

A New Paradigm Applied: The Energy Sector

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We are facing a new paradigm driven by a discontinuity induced by technology change, i.e. the separation of information from physical goods driven by information technology diffusion.

To recap, the new paradigm has the following factors:

1. enables a massive growth in wealth
2. reduces transaction costs
3. requires trusted custodians of information
4. enables new forms of organisations
5. changes the boundaries between organisations and the market
6. creates the self-interest for people to own information defining their person
7. requires maximum storage of data to realise maximum returns

The paradigm directly changes several fundamentals in the Energy sector and ushers in a period where more change can be expected, with new technologies and concepts changing the way energy is supplied, usage measured and used.

First, a change in the wealth of society will coincide with a large increase in energy costs. Peak Oil, the point at which world oil production peaks and begins to decline, is an imminent milestone which creates an increasing demand for efficient energy use and for alternative energy sources. We can expect energy prices to soar, as shortages result in price signals in the market. However, without feasible alternative energy sources of sufficient scale to switch to, there is insufficient energy to supply people at the current consumption or to fuel economic growth. Thus, we can expect energy to consume an increasing percentage of people's income, as people bid up the price of energy to the level where suppressed demand can be met by current supply, in order to meet personal needs.

Second, reduced cost of information drives a reduction of transaction costs. Efficient metering of energy use and targeted charging can be enabled for smaller areas and for individual items of equipment, providing improved price signals to the Consumer. The matching of energy generation and demand can be more closely linked, with consumers able to manage their patterns based upon an energy spot market to maximise their benefit and for society to maximise energy generation efficiency. Local generation can be linked into an energy grid, with local energy producers gaining a return from production and society an increase in available energy. The transaction cost is a core issue enabling new methods of measuring energy generation and consumption and allowing the market to strike a balance between supply and demand.

Third, information regarding energy creation, storage and consumption are major economic factors. The Suppliers and Customers of energy need confidence in the reliability of the information, in order for the energy market to operate efficiently. If the information was held by only one party, e.g. large-scale Suppliers, then the asymmetry of information would lead to Suppliers operating the market for their benefit, which would include increased returns from energy – hence higher prices – and managing supply – such as squeezing small-scale Suppliers from the market

except during periods of peak demand. Customers would end up with reduced access to energy, as the incentives for investment by small-scale Suppliers would be reduced – and higher prices. The answer is for a trusted intermediary to supply information on the market to all parties, thus enabling market pricing independent of any vested interest.

Fourth, reduced transaction costs and an information economy enable new organisational forms. Organisations can self-form from a collection of people bringing skills to a specific project or process, and then disband once the role is complete. Social networking provides new opportunities for communities of people to achieve energy goals, while access to inexpensive information provides the expertise to enable local production, storage and consumption in ways not previously feasible.

Fifth, the boundary between the organisation and the market becomes increasingly blurred. The Supplier in one instance is a Consumer in a different instance and a Customer in a third, with roles shifting multiple times during a single day as energy demands shift, households vary between being net providers and net consumers and individuals go about their daily business. The reduction in transaction costs encourages use of market resources as required rather than using dedicated in-house resources, thus blurring the distinction of an organisation as it operates in the energy market.

Sixth, information on energy demand becomes an indicator on people's activities, their location and their relationships with other people. This information can be used for direct marketing and political purposes, and therefore is a valuable resource. It is the individual's best interest to control the distribution of information identifying their activities both as a form of protection against information being used contrary to their best interests and to maximise the return to the individual for use of their private information.

The final point is that for society to maximise its returns from information about the energy sector, the maximum amount of data should be stored in order to provide the basis for automated network reporting and control, and as market indicators for setting prices based upon supply and demand levels. The greater the data, the better the quality of the information, and thus the more society benefits.

These changes can all be predicted by applying a new paradigm of an Information economy, but probably represent only a portion of the real benefits, many of which will become apparent only in the context of the new paradigm once it is entrenched. The consequence of these changes is a substantial improvement in the energy footprint of the average person, thereby enabling society to prosper in a period of declining oil supplies and providing increased time to develop substitute technologies. However, it can be expected that vested interests will resist change as it represents a challenge to the power of large-scale Suppliers and governments in controlling the market. The ease of the transition depends on the skills and dedication of people in the sector to the consumer of their services.