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The Energy Information Administration (EIA) through the Coal, Nuclear, Electric, and Alternate Fuels Office (CNEAF) has been asked to review an "Application for Contract Designation: TVA Hub Electricity Futures and Options on Futures Contracts - Fast Track" by the Commodity Futures Trading Commission (CFTC). This proposal was submitted to the CFTC by The Chicago Board of Trade (CBOT). The following review is divided into three parts. First, we will consider TVA's unique position as a power provider and how this proposed financial instrument may be regarded by both TVA and its competitors. Second, we will describe how futures' and options' derivative instruments are unique for electric power, and, in particular, for TVA. Third, we will analyze the proposed contract as a stand-alone electricity futures and options contract, and how it might affect TVA and its competitors. General questions about this review may be addressed to Robert Schnapp, Director, Electric Power Division (202-426-1211; Internet: RSCHNAPP@EIA.DOE.GOV). Specific questions regarding the content of this review may be addressed to Dr. Robert Manicke (202-426-1088; Internet RMANICKE@EIA.DOE.GOV).

TVA - Past and Present

Right now, TVA is a Federal Electric Utility and as such it is not governed by the rules and regulations promulgated by the Federal Energy Regulatory Commission (FERC). TVA is required by Federal law to set rates only to recover costs and to provide services that are charged to customers in a "fair manner". TVA has an established legal service boundary, called the "fence". It is prohibited from "crossing" the fence to serve customers of other utilities. What is referred to as the "anti-cherry picking provision" also prevents other utilities from "crossing" the fence to serve TVA's customers.

The Department of Energy (DOE) has recently completed a comprehensive process to develop recommendations on how the TVA should be treated under the Administration's legislative proposals to bring competition to the electric utility industry. Within this process, DOE established the Tennessee Valley Electric System Advisory Committee (Adcom). This committee is comprised of representatives of major stakeholder groups that could be affected by changes to TVA. Many of the positions recommended by this committee could directly affect the establishment of the CBOT's proposed futures' and options' contract with TVA.

The Adcom has made specific recommendations (nonbinding) on many areas of TVA's activities that are directly related to the potential usage of TVA's nodal interconnections for any futures' and options' contract. The most salient of these relevant to any TVA futures' and options' contract concerns transmission and wholesale rate jurisdiction. TVA, its distributor and industrial customers, and all other members of the Adcom believe TVA and all other transmission owners/operators should be uniformly subject to FERC transmission regulations. Moreover, TVA and its industrial customers believe the TVA Board should retain the authority to establish electricity rates in the new competitive environments. It should be noted that some competing





Department of Energy

Washington, DC 20585

utilities, and power marketers from outside the Valley want FERC to have jurisdiction over future TVA rates as soon as restructuring legislation is passed.

Another important consideration related to any futures' and options' contract on TVA's interconnections is the limitation related to the "fence and anti-cherry picking provision" which TVA now operates under. To this end, TVA, its distributor and industrial customers and all Adcom members recommend that the fence and anti-cherry picking provisions should be removed *at the same time* that retail competition is implemented. Many power marketers from outside the Valley believe that if retail competition is delayed, the fence and anti-cherry picking provision should be removed anyway. This could lead to untenable financial difficulties for TVA. The reasoning for this is as follows:

- ▶ Approximately 85% of TVA's electricity sales are to wholesale customers; while 15% are retail customers. Neighboring utilities serve predominately retail customers with very few wholesale customers.
- ▶ If the anti-cherry picking provision is removed, competitors will be able to compete for the majority of TVA's wholesale customer base.
- ▶ If the fence is removed, but retail competition is not allowed, TVA would not be able to compete for retail customers at the same time it is losing wholesale customers
- ▶ *Thus*, under this scenario TVA would be singled out and effectively prohibited from competing in the newly competitive power industry.

Efficient Competitive Power markets

Right now, we are witnessing a period in which competitive ideas are sweeping across the electric power industry within the States. A key issue as more of the United States power markets become subject to competition is the design of an efficient and robust market structure, a task which is complicated by some unique technological characteristics associated with electric power transmission through a grid. An electric power grid differs from other types of networks in that power flows observe physical laws called Kirchhoff's laws. This gives rise to the loop law phenomenon, creating widespread externalities¹ in the markets for electric power. The complexity of these externalities grows very fast with the size of the system. It is widely understood that these externalities, if not mitigated, will cause inefficient resource allocation. Presently, wholesale marketers of power limit their exposures to these externalities by buying and

¹ These externalities are due to the differences between the contract path, as specified by the sending and receiving nodes, and the loop flows that are determined by physical laws. Although, the contract is a useful and necessary financial tool for electrical futures and options, it is never the same as the loop flow. Thus, the true flow will always affect some other contract paths.





Department of Energy

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selling bilateral or forward contracts on future generation and contract paths.

The transmission network plays a strategically important role in all modern electric power systems. By providing the critical connection between local markets, it broadens the scope of all electricity markets. Moreover, it offers substantial potential benefits by fostering economies of scale in generation plants and their related system reliability and security; economies from pooling diverse demands and supplies, and economies from maintenance coordination. However, in the presence of these grid externalities, it is unlikely that the users of the transmission network will take into consideration the effects of power flows that diverge from the contract path. In other words, they do not confront the true costs of congestion and resistive losses that are imposed on others. As a consequence, market inefficiencies ensue. The social cost of these market inefficiencies will be reflected in higher transaction costs for electricity exchange between local and new more distant markets. The negotiation of power exchange contracts is commonly beset not only by these complicated technical details but also by problems created by incomplete information and informational asymmetry with geographically dispersed traders. A standardized futures and options on futures contract with the Chicago Board of Trade (CBOT) will certainly facilitate trading for wholesalers and in the future - retailers, and increase power market efficiency by expediting access to more trading information through the usage of a fungible contract on power through the TVA interconnections.

TVA's Major Nodes for Futures' Contracts on Spot Prices

With this very realistic and flexible CBOT Electricity Futures and Options Contract at TVA's highly strategic interconnections, traders can use utilize all hedging positions used for any other physical commodity. With this CBOT instrument a power trader (wholesale or retail) can establish all the standard hedging positions by offsetting the risk of purchases of power to be delivered in the future, at prices determined by the spot market when delivered, with any necessary futures and options on futures contracts.

The location of the TVA nodes and generation entities makes them highly likely to be used during any power exchanges from the central states to the southern states. Thus, futures prices at these nodes will be somewhat representative of future spot prices of (similar) nodes and generation entities north and south of TVA. These prices may under certain conditions be used as forecasts for future spot prices. They will not be the actual spot prices, and the difference could not be determined by a systematic bias. The volatility of the spot prices at any TVA node will be a function of time and location and eliminate any perfect correlation. But there exist many analytic techniques to help provide future spot "price transparency" or price discovery from these strategic TVA nodes. The "Application for Contract Market Designation" from the CBOT does not give any power characteristics of the interconnection nodes for the futures contract other than their "total transfer capability" and their "available transfer capability". The inclusion of the





Department of Energy

Washington, DC 20585

nodal impedance matrix (or an approximate) for all of TVA's generational nodes and interconnections relevant to the proposed futures' and options' contract would be information that could make power trading with the use of this standardized futures contract more efficient.

In summary, *if the fence and anti-cherry picking* provision in which TVA operates under presently is *eliminated at the same time* that retail competition is implemented, this futures' and options' contract would be an effective financial instrument for maintaining efficient competitive power markets within the TVA locality and much of the surrounding area.

Sincerely,

Robert L. Manicke

Robert L. Manicke, Ph.D.

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