innovating for sustainability

A Guide for Executives

Network for Business Sustainability

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Prepared by NBS

"[S]mart companies now treat sustainability as innovation's new frontier."[1]

1 Nidumolu, R., Prahalad, C.K., & Rangaswami, M.R. 2009. Why sustainability is now a key driver of innovation. ***Harvard Business Review***, 87(9): 57-64.

innovating for sustainability

A Guide for Executives

This report answers the question: “What innovation activities do firms engage in to become sustainable?” Based on 127 leading academic and industry sources from 1992 to 2012, this guide:

1. Presents a sustainability roadmap for business leaders, including a 3-stage framework for assessing which stage(s) of the sustainability continuum your organization currently occupies.
2. Provides 39 practices for fostering innovation across each stage.
3. Highlights “how-to” case studies from leading organizations, large and small, that are actively finding new ways to serve people, profits and planet.

Who Should Read This Report

This report is for chief innovation officers and chief sustainability officers, for directors of operations and directors of product development. It is for designers, engineers, architects and artists, for entrepreneurs and business leaders. Above all, this report is for anyone who sees the potential of innovation to reveal new products, services and business models that benefit people and the environment. It is for the visionaries and frame-breakers who see environmental and social initiatives not as cost centres but as opportunities.

What is "Innovating for Sustainability"?

Innovating for sustainability involves making intentional changes to organizational products or processes that produce environmental and/or social benefits as well as economic value.

Why Innovate for Sustainability?

In 2011, leaders from 16 Canadian companies asked the Network for Business Sustainability what innovation activities would help their organizations become more sustainable.[2] These business leaders believe innovation will help their companies make dramatic improvements to their environmental and social impacts. And they want academic insights into the mechanisms and best practices that drive innovation and sustainable development.

Business leaders realize the pursuit of sustainability can also drive innovation. As management researchers Ram Nidumolu, C.K. Prahalad and M.R. Rangaswami observe in a Harvard Business Review article: "… sustainability is a mother lode of 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 products or enables companies to create new businesses. In fact, because [growing the top and bottom lines] are the goals of corporate innovation, we find that smart companies now treat sustainability as innovation's new frontier."

It's a virtuous cycle. Whether you produce a bicycle made of 100 per cent post-consumer content that biodegrades at the end of its useful life (innovation motivated by sustainable goals) or develop a clean-burning fuel additive in an effort to improve vehicle performance (sustainability motivated by innovation), the result is the same: financial gain for your organization and better relationships with people and the natural environment.

"The combination of innovation, sustainability and profitability is powerful," said Grete Bridgewater, Director, Environmental Services for Canadian Pacific. "If research can unlock the potential in our organizations to view our business models differently and encourage sustainable innovation in a meaningful way, then we will learn, adapt and lead change."

What is "Business Sustainability"?

Business sustainability refers to business models and managerial decisions grounded in financial, environmental and social concerns.

Sustainable companies:

- Create financial value.
- Know how their actions affect the environment and actively address those impacts.
- Care about their employees, customers and communities and work to make positive social change.
- Understand these three elements are intimately connected to each other.

Compared to companies that focus on short-term profits and make decisions based solely on the bottom line, sustainable companies think long term. They forge strong relationships with employees and members of the community. They find ways to reduce the amount of natural resources they consume and the amount of waste and pollution they produce. As a result, sustainable companies survive shocks like global recessions, worker strikes, executive scandals and boycotts by environmental activists.

2 Network for Business Sustainability. 2012. ***Canadian business sustainability challenges 2012***. London, Canada : Network for Business Sustainability. http://nbs.net/knowledge/2012-canadian-business-sustainability-challenges/

innovating for sustainability

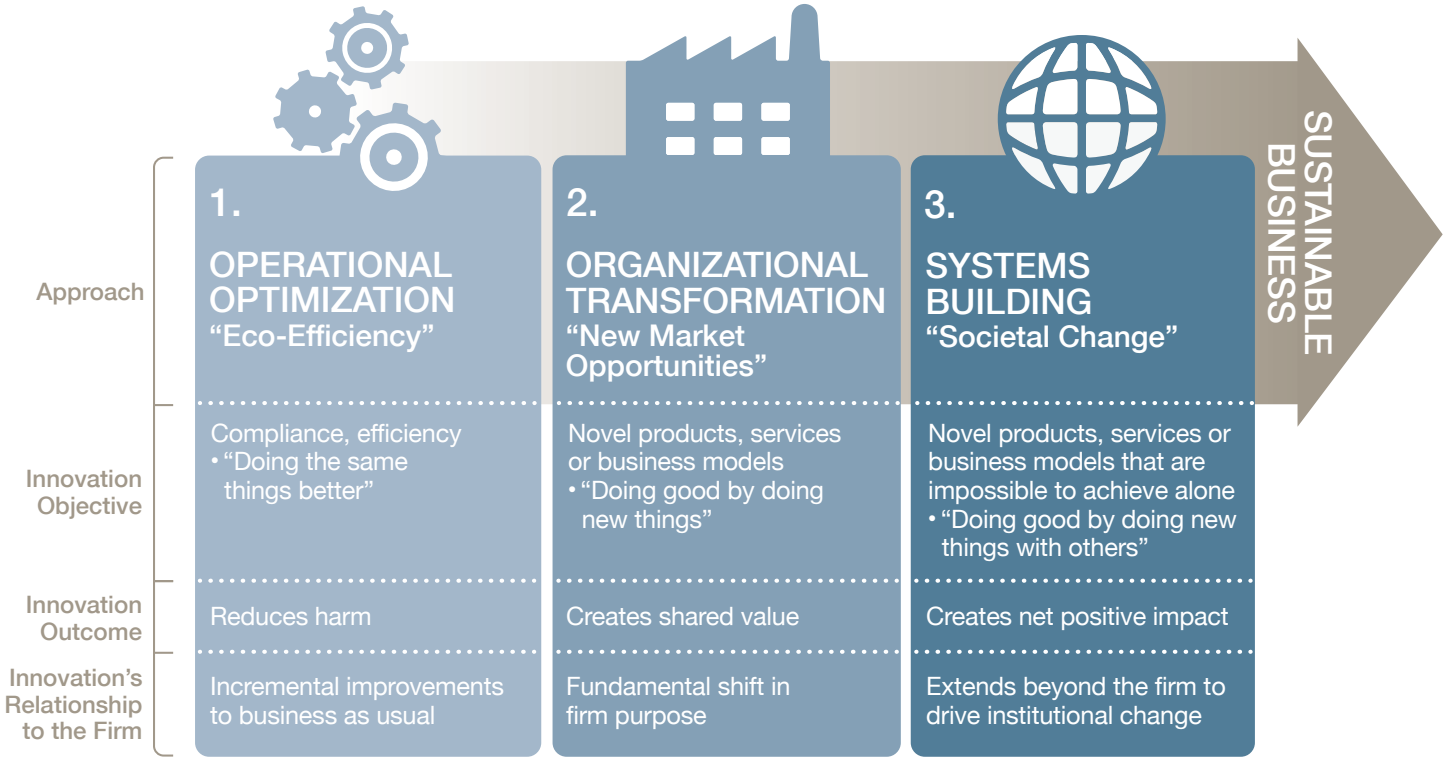
3 Dimensions of Innovating for Sustainability

The research revealed companies pursuing sustainability could map their innovation along three dimensions: (1) whether it focused on technology or people, (2) the firm's view of itself in relation to society and (3) the extent to which innovation extends across the firm.

The framework on the following page builds on these dimensions and presents a new model for assessing and planning your company's approach to sustainability. Business leaders can use this framework to evaluate current activities at the level of individual products, product lines and business units or their entire organization.

A 3-Stage Framework for Innovating

Companies' positions on each of the dimensions correspond to the following three stages: Operational Optimization, Organizational Transformation and Systems Building.



The Framework at a Glance

Organizations in Stage 1 add environmental and social criteria to existing quality or profit criteria. The result? Reducing the harm caused by business as usual. Organizations in Stage 2 see the business opportunity in producing new products or services that serve human needs and/or benefit the environment. This can be described as devising a business model around "doing good." Organizations in Stage 3 are positive change agents who view themselves as part of an interconnected ecosystem – existing to benefit and change society.

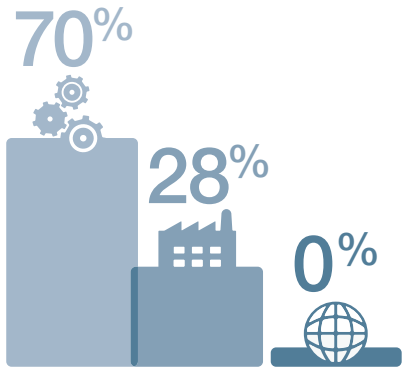
As you move from left to right in the framework, companies come closer to the ideal of true sustainable business: Systems Building. The ideal, however, is unattainable for many conventional businesses today. An automaker, for example, will never be completely sustainable as long as it manufactures vehicles that: burn non-renewable fossil fuels, are made from non-renewable metals dug out of the ground, and produce pollutants hazardous to the environment and human health. The majority of organizations will recognize themselves in the first stage of the framework: Operational Optimization. And there are still many gains to be made in this first stage.

Firms can move through the stages in different ways. Not all organizations start at the first stage of Optimization: many social enterprises, co-operatives, and organizations founded specifically to support sustainable development will launch directly in Stage Two: Organizational Transformation. Also, the leaps from Optimization to Transformation and from Transformation to Systems Building require radical mindset shifts. So, while you can use this framework as an inspirational vehicle for launching your company into a new stage, you can also use the practices in this report to maximize your innovation and improve your societal impacts at whatever stage you currently occupy.

The "Ambidextrous Organization": Straddling More than One Stage

It's not necessary for all of a firm's activities to reside within a single stage. The ambidextrous organization is one with a specific business unit or department experimenting with a more advanced stage of innovation while the rest of the organization maintains business as usual. This pilot approach to sustainability, similar to a "skunk works," is flexible and enables experimentation without having to shift the entire organization.

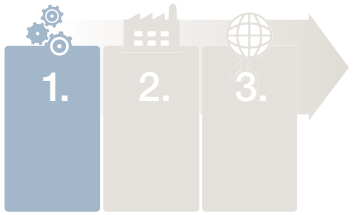
Stages Represented in the Research



The majority of studies in this review (70 per cent) examined organizations in the Operational Optimization stage. 28 per cent examined organizations in the second stage, and 2 per cent reflected a combination. Some companies may occupy the third stage, but none of the studies included in this review provided empirical evidence of them.

how to use the framework

The following pages describe each stage of the framework in more detail. Identify the stage that best aligns with your company's sustainability goals and read the practices on **pages 11-16** for innovating at that stage.



1. Operational Optimization: "Doing the Same Things Better"

Definition: Compliance with regulations or optimized performance through increased efficiency.

In the stage of Operational Optimization, the organization actively reduces its current environmental and social impacts without fundamentally changing its business model. In other words, an Optimizer innovates in order to "do less harm." Innovations are typically incremental, addressing a single issue at a time. And they tend to favour the "techno-fix" – focusing on new technologies as ways to reduce impacts while maintaining business as usual. Innovation tends to be inward-focused in both development and outcome; at this stage, companies typically rely on internal resources to innovate, and the resulting innovations are company-centric: their intent is primarily to reduce costs or maximize profits.

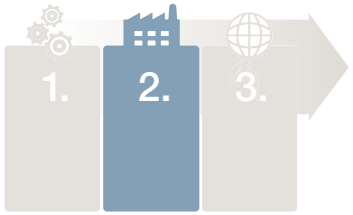
Keywords Associated with Operational Innovations:
Bolt-On or "End of Pipe" Solutions; Incremental Change; Risk Reduction; Competition; Winning; War; Products; Short-Term; In-house R&D; Technology.

Innovation Examples

Organization Level
- Pollution Controls
- Flexible Work Hours/Telecommuting
- Waste Diversion
- Shuttering or Consolidating Facilities
- Energy Efficient Lighting
- Use of Renewable Energy
- Reduced Paper Consumption

Product Level
- Reduced Packaging
- Decreased Use of Raw Materials
- Reduced Use/Elimination of Hazardous Materials
- Optimization of Product Size/Weight for Shipping

Service Level
- Hybrid Electric Fleet Vehicles
- Delivery Boxes Redesigned from Single to Multi-Use



2. Organizational Transformation: "Doing Good by Doing New Things"

Definition: The creation of disruptive new products and services by viewing sustainability as a market opportunity.

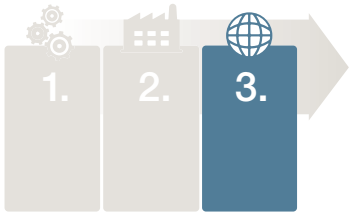
Rather than focusing on "doing less harm," Organizational Transformers believe their organization can benefit financially from "doing good." They see opportunities to serve new markets with novel, sustainable products, or they are new entrants with business models predicated on creating value by lifting people out of poverty or producing renewable energy. Organizational Transformers may focus less on creating products and more on delivering services, which often have a lower environmental impact. They often produce innovations that are both technological and socio-technical – designed to improve quality of life for people inside or outside the firm. Transformers are still primarily internally-focused in that they see their organization as an independent figure in the economy. However, they do work up and down the value chain and collaborate closely with external stakeholders. The move from Operational Optimization to Organizational Transformation requires a radical shift in mindset from doing things better to doing new things.

Keywords Associated with Operational Innovations:
Creative Disruption; Regeneration; Contribution; Benefit; Effectiveness; Resilience; New Markets; People; Opportunity; Collaboration; Social Entrepreneurship; Social Innovation.

Innovation Examples

- **Disruptive New Products that Change Consumption Habits.** Example: A camp stove that turns any biomass into a hyper-efficient heat source and whose sales subsidize cheaper models distributed in developing countries.[3]
- **Disruptive New Products that Benefit People.** Example: CT scanners that are portable, durable and have minimum functionality – making them affordable and useful for health care providers in developing countries.
- **Replacing Products with Services.** Examples: Leasing and maintaining carpets over a prescribed life-time rather than selling them. Introducing car- and bike-sharing services in urban centres to reduce pollution caused by individual car ownership while increasing overall mobility.
- **Replacing Physical Services with Electronic Services.** Example: Reducing paper consumption by delivering bills electronically rather than by mail.
- **Services with Social Benefits.** Example: A smartphone app that rewards people with coupons for local merchants when they make charitable donations.[4]

3 FastCompany Magazine. 2012. *The 2012 Innovation by Design Awards*. October: 105.
4 FastCompany Magazine. 2012. *The 2012 Innovation by Design Awards*. October: 108.



3. Systems Building: "Doing Good by Doing New Things with Others"

Definition: The intimate, interdependent collaborations between many disparate organizations that create positive impacts on people and the planet.

Systems Builders perceive their economic activity as being part of society, not distinct from it. Individually, almost every organization is unsustainable. But taken as a collective, systems can sustain each other. Systems Builders extend their thinking beyond the boundaries of the organization to include partners in previously unrelated areas or industries. Because the concept of Systems Building reflects an unconventional economic paradigm, very few organizations or industries occupy this realm. The move from Organizational Transformation to Systems Building requires another radical shift in mindset – this time from doing new things and serving new markets to thinking beyond the firm.

Keywords Associated with Operational Innovations:
Holistic; Shared Benefits; Net Benefit; Interdependence; Cooperation; Society; Integration; Long-Term.

Innovation Examples

- **Industrial Symbiosis.** Disparate organizations cooperate to create a "circular economy" in which one firm's waste is another's resources. Example: A construction company uses other companies' glass waste: the synergies lead to environmental and economic benefits for all.
- **B Corporations.** Conceived in the United States but now existing in dozens of countries worldwide, B Corporations are organizations legally obliged to deliver societal benefits. Well-known examples include ice cream producer Ben & Jerry's, e-commerce platform Etsy and cleaning product manufacturers Method and Seventh Generation.

Industrial Symbiosis

In a Swedish multi-sectoral initiative, the Landskrona industrial symbiosis program brought together more than 20 firms and three public organizations to find novel solutions to sustainability challenges. In one case, wastewater from car glass manufacturing replaced the drinking-quality water a printing company used in its wet scrubber, which removes volatile organic compounds (VOCs) from flue gases.

how to innovate for sustainability

Now that you know which stage reflects your organization's sustainability goals, figure out what you need to do to foster innovation in that stage. The research identified 39 practices. From targets and monitoring to design tools and knowledge management systems, these practices will help your company innovate – whether your goal is to reduce the carbon footprint of your web design firm or reinvent the automobile. Review the list of practices to identify which you're already using and which you could start implementing today. Note that some practices stretch across stages.

TARGETS AND GUIDELINES

1. Operational Optimization	2. Organizational Transformation	3. Systems Building
Efficiency Targets, Policies. Create formal sustainability targets and policies, such as: Reduce absolute energy use 20 per cent by 2020. Or reduce water consumption five per cent every year.	**Audacious, Net Benefit Goals.** Set big goals even if it's unclear how to achieve them. Ensure these goals reach beyond operational efficiencies and incremental improvements. Examples include: Zero waste, net positive energy (producing your own energy).	
Sustainability Goals Added to Specs. Build sustainability goals into existing technical specifications.	**Sustainability Goals Drive Product Specifications.** Establish environmental and human health targets before determining product or service features.	

LEADERSHIP AND GOVERNANCE

1. Operational Optimization	2. Organizational Transformation	3. Systems Building
Direction from Senior Team. To support employee buy-in, ensure the senior team and line managers articulate your organization's sustainability goals, including why the goals are important to the company.		
Exploiting Organizational Slack. Take advantage of any available resources to pursue innovation. Use the resources to conduct market research, test product eco-labelling, experiment with environmentally-sound process innovation or develop greener products on speculation.		
	Revised Business Model. Revisit and reframe the business model and modes of governance based on the triple bottom line. Consider the needs of all stakeholders, rather than just those who hold shares and treat nature as a stakeholder.	**Equal Consideration of People, Profit, Planet.** Balance all aspects of the triple bottom line in organizational decision-making.

INTERNAL COLLABORATION

1. Operational Optimization	2. Organizational Transformation	3. Systems Building
Cross-Company Collaboration. Create opportunities for employees to collaborate across departments or functions. In addition to spreading innovation practices, this intra-organizational collaboration strengthens employees' awareness of and commitment to sustainability.		

EXTERNAL COLLABORATION

1. Operational Optimization	2. Organizational Transformation	3. Systems Building
Knowledge Institution Collaborations. Work with experts at universities, colleges and technological institutes to compensate for lack of resources or expertise.		
Customer Insights. Work with customers to identify their concerns with respect to both the functionality and sustainability of your products or services. Consider customer user groups as vehicles not only for driving product development but also for driving product uptake.	**Wider Networks, Including Unrelated Industries.** Broaden your network to include NGO's, industry associations and economic development organizations as well as organizations you may have previously dismissed such as competitors or lobbying groups. Explore opportunities at the interfaces of previously unrelated industries. Look for organizations near yours whose wastes could be inputs into your processes – and vice versa.	
	Long-Term Interdependencies. Develop long-term relationships with the partners in your wider network that focus on mutual benefits.	
		Leading Institutional Dialogue. Engage government, industry and educational institutions to influence, for example, capital markets' and investors' attitudes towards sustainability and financial performance metrics. Drive the creation of industry-wide sustainability certification programs.

SUPPLY CHAIN MANAGEMENT

1. Operational Optimization	2. Organizational Transformation	3. Systems Building
Greener Supply Chain. Commit to improving the environmental and social performance of your supply chain. For example, write a supplier code of conduct requiring that all wood products be sourced from sustainable forests. Request written confirmation from suppliers that they meet your specifications.	**Long-Term Supplier Relationships.** Collaborate with existing and new suppliers to access new materials or technologies and compensate for lack of resources or expertise. Audit supplier practices (perhaps by partnering with competitors or others in your industry) and work with suppliers to help them improve.	**Leading and Mobilizing Change.** Become an evangelist for sustainable development in your supply chain. Propose novel ways of working with your suppliers and even help them with companies further up their value chain.

For more resources: see the NBS report on **Managing Sustainable Global Supply Chains**

ORGANIZATIONAL STRUCTURES

1. Operational Optimization	2. Organizational Transformation	3. Systems Building

Monitoring Process Performance. Establish triple-bottom-line metrics for firm operations and monitor progress.

Monitoring Product Performance. Use mechanisms to assess performance of products and services according to sustainability criteria. Examples of mechanisms:

- Web interface that scores apparel products' environmental attributes.
- Index that assesses chemical innovations' environmental merit by plotting product functionality, material intensity, energy intensity, toxicity and resource conservation against two economic indicators: economic value created and security of the business position.

Relevant Reward Systems, Incentives. Establish reward systems and incentives that reflect the importance of sustainability. Link individual compensation to environmental and social performance of everyone from front-line to C-suite employees.

Transparent, Integrated Sustainability Reporting. Adopt transparent sustainability reporting that combines financial, environmental and social metrics. Options include: Global Reporting Initiative, International Integrated Reporting Committee and Carbon Disclosure Project.

KNOWLEDGE MANAGEMENT

1. Operational Optimization	2. Organizational Transformation	3. Systems Building
Existing Innovation Capabilities. Exploit existing capabilities, such as internal databases or research and development teams, and add the sustainability lens.		
Focused Internal Communications. Build internal communications around sustainability objectives and successes. This includes formal vehicles like internal newsletters, intranets, annual reports and the corporate website as well as informal mechanisms like quarterly progress reports from the president.		
Training, Recruiting, Importing Expertise. Acknowledge that "not all the smart people work for us" and hire outside experts or recruit new employees with interest and skills in sustainable development.		
	Unlearning Outdated Knowledge. Recognize that existing knowledge or assumptions preclude radical new ideas. Examples include assumptions about the types of raw materials you need to make your products or the belief that innovation is only possible with a large, well-funded research and development division.	
	Scanning Unfamiliar Fields. Watch community action groups, social entrepreneurs, lobbyists, activists, emerging economies and members of potential target markets for indications of future sustainability concerns or opportunities.	

TOOLS AND PLATFORMS

See NBS's website for more resources on Life Cycle Analysis, Product Servitization and Designing "Green" First.

Biomimicry Examples:

- Self-repairing plastics inspired by the body's ability to heal wounds
- Velcro invented based on the hooking mechanisms on seeds
- Solar cells that mimic photosynthesis
- Energy-efficient buildings that copy termite mounds' ability to maintain constant temperature despite fluctuation in outside temperature.

1. Operational Optimization	2. Organizational Transformation	3. Systems Building
Existing Capabilities. Exploit existing design and manufacturing solutions to produce incremental solutions. Get your design team working on an engine that is more fuel efficient. Have your marketing team find ways to reduce packaging.		
Tools: EMS and LCA. Use available tools such as Environmental Management Systems (EMS) and Life Cycle Analysis (LCA) to integrate sustainability into products and processes. These could range from simple checklists to sophisticated cross-company programs.		
Using Fewer Resources, Less Energy. Find sources of biogas or solar or wind energy to power your operations. If no options exist, purchase Renewable Energy Credits. Design products so they user fewer raw materials, fewer virgin resources.	**Closed-Loop Manufacturing, Cradle-to-Cradle Design.** Adopt closed-loop manufacturing platforms that recover waste heat, water, energy or raw materials and reuse them. When this waste recovery and resource reuse happens between more than one organization, it's described as the "circular economy." Adopt cradle-to-cradle thinking that brings products back to manufacturers at the end of their useful life, at which point they can be disassembled and recycled into new products.	
Preserving Functionality. Ensure product functionality is not compromised.	**Back-Casting.** Start with a vision of the future and work backwards from that, not from the present forward.	
	Biomimicry (Learning from Nature). Encourage designers, engineers and product development teams to observe materials, behaviours and processes in the natural environment. Then apply those insights to solving human sustainability problems.	
	Product Servitization. Determine whether customers care about owning products or just having functionality. Consider new revenue models in which you: 1. Sell and maintain a product; 2. Lease, maintain and reclaim a product at end of life; or 3. Simply replace a product entirely with a service.	
	Jugaad/Frugal and Reverse Innovation Platforms. Experiment with new innovation platforms. Reverse innovation involves identifying or testing disruptive innovations in the developing world and bringing them to developed economies. Jugaad, or frugal, innovation involves conducting a cost-performance assessment and producing "good enough" products that meet customer needs.	
	Bottom-of-the-Pyramid Markets. Find ways to serve marginalized or "bottom of the pyramid" customers. Strong anecdotal evidence suggests pro-poor innovation — both for and by people living in poverty — stimulates new business models.	
	Learning from Local Firms. Multinationals can learn how best to serve new markets by partnering with local organizations.	
	Designing "Green" First. Integrate recovery, reuse and disposal thinking early in the design. process. Set targets early.	

in practice

The following are examples of companies that have implemented some of the above practices.

Rewarding Innovation

Global chemicals manufacturer LANXESS invites employees worldwide to suggest ways of improving the company's economic, environmental and safety performance. In 2009, LANXESS employees submitted approximately 1,800 suggestions – corresponding to almost 400 suggestions for every 1,000 employees. A third of the ideas were realized during the same period, bringing the company total savings of €1.6 million. The creative employees who came up with the ideas benefited as well, receiving prizes worth €590,000 in total.[5]

Environmental Management Systems (EMS)

Unilever developed the Brand Imprint tool to help each brand analyze its social and economic impacts – both positive and negative. The purpose is to help brands effect both incremental and transformational changes in the way they source, formulate, manufacture, package and market products.[6]

Life Cycle Analysis (LCA)

Clothing company Patagonia learned from an LCA that shirts made from regular cotton consume three times more petroleum in their lifetime than shirts made of synthetic fibre (because of the fertilizers used to grow the cotton and the extra effort needed to keep the garment clean). Recognizing that the extensive use of these chemicals harms water, soil and the health of farm workers, the company converted its sportswear lines to 100 per cent organic cotton, which requires fewer chemicals.[7]

Circular Economy

In 2004, Quebec-based paper manufacturer Cascades addressed rising production costs and reduced its carbon footprint by partnering with a local landfill. Paper manufacturing is an energy-intensive process, and the price of natural gas, which had been used to power the equipment, had started rising quickly. Always open to innovative solutions, the company cast its sights on a landfill in the nearby town of Ste. Sophie. Working with landfill owner Waste Management and the local utility, Gaz Métro, Cascades custom-built a 13 kilometre pipeline to carry biogas (methane and carbon dioxide) from the landfill to the paper mill. At minimal expense, they also retrofitted some of their equipment to accommodate the change from natural gas to methane. The initiative

5 LANXESS. *Open to ideas: Idea management at LANXESS*. http://lanxess.com/en/corporate/sustainability-home/employees-sustainability/ideas-management-sustainabilit/ Accessed December 10, 2012.
6 Petala, E., Wever, R., Dutilh, C., & Brezet, H. 2010. The role of new product development briefs in implementing sustainability: A case study. *Journal of Engineering and Technology Management*, 27(3–4): 172-182.
7 Ceres. 2010. *The 21st century corporation: The Ceres roadmap for sustainability. Boston: Ceres.*

had a two-year payback period for Cascades, produced cost savings for the company and revenue for Waste Management, and reduced greenhouse gas emissions for the paper mill by more than 40 per cent. “What started as a project to reduce costs turned into a competitive advantage,” said Cascades Business Development Manager Bernard Hellen. “Not only can we tell customers our paper is made from sustainable sources and post-consumer content – we can also tell them that we produce it with fewer greenhouse gas emissions!”

Designing “Green” First

Toronto furniture manufacturer Keilhauer puts people and the environment alongside features when designing its furniture products. This approach is called “Design for Environment.” Armed with a customer’s needs, Keilhauer president Mike Keilhauer prepares a design brief that includes environmental, ergonomic, feature and aesthetic specifications. The sustainability specifications include raw materials coming from renewable sources, disassembly potential for end of life recycling, how long the product will last, how much recycled content the finished product contains, and what third-party certifications the product must attain. External designers submit designs, which are then reviewed by a cross-functional team including the President, VP Engineering, Engineering Manager, VP of Manufacturing, Purchasing Manager, Sustainability Manager, and Customer Service & Logistics Manager.

Summary: How to Innovate at Each Stage of Sustainable Development

The following table presents a summary of the practices identified on **pages 11-16**, mapped by stage.

	1. Operational Optimization	2. Organizational Transformation	3. Systems Building
Targets and Guidelines	Efficiency Targets, Policies Sustainability Goals Added to Specs	Audacious, Net Benefit Goals Sustainability Goals Drive Specs	
Leadership and Governance	Direction from Senior Team Exploiting Organizational Slack		
		Revised Business Model	Equal Consideration of People, Profit, Planet
Internal Collaboration	Cross-Company Collaboration		
External Collaboration	Knowledge Institution Collaborations		
	Customer Insights	Wider Networks, Unrelated Industries Long-Term Interdependencies	
			Leading Institutional Dialogue
Supply Chain Management	Greener Supply Chain	Long-Term Supplier Relationships	Leading and Mobilizing Change
Organizational Structures	Monitoring Process Performance Monitoring Product Performance Relevant Reward Systems, Incentives Transparent, Integrated Sustainability Reporting		
Knowledge Management	Existing Innovation Capabilities Focused Internal Communications Training, Recruiting, Importing Expertise		
		Unlearning Outdated Knowledge Scanning Unfamiliar Fields	
Tools and Platforms	Existing Capabilities Tools: EMS and LCA		
	Using Fewer Resources, Less Energy Preserving Functionality	Closed-Loop Manufacturing, Cradle-to-Cradle Design Back-Casting Biomimicry (Learning from Nature) Product Servitization Jugaad, Frugal and Reverse Innovation Platforms Bottom-of-the-Pyramid Markets Learning from Local Firms Designing “Green” First	

about the research

This report was inspired by the NBS Leadership Council, which gathers annually to identify the top sustainability challenges for business. This report is an extension of a larger systematic review authored by Dr. Richard Adams, Dr. Sally Jeanrenaud, Dr. John Bessant, Patrick Overy, Dr. David Denyer, and Hannah Metcalfe. They reviewed 127 relevant sources spanning 20 years. The researchers conducted extensive, detailed analysis and synthesis of the sources to determine what innovation activities firms engage in to become sustainable. The team determined that firms innovating for sustainability fall into three distinct stages, and they produced a list of 39 practices for driving innovation within each stage. All content and references are derived from sources in the original systematic review, unless noted otherwise.

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Social Sciences and Humanities Research Council of Canada | Conseil de recherches en sciences humaines du Canada

NBS Leadership Council

NBS's Leadership Council is a group of Canadian sustainability leaders from diverse sectors. At an annual meeting, these leaders identify their top priorities in business sustainability – the issues on which their organizations need authoritative answers and reliable insights. Their sustainability priorities prompt NBS research projects.

about the network for business sustainability

A Canadian non-profit, the Network for Business Sustainability (NBS) produces authoritative resources on important sustainability issues with the goal of changing management practice. We unite thousands of researchers and professionals worldwide who believe passionately in research-based practice and practice-based research.

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NBS Knowledge Centre

For additional resources visit the NBS Knowledge Centre at nbs.net/knowledge. Examples of other NBS Executive Reports:

- Decision-Making for Sustainability
- Building Effective Environmental Policy
- Embedding Sustainability in Organizational Culture
- Managing Sustainable Global Supply Chains
- Measuring and Valuing Environmental Impacts

Join the Conversation!

- This guide is a work in progress. Please tell us what you like about it and what would make it more useful. Post a comment on NBS's Innovation web page at www.nbs.net or email us directly at info@nbs.net.
- Tell us how your organization is innovating for sustainability: your company may be featured online or in future NBS publications. Email info@nbs.net.
- Join the more than 3,000 sustainability managers and researchers who rely on NBS's authoritative resources for their work. Sign up to receive the latest findings in sustainability research and invitations to research presentations and peer-to-peer workshops in your area. Visit **www.nbs.net** to subscribe.
- Follow NBS on Twitter: **@NBSnet**
- Share this report with colleagues at your organization, leaders in your industry association and anyone else who believes researchers and managers working together can create sustainable business models.

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Penser l'entreprise en visionnaire

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