

# ENERGY

## Watching energy costs add up

To find out whether consumers conserve more energy when they are aware of how much their consumption patterns cost, the Department of Energy and the Canadian Government are sponsoring an 18-month energy metering test in Boston, Dallas, Minneapolis, San Francisco, Montréal and Vancouver beginning this fall. Approximately 100 families in each city will receive mechanical devices that display the household's gas and electricity costs, penny by penny, as it mounts 24 hours a day. At the touch of a button, one can also read utility costs for the previous 24 hours, the cost for the next hour if no appliances are turned on or off, and the accumulated cost of the utilities for the month.

Energy use by the monitored families in each city will be compared with another 100 families receiving energy-saving educational materials only and 200 households making no changes.

## Perennial bulb

General Electric Co. is developing a light bulb that it claims will be as bright as a typical 1,000-watt incandescent but will last five times longer — about five years of average use — and consume only one-third the power. Expected to retail at \$10, GE says each bulb could save over its lifetime about \$20 in energy costs. The hybrid bulb — part incandescent, part metal halide — uses incandescent filaments for initial illumination; 30 seconds later, after its energy-efficient metal halide system warms up, it automatically cuts back power to the tungsten filaments. GE expects to market a three-way bulb by 1981.

## Energy and jobs

Neither domestic nor foreign policymakers are assigning sufficient weight to the implications that changing energy-use patterns and energy policy will have on employment in the United States, according to a June report by the economic-policy council of the United Nations Association of the United States. Unless this problem is corrected, the study says, enacting energy-conservation strategies may unnecessarily produce labor shortages and dislocations (regionally or in selective industry sectors), which would further cripple an economy already reeling under the inflationary effects of spiraling energy-cost increases.

In addition, the report says, people will not support government efforts to reduce energy use or alter their choice of fuels if it is perceived that those changes will ultimately put them out of work, reduce their salary or require that they move to another region of the country. Yet all of those things will occur with changes in the type of energy used and the rate of energy consumption, the study says.

The council warns, however, that social and economic chaos could be reduced if the effects of these inevitable changes were studied and planned for now. Furthermore, the economic cost to the United States — as measured in unemployment, higher energy costs and inflation — might be substantially reduced by developing schemes to retrain and relocate, where necessary, those sectors of the work force that will be affected.

Recommendations resulting from the year-long study, delivered at a June 22 White House meeting with Secretary of Labor F. Ray Marshall and Stuart Eizenstat, the President's Assistant on Domestic Affairs and Policy, called for immediate study of:

- the degree to which capital, energy and labor are substitutable or complementary,
- geographic and industrial shifts in demand, production and employment associated with changes in energy supplies and costs,
- and employment effects of changes in fuel use.

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# ARCHAEOLOGY

*Kendrick Frazier reports from Santa Fe at the Conference on Archaeoastronomy in the Americas*

## Third millennium Near East astronomy?

Babylonian observers, cuneiform records clearly show, had accumulated a substantial amount of astronomical knowledge by the middle of the first millennium B.C. Ptolemy and others used it in developing models of the universe. There is also accepted evidence that the Babylonian mathematics in use in the second millennium B.C. was essentially the same as that used to solve the first millennium astronomical problems. Yet apart from first millennium copies of second millennium cuneiform records of the movements of Venus, no cuneiform astronomical records exist for the second millennium or earlier.

H. Clyde Hostetter of California Polytechnic State University reports that his astronomical interpretations of the symbology and iconography of three Near East artifacts suggest that complex astronomical observations were being made as early as the third millennium. He described his evidence in absentia (through slides and an audio tape) at the conference. (Not all the papers dealt with New World astronomy.)

The first artifact is a stone cylinder seal dated to the beginning of the third millennium. Hostetter says its symbology suggests that a one-day difference had been observed in lengths of the spring and the summer at a time when the vernal equinox occurred in Taurus and the summer solstice occurred in Leo. The second artifact is a vase of carved steatite dated at between 3000 and 2800 B.C. Hostetter finds evidence that its symbology records a unique conjunction of the sun, Venus, and the star Aldebaran that occurred in the year 2971 B.C. The third artifact is a bowl of hammered, inscribed copper, not precisely dated but apparently manufactured sometime between the middle of the third and first millennia. Its symbology and iconography, says Hostetter, indicate a knowledge of several eclipse cycles. These include the 177-day cycle of six lunar synodic months, the eclipse year of approximately 346.5 days and an eclipse cycle of 40,899.9 days, which corresponds closely both with 112 tropical years and 70 Venusian synodic periods.

## Rock glyphs and A.D. 1054 supernova

The number of possible rock-art records of the A.D. 1054 supernova found in western North America now comes to 21, reports St. John's College astronomer Ray A. Williamson. Some are very speculative, others more certain. The best case remains the glyphs on a rock wall in Chaco Canyon, N. M., where a pueblo sun symbol is accompanied by a crescent shape and a star symbol, all in the correct relative positions of the rising sun, the new moon and the supernova in the early morning skies of 1054. "Everything is just right with this glyph," says Williamson. The 20 other possible supernova glyphs are at sites in California, Nevada, Utah, Arizona, New Mexico, Texas and Baja California. Many of the glyphs at these sites could, however, represent other things.

Kenneth Brecher of the Massachusetts Institute of Technology, for instance, says he thinks the glyphs at Fern Cave, Calif., have nothing to do with the supernova. Instead, he suggests that when the whole panel of glyphs is considered, they constitute a star map, showing a 20 by 20 degree area of the sky and including such bright stars as Arcturus, Spica, Regulus and Antares.

Williamson says new reports are continually being received and checked, and he encourages more. Because of the possible value to both astronomy and ethnography (by dating rock art), "we want to document and carry this hypothesis as far as we can." The most important obstacle to establishing the hypothesis that some of the glyphs indeed represent the supernova is the lack of accurate dates for the sites. Nevertheless, he says, for some of the examples, "the circumstantial evidence strongly supports it."

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