Funding the Future

Why gas sets the price of electricity, and why the econ...

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The way electricity prices are determined in the UK is widely misunderstood.

Many people assume the price reflects the cost of producing electricity from the cheapest available sources. It does not. Instead, the price is commonly determined by the most expensive generator required to meet demand, which, in the UK, is very often gas.

That arrangement is usually justified by reference to economic theory. It is said that electricity markets operate on “marginal pricing”, which supposedly reflects sound microeconomic thinking. But once you look at the theory being invoked, and then look at the reality of the electricity system, it becomes obvious that the justification is extremely weak.

Let me explain why.

First, the marginal pricing model used in electricity markets is rooted in a standard microeconomic theory of the firm. In that theory, firms maximise profit by producing up to the point where marginal cost equals marginal revenue. In a competitive market, the price that emerges is therefore determined by marginal cost, which is the cost of producing the last unit required to meet demand.

Second, electricity market regulators borrowed this idea. Electricity generators bid into the system, starting with the cheapest sources and moving upward until demand is met. The price paid to all generators is then the price offered by the final generator required to meet demand, which in near enough 97% of cases in the UK in the last year was a gas-fired power station.

Third, the result is that gas frequently sets the price for all electricity, even when much of the electricity is produced by much cheaper methods such as wind or solar power.

So far, all of this is theory. The problem is that the electricity market does not remotely resemble the competitive market assumed in that theory.

To begin with, many electricity generators do not sell their output into a competitive market at all.

Most renewable electricity generation in the UK operates under long-term contracts that guarantee a price per unit of electricity produced. These arrangements exist precisely because governments recognised that relying on volatile wholesale prices would not deliver the investment required to build renewable capacity. And, absurdly, it can be the government that profits from the higher prices paid to renewable producers over and above the price that the government has guaranteed them, which is a fact that no minister ever wants to acknowledge. In other words, the price that renewable producers receive is often not determined by the market in the first place, but the fact that they settle for a fixed price guarantee is not reflected in the price that we as consumers, or businesses as bulk buyers, are offered for electricity.

The same is true of nuclear power. New nuclear projects are built only because governments guarantee long-term prices that make those investments viable. The government is, again, the risk taker in these situations, and we, the consumers, see our benefit.

Next, investment in electricity generation is not determined by market competition either.

Electricity systems are heavily regulated. Governments determine the framework within which investment takes place. Planning systems, grid access, capacity markets, subsidy schemes, and carbon pricing all shape which technologies are built and how much capacity exists.

In other words, the electricity system is a regulated infrastructure system, not a free market. This makes the reliance on textbook marginal-cost pricing not just rather odd, but downright bizarre. The theory being invoked assumes a competitive market populated by profit-maximising firms responding freely to prices. But the electricity system is characterised by guaranteed prices, long-term contracts, regulated investment frameworks, and natural monopolies in networks.

That is not the market described in microeconomic textbooks. Yet policymakers continue to use pricing rules derived from that theory. The result is predictable. When gas prices rise, the electricity price rises with them, even though much of the electricity is produced from sources whose costs have not increased at all.

Wind turbines do not suddenly become more expensive to operate when gas prices spike. Solar panels do not either. Yet the marginal pricing rule means that electricity generated by those sources is often priced as if it were produced using expensive gas. This creates very large windfall gains for some generators.

More importantly, it imposes unnecessary costs on households and businesses.

Ironically, this outcome runs directly against the logic that the microeconomic theory is supposed to support.

In theory, competitive markets should drive prices down to the lowest sustainable level because firms compete to supply goods more efficiently. Consumers should therefore benefit from lower prices from the logic that the electricity regulator uses, but in practice, the opposite happens. As cheaper technologies such as wind and solar expand, the price paid by consumers can still be determined by the most expensive fossil fuel generator operating in the system. So the benefit of low-cost renewable electricity is not passed through to consumers. Instead, the market design locks electricity prices to gas.

This is not an inevitable feature of energy systems. It is a policy choice. And it is a policy choice based on the inappropriate application of a piece of microeconomic theory to a market that does not satisfy the assumptions on which that theory depends.

Electricity is essential infrastructure. It requires system coordination, regulated networks, long-term investment planning, and guaranteed supply. For those reasons it has always been heavily regulated. Trying to pretend that it behaves like a textbook competitive market is simply unrealistic.

The consequences are now becoming increasingly obvious.

First, consumers remain exposed to volatile gas prices even as the electricity system becomes dominated by renewable energy.

Second, windfall gains are generated for some electricity producers and the government through its price-guarantee arrangements when gas prices spike.

Third, the public understandably wonders why electricity prices remain high even when cheap renewable electricity is expanding rapidly.

And fourth, confidence in the energy transition risks being undermined if people believe that decarbonisation simply means permanently high energy prices.

None of this is necessary.

Electricity markets can be designed differently. Prices could reflect the costs of the different technologies providing electricity rather than the cost of the most expensive marginal unit. Long-term contracts, regulated pricing frameworks, or segmented markets could deliver much more stable and rational outcomes.

But achieving that requires abandoning the idea that a textbook model of marginal-cost pricing provides the right framework for electricity markets. That model was developed for competitive markets for ordinary goods. Electricity is not one of those goods. Continuing to price electricity as if it were is not just economically questionable. It is

economically irrational.

What would make rational sense now would be the restructuring of the pricing of the electricity market in the UK to reflect the actual contractual conditions that exist around the generation of power to provide the returns that are actually reasonably required by each of the generators involved, with the goal of reducing to the greatest possible degree the price to the consumer. Technically this is entirely possible.. This would be a proper role for government. The one government. has adopted is one that abandons the role of government and to pretend, instead, that a faux market exists. That has been the height of irresponsibility..

If Ed Miliband wanted to do something really useful with his time in office, this should be his goal.