Review of: "Clausius' thermodynamics, engineering thermodynamics based on the entropy principle by discarding the energy premise"

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Potential competing interests: The author(s) declared that no potential competing interests exist.

I appreciate author's effort to clarify common and different points of various thermodynamic approaches. Honestly, I am rather confused by the text and its organization, I was being lost what is the "main flow" and the main goal – in contrast to abstract which is a clear statement. The text contains pieces of a mosaic but for me it is difficult to see the whole mosaic, the adjoining of the pieces. I do not understand why the energy (premise) in the "engineering thermodynamics" is wrong while "Thermodynamics is the theory of energy". It seems to me that engineering thermodynamics is just simplified, gross version of more theoretical approach suitable for engineering applications. Similarly to transport phenomena where engineers often use mass transport coefficients and simple differences between local concentrations instead of diffusion coefficients, gradients of chemical potentials or concentrations, Fick's laws...

Some additional and more specific comments:

- Heat, in my opinion and understanding, is not a form of energy but a way of energy transfer (between bodies). Heat and work are quantities referring to a process while energy is a quantity (characteristics) describing a body (which can undergo a process). Consequently, work is not produced but a result of a specific movement, transfer of energy.
- The definition of energy as the capacity for doing work calls for the definition of work, at first. Work is another way of energy transfer, so this definition of energy is rather tautological as noted in various publications (one cited). Energy "exists" even when there is no work.
- Introduction is a mixture of – mainly historical – notes and of paper organization. A clear statement of paper's goal and aim would be desirable for its better understanding.
- There is no mention of the thorough analysis of the historical roots of thermodynamics by Truesdell (The Tragicomical History of Thermodynamics 1822-1854. New York: Springer, 1980) and what news this paper brings.
- More elaborated version of Figures 1, 2 appears in Truesdell's Rational thermodynamics New York: Springer, 1984). In accord with his approach, I strongly prefer equilibrium/non-equilibrium insight to reversible/irreversible insight.
- In German, Wert (value) is written, not Werth.
- I think there is no universal entropy growth in advanced thermodynamics. There is just entropy inequality determining the change of entropy. For simple illustration see Arieh Ben-Naim: Journal of Chemical Education 2011 88 (5), 594-596.
- Besides (instead of?) the "Universal dissipation of mechanical/available energy" concept I would stress the "Universality of heat/work transfer" as described by Truesdell (see above).

Anyway, I endorse publication of this manuscript, perhaps after considering the above comments, because I believe that

discussion of various viewpoints is much more fruitful for science and knowledge advancement then preventing to publish them.