

Beyond The Fire Economy

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To design a better energy system we should understand clearly what we want it to do for us. What do we want from an energy system? In purely physical terms we want six activities. We want to control heat flow. We want to adjust local temperatures up or down. We want to make light. We want to exert force. We want to move things - by exerting force, but the activity is so important it deserves its own category. We want to manage information - rapidly becoming the most important activity of all.

To do so we have created a human energy system, made up of physical artefacts, such as buildings, lamps, motors, vehicles and electronics, and using two processes - fire, and electricity. Fire still dominates. The Fire Age predates *homo sapiens*. Our Neanderthal forerunners had fire. We have evolved with fire. We think of fire as cosy, welcoming, hearth and home. But fire is actually a violent, extreme process. Fire produces heat at a temperature so high it's dangerous. Fire turns resources rapidly into waste. Much of this waste is pernicious, locally or globally. Why can't you breathe in Beijing? Fire, and what it pours into Beijing air. Why are governments fighting over the Arctic seabed? Fire, the worldwide desire to feed fire. Why are we alarmed about what's happening to our weather? Fire, and the carbon dioxide it pumps into the atmosphere. We have let fire get out of control.

For more than a century, however, electricity has been supplanting fire. We make light with electricity and electric lamps. We exert force with electricity and electric motors. We manage information with electricity, computers, smartphones and so on. Fire is a chemical process. Electricity is not. Electricity is a physical process. Electricity under human control does not destroy what it happens in. Electricity does not produce pernicious waste. Electricity can save us from fire, and the damage it is doing to our world - except, of course, for one awkward detail. We still make most of our electricity using fire.

We don't need to. We've known since the earliest days of electricity how to make it without using fire, with chemical batteries, or by harnessing natural forces such as wind, moving water and more recently sunlight. However, we have convinced ourselves that making electricity with fire is less costly than these other methods. Because we evolved with fire, we have never accurately costed its pernicious consequences. Because our cost comparisons are wildly inaccurate, we continue to use fire-based electricity, rather than the many much less damaging forms of electricity not based on fire.

We have even come to treat electricity as though it were fire. We buy and sell electricity as a commodity, in short-term batch transactions where what matters is the price per unit. But electricity is not a commodity. It is a process, happening instantaneously throughout an entire system, including the user-technology that does what we want to do - the lamps making light, the motors exerting force, the electronics managing information, and so on. Indeed making light, exerting force, moving things and managing information are themselves processes. Our energy systems carry out these processes for us. What we need, what our transactions ought to foster, is access to these

processes. Thomas Edison initially charged his customers according to how many lamps they had. They were paying to have electric light available, for access to the process, just as you may now pay rent to have access to the comfort of a home. You do not buy comfort by the unit. Comfort is not a commodity. It is a process. But for too many processes, too many services, we have drifted far along a misguided and dangerous blind alley.

Within the past century we have applied the fire model not only to electricity but much more widely. Apart from food, fuel to feed fire is the only product we make that is intended to be consumed continuously, needing continuous replacement. Everything else we make - clothing, footwear, furnishings, tools, appliances, vehicles, buildings - is, or should be, durable, something that lasts. But we have now stumbled into a global economy modeled on fire and its consequences - a 'Fire Economy', what we call a 'consumer society', whose central function appears to be to turn resources into waste as fast as possible. The oxymoron 'consumer durables' succinctly pinpoints the paradox.

We need urgently to move away from fire as the model for human activities. We need to move beyond this Fire Economy, focused on consumption and destruction of resources, to one focused on process and access to process, within a durable and resilient infrastructure. Electricity holds the key. With electricity we can control heat flow, adjust local temperatures, make light, exert force, move things and manage information. We can do so without fire, by harvesting natural forces with infrastructure electricity. Human activities can become process, not consumption. But we need to overcome our crippling inability to acknowledge and account for the true cost of fire. If we do not, spurious comparisons of cost will lead us to choose disaster.

Governments can lead the way, not as legislators or regulators but as major users of our energy systems. Governments can make the rules, and reshape energy business. They can call for tenders for detailed audits of their energy systems, to find and design improvements; to integrate and optimize entire systems throughout their facilities; and to install, operate and maintain the upgraded systems, not merely ad hoc, as happens already, but as strategic programmes with long-term focus. Such programmes will prime the pumps for real 'energy' companies, that invest and operate over whole systems. They will create jobs all over countries, mostly where workers already are. Best of all, if managed effectively, they will save us taxpayers money.

Governments can and must also publicize the results, continuously, as an example to private industry, the media and the public of this new approach to energy systems and energy business. City governments such as those of Sydney, Australia and Seoul, South Korea are already doing this. If more joined in we could move beyond the Fire Economy, and transform our energy systems, within a generation. Let's do it.

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