Energy Control and Management for Power Grids with Distributed Battery Storage Systems

Nguyen Dinh Hoa

EAD – I2CNER, and Institute of Mathematics for Industry (IMI)

Abstract: The deep penetration of renewable generation creates significant challenges on the operation and management of electric power grids because power outputs from renewable energy sources are uncertain, intermittent, and fluctuating. One promising solution for deriving continuous and less variant generation from renewable sources is to employ distributed energy storage systems (ESSs) such as small-scale, on-site ESSs or mobile ESSs in electric vehicles. This talk then introduces several distributed optimization and control approaches for the cooperation of such distributed ESSs with renewable generation to guarantee the supply-demand balance and to maximize the benefit of prosumers as well as grid operators.

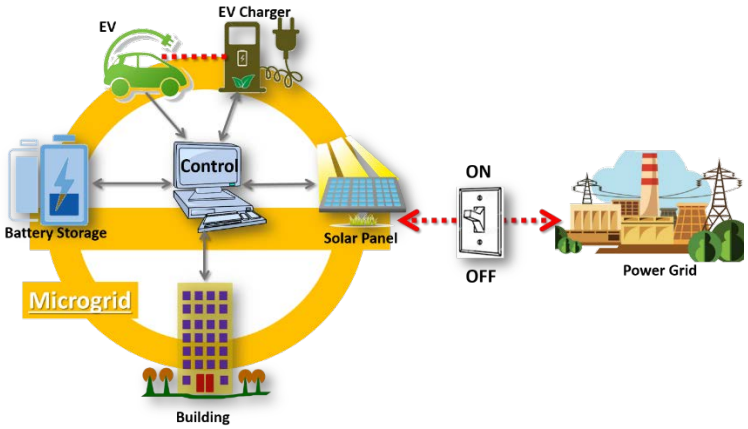

Fig. 1. Illustration of a microgrid with electric vehicles as mobile storages

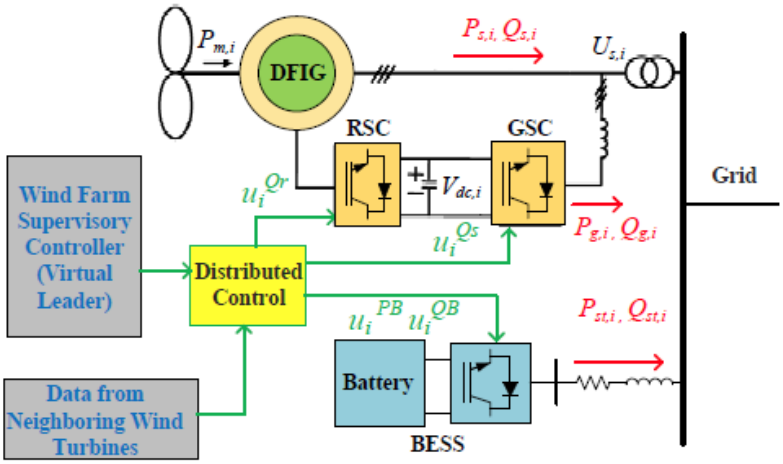

Fig. 2. Illustration of DFIG wind turbines with on-site battery storages in a wind farm