RSCAS Working Papers. Volume:2012/57 Number: Pages: 1-13. December 2012

Impact on reserves and energy delivery of current UC-based market-clearing formulations

G. Morales-España, J. García-González, A. Ramos

Abstract— Reserves are playing each time a more important role due to the massive penetration of renewable energy sources nowadays. Operating reserves must be used for unforeseen events. All predictable events must be directly considered in the scheduling stage otherwise there will be an inefficient and unnecessary use of reserves that increases system operation costs and can even endanger the power system security. This paper presents a qualitative assessment of some widely used implicit assumptions in Unit Commitment (UC)-based Market-Clearing (MC) formulations. We show evidence of the impact on reserves and system security due to considering the use of energy blocks in the MC. In addition to this, we present the consequences on the reserve deployment due to the underlying accepted assumptions in UC-based MC formulations. Finally, we give some recommendations which must be incorporated in UC-based MC formulations in order to schedule and use the operating reserves efficiently.

Index Terms— Market clearing, operating reserves, shut-down ramp, start-up ramp, unit commitment, thermal units.

Citation:
Morales-España, G.; García-González, J.; Ramos, A.; "Impact on reserves and energy delivery of current UC-based market-clearing formulations", RSCAS Working Papers, vol.2012/57, no., pp.1-13. December, 2012.