

# GENERATION, MEET LOAD

RENEWABLES  
INTEGRATION



## Generation, Meet Load

---

*Common Weal published Scotland's energy problem and the most obvious use for its surplus on consecutive days, and recommended against both.*

On 4 June, [Craig Dalzell set out](#), clearly and for the most part correctly, why Scotland pays wind farms to stop generating. On 5 June, the [Common Weal daily briefing](#) warned the country against stumbling into “data centre politics,” with the looming 600MW campaign at Auchtertool as exhibit A. Read the two together and they describe a problem and then walk straight past an answer already on the table. Dalzell wants “more demand within high resource zones” so that we stop throwing away clean power. The briefing, the next morning, treats the single largest parcel of new demand anyone has offered Scotland as a thing to be avoided. Both cannot be right, at least not about this.

Begin with the physics, because the politics keeps skipping it. A wind farm is generation. A data centre is load. Scotland's grid problem is not a shortage of generation; it is a surplus of it, stranded behind a wire that is too thin. The Scotland-to-England transfer boundary, known in the trade as B6, carries about 4.5GW and was constrained for roughly a third of 2025.<sup>1</sup> When the wind blows hard and the wire is full, someone must be paid to stop, and that is the constraint Dalzell describes: a local limit on the wire, not the system-wide curtailment that balancing and inertia impose. The reinforcement that would relieve it, the Eastern Green Link subsea cables, is not energised until 2029 at the earliest.<sup>2</sup> Until then, every megawatt of demand sited north of that bottleneck is a megawatt of Scottish wind that does not have to fight its way south or be switched off. Auchtertool sits in Fife. It is on the right side of the wall.

That is what the briefing fumbles, by filing “corporate warehouses” alongside “corporate wind-farms and corporate battery installations” as one undifferentiated imposition. They are not the same object. One makes the surplus; one could drink it when it spills. To oppose both in the same breath is to oppose the disease and the cure at once.

Now follow the money, because it does not go where the slogan says. In 2024/25 the grid's balancing bill came to £2.7bn, and the rise was driven almost entirely by constraints: thermal constraint costs alone reached £1.7bn, up 64 per cent in a single year, on 13.5 terawatt-hours of energy the network could not carry.<sup>3</sup> The slogan version, that we pay wind farms to switch off, captures only part of it. By the breakdown analysts put on the figures, compensation to the wind farms is the minority share; the larger cost is paying gas plants in the south to fire up as replacement for the power the wire could not move. Dalzell's fix, that generators may keep collecting constraint payments but must reinvest them rather than bank them as profit, takes

---

<sup>1</sup>The B6 boundary carries a secure transfer limit of roughly 4.5GW and was constrained for about 34 per cent of 2025. See *The Energyst*, “Hadrian's wally: B6 boundary implicated in massive curtailment waste,” and Modo Energy's GB curtailment research.

<sup>2</sup>Eastern Green Link 1 (Torness-Hawthorn Pit) and EGL 2 (Peterhead-Drax), each 2GW HVDC, are due to commission around 2029. National Grid / SSEN Transmission project pages.

<sup>3</sup>NESO 2025 Annual Balancing Costs Report (FY2024/25): overall balancing costs £2.7bn, up 10 per cent year on year; thermal constraint costs £1.7bn, up 64 per cent, on 13.5TWh of constrained energy; constraints drove the rise. Balancing costs are projected to peak near £8bn by 2030, or about £4bn if critical network projects are accelerated. The split of constraint cost between wind-down compensation (about a quarter) and replacement generation (the majority, much of it gas) is from Modo Energy's analysis of the NESO data; the NESO report does not itself publish that decomposition.

aim at the smaller, wind-compensation share and leaves the costlier replacement standing. A flexible load in Fife goes after the expensive part directly: in the hours the wire is full, use the wind where it lands, and pay neither the turbine to stop nor a plant in Yorkshire to start.

His Swedish comparison does not bear weight. Sweden's congestion revenue is money the grid operator *collects* by auctioning scarce cross-border capacity, and European rules require it be spent on guaranteeing capacity, relieving congestion, or cutting tariffs.<sup>4</sup> A British constraint payment is money the grid operator *pays out* to a generator. These are opposite sides of the ledger. The spirit is sound, hypothecate congestion money to congestion relief, but the mechanism is incoherent: a payment that exists to compensate a generator for lost revenue stops being compensation the moment the generator is forbidden from keeping it. They re-price their bids, and we arrive back where we started.

Nor does the platform the whole piece stands on. Zonal pricing was taken out and shot in July 2025, when the UK government chose reformed national pricing instead.<sup>5</sup> Writing in June 2026, Dalzell says we do not "(yet)" have zonal pricing, as though it were still on the road. It is not. What is coming quietly vindicates his instinct and the briefing's fear in one move: reformed national pricing leans on locational signals and a Strategic Spatial Energy Plan, which is to say official policy is now explicitly about steering where demand and generation sit relative to each other. The data-centre siting question is the zonal-pricing question wearing a hard hat.

So far this reads as a takedown, and Common Weal deserve better, because on the politics they are mostly right. The jobs case is thin. The developer, ILI Group, now confirms Auchtertool is the largest of three sites in a £15bn "Stoics" programme, with 400MW in North Lanarkshire and 540MW in East Ayrshire, roughly 1,540MW in all, a deliberate cluster play.<sup>6</sup> Clusters are where the evidence says an ecosystem can form, but three sites is still short of the threshold at which it reliably does, and the firm's own study projects 120 permanent posts at Auchtertool. The headline community benefit offered against a £5bn build is, almost literally, a pub. The consent and community-benefit machinery is threadbare.

And the alarm at Auchtertool is not nimbyism in fancy dress; a 25-hectare, 35-metre complex drawing up to 4TWh a year, comparable to the household electricity of around half the homes in Scotland, for a tenant nobody has named, is a perfectly rational thing to be frightened of.<sup>7</sup> The "left-behind community" framing does need one footnote of its own: ExxonMobil's Mossmorran plant, two miles away, shed some 477 jobs when it closed in February 2026, so this is

<sup>4</sup>Regulation (EU) 2019/943, Article 19 (use of congestion income), legislation.gov.uk, and ENTSO-E methodology on the use of congestion income.

<sup>5</sup>UK Government REMA decision, 10 July 2025: zonal pricing ruled out in favour of reformed national pricing, with a Strategic Spatial Energy Plan and reformed TNUoS locational signals. gov.uk; Norton Rose Fulbright REMA summer update.

<sup>6</sup>ILI Group "Stoics" programme: Auchtertool/"Cato" (600MW, Fife) is the largest of three proposed sites, with "Aurelius" (400MW, North Lanarkshire) and "Rufus" (540MW, East Ayrshire), about 1,540MW combined and £15bn headline. Developer-stated. *The Courier* (CEO interview, 4 June 2026); DataCenterDynamics. On the cluster threshold and employment, Brookings, "New evidence on data center employment effects" and "Turning the data center boom into long-term, local prosperity": a single facility brings dozens to a few hundred permanent posts and no ecosystem unless a cluster of roughly four or more forms. ILI's own study projects 120 permanent jobs at Auchtertool.

<sup>7</sup>ILI Group Auchtertool scheme: £5bn, 600MW, 25 hectares, buildings to 35m, up to 4TWh a year. Action to Protect Rural Scotland; *The Courier*; DataCenterDynamics.

a post-industrial corner of Fife that has just lost an employer, not a pristine glen.<sup>8</sup> That cuts both ways, and the developer knows it.

One of their alarms is at least half borrowed, and it is the water. The terrifying numbers in circulation come from evaporative-cooled sites in the arid American west, which can drink millions of gallons a day; closed-loop cooling, of the kind the developer implies, uses a rounding error by comparison, and Scotland is not Nevada.<sup>9</sup> But here the sceptics have the better of it, and I will not pretend otherwise. The widely-quoted 34,000 cubic metres a year, the domestic use of some 239 homes, is a figure the developer's chief executive gave a newspaper, not one defined in the planning application; campaigners say the application does not specify water use at all, and Scottish Water's assurance that the capacity exists is expressly conditional on the developer's own projections.<sup>10</sup> "Show us the evidence" is the right demand, not obstruction. The physics make water unlikely to be the binding constraint, but unlikely is not proven: the number belongs in a binding condition, not a press release. The bigger thing to fear at Auchtertool is still the 600MW, not the puddle.

Which brings us to the hinge the whole case turns on, and the place it is most attackable: flexibility. The promise is that a data centre can soak up surplus wind and back off when the system is tight. A careful new study, an NBER working paper from this summer, is more honest than the brochure and more useful than the slogan.<sup>11</sup> It finds that temporal flexibility always lowers total system cost, but its effect on emissions depends entirely on the grid it sits in. On a wind-rich grid, a flexible load chases the surplus and cuts carbon sharply. On a fossil-heavy grid, the very same flexibility just smooths the baseload plant's day and raises emissions. Flexibility, in other words, is not green by nature; it is green by location. Which is the entire argument for Fife: a load that flexes against stranded Scottish wind is the good case, not the bad one.

The same paper supplies the caveat that should be written into any consent. The flexibility it models is the shifting of deferrable work across hours within a day, and it assumes only

---

<sup>8</sup>ExxonMobil's Mossmorran (Fife Ethylene Plant), about two miles from Auchtertool, closed in February 2026 with the loss of some 477 jobs. The developer pitches the scheme as successor industry for the displaced workforce. *The Courier*.

<sup>9</sup>Closed-loop versus evaporative cooling water use; industry Water Usage Effectiveness figures. Vantage Data Centers; STL Partners; EESI.

<sup>10</sup>The 34,000 cubic metres a year figure (about 239 homes) was given by ILI's chief executive to the press, not defined in the planning application; campaigners (APRS) say water use is undefined, and Scottish Water confirmed capacity "based on the projections of water usage by the developer." *The Courier*, "Water chiefs speak out on Fife AI data centre supply claims" (5 June 2026) and the ILI CEO interview (4 June 2026).

<sup>11</sup>Christopher R. Knittel, Juan Ramon L. Senga and Shen Wang, "Flexible Data Centers and the Grid: Lower Costs, Higher Emissions?," NBER Working Paper No. 34065, July 2025 (a working paper, not yet peer-reviewed). Modelling Texas, the Mid-Atlantic and WECC, the authors find temporal flexibility always lowers total system cost, but the emissions effect is conditional on the generation mix: in high-renewable Texas (around 54 per cent wind and solar) flexibility cuts CO2 by up to 40 per cent and accelerates fossil retirement, while in lower-renewable regions it can raise emissions by up to about 3 per cent by improving the utilisation of surviving coal. Flexibility "can either accelerate decarbonization or it can entrench fossil fuels that it seeks to displace." The flexibility modelled is the shifting of a fraction of deferrable load across hours within a day, not multi-day interruption. The constraint-versus-curtailement mechanism is established in the peer-reviewed literature. Agbonaye et al., "Value of demand flexibility for managing wind energy constraint and curtailment," *Renewable Energy* 190 (2022) 487-500 (open access), distinguishes constraint, a local network limit resolvable only by local load, from system-wide curtailment, and finds flexible local demand (domestic loads and heat pumps) cutting constraint by 67 per cent, curtailment by 74 per cent, and system-operator constraint payments by up to 78 per cent. For the British magnitude, Vázquez Villamor, Avagyan and Chalmers, "Opportunities for reducing curtailment of wind energy in the future electricity systems: insights from modelling analysis of Great Britain," *Energy* 195 (2020) 116777, model curtailment reaching roughly 17 per cent of annual renewable generation at high wind and solar build-out, though there driven mainly by the inertia floor rather than by transmission.

a fraction of the load can move at all; some tasks cannot be postponed for a minute. And the surplus is intermittent where the load is not. A hyperscale centre at full tilt wants firm power around the clock; stranded wind comes only in the windy hours, so most of the year the thing draws ordinary grid power, gas included, and laps up stranded wind only when the two coincide. The economics make it worse, not better: the capital is in the silicon, not the electricity, so a server idling for want of wind is the dearest thing in the building doing nothing. Left alone, the load runs flat out and firm, the profile that soaks no surplus at all.

There is one way out of that idling cost, and it is the move a server farm has that a smelter never will: it can run somewhere else. The work that wants the wind need not sit in Fife waiting for it; a hyperscaler can lift a deferrable job to another of its own sites down a cable and run it on Norwegian hydro that does not care what the North Sea is doing, with about as much ceremony as a routing change. The capability is a decade old and wholly the operator's to use, but using it costs money, and self-interest rarely spends where a single site run flat out will do. So the brittle default is the one that gets built, and when the work does move, the value and the waste heat move with it. The flex that counts is the flex you can write down. Pin the conditions to what cannot follow the bits across the water, the grid connection, the heat it pours out, the public stake in the shed itself, because the load will chase the cheapest electrons it can reach and a Fife consent cannot chase it.

So when the developer says the scheme will have “zero impact on current demands” because it will draw on private wires and power purchase agreements from wind farms, that is the synthesis of this article made by the man selling the site, and then over-claimed.<sup>12</sup> A continuous 600MW load cannot have zero impact. A power purchase agreement is a contract, not a copper-bottomed promise to switch off: it links the operator's bill to a wind farm's output; it does not make the servers stop when the wind drops. Real interruptibility is a physical obligation, and it is the one thing the application does not yet contain.

That is why the answer to a poor bargain is a better bargain, not a bolted door. The questions worth raising at the town hall are not *whether* but *whose*, and *on what terms*: who owns the compute, who owns the waste heat it pours out, who owns the grid services a flexible 600MW load can sell back, and what Scotland keeps when the wind it was built beside is at last made useful.

The developer is instructive here. Ili Group is not only offering Fife a flexible load; it is one of Scotland's busier pumped-storage developers too, behind the schemes at Red John, Balliemanoich and Corrievarkie that would soak the same stranded wind from the other side. It grasps the curtailment trade from both ends, which is more than the politics does. And having won consent for Red John, it sold the scheme to Statkraft, the Norwegian state's energy company, Europe's largest hydropower operator and owner of about half the continent's reservoirs, the most experienced public hand the job could have. That is the whole of it in one transaction: the difference between Scotland and Norway is not the wind or the cold; it is that one of them built a Statkraft.

---

<sup>12</sup>The “zero impact on current demands,” private-wire and power-purchase-agreement framing is the developer's own. A PPA is a contractual/financial link to a generator's output, not a physical guarantee that the load will reduce when the system is short. *The Courier* (CEO interview, 4 June 2026).

Common Weal, of all people, already carry the tool for this. They argue, rightly, that Scotland's energy should not be left to a privatised market that treats clean power as a nuisance. Extend the thought by one link: if the public should hold a stake in the generation, it should hold a stake in the load that finally makes the generation pay. A public equity slice; a mandated heat offtake, of exactly the kind the developer is already dangling when it talks of warming local schools and a hospital, written as a condition rather than a press release; a flexibility obligation built into the grid connection itself. This is how a country captures value rather than merely hosting a shed.

And here the law is already on our side, sitting unused. This is a Permission in Principle, with comments open until 2 July.<sup>13</sup> Scottish planning authorities can attach conditions and time limits to a consent, and a permission left unbuilt lapses by default.<sup>14</sup> That lapse is the point. Use-it-or-lose-it is, at bottom, an anti-landbanking rule, and Britain spent 2025 learning why it needs them: the grid connection queue swelled past 720GW, with demand requests alone up some 460 per cent in six months, much of it speculative placeholders squatting on capacity they may never build. The connections regime has already been rewritten around the principle, build to milestones or forfeit the slot.<sup>15</sup>

Planning consent should carry the same teeth, and the precedent is fresh: the first hyperscale scheme to reach this stage in Scotland, a 213MW centre at the Gyle in Edinburgh, was refused in February 2026, with the land to be sold on to an unnamed operator after consent.<sup>16</sup> Win the permission, then find the tenant. There is nothing exotic in granting a consent that reverts: build to this timetable, run the load as interruptible, cool it closed-loop, fund the community and feed it the heat, or the permission dies and the field is theirs again. Make the consent a contract, not a gift. The one who means it will sign; the one who is landbanking will walk, and good riddance.

The campaigners' own remedy is a moratorium. Action to Protect Rural Scotland want the Scottish Government to halt hyperscale data centres outright, and their diagnosis is exactly right: there is no Scottish policy for developments of this magnitude, and a 600MW load arriving into that vacuum is a fair thing to dread.<sup>17</sup> But a moratorium is only a slower way of saying no. The vacuum is an argument for terms, not for a pause: a framework that says yes to the sites that meet the conditions and no to the ones that do not, rather than a blanket halt that also freezes out the well-sited, flexible, publicly-held version we should want. Diagnose the gap, then fill it; do not just lock the gate while you think.

<sup>13</sup>Planning Permission in Principle published 25 May 2026; comments open until 2 July 2026. Action to Protect Rural Scotland.

<sup>14</sup>Town and Country Planning (Scotland) Act 1997, s.58; Planning etc. (Scotland) Act 2006. Permissions carry duration conditions and lapse if development is not begun in time; authorities may set conditions and vary the period.

<sup>15</sup>NESO/Ofgem connections reform (the "TMO4+" package), live from 10 June 2025: a "first ready, first needed, first connected" queue with use-it-or-lose-it milestones, introduced after the connection queue passed 720GW and demand requests rose about 460 per cent in six months. gov.uk, "Government to tackle speculative demand grid connection requests"; Ashurst; Computer Weekly on data centres and the queue.

<sup>16</sup>The first hyperscale data centre to reach this planning stage in Scotland, a 213MW scheme at the Gyle, Edinburgh, was refused in February 2026; an appeal has been lodged. Land would be sold post-consent to an unnamed operator. *The Courier*; APRS, "Edinburgh data centre refused."

<sup>17</sup>Action to Protect Rural Scotland call for a Scottish Government moratorium on hyperscale data centres, citing the absence of any Scottish policy for developments of this scale. *The Courier*, "Water chiefs speak out on Fife AI data centre supply claims" (5 June 2026); aprs.scot.

None of which is a brochure for hyperscale AI. The position is conditional, and the condition is the entire point: yes, if it is sited where the wind is stranded, flexible enough to follow it, cooled without draining the burn, owned in part by the people whose grid it leans on, and consented on terms that bite. Refuse it on those terms and the developer should leave. Refuse it on reflex, because the thing is big and corporate and new, and we keep the worst of all worlds: the wind still curtailed, the gas still burning in Yorkshire, and the compute built somewhere that had the wit to say yes.

There is a harder question underneath all this, and it is the one neither Common Weal piece reaches, nor, in truth, did the first draft of this one. Everything above concerns the surplus hours, when the wind is dumping power we cannot use, and within them the case stands. But the surplus is not the whole problem. It says nothing about the deficit hours, the still and frozen evenings when the wind does not blow at all and a flexible load, however well-behaved, has nothing to flex against. That is a separate argument, about firm power and the concrete nobody will pour, and it deserves its own essay. A dead calm powers no compute. Neither, it turns out, does a dead argument.

airt.scot · June 2026.

Free to use, in whole or chopped into little pieces, provided the source is acknowledged. (CC BY 4.0)