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BUILDING INTELLIGENCE

A DECARBONISATION RESEARCH PAPER

The Energy Trap

Why the cost of waiting only grows, and why every year of delay leaves thousands of pounds on the table.

THE ARGUMENT IN ONE PAGE

British electricity is among the most expensive in the developed world, and the forces that made it so are structural, not temporary. The wholesale price is set by natural gas roughly nineteen times out of twenty; the grid needs tens of billions of pounds of investment that will be recovered from bills; the cost of balancing an ageing network is rising sharply; and electricity demand is set to grow by more than a quarter within a decade. Even the official bodies that argue prices *could* eventually fall decline to guarantee it, and none expect the near term to be anything other than high and volatile.

For any organisation that occupies a building, this has a hard financial consequence that is widely underappreciated: **the price of a wasted unit of energy is not fixed. It escalates.** A kilowatt-hour squandered on an old fluorescent fitting, or a bank of chargers left live overnight, does not cost the same next year as it did this year. Over the twenty to twenty-five year life of a modern LED installation, that escalation compounds into a number far larger than a simple multiplication suggests.

This paper sets out the evidence for why UK electricity prices are structurally biased upward, explains the mathematics of compounding that turns modest inefficiency into a major liability, and shows why deferring an efficiency upgrade is not a neutral “wait and see” decision but an active choice to pay a rising tariff on avoidable waste. The conclusion is uncomfortable but simple: **delay is the single most expensive option on the table.**

PART 1

Electricity has only ever travelled in one direction

It is worth starting with the historical record, because the instinct to treat the 2022 energy crisis as a one-off spike that will "come back down" is precisely the instinct that costs organisations money.

Take the long view first. In 2010 a typical British household paid roughly £450 a year for electricity. By 2021, before the energy crisis had fully taken hold, that had risen to around £760, an increase of about 36% in **real, inflation-adjusted terms** over the decade.[1] Real-terms is the key phrase: this is not the money illusion of inflation making every number bigger. Electricity became genuinely more expensive relative to everything else people buy, at a compound rate of roughly 2.8% a year above inflation.[1] In cash terms the climb was steeper still: domestic unit prices roughly doubled between 2010 and 2024, a nominal compound rate close to 6.7% a year.[1 2]

Then came the shock. When Russia's invasion of Ukraine convulsed the gas market, electricity followed it upward with brutal speed. Domestic electricity prices rose 54% in the twelve months to April 2022, the largest annual increase since 1970.[1] For businesses the move was just as violent. The average price paid by UK non-domestic consumers climbed from 14.81p per kWh at the start of 2021 to a peak of 28.39p per kWh by the end of 2023, a rise of more than 90%.[3]

+90%
Rise in UK business electricity prices, 2021 to end-2023 peak

~75%
Amount business prices remained *above* 2021 levels after settling in 2024

#1
UK industrial electricity: highest of 25 IEA nations in 2024

The instructive part is what happened next. Prices did *not* return to where they started. By the end of 2024, non-domestic electricity had eased back to 25.97p per kWh, still roughly **75% above its early-2021 level**.[3] The crisis reset the baseline. This is the historical pattern in miniature: prices spike on a shock, then settle at a permanently higher plateau rather than reverting. The ratchet turns one way.

And Britain pays these prices from a position of structural disadvantage. In 2024 the UK had **the highest industrial electricity prices of the 25 International Energy Agency countries that report them**, including taxes and levies, against an IEA median of 15.79p per kWh.[4] In 2023, UK industrial electricity ran about 46% above that median and roughly 50% higher than in France and Germany.[3] For the largest industrial users the gap is wider still. This is not a country where cheap power can be assumed. It is one of the most expensive electricity markets in the industrialised world, and has been for years.

PART 2

Why this is structural, not a passing phase

A sceptical reader, exactly the reader this paper is written for, will ask: fine, but might prices simply drift back down as the crisis fades and renewables come online? It is a fair question, and answering it honestly is what separates a durable argument from a sales slogan. The evidence points firmly toward *elevated and volatile* for the foreseeable future, for four structural reasons that have nothing to do with any single geopolitical event.

First, gas sets the price, almost all the time. Britain runs a marginal-pricing electricity market: in every trading period the price is set by the most expensive generator needed to meet demand, and every generator is paid that clearing price. Because flexible gas plants are almost always the unit that balances the system, gas ends up setting the wholesale electricity price roughly **98% of the time**, compared with just 7% in France and 24% in Germany.[5] The consequence is stark: even though gas provides only around a third of our electricity, its price dictates the cost of nearly all of it. Until that link is broken, every tremor in the global gas market is transmitted almost directly into British electricity bills.[6] And those tremors are not a thing of the past. With the war in Ukraine still unresolved and recurring tension in the Middle East around Iran, the market remains one geopolitical shock away from the next spike. As one energy forecaster observed in mid-2026, a Middle East ceasefire had given markets “some breathing room, but this is a pause, not a resolution.”[22]

Second, the grid needs rebuilding, and bill-payers will fund it. The network that carries electricity around the country was largely built for a fossil-fuel age and must now be expanded and reinforced on a scale not seen in generations. In December 2025 the regulator, Ofgem, approved an initial £28 billion of network investment for 2026 to 2031, a figure it expects to **rise to around £90 billion by 2031** as major transmission projects are confirmed.[7] National Grid’s own “Great Grid Upgrade” transmission plan is worth up to £35 billion over the same period,[8] and the system operator NESO has raised its assessment of the transmission investment needed beyond 2030 to roughly £89 billion.[9] These are not abstractions. Network costs are recovered directly from consumers through charges embedded in every bill, and Ofgem’s own estimate is that this investment will add about £108 a year (gross) to a typical bill by 2031.[7] The wires are getting more expensive precisely because we are electrifying the country.

Third, the cost of running the system is climbing. As more weather-dependent renewables connect to a grid that cannot yet move their power to where it is needed, the operator must increasingly pay wind farms to switch off and other plants to switch on, so-called constraint and balancing costs. In the 2024/25 financial year these balancing costs reached £2.7 billion, of which constraint costs alone were £1.7 billion, up 64% in a single year; 13% of Britain’s potential wind generation was curtailed.[10] NESO has warned these costs could rise toward £8 billion a year by 2030 if the grid is not reinforced fast enough.[10] Whichever way the transition goes, someone pays to hold the system together, and that someone is the bill-payer.

PAYING TWICE FOR THE SAME SHORTFALL

The starkest illustration is what happens when the grid simply cannot move the power it is given. When too much wind is generated in Scotland for the transmission lines south to carry it, the system operator pays those wind farms to stop generating, and then, because the electricity is still needed in England, pays a gas station south of the bottleneck to fire up and fill the gap. Consumers foot **both** bills: once to switch the wind off, and again to switch the gas on. There is a further twist. Because the older Scottish wind farms lose their Renewables Obligation subsidy when they stop generating, they have at times been paid **more to switch off than the electricity itself was worth**, with the public effectively compensating them for the support payment they forgo.[23] None of this is a flaw in wind power. It is the symptom of a grid that cannot yet carry the clean energy we already produce. But every pound of it lands on bills, and it is precisely the kind of avoidable system cost that using less energy helps to relieve.

Fourth, demand is about to surge. Electrifying transport and heat means far more electricity flowing through the system. NESO's Future Energy Scenarios put UK electricity demand on a path from around 290 TWh today to as much as 785 TWh by 2050, roughly a 2.7-fold increase, with demand up more than 30% by the mid-2030s alone.[11] On top of that sits an entirely new source of load: data centres and artificial intelligence, with around 20 TWh of annual data-centre demand expected by 2030 and a connection pipeline running to tens of gigawatts.[11] Rising demand against a constrained grid is not a recipe for cheap power.

Layered over all of this is a tightening carbon price. The UK Emissions Trading Scheme carbon price averaged just over £50 per tonne in 2025, its floor is rising, its cap is falling to align with net-zero targets, and the UK and EU have agreed in principle to link their schemes, all of which feed into the cost of the gas generation that sets the electricity price.[12]

A NOTE OF INTELLECTUAL HONESTY

It is sometimes claimed that "green levies" or net-zero policy are what make electricity expensive. The data do not support that, and this paper will not pretend otherwise. Of the roughly £324 increase in a typical bill since summer 2021, about 53% came from wholesale (gas) costs and around 20% from network costs; environmental and social levies accounted for only about 6%.[6] The dominant driver of high and volatile prices is our dependence on gas, which is exactly why reducing exposure to it, through efficiency and clean technology, is the rational response rather than the problem. Indeed, the government's own Climate Change Committee argues that UK electricity is currently priced at around four times the cost of gas and that this ratio should come down.[13] But note what that tells us: **even the body arguing electricity is too expensive is confirming that it *is* expensive**, and the rebalancing it recommends is a contested, politically fraught reform that no organisation should bank its budget on.[13][14]

PART 3

The tyranny of compounding

Here is the point that most decision-makers miss, and it is the heart of this paper.

When you leave a source of energy waste in place, an old lighting scheme, or equipment that runs around the clock whether or not anyone is in the building, you are not incurring a fixed annual cost. You are incurring a cost that grows every year, because the price of each wasted unit rises. Compounding, which Einstein is popularly said to have called the most powerful force in the universe, works just as relentlessly against you as it does for you.

Consider a single wasted kilowatt-hour, priced at 25p today, roughly the current commercial rate.[3] Escalate it at a modest 5% a year, well within the historical range, and in fifteen years that same wasted unit costs 52p; in twenty years, 66p.[15] At 7%, closer to the recent nominal trend in domestic prices, it reaches 69p in fifteen years and 97p in twenty.[15] The waste itself has not changed. The tariff charged on it has more than doubled or tripled.

> *The naïve view is that leaving a £1,000-a-year problem for twenty years costs £20,000. Once rising prices are included, the real figure is £33,100, or £41,000 if prices climb faster. The gap* is *the cost of compounding.*

Now scale that to a real cost. Suppose a building is quietly wasting £1,000 a year of electricity through avoidable inefficiency. The naïve view is that leaving it unaddressed for twenty years costs £20,000. But prices do not stand still. The table below shows what that same £1,000-a-year of waste actually costs over time, once energy-price escalation is included:[15]

Cumulative cost of £1,000/year of wasted energy, by holding period and annual price-escalation rate

Left unaddressed for…	0% (flat)	3%/yr	5%/yr	7%/yr
10 years	£10,000	£11,500	£12,600	£13,800
15 years	£15,000	£18,600	£21,600	£25,100
20 years	£20,000	£26,900	**£33,100**	**£41,000**
25 years	£25,000	£36,500	£47,700	£63,200

Author's calculations, verified programmatically.[15] Figures rounded.

At a 5% escalation rate, twenty years of that "£1,000 problem" is not £20,000. It is £33,100. At 7%, it is £41,000. The gap between the naïve figure and the real figure *is the cost of compounding*, and it grows the longer you wait. Note, too, that even a deliberately cautious 3% escalation assumption, lower than the long-run trend in UK electricity prices, turns a £1,000 annual waste into nearly £37,000 over a 25-year horizon rather than £25,000.[15]

This is why "we'll deal with it in a few years" is such an expensive sentence. Deferral does not pause the meter. It runs the meter at an ever-rising price on energy you were never getting any value from in the first place.

PART 4

What inefficiency is actually costing you

The compounding argument only bites if there is real, recoverable waste to address. In most commercial and public-sector buildings, there is, and a great deal of it.

Lighting. Lighting typically accounts for around 20% of the electricity used in commercial and industrial buildings.[16] Replacing old halogen lighting with modern LED reduces the electricity used for that lighting by **65% to 85%**, according to the Carbon Trust; against fluorescent or discharge lighting the saving is smaller but still meaningful.[16] The Energy Saving Trust puts the halogen-to-LED saving at around 80%, with LEDs lasting up to twenty times longer.[17] That longevity matters twice over: a modern LED fitting runs for tens of thousands of hours, cutting not only energy but the recurring cost and disruption of replacing failed lamps.[16] Once installed, an LED scheme delivers those savings automatically for its entire two-decade-plus life, and every one of those years is charged at whatever the prevailing, and probably higher, electricity price turns out to be.

Always-on and out-of-hours load. The larger and more insidious source of waste is equipment that consumes electricity when no one is benefiting from it. Plug loads, meaning everything plugged into a socket, can account for **up to 40% of electricity use in a typical office, and up to 50% in the most energy-efficient buildings**, where lighting and heating have already been optimised.[18 16] A substantial share of that is simply wasted: chargers, monitors, printers, vending machines, AV equipment and small power left running through nights, weekends and holidays. This is the “phantom” or “always-on” load, and because it is invisible on a conventional meter, it persists year after year, entirely unmanaged.

This is precisely the waste that intelligent socket technology is designed to remove. Smart sockets detect equipment that is drawing power needlessly out of hours and switch it off automatically. Field and industry evidence indicates that, where such controls are deployed, building energy reductions commonly fall in the range of roughly **20% to 50%**, depending on how much out-of-hours waste was present to begin with, with larger reductions recorded on specific high-waste applications.[19] Results are site-specific, but the direction is consistent with the Carbon Trust’s own findings on how much plug load is typically wasted.[16 19]

Heating. The same logic extends to heat. A modern air-source heat pump delivers three to four units of heat for every unit of electricity it consumes, a seasonal efficiency of 300% to 400%, against roughly 90% for even an efficient gas boiler.[20 13] As the electricity-to-gas price gap narrows over time, and as carbon costs bear down on gas, the operational case for efficient electric heating and proper controls strengthens rather than weakens.

> *A mid-sized building carrying old lighting and unmanaged plug load could lose around £6,000 a year to waste at today’s prices, close to £200,000 over a twenty-year horizon once escalation is included.*

Add these together and a mid-sized building carrying old lighting and unmanaged plug load is not wasting a trivial sum. A site using, say, 120,000 kWh of electricity a year could realistically be losing £6,000 a year to these two categories of waste alone at current prices, which, escalated at 5% over a twenty-year horizon, is very nearly £200,000 of avoidable cost.[15] That is money leaving the organisation every year and, in effect, enriching the energy suppliers who sell the wasted units.

PART 5

The asymmetry of delay

Put the two halves together, prices structurally biased upward, and real waste sitting in the building, and the case against waiting becomes almost mathematical.

When an organisation defers an efficiency upgrade by, say, three years, it tends to think of this as simply pushing the benefits back three years: same savings, just later. That is not what happens. The savings forgone in those three years are **gone permanently**, because you cannot reclaim energy you have already wasted. And because prices are rising, the years you give up are not the cheap early years you imagine; each year's forgone saving is larger than the last. In the worked example above, a three-year delay on a £6,000-a-year saving forfeits close to £19,000 of value that can never be recovered, and it does so while the underlying price base ratchets higher for everything that follows.[15]

The asymmetry is the crux. If you act and prices then happen to fall, you still win, because you have permanently reduced your consumption and were never exposed to the downside in the first place. If you wait and prices rise, as the structural evidence suggests is more likely, you lose twice: you pay the escalating tariff on waste you could have eliminated, and you eventually pay to fix it anyway, later, at higher installation costs. There is no version of the future in which the person who waited comes out ahead of the person who acted. Efficiency is one of the rare decisions where the prudent, risk-averse choice and the financially optimal choice are the same choice.

PART 6

In fairness: the counter-argument, and why it strengthens the case for acting now

A paper that only presented one side would deserve the scepticism it invited, so it is worth stating the opposing case plainly. Some credible bodies argue that electricity prices could *fall* over the longer term. As clean generation displaces gas, the system operator NESO judges that overall system costs "should not increase" and that clean power reduces Britain's exposure to gas-price shocks.[21] As legacy renewable-support contracts expire through the 2030s, one component of policy cost will fall away. And the Climate Change Committee's proposed rebalancing, if enacted, could cut typical costs materially.[13]

These are real possibilities and this paper does not dismiss them. But note that not one of these bodies *guarantees* lower bills: the government's own Clean Power plan explicitly states that the bill impact "will depend on a range of factors… as well as gas prices."[21] And the near-term consensus, including from forecasters such as Cornwall Insight, is that prices remain elevated and volatile well into the 2030s.[22]

The decisive point, though, is one of timing, and it turns the "prices might fall" argument on its head. The right question is: when is the earliest any of this relief could actually reach bills? On every credible assessment, meaningful downward pressure is years away, if it arrives at all. Efficiency, by contrast, pays back far sooner. Typical paybacks, though they vary by site, look like this:[24]

6–18 months
Typical payback: intelligent socket / plug-load control

2–7 years
Typical payback: LED lighting upgrade (depending on the existing installation)

5–10 years
Typical payback: on-site solar generation

7–15 years
Typical payback: heat pump / efficient heating

The first two of those, lighting and always-on load, are the two largest and cheapest-to-fix sources of waste in most buildings, and they are recovered in months to a handful of years. Set the two timelines side by side and the conclusion writes itself. By upgrading sooner, the improvements pay for themselves out of the savings on energy bills: money invested in an organisation's own infrastructure, rather than handed to energy companies for nothing in return. By the time any lower prices arrive, the investment will already have been paid off at close to zero net cost, and those lower prices will then apply to a *permanently reduced* level of consumption. Waiting inverts every part of that: the savings are forgone, the premium on wasted energy continues to be paid, and the investment must still be made later. The time to act is not when prices fall. It is now, so that the savings have paid for the work before they do.

PART 7

The overlooked half of the solution

There is a resolution to all of this that the national debate persistently overlooks, and it is the one thing every organisation can act on immediately, without waiting for a single pylon to be built. The structural problem is, at root, one of too much demand chasing a grid that cannot keep up. Every unit of electricity a building does *not* consume is a unit that does not have to be generated, carried across a straining network, balanced, or paid for twice when it cannot be. Energy efficiency is the only resource that eases the pressure at every one of those points at once. The International Energy Agency calls it **“the first fuel”** for exactly this reason: the cheapest, cleanest and fastest kilowatt-hour is the one you never need.[26]

This reframes efficiency from a private cost-saving exercise into a contribution to the shared problem. We are emphatically not anti-green energy, quite the opposite. But the structural impediments in the system mean those green investments cannot yet deliver on their promise to society, and the fastest way to relieve them is from the demand side. Efficient lighting, intelligent sockets that eliminate always-on load, efficient electric heat and on-site solar do not merely cut your own bill; collectively they free up grid capacity, reduce the need for constraint payments and gas top-ups, and lower the total system cost that everyone ultimately funds. It is one of the rare decisions that is simultaneously good for the organisation, good for the bill-payer, and good for the decarbonisation the country has committed to.

The public sector is uniquely placed to lead here, and, encouragingly, has already committed to. The government has set a target to cut emissions from public sector buildings by **75% by 2037**, against a 2017 baseline, backed by more than £2.5 billion of Public Sector Decarbonisation Scheme funding.[25] As one of the largest single energy users in the country, the public estate has both the scale to make a material difference and the mandate to set the example. Acting on efficiency is not a departure from that commitment. It is the most immediate, lowest-risk way to deliver it.

CONCLUSION

Escaping the trap

The trap is easy to fall into precisely because it demands nothing of you. It springs shut quietly, through inaction, one over-priced wasted kilowatt-hour at a time. Nothing dramatic happens on the day you decide to “wait until next year”, which is exactly why the cost is so easy to ignore and so large in aggregate.

The evidence assembled here points to an unusually clear conclusion. British electricity is expensive by international standards and structurally biased to stay that way: gas sets the price almost all the time, the grid needs tens of billions of pounds that bill-payers will fund, the cost of balancing the system is climbing, and demand is about to grow substantially. Against that backdrop, every unit of energy a building wastes is charged at a tariff that compounds upward year after year, turning a modest annual leak into a five- or six-figure liability over the life of the assets involved. The technologies to stop that waste, efficient LED lighting, intelligent sockets that remove always-on load, efficient electric heat and on-site solar, are proven, are available now, and pay for themselves out of the very savings they create.

The organisations that will look back on this decade well are not the ones that timed the energy market perfectly. No one can. They are the ones that stopped paying an ever-rising price for energy that was doing nothing for them, the waste that lit empty rooms and powered idle equipment through the night, and they did it sooner rather than later, because in an environment of compounding costs, *sooner* is always worth more than *later*.

> *The most expensive decision is the one to do nothing. The energy trap rewards only the energy suppliers. The way out is to stop feeding it.*

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About Unifi ID Limited

Unifi ID Limited is a **smart building and decarbonisation specialist**. Our founding belief is that every building exists to serve the people inside it, so we start by understanding how a building is genuinely used. On the smart building side, our Cortex platform turns real-time occupancy into building intelligence: who is in a building and where, how space is actually used, and live oversight for safety and evacuation. This gives organisations the data to run their estates more efficiently, more safely, and more sustainably.

That same understanding of how a building is used drives our decarbonisation work, which is **design-led**. Rather than fitting standard products to a building, we design each installation around its real pattern of occupancy and activity, which is what secures the maximum saving over the full lifetime of the installation, not simply in the first year. Our measures include LED lighting upgrades, intelligent socket and small-power control, efficient electric heating, and on-site solar generation.

Alongside the physical measures we promote **Carbon Action Plans** and ongoing **carbon reporting**, so that organisations can evidence, track and build on the reductions they achieve. To discuss how much your building could be saving, and how quickly, contact the Unifi ID team at **energy@unifi.id**.

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This paper is intended to inform commercial and public-sector decision-makers on the structural direction of UK electricity costs and the financial case for acting on energy efficiency without delay. Figures are drawn from the sources cited and were correct at the time of writing (2026). It does not constitute financial advice; organisations should assess their own consumption and circumstances.