



A PRACTICAL IMPLEMENTATION OF A DISTRIBUTED CONTROL APPROACH FOR MICROGRIDS

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ABSTRACT—Public low voltage feeders containing a mixture of several micro-sources, distributed energy storage units (ESUs) and controllable loads, which appear to the upstream distribution network as controllable entities, are known as MicroGrids. Through intelligent co-ordination of micro-generators and ESUs, coupled with demand side management techniques, MicroGrids have the potential to offer significant improvements in the commercial value and environmental impact of installed micro-generators. Furthermore, using appropriate active control techniques, MicroGrids could potentially overcome the low voltage distribution network constraints associated with high levels of micro-generation. The research described in this paper builds upon previous research carried out at Durham University, which proposed a preliminary distributed control approach for MicroGrids. The first steps in this approach have now been implemented using agent technology on the laboratory based Experimental MicroGrid at Durham University. Results from this practical implementation of first-stage agent-based control are presented and discussed. Finally, the agent-based controllers are evaluated based on their suitability to satisfy the specific control requirements of MicroGrids.