

Mid Wales Regional Committee MWR 02-03 (p 3)

Friday 14 March 2003

Date:

Time: 10.30 am to 13.15 pm

Venue: The Royal Ship Hotel, Eldon Square Dolgellau

LLECHWEDD ENERGY CONSERVATION PROJECT (LLECP)

The Assembly Government has recently set targets to ensure that at least 10% of Wales' energy needs are generated from renewable sources by 2010 and at least 20% by 2020. To achieve these targets will require the doubling of current output from renewable sources over the next seven years and a further doubling to meet the target set for 2020.

J. W. Greaves and Sons Ltd (Greaves) own some 3 square kilometres of upland mountain land associated with its slate mining and quarrying business at Blaenau Ffestiniog Fastening. From within this catchment area they have been generating the majority of their own power requirements from hydro sources for almost a century. Over the last 6 years, they have been considering ways to maximise the renewable energy potential on the property.

It was clear from the keen interest shown by power generation companies that there was an enormous potential for a wind farm development at the Llechwedd site. However, wind energy is often produced at times when the demand for electricity is low. From further discussion a new concept grew - the development of the **Llechwedd Energy Conservation Project**. The concept that evolved proposed the development of a combined wind farm and pumped storage power

station that could utilise off-peak wind power to pump and conserve energy until needed by the consumer - a truly sustainable energy project.

The unique opportunity to develop such a project only exists through the Company's ownership of a large exposed upland area; and the relationship of that land surface with the extensive areas of former underground workings that lie directly beneath it.

Initial Feasibility Study.

To further the project Mott MacDonald, supported by wind specialists CSMA, were commissioned in 2002 to prepare an Initial Feasibility Study to evaluate the potential for the development of the renewable energy sources at Llechwedd.

The study demonstrated the technical feasibility of three options:

- i. A wind farm of around 45MW capacity (based on 26 X 1.75MW turbines), subject to confirmation of the wind resource;
- ii. A variety of pumped storage schemes with a capacity of up to around 400MW, either in conjunction with a wind farm or as "stand alone" developments; and,
- iii. A number of hydro power options.

The study also provided a framework and financial model to evaluate the likely financial viability of the various options. Such models are important in the volatile electricity market place.

Current Work Programme

Wind Farm - as a consequence of the Report, Greaves has submitted a planning application for the erection of two anemometry masts to verify the actual wind resource over a minimum twelve month period. It is hoped to erect the masts within the next two months. The wind farm development would be the first phase of the whole proposed concept.

Pumped Storage - before the optimum size of the pumped storage scheme can be determined, a more detailed evaluation is required. This would include digitizing existing data on mine workings; verifying geological conditions and the integrity of rock strata below the existing workings, and consideration on alternative access routes to an underground power station.

Hydro Power - Greaves is currently evaluating the potential to replace its existing D/C generating sets with modern more efficient A/C generators to produce renewable energy for export.

Consultation and Liaison - this is an on-going programme to inform and invite comment on the project. Already presentations and discussions have taken place with Assembly members, County Council, Town Council, Welsh Development Agency, Countryside Council for Wales and other bodies.

Further Background Information.

1. Whilst the North Eastern area of the moorland proposed for the Wind Farm development is directly above the deeper disused and submerged mine workings of Maenofferen Slate Mine, The Votty & Bowydd Mine workings extend deeper than the Maenofferen workings and are connected hydrologically.
2. The Llechwedd Mine workings attain similar depths but are not at present hydrologically connected.
3. By erecting a new dam, the two existing reservoirs (Llyn Bowydd and Llyn Newydd) could become one with a much larger capacity than the current combined total of both. This would provide the "Upper Reservoir."
4. It is technically feasible for a pumped storage power station to be built below ground and be connected directly by a shaft to the above ground "Upper Reservoir."
5. Desktop calculations conclude the currently disused and flooded mine workings of Maenofferen and Votty & Bowydd can accommodate the water from the "Upper Reservoir" and thus provide the required "Lower Reservoir."

6. Wind Farms only produce electricity when the conditions are favourable and often,

i.e. during periods of low demand, for example at night, produce electricity that is not required. The penalties for failing to generate the contractually agreed energy are severe (due to the current NETA arrangements).

7. Pumped storage power stations can produce electricity as required i.e. at peak demand, but then have to buy energy to pump the water back into the "Upper Reservoir." The alternative for providing peak time power is to generate from gas-fired power stations, a fossil fuel that is a non-renewable source with very limited UK reserves.

8. By combining both wind and pumped storage, the maximum output of both generating sources could be utilised when there is high or peak demand; and wind energy can be utilised to pump the water back during periods of low demand.

9. In reverse, in less favourable wind conditions, the pumped storage could be used to supplement the supply from the wind farm, thereby mitigating the severe penalties imposed for not meeting the contractually agreed output.

Other Considerations:

1. The UK has an obligation to meet 10% of its energy requirements from renewable sources by the year 2010; and further proposals are for this to be increased to 20% by 2020.

2. On the assumption that this "obligation" will be filtered to Local Authority it is understood that the proposed scheme at Llechwedd **could** meet most, if not all, of Gwynedd's requirement.

3. Whilst there is general support for the development of "green" energy, the development of wind farms have, to date, been discouraged in designated National Parks.

4. The proposed site, while bounded in areas by the Snowdonia National Park, is outside of the Park boundary and on land designated for **Industrial Development**. It has no other statutory designations attached to it, e.g. *Site of Special Scientific Interest; Area of Outstanding Natural Beauty, Wildlife Reserve etc.* Neither is the land likely to be used for the further development of the slate quarrying operation.

5. The physical configuration of the saucer shaped site make it better screened than most other wind farm developments. From the limited locations where wind turbines would be visible, it is unlikely they would be sky-lined. They are more likely to have a higher background or be seen against the existing industrial quarrying environment.

Greaves are keen to retain as much of the design and development of the project as possible within the Welsh economy and to this end would wish to introduce a community-based steering group incorporating the University of Wales, Gwynedd County Council, WDA and other relevant Agencies. This would ensure that the highly specialised skills required in developing the design of this unique project will be focussed locally and be available through the construction period to commissioning and operation.

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