

## **The Benefits of Uniform Clearing-Price Auctions For Pricing Electricity: Why Pay-As-Bid Auctions Do Not Cost Less**

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The recent increase in natural gas and oil prices and the resultant increase in electricity prices have caused some observers to examine the use of the uniform clearing-price (UCP) auction in electricity markets. Some question whether the UCP is an uncommon market structure, whether simply paying generators what they bid would be less expensive, and whether the UCP auction stifles competition. The answer to each of these questions is clearly “no.” To the contrary, the UCP auction has a number of features that ensure an efficient and cost-effective wholesale electricity market for New England consumers.

### **Background on the wholesale electricity market’s UCP auction**

ISO New England administers the wholesale electricity markets based on a UCP auction, as do all wholesale electricity markets in the United States. The ISO dispatches generators in the region starting from the lowest-priced bids (this includes generators that bid \$0, such as hydro units and nuclear units) and progressing to higher-priced bids (i.e., gas-fired generating units), until New England has enough generation to meet consumers’ demand for electricity. Under a UCP auction, each generator receives the same (uniform) price based on the price of the last unit needed to meet the overall demand for electricity, regardless of each generator’s bid. The bid price of the last generator used to satisfy the total demand for electricity therefore determines the wholesale price of electricity.

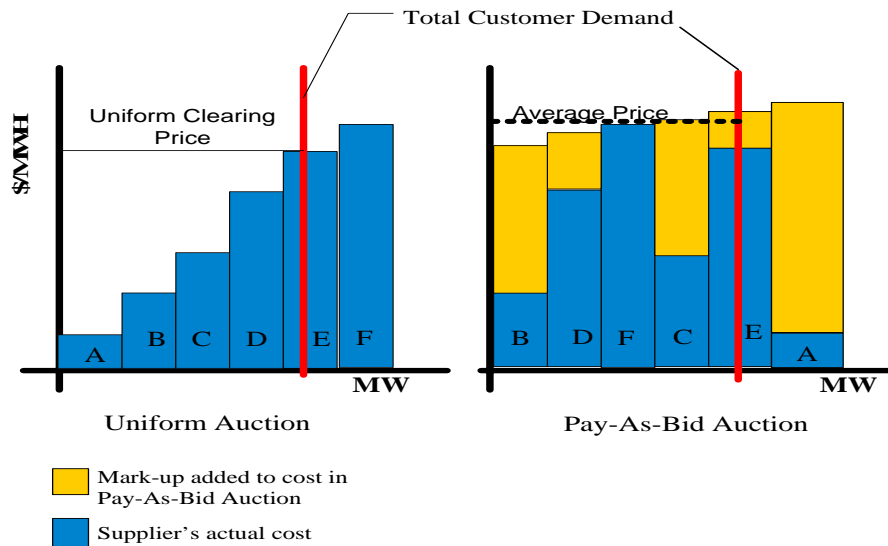
### **A UCP auction is a well-tested and common market structure**

Most commodity markets operate with a UCP structure. Corn, soybeans, oil, iron ore, silver, and gold are all traded with a UCP because, like electricity, one unit of a product is like another, regardless of how it is produced. Corn trades for so many dollars a bushel regardless of what it cost any one farmer to produce that bushel because, to the market, a bushel is a bushel. Some farmers have lower costs, some have higher costs, but each faces the same market price. The UCP in the electricity market is no different.

### **Paying generators what they bid would not cost less than paying a uniform price**

The simple reason why prices would not go down if generators were paid what they bid is that they would bid in a completely different way in a pay-as-bid environment versus a UCP auction. Specifically, in a pay-as-bid auction, generators would submit bids that reflected their best guess at what the price will be for the most expensive needed resource, instead of bidding their actual costs as they do in a UCP auction. Thus, all of the bids in a pay-as-bid model would reach approximately the same level, and the cost of this auction would be essentially the same as the clearing price in a UCP auction (*see* Figure 1). The Blue Ribbon Panel of economists convened to review the California

electricity market discussed this market outcome in detail.<sup>1</sup> With expected costs equal between the two auctions, a UCP auction is preferred because the single clearing price provides transparency, and a UCP auction ensures the selection of the least expensive, most efficient resources are selected, as shown in Figure 1.



**Figure 1:** Pay-as-bid auctions incent bidders to mark up their prices to receive the highest market price. Pay-as-bid auctions do not save money, as overall costs are roughly equal to those in a uniform-price auction.

## The UCP auction works to ensure the lowest cost to consumers

The UCP auction provides an opportunity for existing generators to recover capital costs and creates strong incentives for new investment by new, low-cost resources, such as hydro, wind, and nuclear. These features are explained below.

### Uniform clearing-price auctions encourage companies to build new, inexpensive resources

A UCP auction provides a signal to invest in resources that can produce energy for less than the “price-setting” resources. Today, gas and oil are currently the highest cost fuels; therefore, generating units using those fuels are the price-setting units most of the time. As a result, the market is sending a signal to invest in other types of resources that have lower fuel costs. The market is already reacting to higher oil and gas prices by proposing to build additional wind and other alternative fuel resources, as well as new, cleaner-burning coal facilities. These are exactly the types of responses New England needs to diversify its fuel mix and decrease its dependence on natural gas.

<sup>1</sup> Alfred E. Kahn, et al., 2001. “Pricing in the California Power Exchange Electricity Market: Should California Switch from Uniform Pricing to Pay-as-Bid Pricing?” California Power Exchange. <http://www.cramton.umd.edu/papers2000-2004/kahn-cramton-porter-tabors-blue-ribbon-panel-report-to-calpx.pdf>

**Inexpensive new resources lower prices for all consumers**

UCP auctions provide a structure for all consumers to benefit from the entry of low-cost resources. Less expensive units lower prices for consumers by displacing more expensive, price-setting units. Thus, prices are reduced the most when a greater number of inexpensive resources are added.

**Uniform clearing-price auctions encourage efficient and reliable unit operation**

Because the recovery of capital costs is largely dependent on energy market revenues, the UCP auction provides strong incentives to reduce the costs of unit operations and to operate units when needed. The historic performance of New England generators makes the results of these competitive market incentives apparent, as generators have become significantly more available to produce electricity. The average rate of availability increased from less than 80 percent before markets to approximately 87 percent since markets were introduced. Increased generator availability lowers consumer costs by reducing the need for additional infrastructure.

**Uniform clearing-price auctions support—but do not guarantee—capital cost recovery**

Generators in New England were built or bought with the understanding that a substantial portion of capital costs for non-peaking units would be recovered by operating the units for less than the prevailing electricity price (i.e., the bid price of the last dispatched unit). When many of the gas-fired plants were developed, natural gas was very inexpensive, and it was believed they would have low operating costs in the future. The expectation that oil and older gas units would set clearing prices above the operating costs of nuclear units led to the relatively high sale prices of the existing nuclear and coal units, which benefited consumers by reducing the stranded costs faced by utilities from their old and outdated resources.

Resources can recover their capital and construction costs by keeping their operating costs below the clearing price. This is how nuclear units are recovering their high capital costs—in this case, the cost of purchasing the units from the utilities. The transparent pricing structure of the UCP also allows nuclear units and others to enter into long-term contracts outside the spot market. Absent a UCP and a well-designed wholesale market, some other device would need to be devised to allow each unit to recover its capital costs. Such an alternative would likely look much like the out-of-market reliability contracts paid for by consumers in high-demand areas, which provide for full capital-cost recovery with little risk to the unit owner and with no incentive to add cost-effective measures or new resources.