WED 3/NOV/04

TO ELLYN HARRIES

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Dear Ellyn Harries,

I have read your letter in the South Wales Evening Post regarding proposed wind Mills on mynydd-y-gwrhyd.

I am not a member of any preservation group but am concerned for the environment in general.

I have been asked by C P R W to make a report on Energy. They may or may not endorse it.

However, you may find it useful, so I enclose one copy for your reference.

Yours sincerely

G Jewett

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## ENERGY – A BRIEF SURVEY – dealing with principles only

Examining the immediate rôle of wind power, it seems necessary to try to foresee the global position regarding electrical power during the next 40 years, based on present and probable consumptions.

1. **Natural gas** will have substantially run out in the North Sea.

2. **Russia** has reserves of gas and is exporting to Europe. Supplies will be severely depleted.

3. **Oil**
   a) Oil will become less available and diminish to uneconomic quantities for mass use.
   b) Few new fields will be found.
   c) Existing oil, gas and coal fired power stations will be obsolescent and will require to be replaced or renewed.
   d) Use for the manufacture of synthetic materials will increase.

4. **Coal** will become unavailable in mass quantities. It is believed that China may have vast reserves of coal however.

5. **Nuclear**
   **Japan** has no oil, gas or coal. Nuclear power will be a major source of electricity

   **France** already generates 74% of its total electricity from nuclear power. **U.K.** currently buys electricity from **France** and could buy more.

6. **Hydro-electric**
   More stations will be installed on major rivers, with an unknown effect on the environment from the building of dams. The practical limit of such sources will have been reached.

7. **Alternative sources** will be developed but with economic and environmental disadvantages.

   a) **Minor sources** such as waves, wind, photovoltaic solar panels are all intermittent. As electricity cannot be stored in practical terms, equivalent continuously running power sources as back up will be required. Tidal flow would provide a foreseen amount, with greater regularity, but still require back up.

The main problems will thus remain.

b) **Biomass** will be developed. Power from the decomposition of organic materials such as sewage, farm waste, vegetable matter, waste products from the manufacture of cheese, soya and the like. All well proven and in use. The sewage treatment plant in Twickenham has run internal combustion engines to generate electricity and drive air compressors, for at least 50 years.

The sources are enormous and will increase with population growth. The methane (a greenhouse gas) produced burns to water and Carbon Dioxide (the major "greenhouse" gas) which can be absorbed in caustic soda to form sodium carbonate (soda ash). A useful industrial chemical. Otherwise it will be a liquid pollutant.

Gas from Biomass will be produced on small and large scale in rural and urban locations, depending on local and national decisions.

**8 Pollution**

a) **Sewage:** The pressure of population will produce massive quantities of sewage amongst other things. See 9.

b) **Oil:** Oil is a major producer of pollution at every stage of use. – burning of "top gas" from oil rigs, transport, power generation, leakage, disposal of waste products. It burns to produce carbon dioxide and sulphur dioxide which in turn produces acid rain. This will destroy forests on a massive scale, as in Norway from British power stations. The transport of oil causes ecological disasters. Wrecking and collision of tankers will occur as in the English Channel, EXXON in Alaska. Milford Haven, Spain, Cornwall etc., etc. Washing out tankers.

c) All fossil fuels such as coal and gas, cause similar damage. An insignificant amelioration will be made

**9. Population**

a) **Numbers:** World population is currently estimated at 6.5 billion, and increasing at a possible rate of 80,000,000 per year, causing accelerated growth. What happens within 40 years is not known. The expectation of developing countries is to have electricity consuming devices, individual means of transport, public transport. Not directly relevant to this report, fresh water will be a precious commodity, being diminished by irrigation schemes, personal habits, reduction of catchment areas and so forth.

b) **Food:** there will be a reduction in the area of food producing land. Also, a loss of forests for the absorption of $CO_2$ from the air – all well known effects. Massive changes in eating habits can be expected.

c) **Air travel** will increase and produce large quantities of aerial pollution.

**10. Effects on Communities**

The preservation of the environment for future generations with a reasonable quality of life, will come second to short term solutions for the production of electricity **UNLESS** a **STRATEGY** and a way of looking at our communities is established.

**11. ACTION**

a) **Long term** planning is required and must be implemented.

b) **Short term** strategies are required by all communities, large and small. Short cuts will be disastrous.

c) **Governing** and decision making bodies, including local government and commercial concerns will have to look beyond immediate election result, short term gains. Joint action will be required including political parties, religious organisations, environmental groups. A legal framework will be needed, with penalties for non-compliance.

d) **Short term** advantages and profits will present problems.

e) **Information** is needed. Education in these matters is required urgently. Schools, media.

These considerations are not academic, merely scientifically interesting or for politicians, economists alone. Decisions made now will affect the quality of life and the environment that we all share, and the economic benefits of controlled tourism to exploit Wales' major environmental assets.

**12. Wales**

a) Wales has few natural resources but is environmentally rich, with a unique heritage to pass on. Wales is not an isolated economic unit, but has local economies, some dependent on tourism, e.g. landscape, seascape.

b) Prime sources of energy coal and wood have virtually disappeared.

c) Wales will have oil and natural gas available in the short term

**13.** **Nuclear power** can produce electricity in the quantity required and without the production of "greenhouse" gases or liquid pollutants. Opposition to it may be expected.

Disposal of wastes – several methods are available; more are required on an international basis. Safe methods of dismantling obsolete stations are established but costly. More will be done at the design and construction stage to assist.

The electricity produced can, by electrolysis of water, produce hydrogen for transport, and oxygen for industry or for revitalising static and dead waters, treatment of sewage etc., etc. or discharged to atmosphere. When burnt hydrogen forms water only.

14. **Alternatives:** Only those which do not require back up from generation of electricity by other means should be considered. This would eliminate intermittent producers such as **wind power, wave power**. Wind power could still be used for pumping water etc., which does not require continuous working.

**Solar energy** should be developed for local use such as small scale local lighting including accumulators, which would be mainly for the generation of direct current. The 'grid' uses alternating current.

Solar panel technology is increasing, and can be used on roofs, again it would be a variable amount requiring back up.

15. **Technical opinions:** some divisions exist but it is necessary to look at the long term factors above about which there will be substantial agreement.

No environmentally damaging or short term solutions should be considered.

16. SUMMARY

The availability of fossil fuels will decrease dramatically and suddenly, price will increase. A crisis is upon us.

1) Fossil fuels are pollutant and environmentally damaging.

2) Alternatives:
   a) Short term – intermittent power providers such as wind, waves require back up from other continuous sources, are basically uneconomic and will reduce the environmental natural richness, and should thus be avoided in principle. Tidal flow power requires separate consideration.

   b) Biomass and nuclear power appear to provide the best short and long term answers as continuous providers of power.

3) Local and national strategies are required and be implemented for the short term and long term, avoiding 2(a) solutions wherever possible.

No attempt has been made to examine political or global effects other than above, or for other natural resources.

In terms of long term solutions, I would put in order of usefulness for electric power generation. 'Marks' out of 6:-

| | |
|---|---|
| Biomass | ***** |
| Nuclear and Production of hydrogen for transport | ***** |
| Tidal | **** |
| Solar | *** |
| Wave | *** |
| Fossil fuel | * |
| Wind | * |

17. A further study may be required to evaluate prime cost; running and maintenance costs, cost of removal, social and environmental effects. A multiple solution is required.

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