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Today's News

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Rising Fuel Costs Threaten Polar and Marine Research

By MARIA JOSÉ VIÑAS

Paying more than $4 for a gallon of gas makes a lot of commuters grind their teeth when they fill their tanks. They get little sympathy, however, from Robin Bell, who next winter could be looking at $60 to $130 for each gallon of fuel for her vehicles. The vehicles are two small aircraft that Ms. Bell, an ice-sheet expert at Columbia University, needs to survey an unexplored mountain range in Antarctica that holds an unparalleled record of global climate change.

Her project took an international team of researchers several years to plan. It may now be shelved, made into an impossible mission by spiking fuel costs.

Just like Ms. Bell, many scientists who work at the far ends of the planet are finding out they might not be able to carry out their research next season. This is a particularly painful irony because those expeditions would occur during the third International Polar Year, a concerted scientific effort to promote our understanding of how polar regions affect the global climate.

Marine scientists, who also depend heavily on the use of fuel-guzzling ships, are not doing much better.

"Fuel prices have hit polar science particularly badly," said Alexandra Isern, research support manager at the division of Antarctic infrastructure and logistics of the National Science Foundation. The majority of polar research projects "rely on fuel in some form or another because they need vessels, planes, or helicopters," Ms. Isern said.

Fuel Needs in Antarctica

Getting the gas to one of the most remote regions on earth requires very complicated logistics, which are managed by NSF. The three American stations in Antarctica need six million gallons of fuel every year to run. The science foundation buys all this gas from the United States military and then sends it in a chartered tanker to McMurdo Station, from where it gets distributed to the two other bases. All the fuel for distant temporary research camps, as well as for running aircraft and other vehicles, comes from that six-million-gallon stash. And the cost has gone up 60 percent since 2007.

Additionally, the icebreakers operated by NSF, which can serve as oceanographic laboratories and open pathways to the stations, use three million gallons of fuel a year. The massive ships burn 6,800 gallons each day they are cruising and up to 9,000 gallons per day when they're breaking ice. NSF, which paid $2.25 for each gallon of fuel the icebreakers used in 2007, will have to pay $3.35 per gallon in 2008. The forecast for 2009 is $4.25 per gallon.

"There's no way we can absorb an increase of that magnitude and not have an impact," said Ms. Isern, who explained that her office is going through the grant proposals for the 2009 Antarctic season, which starts in November. Some projects may now be too expensive to carry out. Most decisions about who gets funds and who doesn't will be made by mid to late summer.

"It's terrifying," said Ms. Bell, a senior research scientist at Columbia's Lamont-Doherty Earth Observatory. "The international scientific community has worked for six years to put together the scientific justification and plans to go to all of these places [in the polar regions] that people can't study systematically. It's a very complex dance—the different nations are bringing in different portions, and now the price of fuel is undercutting a lot of these plans."

Ms. Bell is the principal investigator of an international project to do an airborne survey of the Gamburtsev mountain range, a cordillera in an unexplored corner of Antarctica that researchers believe holds the oldest climate record on earth. The project, in which Australia, Britain, China, and Germany are collaborating, also wants to analyze how the glacial lakes at the side of the mountains might be contributing to the instability of the ice sheet. The United States' role in this mission is to provide about 35,000 gallons of fuel needed to run the two survey aircraft. Although the project got funded last year, NSF is now analyzing if it can afford to fly the gas from the Antarctic stations to the remote Gamburtsev range. That cost, Ms. Bell calculates, could be as high as $130 per gallon, depending on the way the fuel is delivered.

Ms. Bell is worried that the narrow window of opportunity provided by the international effort will close if the American team fails to meet its obligations.

"If the cost of fuel hamstrings the United States, we'll lose contributions from our partnerships, and that will leave us to go alone," she said.

Cuts Expected in the Arctic

On the opposite end of the planet, things aren't going much better for scientific research. The increase of fuel cost is going to take its toll on Arctic research, says Brendan P. Kelly, program manager for Arctic natural sciences at NSF. He calculates there will be a 25-percent cut in the number of new Arctic projects the science foundation will be able to finance in 2009

"The cost of the projects that we are already committed to has gone up so much that it's taken away from our ability to fund new projects," Mr. Kelly said.

Ginny Catania, a geophysicist at the University of Texas at Austin, recently was rejected after submitting a proposal to investigate the intricacies of Greenland's ice sheet melting.

"NSF asked us to cut our budget by half," Ms. Catania said. When her team revised the logistics cost of the mission, which last fall they had calculated would reach $600,000, they found out the increase in the price of gas had added an extra $150,000.

"Maybe we could have made it if fuel cost hadn't gone crazy," Ms. Catania said.

A Setback for Marine Science

Another scientific field that depends heavily in the use of ships and is being hit hard by fuel prices is marine science.

The University-National Oceanographic Laboratory System, or UNOLS, a consortium of 61 academic institutions and national laboratories and their fleet of 23 research vessels, saw the daily cost of operating an average vessel increase from $13,321 in 2004 to an estimated $20,621 in 2008. That has contributed to a decrease in the use of the UNOLS fleet, whose vessels before 2004 spent a collective 5,000 days at sea but now navigate the oceans only a total of 4,000 days.

The largest source of money for the academic vessels comes from NSF. In 2007, NSF spent $10.6 million to fund 2,300 of the days the UNOLS vessels spent at sea. This year, to finance a similar period, the science foundation has spent an additional $7.4 million, which represents a 70-percent increase.

The spike in fuel prices has made things even more complicated for UNOLS, which in 2007 didn't know until the

last minute if it would be able to operate all of its fleet.

"Last year, NSF could not fund enough science to keep all the ships operating, and we had to face the tough decision of perhaps having to lay off one or two ships because we did not have enough money to keep them operating at a minimum schedule," said Marcia McNutt, chairwoman of UNOLS. A last-minute money injection from private and foreign sources avoided the disaster.

"When a ship sits at the dock, it's not good for it—it's like leaving your car parked in a field and doing nothing with it for months," Ms. McNutt said.

The main player in UNOLS is the University of California at San Diego's Scripps Institution of Oceanography, which operates four of the consortium's ships. Tony Haymet, director of Scripps, said the cost of putting these vessels to sea will double in 2008, from $4-million in 2007 to $8-million. To compensate for this increase, Scripps is exploring an array of solutions that range from making the ships more fuel-efficient—by replacing old engines and giving the vessels a special hull coating that allows them to slide more easily through the water—to increasing shared international use of the vessels, and thus sharing more costs.

The last resort would be to cut days at sea, said Mr. Haymet, who explained the Scripps ships are used to try to answer key questions on fisheries management, climate change, ocean acidification, and the pollution of the seas by plastic.

"The marine-science community finds itself at the center of all of these questions at a time when working with vessels is getting more and more difficult," Mr. Haymet said. "We have many ways of observing the oceans now, such as satellites and robotic networks, but even with them, we still need to have vessel capability to go to the sea."

The University of Miami's Rosenstiel School of Marine and Atmospheric Science is trying to compensate for fuel cost in a different way. The school owns a 96-foot catamaran used mainly for coastal research. Otis Brown, dean of Rosenstiel, said the school is relying more and more on private users, such as oil companies that use the catamaran to do near-bottom profiling. The private money helps pay for costs like dock fees and thus reduces the daily rate charged to academic researchers.

The downside: Private funds come with strings. If companies help pay for voyages, they have some say about the data acquired during them, and sometimes they want to keep the data private for longer than the researchers would like.

Still, creative solutions like Scripps's or Rosenstiel's will be needed to keep the vessels at the sea in the future, given the likelihood that fuel costs will continue to rise, said Robert Gagosian, president of the advocacy group Consortium for Ocean Leadership.

"The solution can't be just more money because it is going to be a long-term problem," Mr. Gagosian said.
