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# Helm's Wishful Thinking on Energy Policy: Repeating Past Mistakes, Expecting Different Results

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## Introduction

In October 2017, the UK government issued Professor Dieter Helm's "Cost of Energy Review" (the Helm Review).[2] The terms of reference (TOR) for this review list the government's objectives for the energy sector: among them, meeting carbon targets "whilst concurrently ensuring security of supplies of energy, in the most cost-effective way". The TOR require that "[t]he specific aim of this review is to report and make recommendations on how these objectives can be met in the power sector at minimum cost and without imposing further costs on the exchequer."

The scope of Helm's report is broad, incorporating the costs to consumers arising from wholesale and retail markets and network regulation. Given the history of investigations focused on energy retail over the last decade, including the Energy Supply Probe, Retail Market Review, and Competition and Markets Authority inquiry, Helm's comments on retail regulation cover heavily-trodden ground. We do not wish to cover this ground again here, so we focus our review on his recommendations pertaining to electricity generation and network regulation.

The Helm Review is a report of two halves. Much in the opening chapters of the Helm Review is consistent with cost minimisation and economic efficiency in energy market design and regulation. However, many of the recommendations subsequently set out in the Helm Review contradict the analysis set out earlier in the document, whilst others strike us as impractical. We conclude that the recommendations of the Helm Review do not provide a reliable guide for government on energy policy.

Instead, any reforms should take greater account of the criticisms of current policy in the earlier chapters of the Helm Review, especially of the unnecessary costs caused by government intervention in energy markets.

## Economic Efficiency Is the Best Guide to Minimising Costs

At present, there is good reason to focus on minimising costs (subject to meeting carbon targets and security of supply) in the formation of government policy on energy and climate change. As Helm points out at length, the accumulation of uncoordinated policies drives up costs unnecessarily by promoting expensive methods of reducing carbon dioxide (CO2) emissions, whilst leaving cheaper alternatives under-used. Because of planning errors and lobbying by vested interests, these policies have not managed to "beat the market" or "pick winners". Instead, these policies have discriminated in favour of unnecessarily expensive methods to reduce CO2 emissions. Helm's analysis is useful, if hardly novel, in highlighting the importance of economic efficiency.[3] Policymakers, regulators, and the general discourse of energy policy seem to have abandoned economic efficiency—to great cost—in many recent discussions of energy policy.

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Abandoning economic efficiency is not in society's collective interest. A more efficient policy would provide the same environmental benefits at lower cost, or greater environmental benefits could be achieved at the current cost. In principle, economic inefficiency need not be in any individual's private interests either; the additional benefits from improved economic efficiency can be used to ensure that no person or business is made worse off by a more economically efficient policy, whilst some are better off.[4]

Therefore, reassessing policy through the lens of economic efficiency provides a useful starting point for reviewing the power generation market. Unfortunately, Helm makes errors in his prognosis for the wholesale market, and fails to apply the lessons of the generation market to the rest of the sector. As a result, his recommendations will not solve the problem of unnecessary costs, but will most likely make it worse.

## Electricity Markets, Not Central Planning, Provide the Most Efficient Solution to Technological Change

To begin, we would like to correct a false impression that some readers might gain from the Helm Review, namely that electricity markets cannot work, or will not work efficiently, in future conditions. This is not an original point—many other commentators have suggested that the electricity market will need some kind of "new paradigm". However, Helm is as wrong in this respect as the commentators from whom he borrows this line of argument.

When discussing technical change (Chapter 6), Helm implies that, in the future, electricity market prices will not allow investors to recover their costs because of some fundamental change in generation technology. Specifically, he writes that future electricity markets will incorporate electricity storage, an active demand side, and a large amount of capacity with zero marginal cost. He concludes that these developments "will gradually render almost all of the existing arrangements redundant".[5] However, this conclusion is unwarranted.

In fact, electricity markets in the UK and elsewhere already accommodate storage (in the form of hydro reservoirs and pumped storage) and large power stations with zero marginal cost (nuclear power, in particular). Demand may become more "active" (i.e., more responsive to prices), but industrial customers already recognise high prices as a signal to stop consuming (or to start in-house generators). These developments are not new and their expansion will not undermine the fundamental economics of the market.[6]

The fear expressed by Helm and others is that wholesale market prices will become irrelevant because virtually all generation will have zero marginal cost (the main determinant of prices in a competitive market).[7] However, this fear is negated by other statements about future electricity markets, including many offered in the Helm Review. For instance, like many others, Helm predicts an increase in the active management of demand or use of storage or the dispatch of biomass plants, when the supply of generation is short. Each of these technologies has positive marginal costs and will set positive wholesale prices some of the time. The intermittent use of such schemes will make the value (and, hence, the price) of electricity "volatile"[8] (i.e., unpredictable, but not always zero).[9]

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Helm makes a second error when he states that security of supply requires "excess capacity", which will always depress electricity prices below the level necessary for cost recovery.[10] Investing in excess capacity would indeed depress prices, but it would also be a mistake, and is unnecessary for achieving security of supply. In the design of electricity markets, security of supply only requires investment in capacity up to the point at which the probability of a shortfall is reduced to an efficient level (as it can never be eliminated entirely). The remaining probability of a shortfall (sometimes defined as the expected number of hours per year of lost load) gives value to capacity; spot prices rise when a shortfall actually occurs and forward prices rise in anticipation of possible shortfalls. A competitive, decentralised market optimises capacity at the point where that value is equal to the cost of adding capacity. Investing beyond that level would indeed create "excess capacity" and depress prices below costs, but that would be inefficient and not an outcome to be expected from a well-designed market.

Electricity market rules must constantly evolve to accommodate new technologies and new forms of behaviour. However, the fundamental economics of supply and demand will be as valid in the future as they have been in the past, and will continue to set prices that drive efficient investment and operations. Reforms that ignore these economic principles will prove counter-productive.

## A Single Carbon Price Would Lower Costs of Emissions Reductions Relative to the Current Panoply of Intervention

If markets are to create economically efficient outcomes, prices must account for all the costs incurred in production, including the costs to society caused by emissions of CO2 and other pollutants.[11] It is therefore efficient—and helps to minimise costs—that generators using fossil fuels pay a charge for the CO2 they emit into the atmosphere and that they include the charge in their prices. In the UK today, the cost of CO2 emissions is set in the first instance by the EU's Emissions Trading Scheme (currently around £6 per tonne of CO2), but it is topped up within the UK electricity market by a government-imposed carbon price floor (which currently adds another £18 per tonne of CO2).[12] This aggregate price, around £24 per tonne of CO2, is still low compared to the government's estimate of the long-term "social cost" of CO2 emissions (the cost the government advocates for use in policy appraisal), which stands at £79 per tonne of CO2 in 2030 (all in 2017 prices).[13]

Helm makes two simple, but important, observations about the position of this carbon price in relation to other parts of the UK economy.

- First, it is bound to be costly and inefficient to focus all reductions in CO2 emissions on one sector, and Helm has good reason to identify agriculture and transport as alternatives.[14]

- Second, Helm highlights the inefficiency and unnecessary costs that arise from subsidising renewable energy sources more than would be justified by their value to the economy and the environment or even their "infancy".[15, 16]

These observations are neither complex nor original, but government policy seems to have ignored them in recent years. As the rising costs demonstrate, ignoring these observations was unwise. Given the resulting pressure on energy prices, it is becoming harder to justify paying higher prices for particular technologies simply because they are "renewable".

Helm's proposed remedies include a single carbon price to fix the market failure of emissions and integrating renewables into the electricity market to compete with fossil generators on equal terms.[17] These are standard recommendations arising out of the basic microeconomic theory taught at the undergraduate level. However, the practical difficulties involved in creating a credible single carbon price are legion.

Helm's proposed second-best solution is altogether more interesting. When the carbon price is not set at the appropriate level to achieve carbon targets, he advocates a two-stage auction—one auction for generation capacity in general, and a second for the types of capacity required to limit CO2 emissions.[18] This second auction would apply equally to all renewable or low-carbon energy sources and would still result in a common (shadow) price for CO2 emissions. Helm's point is that cost minimisation requires that market failures are corrected on a common basis for all technologies so that investors and consumers working within a market mechanism can select the least-cost method.

Helm's observations will advance the debate on energy policy by highlighting the fact that not all investment in renewable energy is good for the economy, or even good for the environment. Undoubtedly, some support for renewable energy results from specific lobbying for high-cost technologies. Such support diverts funds from other, lower-cost methods of addressing climate change. Applying a common system of capacity auctions to all technologies would be a major contribution to cost minimisation.

Therefore, it is surprising that Helm contradicts himself, undermining his own proposal for a market mechanism for selecting the capacity mix. Helm recommends that the system operator be allowed to "vary" the outcomes of the auction to avoid an "unbalanced portfolio"[19] or for reasons of national (i.e., cyber) security, in the latter case without even publishing reasons for its decision.[20] Such discretionary variation of auction outcomes would entirely undermine the purpose of holding a common auction in the first place. It would open the system to arbitrary decisions and make it prey to the same kind of lobbying that Helm criticises at other points in his report.

If it should be deemed necessary to allow such variations in auction outcomes, the only way to prevent the system from descending into arbitrariness and subjectivity, and hence increasing costs unnecessarily, is to make the decisions transparent. This could be accomplished by obliging the system operator to give reasons for its decisions, based on published evidence, and by making these decisions subject to appeal or review by an independent body.

## Public Ownership Will Politicise Rather than Deregulate Networks

Unfortunately, a similar error lies at the heart of Helm's chapter on networks. As mentioned above, the opening chapters of the Helm Review highlight unnecessary costs and inefficiencies due to the failure of successive government agencies to identify efficient technologies correctly. However, despite recognising the impossibility of government policy to "pick winners", Helm eventually proposes that publicly-owned National and Regional System Operators (NSO and RSOs) should be given the role of deciding future investment in transmission and distribution networks. We cannot see how this proposal is consistent with earlier analysis in the Helm Review, or any reason why it would be desirable from the point of view of consumers.

Helm cites several arguments for creating new, publicly-owned system operators, but none hold up under close scrutiny. In particular, Helm argues that:

- "Technical developments are undermining the distinction between networks on the one hand and generation, demand side and storage, and supply on the other".[21] Even if this were true, the transmission and distribution networks already invest in (or commission) other technologies, such as local generation, storage, and demand-side management, and they will continue to do so whenever it is economic.[22] Little or nothing would be gained by creating new publicly-owned institutions.

- "Any new RIIO price formula set for the next period will almost certainly break down."[23] In support of this claim, Helm highlights problems with the current eight-year duration of price caps under RIIO and the lack of sufficient corrections to price caps when conditions change. If true, these objections justify a change in the regulatory rules, not the wholesale abandonment of network regulation.[24] Indeed, Ofgem has already started a consultation process focused on whether it should change its method of setting price controls at the next (RIIO-2) distribution review, including possible new rules to reduce cost-forecasting errors and to ensure reasonable returns for network companies.[25]

- "Network regulation is no longer needed",[26] and it is hard to make a "case for private ownership of the new NSO and RSOs".[27] Experience does not support these arguments. Helm argues that the new NSO and RSOs would be "accountable in the ways public agencies are—to BEIS, the Select Committees, and subject to the National Audit Office and public accounts committee scrutiny, and ultimately to Parliament".[28] However, it was precisely the inefficiency of that type of politicised control that led the UK government to abandon the model of the "nationalised industry" in the 1980s and 1990s, and to replace it with independent regulation of privatised utilities. The disadvantages of the nationalised industry model were well-documented at the time. It should not be necessary to relive that experience just to relearn the lesson of history. Indeed, in the first part of his report, Helm criticises the politicised nature of current government interventions in generation; it is odd that he ignores these criticisms when forming recommendations for networks.

Other aspects of Helm's arguments suggest a lack of analysis or at least a lack of internal consistency. For instance, he argues that much of the current role of network regulation would be abolished "at a stroke".[29] However, he acknowledges that "It would now be for the NSO and RSOs to determine what operations, maintenance and enhancements to the networks are required".[30] It would be naïve in the extreme to assume that a publicly-owned body can be relied on to act in the "public interest"[31] and will never pursue the objectives of its managers or of its political overseers at the expense of the public. Therefore, transparent regulatory scrutiny of all these decisions would be required to ensure such bodies act efficiently and in the public interest—as indicated by the independent regulation of municipal and state-owned utilities in much of Europe and elsewhere.[32]

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In fact, it may be harder to encourage the proposed NSO and RSOs to act efficiently than it would privately-owned networks, precisely because the NSO and RSOs will not possess large assets and will not be motivated by profit. In these conditions, the effectiveness of incentive regulation is diluted, and any supervisory bodies must exert more direct oversight over the decisions of management. This is unlikely to create clarity of direction or efficient, minimum-cost outcomes.

Helm also suggests that his model would reduce the cost of capital, because the current network owners would merely lease their assets to the NSO and RSOs, which he regards as a low-risk activity. However, experience suggests that this model may not reduce risk or the cost of capital as much as Helm hopes. The NSO and RSOs would not be credit-worthy buyers for leasing contracts unless they had a government guarantee. Across the globe, there are many instances of similar contracts becoming worthless because respective governments set tariffs too low to allow the buyer to pay the lease fees, or because the governments removed the right of the buyer to recover its costs.[33]

The cost of capital is driven by risk, but in regulated sectors the sources of risk are primarily institutional and political, not commercial. At their current level of detail, Helm's recommendations do little or nothing to reduce political risk or the cost of capital—in fact, the opposite is true.

## Conclusion

Much of the analysis in the opening chapters of the Helm Review correctly identifies barriers to cost minimisation and economic efficiency in energy market design and regulation. In particular, uncoordinated government interventions intended to favour certain generation technologies (attempts at "picking winners") have driven up costs unnecessarily by promoting expensive methods of reducing CO2 emissions, whilst leaving cheaper ones under-used. The resulting economic inefficiency is not in society's collective interest. Establishing a single price for CO2 emissions and allowing the market to determine the capacity mix would be a more efficient policy: It would provide the same environmental benefits more cheaply, or greater environmental benefits at the same cost.

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The concerns Helm raises about the effectiveness of government interventions in electricity generation should drive government policy on the operation of the system and network regulation. We find no grounds in the Helm Review for the proposal to create publicly-owned network operators as Helm recommends. To give them discretion to select or reject technologies of network operation, subject only to political oversight, and in some cases without giving reasons would lead to inefficient outcomes for exactly the same reasons that the government's existing policies on carbon and renewable generation have. Such an approach to networks would suffer from the same kind of lobbying and unnecessary cost escalation Helm criticises in relation to generation. Indeed, controlling a publicly-owned body with multiple political objectives may be more difficult than regulating a privately-owned company motivated solely by profit. The current problems with electricity network regulation (to the extent there are any) do not lie in private ownership—which tends to favour cost minimisation—but in unsustainable parts of the RIIO regulatory framework. The regulation of network operators may need some amendment, but it cannot be abandoned entirely.

Helm has diagnosed some important problems, albeit not, in many cases, for the first time. The main failing of the Helm Review is in his prescriptions. Most notably, Helm's proposal to nationalise the operators of the electricity system flies in the face of his own critique of the panoply of previous government interventions in the sector. Repeating past mistakes and expecting different results is wishful thinking, and does not make good energy policy. The government is therefore right to call for further evidence before acting on Helm's proposals.

## Notes

[1] The authors would like to acknowledge the help of Graham Shuttleworth in shaping this paper, and Jeff Makholm for his comments.

[2] Dieter Helm, Cost of Energy Review, 25 October 2017, available at http://www.biee.org/wpcms/wp-content/uploads/Cost_of_Energy_Review.pdf.

[3] Policymakers and regulators do not rely on a consistent definition of efficiency when designing government policy. When we refer to economic efficiency, we refer to an allocation of resources such that no agent in the economy may be made better off without another being made worse off. Therefore, economic efficiency encompasses related concepts such as allocative efficiency (i.e., goods are allocated to the agent, which places the highest value on them at the margin), dynamic efficiency (i.e., efficiency over time), and technical/productive efficiency (i.e., factors of production are producing the maximum combinations of outputs for given inputs). The welfare theorems of neoclassical economics state that under a series of assumptions regarding the process of trade, a decentralised competitive equilibrium will be perfectly efficient such that the gains from trade are exhausted.

[4] Of course, some people or companies may benefit unjustifiably from current policies, only because their impact is so hard to comprehend. A clarification of policy might expose these benefits as unjustified and lead to their elimination. We see no reason why such effects should be viewed negatively.

[5] Helm, para. 7-8, p. 61.

[6] Expansion of intermittent generation technologies may increase the need for ancillary services, which may necessitate reform of the market mechanisms through which these services are procured. This process is already underway in a number of jurisdictions throughout Europe. We discuss this topic more in a recent NERA publication: Richard Druce, Stephen Buryk, and Konrad Borkowski, *Making Flexibility Pay: An Emerging Challenge in European Power Market Design*, NERA Economic Consulting, 15 August 2016, available at http://www.nera.com/publications/archive/2016/making_flexibility_pay.html.

[7] Helm, para. 27, p. 88.

[8] Helm, para. 39, p. 68.

[9] Helm is wrong to suggest that short-term markets would become irrelevant if all the production technologies had only fixed costs. In such markets, assets with fixed costs and limited capacity can support a market in tradeable rights, as happens in the North American markets for long-distance gas pipelines, as well as more generally for real estate (e.g., leases, rentals).

[10] Helm, para. 25, p. 88.

[11] This principle underlies the decision to use competitive markets as a principle means of organising society.

[12] House of Commons Library, *Carbon Price Floor (CPF) and the Price Support Mechanism*, Briefing Paper No. 05927, 28 November 2017.

[13] *Valuation of Energy Use and Greenhouse Gas Emissions for Appraisal*, Department for Business, Energy & Industrial Strategy, January 2018, available at https://www.gov.uk/government/publications/valuation-of-energy-use-and-greenhouse-gas-emissions-for-appraisal.

[14] Helm, para. 26-28, pp. 16-17.

[15] Feed-in tariffs for renewables lie well above current wholesale market prices for electricity (which includes the cost of CO2 emissions from fossil-fuel-fired generation). Recent clearing prices paid for renewable energy sources have ranged from £50/MWh for solar PV to £114/MWh for offshore wind. See Helm, Table 12, p. 104.

[16] Helm notes the argument that these additional payments support an "infant industry", but points out that they are not related to the degree of "maturity" of each technology. Helm, para. 56, p. 198.

[17] As Helm points out, "A common carbon price across the whole economy (and not just electricity)…is the first-best route to minimising the costs of the decarbonisation transition" (see Helm, para. 30, p. 17) and "The first-best answer is to fix the market failures, and then to integrate renewables into the mainstream of the electricity markets" (see Helm, para. 105, p. 110). Setting a common carbon price for all emissions of CO2 (or greenhouse gases in general) would "fix the market failure", allowing renewables to compete within the electricity market on the same basis as any other technology.

[18] Helm, para. 129, p. 116.

[19] Helm, para. 56, p. 96.

[20] Helm, para. 57, p. 97.

[21] Helm, para. 34, p. 135.

[22] See, for example, *Flexibility Services: Invitation for Expressions of Interest*, UK Power Networks, August 2017.

[23] Helm, para. 36, p. 136.

[24] Helm alludes to the problem in terms of unjustifiable variations in profit under price-cap regulation, leading to pressure for the price cap to be adjusted when profits rise. This problem with long periods between reviews was entirely predictable, having been foreseen over 20 years ago. See D.L. Weisman, "Why Less May Be More Under Price-Cap Regulation", *Journal of Regulatory Economics*, Vol. 6, pp. 339-362, December 1994.

[25] *Open letter on the RIIO-2 Framework*, Ofgem, 12 July 2017, available at https://www.ofgem.gov.uk/publications-and-updates/open-letter-riio-2-framework.

[26] Helm, para. 51, p. 139.

[27] Helm, para. 53, p. 139.

[28] Ibid.

[29] Helm, para. 51, p. 139.

[30] Helm, para. 47, p. 138.

[31] Helm, para. 54, p. 96.

[32] Contrary to what Helm writes in paragraph 51 on page 139, regulators such as NVE in Norway very much see themselves as "second-guessing" the decisions of municipal and state-owned electricity networks, on behalf of electricity consumers.

[33] The inadequacy of tariffs has been a constant feature of public sector utilities in much of Europe until recent times, and remains a problem in India. Removing the right of the customer to recover costs is not a common practice, but it happened in the 1990s in Kazakhstan. There, generators had contracts with a single buyer, but they became worthless when a government sponsored reform took away the single buyers' network assets and its monopoly over wholesale electricity sales. These examples show the kinds of risks that capital markets would take into account—or which any new scheme in the UK would have to address.

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