Parallels in Government and Corporate Sustainability Reporting

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One of the core tenets of Sustainable Development is transparency and information sharing, i.e., government and corporate reporting. Governments report on issues within their sphere of responsibility to the degree that their constituents demand that they do so. Firms undertake reporting for two reasons: they are required to do so by law, and doing so makes good business sense. In recent years, stakeholders have come to see themselves as having a right to information about government actions and business operations that have the potential to affect their lives, health, community and environment. As a result, disparate groups, including industry associations, non-profit groups, academics, and individual firms, attempted to lay out what governments and firms should report. There are many types of sustainability reporting. In this paper we focus on three of them that both governments and firms utilize: indicators, material flow accounts, and expanded corporate and national financial accounts. We discuss the benefits of each. We argue that while the goal of complete and perfect data is not achievable or feasible, sustainability reporting of all three types is necessary to ensure that sound public and private decisions are made.

Parallelen hinsichtlich der Bewertung der Nachhaltigkeitsfaktoren einer Regierung und von Unternehmen.

1. Introduction

Reporting to and by the government existed before the era of Sustainable Development (SD). Governments needed information on which to base policy, design regulations, and track compliance with the law[1]. Governments reported information to the public in response to national legislation and international commitments, to promote the efficient functioning of markets, and educate the public about particular issues and actions.

Firms needed information for decision making and to track business operations. Firms shared information either because they were compelled to do so legally, e.g., compliance with environmental reporting and financial disclosure requirements, or because doing so promoted core business goals of enhancing profitability, maintaining reputation or managing risk (Shields et al., 2006). Reports were neither comprehensive nor automatically made available to all interested parties. As Thomson and Joyce (2004) observed, information flowed from companies to regulators and financiers, and to a lesser degree to shareholders, but trickled to all other stakeholders.

This situation is changing. One consequence of the acceptance of SD as a guiding principle for both government and corporate action has been reconsideration of the role and nature of reporting. There is now wide agreement that sound information supports sound decision making. Further, stakeholders' desire for information is increasingly seen a legitimate expression of their values, goals, and objectives, as well as their 'stake' in the performance of the government and the firm (Šolar & Shields, 2005).

The Århaus Convention (AaC, 1998), adopted in 1998 in the Danish city of Aarhus (Århus) at the Fourth Ministerial Conference as part of the "Environment for Europe" process, designated the right to be informed as an obligatory human right for citizens of signatory countries. Among the established rights was "access to environmental information". The other two main rights are public participation in environmental decision-making, and access to justice. A subsequent study (EC, 2004) of the implementation of the Århaus Convention in "new" EU member states concluded that access to environemental information is easier than was the case prior to the Convention.

It is now recognized that more extensive information sharing supports both social learning and effective public participation in decision making. Firms too have recognized the need to report more information because the act of doing so is a core aspect of corporate social responsibility, and is essential to earning and keeping the social license to operate (Shields et al., 2006).

The nature and extent of adequate sustainability reporting remains an open question. In this paper, we describe the types of minerals-related sustainability reporting being proposed, and in some cases under-

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taken, by governments and firms. We then briefly address the issue of adequacy, i.e., how much information should be collected, interpreted, stored and reported? We conclude with some thoughts about optimal reporting.

2. Governmental Reporting

Governments share information because doing so is essential to democracy. The United States President's Council on Sustainable Development wrote (PCSD, 1996, p. 57): "Information and education, in both formal and non-formal spheres, have a tremendous potential for increasing citizen awareness and ability to engage in decisions affecting their lives." They went on to argue that federal governments have a vital and ongoing role in ensuring the quality and integrity of public information, whether it is generated by the government or the private sector (PCSD, 1996).

Governments in many regions of the world including Europe and North America are beginning to report information in formats that make clear its relevance to sustainability. This reporting is taking a number of different forms, including: indicators of sustainability, material flow accounts, and resource and environmental satellite accounts linked to National Accounts. Each of these uses a different methodology and serves a different purpose. All use some information already collected for other purposes, but require the collection and interpretation of additional data. Some information is common to all three forms; some is unique to each.

2.1 Indicators of Sustainability

Indicators and indices package complex mineral information into understandable forms for stakeholder's, decision-maker's and the public's use (Villas Bôas & Beinhoff, 2002). They should provide the best available information, be scientifically sound, highlight trends, and identify areas of needed research. In so doing, indicators improve the public dialog on what outcomes are desired and decision making on what actions are needed to move nations closer to their sustainability goals.

The European Union has created and reported sustainable development indicators for the non-energy extractive industry (RMSG, 2004). Several nations, including the United Kingdom and Slovenia, have developed and reported one or more national mineral indicators (Langer et al., 2003). The United States has created mineral indicators, but not yet reported on them. These mineral indicators provide information about access to resources, levels of reserves and resources, income derived from the production of minerals, trade flows and environmental and social impacts, among other topics. The most recent review of national indictors of sustainability for the minerals extraction industry was made by a group of experts in 2005 (Villas Bôas et al., 2005).

Any single mineral indicator provides limited information about the environmental, economic or social system of a nation. In contrast, a suite of indicators can provide a clearer picture of how minerals activities are contributing to the sustainability of the nation. Typically, many of the mineral indicators within a national set are correlated, e.g., income is a function of production levels and prices. Although there is no formal linkage among individual indicators in either an accounting sense or a systems model sense, a set of mineral indicators can increase understanding of the interconnectedness of physical, social, economic and environmental systems. They can also provide a comprehensive look at the ways mineral activities and use are contributing to or detracting from a nation's sustainability.

2.2 Material Flow Accounts

Material flow accounting focuses on the physical economy of a nation or region. Physical inputs to the economy, material accumulation in the economy and outputs to other economies or back to nature are tracked. The accounts provide insights into the physical metabolism of the economy and indicate the material intensity of the society (EUCom, 2001). These accounts can advance understanding of how to make the most economically and environmentally efficient use of resources. Because the accounts report both categories of materials and branches of production, they can be used to track problematic substances and problematic amounts of matter. Further, they can be used to develop strategies for preventing environmental releases (NRC, 2004).

The European Union has created and reported economy-wide indicators of material use under the direction of EUROSTAT (EUCom, 2002). Mineral resources are part of the accounts. Unlike indicators of sustainability, material flow indicators are the products of a comprehensive, integrated, and balanced set of accounts that utilize a standardized format. They can be linked to other indicator or accounting sets, but do not they report economic or social information. Rather, entries refer to exchanges of specific units of materials. Material use indicators include domestic extraction, direct material input, domestic material consumption and physical trade balance. The indicators are being discussed in the context of efforts to increase eco-efficiency and decrease material intensity.

The U.S. National Research Council has argued for development of material flow accounts for the United States (NRC, 2004). However, to date no federal agency has been assigned the task of creating, maintaining and storing these accounts and no funding has been provided to do so.

Sustainability for minerals means sustaining the flow of services and benefits currently provided to society by minerals while ensuring that the net benefits of production are positive over the life cycle of the resource. Material flow accounts will help quantify the benefits and costs of alternative forms of mineral production in physical terms. This information will help decision-makers and the public choose eco-efficient ways of providing minerals' benefits to society.

2.3 Resource and Environmental Accounts

National income and product accounts measure the overall economic activity of a nation. The information is reported in terms of total income and the output of goods and services. National accounts have traditionally focused on activities in markets and have omitted activities that take place outside of markets. Augmented national accounts that incorporate natural resource and environmental accounts would provide information on the interaction between the physical world, the environment and the economy. Calculation of a green gross domestic product would help societies understand the

degree to which their current income is being provided in a sustainable manner (Atkinson et al., 1997; Hecht, 2005).

In the United States, the Bureau of Economic Analysis (BEA, 1994) published a report recommending the development of Integrated Economic and Environmental Satellite Accounts (IEESA) and proposing both a framework for such accounts and a plan for future work. The BEA accounts were fashioned after the United Nations System of satellite accounts for the environment and comprise accounts for the environment and natural resources. A Blue-Ribbon panel to the US National Research Council reviewed the proposal and recommended that the accounts go even further than BEA had proposed to include non-market work, services of the environment, and changes to human capital (NRC, 1999b). The BEA has not yet published a set of environmental satellite accounts for the United States.

In Europe, a System of Integrated Environmental and Economic Accounting (SEEA) has been proposed and implementation is under way (UN and others, 2005a). The purpose of these accounts is to facilitate analysis of the contribution of the environment to the economy and of the impact of the economy on the environment. The EU environmental accounts comprise a set of modules: air emissions, material flows, environmental protection expenditures, environmental taxes, forest timber, subsoil assets, and water flows. Regular production in a timely fashion of theses environmental accounts modules is planned.

The first three modules of the accounts have been designated as priorities (EC, 2005). The first module, the air emission account, is a physical flow account in a NAMEA (National Accounting Matrix Including Environmental Accounts) type format. It links direct emissions by industries and households to economic activities (UN and others, 2005b). NAMEA will also support monitoring of decoupling, which is one of the main issues of the Thematic Strategy of Sustainable Use of Natural Resources (EC, 2005). In the context of sustainability decoupling refers to breaking the link between economic activity and both environmental impacts and total material requirements (Moll et al., 2003).

The second module is economy-wide material flows, which were discussed above in Section 2.3. The third module is environmental protection expenditure and environment industry accounts. Currently, Eurostat is reporting Environmental Taxes by Revenue Type by Country, Energy Taxes as a percent of Gross Domestic Product, Emissions of Greenhouse Gases by Industry, and Material Composition and Development of Physical Exports (EUCom, 2006).

Mineral resources are supposed to be included module 6, Sub-soil asset accounts (oil and gas). These subsurface accounts have not yet been created. Minerals can be reported in terms of physical units or monetary value. The former type of accounts would address flows and stocks. Flow data, i.e., production, imports and exports, are already available in both the United States and Europe, as discussed in the preceding material flow Section. Stocks refer to produced minerals held in stockpiles by firms and governments and minerals still in the ground. Below ground resources are classified by degree of certainty about their presence and their economic viability given current market conditions and state of technical knowledge. Estimating the amount of in-ground reserves (resources profitable to produce and known with a high degree of certainty (USGS, 1992) will be challenging, but is at least theoretically possible using geostatistical methods. Estimating the amount of resources, both inferred and undiscovered, is clearly much more problematic. The US Geological Survey has done some work in this field; however, only for selected economic commodities, i.e., copper (USGS, 1996). Considerable additional research and data collection would be required to develop a comprehensive set of in-ground mineral stocks data.

Developing monetized accounts for mineral resources will also be challenging. The goal would be to estimate the total value of sub-soil assets and to parse that value into separate estimates of the value of the mineral, i.e., its economic rent, and the value of the associated capital (NRC, 1999b). The US Bureau of Economic Analysis used five alternative methods to calculate the resource rents associated with mineral reserves and flows (BEA, 1994). Resource rent may be divided between depletion (opportunity cost or Hotelling rent) and return to natural capital (Ricardian rent) (Khemani & Shapiro, 1993; NRC, 1999b). The BEA was interested in the former of these for reasons discussed below, but each method of calculation had strengths and weaknesses. The difficulties in quantification are multifaceted and include: valuation of mineral resources that are not proven reserves; the impact of ore (deposit) heterogeneity on valuation, as well as the impact of co- and by-products; the volatility of short run mineral prices; the distortions introduced to the calculation by the valuation and depreciation of capital; the difficulty of distinguishing resource rents from returns to capital in vertically integrated companies; and the differences between market valuation and social valuation of minerals (NRC, 1999b).

These problems notwithstanding, there are clear benefits to be gained from producing mineral resource accounts. First, societies are rightfully concerned about availability and exhaustion of resources. Physical mineral resource accounts would enable governments to track additions to and removals from stocks. The accounts would enable the public to better understand their country's potential import dependence and the sustainability of the economy of the nation. Second, monetized accounts could be used to address issues of intergenerational equity, concerns about whether the depletion of nonrenewable resources is short-changing future generations.

One way to think about minerals and sustainability is in terms of capital. Essentially, sustainable development involves managing resources in a way that is conducive to the long term creation and maintenance of capital (natural, social, human, economic and physical). This perspective extends naturally to mineral resources, which are themselves a form of endowed, natural capital (Shields and Šolar, 2000.) Minerals are being produced sustainably if the Hotelling or scarcity rent generated by their sale is being captured and invested in other forms of capital (Solow, 1986). Thus, the accounts could be used to determine whether capital formation in other sectors (human, built physical, and environmental) are offsetting depletion, and whether rents are being reinvested in ways that will benefit future generations.

It has been argued that, in countries where minerals are owned by the state, rent should be returned to the government to be used for the good of society. For example, rent could be reinvested in something that

would ensure that the county's future income was maintained, such as in human capital through increased educational opportunities (Hecht, 2006). Another aspect of sustainable development is intra-generational equity. Monetized accounts could also potentially provide information about the manner in which resource rents are distributed and the degree to which they are being returned to impacted communities (MMSD, 2002).

3. Corporate Reporting

Corporate reporting to different stakeholders is determined within the framework of a company's policies and internal regulations. Firms report information (a) in response to legal mandates, (b) in response to financial demands, (c) for decision making, and (d) to maintain or acquire a social license to mine. If a company's stakeholders are to make decisions about a company in a manner consistent with sustainability, the company's financial reports must reflect the true (private and public) value of resources and any liabilities resulting from environmental risks (Gorman, 1998).

As is the case with governments, mining firms are beginning to report information in formats that make clear its relevance to sustainability. And as was the case before, this reporting can take many different forms, three of which mirror government reporting described above: indicators of sustainability, life cycle assessment, and enhanced balance sheets. Each of these uses a different methodology and serves a different purpose. All use some information already collected for other purposes, but require the collection and interpretation of additional data. Some information is common to all three forms; some is unique to each.

3.1 Indicators of Sustainability

The purpose of indicators of sustainability is the same regardless of scale. For the firm, or for an operation, the indicators provide information that enables stakeholders to determine whether principles of sustainability are being followed. Thus, sustainability reporting is detailed reporting of financial, environmental and social performance indicators. One of the important merits of indicators sets is that they include social impacts, which is not the case for other forms of sustainability reporting.

Initially, individual mining firms were attempting to create indicators that reflected their own unique situations. However, developing and reporting indicators within each company can become an expensive, excessive and duplicative activity, especially if reporting priorities are not set clearly enough. Moreover, there are many voluntary, but incompatible international, national, local, and sectoral reporting initiatives. The movement toward consistent report standards was begun by the Global Reporting Initiative (GRI), which originally published its draft Mining and Metals Sector Supplement in 2004 (GRI, 2004). The International Council on Mining & Metals chartered sustainable development principles, and published a guide on reporting against those principles, and the GRI the following year (ICMM, 2005). More and more firms are shifting to and standardizing their reporting on the GRI/ICMM suite of indicators, particularly among multinational, multi-operation, publicly-traded mining companies.

3.2 Life Cycle Assessment

Life cycle assessment (LCA) mirrors material flow accounting. It is a tool that allows the total environmental impact of a design or a product to be analyzed. It can be used during different stages of the design process, and covers all phases of product life: raw material acquisition and refining, including mine and mill reclamation; processing and the production of both outputs and production equipment; distribution and transport; use, reuse, and maintenance; and end-of-life (Mulder, 2006).

In LCA, the subject of analysis is the functional unit as opposed to a geographic region, which is the case for material flow analysis. Selection of the unit defines what subsequent results can be compared to. In the case of minerals, the assessment can be made over the mine life and over the life of the product produced at the mine, both of which will yield useful information. The contribution of a site or a product to different forms of pollution can be calculated. All contributions of a product to a specific environmental problem are counted in the same standard unit. Although different forms of environmental impact cannot be summed, they can be combined through the use of risk-adjusted weights, which are derived from the distance of the current or proposed situation to the desired situation, as laid out in corporate or government policy documents.

Conducting LCA can contribute to sustainability in a number of ways. First, analysis of current operations can identify inefficiencies, points where process redesign will lead to lower costs and fewer emissions. Second, the results of LCA conducted prior to mine development can clarify the environmental cost of a specified engineering design and allow for comparison across alternative designs. Increasingly, it is not enough that a mine design yield the highest net present value of the deposit, but also that it minimize environmental liabilities. LCA on proposed products identifies environmental consequences over the life of the product. Firms may decline to manufacture certain products once the full environmental impact and associated liability, across all inputs and emissions, and over the full life from resource extraction to product disposal, is known. To the degree that LCA information on products is made available to the public, individuals have the opportunity to make consumption choices that minimize their personal environmental footprint and in so doing direct their purchases toward firms that behave responsibly and away from those that choose not to implement sustainable practices.

3.3 Enhanced Corporate Balance Sheets

In developed nations, it is mandatory that companies report all financial incomes and expenditures on their balance sheets. Reporting may be aggregated or may be fairly disaggregated, depending on the laws and accounting standards of the nation. In some countries, such as the Unites States, financial accounting standards require that contingent and environmental liabilities be recognized in financial reporting if there is a significant likelihood that a cost from the liability will be realized by the company (Gorman, 1998). The liability may be reported on the balance sheet if the amount of the loss can be reasonably estimated or alternatively may be discussed in footnotes to the balance sheet. This latter is more likely to be the case when environmental lia-

bilities are characterized by high uncertainty and are difficult to quantify in monetary terms, as can be the case with some minerals activities.

In other countries, such as Slovenia, there is no act / standard from an accounting perspective requiring reporting of environmental liabilities within the balance sheet. Nonetheless most firms do incorporate environmental liabilities and assets within the balance sheet, including environmental costs and benefits such as (environmental) taxes, liabilities (as money provisions for land reclamation), and income tax relief (environmentally friendly investments).

Mineral reserves and resources are typically reported as assets, or in some cases noted under good will (potential reserves). Assets and balance sheets provide information that contributes to a sustainability assessment of a firm. High environmental liabilities call into question the ability to produce resources in a manner that generates a positive net benefit to society over the life of the mine and resource. Firms reporting positive profits on their balance sheets are more likely to be able to pay for environmental reclamation.

The form of accounting system that a firm utilizes affects its ability to perform internal sustainability assessment. Traditional accounting systems allocate non-value-added costs such as environmental liabilities and overhead to all units of output of all products produced, based on direct labour costs. Activity-based accounting (ABC) assigns these costs to specific products based on actual activities (Brook et al., 1993). So, for example, if a firm has an environmental liability associated with one of its mines, the cost would be allocated only to the output from that mine, not spread across the output from all the firm's operations. ABC is time consuming and expensive. It is, however, a form of full cost accounting that makes it possible to determine whether the actual cost of producing a commodity exceed revenue from sales or vice versa. Such information can assist firms in choosing a product mix minimizes their corporate environmental footprint while maximizing profits.

4. How much is enough?

Up to this point we have focused on the types of reporting and the potential benefits associated with each in terms of enhanced understanding about sustainability. However, collecting, analyzing, storing and reporting information is not a costless activity. Moreover, information technology has lead to a dramatic increase in the amount and diversity of information available. How much information is enough and how much is too much?

From an economic standpoint, lack of information or too costly information can lead to market failure and inefficiencies due to poor decisions. Enough information is the amount that ensures that governments make policies, firms make business decision and societal members make choices that increase the likelihood that desired ends will be achieved. In the case of sustainability, information is the basis for a process of social learning that will in time lead to more sustainable actions and choices. Too much information is an amount that is infeasible to manage and interpret, plus data irrelevant to the core questions at hand.

To some degree, the actual amount of information that needs to be shared is a function of trust among parties. Through a constant stakeholder communication process it is possible to learn what people want to know, their goals and expectations, and to identify information they will need to determine whether their goals are being met. There is equal responsibility among governments, firms and stakeholders to build up and strengthen mutual understanding and trust. Costs of collecting interpreting and reporting are balanced with the benefits of understanding good decision making and trust building. Regardless of who is doing the reporting, credibility and trust are enhanced when: the right (relevant, accurate) data are being collected; data analysis is scientifically sound and unbiased; the form of reporting appropriate; reporting is reaching stakeholders; information is being understood; and feedback is reaching the firm or government, and is being acted upon.

5. Conclusions

An integrated reporting of indicators, material flows and integrated accounts is necessary to provide the types of information that will support sound public and private decision making regarding sustainability. No single approach is appropriate because each provides important and unique information. Indicator sets address social sustainability; material flow accounting (MFA) and LCA track and link activities to units of pollutants; enhanced national accounts and balance sheets link resources and the environment directly to economic activity. Because information collection, storage, interpretation and reporting are expensive and time consuming activities, a goal of complete and perfect data is neither achievable or feasible. Choices will have to made about which data are essential. The United States is currently engaged in that discussion. The European Union has prioritized its activities and begun to produce indicators and accounts. Individual mining firms are also deciding the scope of their reporting efforts, some of which are more extensive and others less so. Given that sustainability means different things to different groups, nations, and companies, it is understandable that the scope and nature of reporting would differ as well.

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