimation, analysis, internal reporting, and use of...
 - materials and energy flow information, environmental cost information, and other cost information...
 - for both conventional and environmental decision-making within an organization.

TABLE 5.3 Summary of environmental costs, expenditures and revenues. Adapted from UNDSO (2001:16).

Environmental Media										
Env. costs/expenditure categories	Air/ Climate	Wastewater	Waste	Soil / Groundwater	Noise / Vibration	Biodiversity / Landscape	Radiation	Health & Safety	Other	TOTAL
1 Waste and emission treatment										
2 Prevention and environmental management										
3 Material purchase value of non-product output										
4 Processing costs of non-product output										
◀ Total Environmental expenditure										
5 Environmental revenues										
◀ Total Environmental revenues										
TOTAL										

EMA as Driver of Sustainable Investment

EMA helps companies recognize and achieve the multiple benefits of Sustainable Investments

– Reduced costs

- increased profit margins
- lower product prices
- increased market share

– Reduced liability

- improved company image
- increased market share
- increased access to financing and customers contracts

Environmental Costs Are Often Underestimated

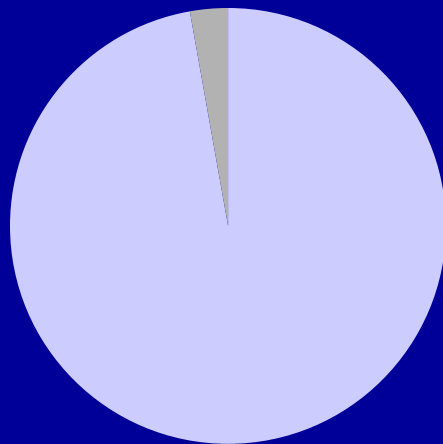
- Research Findings:
 - For every dollar of waste cost that companies actually measure, **another 2 to 3 dollars of cost are**” hidden” in the accounting records, or are not on the books at all
 - Companies typically underestimate how much waste really costs them, sometimes by several orders of magnitude
 - This applies even to big, well-managed companies

Environmental Costs At A Refinery

(As a percentage of operating costs,
excluding crude oil input)

**Original
Estimate**

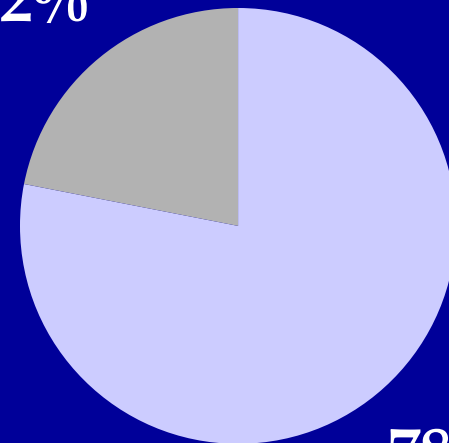
3%



97%

Actual Situation

22%



78%

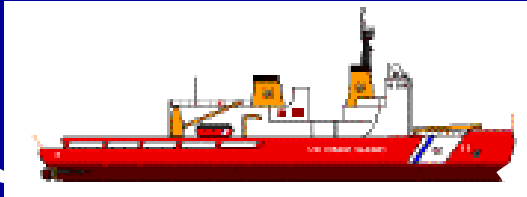
Source: *Green Ledgers: Case Studies in Corporate Environmental Accounting*. World Resources Institute, May, 1995.

The Cost of Waste Ink at the Southwire Company

- The cost of a drum of hazardous waste ink was estimated as \$50 - the average disposal cost per drum
- Upon closer inspection, the true cost of waste was discovered to be \$1300 per drum, including:
 - \$819 in lost raw materials (ink, thinner)
 - \$369 for corporate waste management activities
 - \$50 for disposal
 - \$47 for internal waste handling activities
 - \$16 to pay a hazardous waste tax

The Cost Iceberg

Environmental costs can be like an iceberg, with only a small part of the cost visible



Adapted from: Bierma, T.J., F.L. Waterstaraat, and J. Ostrosky. 1998. "Chapter 13: Shared Savings and Environmental Management Accounting," from *The Green Bottom Line*. Greenleaf Publishing:England.

Comprehensive Inclusion of Relevant Costs and Savings (conventional and less tangible costs...)

- The cost of lost manufacturing inputs
 - lost materials, energy, labor, capital, etc.
- The cost of waste management
 - waste handling, regulatory compliance, waste treatment & disposal, etc.
- Less tangible costs
 - reduced production throughput, reduced product quality, negative company image, liability, etc.

External Costs

- Costs for which companies are not yet accountable or which are of no material economic effect to business financial condition.
- Examples include adverse health effects to community, damage to personal properties or ecosystems owing to business activities.

Improved Cost Allocation

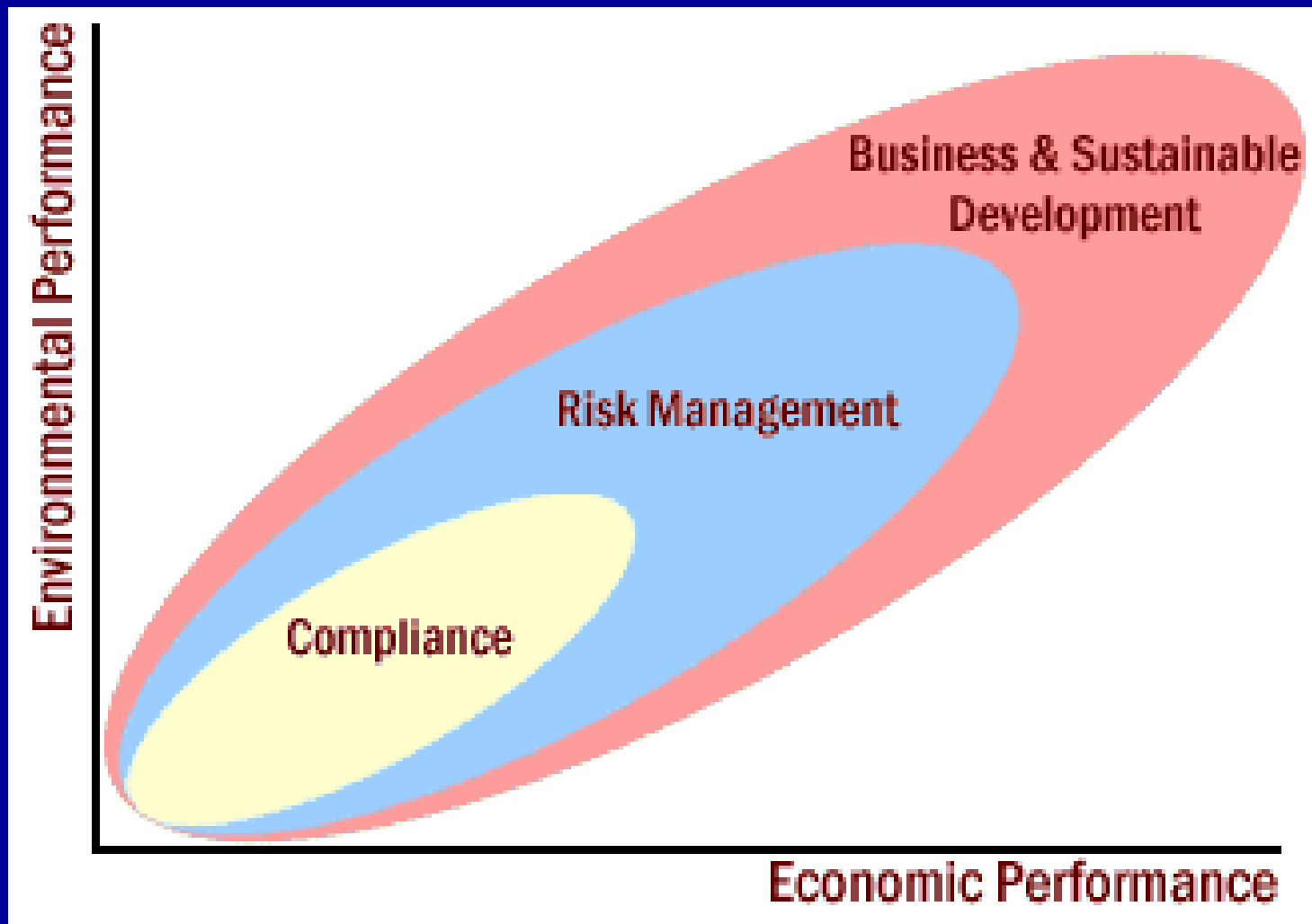
- Proper cost allocation is very important to sound investment profitability analysis;
- Lumping of environmental costs into overhead accounts and improperly allocating them to departments, products or processes distort the true financial benefits from projects that improve efficiency and environmental performance.

Sustainability Accounting

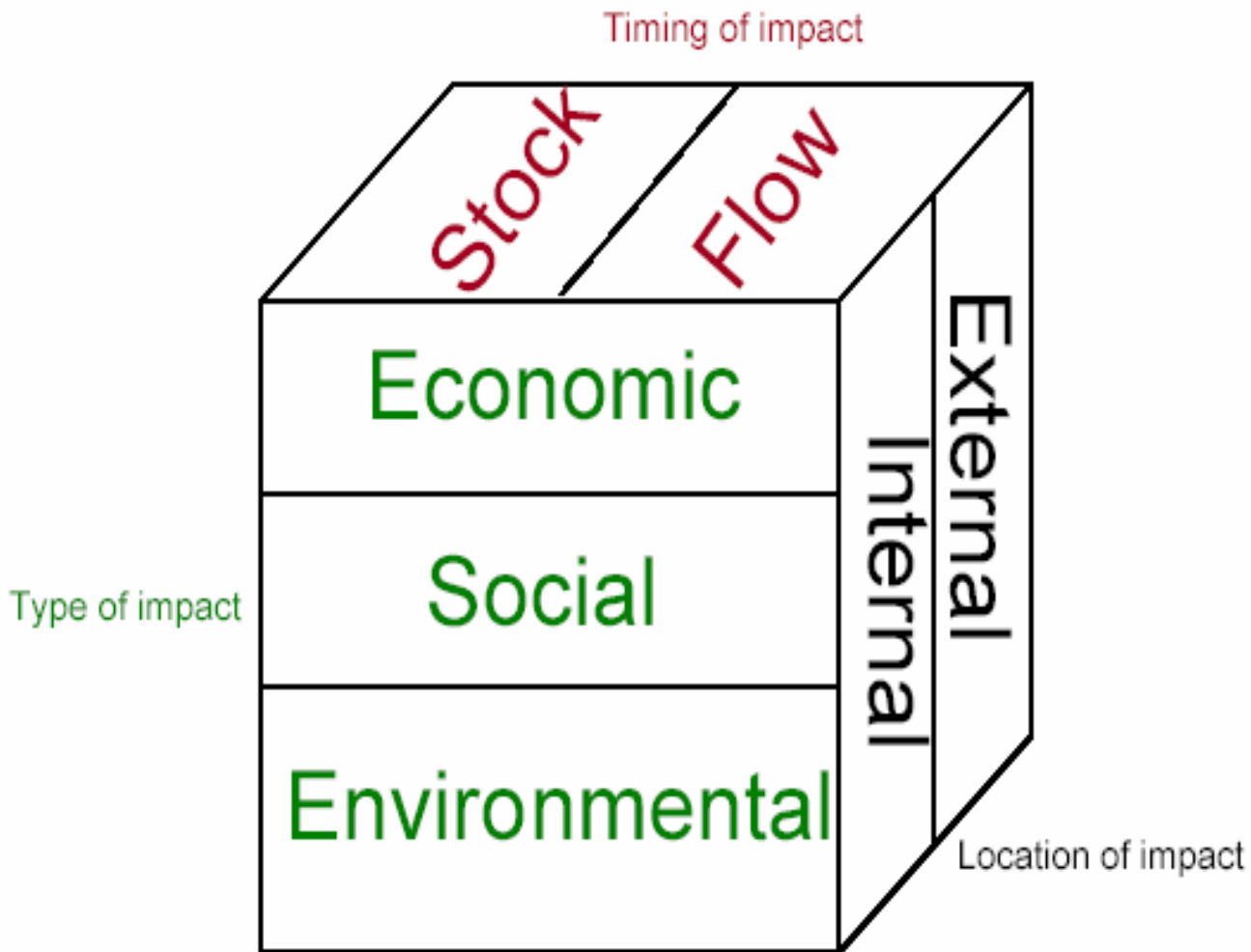
SA is a new concept and different methods of determining the costs must be investigated:

- Risk Assessment approach
- Three dimensional approach
- Health and Safety accounting

The ideal would be an integration of all the different methods



Risk Management approach



Sustainability Accounting in three dimensions

Health and Safety Accounting

Special focus on four prioritised Health & Safety issues

- **Accidents**
- **Psychological working environment**
- **Heavy lifting**
- **Monotonous repetitive work**

Health and Safety Accounting

Health and Safety Accounting provides the following new knowledge:

- **Economic perspective**
 - **Cost of absence and derived effects**
 - **Cost of errors/quality**
- **Customer perspective**
 - **Effect and customer satisfaction and experience**
- **Internal process perspective**
 - **Distribution of data on activities and internal processes that contribute to stress**
- **Learning and development perspective**
 - **Recognition of causality and the effect of a bad psychological working environment**
- **Interested party perspective**
 - **Dialogue with authorities and employees**

New Cost categories

- **Materials Costs of Product Outputs**

Includes the *purchase costs* of natural resources such as water and other materials that are converted into products, by-products and packaging.

- **Materials Costs of Non-Product Outputs**

Includes the *purchase (and sometimes processing) costs* of energy, water and other materials that become Non-Product Output (i.e., Waste and Emissions).

- **Waste and Emission Control Costs**

Includes costs for: *handling, treatment and disposal* of waste and emissions; *remediation and compensation* costs related to environmental damage; and any control-related *regulatory compliance* costs.

New Cost categories (2)

- **Prevention and Other Environmental Management Costs**

Includes the costs of *preventive environmental management activities* such as cleaner production projects. Also includes costs for *other environmental management activities* such as environmental planning and systems, environmental measurement, environmental communication and any other relevant activities.

- **Research and Development Costs**

Includes the costs for *Research and Development* projects related to environmental issues

- **Less Tangible Costs**

Includes *both internal and external* costs related to less tangible issues. Examples include *liability, future regulations, productivity, company image, stakeholder relations and externalities*

TABLE 3.1 Comparison between two management and organisational behaviour styles. Adapted from Byrne (2000) and King Committee (2002:242)

Characteristics	20th Century Corporation	21st Century Corporation
Organisation	The pyramid	The web or network
Reach	Domestic	Global
Focus	Internal	External
Structure	Self-sufficiency	Interdependencies
Operations	Vertical integration	Virtual integration
Resources	Atoms: physical assets	Bits: information
Source of strength	Stability	Change
Style	Structured	Flexible
Leadership	Dogmatic	Inspirational
Motivation	To complete	To build
Workers	Employees	Employees + free agents
Job expectations	Security	Personal growth
Strategy	Top-down	Bottom-up
Products	Mass production	Mass customisation
Financials	Quarterly	Real-time
Inventories	Months	Hours
Improvements	Incremental	Revolutionary
Quality	Affordable best	No compromise
Development	Financial gain	Sustainable development
Social responsibility	Internal	Internal and external
Transparency	Financial reporting	Sustainability reporting
Resource use	Inefficient use	Resource productivity
Communication	Passive one way	Active multi-way dialogue
Systems	Management systems	Life-cycles, business design
Actions	Reactive	Proactive
Responsibility	Public relations	Corporate governance
Environmental	End-of-pipe	Cleaner production
Balance	Eco-efficiency	Triple bottom line

Conclusion

- ‘To sustain’ derives from the Latin word *sustenire*, meaning ‘to hold up’. To make sense, ‘sustenire’ being a transitive verb, requires a subject and an object. Something or someone must act to hold up whatever is to be upheld. The source of the word ‘sustainability’ leads to the crux of the matter, sustainability is not a perpetual-motion machine – **it requires humans to be careful stewards, to uphold the integrity of our natural environment, to uphold companies in a cost-effective sustainable way.**