DISTRIBUTED SCHEDULING OF DEMAND RESOURCES IN A CONGESTED NETWORK

Abstract: This work proposes a distributed method to schedule supply and flexible demand in a congested network, accommodating diverse benefits of end-users. We look at two different time horizons to schedule supply and demand; a day ahead and an hour ahead, which we refer to as day-ahead and real-time clearing. For day-ahead clearing, we decompose the system-level problem and solve it in an iterative way to schedule supply and flexible demand over multiple time steps. However, after the day-ahead quantities are cleared and the actual consumption/production is to occur sooner, we use moving-horizon functional clearing. We show an application of this framework to the IEEE 30-bus test system with a large number of various air conditioning loads. The experiment shows effectiveness of the methods in managing congestion and in coping with unexpected conditions such as a rise in the weather temperature. This work was presented and awarded the best conference paper in the 2014 Power and Energy Society General Meeting.

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