

Questioning the Energy Transition

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Larry Lohmann
The Corner House

ABSTRACT

What is an energy transition? Usually the term signifies a shift away from fossil fuels and the technologies that require them. The question that naturally follows is: how is this shift to be financed? This paper outlines some of the pitfalls associated with this way of looking at climate and energy issues. It argues that it may be helpful to take a step back and begin with a different set of questions: What is energy? Is energy what we really want? Or do we perhaps want to open ourselves more to different ways of organizing nature?

When the editors of *Ecos* approached me to write something about «finances for transition», I knew the kind of question they had in mind. How expensive is the social and technological change that we need in order to get out of fossil fuels and address climate change effectively? Is the necessary finance available? From where? How can social movements help secure it? Questions like this are ubiquitous. Every climate campaigner is asked them at one time or another.

Yet as natural as these questions are, I was vaguely troubled by them, as I often am by questions that I don't understand. It wasn't that I thought the questions were unreasonable. I wanted to be able to answer them. But I also knew that unless I understood them better, I might end up giving confused responses that were of no use to anybody.

One idea I felt I didn't quite grasp was precisely the fundamental one of *transition*. What is this transition that needs to be financed? Is it fundamentally a question of finance at all? Until such questions are taken more seriously than they are today, there's a good chance that hunting around for trillions of dollars to confront global warming will end up setting back the climate cause rather than addressing it.

Is Energy Really What We Want?

The key concept in most discussions about transition is one that's so obvious it's not even mentioned above: energy. Usually when people talk about transition, they mean *energy* transition.

For many people, what an energy transition is may seem perfectly obvious. It's the replacement of fossil-based energy with renewable energy, preferably from the sun, the wind and the tides rather than from uranium and plutonium.

But let's ask a surprising question – one that complicates the whole idea of an energy transition. What if energy is not really what we want? Or rather, what if the energy transition that we need to strategize is not from one energy source to another, but instead from a rather autocratic organization of nature typified by the currently-dominant concept of energy toward a more complex,

democratically-open nature that gives a place to a more diverse set of practices more conducive to a human future?

That may seem an incomprehensible idea. Doesn't everybody need energy? Isn't energy poverty one of the problems of our times? Surely the problem is not energy itself, but only how to make it clean and distribute it equitably.

But before we assume that all this is obvious, maybe we should take a step back to make sure that we know what this energy is that everybody is supposed to need and want.

Many people find it difficult to explain the concept *energy*. However, there is at least one group of people who aren't fazed by the challenge: physicists. Physicists have good reason to be confident that they, at least, know what energy is. They invented the concept. Before 1800 no one talked about energy in the modern sense. By 1870 a lot of people did. This was due at least partly to the development of the science of thermodynamics.

So I suggest that if we want to be clear about what energy is – and whether we can really be said to “want” it in any uncomplicated sense – we listen carefully to what the 19th-century thermodynamicists said.

Energy and Labour

One of the most interesting things they said was that energy was all about labour. They organized their energy concept around the incipient idea of industrial capitalist work.¹ What impelled and inspired the thermodynamicists was the study of steam engines and electric motors and batteries: how to make them do work; how to make them do it better. A key objective was to disentangle both human and nonhuman activity from the “unproductive” matrices in which they were embedded so that they could be brought under centralized ownership, circulated and amassed conveniently for maximum profit.

Take for example the First Law of Thermodynamics. The way that the First Law commensurated heat and mechanical energy was not the result of disinterested inquiry into the nature of the universe. It was a way of theorizing the steam engines that capital was learning to use to appropriate the maximum surplus from workers.

On the one hand this involved learning to mobilize specific “energies” previously entangled with a multitude of subsistence practices into a general capacity to maximise the ability of human bodies to make stuff. It involved helping capital untie itself from inconvenient locations like remote waterfalls and reduce its subservience to the cyclic rhythms of the day and the seasons.²

On the other hand it meant disciplining humans in new ways. The new energy was not only about developing machines that could help capital concentrate workers in one place. It also facilitated capital's ability to make good on its perennial threat to discard labourers who did not come up to the proper standards of obedience and hire others. And it helped business micromanage labour at minimal cost through what Karl Marx evocatively called the «closer filling-up of the pores of the working day».³ The First Law of Thermodynamics was also in the background when, a century

1 G. Caffentzis, *In Letters of Blood and Fire: Work, Machines and the Crisis of Capitalism*, PM Press, Oakland, 2013.

2 A. Malm, *Fossil Capital: The Rise of Steam Power and the Roots of Global Warming*, Verso, London, 2015.

3 K. Marx, *Capital*, vol. I, trans. Ben Fowkes, Penguin, London, 1990, p. 545.

later, another kind of heat engine, the internal combustion engine, helped speed up circulation, make possible surplus-gobbling suburbs, and enable what geographer Matthew Huber calls the privatization of reproductive work.⁴

On another front, 19th-century thermodynamicists joined forces with inventors, engineers, and owners to disconnect what we now call electromagnetic energy from specific contexts of, say, lightning or batteries and re-entangle it with mechanical energy. James Joule, for example, concerned himself with maximizing the capacity of electric motors to perform what he revealingly called “duty”. In the 1860s, in turn, the dynamo embodied the convertibility of mechanical energy back into electricity, completing an equivalence that was only really cemented over many decades, beginning with developments such as Thomas Edison's 1882 Pearl Street generating station on Wall Street, which heralded the electric grids later to dominate all industrialized countries.

It was in part all this thermodynamic linking of heat engines with turbines, wires, electric motors, crankshafts and so on that brought into being the gigantic, open-ended abstraction called «energy» – something of which fire, motion, magnetism and so on now seemed to be merely specific instances. Energy, to borrow words that Marx used in the *Grundrisse* to describe the commodification of labour, was «an abstraction which became true in practice».⁵

Given where we middle-class Europeans are today, it probably takes a historian or anthropologist to convey what a radical step this was. As historian Joel Mokyr has written, the equivalence of different forms of what we now call «energy»

... was not suspected by people in the eighteenth century; the notion that a horse pulling a treadmill and a coal fire heating a lime kiln were in some sense doing the same thing would have appeared absurd to them.⁶

Few people in the 1700s could have envisaged the future emergence of a distinct «energy sector», either, or even of «all-purpose» engines. Farms had their animals, ironworks had their charcoal fires, sailing ships had their prevailing winds. But only visionaries like James Watt could imagine a steam engine not «as an invention for a particular purpose, but as an agent universally applicable in industry» from cotton weaving and metallurgy to irrigation and navigation.

By locating the laws of thermodynamics in history in this way, am I suggesting that they are false? Not at all: just that they – and the notion of energy they represent – become prominent only in the socionatural world of industrial capitalism and globalized wage labour.

Worlds outside Wage Labour

The reason I'm spelling this out is that, both at the time and after, wage labour was not the only kind of work there was. Admittedly, paid work had been a reality for centuries. Probably before 1600, the meaning «waged employment» had already been added to the cloud of other senses surrounding the word «work». By around 1750 that the term «work» had already come to mean an aggregate of concrete activities rather than the individual activities themselves. But it was only around the time of the thermodynamicists that the concept of commodifiable labour-power really came into its own:

4 M. T. Huber, *Lifeblood: Oil, Freedom and the Forces of Capital*, University of Minnesota Press, Minneapolis, 2013.

5 K. Marx, *Grundrisse*, trans. M. Nicolaus, Penguin, Harmondsworth, 1973, pp. 104-05.

6 Quoted in E. A. Wrigley, *Energy and the English Industrial Revolution*, Cambridge University Press, Cambridge, 2010, p. 42.

an abstract, saleable, homogeneous fluid that was measurable in units of time and that could even be treated as a measure of value – a fluid embodied in a proletariat that was still emerging.

Indeed, although «wage labour» has since come to dominate the meaning of «work» in modern European languages, other, more venerable meanings continue to haunt the term today. This multiplicity might be clearer in some other language families. In Thai, for example, as in European languages, the word for «work» – in this case, *ngaan* – has come to denote «productive»waged labour. But it also simultaneously continues to signify a wide range of things that we in Europe might call by other names – *sui generis* festivals, rituals, religio-agricultural practices, commons activities and other pursuits that have nothing to do with capital accumulation. *Ngaan taengngaan* is a wedding, *ngaan sope* a funeral, *ngaan wat* a temple fair, *ngaan chalong pii mai* a New Year's celebration, and so on. (And incidentally, *phlang ngaan* is a thermodynamics-influenced neologism meaning «energy».)

The point is that the thermodynamicists weren't interested in – and didn't help to elaborate – any of these other meanings of work or human activity. They could no more conceive of their heat engines being used for subsistence, comfort, the remediation of human weakness or just plain fun than Hero of Alexandria, in the first century AD, could have imagined using the famous «toy» steam engine that he invented for purposes of capital accumulation. As historian Theodore Porter puts it, «an economic point of view formed the root of thermodynamics ... Economic and physical ideas grew up together, sharing a common context». ⁷ From its birth, energy has been about a particular pattern of exploitation of human as well as nonhuman beings.

Fossil Fuels

One thing I've left out of the story of how today's energy came into being is fossil fuels. This is a pretty important omission. It was the addition of coal, oil and gas to the combination of heat engines and commodified labour that really entrenched the abstraction that we refer to as energy so deeply into world politics. Although Hero's craftsmanship had already in a sense commensurated heat and mechanical energy 1,750 years before, it was only with the huge, mobile concentrations of power in fossil fuels – derived from hundreds of thousands of years of plant and marine life growth – that either the wage labour relation or the commensuration and commodification of different kinds of energy could become so generalized worldwide and the illusion of “infinite economic growth” so easy to accept.

Today we like to tell ourselves that fossil fuels are just “one form of energy” and therefore could be “replaced” by another form. We think of energy as something we've always had a craving for – a craving that just happened to be filled one day by coal, oil and gas. But history suggests it's more the other way around. The modern concept of energy achieved global dominance only because of fossil fuels – or, more precisely, because of the way fossil fuels have been fused worldwide into industrial and transport machinery in the long battle capital has waged to extract as much value as possible from ordinary people.

We also like to tell ourselves that perhaps the political problem with energy is merely that it needs to be distributed fairly all over the world. But if fossil capitalism has defined what we mean by energy, then the more dominant the concept is, the more inequality there will be. ⁸ To interpret

⁷ T. M. Porter, «Rigour and Practicality: Rival Ideals of Quantification in Nineteenth-Century Economics», in P. Mirowski, *Natural Images in Economic Thought*, Cambridge University Press, Cambridge, 1994, p. 141.

⁸ A. Hornborg, *The Power of the Machine: Global Inequalities of Economy, Technology, and Environment*, Altamira Press, Lanham, MD, 2001.

popular struggles over energy as if they were all about getting equal shares of it is to miss most of what is important about this politics today. Merely to use the word uncritically is to cover up some of the most important issues that need to be discussed.⁹ This is one reason why, instead of asking questions like «How can we finance an energy transition?», it might be more strategic to ask first «Is the world that is defined (in part) by energy the world that we are striving for?»

Worlds outside Energy

Among us urban-based Europeans, it is often hard to grasp the political and scientific biases hidden inside the concept of energy without attempting to contrast the energy practices that we think we understand best with other practices that have usually had no generic name, and to which the rule of energy is implacably opposed.

Such acts of contrasting carry the risk of erecting silly binaries in our minds. They invite silly questions like “Is stepping back from the concept of energy really an 'alternative'?” – as if political action consisted in the implementation of intellectuals' plans, or as if there did not *already* exist a worldwide struggle to step back from the concept. Nevertheless, rough contrasts are often a starting point toward a wider perspective.

For example, one aspect of energy, as the concept is usually understood, is that there can never be enough of it. Partly by virtue of its very abstraction, it is scarce in principle.¹⁰ By contrast, plural, vernacular little-e “energies” (which of course do not ever go by that name) particular to specific commons practices tend to be self-limiting. There may sometimes be a dearth of these “energies”, but it is not the case that human beings are always impinging on them in a hostile, Cartesian or Malthusian way. They're not scarce, and the Second Law of Thermodynamics – which encapsulates capitalist anxieties about “efficiency” – holds no terrors for those who depend on them.

Take, for example, a Southeast Asian villager using dead wood from a local common woodland in order to boil some rice. She's likely to think that it's antisocial and disrespectful, maybe even a bit crazy, to use more wood than is «just enough» to cook the meal. But that doesn't mean she regards the wood as scarce, provided that the local woodland is treated and conserved by the community as a dead-wood commons. Not coincidentally, she probably wouldn't see the wood as “energy”, either.

Contrast this villager with a government energy planner. For the planner, energy is something abstract. It might be coal, hydroelectric, nuclear, biochemical, solar, whatever. It might be used by a steel factory, a hospital, a bus fleet, whatever. From the planner's point of view, there can never be enough of it, because its purpose – economic growth – is also abstract, as well as being in principle unlimited. This energy will always be scarce. It will always be looking for new aspects of nature to treat as “resources” on the model of fossil fuels.

In practice, the planner's energy will usually be in conflict with the villager's “energies”, and vice versa. Neither the planner nor the villager can offer an “alternative” to the other in terms of energy. For example, the common woodland from which the villager feeds her stove is probably just going to get in the way of the hydroelectric dam, coal mine or wind farm that the planner proposes to meet his abstract, hypothetical “energy need”, and will have to be swept away.

In indigenous Latin America, by the same token, a planner's project to extract oil to meet energy needs will often be seen as interfering with, diminishing or blocking other “energies” associated

9 I. Illich, «The Social Construction of Energy», *New Geographies 2*, 2009, pp. 11-19.

10 Jean Robert, «Alternatives and the Technogenic Production of Scarcity», *New Geographies 2*, 2009, pp. 134-38.

with the earth. Here, too, “energy justice” starts to look like a contradiction in terms. And, assuming that energy itself signifies an ever-expanding commodity frontier, is the phrase “green energy” likely to be any less self-contradictory? Serious climate thinking requires that such questions be asked.

Beyond the Idea of Energy Transition

As their reports and advertisements frankly reveal, most oil companies, banks and industrial corporations see energy transition not as a process that will replace fossil fuels, but as a process that will supplement them. They're not against transition, but they don't see it in climate terms. Instead, they see it as a way of delivering better returns on investments that, at bottom, will go on being organized around oil, coal and gas. For them, an energy transition is a way of diversifying and intensifying the same type of labour exploitation that fossil capitalism made universal. Climate activists need to be careful lest their own advocacy of “transition” merely plays into this dynamic.

One way out of this trap might be to try to work not so much toward an “energy transition” as toward a political transition that better recognizes plural forms of energy. Like all fundamental political transitions, this one would be less about finance than about movement-building. What kind of work do we want? What kind of nature and science do we want? Who has already taken this approach and how can we learn from and join with them?

For me, this suggests that the most interesting future climate alliances will not be among governments, corporations and NGOs seeking finance for a “green” or “fair” thermodynamic energy. Instead they will be among movements who unite in a refusal of or resistance to capitalist labour, from peasants or indigenous peoples fighting the enclosure of commons to urban dwellers who have had enough of falling wages, austerity and financial robbery. Such movements may at first seem to be following different strategies. Some will be seeking to defend existing commons and sources of subsistence; others to construct new commons and means of subsistence on top of, and against, the structures that energy represents. My hope is that these quests can perhaps become the same.¹¹

11 The Corner House, *Energy, Work and Finance*, Sturminster Newton, Dorset, 2014; *Energy Alternatives: Surveying the Territory*, Sturminster Newton, Dorset, 2013; and *Energy Security: For Whom and for What?*, Sturminster Newton, Dorset, 2012.