

Energy Outlook: Conservation Makes It Sunny

Imagine. It's the year 2000. With oil imports virtually eliminated, the OPEC nightmare is over. Unemployment is half the 1980 level. Over the past 20 years per capita income has increased 45 percent, labor productivity climbed 40 percent, the economy is soaring and inflation has all but been licked. The average American drives 30 to 70 percent more miles by car, flies 60 to 90 percent more miles by plane and sets his home thermostat at a comfortable 70°F. Sound good? According to an extensive and detailed analysis — prepared by the Solar Energy Research Institute and published this week by the Congress — this could be America's future for the price of a national commitment to energy conservation and development of renewable energy sources today.

Of course not everyone sees things this way, least of all the Reagan administration. And that may explain reports of a brewing battle between energy policymakers over what role energy conservation and renewables will be allowed to play in the investment arena over the next four years. But rosy as the SERI study is, it is also not out of line with a range of studies that have emerged this spring from such places as the Mellon Institute, Princeton University and the National Audubon Society (SN: 4/25/81, p. 261).

"Far from being incompatible with vigorous economic growth, cost effective investments in efficiency and in solar energy sources may provide the only avenue to enhanced economic vitality," the SERI report claims. It adds that "it is possible to construct a plausible, practical and economically attractive sequence of events that would allow productivity of the average American worker to increase as fast as it has during the past 20 years," all the while reducing energy use nearly 25 percent nationally over 1980 levels.

In many ways, the study parrots the much heralded Reagan doctrine of "let the marketplace decide," though with perhaps a more religious adherence to principle. For instance, it recommends phasing out energy subsidies such as the more than \$6 billion spent annually to support routine energy supplies (including the liberalized depreciation for privately owned utilities, subsidized enrichment fees for nuclear fuel and oil or gas depletion allowances). "However, an unbridled market cannot, will not and perhaps should not provide for such 'externalities' as environmental quality, equity or national security," the study says, so the government must ensure that these factor into private decisions.

It should come as no surprise that the estimated pricetag for the proposed 20-year program is high — between \$750 bil-

Sector	Solar Thermal	Biomass	Wind	Photovoltaics	Hydro	Total
BUILDINGS	1.9-2.3	1.0	.8-1.1	.4-7	—	4.1-5.1
Residential	(1.6-1.9)	(1.0)	(.8-1.1)	(.3-.45)	—	(3.7-4.45)
Commercial	(0.3-0.4)	—	—	(.1-.25)	—	(.4-.65)
INDUSTRY	5-2.0	3.5-5.5	—	—	—	4.0-7.5
AGRICULTURE	—	.1-.7	—	—	—	1-.7
TRANSPORTATION	—	.4-5.5	—	—	—	0.4-5.5
UTILITIES	—	—	5-3.4	—	3.4-3.7	3.9-7.1
TOTAL	2.4-4.2	4.8-10.5*	1.3-4.0*	.4-0.7	3.4-3.7	12.3-22.5*

*These columns don't add; estimates are set lower than sector could offer.

lion and \$800 billion, roughly twice the national energy bill in 1980. But true to Reagan dogma, the driving criterion in ironing out its details was always economic cost. "Therefore, the total cost of the conservation and solar investments proposed in this report is necessarily less than the total cost of producing conventional fuels to provide the same energy services." What's more, since not a penny would go for foreign oil, most if not all the investments would be recycled within the U.S. economy. And to ensure that eco-

nomics considerations erred on the side of conservatism, new investments were justified only if by the year 2000 they could match oil at \$40 per barrel, gas at \$5 per million Btu or residential electricity at \$0.08 per kilowatt-hour.

Forecast energy savings would come primarily from off-the-shelf or commercially ready technologies — not unforeseen breakthroughs. For example, the building sector, offering the biggest potential, could shave 75 percent of the heating and cooling needs typical of new units. □

A lefty eyes the sweetener game

With an average U.S. individual consumption of 85 pounds of sugar per year and an estimated 50 million obese Americans, the market exists for artificial sweeteners. In an attempt to enter that market, Biospherics Inc. of Rockville, Md., recently acquired a patent for a sweetening process that involves L-sugar.

L-sugar, explains process developer Gilbert V. Levin, is the left-handed counterpart to the normal right-handed sugar. In other words, while the two forms of sugars have identical chemical components, they are mirror images of each other. Because of the different geometric arrangements of its molecules, L-sugar cannot be metabolized by the human body: Metabolic enzymes have evolved to accept only right-handed sugar molecules. "It's like trying to fit your left hand into a right-handed glove," Levin says. "The glove can't accept the hand." As a result, L-sugar is noncaloric. In addition, says Biospherics researcher Manja Blazer, the no-calorie sugar should neither cause tooth decay nor leave an after-taste when used in diet soft drinks, foods and pharmaceuticals.

The L-sugar that looks most promising for use in such products is L-fructose, the left-handed counterpart to corn sugar. Fructose — sweeter and cheaper to produce than sucrose — has replaced in the past couple of years cane or beet sugar in

certain soft drinks. Coca-Cola Co., for example, has used right-handed fructose in certain beverages since 1974. The success of right-handed fructose may signal future success for L-fructose, Levin says.

And that L-sugar optimism extends beyond the laboratory: Biospherics's patent acquisition recently sent its stock soaring — from \$3 to \$9 one week. Still, at this point L-sugar's corporate success is based on little more than stock market speculation. Additional research is needed for some unanswered questions.

For example, Biospherics has yet to study the physiological effects of extra bulk — nondigestible molecules — traveling through the digestive track. Moreover, the L-form synthesis thus far has been confined to the laboratory; whether it can be accomplished in an economically feasible fashion remains to be seen.

Then, of course, there are always the extensive toxicity tests to be conducted. Blazer says optimistic research results of L-sugar studies already in the scientific literature now are being submitted to the U. S. Food and Drug Administration for review.

Meanwhile, FDA may be approaching another stretch in the sweetener spotlight. The agency again can take steps to ban the artificial sweetener saccharin on June 30, when a congressional moratorium on any saccharin ban ends. □