A Thermodynamic View of Politics©

by

Richard D. Hughes, Emeritus Professor of Government, CSUS

Thermodynamics—the Science of Energy

1. All that exists is either energy or empty space, according to physicists.

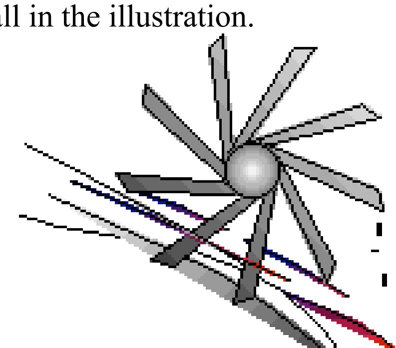
2. Energy comes in two forms: a) what we ordinarily think of as energy (heat, light, electricity, energy of motion, potential energy—as in a waterfall), and b) what might be called "stored" energy, matter, or what the physicist calls mass.

3. The relationship between these two forms of energy is described by Einstein's famous equation: $E=MC^2$, where E is energy, M is mass, and C is a constant—the speed of light in a vacuum.

4. The first two laws of thermodynamics say something about the amount of energy in the universe and how it is transformed.

5. The first law asserts that there is a finite amount of energy in the universe. It may change form but it neither disappears nor suddenly appears. It could be viewed as a logical category. An individual in this room is not likely to disappear into nowhere, nor do we expect a gorilla to suddenly appear in our midst—without at least using the door. The only known violation of this law is the loss of socks in the wash—especially left ones.

6. The second law asserts that the amount of available energy in a closed system is constantly decreasing. "Available energy" is the technical term for energy which can be used for something. Consider the example of the waterfall in the illustration.



It might be nice to capture the wastewater flowing to the right, but then the waterwheel would not turn. The "available" energy, which is captured from the flowing water from the left, cannot be totally captured. A lot of it is lost. (In theory, fifty percent, in practice, even more.) Energy can be made available to us for useful work, but only if energy is used to capture it—waste. So it is with autos, power plants, humans, and entire economies.

Relationship to Politics

1. On the energy availability side, consider our dependence upon oil imports from the Middle East, consider the Somali warlords' interruption of food supplies before the U.N. intervened, consider the power of Big Oil in California politics. (We are the only oil producing state without an oil severance tax—it would raise $700 million annually—enough to operate five to six campuses the size of California State University, Sacramento.)

2. On the waste side, consider clean air problems in California, pollution of ground water by leaking gasoline tanks, shrinking landfills, the importance of sewage systems.

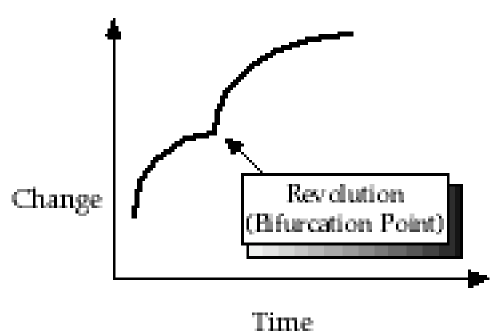
3. Therefore politics is really about energy. I would go further. Politics is the struggle for control over people's picture of reality. The most important energy, human energy, is controlled by ideas. If you restrict access to information through secrecy, cover-ups, lying, then you have a chance to control the picture of reality people have, and thus their actions. In most, perhaps all countries, care is thus focussed upon education and access to news media. (In this country such media access is restricted by money. In the former Soviet Union it was restricted directly through censorship.)

Energy and Social Change

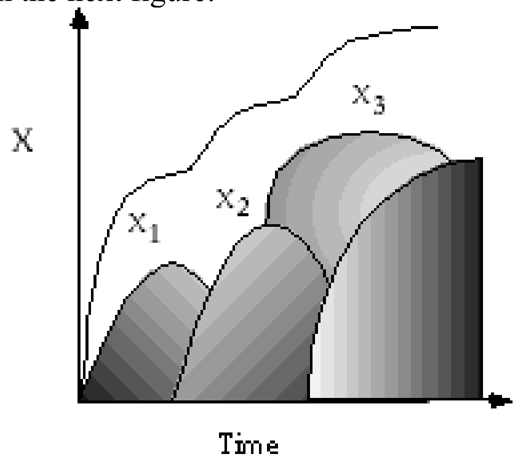
1. Ilya Prigogine (a man born in Russia, now a Belgian citizen) won the Nobel Prize for Chemistry in 1977 for inventing the mathematics to explain life. If you want to read more about this mathematics, or get through many a rough night avoiding the thought of suicide, I commend Grégoire Nicolis and Ilya Prigogine, *Self-Organization in Nonequilibrium Systems: From Dissipative Structures to Order through Fluctuations.* New York: John Wiley &Sons, 1977, especially chapter 18.

The basic idea is alluded to above. You and I exist far from equilibrium, our temperature is higher than that of the room due to the processing of food energy into wastes. When we die, we reach the temperature of our surroundings: equilibrium.

2. Systems survive and change because of the flow of energy through them. Over time, fluctuations (of any kind) can lead to a complete change of the system. The idea can be shown in the figure below.



3. In insect populations a new subspecies can replace others because of innovations that better use the available energy, as illustrated in the next figure:



4. Nicolis and Prigogine have mathematically modeled a town. Although some of their conclusions may appear trivial, they have provided us with confirmation of our intuitions regarding evolving social systems. It is important to preserve the openness of the system to its environment while promoting innovation and adaptability. Their model had an additional conclusion consistent with the notion of innovation's key to success in the long term. "A very interesting result emerging from the model is the following. If a new activity is launched at a certain time, it will grow and stabilize. If the place is well chosen, it may even prevent the success of similar attempts made nearby at a later time. However, if the same activity is launched at a different time, it need not succeed; it may regress to zero and represent a total loss. This illustrates the dangers of short-term, narrow planning based on the direct extrapolation of past experience. Such static methods threaten society with fossilization or, in the long term, with collapse. The principal message of the dynamical modeling advocated in this section is that the adaptive possibility of societies is the main source allowing them to survive in the long term, to innovate of themselves, and to produce originality." Grégoire Nicolis and Ilya Prigogine*, Exploring Complexity: An Introduction.* New York: W. H. Freeman and Company, 1989, p. 242. The selection comes from a passage entitled "Self-Organization in Human Systems," pp. 238-42.