exponential form chosen above, leads to unreasonable results. For example, if the 1985 base case energy contribution is chosen to be 0.12 quad, then the option 3 estimate for 1985 is 0.32 quad. Using the year 2000 estimates and the 1985 estimates just mentioned to calculate the constants in Eq. 1, one obtains growth scenarios with identical exponential rates. That is, the growth rates for the two cases are identical and the estimates are fixed in a ratio of 8:3 for all years.

This result is unreasonable because of its implications for the early years of the period of interest (1978 to 1980, for example). Under option 3 the 1980 energy estimate according to this formulation exceeds 0.09 quad, implying roughly one million solar heating units. Further, because the growth rates are identical, the integration paths do not permit an examination of the sensitivity of the net energy effect to growth rate changes, and this does not satisfy an intuitive desire that the rapid integration growth rate be higher than that of the base case.

For these reasons, the base case path was taken as described above, with the 1985 energy assumed to be roughly 0.12 quad. But the option 3 path was altered to provide more realistic estimates in the initial years. The integration paths analyzed were

$$C(t) = 0.0941\{e^{0.1025(t - t_0)} - 1\} \quad (2)$$

for the base case, and

$$C(t) = 0.0941\{e^{0.1425(t - t_0)} - 1\} \quad (3)$$

for option 3. These paths satisfy capacity estimates for the year 2000, but for 1985 give 0.12 and 0.2 quad estimates for the base case and option 3, respectively.

While this is seemingly a great deal of discussion over an apparently minor point, the fact is that the importance of the invested energy relative to the output energy is fairly sensitive to the form and rate of the integration path selected.

References and Notes

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