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Sverre Hakestad

NordPool

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## **Re: Comments on the report of your visit to Colombia**

Dear Sverre Hakestad:

CREG passed along your email of 21 August 2007 with comments on the Colombia electricity market. First, many thanks for your comments. They are greatly appreciated. I know these comments reflect your initial impressions of the proposed market design, rather than an extensive analysis of the design, but still I think it will be helpful for me to respond to some of your points, as it appears that there is some misunderstanding about how the Colombian market works.

The Colombia market design is built around three complementary markets: (1) the firm energy market to coordinate new investment, price firm energy, hedge load from high prices during periods of scarcity, and reduce supplier risk, (2) the forward energy market to price energy on a medium-term basis and provide price coverage for load and suppliers to hedge spot price volatility, and (3) the spot energy market to efficiently dispatch resources on an hourly basis and price deviations from forward obligations. The market is designed to minimize customer and supplier risk, and to send efficient price signals in the long term, medium term, and short term.

You conclude your email by stating to XM, “a forward market as Cramton suggests would take away all your volumes in the existing DAM. You would be left with a small market with no price signal at all.” While it is true that nearly all the energy volume would be traded on a forward basis, just as it is in the existing market, the claim about the price signal is exactly backwards. The reason is that the firm energy and forward energy contracts are financial contracts (firm energy also has a physical component). The DAM is for real-time dispatch. All of a supplier’s energy is bid into the DAM; the DAM is not simply a balancing market as in some systems like the UK and NordPool. The presence of forward energy contracts, which put the supplier in a balanced position in the spot market, is precisely what gives the supplier the incentive to offer at its true marginal cost. Thus, the forward energy contracts promote efficient dispatch, because each supplier has roughly a balanced position and therefore has little incentive to distort its offer from its true marginal cost. The spot market continues to play the important role of dispatching resources and pricing spot energy, and indeed it works better as a result of the forward energy market, because suppliers have the correct incentive to offer at marginal cost.

An important innovation in the forward energy market is that all nonregulated load (those customers with hourly meters) are hedged only with respect to expected energy demand, rather

than actual, so that the customers see and pay the spot energy price on the margin. This motivates efficient demand response, while still hedging load from spot price volatility for its expected energy purchase.

You state, “Our understanding of Cramton’s forward energy market is that there is a high risk of achieving ‘wrong prices’ in the auction products. Each price will include many risks such as volume risk, price risk, unavailability risk, time risk and more.” Certainly, the forward energy product is not devoid of risk. Any forward energy product has risks. The design question is whether an alternative product definition could reduce risk overall for suppliers and load. I have studied the risk question extensively. See my paper with Steven Stoft and Jeffrey West, “Simulation of the Colombian Firm Energy Market” available at <http://www.cramton.umd.edu/auction-papers.htm>. The analysis suggests that the load-following product minimizes risk overall. Risk is variation in profit for a supplier and variation in payment for load. The firm energy market and the forward energy market greatly reduce risks for suppliers and load. This is a chief advantage of the approach. The full price coverage of these two products means that both suppliers and load are hedged from volatile spot prices. Suppliers do face unavailability risk, but this is precisely what motivates suppliers to efficiently invest in reliability enhancing measures. As you will see in my final paper on the market, I have recommended that a cap on energy volume at about 4% above forecast be applied for the regulated product to further limit volume risk for the supplier. This amount of volume risk is trivial for a supplier in contrast to the very high risks of spot price volatility.

You state, “[The risks] will definitely boost the transaction costs and thus the electricity price.” I see no support for this statement. Rather, I find much to support my contention that risk is minimized and so are transaction costs. Other systems, such as NordPool, may do a reasonable job of minimizing risks and transaction costs, but I am not convinced of the superiority of your approach, especially within the context of Colombia.

You state, “a load following product decreases the system’s efficiency to a large degree. It is never an efficient solution when generators have to follow load of their customers.” Here again is the confusion of physical vs. financial contracts. The load following is a financial obligation not a physical one. Resources will be dispatched efficiently on an hour by hour basis based on the offers in the DAM. The forward energy contract simply puts the generator in roughly a balanced position so that it has an incentive to offer at its true marginal cost.

I agree with you that a volatile spot price serves an important role in promoting efficient dispatch and in motivating demand response. Similarly, the medium-term price signals of the forward energy market serve an important role in motivating medium-term demand response and medium-term supplier decisions. Finally, the firm energy market sends an efficient price signal to the long-term market for investment in new capacity.

I do understand that you are pleased with the performance of the NordPool market. I, however, believe that there are significant differences between Colombia and Norway, that make the NordPool system ill-suited to Colombia. The main differences are: (1) water shortages in Colombia tend to be rarer and more extreme than in Norway, occurring only once in every 10 years or so, (2) Colombia is an economy with relatively large growth in demand (about

6%/year), and (3) the vast majority of electricity customers in Colombia are extremely poor. (1) and (2) combined are the reason why a firm energy market is essential in Colombia to coordinate investment and achieve an efficient mix of hydro and thermal resources, and most importantly sufficient firm energy to withstand a shortage. (3) makes it critical that payments by load be relatively constant across all months, even those months of scarcity. In Norway, it is not a big deal if electricity payments go up by a factor of three. The monthly electricity bill in Norway is a tiny percent of the customer's budget. In Colombia, a three-fold increase in the electricity payment would be impossible for a majority of Colombia's electricity customers.

I hope that my remarks are helpful. I have attached my recent paper that fully specifies the market design.

Again, thank you for your comments, and please let me know if there are other aspects of the design I may help clarify.

Yours truly,

A handwritten signature in black ink that reads "Peter Lamton". The signature is written in a cursive, flowing style.