



Economic Regulation Authority

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Promoting fair prices, quality services and choice.

SHORT RUN MARGINAL COST

The market rules of Western Australia's wholesale electricity market require that a market generator must not offer prices into the market that do not reflect the market generator's reasonable expectation of the short run marginal cost of generating the electricity when such behaviour relates to market power.

As short run marginal cost is not defined in the legislation or in the market rules, there is a need for a simple and workable description of this concept. The Economic Regulation Authority has published two papers on its [web site](#) that seek to explain short run marginal cost.

The purpose of this paper is to provide a further but more simplified description of short run marginal cost to assist in its practical application in the wholesale electricity market.

The Basic Concept

Generally, short run marginal cost is viewed as the change in total cost that arises as a consequence of changing the quantity produced by one unit. The costs are therefore only those that vary with the one unit change in the quantity produced, all other things constant. Short run marginal cost does not therefore include fixed costs which do not vary in an instant in time.

While the concept is simple enough, difficulties arise in defining cost. More broadly, short run marginal cost might be seen as the impact on the value of a business as a consequence of varying output by one unit. While this cost or value is committed at an instant in time, it may not be realised until some time well into the future.

Hence, short run marginal cost can be the out of pocket cost to vary output by one unit. However, the concept can be extended to include any consequential impacts including any opportunities gained or lost as a result of the decision to change output by one unit.

Negative Bids

If, for example, generating plant is running at the minimum output level and there is a further decline in demand, such as occurs overnight, the generator may need to offer a negative price for the electricity generated to keep the plant operating. Any such negative price adds to and forms part of short run marginal cost.

A generator is acting rationally by bidding a negative price to the extent that the additional cost incurred avoids but does not exceed total shut down and start up costs.

In effect, the operator of a plant has an economic incentive to offer negative prices into a market so as to avoid shut down and start up costs. In aggregate, however, the costs incurred by offering negative prices must not exceed shut down and start up costs, otherwise the operator would be better off shutting the plant down.

Value

In addition to the above, the “value” concept is relevant to short run marginal cost where the economic impact of a decision to vary output by one unit differs from the out of pocket expenses involved. For example, a generator may have contracted fuel at a specific price under a long term contract. If, however, the market price of fuel changes, then short run marginal cost can be significantly impacted by the market value of the fuel at the time that it is used and not the historical contract price actually paid. Generators with long term fuel contracts therefore bear the fuel price risk, which can be either positive or negative.

Furthermore, restrictive contractual conditions can have perverse impacts on short run marginal cost. For example, take or pay and use it or lose it provisions of a contract can cause the value of fuel to approach zero if inventory remains as a contract nears the end of its life and there are restrictions on alternative uses for that fuel.

There are other examples where short run marginal cost differs from the out of pocket costs involved. The reasons for this is that it may be value and not cost that is relevant, and that short run marginal cost takes into account consequential impacts of a decision to vary output by one unit, no matter when the impacts are actually felt.

Questions or requests for further information may be directed to:

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