

ASSESSING LOCATIONAL MARGINAL PRICING IN GB

14 OCTOBER 2022



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The potential for GB to move to Locational Marginal Pricing (LMP) has become an important topic of debate this year. National Grid (NG) ESO concluded based on its Net Zero Market Reform project, that LMP is the proposed wholesale market model to best support the energy transition to Net Zero¹. We have also seen significant quantified benefits of £30bn claimed in a study by Octopus Energy and the Energy Systems Catapult.² Ofgem is currently carrying out its own assessment and BEIS is considering the case for reform as part of its Review of Electricity Market Arrangements (REMA).³

The implications of such a move are wide-ranging and likely to be controversial. Therefore, any assessment of LMP must be comprehensive and transparent. Frontier Economics has produced two studies to support policymakers as they consider the issues further:

- A first overarching study discussing how to carry out an assessment and identifying the gaps that need to be filled in the current evidence that has been put forward – “[An assessment framework for a move to LMP in the GB Electricity Market](#)”; and
- A second deep-dive into the particular issues related cost of capital – “[LMP – implications for cost of capital](#)”

We summarise here the key findings of our first report.

Constraint costs are expected to continue rising until late 2020s, but this is only part of the story

Much of the LMP debate has focused on rising constraint costs.⁴ However, this alone cannot justify a change to LMP. While it is true that LMP removes the need to make constraint payments, it does not mean that these constraint costs will disappear. Instead they are simply moved elsewhere:

- Wholesale prices have to rise in some areas to ensure constrained-on generation is running; and
- Generators previously constrained-off will no longer receive compensation; which may lead to knock-on effects like higher CfD strike prices for new investments.

Given constraint costs are primarily about transfers, understanding customer impacts requires a holistic assessment of all the payment flows. Constraint cost savings should not be used alone as an indicator of benefits.

¹ National Grid ESO, FTI consulting; Net Zero Market Reform Phase 3; 24th May 2022: <https://www.nationalgrideso.com/future-energy/projects/net-zero-market-reform>

² Octopus Energy, FTI Consulting, Compass Lexecon; GB Locational Pricing - A framework for analysis of benefits and some initial results; 6th May 2022: <https://www.eprg.group.cam.ac.uk/wp-content/uploads/2022/05/SLIDES-FINAL-JASON-MANN-EPRG-2022-Locational-pricing-v09-1.pdf>

³ BEIS; Review of Electricity Market Arrangements; 18th July 2022: <https://www.gov.uk/government/consultations/review-of-electricity-market-arrangements>

⁴ National Grid; Modelled Constraint Costs; August 2022: <https://www.nationalgrideso.com/document/266576/download>

The benefits case should be centred on responses to locational signals

The key LMP benefits question relates to whether, over the long-run, it can trigger more efficient locational decisions by generation, load, storage and interconnectors, reducing the need for network investment. However, increased efficiency of decisions cannot simply be assumed.

Given it is not possible to model responses of a diverse group of investors, any assessment is likely to rest on subjective judgements. As a result, these need to be transparent and consider:

- whether participants have the ability to respond to a location signal (specifically, whether there is sufficient locational choice in the number of technically feasible sites, and investor control over where generation is built); and
- for those technologies or sources of demand that can respond, whether an LMP signal is more accurate and investable than the alternative of TNUoS (including following reform).

Any such assessment also needs to recognise that the efficiency of the LMP signal will depend on the precise design of the LMP market and broader market design decisions taken as part of REMA.

Any estimated benefits should be weighed against the wider implications of LMP

LMP is likely to result in a range of other important impacts for the electricity system:

- **Cost of capital** - although we know from recent GB experience that uncertainty created by the volatility in TNUoS charges has presented challenges to investors, the introduction of an LMP regime is expected to lead to investors facing an even greater risk around their expectations of earnings (e.g. due to loss curtailment compensation), which will likely lead to investors seeking a higher return on their capital. This is a key area given the scale of future investment needs. In our second report we consider the drivers of this increased uncertainty in more depth, including an analysis to place some quantitative bounds around the scale of any impacts.
- **Market liquidity** – historically liquidity has been a key issue for the GB market so it is important to understand the possible effects, as maintaining current high levels of GB liquidity is not guaranteed under LMP, with a wide range of levels of liquidity observed in LMP markets.
- **Transitional implications:** as well as significant direct and indirect costs of implementation, there is also a significant risk of increased cost of capital (or even an investment hiatus) during any lengthy period of transition (at least five years) due to uncertainty over the market rules.

Finally, any assessment requires a well-considered counterfactual

The GB system is undergoing wide-ranging change, so the future energy system without LMP is unlikely to look the same today. As a result, it is important not to ascribe benefits to LMP which could be more easily secured through other means. For example:

- TNUoS charges are currently under review by the TNUoS Taskforce, and known-deficiencies could be addressed to make it more cost-reflective, less uncertain, more granular, or apply to interconnectors.
- To the extent that the network planning and delivery process today is viewed as having deficiencies (because transmission build has lagged new, largely renewable, generation build), there may be other credible solutions to address such a lag (e.g. changes to planning arrangements or more anticipatory network investment).⁵
- There is no reason why any actual or perceived inefficiencies in the current despatch process can only be addressed by a move to LMP – there may be other more limited reforms to improve the information and optimisation tools available to the ESO.

Important evidence gaps remain

Our review of the existing evidence suggests that none of the work undertaken to date is inconsistent with the framework we discuss in our report, and therefore each study represents a constructive contribution to the debate. However, there remain important gaps that future analysis should address. Key among these gaps are:

- a lack of justification for improvements in locational siting decisions under LMP – it is too simplistic to just assume investors can more efficiently respond to LMP signals;
- limited consideration as to what a reasonable counterfactual might be; and
- limited consideration of the implications for cost of capital, an aspect on which our second report makes a contribution.

⁵ It is important to note that constraint costs are a necessary part of an optimised system. Were there to be no constraint costs, we would have over invested in network capacity at a very substantial cost to the consumer.

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