soil would apply for Fig. 2, with probably a negligible difference of emissivity between the Sinai and the Negev.

The multifaceted study of possible desertification in this region is continuing and should in no way be regarded as definitive, not even for any of the subtopics. In spite of the efforts since the winter of 1972–1973 to study and analyze these phenomena, many uncertainties and questions remain. Specifically, appropriate mapping of radiation temperature differences from satellites will be available only in 1977, when LANDSAT-C (Land Satellite), with a thermal band in its scanner will offer a relatively high resolution and the coregistration of the thermal radiation measurements with the multispectral reflectance measurements. However, for most pertinent information, the operating time should be changed from 9:30 a.m. to about 10:30 a.m. (*10*). Further studies in a variety of disciplines are needed, and specifically I personally hope that Jackson and Idso will carry out detailed temperature measurements in an area of natural vegetation in the United States that does exhibit an infrared reflectance anomaly. Such reflectance anomalies have been found to exist in many parts of the world (*7*), including the Sahel.

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14 July 1975; revised 25 July 1975

Fuel Savings by Lowering Thermostats

In criticizing Federal Energy Office (FEO) estimates of the fuel savings that would result from lowering thermostats 6°F, Ferrar and Nelson (*1*) appear to have erred. Their double-log regression showed fuel demand about proportional to the square root of heating degree-days, as derived from averages of individual state statistics. This relationship should not be used to estimate degree-day effects within a region. A time series regression, against observed degree-days within a state or region, must be used, and it should yield almost direct proportionality. Conduction heat losses from residences are proportional to the difference in temperature between inside and outside. Radiant heat losses, proportional to the fourth power of absolute temperature, also turn out to be nearly directly proportional to this temperature difference for small absolute reference shifts of 3°K (6°F). Using Ferrar and Nelson's tabulated data, a revised calculation yields a fuel saving of 24 percent of 1973 estimated demand; that is, 1.7×10^{14} Btu, or 840,000 barrels per day, which is close to the FEO estimate (900,000 barrels per day) that they quoted.

Comparison of per capita consumption between two areas shows only that architectural and life styles change in response to the local climatology of degree-days. A resident of the South Atlantic region who moves to New England, where more than twice as many degree-days are encountered, would not double his fuel consumption, because his new home would be better insulated and designed against this severity. The square root effect would apply. But if a particularly cold winter in the South Atlantic area caused doubled degree-days to be recorded, his fuel consumption there would indeed be doubled in response.

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Reed questions the use of cross-sectional data to estimate relationships between per capita fuel demand and degree-days. He argues that a time series regression should be used and asserts, on the basis of a thermodynamic argument, that such a regression should yield almost direct proportionality between the daily demand for heating oil and the degree-day variable. We contend that the thermodynamic solution, while relevant on a day-to-day basis, is not appropriate for forecasting the impact of a season-long policy.

A time series elasticity of unity implies a constant short-run return to that input. It is unrealistic to expect this constant unitary elasticity to prevail for longer than an extremely brief interval within a social system. The purpose of our study was to determine what one could reasonably expect from a policy implemented for a major portion of the heating season, during which time other social and economic forces were effective. The thermodynamics of the situation, while centrally relevant to the demand for heating fuel, should not be interpreted as the overriding effect in assessing an aggregate system demand.

At present we know of no time series studies which would alter the conclusions reached in our report. Moreover, in a time series study by Strout (*1*) on heating fuels, a degree-day elasticity of 0.468 was established. Similarly, Miller (*2*), employing data from December 1973 to May 1974 and September 1974 to May 1975, obtained results substantially similar to those presented in our work.

In the fuel oil heating industry a degree-day elasticity of unity is widely used as a base point, but correction factors are regularly applied, not only for geographic regions (Reed's point) but also for seasonal combustion efficiency changes. In attempting to forecast demand over a heating season, one must make sure that these correction factors are taken into account. Similarly, it is common in the heating industry to calculate relationships between consumption and degree-days for commercial establishments on a building-by-building basis. Again, this industry behavior calls into question the reliability of a unitary elasticity for forecasts of a seasonal duration.

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