

Suggestion of Environmental Thermoconomics

Deokjin Kim

EnTEs Institute, Korea. E-mail: entes@outlook.kr

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Abstract We suggest the environmental thermoconomics that combines the environmentology of nature conservation, thermal engineering of resource saving, and economics of human development. From this study, the rights and duties of resource saving, human development, and nature conservation can be proven and calculated from accurate interpretations based on thermal engineering knowledge for all changes of around us. The activity energy of nature can be calculated by thermodynamics. Thermodynamic energy is converted into economic money through thermoconomics. Therefore, the value cost of nature is calculated. This is the cost of rights and duties of human to nature.

1. Introduction

In this study, a new scholarship called environmental thermoconomics is proposed. The core is how to calculate the value of nature at an economic cost. For this, environmentology, thermal engineering and economics must be integrated.

2. Environmental Thermoconomics

2.1 Outline diagram

Fig. 1 shows the relationship between the environmentology of nature conservation, thermal engineering of resource saving, and economics of human development. We would like to call the integration of the three scholarships environmental thermoconomics.

2.2 Environmental thermal engineering

The activity energy of nature can be calculated from the energy of the first law of thermodynamics, the entropy of the second law of thermodynamics, and the exergy of the mixture of above two laws (See "Biological thermodynamics", Wikipedia).

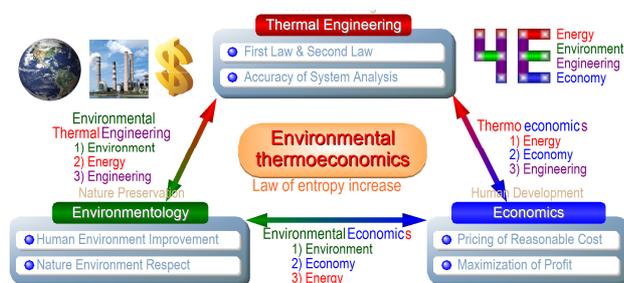


Fig. 1 Outline diagram of Environmental Thermoconomics

2.3 Thermoconomics

Thermodynamic energy is converted through thermoconomics into economic money.

2.4 Environmental thermoconomics

Therefore, environmentology, thermal engineering, and economics can be integrated.

2.5 Objective

The target of this scholarship is to prove the rights and duties of resource saving, human development, and nature conservation from accurate interpretation based on thermal engineering knowledge and to calculate the costs for all changes around us. The aim of this scholarship is to realize a community in which nature, human, and AI entities cooperate and develop each other on Earth.

2. Rights and Duties

2.1 Energy

Energy means the ability to bring about change. Since

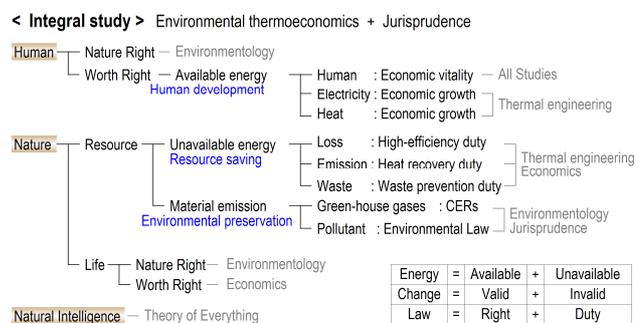


Fig. 2 Rights and Duties on Energy

change occurs in all things, energy can be applied to all things. Especially, the degree of thermodynamic change is precisely calculated by thermodynamics.

2.2 Available Energy

Available energy means the ability to bring about effective change, and this is called exergy in thermodynamics. It has the potential to achieve resource saving, human development, and nature conservation from available energy.

2.3 Unavailable Energy

Unavailable energy means the ability to bring about ineffective change, and this is called anergy in thermodynamics. Loss, emission and waste are unavailable energy.

2.4 Energy = Available energy + Unavailable Energy

All energy can be divided into available energy (= exergy) and unavailable energy (= anergy) by the laws of thermodynamics. The amount of energy is a constant value. That is, it is understood that it is necessary to increase the available energy of resource saving, human development, and nature conservation by reducing the unavailable energy of loss, emission and waste.

2.5 Rights and Duties

Therefore, available energy corresponds to rights, and unavailable energy corresponds to duties. Fig. 2 shows the rights and obligations for energy.

3. Costing of Rights and Duties

3.1 Unit price of power plant electricity

The natural energy of environmentology goes through the power plant of thermal engineering, and it is converted into money of economics. That is, it is the electricity of power plant that connects nature and human. The unit price of electricity is set for each country. This is the core of environmental thermoeconomics. If this cannot be understood, then environmental thermoeconomics cannot be born.

3.2 Value costing of Ecosystem

The energy, available energy, and unavailable energy of an ecosystem can be calculated through the laws of thermodynamics. Here, the available energy of the ecosystem is equivalent to electricity. Therefore, the cost of the value of the ecosystem can be calculated as the multiplication of the available energy and the electricity unit price.

3.3 Costing of penalty

It is clear that loss, emission, and waste must be reduced. If not, a penalty fee should be set. The penalty cost is the

multiplication of the loss emission waste energy and the electricity unit price. A representative penalty costing is to calculate Certificated Emissions Reduction.

3.4 Minimum penalty

The thermodynamically calculated available energy is the ideal maximum value of production or the ideal minimum value of loss. The penalty should be set to the loss. Therefore, the calculated penalty becomes the minimum value. Therefore, the penalty set by the government must be equal to or higher than the minimum penalty.

3.5 Three cores for calculation

There are three key points in the calculation. First, calculate the available energy of the given system. Second, multiply the value by electricity unit price. Third, multiply the value by the enforcement will factor of government's policy.

4. Scholarship of Everything

4.1 Energy and Entropy

Energy and Entropy is a word that can be applied to all scholarships. Find the formulas that can calculate the energy and entropy of the given system at the scholarship.

4.2 Costing

From the energy and entropy calculated from the scholarship, the available energy and unavailable energy can be calculated. Multiply that value by the nation's electricity unit price. Since that value is the ideal maximum or minimum value, multiply that value by the propulsion will factor of the scholarship.

4.3 Exception

Environmental thermoeconomics is derived from the laws of nature. Therefore, this scholarship cannot be applied to human's greed to which the laws of nature cannot be applied.

4.4 Article 0 of the nation constitution

As Article 0 of the nation constitution, we propose that the rights and duties of nature, human and natural intelligence are the same. Article 0 means that it applies to all laws, company regulations, incorporation articles, etc.

5. Conclusions

The word "environmental thermoeconomics" does not currently exist in the world. In this paper, the scholarship is newly proposed. The main field is to calculate the value (or worth) of nature into the cost of economics. This is because the laws of nature are thermodynamically established. However, this scholarship cannot be established at human's greed.