

Livestock Systems Department

Title

Precision energy management for dairy farming systems

Abstract

Reducing electricity costs and environmental impacts through the integration of renewable energy technologies (wind, solar photovoltaic (PV), solar thermal and biogas) in Irish milk production will become an important topic in the future for two reasons. First, the introduction of a dynamic electricity pricing system, with peak and off-peak prices, will be a reality for 80% of electricity consumers by 2020. If farmers carry out their evening milking during the peak period, energy costs may increase, which would impact farm profitability. Second, if Ireland is to meet its targets of reaching a 40% renewable contribution to electricity (currently at 16.7%), small scale generation will require significant development. However to date no independent appraisals have been carried out to validate the performance of renewable technologies in the Irish dairy farming environment. This project will use dairy farm energy consumption trends from previous projects (RMIS 5899 & 6012) together with renewable technology performance data from our project collaborators, Cork Institute of Technology (CIT) and Wageningen University (WU), (CIT have two wind turbines with advanced data logging abilities, a solar photovoltaic installation and a solar thermal test rig, Wageningen University have access to biogas plant performance data) to carry out the following; 1) Feasibility studies on the suitability of the specified renewable energy technologies for Irish dairy farms from technical and economic view points. 2) Sensitivity analysis of electricity price on the return on investment for the renewable energy technologies 3) Development of a model to examine the effect of implementing demand side management (energy storage and load shifting) on dairy farm energy costs in a smart metering electricity pricing environment. 4) Development of a decision support tool to provide advice to industry on the planning and implementation of small scale renewable energy projects at farm level.

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