IMPACT ASSESSMENT OF SHORT-TERM FLUCTUATION OF HIGH PENETRATION PV POWER GENERATION ON POWER SYSTEM FREQUENCY CONTROL

Zhiping Tan\textsuperscript{1}, Muneaki Kurimoto\textsuperscript{1}, Yusuke Manabe\textsuperscript{2}, Toshihisa Funabashi\textsuperscript{2}, Takeyoshi Kato\textsuperscript{2}

\textsuperscript{1}Department of Electrical Engineering, Nagoya University, Japan, \textsuperscript{2}Institute of Materials and Systems for Sustainability, Nagoya University, Japan

With the rapid growth in renewable energy, the uncertainty of wind or photovoltaic energy (PV) has raised many challenges to power company. Among all the issues caused by high penetration of PV, short-term fluctuation has drawn a lot of attention. Moreover, the control scheme of EDC or LFC might have huge impact on frequency deviation, however, such relationship or impact is hard to evaluate. By using a practical EDC- LFC simulation model developed by IEEJ, which is called ‘AGC30 model’, and the demand-supply balance of power system with high penetration PV has been examined in MATLAB/Simulink. The standard data from AGC30 represent the average of Japan, which is used as the input data of simulation. With a day-ahead unit commitment scheduling, the power system satisfies the lowest fuel cost, and under this condition, the constraint of LFC reserve capacity is also satisfied. The result shows how the increase in capacity of pumped storage hydro would mitigate a large short-term fluctuation caused by photovoltaic.