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Chapter 4

Finance

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The intersection of sustainability and finance occurs on many fronts. In this chapter, we will discuss how sustainability impacts various activities associated with the finance function, such as investments, banking, trading, insurance, and more. The chapter starts with capital investments, which are long-term corporate finance decisions related to fixed assets and capital structure. The discussion of the valuation techniques centers on the inclusion of sustainability measures in the analysis. Green and socially responsible investment opportunities, such as green bonds and emissions trading, are explored in the financial investment section. We then turn to financial services, such as banking and insurance.

4.1 Capital Investments

Prior to the acceptance of sustainable projects, socially responsible organizations have to evaluate the feasibility and sustainability of capital investments. Common financial methods historically employed in capital budgeting decisions include return on investment, payback period, unit cost of service, cost–benefit ratio, internal rate of return, and net present value. However, these methods are not always the best choices in sustainable finance since these methods do not explicitly account for cash flows associated with social, environmental, and economic impacts. These methods tend to externalize rather than internalize sustainable costs imposed on the society.

Sustainability Valuation

Valuation determines a company's worth. **Sustainability valuation**[1] shows how sustainability adds value to the business. Currently, no existing methodology is considered adequate for sustainability valuation. This has led to much debate surrounding the best way to measure sustainability valuation within the firm. A recent McKinsey & Company survey shows that executives believe that improvements in social, environmental, and governance performance create value; however, they do not agree on how much or how to measure it.McKinsey & Company (2009). Naturally, respondents agree that it would be helpful if companies reporting on sustainability performance would quantify financial impact, measure business opportunities as well as risks, and be transparent about methodology.McKinsey & Company (2009).

Research has shown that nonfinancial measures are the leading indicators of a firm's future financial performance.Frigo (2002). Additionally, research shows that firms listed on the Dow Jones Sustainability Index consistently outperform firms not listed on the Index. Thus, determining appropriate sustainability valuation metrics is particularly critical in this time of increasing emphasis on sustainability.

Given the importance of sustainability valuation but the lack of standardized approaches, several efforts have been made to identify or develop appropriate valuation metrics. In a recent effort to valuate sustainability performance, qualitative reports of progress were analyzed and converted to five common financial metrics: ratio analysis, discounted cash flow analysis, rules of thumb valuation, economic value-added analysis, and option pricing.Yachnin & Associates and Sustainable Investment Group Ltd. (2006). Other traditional financial approaches used include cost–benefit ratios and net present value.

1. A methodology for demonstrating how sustainability adds value to a corporation. To date, no specific set of financial metrics has been established for demonstrating the impact on company performance.

Yet it is commonly agreed that existing financial metrics are insufficient to capture the real value of sustainability. As a result, a number of new approaches and methods have been proposed: deliberative monetary valuation, social multicriteria evaluation, three-stage multicriteria analysis, multicriteria mapping, deliberative mapping, and stakeholder decision/dialogue analysis.Stagl (2007); International Finance Corporation CommDev (2009). Yet another approach, the Financial Valuation Tool for Sustainability Investments,International Finance Corporation CommDev (2009). has been developed specifically for the extractive industries (mining, gas and oil exploration, etc.) and could serve as an example for other industries. Until appropriate methods are developed and widely adopted, businesses are left to use common financial metrics.

Capital Budgeting Investment

Capital budgeting[2] decisions allow companies to use financial metrics to compare and prioritize investments in sustainability projects. Return on investment, payback period, and unit cost of service can be utilized in cases that have explicit costs and revenues related to sustainable investment. The use of basic capital budgeting tools, such as internal rate of return, net present value, and cost–benefit ratio, will require some adjustments and cautious use in order to accommodate sustainability analysis. Total cost accounting and life cycle costing analysis are excellent tools for a comprehensive analysis of sustainability-related investments (see Chapter 8 "Accounting" for a full discussion).

Once capital budgeting projects are analyzed, selected, and prioritized, there may exist various outside financing options for sustainability-related projects. The **Database of State Incentives for Renewables and Efficiency (DSIRE)**[3]Retrieved March 23, 2009, from http:///www.dsireusa.org is a good starting point. State and federal regulations related to renewable energy have resulted in state and federal rebates, performance-based incentives, tax credits, tax incentives, power-purchasing agreements, revolving loan funds, and grants. Among some of the incentives you may find at the DSIRE Web site are tax rebates of up to $350,000 per entity to governmental agencies that purchase alternative fuel vehicles for business and official activities. Manufacturers of vehicles designed to operate on alternative fuels or hybrid diesel/electric may get financing assistance from the Alternative Fuels Conversion Program (AFCP). The AFCP will generally fund up to 50% of the additional cost of purchasing hybrid diesel or electric vehicles instead of a regular vehicle. As a result of the American Recovery and Reinvestment Act of 2009, additional sources of financing for investments in sustainability projects will become available.

Another option is performance contracting. Performance contracting is considered a remodeling or construction financing method whereby the business does not pay

2. An investment planning process that includes elements such as internal rate of return, net present value, and cost-benefit ratio that can be used to evaluate the value of sustainability-related investments.

3. A database that notes state and federal funding options for sustainability-related corporate projects. These options include rebates, performance-based incentives, tax incentives, revolving loan funds, and grants.

up front for energy efficiency projects to be integrated into the current project budget but rather finances projects through guaranteed energy savings expected in the future.

4.2 Socially Responsible Investments

Socially responsible investing (SRI)[4] refers to the evaluation of investment options in light of its social, economical, and environmental impacts on the globe in the future. This is an ethical investment strategy that focuses on maximizing both an investor's financial return and an investment's sustainability impact. **Green investing**[5] refers to the investment in securities that focus solely on financing to environmentally conscious businesses.

The **Social Investment Forum (SIF)**[6] and other SRI publications provide good sources of information about social investing. SIF is a national nonprofit trade association that provides programs and resources to its members to assist them with integrating social, economic, environmental, and governance factors into their investment decisions. The European nonprofit Ethical Investment Research Service also provides a source of research on the social, environmental, and economic performance of various companies as does the Investor Responsibility Research Center and the Sustainable Investment Research International network. Other sources for consumer SRI education can also be obtained from the GreenMoney JournalRetrieved March 23, 2009, from http://www.greenmoneyjournal.com and Clear Profit Publishing.Retrieved March 23, 2009, from http://www.clear-profit.com Both organizations promote SRI and corporate social responsibility through news and research.

SRI is estimated to be a $2.7 trillion industry in the United States.Social Investment Forum (2008). The Interfaith Center of Corporate Responsibility represents the largest association of faith-based institutions making socially responsible investments. Common screens or criteria used to eliminate companies for SRI investments are animal testing, product and worker safety, industry focus (such as gambling, mining, or weapons systems), and product focus (such as alcohol or tobacco).

The proliferation of SRI products and services, such as mutual funds, equity indexes, and investments in individual stocks and bonds, is a reflection of the growing trend in SRI.

Mutual Funds

As a $200 billion business, SRI-focused mutual funds perform competitively with non-SRI funds over time despite concerns for the higher risk levels.Social Investment Forum (2007). Some of the largest families of socially responsible

4. The evaluation of investment options related to the social, economical, and environmental impacts on the globe in the future. It is an ethical investment strategy that focuses on maximizing an investor's financial return and an investment's sustainability impact.
5. Investments in securities that focus solely on financing to environmentally conscious businesses.
6. A national nonprofit trade association that provides programs and resources to its members to assist with integrating social, economic, environmental, and governance factors into their investment decisions.

mutual funds are managed by AHA, Calvert, Domini, MMA Praxis, Parnassus, and Pax World. Selection of companies for these funds are generally screened based on governance, ethics, diversity and women, indigenous people's rights, transparency, equitable and affordable access to water, climate change, stakeholder engagement, weaponry, nuclear power, and other factors.

SRI Indexes

The risk of investing in SRI indexes is lower than investing in individual socially responsible investments. The proliferation of SRI indexes is a reflection of the growing trend for sustainable investment.

Dow Jones Sustainability Indexes (DJSI)[7]. The DJSI are comprised of global, European, Eurozone, North American, and U.S. benchmarks. Launched in 1999, DJSI are the first global index tracking the financial performance of leading sustainability companies. The companies are screened based on environmental attributes (climate change strategies, energy consumption), social attributes (human resources development, knowledge management, stakeholder relations), and economic attributes (corporate governance, risk management) in 57 industry sectors.

KLD Indexes. KLD Research & Analytics has developed 19 socially or environmentally related domestic and global indexes.Retrieved March 23, 2009, from http://www.kld.com/indexes **KLD's Domini 400 Social Index**[8] was the first benchmark index based on environmental, social, and governance (ESG) factors and has been in use since 1990. It is a value-weighted stock index of 400 publicly traded American companies that are screened based on rankings in employee and human relations, product safety, environmental safety, and corporate governance. The index includes companies not in the S&P 500.

KLD's Global Sustainability Index (GSI)[9] is a broadly diversified global benchmark based on ESG rankings. The GSI lists companies with the highest sustainability rankings. The ranking takes into consideration the environment, community and society, employees and supply chain customers, and governance and ethics. The index tries to limit the financial risk associated with sector bias.

FTSE4Good Index. The FTSE4Good Index Series measures the performance of companies that meet FTSE's globally recognized corporate responsibility standards on their environmental record, development of positive relationships with their stakeholders, and support for universal human rights. Member companies are primarily from the United Kingdom, United States, and Japan.

7. Launched in 1999, DJSI are the first global indexes tracking the financial performance of leading sustainability companies.
8. Established in 1990, this is the first benchmark index based on environmental, social, and governance (ESG) factors. It is a value-weighted stock index of 400 publicly traded American companies.
9. A broadly diversified global benchmark based on ESG rankings, that lists companies with the highest sustainability ratings.

Opportunities for the Majority (OM) Index. The OM Index represents publicly traded firms operating in base of the pyramid markets (see Chapter 9 "Next Steps: Sustainability Strategy") in Latin America and the Caribbean.

Australian Sam Sustainability Index (AuSSI). The AuSSI was launched in Australia in 2005. The AuSSI represents sustainability leaders in 21 industry clusters.

Green Investment

Green investing[10] refers to the investment in organizations that are committed to environmentally conscious business practices, such as the conservation of natural resources, the production and discovery of alternative energy sources, and the implementation of clean air and water projects.

Despite the fact that investing in green companies is riskier than other investment vehicles due to the life cycle of the companies, 64% of respondents identified the environment as the most desirable investment opportunity.Allianz Global Investors (2009). Green bonds, carbon trading, and renewable energy credits (REC) are notable examples of green investments.

Green Bonds[11], or Qualified Green Building and Sustainable Design Project Bonds, are tax-exempt bonds issued by federal or municipal qualified agencies to businesses to provide financing for green design, green buildings, investment in other projects intended to mitigate climate change, as well as for the development of **brownfield sites**[12] (underdeveloped or abandoned areas often containing trace amounts of industrial pollution).

10. Investments in organizations that are committed to environmentally conscious business practices.
11. Tax-exempt bonds issued by federal or municipal qualified agencies to businesses to provide financing for green design, green buildings, and other green initiatives. Also referred to as Qualified Green Building and Sustainable Design Project Bonds.
12. Underdeveloped or abandoned areas that often contain trace amounts of industrial pollution.

4.3 Measuring Corporate Performance

As we discuss capital investments and socially responsible investments, it is appropriate that we discuss how to measure corporate performance. Whereas businesses have traditionally assessed corporate performance through financial measures, there is growing emphasis to adopt a long-range and broader perspective that includes nonfinancial measures. There is much support for adopting more comprehensive strategic corporate performance measurement systems. Research has shown that nonfinancial measures are often the leading indicators that drive lagging financial performance.Frigo (2002). Furthermore, nonfinancial indicators can provide a link between current activities and future financial performance of the firm.Frigo (2002). Indeed, a triple bottom line orientation requires the inclusion of nonfinancial indicators of company performance.

The **balanced scorecard**[13]Kaplan and Norton (1992). is the most popular performance measurement system currently used that incorporates both financial and nonfinancial measures in evaluating overall firm performance. The most recent biennial survey of management tool usage among corporations worldwide shows that 66% of respondents report their company uses the balanced scorecard.Rigby and Bilodeau (2007). The balanced scorecard provides a comprehensive measure of corporate performance.

The balanced scorecard is comprised of four categories of indicators in the areas of innovation, learning and growth, internal business processes, customer value, and financial performance. Organizations select unique indicators within each area that are directly linked to the organization's strategic goals. Indicators often selected include employee training and corporate culture attitudes, internal business processes, customer requirement conformance and satisfaction, and risk assessment and cost–benefit data. As a management system, it helps identify measures to be taken by providing feedback concerning external outcomes related to internal processes. This allows for the alignment of daily business activities with long-term organizational goals and performance.

There has been an effort by some researchers to show how the balanced scorecard can be used for the sustainability-focused organization.Figge, Hahn, Schaltegger, and Wagner (2002); Moller and Schaltegger (2005); Radcliffe (1999). Balanced scorecards that incorporate sustainability considerations are referred to as Sustainability Balanced Scorecards.

13. A comprehensive method of measuring corporate performance that incorporates financial and nonfinancial measures.

4.4 Carbon Finance

In general, **carbon finance**[14] refers to applying a financial management system, models, and tools to manage a company's carbon dioxide and other greenhouse gas (GHG) emissions. Companies currently voluntarily attempt to reduce carbon dioxide and GHG emissions (air pollution associated with climate change), yet many believe regulations will soon emerge in this area, thus, the field of carbon finance is poised for growth. Carbon finance encompasses various topics, such as cap-and-trade, carbon emissions trading, carbon tax, renewable energy certificates, and more.

Cap-and-Trade and Emissions Trading

A **cap-and-trade system**[15] is an attempt to set a limit (a cap) on the amount of allowable carbon emissions from an industry, a geographic region, or a country. Companies are issued carbon permits for their share of allowable emissions. A company's goal would be to reduce emissions so as not to exceed its permits. Companies with fewer emissions than its permits can make money by selling their excess permits or carbon credits to another company; conversely, companies with more emissions than their permits allow must purchase additional permits. This gives rise to carbon trading, the buying and selling of company rights to emit carbon dioxide into the air. **Carbon trading**[16] is a market-based mechanism to allocate carbon emissions allowances within the emissions trading system. It is speculated that the rise of a cap-and-trade system could also give rise to the creation of an economically viable carbon capture and storage industry. Carbon capture and storage involves removing carbon dioxide from fossil fuels before or after they are burned for energy. There are already a number of cap-and-trade systems in place that provide the mechanism for emissions trading markets (see Chapter 2 "Operations Management").

Carbon Tax

Levying a carbon pollution tax, or carbon tax, is one of the many options to lower carbon emissions. The tax is enacted upon the amount of carbon emissions and is reflective of the societal costs of carbon pollution. In a carbon tax, the government translates the price per ton of carbon into a tax on nonrenewable fuels, such as natural gas or oil. Rather than externalizing the costs of emissions from these energy sources, the carbon tax is an attempt to internalize costs and make consumers pay for the ultimate environmental damage resulting from the choice to use nonrenewable energy sources.

14. The application of a financial management system, models, and tools to manage a company's carbon dioxide and other greenhouse gas emissions.

15. A system that attempts to set a cap on the amount of allowable carbon emissions from an industry, geographic region, or country.

16. A market-based mechanism that allocates carbon emissions allowances within the emissions trading system.

4.5 Sustainable Financing

Banks, credit unions, independent credit agencies, venture capitalists, and insurance companies are financial intermediaries that raise capital from investors and provide financing to operations with public and personal borrowing. Along with the wave of positive economic, social, and environment impact projects, government and financial institutions' attention has been drawn to the integration of green policies and practices for the financial services industry's operations, product offerings, distribution, and customer access to services. The insurance industry provides an excellent example of a proactive approach to ecologically friendly sustainability by offering green insurance to manage and reduce climate change risks.

Industry Principles and Standards

As a steward of the global economy, credit managers of financial institutions can base lending decisions on social, economical, and environmental guidelines that support sustainable businesses and their operations. There are two primary industry standards: the Equator Principles and the Wolfsberg Principles.

The Equator Principles. The **Equator Principles**[17] promote social and environmental policies to increase the positive impacts on ecosystems and communities, offering a consistent approach to environmental sustainability and social management. Equator Principles relate to the management of social and environmental issues in project financing. An Equator Principles Financial Institution (EPFI) is a financial institution that has adopted and integrated all 10 Equator Principles. For any project financing deals above $10 million, EPFIs only provide financing to projects that are socially responsible and environmentally sound. The Equator Principles are used for establishing procedures and standards related to an EPFI's project financing activities. Currently, 65 international banks have become signatories to the Equator Principles.

The Wolfsberg Principles. With the concerted effort of 11 of the world's largest private banks and the anticorruption organization Transparency International, the Wolfsberg Anti-Money Laundering Principles for Private Banking (Wolfsberg Principles for short) were established in 2000. The **Wolfsberg Principles**[18] provide guidelines specifically dealing with antimoney laundering, antiterrorism funding, and the identification and examination of unusual or suspicious activities. The principles also cover diverse policies that pertain to knowing your customers, especially for relationships between high net worth individuals and the financial institutions. So far, they are the best set of nonbinding guidelines concerning

17. Guidelines that relate to the management of social and environmental issues in project financing. The related financial institution, EPFI, provides financing to projects that are socially responsible and environmentally sound.

18. Nonbinding guidelines that deal primarily with appropriate monetary dealings between bankers and their customers.

appropriate dealing between private bankers and global clients. Wolfsberg Principles deal primarily with appropriate monetary dealings between bankers and their customers.

A sustainability development program in banking would involve the adoption and incorporation of the Wolfsberg Principles and the Equator Principles into the banking business practices. The adoption of both of those principles by financial institutions gives rise to the opportunity for the provision of funding to ecologically friendly, socially disadvantaged, and economically underserved communities and sectors.

Sustainable Development Labeling Project. Significant progress has also been made to improve the quality of investment information provided by financial institutions. For example, French bank Caisse d'Epargne has recently launched a sustainable development labeling system, Bénéfices Futur, to rate savings, loan, and insurance products based on the impacts of financial risk, social responsibility, and ecological changes.Groupe Caisse d'Epargne (2008). The labeling system ranks bank products based on green marketing of products, accessibility of products, and the bank's investments in and donations to socially responsible sectors and projects that support public interest causes. The labeling system also rates financial products that help to identify gaps between actual and perceived coverage and specify deductibles and effective time periods. Caisse d'Epargne's sharing of the labeling system with other banks facilitates the spread of sustainability efforts in the banking industry.

Categories of Sustainable Financing

Green financing. Sustainable financing can be classified as either **green financing**[19] or social financing. Greenfinancing enables investors to finance green projects less expensively, by offering attractive financing, a lower interest rate or tax incentives, and rebates for environmentally friendly investments and investment in green funds or bonds. An **energy-efficient mortgage (EEM)**[20] is an example of a green finance opportunity. In the EEM case, lenders can make an adjustment to the loan-to-value and stretch debt-to-income qualifying ratios for borrowers with energy-efficient houses because of the projected monthly energy savings. For widespread adoption of green projects, financial institutions, residents, builders, and local government need to be equipped with affordable sustainability knowledge and practical information on how to finance those projects.

Social finance. Apart from being green, sustainable finance also involves social finance activities that enhance local communities and social development. **Social finance**[21] enables the channeling of investment capital to deliver positive social,

19. Attractive financing, a lower interest rate, tax incentives, or tax rebates for environmentally friendly investments and investments in green funds or bonds.

20. A green financing measure in which adjustments are made to standard mortgage measures for energy-efficient houses.

21. Investment capital made available to positive social, economic, and environmental activities that enhance local communities and social development.

economic, and environmental returns for the long run and for a global community. These channels include, but are not limited to, community investing, social enterprise lending, sustainable business, philanthropic grant making, and program-related investments. The Center for the Development of Social Finance is a nonprofit education and research organization that strives to expand awareness of social finance.

Microfinancing[22] has gained great exposure recently as a special variety of social financing. Microfinancing is access to capital for women, minorities, and low-income borrowers who are not able to access loans from traditional resources. Microfinancing provides smaller loans with favorable terms and, for some programs, requires no or little collateral. Microfinancing seeks to aid in the revitalization of urban and rural communities.

Some states have sustainable microloan fund programs for underserved sectors, low-income communities, small businesses, and farmers. For example, the Strolling of the Heifer's microloan fund offers loans anywhere from $1,000 to $10,000 for terms up to 3 to 5 years. Despite the relatively low budget, such programs are a good investment in the future health of the entire serviced region.Strolling of the Heifers (2009).

Microfinancing also involves making small loans (or microloans) to low-income businesses to stimulate economic growth in less developed countries. Grameen Bank, Kiva, and Prosper are examples of successful microfinance enterprises. Grameen Bank offers no-collateral microloans to 7.5 million women in Bangladesh. Dr. Muhammad Yunus, founder of Grameen Bank, won the Nobel Peace Prize in 2006 for this nonprofit microfinancing concept.

Both Kiva and Prosper provide Internet microcredit to support sustainable causes. Kiva enables quick access to funds for small entrepreneurs especially in Indonesia and India. The average loan from Kiva is around $110 to be repaid in 6 to 12 months with no interest charged. Fifty percent of those borrowers in India were able to graduate out of poverty with the help of Kiva.Malhotra (2008). Prosper links suppliers and demanders of funds in the developed and developing world.

22. A type of social financing in which women, minorities, and low-income borrowers are provided with access to capital.

23. Financial institutions such as banks, credit unions, loan funds, and development venture capital companies that provide financing to small businesses and housing and community facilities projects that revitalize economically distressed communities.

Community Development Financial Institutions

As an integral member of communities, financial institutions provide support for sustainable community social and economic development and ecological conservation. Specializing in promoting economic and community development, **Community Development Financial Institutions**[23] provide financing to small businesses and housing and community facilities projects that revitalize

economically distressed communities. There are four types of community development financial institutions: community development banks, community development credit unions, community development loan funds, and community development venture capital companies.

Community Development Banks. Community development banks are for-profit banks committed to socially, economically, and environmentally sustainable community development. ShoreBank is the largest and most well-known community development bank in the United States and is the only one that takes into consideration all three dimensions of sustainability (social, economic, and environmental). ShoreBank opened in 1973 in Chicago and currently boasts $2.4 billion in assets and $4.2 million in net income with offices and businesses around the country and internationally; it is the nation's first community development and environmental banking corporation. ShoreBank defines its triple bottom line mission as profitability, community development impact, and conservation. Community development banks exist around the world, the most notable of which is Grameen Bank, as discussed under the topic of social finance.

Community Development Credit Unions. Community development credit unions (CDCU) are nonprofit, cooperatively owned, government-regulated, tax-exempt and insured financial institutions specializing in social financing. They serve low- and moderate-income people and communities by providing below-market-rate small loans to imperfect or no credit history borrowers and by offering financial education for its members. Major funding for CDCU institutions comes from banks, foundations, and other investors for deposits to support their work. Through partnerships with the private sector and participation in outreach and government programs, CDCU institutions are able to leverage community revitalization efforts. Federally chartered CDCU institutions are state regulated.

Community Development Loan Funds. Community development loan funds provide loan funds for businesses, nonprofits, and underserved areas for the purpose of economic development. Loan funds provide financing to traditionally unqualified borrowers who would use the funds for advancing sustainable actions. These loan funds require collateral, but they have flexible payment schedules. The government's sustainable development loan fund offers low interest loans up to $500,000 to businesses for green projects like utilizing sustainable resources, producing recyclable finished products, and installing pollution prevention procedures.

Community Development Venture Capital. Community development venture capital (CDVC) funds provide equity capital to entrepreneurial companies that will ultimately benefit low-income people and distressed communities. The amount of

the investment funding from CDVC funds is generally less than that of their traditional counterparts. The average CDVC fund investment for small businesses was about $331,000 per company in 2000.Ward and Patterson (2003). Kentucky Highlands Investment Corporation (KHIC) runs a very successful rural economic development program. KHIC's ventures contribute at least 68% of the net growth of manufacturing jobs in Kentucky Highland's nine target counties from 1970 to 1990. The positive entrepreneurial capitalism spurs from the enhanced availability of community venture financing.Ward and Patterson (2003).

4.6 Sustainable Insurance

The insurance industry is particularly interested in sustainability, given the impact that climate change has had on this industry's profitability. In fact, climate change is the number one risk to the insurance industry.Ernst & Young (2008). According to an Ernst & Young study,Ernst & Young (2008). climate change could result in increased mortality and health problems, increased environmentally related litigation, increased conflicts over control of resources, and negative impacts on capital markets.

According to a 2005 study by the Association of British Insurers, if carbon dioxide emission levels are doubled, the capital requirement for insurers could increase by $76 billion, which is an 80%–90% increase due to the increased risk of tropical cyclones in the United States and Japan.Association of British Insurers (2005). Allianz, Europe's largest insurer, estimated that losses due to climate change could be as high as $400 billion. In addition to property loss, insured companies may face carbon-regulatory risks governing its investment and insurance policies on green projects. Given these challenges, the industry is addressing the concept of sustainability and is taking notice of social, environmental, and economic impacts.

Many insurers have increased their focus on financial risk management. Yet proactive insurers are making progress in developing both investment strategies to "participate in the 'green' revolution in the financial markets" and in creating new climate-friendly products to address climate change risk.Mills (2007). Many of these financial products deal with green building, hurricane-resistant design, promotion of alternate fuels, and sustainable driving practices to reduce carbon emissions. Proactive insurers encourage the insured to participate in the insurance sustainability effort.

Insurance companies play an important role in social, economic, and ecologically friendly sustainability. Swiss Re has sold weather-risk products to 320,000 small farmers in India. For renewable energy-related insurance products, Willis Holdings covers potential power underproduction of wind farms. As a pioneer in offering green-building policies, Lexington Insurance Company's new policies will pay the insured to rebuild a home using environmentally friendly and energy-efficient materials after it is destroyed by natural disasters.Tergesen (2008).

In Japan, Sompo Japan Insurance and Tokio Marine Nichido Fire Insurance Co., Ltd. have given premium discounts to 10 million policyholders who drive low-emitting cars. Travelers and Farmers cut 10% off the policy premium for hybrid cars.

Progressive and GMAC insurance companies offer pay-as-you-drive (PAYD) policies in parts of the United States. In the U.S., automobiles account for 25% of all GHG emissions and it is anticipated that implementing PAYD policies and hybrid vehicle incentives could reduce emissions by 10%.Bordoff (2008).

Increasingly, insurance companies have utilized exclusion clauses—tightened conditions to foster the right decisions by customers. Some insurance companies limit liabilities for emitters of greenhouse gases and for companies that do not have a climate mitigation plan in place. "Development and establishment of business-continuity management (BCM) procedures [is used as] a prerequisite for adding on business interruption coverage to a company's property insurance."Ross, Mills, and Hecht (2007). As one of the world's largest re-insurers, Swiss Re, Munich Re requires disclosure of a company's climate strategy in their directors and officers insurance application.Makower (2005).

As this chapter has demonstrated, the finance function, as well as the finance industry, is greatly impacted by sustainability considerations. Every aspect of finance, from investments to banking and from trading to insurance and risk, requires new thinking when we consider the social, economic, and environmental impact of business.