Explanatory Paper

Summary of Scarcity Pricing

Prepared by the Electricity Authority
28 March 2011

Introduction and purpose of this paper

1. Although this paper is designed to be as simple as possible, there are some technical terms that have been difficult to avoid. Please refer to the glossary for an explanation of these terms.

2. The Electricity Authority (Authority) is an independent Crown entity charged with promoting competition in, reliable supply by, and the efficient operation of, the electricity industry for the long-term benefit of consumers. It is progressing a number of priority projects set by Government[1] to improve the performance of the electricity market for the benefit of all consumers. The possible introduction of scarcity pricing measures is one of these projects.

3. In the last decade, New Zealand consumers have observed more public conservation campaigns and generation shortages than it should have and the Authority has identified situations where price suppression might be causing generation levels and fuel storage to be too low.

4. The Authority has recently published a Consultation Paper[2] which would introduce scarcity pricing as the means of addressing this issue. Scarcity pricing is a set of measures designed to induce higher levels of generation and/or price responsive demand. The Authority is seeking feedback from the public on the proposals.

5. While scarcity pricing has a simple goal – to increase investment in generation and/or price responsive demand and more prudent levels of fuel storage – the underlying details are relatively technical and complex. This paper explains the nature of the issues that scarcity pricing is designed to address, and how scarcity pricing would work in general terms.

6. While this paper provides a broad overview of the scarcity pricing proposals being considered by the Authority, parties wanting to make a submission on the proposals should refer to the Consultation Paper itself and not make references to this paper.

Spot market for electricity

7. Like many other developed countries, New Zealand operates an organised wholesale electricity spot market (spot market) as the primary mechanism to achieve coordination between generators selling electricity and purchasers (including retailers and large industrial users) buying it. The rules for the spot market are set out in the Electricity Industry Participation Code 2010 (Code), which is administered by the Authority.

8. In any given spot market trading period, if the amount of generation available increases and demand for electricity remains the same then this tends to cause spot prices to decrease. Similarly, if the amount of generation decreases the supply of electricity becomes relatively scarcer and spot prices will tend to increase.

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1 Included as “new matters” in S42(2) of the Electricity Industry Act 2010

2 See “Scarcity Pricing – Proposed Design”, Electricity Authority, March 2011

9. High spot prices encourage generators to make more of their existing generation available and retailers and other purchasers to reduce their usage or shift it to lower price periods. Over time, rising spot prices provide scope for generators to profitably build and operate new power stations and for purchasers to make arrangements to vary their demand in response to spot prices.

Key concern with current arrangements

10. For some time, the industry and the Government has been concerned that the incidence of public conservation campaigns has been greater than it would have been if the amount of generation and hydro storage were at efficient levels. A number of situations have been identified as contributing to this underinvestment.

11. Although spot market prices generally signal the state of supply conditions appropriately, there are very few occasions when generation becomes so scarce that an external intervention is required to reduce demand. These interventions to reduce demand tend to cause spot prices to decrease when they should rise.

12. For example, if conditions became so tight that widespread forced power cuts were required, this action tends to reduce rather than increase spot prices. This happens because existing arrangements take no explicit account of any forced reduction in electricity demand. Instead, the spot market operates as if the affected electricity users had never wanted any power in the relevant period. Spot prices do not include the cost imposed on consumers whose power is reduced.

13. In the case of public conservation campaigns, there is concern that some parties currently have a financial incentive to call for, and rely on, this emergency mechanism. This incentive arises because conservation campaigns dampen demand, which again tends to reduce spot prices. Thus, by inducing a public conservation campaign, net buyers of electricity can reduce their own costs at the expense of consumers, who incur the costs associated with reducing their electricity usage.

14. The suppressing effect on spot prices that occur in these situations can undermine the incentive for generators to make more power available (e.g. bring a generating unit back from maintenance early) or to preserve more fuel and/or by retailers contracting with electricity consumers to reduce their load.

15. Future investment decisions may also be affected. Generators and retailers make their decisions based on *expected* spot prices. If they expect spot prices to be suppressed below the true value in a supply emergency, this will reduce the incentive to take actions ahead of time, such as building last-resort generation plant or investing in demand-response capability. It also weakens the incentive on electricity retailers and other large wholesale buyers to enter into future supply contracts with generators. These contracts can help to underpin generation investment.

16. Ultimately, the suppressing effect on spot prices reduces the levels of investment in generation and demand responsiveness below levels that are optimal. Regular publicity about the prospect of electricity supply shortages also has a negative effect

on business investment in New Zealand. These outcomes are detrimental to the long term interests of all consumers.

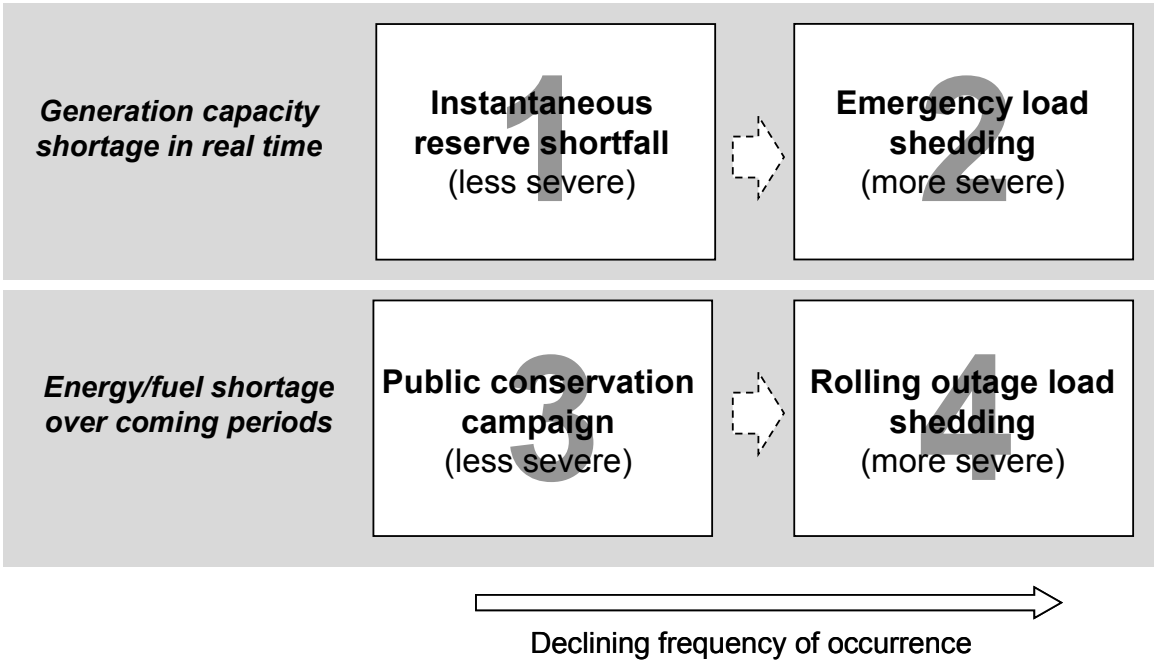
Different types of supply emergency and response

17. Supply emergencies can take different forms, depending on whether they reflect a shortage of generation *capacity* in the immediate period or insufficient *energy and/or fuel* supply to meet projected demand over the coming weeks or months. These different types of emergency prompt differing responses as the costs they impose on consumers vary.

18. Two supply emergencies have been identified which are at the less severe end of the spectrum. One is a situation where the amount of generation or interruptible load held in reserve (called instantaneous reserve) must be temporarily relaxed due to a shortage in generation. The other is a situation where fuel reserves (usually hydro lake storage) decrease to levels that induce the industry to ask the public to voluntarily conserve electricity.

19. The more severe costs incurred during supply emergencies are associated with measures that involve forced power cuts. In the case of emergency load shedding, these cuts may be invoked without notice in response to the unexpected outage of a significant amount of generation. They may also be notified in advance in the case of rolling outage load shedding if a shortage is expected for a sustained period (e.g. due to a severe drought affecting hydro generation).

Table 1: Types of supply emergencies



20. The different forms of supply emergency are summarised in Table 1. In each case, the responses involve an intervention that imposes costs or risks on electricity users that may not be reflected in spot prices for the reasons described in section 0.

Proposed measures

21. The proposed scarcity pricing measures aim to ensure that costs imposed on consumers by the interventions described above are reflected in spot prices. These changes should strengthen the incentives on generators and retailers to act in ways that reduce the number of supply emergencies that occur.

1
Instantaneous reserve shortfall
(less severe)

22. In the case of instantaneous reserve shortfalls, the Electricity Commission (the predecessor to the Authority) implemented changes to the spot market in mid-2010 which largely eliminated the potential for artificial spot price suppression during these events. Therefore, the measures in the current package intend only to fine-tune these earlier changes[3].

2
Emergency load shedding
(more severe)

23. In the case of forced power cuts to reduce demand, it is proposed that a minimum price would apply in the spot market. This minimum would be set at $10,000/MWh ($10/kWh) for emergency load shedding. This price 'floor' is intended to address the spot price suppression that can occur under existing arrangements.

4
Rolling outage load shedding
(more severe)

24. A different spot price floor of $3,000/MWh ($3/kWh) is proposed for rolling outage load shedding, reflecting the lower cost that pre-notified power cuts might be expected to impose on consumers.

25. Note that these proposed price floors would only be triggered if a shortage is widespread and affects one or both islands. No spot price floor would apply for more localised shortages, as these are most likely to be caused by problems in the transmission or distribution lines networks, neither of which is intended to be addressed by scarcity pricing measures being proposed now.

26. These price floors are similar to scarcity pricing mechanisms which operate in some other parts of the world (e.g. Australia, Singapore, and Texas). In each case, these markets apply a form of administered spot price when there is insufficient generation to meet demand and power cuts are imposed on consumers.

3
Public conservation campaign
(less severe)

27. Two approaches are being considered to reduce the incentive for net buyers to call for a public conservation campaign. One is the application of a floor price at $500/MWh (50 cents/kWh). The other is a requirement on parties to regularly disclose their net spot market exposure to the Authority. The Authority

[3] The potential need for subsequent fine-tuning was recognised when the initial changes were introduced by the Commission in mid-2010.

would publish a summary report that provides sufficient information to identify parties likely to benefit financially from public conservation campaigns. This should reduce the incentive to lobby for public conservation campaigns and exaggerate security risks. In addition, the Authority has recently made changes to the Code to require retailers to compensate residential electricity customers during a public conservation campaign.[4]

Transition arrangements

28. The Authority recognises that retailers, generators and large wholesale buyers would need to adjust their plans in response to the introduction of scarcity pricing measures. For this reason, it believes that a phased transition is desirable. This would assist parties to progressively gain experience with the new arrangements, and help to ensure that they are well prepared by the time scarcity pricing is fully introduced.

29. A transition should also increase the overall durability and credibility of proposed changes. If market participants have doubts about whether scarcity pricing will actually be applied in a supply emergency, they will be less likely to take the actions needed to avoid such emergencies.

30. The Authority has considered three broad forms of transition:

    (a) staging the introduction of the various measures, focusing first on the price floor for emergency load shedding, instantaneous reserve changes and the disclosure requirements;

    (b) introducing the whole package of changes (including disclosure), but increasing the value of the scarcity price floors over a transition period; and

    (c) introducing the whole package (including disclosure) with full scarcity floor values, but moderating the impact of price floors with a stop-loss type mechanism that is progressively relaxed over time (e.g. a cumulative price threshold).

31. If (b) or (c) is adopted, the transition profile could be specified in detail. Alternatively, an initial set of values could be defined, with subsequent changes being contingent on further assessments by the Authority.

32. At this point, the Authority does not have any firm preference in relation to transition arrangements. A key issue in selecting the path forward will be the perceived effect on the durability and credibility of scarcity pricing arrangements. Obtaining stakeholder views on these matters will be very important in identifying the package of measures that best balances these various considerations.

33. The Authority is also mindful of other measures that could complement scarcity pricing, relating primarily to hedging[5] arrangements. At this point, the Authority

[4] More information is available here: http://www.ea.govt.nz/consumer/customer-compensation-scheme/

[5] Hedge contracts are agreements that allow parties to manage their exposure to the volatility of spot prices, a practice that is similar to the mortgage buyers choosing between fixed and floating mortgage rates.

considers that the scarcity pricing proposals outlined above are a good starting point, and it will observe hedging behaviour to determine whether to consider additional measures to achieve robust security of supply arrangements and management of market risks.

How would electricity consumers benefit?

34. At present, during supply emergencies, interventions taken to cut demand reduce spot prices rather than increase them. The proposed scarcity pricing measures aim to ensure that costs imposed on consumers by these interventions are reflected in spot prices.

35. Some consumers, such as major industrial users, operate in the spot market and would be directly affected by these proposals. However, most consumers purchase their electricity from a retailer at fixed prices in a pre-defined contract. Nonetheless, these contract prices respond to trends in spot prices over time.

36. The only obvious effect from introducing scarcity pricing measures is that spot prices will be affected during supply emergencies. However, the expectation of higher prices during these periods is likely to encourage an increase in investment in generation and responsive demand, which could reduce spot prices in other trading periods. Overall, the net effect is expected to be a slight increase in electricity prices faced by consumers.

37. This negative effect is expected to be outweighed by other positive benefits. Scarcity pricing measures are expected to increase investment in generation and price responsive demand and this should reduce the number of supply emergencies experienced in New Zealand. This would reduce the costs incurred by electricity consumers during forced power cuts, public conservation campaigns, and rolling outage load shedding. It would also increase confidence in the reliability of New Zealand's power system and this could increase business investment.

Next steps

38. The Authority is seeking views from submitters on the issues set out in the Consultation Paper. This feedback will be taken into account by the Authority in the next phase of work.

39. This work is expected to include the preparation of a detailed design proposal which will include proposed Code amendments. It is expected that this will be released for consultation in mid-2011. Final decisions on scarcity pricing proposals are expected in the third quarter of 2011, with any resulting Code changes to be made by 1 November 2011.

40. To assist parties in this phase of the process, the Authority will hold a briefing session before the submission closing date on the scarcity pricing proposals contained in the Consultation Paper. The specific details for this briefing session are posted on the Authority's website.

Glossary:

Authority	Electricity Authority, which is an independent Crown entity responsible for the efficient operation of the New Zealand electricity market.
Price responsive demand	Arrangements for consumers to vary their electricity use in response to spot prices.
Emergency load shedding	A situation where consumers' power use must be reduced when there is not enough generation available to meet demand.
kWh	Kilowatt hour (1,000 watts = 1 kilowatt).
MWh	Megawatt hour (1,000 kilowatts = 1 Megawatt).
Net buyer	A net buyer is a party that is exposed to the variation in spot prices for a portion of the electricity it buys on the spot market.
Scarcity pricing	Measures the Authority is considering to correct any dampening of spot prices when generation becomes short of supply.
Spot market	Short for New Zealand wholesale electricity spot market.
Spot prices	Prices in the wholesale electricity spot market. Spot prices vary according to changing demand and supply conditions. Prices of $50-120 per MWh are relatively normal. However, prices can be as low or lower than $1 per MWh and can be as high as $10,000 MWh or more. Spot prices are referred to as final prices in the Code.
Generator	A party that owns power stations and sells the electricity they generate on the spot market
Retailer	A party that buys electricity on the spot market and sells it to consumers
Code	Short for Electricity Industry Participation Code 2010. The Code contains the set of rules governing the electricity market. It can be found here: http://www.ea.govt.nz/act-code-regs/code-regs/the-code/
Instantaneous reserve	The amount of generation or interruptible load held in reserve to cover normal contingencies such as the sudden and unexpected failure of a large generating unit.
Interruptible load	Load that can be reduced automatically in a contingency such as the failure of a large generating unit.