Fact sheet
Energy 08
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08

ON-SITE ELECTRICITY GENERATION

Incentive payments to export electricity to the grid would give on-site electricity generation a boost in Ireland.

Introduction

On-site generation of renewable energy has become an element of many farming businesses across Europe. To encourage deployment of green technologies, many countries have introduced incentive payments at relatively high rates to encourage early adopters. This makes the prospect of producing electricity to feed directly to the grid an attractive one to those with reasonable resources and access to a grid connection.

In Ireland, the absence of feed-in support tariffs has curtailed any development of on-farm electricity generation. The financial viability for small-scale projects now very often relies upon greater value being obtained for the energy produced than the wholesale rate available for exported energy. Electricity used on-site to offset import from the grid provides greater benefit than the export value. As the cost of battery storage drops, this will increasingly be used to 'time-shift' generation to match demand. However, before investing in this kind of technology what can be done to maximise the offset of imported electricity?

Top tips

- Look at options for reducing on-site electricity demand by reviewing power-hungry activities;
- next look at options to meet demands from on-site generation by rescheduling tasks to match renewable energy generation – in some cases it may be possible to automate this by upgrading controls;
- investment in energy storage technology should be considered following the steps above;
- benefits from battery storage installations should be calculated in cent (c)/kWh over the expected life of the specific batteries proposed; and,
- calculate savings based on energy returned from the storage device, not from the input energy.

Carefully calculate the savings available.

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08: On-site Electricity Generation

Making the most of on-site generation

Moving demand

Some energy demands such as lighting and heating will need to be met, irrespective of available generation. Others however can be scheduled to match output from renewable resources.

Feed milling can be carried out when the wind is blowing, as it would have been in the past where windmills were used.

Likewise, pumping slurry to an above ground store can be carried out when renewable energy is available.

Forward planning is required to make this work and a level of buffer capacity needs to be maintained. Some functions can be automated to favour renewable energy.

A daily water heater for example can be set using a modern controller to wait until on-site generation is available before switching on. Always use a fall back of mains power by a certain time to ensure that hot water is available when required.

Improving efficiency

Improving the efficiency of operations will make what renewable energy is available go further and will also reduce the requirement to import power from the grid. Examples of efficiency improvements include:

- getting the most from a plate cooler in dairy by maximising the water flow through it to reduce the energy required to cool milk within the bulk tank;
- installing a rapid action door on a cold store where frequent movements by fork-lift or trucks are required;
- upgrading old ventilation fans with more-efficient modern versions; and,
- installing variable speed controls on pumps/compressors/fans with long run times where a variable output is required.

Certain tasks can be scheduled for when renewable energy is available.

Energy storage

Energy can be stored in many forms and the most appropriate will depend on the specific end use. Storage technologies all incur efficiency losses so that the energy they return will be less than the input energy. They also come at a cost, therefore, the benefits need to be calculated carefully before any investment is committed.

Heat storage

Heating water with on-site generation and storing it in a well-insulated tank for later use can pay where the offset energy is mains electricity. If water is normally heated using oil or gas then the saving in purchased fuel may be little more than the lost export payment. "Heat batteries" which use phase changing salts provide a more efficient storage medium.

Cold storage

Ice builders can be used to store a cooling effect for use later. A similar effect can be achieved by pulling cold room temperatures down when on-site energy is available to reduce the energy demand at a later time.

Battery storage

Battery costs are falling, meaning that the situations where they can be financially viable is increasing. Batteries have a finite life and therefore the potential savings over their lifetime need to justify the capital cost. Full analysis of the energy demand pattern should be carried out to inform any investment decision.

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Further information

For further information please contact Barry Caslin, Teagasc, Rural Economy Development Programme at:

+353 (0)76-111 1213

barry.caslin@teagasc.ie

The following resources are also helpful:

- www.teagasc.ie
- www.seai.ie
- www.ipcc.ch
- https://tippenergy.ie/
- www.3cea.ie

www.teagasc.ie/ruraldev

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