Application for Environmental Permit EPB3.5 (Version 4)

Buckles Farm, Kaber, Kirkby Stephen. Cumbria

Pre Application Ref.EPR/GP3001LP/A001

BF 1.4 Energy Efficiency.

Messrs Buckle (partnership) presently has a 32,000 bird free range egg unit as part of its business portfolio. The extension of a further 32,000 bird unit which then exceeds the 40,000 bird limit for control under PPC is a move to secure the business by focussing on a less volatile farming sector; ie free range egg production. The farm will have a maximum flock size of 64,000 birds in all.

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| **Feature** | **Energy Efficiency Measures** |
| Building design | Overall ergonomics within unit, including automated water delivery, feed, egg removal, scraping\* below perches, drinkers, feeding troughs and nest boxes.  \*latest spec. includes wider belts to collect greater proportion of droppings. (Big Dutchman)This covers approx. one third of the surface area of the buildings. |
| Low energy lighting | The poultry farm will exclusively use low energy consumption LED lighting in the future. The existing building which is not on LEDs will progressively have lighting changed over the next 3-5 years. There will not be a need to introduce fluorescent tubes or to arrange for their frequent removal to a licenced site. This will reduce risk of their breakage and allow for better light conditions for bird husbandry (Poultry not subjected to ‘flicker’ from fluorescent bulbs) All existing and future lighting on dimmer systems which reduces electricity consumption and provides managed “dawn and dusk” for animal husbandry . |
| Walls and roof. | All Insulated to industry high standard to retain heat generated inside unit. Walls insulated to u value of 0.46W/m2, roof to a value of 0.26W/m2. Solid panels in walls, 150mm glass wool insulation for all roof pitches. Also prevents condensation. |
| Floors | Water table unlikely to ever rise to vicinity of floor but additionally, both existing and proposed buildings will have impermeable membrane (DPM) helping to prevent downward heat movement but more importantly helping to prevent upward ingress of water and subsequent wetting of litter in scratch areas within building.(adjacent to pop holes.) introduced moisture into house would demand additional heat to remove. |
| Efficient air flow exchange | Maintenance programme in place to ensure fans and conduits, (inlet and outlet) are free from dust and rotate with minimum resistance. Thorough cleaning with each turn-round. Air inlets on roof, (but not apex) are passive motor driven.  Ventilation is predominantly achieved through roof inlet air mass, matching that vectored out at the side and gable end. However there are climatic conditions fluctuate and the whole system is capable of adjusting to ensure the internal temperature and humidity both remain between optimal limits.(computer controlled) This is achieved initially by increasing inlet fan capabilities. There are six gable end fans serving house 1b and 10 high velocity roof extraction fans serving house 1a. The proposed houses, 2a and 2b will each have 6 no. fans at the western gable end. These extract air sequentially when this is needed, optimising electricity used. Usually there is a duty fans and maximum exchange of air limited to summer conditions. Frequency and duration will depend on weather patterns and time of year. Fans changed when necessary but routine maintenance has required only 1 change in 8 years.  3No. temperature probes / house ensure computer efficiency in manging temperature and air flow. |
| **Feature** | **Energy Efficiency Measures** |
| Passive air exchange ventilation | Natural ventilation used daily through opening pop-holes which are located on both sides of the building and allow for passive ‘flow-through’ of fresh air. No energy consumed. Pop hole flaps angled to reduce rain ingress onto litter which would then need additional heat to maintain dryness. |
| Design of vents and ports | Roof mounted inlets draw in and air is expelled through gable ends on house 1b and both proposed houses. Free- range access to outside also contributes to air movement arrangements. This configuration helps support good air exchange but retains heat at minimum energy addition. |
| Heat Recovery | Heat recovery units will extract heat from air exhausted from the houses (drawn from apex – 10oC higher) and used to pre-heat fresh incoming air on houses 1a and 1b. This is an energy efficient method of providing additional heat, but does incur additional electricity consumption. |
| Cost of electricity | 3 phase electricity more efficient than single phase. |
| Solar panels | Proposal to install solar panels on roofs of houses 2a and 2b. Orientation ideal as one side of roofs faces south. |
| Off Site nutrient budgeting  (Fuel consumption) | Additional manure produced will replace existing application of NPK inorganic fertilisers to a significant extent on both own farm and neighbouring ones. Present demand significantly outstrips supply so local distribution will incur minimal travel to supply and limit the haulage associated with bagged fertiliser. Production of NPK energy consumption will also be reduced from a more global perspective. This reduces agri- chemical usage, associated energy consumption and also application when *needed*, not applied for *disposal* purposes. *Progressive farm vision to become carbon neutral.* |

During first 24 months running (with permit) data will be collected of monthly overall and specific area electricity consumption. This will be reviewed regularly and then shared with Environment Agency.

Further opportunities will be considered through available guidance documents.

1. Opportunities for saving money by reducing waste on your farm , DEFRA
2. Farm energy Central audits.
3. Various publications :- Farm Energy centre.
4. Carbon Trust