

***Tracking Progress toward Sustainability:
Linking the Power of Measurement and Story***

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ABSTRACT

Over the past decade, there has been a significant increase in efforts to track progress toward sustainability. Many aspects of society, including mining, are participating in this “movement”. The drivers are diverse and include evolving ideas in business and public administration as well as concerns for human well-being, community robustness, environmental integrity, and overall social and ethical responsibility. The scale in question varies greatly from local to global. For the most part, there has been a preoccupation with developing discrete measurable signals. This paper argues that the overwhelming focus on the quantitative is ill-advised and that a more effective approach is to bring together the best of both quantitative and qualitative. The mining industry in particular is well-placed to affect this shift and reap the associated benefits.

INTRODUCTION

In the broad sweep of history, trying to capture the nature of change over time has been a topic of interest since at least the ancient Greeks. However, the last half of the 19th century and through the 20th century saw an increasing focus on counting. Lewis Mumford voiced a concern about this in 1934 when he wrote:

The new attitude toward time and space infected the workshop and the counting house, the army and the city. The tempo became faster, the magnitudes became greater; conceptually, modern culture launched itself into space and gave itself over to movement. What Max Weber called the "romanticism of numbers" grew naturally out of this interest. In time-keeping, in trading, in fighting, men counted numbers, and finally, as the habit grew, only numbers counted.

Even Albert Einstein added a note of caution with a sign hung on his Princeton office door that read *not everything that can be counted counts and not everything that counts can be counted*.

Counting in this context of course is motivated by a desire to recognize, track, record, and understand change. Doing so is essential to learning and the point to be argued in this paper is that the power of counting can only be realized by seeing it as part of a

larger context of performance measurement and progress assessment which includes other equally important aspects. Without effort put to these other aspects, counting can be misleading, even dangerous.

In the last half of the 20th century, counting gained momentum. Much influenced by the events of the depression, systems of national accounts were established in most countries around the world immediately after WW II. Partly in reaction, the 1950s and 1960s saw social indicators and quality-of-life indicators come of age.

In the late 1960s and early 1970s, Ministries of Environment were created in almost every country. An early task was almost always the identification of key environmental indicators for tracking the state-of-the-environment. The early reports of the Council of Environmental Quality (1970 – 1990) provide an exceptional body of literature addressing almost every technical aspect of indicator development and use. Similar work on health, healthy communities, and sustainable development followed.

All of this activity is summarized in Figure 1 in terms of a recognizable body of literature for each focus area mentioned above. As can be seen from Figure 1, the banner of sustainable development is a late arrival on the scene and the corporate component (in which mining played a significant part) was introduced even later. However, publication of the 1987 report of the World Commission on Environment and Development (Brundtland Commission), *Our Common Future* (WCED, 1987), which marks the “official” beginning of sustainable development activity, represents a significant turning point for those interested in tracking change and continuous improvement.

It is a turning point for two reasons. First, it placed firmly on the international stage a need to put as much effort into not only traditional economic concerns but also environmental integrity, human well-being, and the effectiveness of our rules and institutions. And second, by example it argued cogently that a whole system approach was essential and that focusing on the individual parts of the “system” without also paying due regard to the big picture would not provide an adequate sense of change to support good decision-making.

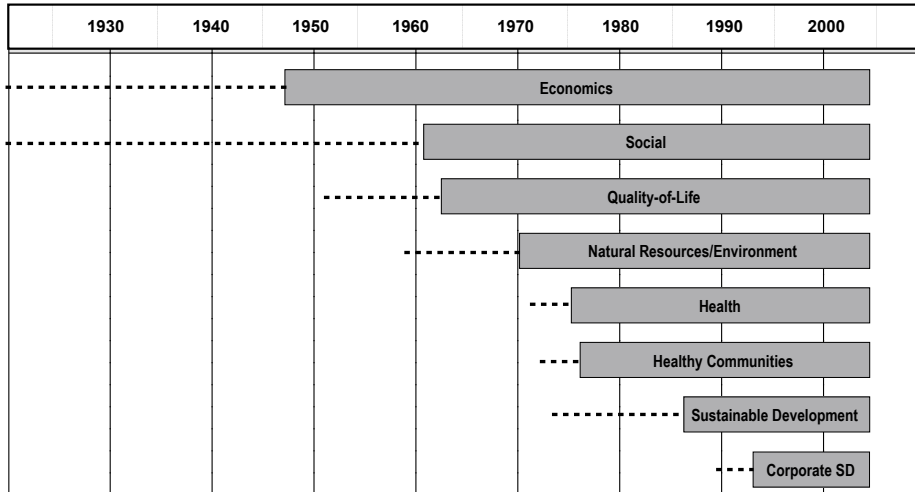


Figure 1. The span of the late 20th century indicators literature (modified from Hodge, 1995).

Five years later, the United Nations Conference on Environment and Development (Earth Summit) at Rio de Janeiro, Brazil produced its *Agenda 21* (UNCED, 1992). Agenda 21 pushed farther into the detail of implementation and, among many recommendations, called for new ways of tracking progress that would entrench the concept of sustainable development in practice, not just theory.

On the corporate side, response to the ideas of sustainable development followed quite quickly. Corporate environmental policies which had emerged in the late 1980s took on the flavor of sustainable development by the mid-1990s. A number of mining companies including Placer Dome, Noranda, and Rio Tinto played a leading role in this transition. By the early 2000's, corporate social responsibility had been added to the mix and something like "health, safety, environment, and community" now seems to be the most popular label (see for example, BHP Billiton, 2002).

Throughout this evolution there has been a continuing increase in effort put to developing measurable signals that can "objectively" show change. At the community level, this interest is neatly captured by Maureen Hart, a leader in the community indicators movement, in her motto, "we are what we measure, it's time to measure what we want to be" (Hart, personal communication).

Thus, it can be seen that the quest for new indicators to capture and track change over time has gained significant momentum over the last 50 years. Today that momentum carries on. Companies, communities,

counties and municipalities, states and provinces, regions, and international agencies continue this quest.

THE ASSESSMENT CYCLE

Despite the great interest in indicators, measured signals of change provide only part of an integrated cycle that that comprises performance measurement and progress assessment. Figure 2 below shows that cycle and its four essential elements: (1) story, (2) measurement and indicators; (3) judgment, and (4) communication.

Story. Many aspects of change have not been or cannot be measured. But they are known by people in the organizations and communities that carry the institutional memory. The insight that is to be gained emerges through the story that these people have to offer. In this matter, they are the experts. Over the past decade, there has been a major resurgence of interest in the role of story in policy development, decision-making, and organizational behavior (for example see Fischer and Forester eds., 1993 and Denning, 2001). Also, seeking the stories of various interests offers a powerful and respectful means of engagement.

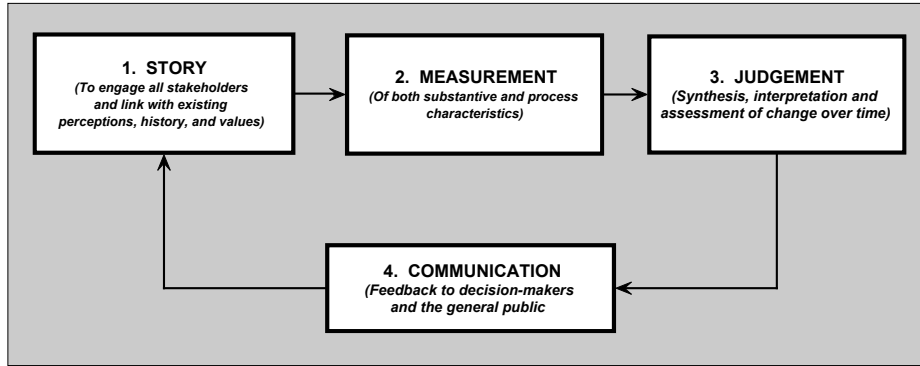


Figure 2. Elements of the Performance Measurement and Progress Assessment cycle.

Measurement. Measured or counted indicators provide a firm "backbone" for any systematic approach to performance measurement and progress assessment. Measurement serves to confirm and give confidence to observations. Importantly, measurement often provides counter-intuitive insight that opens up whole new perspectives.

Judgment In tracking progress toward sustainability whether the scale be that of project, organization, community, industry, or political jurisdiction, the greatest challenge is to bring together the power of both quantitative and qualitative analysis in a synthesis that can be respected across all interests. Even when indicators have been compiled and nested in the story of a place, the task remains of judging the significance of the gathered evidence. This means setting criteria for assessing the significance of both measured indicators and articulated story. Key is maintaining the transparency and integrity of the synthesizing and judgment process.

Communication. Lastly, all is for naught if the results are not communicated effectively to the implicated interests.

Each of the above aspects of the performance measurement and progress assessment cycle requires a special skill set and no one person has all of these. Those expert in story may not be those expert in measurement. In fact, those comfortable with story are often uncomfortable with the rigor of counting and vice versa. This is the classic cultural divide between those trained in the hard sciences and those in the social sciences and humanities. Not surprisingly, "story tellers and "bean counters" often have

difficulty communicating because they think in different terms. However, neither story teller nor bean counter may be proficient in synthesis, weighing evidence, and making judgment about significance. Further, none of these groups are necessarily effective at communicating.

The cycle described above is generic whether the application be the annual performance review (of an individual, company, government, or country) or some topic/issue-focused assessment of change.

The lesson from all of this is that no one aspect of this cycle is more important than another but all are critical. In spite of a need to consider all four of these aspects with the same degree of rigor, it is measurement that gets the lion's share of attention and the result is not optimum.

In the discussion that follows, the importance of story is further examined.

MINING AND SUSTAINABILITY

Mining is in an unprecedented period of transition. As pointed out in the final report of the project Mining, Minerals and Sustainable Development North America (Mining Minerals and Sustainable Development, 2002a):

A broad array of interrelated technical, environmental, and social issues face the mining/minerals community. Legal and financial implications have multiplied as investors, indigenous people, communities, non-governmental organizations and other interests apply increasing scrutiny to mining operations.

With the immediacy of worldwide communications, local incidents become global news overnight.

In short, the mining industry is under great pressure to demonstrate change. Therefore it must develop systems to recognize, track, record, and understand that change. In practice, their five primary reasons to do this (modified from NRTEE, 1993 and Hodge, 1996):

1. to facilitate continuous learning and improved decision-making;
2. to provide early warning signals for needed changes in policy, behavior, or infrastructure thus reducing risk;
3. to encourage innovation, creativity, and pride by recognizing and celebrating success;
4. to promote accountability by reporting on whether or not commitments have been discharged; and
5. to identify and prioritize gaps in knowledge so that the limited available resources can be put to work first on topics that are the most pressing.

Note that all of these are substantive and directly relate to effectiveness and efficiency. If success is achieved on these fronts, public image will improve. However, if a primary motivation is public image improvement, success on achieving the above five is unlikely and success on public image improvement will be short-lived at best.

To achieve success then, a rigorous and open system of performance measurement and progress assessment is required, one that consciously addresses all four elements of the cycle: story, measurement, judgment, and communication.

In guiding this change, the industry has turned to the ideas of sustainability and sought ways to transform the general theory to practical application in ways that work for mining. One attempt to do so was made in 2002 by a Work Group of the project Mining Minerals and Sustainable Development North America. The result was development of the Seven Questions to Sustainability (7Qs), a robust assessment template to be used to ascertain the contribution of mining and minerals activities using the ideas of sustainability as a foundation (Mining

Minerals and Sustainable Development North America, 2002b).

The Seven Questions to Sustainability (7Qs) Assessment Framework

The 7Qs Assessment Framework was developed by a multi-interest working group of about 30 individuals drawn from across the US and Canada and reflecting a range of interests including industry, non-government organizations, communities, and government. For the purposes of this paper, it serves well as a check list of topics that require tracking over time in terms of any assessment of progress. The seven questions address (see also Figure 4):

1. Engagement: Are engagement processes in place and working effectively?
2. Human Well-being: Will people's well-being be maintained or improved from the beginning of the project through post-closure?
3. Environmental or Ecological Integrity: Is the integrity of the environment assured over the long term?
4. Economic Vitality (Activities of the Market Economy): Is the economic viability of the project or operation assured and will the economy of the communities within the project's area of influence be better off as a result?
5. Non-market and Traditional Activities: Are traditional and non-market activities (which includes all of what we do that is not bought or sold in the market including faith and cultural oriented activities, the huge range of volunteer activities, and housework) supported in a way that is consistent with the goals of the local community?
6. Governance and Institutions: Are the rules, incentives, programs, and capacities (of all the players including company, community, and government) in place to address project consequences from beginning through post-closure?
7. Synthesis and Continuous Learning: Does a full synthesis show that the net result will be positive (or negative) in the long term; will there be periodic re-assessments that will facilitate continuous learning and adaptation to change?

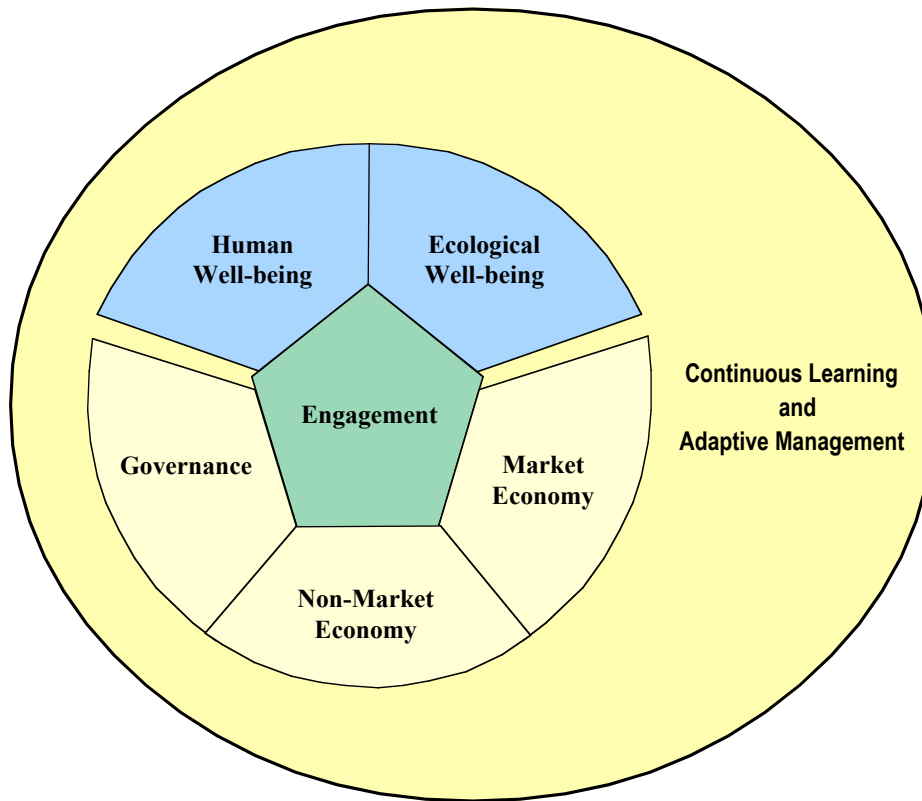


Figure 3. The Seven Questions to Sustainability (7Qs) framework.

Human well-being and ecological (or environmental) integrity are the ultimate results to be achieved (and therefore to be assessed against for success). Mining in particular can be used as a catalyst in achieving these results. Activities of engagement, market economy (in this case the mine operation and related activities as well as the economy of the surrounding community/region), non-market activities and governance are all sets of activities that provide the means to achieve well-being. In the ideal, all of these elements lie in a field of continuous learning and contribute to adaptive management. To plan and act effectively, this larger picture needs to be considered as decisions are made about any particular mining activity.

In formulating the 7Qs template, the MMSD – North America Work Group began with the seven general categories and developed a full hierarchy of objectives, indicators, and detailed metrics (see Mining, Minerals and Sustainable Development North America, 2002a). During this process there was much debate about detailed wording and there is no doubt that in any specific application, wording would have to be tailored to the social, political, economic, and environmental conditions of the site. However, there was remarkable convergence on the idea that these seven categories spanned the essential

ingredients of what needed to be considered in assessing the contribution of a mining project.

TRACKING PROGRESS

Combining the characteristics of performance measurement and progress assessment with the elements of the 7Qs assessment template leads to development of the check template shown below in Figure 4.

Element of Contribution	1. Story	2. Measurement	3. Judgment/Synthesis	4. Communication
1. Engagement				
2. People's Well-being				
3. Environmental Integrity				
4. Economic Vitality				
5. Non-market and Traditional Activities				
6. Governance and Institutions				
7. Synthesis, Continuous Learning, and Adaptation				

Figure 4. Check template that combines elements of the 7Qs Assessment Template and components of the performance measurement and progress assessment cycle.

Each line item of Figure 4 needs consideration in an assessment of a project's contribution over time. And over time, progress in achieving that contribution needs to be tracked and assessed. In making such an assessment of each line item, each element of the performance measurement and progress assessment cycle needs attention.

For example, assessing the effectiveness of engagement by a given company on a given project might involve a count of the resources put to the engagement effort and the number of successful programs that have been mounted in the community. However, in the end, those measures mean nothing if the community is angry at the company. And the most efficient way of ascertaining the attitudes of people towards a project is to go and ask them. Furthermore, to develop an understanding of what is underneath today's attitude, the most effective step is to ask people their story. In this, they are the experts. And in learning that story, the company has everything to gain and nothing to lose. But in the process of learning those stories, the company itself will find itself changed. That is the nature of engagement, it is 2-way.

Each line item of Figure 4 is similar in that both story and measurement are needed to best capture change. Columns 1 and 2 (story and measurement) are the inputs to the assessment process. In some cases, the "story" component plays most strongly in this input, sometimes measurement is dominant. However, without exception the greatest insight is achieved when the quantitative is synthesized with the

qualitative in the judgment process. To some extent, of course, this bringing together is always done. Any author well knows that the trickiest part of any report writing is not plotting the graphs of indicators but in writing the interpretative paragraph that goes along with it. This interpretation inevitably draws on the qualitative insight of the author.

However, what is now clear is that drawing on the qualitative aspects should not be undertaken lightly and in a haphazard fashion. It requires as much rigor and technique as does the measurement part.

APPLICATIONS

The Tahltan, Mining, and Sustainability

The traditional territory of the Tahltan First Nation covers close to 100,000 km² in northwestern British Columbia. It is vast area of mountain and plateaus stretching inland from the Coast Mountains. At its heart is the Stikine River which rises high in the Stikine Plateau and traces a gently counter-clockwise arc to its meeting with the Pacific near Wrangell, Alaska.

Before contact with Europeans, the Tahltan played a key "middleman" role in trading between the coastal Tlingit and inland First Nations. The Tahltan have had a long relationship with the mining industry starting with the short-lived 1861-1862 Stikine River Gold Rush. Ever since, familiarity with the land

has led them to play a support role in prospecting and exploration. More recently, the Tahltan business sense has led to the creation of incorporated businesses that are providing services to operating mines including, at the present time, Barrick's Eskay Creek Mine.

However, their relationship with mining has not always been such that they have felt that a fair distribution of costs, benefits, and risks has been achieved. In 1987, the Tahltan released a formal resource development policy that established some basic conditions for natural resource activities within Tahltan Country. In a further development, a Mining Symposium was held in April 2003 that set out to:

1. provide an opportunity for the Tahltan First Nation to apprise itself of mining and mineral activity in the Tahltan traditional territory (the Stikine Watershed), past, present, and future, and to express their sense of what this has meant or could mean to the Tahltan;
2. use the 7Qs Assessment Framework to systematically identify and review implications of mining/mineral activity to the Tahltan people and in the process;
3. identify issues and concerns from the perspective of the Tahltan people, the mining industry, government, and others;
4. undertake a preliminary "back-of-envelope" assessment of the contribution of mining in order to build a sense of: (a) sources of data and information; (b) the state of current knowledge; and (c) current capacity to fill gaps; and
5. build an initial strategy and action plan for guiding future Tahltan relationships with the mining/minerals industry.

The details of this exercise can be found in Tahltan First Nation et al. (2003). What is relevant to this discussion is that 36 individuals including 26 Tahltan, 5 from industry, 4 from government, and a facilitator gathered together for two and a half days to discuss the relationship between the Tahltan and mining, past, present, and future. The 7Qs Assessment Framework served as an organizing template and as a check list of issues to be considered. While the process of assessment should be considered preliminary, the power of what was completed

came from the stories that the Tahltan brought to the table.

Two issues serve as useful examples. In the 1960s, increasing use of the helicopter meant that the staging area for mineral exploration moved from Telegraph Creek within Tahltan territory to Smithers to the south. The net result was that contact with the Tahltan and use of Tahltan people in support of exploration were significantly reduced. To the Tahltan, the change was marked. In contrast, the exploration industry was oblivious to the implications of the change except as it enhanced their mobility. Such implications can be seen retrospectively once understood. But the understanding comes through story, not through measurement.

A second example is the continuing concern about substance abuse and related family violence. Resources to purchase drugs and alcohol can often be tied to mining-related wages. While the job and wage-related benefits can be easily counted and portrayed as a mining-contribution, the negative side-effects remain hidden because they are not so easily captured in measured indicators. In this case, the wage economy of mining is functioning in parallel with the non-wage traditional life style of the Tahltan and the mix requires careful management. Again, in retrospect the implications can be understood but it is story, not measurement, that brings the insight to light.

The BHP Billiton 2002 Health, Safety, Environment, and Community Report

Over the past decade, leading mining companies have made great strides in their approach to sustainability reporting. An example (others could have been chosen) that reflects such progress is BHP Billiton's 2002 Health, Safety, Environment and Community (HSEC) Report (BHP Billiton, 2002). The report lays out a hierarchy of management instruments that include a company-wide charter, company-wide HSEC policies, management standards, procedures, protocols, guidelines, and toolkits as well as project-specific management systems and procedures.

Key to implementation is annual reporting which documents a scorecard of targets and success achieved (or not). The reporting system is synchronized with the framework of the evolving Global Reporting Initiative. The report includes

measured indicators and their interpretation as well as a large number of case histories that tell the story of the past year's events at a large number of their field operations.

Three characteristics require noting. First, measured indicators are critical for establishing the strength of the report. Second, its overall effectiveness comes because of the stories, not the measured indicators. And third, the effort put to telling the bad or less successful aspects along with the good lends a sense of reality that greatly enhances the integrity of the report.

IN SUMMARY

Over the past number of years there has been much emphasis put to generating ideal measured indicators of change. This interest has been felt within many aspects of human endeavor, including mining. While there is power in measurement, measured indicators serve as only one element of a more complex cycle of performance measurement and progress assessment that includes "story" as well as critical input, judgment, and communication. Each of these needs to be treated with rigor. The greatest insight is achieved when qualitative and quantitative insight is combined by bringing measurement and story together.

While measurement has enjoyed much emphasis and is often characterized by systems of quality control, techniques of "story" remain less developed. Interestingly, many geologists have gained a capacity for "story" because of the logic and rigor that is required in making good geological interpretation. However, the link between that skill and the same approach applied to assessing change over time related to all of the aspects that are gathered together under that banner of sustainability is rarely made. Further, the capacity to both listen to and hear the stories of others is a capacity that has not been a

strength of the mining industry in the past. In general, the technically oriented people who comprise the majority of mining industry personnel have a high comfort level with numbers and counting and a low comfort level with storytelling, particularly when the issues to be described range into social, cultural, political, economic, and environmental concerns that are outside their immediate training.

By embracing the concept of story there is much to be gained. Many aspects of contribution that the mining industry makes are simply beyond the realm of measured indicators. In many communities, the livelihood brought by mining is important not only because of jobs, wages, and cash contribution to the local charity but also, more importantly, because of the stability, respect, and confidence it brings to families and community during the life of the mine. There are many examples of where this sense of community leads to lasting relationships that far outweighs the significance of what can be short-term mining income. This side of mining's contribution defies capture by measured indicators.

As is often the case, such a perspective is a double-edged sword because story also includes the black side – the negative experiences. And mining, like every facet of human activity, has its share of the negative whether it is related to loss of life from accidents or poor design, labor strife, environmental disaster, the wrench of ill-prepared-for closure, or community discontent about the unfairness of the distribution of associated benefits. However, this other side is real and needs to be expressed. If not, the skeleton in the closet will leap out at the most inopportune moment. Further, by telling the bad along with the good, a sense of honesty and integrity is generated that over the long term is significantly more important than the details of any specific incident.

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