Transmission pricing methodology: Sunk costs

Overview paper

8 October 2013

Market Design

1 Introduction

1.1 This paper gives an overview of a working paper on sunk costs. The sunk costs working paper[1] considers the definition of sunk costs, the relevance of sunk costs to production and pricing decisions, and the implications of sunk costs for transmission pricing. This paper is intended for non-technical readers.

1.2 Parties wishing to make submissions should review the sunk costs working paper[2], as that paper fully explains the Authority's views on the matter.

Background: the current TPM can be improved

1.3 The Electricity Authority (Authority) is reviewing the method used by Transpower New Zealand Limited (Transpower) to recover the costs of operating, maintaining, upgrading and extending the transmission grid. This method is the transmission pricing methodology (TPM).

1.4 The Authority considers that the current TPM can be improved so as to better meet the Authority's statutory objective. Section 15 of the Electricity Act 2010 states the objective as 'to promote competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers'.

The sunk costs working paper is the second in a series of working papers

1.5 The Authority has considered submissions on the October 2012 TPM issues paper.[3] It has decided to develop a second issues paper based on these submissions and on information provided at the TPM conference held in Wellington on 29-31 May 2013.

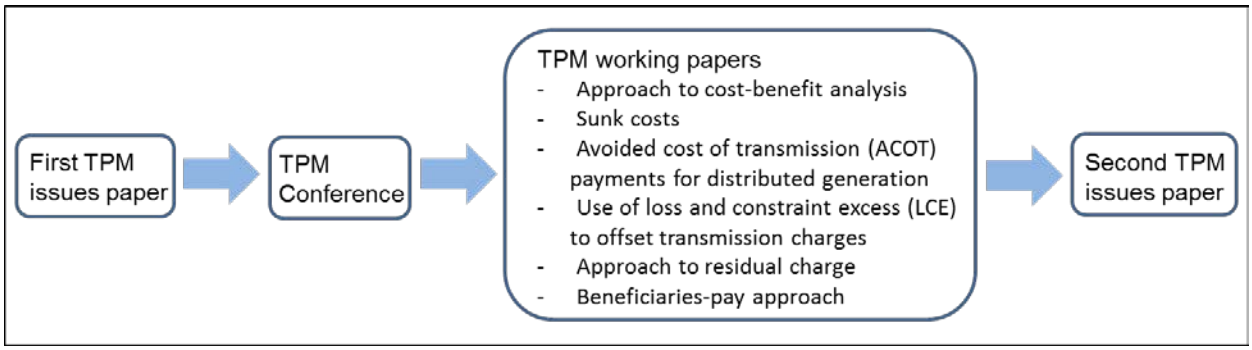
1.6 Before developing the second issues paper, the Authority is considering key issues that arose in relation to the TPM proposal to reflect in the paper. The Authority has identified six topics, which it will explore through a series of working papers. The Authority intends to use the feedback it receives on the working papers as an input into development of the second issues paper. The overall process is summarised in Figure 1.

---

2 Transmission pricing methodology: Sunk costs: Working paper, 8 October 2013. Available from: https://www.ea.govt.nz/our-work/consultations/priority-projects/tpm-sunk-costs-working-paper/

3 Available from: http://www.ea.govt.nz/our-work/consultations/priority-projects/tpm-issues-oct12/

Figure 1: Overview of process



1.7 The sunk costs working paper is the second of this series of working papers, as illustrated above.

2 The working paper discusses charging for sunk costs

2.1 Several submitters on the October 2012 issues paper said that the proposed TPM would change the way Transpower charges for sunk costs. They argued that such changes would cause economic inefficiencies.[4]

2.2 Some submitters claimed that no dynamic efficiency benefits would result from adjusting prices to account for assets with sunk costs. That is, such pricing would not lead to more efficient investment and innovation over time. They claimed the changes may in fact result in efficiency losses instead.[5] Some submitters thought the proposed methodology would convert a fixed or sunk cost to a variable charge. They predicted that the proposed changes would give rise to pricing signals that would cause inefficient allocation of resources. That is, in their view, the resulting pricing signals would prevent resources being applied to their highest value use. [6]

2.3 The working paper assesses the validity of these claims. The paper reviews how economic theory defines a sunk cost, and considers the relevance of sunk costs to efficient production and pricing decisions

3 Sunk costs and opportunity costs

Lost opportunities have costs

3.1 To understand sunk costs, it helps to understand opportunity costs. Economic theory holds that resources available to decision-makers are almost always

---

4 For example, Mighty River Power, *Mighty River Power submission to Electricity Authority's transmission pricing methodology: Issues and proposal consultation paper*, 1 March 2013, paragraph 2.2

5 For example, Competition Economists Group, *Transmission Pricing Methodology – Economic Critique*, paragraphs 7 - 8.

6 http://www.ea.govt.nz/about-us/news-events/events-calendar/transmission-pricing-methodology-conference/ - see for example comments from representatives from Vector, Pioneer Generation, and Mighty River Power, pages 72, 211, 244, and 245.

limited. When resources are limited, deciding to have more of something means simultaneously deciding to have less of something else. The opportunity cost of any decision is the value given up by choosing one option instead of the next best alternative.

3.2 For example, a person may have a choice between investing in shares or putting their money in a bank. The expected return on the shares might be 8%. The interest rate from a bank deposit (the next best alternative in this example) might be 3.5%. This means the opportunity cost of investing in the shares is 3.5%.

Costs are sunk when no opportunity is lost

3.3 Sunk costs have no opportunity cost because no alternative use of the asset exists. The firm cannot sell the asset; nor can it change the use of the asset to recover costs.

A cost, once sunk, cannot be avoided

3.4 Once a firm has committed to a sunk cost, it cannot take action to avoid the cost. Even if a firm closed and production ceased entirely, any sunk costs the firm incurred would remain. In other words, once a firm spends money on a sunk cost, it is irrevocably committed.

3.5 A sunk cost might arise because of technical characteristics. For example, adopting Blu-ray as the standard format for high definition digital video discs may mean some costs of developing the alternative HD DVD format were sunk. Sunk costs might also arise because of legal or contractual characteristics. For example, some costs of leasing a building might be sunk if the leaseholder has to leave the building before the end of the lease, and the lease contract prevents sub-letting.

4 Sunk costs in production decisions

4.1 Economics seeks to distinguish between sunk costs and other forms of costs because a firm should ignore sunk costs when deciding whether to *continue to produce* a good or service. If the revenue the firm receives for the good or service exceeds the costs of producing it, *excluding* sunk costs, the firm is better off continuing to supply the product. If the revenue does not exceed the costs of producing the good or service, *excluding* sunk costs, the firm would be better to stop producing the product. It can then divert resources that are not sunk to alternative uses and create higher value.

5 Sunk costs in pricing decisions

5.1 Submissions on the transmission pricing methodology focused on the implications of sunk costs for pricing, not for production decisions.

Pricing affects both static and dynamic efficiency

5.2 Pricing can impact on two broad types of efficiency: static efficiency and dynamic efficiency. Static efficiency requires ensuring that, at any given time, two conditions apply. First, each unit of output should be produced for the lowest possible cost (productive efficiency). Second, resources must flow to their highest value use (allocative efficiency). Dynamic efficiency can be defined as efficient investment and innovation over time.

Marginal pricing for static efficiency focuses on variable costs

5.3 Pricing for static efficiency focuses on costs that change as the level of production changes. These costs are called 'variable costs'. The costs of meals for the inter-island ferry are an example of variable costs. The cost of supplying each meal varies according to the number of passengers.

5.4 To promote static efficiency, firms need to set prices that take account of the costs involved in producing one more unit of a product (the marginal cost). The price for the last unit produced (the marginal price) must equal the marginal cost of producing that unit. The price must also be one that the consumer purchasing that last unit is willing to pay.

Fixed costs can be ignored when setting marginal prices

5.5 As well as variable costs, firms also have fixed costs that do not vary with changes in the level of production. To continue the inter-island ferry example, fixed costs include the cost of the inter-island ferry itself, and the cost of the ferry terminal and loading facilities. (Fixed costs do not include most of the costs of maintaining these assets — these are mainly variable costs.) For static efficiency, firms can ignore fixed costs when setting marginal prices, such as the price that should apply to standby passengers. This is because fixed costs do not need to be altered to alter production levels.

Marginal pricing applies only to the last unit produced

5.6 Except for marginal pricing, firms need to include fixed costs when setting prices or investment will not be dynamically efficient. Marginal pricing applies only to the last unit produced — the marginal unit. Under many real world circumstances firms should not set the price of all units at marginal cost, because marginal cost does not cover the full economic cost of supply, that is, costs including fixed costs. If investors are unable to recover their full economic costs, including their fixed costs, they will not continue to invest because to do so would result in a loss for them. This applies even if investing in the activity is the most efficient use of resources available. For example, a skifield may set the price of a ski season pass at $10 for a child (being the marginal cost of catering for one more adult skier) and $400 for an adult. If the adult season pass cost $10, the price would not signal the full cost of the skifield facilities and staff. Moreover, the skifield would fail to recover all its costs, so would generate losses for its investors.

5.7 Firms can make two types of decision about economic activities: marginal and not marginal[7]. Marginal decisions are about the last unit produced and consumed. The remaining decisions are about all other units produced and consumed. For many economic activities, the non-marginal decisions are much more important than marginal decisions.

Electricity industry pricing decisions tend not to be marginal decisions

5.8 Sectors such as the electricity industry rely on long-life assets (in generation, transport, and consumption). Decisions may or may not be marginal. For example, the decision to purchase a cool store that will consume electricity is not a marginal decision. The decision about how much electricity to use in a particular half hour to manage cool store load is a marginal decision.

5.9 In the main, decisions about how we allocate and use society's resources over time are not marginal.

Economic theory provides little guidance on pricing that is not marginal

5.10 Economic theory does not provide the same definitive guidance for non-marginal pricing as for marginal pricing, apart from that consumers will not pay more than the value of the benefit they receive from consumption. The debate in the economics literature is about how best to recover fixed costs (which includes sunk costs), and not about whether efficient pricing requires a distinction between sunk and other costs.

Pricing should reflect full economic cost

5.11 When firms make an investment to meet demand for a good or service, the full economic cost of the good or service will include sunk costs. No obvious economic efficiency reason suggests that the price for the good or service should be *lower* than the full economic cost of the good or service. Indeed, if prices do not recover full economic costs investors will tend not to invest and this is likely to cause dynamic inefficiency. For example, the price for a ride on a roller coaster may be $40, including $10 of sunk costs (such as the costs of unused roller coaster designs). Economic efficiency does not imply that the ticket price should be $30. If the price is $30 then, in time, there will be no roller coasters, even if sufficient consumers are willing to pay the full economic costs of $40.

Pricing can be variable

5.12 Firms can recover fixed costs through variable prices for all units except the marginal unit while still applying resources to their highest value use (that is, achieving allocative efficiency). For example, airlines charge different passengers different prices for the same journey in order to optimise their use of aircraft, recover fixed and sunk costs, and maximise their profit. For the same reason,

[7] The technical term economists use for decisions that are not marginal is 'infra-marginal'. This is the term used in the sunk costs working paper.

applying a variable transmission charge for units other than the marginal unit will not necessarily mean transmission assets will be under-utilised.

Marginal and non-marginal prices can be different

5.13 Setting prices for the marginal unit requires a focus on variable costs rather than fixed costs. Marginal willingness to pay must be aligned with the marginal cost to supply. However, for non-marginal decisions, the price charged for the good or service may be higher than marginal cost without inefficiently distorting the demand for the good or service. This is because all consumers except the marginal consumer are willing to pay more than the cost of producing the last unit (the marginal cost). The marginal consumer is willing to pay only the marginal cost.

Transpower's individual price-quality path

5.14 The regulatory regime applying to Transpower under the Commerce Act 1986 is consistent with the conclusions that:

(a) sunk costs are relevant to production decisions when revenue from a service is not sufficient to meet the full economic costs of the service

(b) economic theory provides no reason to distinguish between sunk and fixed costs for the purposes of setting efficient prices.

5.15 Transpower is required to operate efficiently and would be expected to consider the extent to which its costs are sunk when it decides whether to continue providing a service in which it has already invested.

5.16 For services for which a demand exists, Transpower has a regulatory right to recover its approved costs. This regulatory right is akin to a property right and means that, for Transpower, no cost is irrevocably committed; all approved costs can be recovered. From Transpower’s perspective, all costs in providing transmission services can be recovered, hence the regulatory right would seem to ensure that expenditure by Transpower on long-lived assets take the economic characteristics of fixed costs rather than sunk costs.

Conclusion: assess a pricing methodology on its merits

5.17 Some submitters considered that prices under the TPM should not be changed as this would change how "sunk" costs are charged for, and fixed costs should not be recovered by variable charges. Economic theory does not support these views. The Authority concludes that it should consider the total economic efficiency effects (static and dynamic) of a particular pricing proposal, and not just one aspect or one set of prices. A pricing methodology needs to be assessed on its merits.

5.18 Accordingly, the Authority is of the view that it may change the methodology for determining transmission prices, irrespective of the existence of sunk costs, if the change promotes overall efficiency in the electricity industry.