



Advanced Sustainable Foundry  
19-21 May 2014 • Palacio Euskalduna, BILBAO

## Sustainability is the Key Driver of Innovation

(D.R. Cooper)

Fairmount Minerals Ltd, Benton Harbor, Michigan

Copyright 2014 World Foundry Organization

### ABSTRACT

Innovation Opportunities; building business platforms will allow technology development centered on Sustainable Development efforts. The presentation will discuss the growing enthusiasm for sustainability within the business and metric reporting. We will link business values and sustainable work projects, how to challenge your workforce to engage in business innovation training and develop innovation programs that are aligned with business sustainability improvements. The examples will provide global evidence of how sustainability pays for all stakeholders.

**Keywords:** Sustainable Development, Business Innovation, Innovation

### INTRODUCTION

Sustainability and Innovation are both important and critical issues for organizations. Based on surveys and interviews Sustainable Development (SD) is driving business innovation and will continue to do so for the next decade.

The last 10 years has allowed for a change and positive adoption rates in companies understanding of sustainability. Many companies were convinced that the more environment-friendly they become, the more the efforts will erode their competitiveness. They believed SD initiatives adds costs and will not deliver immediate financial benefits.

Companies have engaged in many different methods to foster innovation, from cultural changes to incentivizing employees for being innovative. New technology was the catalyst for business innovation in the 1990's, however, few have made the connection between innovation and sustainability or have used sustainability as a way to improve innovation performance. Sustainability is a new

way to engage in business innovation and gain or maintain a competitive advantage. Business Innovation involves more than just science and technology, it is a social process in which both economic and ultimately governance factors have important roles. In the last few years, more and more companies are looking to play catch up to the leading companies in the United States. As a result, we are seeing sustainability being driven from a group of top leadership.

MIT Sloan's 2012 Sustainability & Innovation Global Executive Study asked 2600 executives across various industries about innovation and the role of sustainability. 48 percent responded that they had changed their business model to incorporate sustainability, up from 40 percent in 2011. Of those, 75 percent reported that they broke even or made a profit, and 46 percent said sustainability added to their bottom line.

There are still a number of senior business leaders today that think sustainability is disconnected from the core of their business; however, research suggests that sustainability is strongly tied to the ability of the company to innovate. Recent completed research demonstrates that being a sustainability leader can significantly raise your company's chances of being a top innovator.

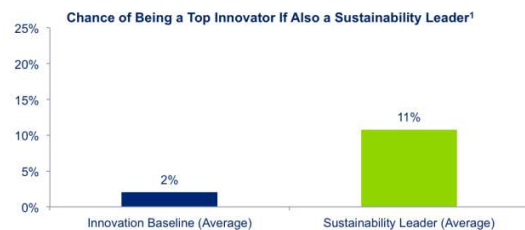


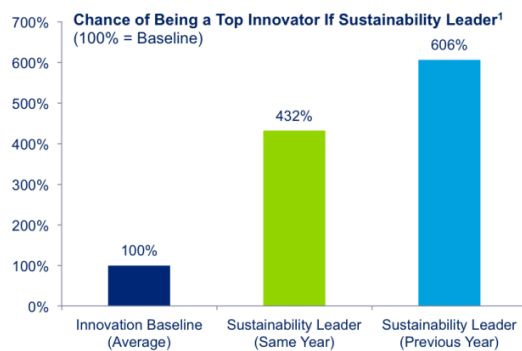
Fig. 1. The Graph provides the average survey results.



**Advanced Sustainable Foundry**  
19-21 May 2014 • Palacio Euskalduna, BILBAO



When the question was asked if sustainability is linked to innovation, the results showed a 2009 sustainability leader is 400% more likely to be an innovation leader in 2009 and 600% more likely to be one in 2010. Sustainability and innovation are linked together, as shown in Figure 2.

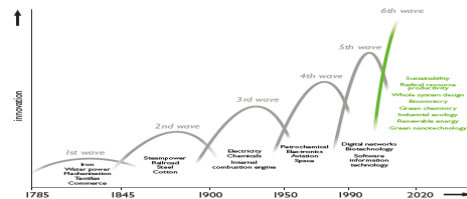


**Fig. 2. Provides the Percentage of Being a Top Innovator.<sup>1</sup>**

### WHY ARE WE SEEING SUCH A STRONG LINK FROM SUSTAINABILITY TO INNOVATION?

Sustainability can provide a different “lens” for thinking and helps companies to approach situations differently. Thinking about different subjects or thinking differently about existing subjects creates new ideas. Thinking differently can unlock companies’ innovative potential. They may see situations from a different point of view. They may reexamine their perspective of what’s important, and they can tap into new ideas. Many Environmental Health & Safety (EH&S) leaders are becoming more involved in the ideation sessions.

A study from 2004 projected sustainability is part of the 6<sup>th</sup> wave of innovation. The use of bio products and green chemistries were predicted to increase significantly. The time for implementation continues to be shorter than previous waves of innovation. Figure 3 shows the rate of change in the US, which was predicted to increase with technology and the ability to adopt change.



**Fig. 3. The waves of Innovation<sup>10</sup>.**

### ADDING CONSTRAINTS

Sustainability can also help drive innovation by adding constraints. While constraints are often seen as reducing the ability to be creative, that is not always the case. The constraints imposed by regulations are moving us to reserve resources for future generations. Sustainability can actually serve as great ways for companies to think differently and therefore act innovatively. For instance, viewing emission standards as a new constraint may lead to ideas for improving energy efficiency and reducing the volume of resources required. Figure 4 shows there are 4 different stages to engage more departments in an organization. Individuals advance from compliance, to reviewing the end to end supply chain. Top Management can spark research development and marketing for creating and designing new products and services. Once additional departments are engaged creating a true sustainable culture, new business models naturally occur and will be developed allowing companies to prosper.

### Sustainability Challenges, Competencies, and Opportunities



**Fig. 4. The stages of Engagement.**

Sustainability can drive innovation by introducing **new design constraints** that shape how key resources—energy, carbon, water, materials and waste—are used in products and processes.

A 2012 survey was conducted with the American Foundry Society (AFS) adhoc Sustainability Committee members<sup>6</sup>. The initial survey included 42 member



## Advanced Sustainable Foundry

19-21 May 2014 • Palacio Euskalduna, BILBAO



companies. After attending many educational sessions the survey showed 62% of the member companies were operating in stage 1 are viewing compliance as a method for reducing resource consumption. Stage 2 showed a few results and one company had scoring in Stage 3.

### **Process**

A Harvard Business Review<sup>2</sup> article notes: "Sustainability is a mother lode of organizational and technological innovations that yield both bottom-line and top-line returns." In order for sustainability to impact innovation, companies must look at modifying the existing business model or creating a new one.

Key examples include<sup>2</sup>:

- Leadership Support, CEO buy-in
- Change Management – Appreciate Inquiry
- Stakeholder Collaboration –Best practice sharing
- Living through principles - trust, fun, integrity, etc.

The first, of course, is support from the top leadership. It is not enough for executives to state that this is a priority; they must act upon it and demonstrate the leadership activities. Sustainability cannot be only denoted in something such as annual Sustainability CSR (corporate social responsibility) report. It must be part of the strategic plan and interwoven into the roles of the different departments.

The second is communicating the business case for change and action. Innovation means thinking differently and most people are not comfortable with change. Having a clear vision of how this change will benefit those participating and those potentially being impacted in the future by the change goes a long way to gaining buy-in. So does involving the individuals that will be impacted.

The third is collaborating and obtaining input from external stakeholders. This can include customers, nonprofit organizations, suppliers, the community and even competitors. A local university may have new

insights and relevant research and a customer may have suggestions on improving the product in ways you may not have thought of.

The fourth and equally important ingredient is to have fun. Integrity and Trust are required to allow the individuals to engage in having fun. Get your company's creative excitement by creating safe friendly games.

Companies can use sustainability to their advantage and turn these new ways of thinking and innovative outputs into concrete improvements: improved focus, ideas and decisions about which ideas to pursue. No matter how an organization's innovation process is defined—even if they don't have a formal innovation process at all—just the act of including sustainability in their thinking can create real value.

### **INNOVATION TYPES**

There are two different distinctions between innovation types. The two types include

- 1). Sustaining Innovation - incremental advantages
- 2). Disruptive Innovation – radical thinking.

Both types will open new roads to organizations which may not have engaged in this type of thinking. The types of innovations will differ according to the innovation systems and socio-economic conditions of different countries, and needs critical assessment.

### ***Innovative Leaders Speak out Around the World***

CEO's and world leaders continue to speak out on linkages of business innovation to sustainability. Bill Gates called on world leaders to invest more in innovation for development, describing innovation as the "most powerful force for change in the world". "Innovation fundamentally shifts the trajectory of development," Gates, founder of the computing corporation Microsoft and co-chair of the Bill & Melinda Gates Foundation, told the summit of the



Advanced Sustainable Foundry  
19-21 May 2014 • Palacio Euskalduna, BILBAO



Group of 20 major advanced and emerging economies (G20) in France on Nov 3, 2011.

***Leaders are setting the stage in key areas around the world.***

Gates said that, despite some successes, "Innovation has not played as big a role in development as it could have". "Some innovations take hold in rich countries quickly but take decades to trickle down to poor countries. The pace of innovation specifically for the poor has been too slow. But I believe it can be sped up, and the rapidly growing countries of the G20 are especially well positioned to drive this improvement." In particular, he said, the G20 should identify the "highest priority innovations for development" including areas of agriculture, health, education, governance, manufacturing and infrastructure.

"One of the newest resources for development — and potentially one of the most transformative — is rapidly growing countries' capacity for innovation. Countries like Brazil, China, India, and Mexico are in a great position to work closely with poor countries because they have recent experience in reducing poverty, as well as enormous technical capabilities," Gates said. "This unique combination gives them both the insights and the skills to create breakthrough tools for development."

*"Innovation fundamentally shifts the trajectory of development," said Bill Gates, founder of the computing corporation Microsoft and co-chair of the Bill & Melinda Gates Foundation*

**CUSTOMERS ARE ASKING THE QUESTIONS**

Even if a company is not investigating about how to incorporate sustainability into business operations, it is very likely that at least some of their customers are. The organization is at risk and potentially missing out on valuable opportunities if they do not include the topics in the search for innovative ways to provide value to these customers.

The business case for sustainability is a well-defined list of benefits, both tangible and intangible. These include, but are not limited to, cost savings, quality improvements, attracting and retaining talent, enhancing reputation, and compliance, among others. Innovative sustainable

development's potential is a way to create opportunities for companies to tweak or radically improve their products and services in a way that reduces their environmental impacts. The services and products deliver new features and benefits.

Sustainability-driven innovation includes identifying new applications for current services and products, upgrading business processes, developing new products and services, using or creating new technologies and changing management techniques.

- ✓ *Identify key areas for improvement—not all sustainability initiatives are created equal in terms of potential to create business value.*
- ✓ *Prioritize projects—don't follow the leader, but instead prioritize projects based upon your individual company strategy.*
- ✓ *Measure key performance indicators and results against target: establish meaningful targets for improvement with verifiable data.*

**Implementation of Small Ideas assisting – People, Planet, Profits (3P's)**

Sustainability-focused innovation does not have to mean an overhaul of the entire organization. Even the small ideas can save big and have a big impact. Many examples exist where a small change led to bigger changes and bigger savings, for the company, as well as for the planet.

For example, UPS' no left turn policy resulted in a savings close to \$20 million a year. 3M's 3P program (Pollution Prevention Pays) encourages employees to rethink products and processes. The 3P's saved 3M nearly \$1.7 billion, and eliminated more than 3.8 billion pounds of pollution as a result. A Foundry is providing approximately 200,000 cubic yards of foundry by-products to facilitate the construction of a community sledding hill, ice rink, amphitheatre and parking for residents in the City of Waupaca, Wisconsin. The 3P's is allowing for a reduction of landfill, community benefit and reuse of a natural mined material.

The members on the committee<sup>6</sup> have created a list of items which to most are small ideas, which once



Advanced Sustainable Foundry  
19-21 May 2014 • Palacio Euskalduna, BILBAO



reviewed show significant impact to the triple bottom line.

Use of challenges was tested by an AFS member company to generate ideas for innovation using the principals of SD. In 2013, the member company used specific challenges to engage and educate employees in the process of innovation. The Business Innovation Team at includes approx. 45 employees or 5% of the company. Six companywide challenges were posed to all internal stakeholders in the form of questions. A challenge was supplied monthly to the organization from May – October, 2013. The group was given three weeks for each challenge to provide responses as well as build on other responses. A tracking system was provided and individuals would email their responses to a contact person.

All employees were all asked to engage in the process and each facility had a goal to provide a set number of ideas into the tracking system over the time period. The group submitted over 300 responses during the 6 months. The challenges served as a way to assist the facilities in achieving their goals. As ideas were received the concept of idea mapping<sup>4</sup> was utilized. This tool worked to advance the ideation to the next level. With a focused approach individuals were able to contribute ideas concerning a topic with little background information.

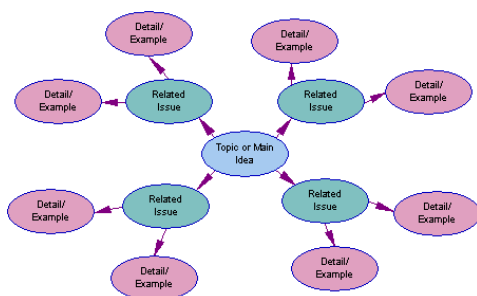


Fig. 5. An example of an Idea Map.<sup>4</sup>

Idea Mapping<sup>4</sup> is a powerful whole-brained visual thinking tool that enhances memory, note-taking skills, thought organization, planning, creativity, and

communication. It uses color, keywords, lines and images to connect thoughts associatively. Idea Maps are the natural expression of the way the brain processes information associatively. Idea Mapping is a simple and profound tool that helps individuals and organizations improve productivity, clarify thinking, save time, and enhance learning, while simultaneously producing incredible results.<sup>4</sup>

### ***Building a Pipeline of Ideas***

Once you have the ideas, you can spend time reviewing and identifying those to pursue.

- Focus on the Front-End: Innovation leaders spend more time working the innovation process to identify higher-quality ideas at the front end and consequently fund more sustainable ideas than their peers.
- Collaborate Externally: Top performers devote more to open innovation with stakeholders, thus they are better at combining external technologies with internal capabilities.
- Optimize the Best Ideas: Leading innovators spend more time in the innovation process and less time in execution.
- Improve Transparency: The best firms communicate and collaborate on successes and failures to continuously improve the process.

Developing the ideas into your strategic planning process is key to maintain momentum. Continue to dig deeper – using different tools. Collaborate where it makes sense with external stakeholders, follow the value creation and support future opportunities.

### ***Linking to bottom & top line returns to the Triple Bottom Line***

Research shows that sustainable development cultures create organizational and technological innovations that yield both bottom-line and top-line returns. Becoming environment-friendly lowers costs because companies end up reducing the inputs they use. In addition, the process generates additional revenues from better



Advanced Sustainable Foundry  
19-21 May 2014 • Palacio Euskalduna, BILBAO



production or enables companies to create new businesses. In fact, because those are the goals of corporate innovation, we find that smart companies now treat sustainability as innovation's new frontier.

Leadership and talent are critical for developing a low-carbon economy. The current economic system has placed enormous pressure on the planet while catering to the needs of only about a quarter of the people on it, but over the next decade twice that number will become consumers and producers. Traditional approaches to business will collapse, and companies will have to develop innovative solutions. That will happen only when executives recognize a simple truth: Sustainability = Innovation. Indeed, the quest for sustainability is already starting to transform the competitive landscape, which will force companies to change the way they think about products, technologies, processes, and business models.

The key to progress, particularly in times of economic crisis, is innovation. Just as some internet companies survived the bust in 2000 to challenge incumbents, so too, will sustainable corporations emerge from today's economic conditions to upset the status quo.

### **By-product Synergy**

*By-Product Synergy is the matching of wastes and undervalued resources at one facility with potential users at another – the results include reductions in operating costs, improved environmental performance, increases in energy efficiency, reductions in CO2 emissions, and job creation and retention. – Definition provided by USBC-SD*

Communicating the current practices of the metal casting industry is important since the industry is one of the oldest recyclers, (examples; slag, spent foundry sand, packaging, etc.). Utilizing the triple bottom – economic, governance, and social elements, allows for the projects. One innovative idea is to engage in By-product Synergy groups. The groups allow the audiences to identify opportunities across organizations and industries. The AFS First Group<sup>9</sup> has been engaged in the reuse of spent foundry sand for over a decade.

The United States Business Council for Sustainable Development (USBC-SD)<sup>8</sup> has been working on by-product synergy efforts for many years within and across industries. Recently the AFS sustainability committee has been in discussions with the group<sup>8</sup> to leverage the current projects for growth.

There are also innovations in the ways organizations are arranged, in the way agendas are set, in the ways funding is allocated, and in ways of ensuring accountability.

Many constraints placed on metalcasters from regulatory agencies or a local community has and will continue to force the innovation process. Many on-going projects already include the following; Recognition of the efforts in the projects and taking credit for the efforts is missing from the metal casters surveyed.

Examples include:

- **Reclamation or offsite beneficial reuse of spent foundry by-products (sand, slag, etc.)**
- **Reduction or greater implementation of energy use**
- **Reduction or greater implementation of water use**
- **Utilization of state of the art pollution control equipment (air, water, etc.)**
- **Substitution of process chemicals/materials with less hazardous replacements**
- **Improvements in land use management sustainability initiatives, being a local resource, employee health programs)**

The results from interviews and the AFS survey showed that companies that pursue sustainability significantly increase their chances of becoming innovative leaders in the process. This is consistent with a conclusion noted<sup>3</sup> where innovation became stronger over time — the assumption being that using sustainability as a lens can lead to innovative ideas, some of which take time to become visible from the outside and therefore would show up in future years' innovation results<sup>3</sup>

***The majority of managers who say that their company's sustainability activities have added to profits also say that innovation has led to business model change.***



Advanced Sustainable Foundry  
19-21 May 2014 • Palacio Euskalduna, BILBAO



## CONCLUSION

In summary, sustainability is on the rise and will drive business innovation. Metalcasters are encouraged to communicate the great elements of Sustainability already implemented in the organizations and industry. Additionally, metal casters are being requested to set goals which drive innovation for a competitive advantage. Creating a culture which includes change management techniques allows individuals to create change. Continuing education is key for gaining innovative ideas from the viewed constraints. Engaging all stakeholders allows for ideation excellence. Sustainable-Driven Innovators in the metal casting industry will outperform financially.

The committee <sup>6</sup> is striving and encouraging metalcasters to develop and publish Sustainability Policies. The policies are used to communicate and convey companies' individual messages on their advancements. The AFS research and activities provide a working document and template for metalcasters to communicate their findings in the form of metrics and reporting. Many new ISO programs around the world are looking to assist individuals in making the commitments.

A comparison survey <sup>6</sup> was completed initially with a group of 60 global companies. The original responses were obtained in early 2012 with a follow up in late 2013. The results are consistent with the research and discussions with key leaders. During the 15 month time period, education sessions and committee work communicated at events resulted in a 73% improvement in understanding and efforts for communications on linking Sustainability with Innovation.

Innovation is driven by your Sustainable Development Activities completed in organizations. Sustainability activities bring a new set of data to the table. Reviewing constraints in a positive manner, engaging with stakeholders and acting on your ideation events allows you to grow in your triple bottom line.

## REFERENCES

1. Harnessing sustainability's ability to spark innovation, [http://www.deloitte.com/view/en\\_US/us/Services/additional-services/deloitte-sustainability/65b2f6a461fe1410VgnVCM2000003356f70aRCRD.htm#](http://www.deloitte.com/view/en_US/us/Services/additional-services/deloitte-sustainability/65b2f6a461fe1410VgnVCM2000003356f70aRCRD.htm#) (2013).
2. Nidumolu r., Prahalad C.K., and Rangaswami, M.R, Harvard Business Review - Why Sustainability Is Now the Key Driver of Innovation by (September 2009).
3. Innovation with Impact; Financing 21<sup>st</sup> Century Developments. Gates tells G 20 innovation is the key to development, (2011).
4. What is idea mapping <http://ideamappingsuccess.com> (2013).
5. Makower J., How sustainability leadership drives innovation, <http://www.greenbiz.com/blog/2013/10/27/how-sustainability-leadership-drives-innovation>, (Oct 28, 2013.)
6. American Foundry Society Sustainable Development Committee, 2012 Sustainability Survey, Dana Cooper, (April, 2012).
7. American Foundry Society, 2013 Sustainable Development Survey and Interviews, Dana Cooper, (May 2013).
8. USBC-SD website & interviews, Dana Cooper, Andrew Mangan, (2013-March, June, Sept).
9. AFS First Organization, <http://www.afsinc.org/government/AFSFirst.cfm?ItemNumber=7> (2013).
10. The Natural Edge Project <http://www.naturaledgeproject.com>, (2004).
11. Cooper, D. Fairmount Minerals Ltd Interviews, Dana Cooper, (June 2013).

## ADDITIONAL READING

“World’s Most Admired Companies—Best in Innovation,” Fortune, 2006–2011;  
“50 Most Innovative Rankings,” BusinessWeek, 2006–2010;  
“100 Best Corporate Citizens,” Corporate Responsibility Magazine, 2006–2011; “Green Rankings,” Newsweek, (2009–2010).