UK STEEL – SUBMISSION TO THE REVIEW OF ELECTRICITY MARKET ARRANGEMENTS: SECOND CONSULTATION

Date: 7 May 2024
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About UK Steel

UK Steel, a division of Make UK, is the trade association for the UK steel industry. It represents all the country's steelmakers and a large number of downstream steel processors.

Submission to the second consultation on the Review of electricity market arrangements (REMA)

Challenge 1: Passing through the value of a renewables-based system to consumers

General comments to challenge 1:
High electricity prices are consistently cited as harmful to the steel industry's ability to decarbonise its production, a major impediment to investment, and detrimental to its immediate market competitiveness. The reasons for this are worth noting:

- Steel production and processing is an energy-intensive process, and the production of millions of tonnes of steel each year consumes vast amounts of energy. Before the recent increase in energy prices, for the most electro-intensive producers, electricity represented approximately 20% of converting globally priced raw materials into finished steel products for consumers, and energy costs were even higher than Labour costs. After the rise in energy costs, energy is now the biggest cost for some steel producers.
- Steel is an intensively traded product, with some 25% of all steel produced globally being exported. Outside of China, over 40% of steel produced travels across borders, with the UK importing 60% of its requirements and exporting around 45% of production. The UK's main competitors are based in the EU, where most imported steel is produced and where most exported steel is going, making price differentials between the UK and EU competitors particularly important.
- The steel sector operates on relatively thin margins. Whilst there are increasingly specialised and high-value steels being produced, market requirements and economies of scale mean that the vast majority of steel made even in developed economies is commoditised and available from a broad range of sources. There is, therefore, intense competition, which keeps steel prices and margins low.
- High electricity prices generally reduce profit margins and thus lead to less reinvestment. Further, high electricity prices also function as a disincentive to investment from international steel companies, with the UK seen as a less favourable investment location than other countries.
- The disparity in industrial electricity prices in the UK and its European competitors is a major barrier to meeting the Net Zero target since all options for decarbonising steel production, from CCS to hydrogen and electric arc production, lead to significantly increased electricity consumption. Steel plant investment goes to the most cost-competitive regions, which will increasingly be those with internationally competitive power prices. If all UK production were to convert to electric arc furnaces using scrap steel, the sector would face higher electricity costs of £132m (at a price disparity of £24/MWh) compared to if they face electricity prices at German levels.

<u>Impacts of higher electricity prices</u>
The disparity in electricity prices between the UK and its European competitors has several negative impacts on the sector:

1. Barrier to the decarbonisation of the steel industry: Reducing the industry's emissions requires structural changes to UK steelmaking, demanding significant investment in new equipment and plants. We have seen moves towards large investment in decarbonisation when a supportive business environment is created with competitive electricity prices and Government match-funding. The key example here is Tata Steel's September 2023 announcement of £1.25 billion invested in a new electric arc furnace, with Government funding of up to £500 million alongside implementation of the Supercharger package. This investment will secure 5,000 jobs while reducing all of the UK's emissions

by 1% alone. When an agreement with the Government is reached, the British Steel £1.25 billion proposal will deliver similar benefits to Scunthorpe and Teesside.

While there are many interchangeable Net Zero production methods, these can generally be grouped into three routes: electric arc furnaces (EAF), hydrogen-based steelmaking, and Carbon Capture and Storage (CCS), which are all more electro-intensive than current production methods. If the entire sector switches to EAFs, the industry's electricity consumption will more than double and the sites switching will increase their use by five times[1]. A sector switch to hydrogen-based steel production would more than triple the entire industry's power consumption and increase the demand of the sites switching by almost nine times. Finally, capturing emissions in a separate chemical plant on site is incredibly energy intensive, and steelmakers investing in CCS will also increase their electricity consumption substantially.

High electricity prices are paramount to maximising the value of the investments announced by British Steel and Tata Steel, as high electricity prices make decarbonisation efforts more expensive. This makes electricity prices not just a present-day issue but a problem that will continue to exist in the future.

2. Attracting investment: While big investments have been announced in combination with Government co-financing, it still remains that differences in electricity prices will impact the ability to attract long-term investment in R&D, process improvement, and innovation into the UK. Most of the major steel producers in the UK are part of multi-national companies with facilities in the EU and four also operating outside the EU. From this perspective, the cost competitiveness of each particular market is crucial to attracting investment. Persistent cost disadvantages in the UK lead to underinvestment, which in turn leads to further erosion of competitiveness. Since the financial year 2016/17, the industry has paid £660 million more for electricity than competitors in Germany and £757 million more than steelmakers in France. To place this in context, the average annual capital investment in the UK sector is £200 million.

3. Competitiveness: A primary concern of electricity price disparities is the impact on steel manufacturers' international competitiveness. Raw materials such as iron ore and coal are sold in global markets, and there will be little difference in the price of iron ore used by steel producers in the UK, France, or India. It is where there are national and regional variations in costs that competitiveness issues arise. Electricity costs can represent up to 180% of UK steel producers' GVA. As they are competing internationally, they are unable to pass on any additional costs over and above those faced by their competitors. A consistently higher electricity price impacts their ability to compete and diminishes profitability. An electricity price disparity of £24/MWh (as found in UK Steel's November 2023 electricity price disparity report[2]) translates into a total additional cost to UK steel producers of around £117 million per year compared to those in Germany. Such a cost represented an estimated 82% of the steel sector's overall EBITDA in 2022.

<u>Cause of electricity price disparity</u>

UK wholesale power prices have long been higher than in Germany and France. On average, wholesale power prices in the UK are higher than in the rest of Europe, primarily due to the different power generation mixes driven by government policy. Natural gas makes up a significantly higher proportion of the electricity generational mix in the UK, whereas nuclear dominates in France, and coal takes up a large share in Germany. When discounting the carbon price from the wholesale price, German wholesale prices are in the region of £35/MWh for 2023/24, French wholesale prices around £53/MWh, whereas the gas-dependent UK faces significantly higher wholesale costs of £65/MWh, as natural gas prices have skyrocketed since the Russian invasion of Ukraine. The UK's physical separation from mainland Europe means it also has a low level of interconnection compared to its European neighbours, as evidenced in this consultation, constraining our ability to import low-cost electricity.

[1] UK Steel (2022), Net Zero Steel: A Vision for the Future of UK Steel Production, https://www.makeuk.org/about/uk-steel/net-zero-steel---a-vision-for-the-future-of-UK-steel-production
[2] UK Steel (2023), Industrial Competitiveness: Electricity prices faced by UK steelmakers, https://www.uksteel.org/electricity2023

Another big contributor to the electricity price disparity is the difference in network charges. While total network costs across all users are similar in the UK, France, and Germany at around €33–36/MWh, industrial consumers pay a far higher rate in the UK, as French and German steelmakers are exempted from 80-90% of their network charges. Their governments have reduced network costs for industry as they recognise both the importance of this to international competitiveness and the vital role large energy users play in balancing the power networks. French and German steel sites have network prices at around £1/MWh, whereas UK producers paid around £32/MWh in the UK in 2023/24. After the introduction of the British Industrial Supercharger, it is expected that this will drop to £11-13/MWh, which would still leave UK steelmakers facing network charges over ten times higher than their key competitors.

Finally, policy costs were historically the biggest cause of the electricity price disparity, often twice as high in the UK as in Germany and France. However, after the implementation of the British Industrial Supercharger package, it is expected that policy costs will be similar to Germany/France.

Impact of REMA reforms

Considering the above evidence and the impact of electricity prices on the steel industry's ability to decarbonise, attract investment, and compete, it is disappointing that the Government is abandoning reforms to marginal pricing, the split market option, and the Green Power Pool. UK Steel believes that these reforms should be further analysed and reviewed to assess their ability to deliver lower electricity prices for consumers.

The Government has made it clear in the consultation document that it will solely focus on improving system costs. It is silo-thinking merely to focus on the decarbonisation of the electricity system rather than considering how lower electricity prices for certain consumer groups could significantly improve their ability to decarbonise. DESNZ justifies this by stating, "*it is unclear what long-term upside there would be for those targeted compared to the counterfactual that aims for lower prices overall, and where particular groups of consumers are already targeted through existing schemes*" (p37 Second Consultation Document). However, the existing schemes aim to reduce other elements of electricity pricing, i.e. network charges and policy costs, rather than wholesale prices. The reforms to marginal pricing might offer an opportunity to address wholesale prices and deliver more competitive power prices for industry as it seeks to decarbonise through electrification. We are therefore concerned that the Government has not considered the full benefit to particular consumer groups.

DESNZ states in the Options Assessment that "*there are also a number of consumer protection issues inherent in exposing end users to tariffs that differentiate between the two markets (and therefore reward those who are able to shift demand)*" (p30 Options Assessment). The reforms considered are thus discounted, as they could reward consumers for shifting demand, but later in the consultation, the Government uses the same argument as an advantage of locational pricing, where consumers should be rewarded for shifting demand, whether locational or temporal. Rewarding consumers for shifting demand cannot be a disadvantage of one model and an advantage in another.

While the Government is proposing that "*large consumers can take additional steps to insulate themselves from price volatility by purchasing renewable power in current market structures, including through Corporate Power Purchase Agreements (CPPAs)*" (p31 Second Consultation Document), we demonstrate below why current CPPAs are not a silver bullet for the steel industry and other energy-intensive sectors. In combination with the decision to take LMP forward within the REMA, it is now clear that REMA will, at worst, raise electricity prices for the steel industry and, at best, keep them at the current levels. As such, we are disappointed that these reforms are not taken forward for further analysis and assessment.

1. What growth potential do you consider the CPPA market to have? Please consider: how this market is impacted by the barriers we have outlined (or other barriers), how it might evolve as the grid decarbonises, and how it could be impacted by other REMA options for reforming the CfD and wholesale markets.

The power Purchase Agreement (PPA) market has traditionally not been widely used by energy-intensive industries, like steel, for several reasons:

[redacted]

A wider Government-driven PPA market might change the above as it could decrease the risks for EIIs due to the scale and size of such a market. However, currently, the CPPA market is unlikely to have significant benefits and will not have substantial growth potential for the steel industry as a whole.

2. How might a larger CPPA market spread the risks and benefits of variable renewable energy across consumers?
Without further reforms, we do not see the risks and benefits being spread across all consumer groups, including EIIs.

3. Do you agree with our decision to focus on a cross-cutting approach (including sharper price signals and improving assessment methodologies for valuing power sector benefits) for incentivising electricity demand reduction? Please provide supporting reasoning, including any potential alternative approaches to overcoming the issues we have outlined.
We believe that there could have been significant potential for industrial demand reduction.

Challenge 4: Operating and optimising a renewables-based system, cost-effectively
22. Do you agree with the key design choices we have identified in the consultation and in Appendix 4 for zonal pricing? Please detail any missing design considerations.
23. How far would our retained alternatives to locational pricing options go towards resolving the challenges we have identified, compared with locational pricing? Please provide supporting evidence and consider how these alternative options could work together, and/or alongside other options for improving temporal signals and balancing and ancillary services.
24. Do you agree with our proposed steps for ensuring continued system operability as the electricity system decarbonises? Please detail any alternative measures we should consider and any evidence on likely impacts.

Background to the steel industry:
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- High electricity prices generally reduce profit margins and thus lead to less reinvestment. Further, high electricity prices also function as a disincentive to investment from international steel companies, with the UK seen as a less favourable investment location than other countries.
- This electricity price disparity is a major barrier to meeting the Net Zero target since all options for decarbonising steel production, from CCS to hydrogen and electric arc production, lead to significantly increased electricity consumption. Steel plant investment goes to the most cost-competitive regions, which will increasingly be those with internationally competitive power prices. If all UK production were to convert to electric arc furnaces using scrap steel, the sector would face higher electricity costs of £132m (at a price disparity of £24/MWh) compared to if they face electricity prices at German levels.

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[3] UK Steel (2022), Net Zero Steel: A Vision for the Future of UK Steel Production, https://www.makeuk.org/about/uk-steel/net-zero-steel---a-vision-for-the-future-of-UK-steel-production

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Response to locational and zonal pricing proposals:
We recognise the challenges posed by a constrained network and wish to work with the Government to solve these problems and create a more efficient electricity system. However, we do not support the Government's proposal to take forward locational and zonal pricing as part of the REMA process. Below, we will outline why we have substantial concerns about the proposal to implement zonal pricing, why we believe it is unlikely to deliver the intended benefits, and why it will very likely increase electricity prices for energy intensive industries (EIIs) like the steel sector. As outlined above, competitive electricity prices are critical to our industry, as higher electricity prices will not only make industrial decarbonisation through electrification harder, but it will also increase the risk of carbon leakage and overall higher global emissions.

We are concerned that locational zonal pricing will penalise steel producers and EIIs due to their existing locations, which they cannot change and were often chosen due to access to raw materials. If locational operational signals are introduced, where demand users will face the locational pricing, then steelmakers will likely see an increase in their wholesale prices, as they are not co-located next to existing generation. As outlined in the consultation document, "*locational pricing automatically 'translates' system constraints into the wholesale price signal, incentivising market participants to actively respond to changes in local levels of supply, demand, and network capacity*" (p90 Second Consultation Document). Industrial and large energy users will thus face higher wholesale prices as a result of network constraints. Furthermore, the Government states that zonal locational pricing "*may also drive new industrial investment and economic growth in areas with high levels of renewable generation. End users, particularly those that are energy intensive or can shift their electricity demand to match renewable output, may look to invest in new or expanded facilities in these regions, creating new jobs and opportunities for the local economy*" (p91 Second Consultation Document). First, it is worth noting that if this statement is true, then the opposite will also be the case, i.e. EIIs that cannot move to regions or zones with higher renewable generation will have higher wholesale prices. Second, it is highly unlikely that energy-intensive industries will relocate to zones with lower prices due to their existing assets, impact on jobs, lack of skills, access to raw materials, and practical implications, especially as lower prices will be temporary in the medium term (10-20 years). Thirdly, while high electricity prices are a key barrier to investing in new green steelmaking in the UK, an increasing barrier is the lack of access to new capacity. One UK steel producer has, for example, decided to invest in two new electric arc furnaces at separate locations, as sufficient grid capacity for one larger plant would not be available for another decade. Fourthly, the very long implementation period of five to ten years will create significant uncertainty for steel companies and other EIIs, which will likely have a negative impact on investment in low-emission manufacturing. Implementing reforms which will create uncertainty around electricity prices for the next 10-30 years will reduce investments in industrial electrification, considering how critical competitive electricity prices are to these investments. Fifthly, there will also likely be political limitations, as the Government has prioritised steel producers making investments in new green steelmaking production plants close to their existing plants to limit any impact on jobs.

It is also concerning how little emphasis has been placed on the impact on EIIs, their competitiveness, ability to decarbonise and attract investments. While the Government makes statements that "*Zonal Pricing has the potential to lead to savings for the typical household in all regions*" (p91 Options Assessment), it does not consider the impact on EIIs. The analysis continuously highlights the impact on households and typical domestic electricity bills but does not extend the same analysis to the impact on manufacturers and EIIs. As

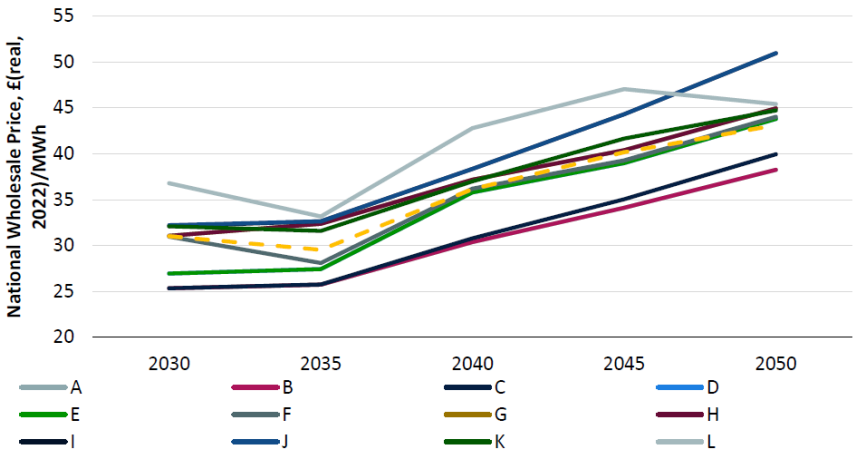
[4] UK Steel (2023), Industrial Competitiveness: Electricity prices faced by UK steelmakers, https://www.uksteel.org/electricity2023

domestic households only make up a little over a third of electricity consumption in the UK, the analysis does, therefore, not consider the impact on over 60% of electricity demand users. When stating, "*[i]n the next phase of REMA, we will consider how different options for exposing end users to locational price signals balance the need to optimise the electricity system while protecting those who may be unable to respond. Any potential move to locational pricing would be introduced carefully to give electricity end users time to adjust and enable adequate protections to be put in place where appropriate*" (p91 Second Consultation Document), it brings into question how the Government can claim that all consumers will benefit from zonal pricing. Furthermore, LCP Delta and Grant Thornton have excluded locational operational signals (i.e. the demand side exposure from locational pricing) from the scope of their economic research, meaning that the research has not assessed the impact on any consumer group of introducing more or less locationally-reflective pricing for the demand-side can face. Options range from retaining national wholesale pricing to adjustment for regional variations, average across multiple zones, and demand-side paying zonal price, but the analysis has not considered the impact of exposing demand users to zonal pricing. The absence of analysis of the impact on demand users is troubling, and the Government is not in a position to make any conclusions on the basis of this partial analysis. This leaves us with significant concerns that the Government is taking forward electricity market models without a thorough analysis of the impact on specific consumer groups, including groups where electricity pricing is critical to their ability to operate in the UK.

DESNZ officials have claimed that all consumers will face lower electricity prices, but some will face even lower prices than others if locational pricing is implemented. Furthermore, the Government states in its consultation documents that its "*analysis shows that, even when consumers are shielded from locational price signals, they see a net benefit under locational pricing*" (p90 Second Consultation Document). We do not believe that the Government has the evidence to support this statement, and as we will demonstrate below, its own analysis and consultation documents show that EIIs and steel producers are very likely to see an increase in their electricity prices if zonal locational pricing is introduced.

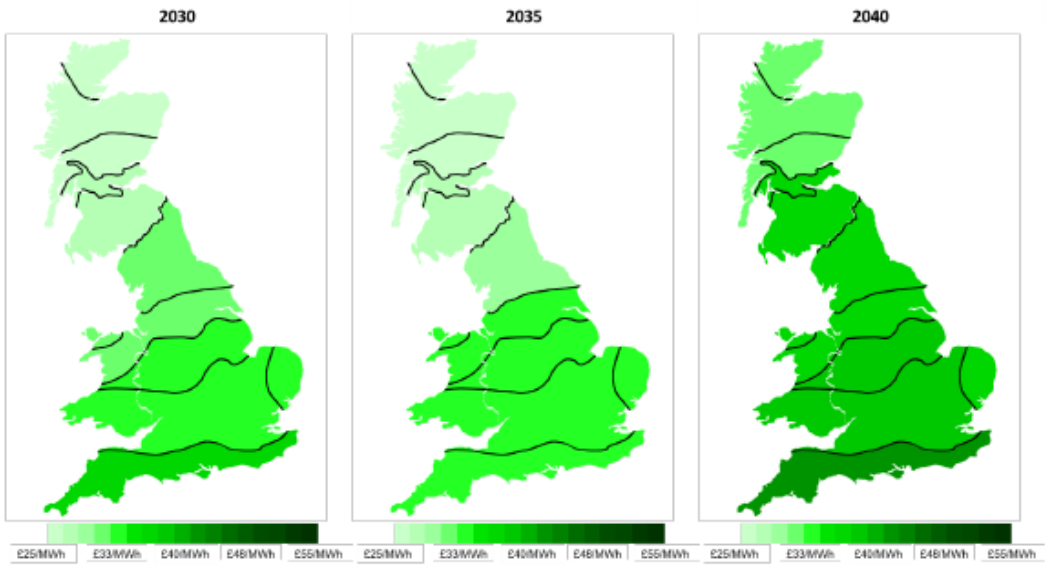
- The Government states, "*one would expect areas with significant generation output relative to demand to have lower wholesale prices and vice versa*" (p89 Second Consultation Document). It would, therefore, also be true that areas with insufficient generational output relative to demand would have higher wholesale prices. Similarly, the Government states, "*[l]ocational pricing means that wholesale prices will be more reflective of the physical system – i.e. that they will be higher in constrained areas and lower in non-constrained areas – which increases dispatch efficiency*" (p84 Options Assessment), again recognising that certain areas will see higher wholesale prices.
- The LCP Delta and Grant Thornton analysis accompanying the consultation states that "*Depending on how locational pricing is implemented then the benefit on consumers could vary across the country. If consumers are fully exposed, then those in the higher price zones in southern England may pay more for their energy than those in lower price zones in Scotland*" (p84 LCP Delta and Grant Thornton). This again questions how the Government can claim that all consumers will see a benefit from location pricing. While the LCP Delta and Grant Thornton analysis is preliminary, and any final zones are not yet determined, figures 28 and 29 do add further evidence against the above claim, as the two figures clearly demonstrate that wholesale electricity prices will increase in several regions where steel producers operate:

Figure 28: *Zonal prices in the locational pricing factual for DESNZ Net Zero Higher scenario*



(Note: Each line represents a separate zone, with the dashed yellow line representing the demand-weighted wholesale price in the national pricing counterfactual for the DESNZ Net Zero Higher scenario. It shows that several regions would have higher wholesale prices than in a scenario of continued national pricing)

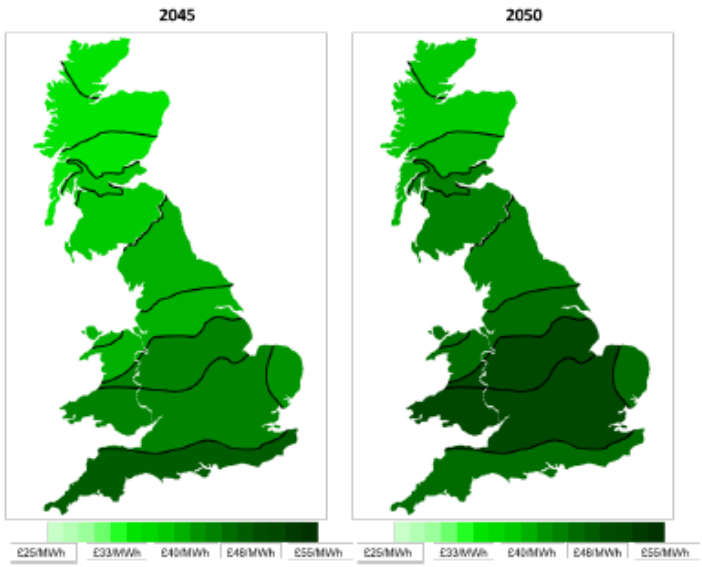
Figure 29: *Zonal price maps in the locational pricing factual for DESNZ Net Zero Higher scenario in £(2022)/MWh*



National price: £31/MWh
Locational Price: £25-37/MWh

National price: £30/MWh
Locational Price: £26-33/MWh

National price: £36/MWh
Locational Price: £30-43/MWh



National price: £40/MWh
Locational Price: £34-47/MWh

National price: £43/MWh
Locational Price: £38-51/MWh

- The LCP Delta and Grant Thornton analysis shows that prices would vary by up to £13/MWh across zones, creating a significant disparity between UK regions and, thus, winners and losers. The authors of the analysis furthermore conclude that "*On average, demand weighted wholesale prices are slightly higher in the locational pricing factual than the national counterfactual. Prices in high demand zones show price increases compared to a national pricing counterfactual. […] This leads to increased consumer costs from wholesale pricing, as consumers have to pay more for their energy usage in some zones*" (p70 LCP Delta and Grant Thornton).
- It is also worth noting that one of the reasons why wholesale prices will increase is that some of the balancing costs will be integrated within the wholesale price, as stated on p85 in the Options Assessment: "*Whilst it may be counterintuitive in the first instance that the wholesale cost rises under locational pricing this is due to constraint costs effectively moving into wholesale prices from the [balancing mechanism] given these prices now account for constraints*". Similarly, the LCP Delta and Grant Thornton analysis states that "*wholesale price costs increase by £21bn as prices increase in*

the highest demand zones compared to the national run. This is mainly due to constraint costs effectively moving into wholesale prices given these prices now account for constraints" (p54 LCP Delta and Grant Thornton). While this may not seem like an issue, it will disproportionally affect EIIs, as they are compensated for BSUoS (and other network) costs through the British Industrial Supercharger. As balancing costs will be integrated into higher wholesale prices, for which EIIs are not compensated or exempt, this will lead to higher overall prices for them. Zonal location pricing will, therefore, undermine the British Industrial Supercharger, which specifically aims to improve the competitiveness of EIIs, reduce the risk of carbon leakage (and thus higher global emissions), and improve the ability of EIIs to decarbonise through electrification.

As such, location pricing will significantly increase the risk of higher electricity prices for EIIs and the steel industry. We do not believe that the evidence presented in the consultation documents and accompanying analysis supports the notion that zonal pricing will deliver lower overall prices. Instead, the evidence suggests that zonal pricing will undermine the British Industrial Supercharger and will very likely raise industrial electricity prices, which will cause meaningful damage to the steel industry.

We would also question DESNZ's understanding of EIIs, steelmakers, and industrial decarbonisation when it publishes analyses that state, "*[f]or example, it may be unfair to expose households to locational prices, but it may be beneficial expose certain non-domestic consumers, such as some forms of industrial processes, as some could change location based on energy prices"* (p55 LCP Delta and Grant Thornton). As demonstrated repeatedly and recognised by the Government when it introduced the British Industrial Supercharger, the competitiveness of industrial electricity is critical to the decarbonisation of industry, its ability to attract investment, and to compete. It is furthermore an absurd suggestion that steelmakers and other EIIs would close down their existing plants and move them across the country (ignoring existing assets, impact on jobs, access to raw materials, and the practical implications of this) to benefit from lower electricity prices. In this scenario, the economic rational choice would be to close the site permanently due to high uncompetitive electricity prices.

Finally, we have general concerns about the feasibility of locational zonal pricing, which are also highlighted in the consultation documents. One, we question whether additional locational signals will be sufficient to influence the location of new power generation, considering the more significant planning constraint and desire for higher load factors. The Government recognises this as it states, "*[f]actors outside of the market, like weather patterns and seabed leasing, are the main drivers for where renewables locate*" (p72 Options Assessment), and "*[f]actors such as connection times, load factors and planning permission play a pivotal role in the siting decisions of generation or storage*" (p77 Options Assessment). Two, the LCP Delta and Grant Thornton analysis shows that "*system cost benefits could be outweighed by increases in cost of capital. Increases in cost of capital of 0.3 to 0.9 percentage points result in a move to locational pricing becoming a net cost to the system*" (p10 LCP Delta and Grant Thornton). Three, as noted, locational pricing "*could potentially reduce liquidity, particularly in forward markets due to the additional price uncertainty created, as well as the fragmentation of the market*" (p123 Options Assessment). As the UK electricity market already suffers from low liquidity, the Government must be careful about reducing this further. For these reasons, we believe that the feasibility of locational zonal pricing has been overestimated.

We would instead recommend that the Government considers the alternative options listed in Chapter 4, i.e. options A – F, rather than proceeding with locational pricing. These options would be an evolution of the existing electricity market instead of a revolution, where the market would be fundamentally changed. Should the Government wish to persist with locational pricing, we would encourage it to consider only introducing locational investment signals and not locational operational signals. Of the options listed in Table A4.4, it would be advisable to retain national wholesale pricing to minimise the locational disadvantage to existing demand users. However, this model does still increase wholesale prices overall, as balancing costs are moved from BSUoS to wholesale prices, meaning it would still be preferable not to proceed with locational pricing.

For further information, contact:
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