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NEWS: ANALYSIS & COMMENTARY

Business On A Warmer Planet

Rising temperatures and later winters are already costing millions. How some companies are adapting to the new reality

By John Carey

The normal bitter cold of Canada's frozen north is tough on man and machine, but it's a boon for Diavik Diamond Mines Inc. Temperatures of -40F make it possible to build a winter "ice highway" over frozen rivers, lakes, and tundra. That's how the company usually hauls the thousands of tons of equipment, fuel, and supplies it needs for its mining operation 200 miles northeast of Yellowknife. "We freeze our butts off, but we use the climate to good effect," says Diavik's Tom Hoefer.

Not anymore. Winter temperatures this year were far above normal, so the road shut down early. Plus, the ice never got thick enough to support the weight of big trucks. Diavik was faced with a choice: Slow operations, or haul everything up by air. Because of the mine's value -- it produces more than 8 million carats a year -- top executives opted for the expensive airlift. Diavik had to find a Russian helicopter, one of the world's largest, to haul up a 500-ton hydraulic evacuator. Even then, workers had to cut their giant shovel into pieces for transport and weld it back together at the mine. Meanwhile, a Russian airplane has been flying around the clock, bringing hundreds of tons of clay needed for a protective dike, as well as other equipment. Diavik is spending millions of extra dollars "all because of the short ice road season," says President Mark Anderson. "I think a lot of people are becoming more convinced that climate change is real" and that we must adapt to it.

"INEVITABLE"

Diavik's predicament is just one example of a new inflection point in the story of global warming. Until now, the central quarrel has been over whether -- and how best -- to reduce the emissions of carbon dioxide and other gases that are responsible for climate change. Now it is clear to many that any curbs will be too little and too late to prevent significant warming. "No matter what we do now in terms of mitigation, changes in climate are inevitable," says Ivo Menzinger, head of sustainability and emerging risk management at insurance giant Swiss Re.

That means that companies, governments, and ordinary people may have to make expensive adjustments to cope with the predicted physical effects of climate change,

which include rising sea levels, shifting agricultural cycles, and more severe storms. *Adapt or Bust*, warns the title of a new report from Lloyd's. "It will be huge. There will be so much we will have to adapt to," says Kristie L. Ebi, a scientist at consultant Exponent Inc.

Change has begun. Rising temperatures are melting ice roads, forcing villages in Alaska to move, shortening growing seasons in Africa, and causing oil companies to change the way they drill in the Gulf of Mexico. "This is not [just] an issue our kids will have to deal with. It's happening now," says Allan Carroll, an insect ecologist at the Pacific Forestry Center in Victoria, B.C.

Several years ago, Carroll predicted that warmer temperatures could flip an ecological switch, causing the loss of valuable forests of lodgepole pine to the mountain pine beetle. Normally, the pests are held in check because newly hatched bugs are killed by cold starting in late fall. That forces the tiny beetles into a two-year life cycle and keeps them from attacking trees at their most vulnerable time, in late summer. But when Carroll charted rising temperatures in British Columbia, he realized that early, killing cold was a thing of the past. That, he worried, would enable the beetle to switch to a one-year life cycle and spread like wildfire.

His predictions came true. "This is one time when I'm unhappy to be right," Carroll says. Years of fire suppression have created prime beetle habitat, large stands of same-age lodgepole pines. That has made it easier for the beetle, which has now wiped out 22 million acres of forest -- an area the size of Maine -- in British Columbia. Within six years, scientists expect, it will have killed 80% of the mature lodgepoles in the province and could be rampaging across Canada and the U.S. "No natural forces can stop the beetle until it kills all of its natural habitat," warns Hamish Kimmins, professor of forest ecology at the University of British Columbia. Right now, loggers and sawmills are running flat out to process the dead trees. But the boom won't last. "Ecologically it's not a disaster because the lodgepole pine will regenerate," says Kimmins. "But it's a social disaster because so many communities are dependent on logging and pines."

The scientists who study the pine beetle say it presents a cautionary tale. Other nasty surprises are expected to arise from the delicate dance of nature and climate, affecting both public health and the economics of entire regions. In China, for instance, the line below which there are no hard freezes has moved northward. Since freezing temperatures kill the snail that spreads the parasitic disease schistosomiasis, this change is putting 20.7 million additional people at risk for the illness. Field studies show that the snail can survive in the new areas, says Guojing Yang, an infectious disease expert at Jiangsu Institute of Parasitic Diseases in China. Meanwhile, in Alaska, a rise of 9F in the temperature of the Yukon River since 1985 has been linked to the spread of a salmon parasite. By the time the fish make it upriver, they're too diseased to be sold. That's wiping out upstream fisheries and contributing to an overall decline in commercial fishing, explains Richard M. Kocan, professor of fishery sciences at the University of Washington.

Sub-Saharan Africa is also confronting new burdens because of climate change. "Over the last several decades, temperatures are up two degrees in Mali, and the rainy season has decreased by more than a month," says Exponent's Ebi. That means the growing season is too short for standard rice. Researchers are developing a faster-maturing variety, but that's only a partial solution, health experts caution, since the dry season's potato crop is starting to fail as a result of increased heat. The economic system of the whole country could collapse, says Ebi. "In the village I'm working with, the elders know they are on the edge."

So are the residents of the village of Shismaref on the west coast of Alaska. With melting permafrost and the disappearance of sea ice that once protected the town from pounding waves, "Shismaref is literally being battered to the point of falling into the sea," explained Sheila Watt-Cloutier, chair of the Inuit Circumpolar Conference, in recent Senate testimony. The townspeople have voted to move the entire village, which will cost more than \$100 million.

Adapting to a warming earth is an urgent issue in the Arctic, where a four-degree jump in average temperature over the last 30 years is an example of "climate change on steroids," says Joel Smith, a vice-president at Stratus Consulting. The state of Alaska is setting up a blue-ribbon commission to identify risks and strategies for adaptation, but businesses are already adjusting. The allowable period for traveling on the tundra has shrunk from 220 days in 1970 to about 100 days, changing the way companies explore for oil and gas. Cruise lines are trying to cope with shrinking glaciers and vanishing sea ice. While the government is thinking about policies to reduce climate change, "business is focusing on adaptation," says Robert Page, vice-president for sustainable development at Canadian power giant TransAlta Corp. in Calgary. "How do we adapt to a future of melting permafrost, less water, and more extreme weather?"

SEE NO EVIL

The key, say Page and others, is recognizing that the future will not be like the past. Hurricanes Katrina and Rita, for example, "toppled what companies perceived as a worst-case scenario," says Cindy Gordon, refining-issues manager at the American Petroleum Institute. Drilling rigs were destroyed by the storms, so the API has issued tougher standards, such as anchoring platforms more securely and requiring a certain height above the water. In San Francisco, planners are exploring beefing up the storm sewer system to deal with heavier rains. And the European Environment Agency warns of coming droughts and water shortages. In the past year, attention to the problem of adaptation "has taken a quantum leap," says consultant Smith, who has helped identify issues for cities like Denver and Aspen, Colo.

Some climate skeptics argue that the future is too uncertain to know what steps to take. One federal government official says his Bush Administration overseers won't allow any talk about climate "change." Instead, he can attribute unusual weather patterns only to "natural climate variability." True, uncertainty is a given. Forecasters can't tell if this year will bring more Katrinas or more heat waves like the 2003 blast in Europe that left thousands dead and nuclear power plants threatened with shutdowns for lack of cooling

water. But when it comes to the big picture, the proverbial canary in the coal mine "is dead," says Peter H. Gleick, president of Pacific Institute for Studies in Development, Environment & Security in Oakland, Calif. "You can look at any event in isolation and question it." But examined together, the only conclusion is that "we are faced with unavoidable, irreversible impacts," he says.

For most companies, the issue is hardly on the radar screen. Forty surveyed by Andrew J. Hoffman, professor of sustainable enterprise at the University of Michigan, say they are primarily concerned about meeting possible greenhouse gas emissions curbs, not adjusting to climate change. But they and others are beginning to grasp the probability of nasty weather surprises. That in itself is "a positive development," says Burr Stewart, strategic planning manager for the Port of Seattle. Creating more capable emergency management plans, as Seattle is doing, "is another form of adaptation," he says.

Some environmentalists worry about talk of adaptation. If people believe they can cope with climate change, why bother to take action to reduce carbon emissions? The answer, given new science suggesting more rapid climate change than expected, is that preventive steps would make the task easier. "This is just the beginning," warns Peter Höppe, head of Geo Risks Research at Munich Re. "As climate change is accelerating, we will have to adapt to many more extreme events."