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Letter to the Editor

Another reply
15 July 1997

Dear Editor

You asked for comment on David Scienceman's letter regarding Energy terminology. As a visiting scholar from Australia to the Department of Environmental Engineering Sciences at the University of Florida, Dr Scienceman contributed in major ways to the concepts and application of emergy evaluation off and on over a 10 year period. I prefer 'emergy evaluation', since the process is both analysis and synthesis at the same time.

The concepts were published earlier under different names. Appendix E (pp. 316–317) in Environmental Accounting (Odum, 1996) provides dates of use and numerical values for each span of years starting in 1967.

It was a team agreement in 1983 that new terminology was necessary for the rigor of the energy hierarchy concepts to be clear. Elisabeth C. Odum suggested embergy as short for embodied energy. As a library scholar without equal, David researched the basis for scientific nomenclature and linguistic roots. Emergy, transformity and empower were used by us thereafter in many theses, dissertations, papers and books. One editor found emergy to be confusingly close to energy in spelling and made me change it to enmergy for that paper. E. Tiezzi recognized the importance of an emergy-related entropy concept: emtropy.

Since 1983, all of us used sej as the abbreviation for solar emjoules However, I see nothing wrong with semj as its abbreviation except for its length. Embit seems confusing (possibly implying a product) when what is meant is emergy per bit. Transformity is the emergy per joule of a particular form of energy (Scienceman's fj). But as an abbreviation in a numerical table sej/fj is not helpful because the f for form doesn't say which form of energy. To be complete one has to write sej/coal joule or sej/snake movement joule. A recent paper was entitled "The ratio of emergy to exergy". Where only one kind of exergy is in the denominator that ratio is transformity. Adding different kinds of available energy as exergy ignores the hierarchical differences in kinds of energy (types, forms). I refer you to my book, Environmental Accounting (Odum, 1996).

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Scienceman's letter is needed to show how these definitions follow the tradition of care with units and dimensions from physics and engineering. On the other hand, he could be more charitable by not criticizing verbal explanations intended for other kinds of audiences, so long as the concepts are correctly used. Scienceman also uses concepts qualitatively for some purposes such as his delightful energy systems representation of the plot in Wagnerian Opera. With his help we assembled a booklet manuscript entitled 'The Writings of David Scienceman' and hope that he will make final corrections and authorize its publication.

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References

Odum, H.T., 1996. Environmental Accounting, EMERGY and Decision Making. Wiley, NY, 370 pp.