Encouraging renewable energy: smart policy

As fossil fuels’ energy return on investment ratio diminishes, renewables’ EROI is continuing to increase.

Most policy experts agree that a strong renewable energy policy is smart national security policy because it reduces dependence on foreign energy sources. And, while the political debate may rage on, science clearly has shown that renewable energy also is smart environmental policy. Less well known is that support for renewables also will spur long-term economic growth.

Understanding this connection requires a basic knowledge of two economic principles. The first is the concept of energy return on investment. EROI is the ratio of the amount of usable energy acquired from a particular energy resource to the amount of energy expended to obtain that resource. For example, if one barrel of oil is needed to produce 10 barrels of gasoline, then the EROI for gasoline is 10. EROI falls as it becomes more difficult to produce a given energy source. An EROI below one is an “energy sink,” where the energy used in production exceeds the energy obtained.

Economists have long recognized a relationship between falling EROI and economic downturns. For example, the EROI of gasoline on the eve of prolonged economic slumps in 1972 and 2008 was about 70 percent of its EROI in the economically robust 1990s.

Second, economists widely accept that spending on energy is relatively inelastic compared to spending on other things. This means that as money becomes tight or energy prices rise, consumers tend to reduce spending on other items while purchasing the same amount of energy.

By putting these two principles together, we can see that if energy sources with higher EROIs were available, then society would spend less money for the same amount of energy. This frees up more money to feed other sectors of the economy, spurring economic growth.

How do renewables fit into the equation? A common criticism of renewables is that they supposedly hurt economic growth by increasing energy costs for consumers, and thereby drain money from other sectors of the economy. But these critics fail to recognize that wind energy already has a relatively high EROI; several studies have estimated wind’s EROI at somewhere between 10 and 20.

More importantly, the EROI of all renewables is rising while the EROI of all fossil fuels is falling. This is because renewables’ primary cost is technology, which will fall over time; fossil fuels’ primary cost, meanwhile, is extraction, which rises over time. EROIs for fossil fuels have fallen over time so that today they are estimated to be 17-35 for foreign oil, 11-18 for domestic oil and four for speculative new sources such as tar sands.

Domestic coal presently has the highest EROI – estimates range from 40 for coal produced by relatively clean processes to 80 for the dirtiest and cheapest coal. But as with oil, coal will inevitably see its EROI fall over time too.

Today, renewable energy may well be an added cost – for example, the California Public Utilities Commission estimates that a 33 percent renewable portfolio standard would add $54.6 billion to electricity costs in that state by 2020. But studies also have found that as the EROIs of fossil fuels inevitably fall, increased energy prices will cost California $84 billion and 620,000 jobs over the same time period.

These studies conclude that in the long term, a 33 percent RPS and a focus on energy efficiency would facilitate the replacement of low EROI energy with high EROI energy, and free up more money for discretionary spending to generate an estimated $20 billion net surplus and 112,000 net new jobs in California by 2020.

On the other hand, an energy policy that fails to promote renewables will force us to continue to rely on low-EROI, increasing-cost fossil fuels. In the long term, this will reduce money available to support other economic sectors; our economy will be depressed.

Fossil fuels are a finite resource. While fuel efficiency improvements can buy us more time, the decline in EROI for fossil fuels is inevitable. Only an emphasis on an energy policy that increases EROI, like renewables and energy efficiency, can keep energy costs from consuming an ever larger portion of our economic output.

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