

*Editorial*

## **Energies and Policies**

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The International Energy Agency, headquartered in Paris, was founded in the early 1970s and is an energy policy advisor to 27 countries. On June 6<sup>th</sup>, a press release and related report from the IEA were announced as descriptive of means toward sustained economic growth and affordable energy technology. While your author agrees with these IEA objectives, some IEA proposals join others in falling short on these very counts.

Humankind faces major problems, some of new prominence. Increased affluence of humans in developed and developing countries is greatly reducing the habitat of other living beings, with resultant reductions and extinctions. Increased consumption in developed and developing nations is depleting some resources that are important to humans, and emissions of carbon dioxide, produced by carbon burning, are causing Earth's climate to become warmer, with melting of glaciers and polar ice, rise of sea level, and increase of weather extremes.

Great divisions between rich and poor mark the human world. The rich are large consumers, and the numerous destitute, lacking basic resources including decent education, are the most disease-afflicted and are nevertheless the most rapidly increasing in numbers.

These conditions and associated problems are intertwined and of enormous portent. Since humans cause them, human must see to their resolution. What are the prospects? The human condition, political systems, and energy are at the center.

A robust living entity strives to endure and prosper. This is reflected in political systems worldwide and in policymaking, which has long been more characterized by the influence of established interests than by rational thinking and paths logically selected for the long term public good. Good revisions to political systems have come very slowly, and there have been important setbacks in the United States and elsewhere. However, emphasis must turn from preservation of business as usual to wider and more equitable distribution of goods and services.

Economic growth, measured by increase of gross domestic product, is unsustainable in the long term. Human consumption cannot increase continually, though technological innovation helps. Indeed, resource depletion is already with us in important areas, and prices are accordingly rising with impacts that are especially severe in undeveloped countries. With the economic system in developed countries based on continual economic growth, structural revision is necessary but is unaddressed in the latest IEA statement. Indeed, the IEA proceeds from a basis of 3.3% annual economic growth worldwide.

IEA does not mention, much less treat, population control by peaceful means, the absence of which is a critical deficiency because increased population is a ticket to faster resource depletion and to population control by catastrophe. Owing to inappropriately directed power of science and technology, world population has increased by a factor of three during your author's lifetime! Of course, the impacts of human population are far greater in developed economies, and these have experienced the demographic transition toward low population growth or even decline, but human numbers are rising rapidly in developing economies, especially India and China (which is confronting human population increase amid much criticism, some justified) and the net annual global increase of human numbers is near 100 million.

The IEA report appropriately cites need for reduction of emissions of the greenhouse gas, carbon dioxide, whose content in Earth's atmosphere is now rising  $\frac{1}{2}\%$  annually and ever more rapidly, owing to increasing carbon burning worldwide. A variety of means toward reduction are presented, but not all would be helpful and implementation of effective measures depends on a willingness to bear increased costs.

Increased nuclear power as a substitute for coal-fired power plants is proposed by IEA as one means toward reduction of carbon dioxide emissions, with 32 new nuclear plants annually for the next forty years. However, increased production of power by nuclear fission would not be a good choice. Consider human society and its changes during the last 2000 years. Does this not teach that no sense attaches to further development of a technology whose radioactive wastes (approximately 30 tons annually per 1000 megawatt reactor), must be sequestered after processing for at least 100 thousand years? And given strife in the world, the risk of terrorism in particular, and the lifetime of nuclear plants not more than fifty years, it would be dangerous in the extreme to pursue such a course.

What are our options? As the IEA clearly states, the only paths are very difficult, and the outcome is accordingly problematic. But education and research present hopes, at least. As the IEA report states, fuel efficiency must be sought; this should be found in construction of enhanced rail transportation for both passengers and freight, especially in the United States, just now being surpassed by China as the leading emitter of CO<sub>2</sub>. Construction of new coal-burning power plants must stop worldwide. Electricity generation by concentrated solar power as now being developed by Algeria and Spain and, to a lesser extent in Nevada, USA, and other options for power generation such as waves and tides and nuclear fusion should be pursued. Subsidies for all biofuel production must be eliminated because about as much energy is required to grow and process fuel from crops as the fuel provides, because arable land is in short supply, and because conversion of food to fuel raises the price of food. The clamor toward conversion of cellulose to fuels is especially misguided – even large areas devoted to new cultivation of grasses, for example, with necessary exclusion of both wild and domestic herbivores, would contribute negligibly to petroleum supplies while creating about as much greenhouse gas emission as would be saved.

If there were rationally based policies at national and global levels, we could properly hope that the market place would become a more useful and reliable regulator of opportunities and choices.

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In addition to technical reports, it is hoped that papers related to constructive discussion, comments, agreements and disagreements on policies will be published in this journal.

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