The ABCs of Market Power Mitigation: Use of Auctioned Biddable Contracts to Enhance Competition in Generation Markets

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Synopsis: Creating competitive markets in generation presents a difficult problem for regulators when there is resistance among market players to division and divestiture of asset portfolios. The authors suggest that auctioned biddable contracts (ABCs) allow for the creation of multiple players while leaving operational control of generation assets in the hands of incumbent firms. Contracts are designed which give the owner of the ABC the right to schedule or bid generation into the market, while providing appropriate incentives for efficient operation to the existing owners. In addition, the auction process itself can be designed to facilitate the rent transfer objectives of stranded cost/benefit recovery.

1 Divestiture is often politically unfeasible

Competitive markets require multiple players, or the credible threat of new entry. However, it is extremely difficult for regulatory bodies to create new players without resorting to forced divestiture of assets. Forced divestiture is often fiercely resisted; private owners claim interference with property rights while state-owned enterprises claim negative impacts on employment and the environment. This is particularly true in the case of electric power generation.

Despite the efforts of some larger players to claim otherwise, the North American electricity market remains a set of loosely-linked regional markets. When these regional markets are properly defined, which includes assessing transmission constraints at peak periods and the ownership structure of generation at the margin in key timeslots, few regions of the US and Canada can be shown to have truly competitive markets in generation.[1]

Thus far in the restructuring process, regulators have only been able to encourage divestiture by making it part of a larger deal related to stranded cost recovery. Divestiture has been used primarily as a mechanism for quantifying stranded costs, rather than as a means of reducing market power.[2] In jurisdictions where this carrot and stick approach is not available, any attempt to force divestiture of generation assets would likely result in protracted litigation, postponing indefinitely the benefits of fully competitive generation markets.

[1] London Economics' market power analysis model shows that of the 22 transmission defined regions which make up the continental US power market, only 8 have concentration ratios below the threshold established by the US Department of Justice; this number is further reduced when specific timeslots are analyzed.

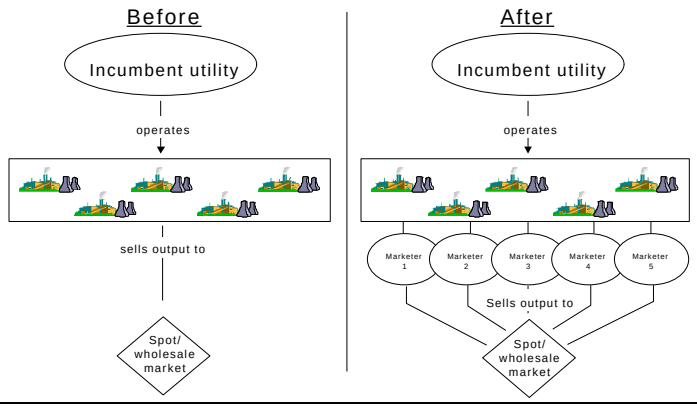
[2] California is one of the few states to have forced divestiture of multiple portfolios from incumbent companies to help address market power concerns.

We suggest that auctioned biddable contracts (ABCs) have the potential to resolve this dilemma. Under our structure, existing generation owners that wish to do so would be allowed to continue operating their plants. However, output from these plants would be divided into a series of contracts and auctioned off, with the contract owners having full bidding and dispatch control. Portfolios of contracts can be created by the regulator in such a way that the contract holders have little or no market power in any particular timeslot; while existing operators could possibly be allowed to bid for the portfolios, ownership of more than one portfolio by any market participant would not be allowed. Figure 1 illustrates this structure. The auction process has the additional benefit of quantifying any stranded cost or benefit; as we discuss in Section V, special payment streams can be set up in conjunction with the ABC auction to deal with any rent transfer necessary to ameliorate stranded costs or to distribute stranded benefits to ratepayers.

ABCs are superior in several respects to most other forms of market power mitigation. The contracts fundamentally change the incentives on various players in the market. In the absence of full divestiture, the two most common forms of generation market power regulation have been imposed contracts for differences (CfDs) and direct price intervention. Jurisdictions in which CfDs have been applied have seen stunted wholesale markets, with distorted prices and contract structures. Players with high levels of contract cover often sell uncontracted energy into the market at marginal cost, substantially reducing the viability of new entrants. Under the ABC structure, all players must recover both fixed and variable costs from the wholesale market.

Use of direct price intervention on the part of regulators instead of CfDs often results in a drift towards price caps based on the regulator's estimate of new entrant pricing, potentially providing incumbent generators with revenues over what they would have received under a more competitive market structure. ABCs are a more effective means of dealing with market power because they disperse market power and enable the market to provide more effective price signals.

Figure 1. Market structure before and after ABCs



2 What would the PPA for an ABC look like?

Purchasers of the ABCs would be required to make an upfront payment for change of dispatch control, and a set of monthly payments related to availability and fuel usage. The availability payments would be designed so that the incumbent generator continued to receive its current regulated return. The formula for calculating availability payments would be agreed upon between the regulator and the incumbent generator before the auction took place, and specified in the bid documents. Potential ABC purchasers would thus be able to factor into their bid the expected availability and fuel payments for each plant in the portfolio for which they were bidding.

The generation owner would be paid fixed availability payments in every hour the unit was available. Payments could be sculpted seasonally and daily to ensure that the generator was under maximum incentive to keep the unit available in peak price periods. The sum of expected availability payments (based on target levels of maintenance requirements and forced outages) would be equal to the generator's expected fixed (embedded) costs on the unit. These would include: fixed O&M costs (staffing, spares, etc.), property and other taxes, depreciation, return on capital (at the book value of the asset), and other fixed costs. Some elements of fixed costs would be adjusted from year to year by pre-determined indices such as the producer or consumer price indices. These should reflect productive efficiency improvements expected over the period.

The responsibility for fuel purchasing can remain with the operator or be assumed by the ABC purchaser. If responsibility for fuel purchasing remained with the operator, ABC owners would compensate the operator on a monthly basis for fuel based on a target heat rate for the plant and a relevant monthly average index price for the fuel in question. Target heat rates could be set to degrade over the life of the plant. Provided the fuel compensation mechanism is designed appropriately, both the operator and the ABC holder should be able to hedge against fuel price risk in the financial markets. Alternatively, the owner of the ABC could be given the option to take over the fuel purchasing responsibility. The ABC owner would supply fuel to the plant based on the target heat rate, and be responsible for all inventory related costs.

Plant operators would have several incentives to operate the plant in an efficient manner. The capacity included in the ABC would be based on the plant's operating history as well as on an understanding of how plants with similar technologies have performed. Should an operator be able to perform in excess of the output specified in the ABC, the operator would be allowed to retain and market the remaining power. Regulators would need to take care when designing the ABC not to reward previous poor performers by setting target output in the ABC too low, and thereby giving the operator a windfall after the contract is in place. In addition, operators could benefit under the fuel contract; if the plant attains a lower heat rate than specified in the ABC fuel compensation/supply clause, the operator would keep the resulting additional profit. Table 1 summarizes the details of the ABC PPAs.

Table 1: Elements of PPAs for Auctioned Biddable Contracts	
availability payments	fixed payment for each hour unit is available; based on expected fixed costs calculated according to formula set by regulators prior to auction
energy payments	variable payment for each MWh produced; calculated using fuel cost, indexed against appropriate fuel and delivery point, times target heat rate
pass-through costs	included in calculation of availability payment; may include property taxes and some environmental costs
maintenance scheduling	number of weeks allowed and amount of notice required specified in ABC; incentives provided to assure that maintenance is scheduled in an economically rational fashion
dynamic constraints	contract specifies parameters such as minimum on / minimum off time, ramp rates, etc. to prevent ABC holder from ordering operator to run plant contrary to its engineering specifications
forced outages	PPA allocates risks of forced outages at periods of high market prices between generators and ABC holder; reflected in asset or ABC valuation
force majeure	clause in ABC defines conditions under which operator would not be required to pay marketer damages in event unit unable to comply with a dispatch order
transmission	ABC owner pays all transmission and grid service charges; operator pays no costs beyond the busbar

3 Acceptance of ABCs among market participants

Given an environment in which incumbent players are reluctant to divest themselves of generation assets, ABCs are attractive to market participants from several perspectives. Many incumbent utilities do not look at their generation assets in the same way that a pure trading company would. They regard ownership and operation of the plants as central to their company's ethos; the engineering skills required to keep plants in good operating order are viewed as the utilities' key core competency. Such utilities are quite capable of dealing with quantity risk; they are willing to guarantee delivery of so many megawatts at such and such a time. Price risk, however, is a completely different matter. Traditional utilities are increasingly recognizing that they lack the trading skills necessary to deal with the potentially large volatility of wholesale power markets; recent volatility in Midwestern US markets has reinforced this view. Thus, while the utilities will adamantly oppose forced divestiture, ABCs play to their perceived strengths: operational excellence is rewarded, and price risk is minimized.

Power marketing firms are the most likely purchasers of ABCs. Other purchasers could include large industrial electricity users or financial institutions, and "cross-marketers" from the telephone, cable, or natural gas industries. Marketers are expected to view ABCs very positively. Power marketing firms today generally find themselves in a short position. In order to increase their volume, and to expand their risk management product offerings, they are

seeking to sell customized long term power supply deals from a diversified book of power purchase obligations. However, in times of market stress, such as when units go down unexpectedly or temperatures spike, liquidity disappears as regulated utilities withdraw from the market. This leaves power marketers in the grip of a short squeeze, causing inter-day prices to skyrocket as power marketers scramble to meet their obligations.

To prevent this, marketers are increasingly seeking to control physical generation assets. However, doing so presents operational and organizational challenges which many power marketers are ill-prepared to assume. Purchasing an ABC allows a marketer to balance its book while avoiding operational risks. Some marketers may view ABCs as an extension of the tolling concept, where marketers supply fuel to generating companies and receive power in return. Marketers will likely view ABCs as a means of reducing their supply risk, giving them a large block of power which they can trade around.

4 Portfolio and auction design

The design of the portfolios to be auctioned off, and the auction process itself, needs to be accomplished with three objectives in mind: first, market power needs to be minimized across all timeslots; second, portfolios should not violate basic engineering principles; and third, transaction costs should be minimized. While it is possible to auction contracts on each individual plant, detailed rules on the amount of capacity any one company could control at each point in the merit order would be required. Instead, it may be more practical for the regulatory authority to create portfolios of ABCs which are designed to maximize the potential for competition. Competition regulators generally view a market with five equal competitors as being reasonably competitive; this would indicate that, to the extent that plant groupings allow, each of the five portfolios should contain approximately equal amounts of capacity in base, shoulder, and peak periods.

In order to assure that there is no conflict between the dispatch requirements of the ABC owners and the operational characteristics of the underlying plants, portfolios should not contain fractional units or split hydro stations which are on the same river system. However, different units at the same site can be placed into separate portfolios. The term of the ABC can reflect the underlying life of the plant, or can be set to run for a shorter period. Regulators will need to judge whether there is any gain in economic efficiency from rebidding the contracts after a five or ten year period, or from simply allowing them to fall away if sufficient new capacity has been built to induce competition into the market. In our view five years is the minimum term for the contracts; the gains from having the ABCs in place would be mitigated by the cost of setting up the transition to the new system for such a relatively short time period.

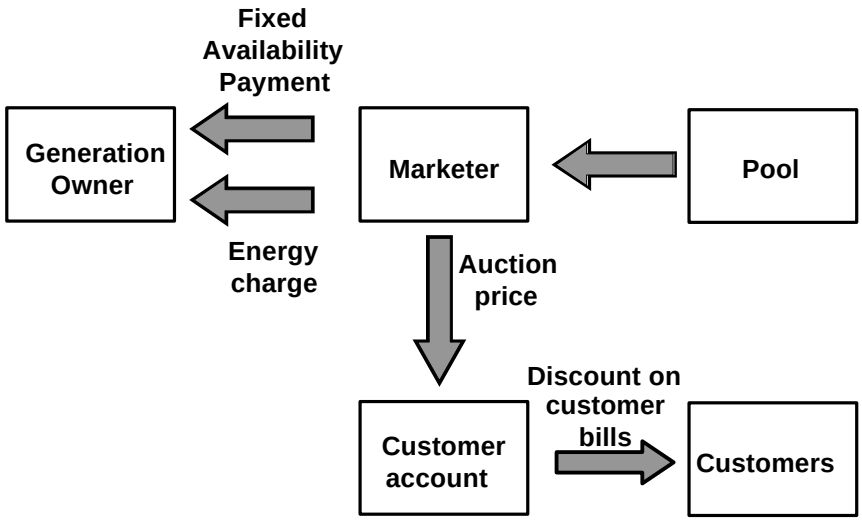
Some ongoing regulatory oversight will be required after the auction has taken place. Explicit authority will need to be given to either the competition authority or the sector regulator to prosecute collusion among ABC holders should it take place. The regulator may also wish to codify a process whereby portfolio owners would be allowed to swap ABCs amongst themselves provided that the parties to the swap could prove that the transaction would not negatively impact competition. In addition a dispute mechanism will need to be set up to handle disagreements between marketers and operators. Procedures will need to be in place to

deal with the potential bankruptcy of an ABC owner, as well as for attempts by marketers to abrogate contracts should they become wildly out of the money.

5 Compatibility with stranded cost/benefit recovery efforts

ABCs are helpful in designing efficient rent transfer mechanisms related to stranded benefits and costs. If the availability payment has been properly designed, the incumbent operator will receive the return that was originally expected under ratebase. As such, the additional upfront payment made by the ABC purchaser would be placed in a customer account, to be returned over time on customer bills. Figure 2 shows how the payment streams would work.

Figure 2. ABC payment streams in the case of stranded benefits



Where there are stranded costs, the problem becomes slightly more complex. If marketers perceive the present value of the availability payments and fuel pass-through as negative compared to their perception of the forward curve for power and their expected additional trading benefits, they may not participate in the auction.

We propose three initial mechanisms for consideration in dealing with this problem:

- **bundling contracts** from plants with potentially stranded costs with contracts from plants where embedded costs are much less than expected market prices. The net value of the contract portfolio bundle is therefore positive and the auction could proceed as described above. Careful design of contract portfolios would be required so as not to give the bundle purchaser market power, as previously noted;

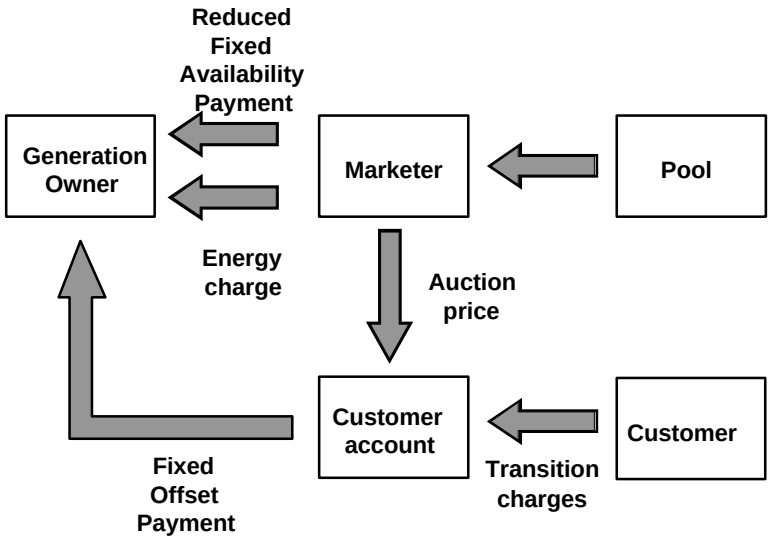
- **reducing the availability payment** by setting a fixed payment stream to the generator funded by a transition charge on customer bills. Once the fixed availability payment from the marketer has been sufficiently reduced, the contract will have a positive value at

auction. Note that the efficient transfer of rents in the scheme is not dependent on setting the customer-generator offset payment accurately. If the payment stream is too high the additional value captured in the contract auction is returned to customers by reducing the transition charge; or

- **a "negative value" auction**, where the winner is the marketer which requires the minimum fixed payment via the transition charge to take over the obligation to make fixed availability payments to the asset owner. Auctions of "negative value" obligations are common in some fields such as telecommunications. Universal service obligations for rural customers are one example.

Of these three choices, some combination of the first and the third is most effective means of reducing transaction costs and inducing transparency. Portfolios should be designed primarily to minimize market power in all timeslots, with bidders given the freedom to make either a positive or negative bid depending on their perception of the portfolio's value. Figure 3 shows how payments streams would work in conjunction with recovery of stranded costs.

Figure 3. ABC payment streams in the case of stranded costs



There has been some debate regarding which party should benefit from residual value in the site once the term of the ABC is completed. Clearly, if the availability payment had been set in such a way that the operator has received the return they expected when the plant was in ratebase, any residual value should be returned to the ratepayer. However, in order to maximize that residual value, it may be necessary to allow the operator to retain a portion of it so that they have an incentive to keep the facility in good working order and engage in life extension projects.

The residual value embodied in the site could be auctioned off as the ABC nears its end, or a long term option on the residual value could be sold at the same time as the ABC. While

market conditions would allow for a more accurate valuation of the residual value toward the end of the term of the ABC, issues of generational equity have been raised with this approach. While the proceeds from selling long-term options on future site value would likely be less than even the present value of selling the site value at the end of the contract, this method has the appeal of completing the transition from ratebase to marketplace in a timely fashion.

6 ABCs in legislation: the Alberta experience

In late 1997, the provincial government of Alberta commissioned London Economics to examine alternatives to the legislated contracts which would minimize the potential for strategic bidding. As a result of the study[3], the Alberta legislature in early 1998 passed legislation to implement ABCs there. The Electric Utilities Amendment Act of 1998 would empower an Independent Assessment Team to establish PPAs for all generation stations in the province built before 1995. The PPAs will commence January 1, 2001 and continue for the life of the plant or until year-end 2020, whichever comes first. Once the PPAs have been approved by the Alberta Energy and Utilities Board, they will be auctioned off. The auction is scheduled to take place by 2000.

Currently, the prices in the Power Pool of Alberta show the perverse effect of attempting to use large amounts of contract cover to mitigate market power. The Pool has been in operation for over two years. In that time, prices in the Pool have generally been regarded as low relative to estimated average costs of generators. In 1997, which has seen the highest prices to date, the average price was around C$21/MWh, well below the level required to support new entry. This is inconsistent with the fundamental supply and demand balance of the Alberta market, which has had very tight capacity margins and steady load growth. No significant new generation has been built in over five years.

We hypothesize one cause of the historically low pool prices is the current high levels of legislated contract cover. Under these contracts, over 90% of output is sold at a pre-determined price. The pool price therefore effectively applies to less than 10% of energy. Generator revenues are largely set by the high level of contract cover, which provides recovery of fixed costs and returns to capital. This leaves generators with incentives to bid close to their short-run marginal cost, even in peak periods. The resulting prices have made financing new plants in Alberta virtually impossible in the past.

Instituting ABCs in Alberta should provide more efficient price signals from the wholesale market. Because the marketers purchasing the ABCs would be effectively unhedged against the Pool (except for their own commercial hedging arrangements), they will need to recover all of their fixed and variable costs from the wholesale market. This should minimize the potential for distortion of prices which occurs when generators are heavily contracted. By inducing more competition into the Pool, and by realigning generator incentive structures, ABCs will help assure that Pool prices provide the appropriate signals for new entry while transferring the benefits of existing low-cost generation to Alberta consumers.

[3] "Options for Market Power Mitigation in the Alberta Power Pool." Final report prepared for the Alberta Department of Energy by London Economics, January 1998. The report is available to download from the Alberta Department of Energy website, www.energy.gov.ab.ca.

7 A pragmatic solution to a pervasive problem

ABCs represent a pragmatic approach to inducing competition in generation in the face of political opposition to forced divestiture. They enable the development of more vibrant wholesale power markets, induce transparency into the regulation of generator market power, and enable existing players to better adjust to dramatically different roles in evolving power markets. The concept is potentially applicable worldwide. Although it appears that the first application of the concept will be in a system where generators are primarily privately-owned, ABCs may be particularly attractive in jurisdictions where it remains unfeasible to sell off state-owned power companies directly. Countries which face constitutional constraints on privatization would be prime candidates for ABCs.

In the US, ABCs may present an additional option for state and federal regulators when evaluating proposed mergers. While US regional markets sometimes do not correspond to political demarcations, regulators may be able to use the process of ISO formation and merger approvals to influence multi-jurisdictional markets. This process may allow regulators to combat generation market power within ISOs by designing and auctioning a reasonably competitive set of ABC portfolios. With sufficient creativity on the part of financial markets, utilities and regulators, auctioned biddable contracts could play a role in ensuring competitive regional power markets while avoiding the delays inherent in litigating forced divestiture.