CASE STUDY: WEYERHAEUSER

COMPANY PROFILE

Weyerhaeuser Company, one of the world’s largest forest products companies, grows and harvests trees, builds homes, and manufactures forest products such as lumber, wood and building products, and pulp and paper. Weyerhaeuser has a worldwide presence: it manages 20.3 million acres of timberlands in nine U.S. states, three Canadian provinces, and in Uruguay and China; it operates wood products and cellulose fiber mills in the United States and Canada; and it conducts residential real estate operations in seven U.S. states. The company’s timberland, wood products, and cellulose fibers businesses made up a majority of its $6.2 billion in 2011 annual revenues.

BUSINESS DRIVERS AND INITIAL CONCERNS ABOUT IMPACTS OF CLIMATE CHANGE

Climate and weather directly and indirectly affect the growth and productivity of forests. Extreme weather events such as storms, droughts, and floods can damage trees, especially during replanting when seedlings are small. Changes in climate—higher air temperatures, changes in precipitation, longer and more frequent droughts—influence the structure and function of forest ecosystems and can increase the likelihood of “disturbance events” such as insect outbreaks, spread of invasive species, wildfires, and severe storms.

Under typical conditions of variability, most tree species are somewhat resilient to increases in air temperature or changes in precipitation over time. But climate change is expected to make future droughts and storms more severe and damaging than those experienced in the past. Warmer temperatures alter the timing of snowmelt and may affect the seasonal availability of water, and they may lengthen the growing season or shift the geographic range of some tree species. Rising temperatures may enable some insect species to develop faster and expand their ranges, and insect outbreaks can defoliate, weaken, or kill trees. A mountain pine beetle outbreak, for example, damaged more than 3.8 million acres of forest in the western United States and spruce beetle outbreaks have resulted in the loss of an estimated 3 billion board feet of timber in Alaska over the past three decades.1 Warmer spring and summer temperatures, along with decreases in water availability, also dry out woody materials in forests and increase the risk of wildfires. These disturbances can interact with one another to increase overall risks to forest productivity.

In December 2007, a series of snow, wind, and rainstorms battered western Oregon and Washington—where
over one-third of Weyerhaeuser’s timberlands are located—causing severe flooding and wind damage. A small portion of Weyerhaeuser’s timberlands received extraordinarily high rainfall and suffered hundreds of landslides, renewing discussions with communities about the effects of tree harvesting on steep slopes. The company’s manufacturing facilities for wood products and fibers can also be vulnerable to severe weather and changes in climate, for example, the company has wood processing facilities located in hurricane-prone regions of the southeastern United States. Pulp and paper manufacturing also requires large volumes of water, potentially making the company vulnerable to significant reductions in water quality and supply.

Weyerhaeuser also hears concerns from its customers and investors about climate change–related risks. Some of its largest customers, such as Procter & Gamble, survey their suppliers to better understand how they are addressing climate and sustainability risks. Weyerhaeuser also participates in the UK-based Carbon Disclosure Project’s annual survey, on behalf of 700 institutional investors holding $87 trillion in assets, of the regulatory, physical, and business risks from a changing climate.

**COMPANY RESPONSES**

Climate and weather factors have always been integrated into Weyerhaeuser’s business planning, risk assessment, and core management operations, particularly for the timberlands business. Weyerhaeuser has more than a century of experience with understanding the impacts of weather and climate on forests, and managing those to maximize yield. The company’s continual risk assessment and adaptive management processes are critical for building resilience to the effects of climate and weather, and incorporating climate change factors into these processes only reinforces to Weyerhaeuser the importance of its existing efforts and approaches. Drawing on this expertise, the company is also beginning to help other industries adapt to changes in climate and weather.

**Risk Assessment: Continual Monitoring and Review**

Climate and weather risks are part of Weyerhaeuser’s broader corporate climate change strategy (Box 1). Climate and energy trends are included in the company’s periodic capital investment and corporate direction-setting process, which considers a broad set of future scenarios.

In Weyerhaeuser’s timberlands business, a centralized strategic planning group uses geographic- and species-specific forecasting models and light detection and ranging (LiDAR) technologies (Figure 1) to examine the relationship of local and regional climate changes to long-term forest growth and yield. The company’s in-house staff of hydrologists, pathologists, and other experts conducts extensive research on the ground to collect real-time environmental data, and key findings are incorporated back into the central planning models. These models are based on historical data, incorporating over five decades of research, and quantify risks by region based on past trends. For much of its risk management analysis, Weyerhaeuser relies on close monitoring of existing conditions that affect its timberlands, allowing it to quickly identify changes in underlying climate and weather conditions and any associated potential impacts.

This continual risk assessment process provides an early indication of changes in the growing environment, enables the company to assess possible vulnerabilities to shifts in climate, and guides its responses and adaptive management practices. For example, Weyerhaeuser anticipates that continued favorable precipitation patterns in Washington and Oregon will keep wildfire risks to

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**Box 1: Corporate Climate Strategy**

Weyerhaeuser has a Climate Change Steering Team made up of technical, scientific, and policy managers to guide the company’s strategy, positions, and goals on climate change issues. The company has outlined 43 sustainability metrics and goals to achieve by 2020 and uses a business scorecard to track progress. One of the company’s goals is to reduce greenhouse gas emissions by 40 percent by 2020, compared to a year 2000 baseline. Other goals include adopting sustainable forestry standards, better managing water resources, and enhancing ecosystem services, among others. The Governance and Corporate Responsibility Committee of the company’s Board of Directors has responsibility for oversight of the sustainability strategy and receives regular updates on the company’s sustainability performance.
a minimum, but that warmer winter temperatures in Oregon may lead to greater outbreak of the Swiss needle cast disease affecting foliage. The Oregon Department of Forestry estimates that, as winter temperatures continue to rise, forest growth losses in Swiss needle cast epidemic areas could exceed $200 million per year.4

In addition, Weyerhaeuser participates in research efforts that seek to advance the current understanding of emerging risks. Weyerhaeuser’s timberlands business engages in research partnerships with universities, government agencies, and others to better understand the possible physical risks from a changing climate. The company participates in the Swiss Needle Cast Cooperative led by Oregon State University, which is studying, among other issues, the impact of potential climate changes on the foliage disease. Weyerhaeuser has also participated in scenario planning initiatives in Washington state to understand the long-term effects of climate change in the region. As part of the company’s larger water conservation effort, it initiated a long-term study in 1999 to determine the effect on water systems and quality of converting grazing land in Uruguay into forests. This study is being conducted in collaboration with North Carolina State University, the federal agricultural research agency in Uruguay, and a major research university in Montevideo. The study will help determine the impacts of land use (including managed forestry or biomass crops) on water supply and the quality of drainage water.5

Risk Management: Adaptive Management Practices

Over time, Weyerhaeuser has developed robust management responses to build resilience across the growing cycle of its timberlands—from planting to final harvest—against losses from storms, pest infestation, wildfires, and drought. The company regularly updates its forest timber inventories, growth projections, harvest schedules, and planting activities to account for potential and actual annual losses from extreme weather. The company locates its forestlands in favorable geographies with manageable incidence rates of storms, drought, and fire. Weyerhaeuser’s lands in western Washington and Oregon, for example, have a much lower risk of fire than land in the eastern parts of the states.

Weyerhaeuser plants forest lands with tree species and varieties that are best able to withstand regional extremes in climate that can occur over multi-decade growth periods. Maintaining a diversity of species helps the forest regenerate under changing climate conditions. Through Weyerhaeuser’s tree improvement program, the company is developing tree varieties with genetic characteristics that will, for example, allow seedlings to withstand summers with slightly less water. In 2011, Weyerhaeuser spent $21.5 million on forestry research conducted by its in-house scientists, at universities, and at other research organizations on issues such as forest health and productivity, water quality, landscape management, and biodiversity.

The risk of pest outbreaks is actively managed through thinning and pruning practices. Logging and replanting schedules are also adjusted to account for weather-induced conditions that could delay those activities.6 When severe storms occur, the company knows how to salvage timber, replant quickly, and work with affected communities. After the series of storms in Oregon and Washington in 2007, Weyerhaeuser and the Washington Department of Natural Resources reached a voluntary agreement to apply additional protections to two watersheds. Weyerhaeuser undertook a study analyzing the likelihood of future landslides under scenarios of increasing frequency and magnitude of storms, and committed to supplementing its existing risk assessment requirements with additional tools to predict landslides and protect landslide-prone slopes.
The five homebuilding subsidiaries of the Weyerhaeuser Real Estate Company (WRECO) have also begun to integrate local climate change considerations and green building principles into their businesses, for example in water-stressed regions of southern California and southern Nevada. WRECO’s LivingSmart® program is offered on all new homes built, providing a combination of features that save energy, conserve resources, improve air and water quality, and minimize water consumption. WRECO’s Pardee Homes, the creator of the LivingSmart brand, uses revegetation and restoration techniques, wetlands protection measures, and water saving and native plant material designs for local climates.

**Business Opportunities: Weyerhaeuser Solutions**

Weyerhaeuser’s corporate climate change strategy has also helped the company to think differently about its core products and new market opportunities (Box 2). Weyerhaeuser Solutions, established in 2011 as a wholly owned subsidiary, has begun to leverage Weyerhaeuser’s long experience with land management to help others with interests in large-scale land holdings, industries and sectors such as energy, chemicals, materials and mining, agriculture, manufacturing, and government. Weyerhaeuser Solutions helps clients, for example, to reduce their carbon footprints, source bio-energy feedstocks, and manage landscapes for optimal water supply and quality.

The idea for Weyerhaeuser Solutions first emerged from conversations with businesses about sustainability challenges, climate change, and increased interest in implementing sustainable forestry practices on company-owned land or investing in sustainable forestry projects. Weyerhaeuser Solutions is able to leverage its sustainable forestry expertise, technologies, modeling tools, and logistics capabilities to offer land management services at the vast scale required for global industries over large areas. Deploying Weyerhaeuser Solutions required a significant shift for the company, as it began sharing aspects of and developing marketable services from what had been considered confidential and proprietary information about sustainable land management practices.

**Box 2: Business Model Innovation**

In addition to annual strategy updates and planning, Weyerhaeuser conducts periodic company-wide direction-setting sessions to consider the impact of alternative scenarios on the business and to develop a robust response. According to Shari Brown, the company’s director of environment and sustainability: “We always have to adapt and evolve. Nobody stands still. Market conditions change. Business conditions change. Climate changes.” Through this process Weyerhaeuser has refined its high-level vision to provide “superior sustainable solutions to the world.” The company recognizes that forest resources will increase in importance in the future as a critical source of materials, shelter, and energy, and each of its businesses is creating products and services to meet this vision. The timberlands business is expanding its scope to embrace the Weyerhaeuser Solutions model. The cellulose fibers business is generating a stream of new products to provide feedstocks for textiles, replacements for asbestos, and fuel-saving lightweighting additives for automotive plastics. The wood products business is expanding the amenability of wood as a construction material by introducing a fire resistant floor joist and thermally efficient structural components as well as creating bracing components for high wind regions. On the horizon are developments through partnerships to produce transportation fuels from forest resources. Weyerhaeuser has a 50–50 joint venture with Chevron (Catchlight Energy) that combines Weyerhaeuser’s expertise in land stewardship, resource management, and capacity to deliver sustainable cellulose-based feedstocks at scale with Chevron’s technology capabilities in molecular conversion, product engineering, advanced fuel manufacturing and fuels distribution. Weyerhaeuser also participates in the Northwest Advanced Renewables Alliance consortium, led by Washington State University, to produce jet biofuel from woody feedstocks in the Pacific Northwest.
events on the ground in order to create a robust picture of current and future risks to forests and trees. The current challenge is to develop practices and actions that respond to an even wider range of possible outcomes over the long term. Moreover, current models that rely on historical climate and weather variability may underestimate the likelihood or severity of future changes.

For its manufacturing facilities, Weyerhaeuser does not currently conduct forecasting exercises to assess potential damages to mills or other operations from physical climate change. Weather risks to facilities—such as from wind and floods—are assessed by the company’s property insurance carrier and are addressed through the company’s strategies that ensure continuity of operations and effective responses to natural disasters, but they do not consider increased risks due specifically to climate change. In some cases, the company’s sustainability strategies will help to mitigate some of these physical risks. For example, disruptions to energy supplies for manufacturing operations are mitigated by Weyerhaeuser’s low-carbon energy independence: the company meets over 75 percent of its own energy needs with biomass sourced from its own plants.30
**ENDNOTES**


4. Swiss needle cast is a foliage disease that causes Douglas firs to prematurely shed—or cast—their needles. Under most conditions, the fungus that causes the disease is a benign part of the tree canopy. The current epidemic is attributable to a variety of factors, including several climate and topographic variables. Oregon State University College of Forestry, Swiss Needle Cast Cooperative, “Swiss Needle Cast Summary,” http://sncc.forestry.oregonstate.edu/swiss-needle-cast-summary, accessed on October 16, 2012.


