DENMARK: JUTLAND STUDY TOUR 2000

Dùthchas
Our Place in the Future

Contents

Introduction

An important aspect of the Dùthchas Project has been networking with other rural communities in Europe. The aim of this is to exchange experiences and learn from each other. This Study Tour was arranged by Oxford Brookes University, and the Dùthchas Project was able to send three representatives on the trip. All costs were paid by the Dùthchas project.

Each of the three Pilot Areas sent one delegate from the Strategy Group dealing with Renewable Energy:

- North Uist – Donnie Johnson
- Trotternish – Ian Willoughby
- North Sutherland – Wilma Robertson

The main purpose of the Study Tour was to learn about the way in which Renewable Energy has been developed and is used in the Jutland Peninsula in Denmark.

It was the responsibility of the delegates to:

- Learn about Renewable Energy development and use in Jutland
- Report their findings
- Relate their findings to their own home area
- Take steps to communicate these findings to other people in the area

The tour gave a very good insight into the various sources of renewable energy being used in Denmark.

These are:

1. Wind Energy - wind turbines
2. Biogas - taken from domestic waste and farm manure used to drive the engines of generators
3. Wood Chip - burned to fuel boilers providing heating to towns and villages
4. Oil from Oil Seed Rape - used to power generators and car engines
5. Photo Voltaics - used to provide electricity to a large school, also to dwelling houses
6. Solar Panels - to heat water for domestic use

The Report which follows is part of the effort to record these findings for the benefit of others. The people of the rural Highlands and Islands are increasingly aware that their home areas are very rich in renewable energy resources. There are both opportunities and barriers to future development of this resource, and this Report documents the examples seen in Jutland.

Glossary of Terms

Contributed by Ian Willoughby

Renewable Energy
Renewable energy is the term used to cover those continuous energy flows that occur naturally and repeatedly in the environment.

Biofuels
Biofuels are any solid liquid or gaseous fuels produced from organic matter, either directly from plants or indirectly from industrial, commercial, domestic or agricultural waste.

Landfill Gas
Methane-rich gas produced by anaerobic digestion of waste in landfill sites and combusted to provide energy.

Energy from Waste
The combustion of domestic, industrial or commercial wastes.

Municipal Solid Waste
Waste products collected from households (which may be used as fuel for power and heat generation).

Industrial and Commercial Waste
Materials collected from industrial and commercial premises (which may be burnt for power and heat generation).

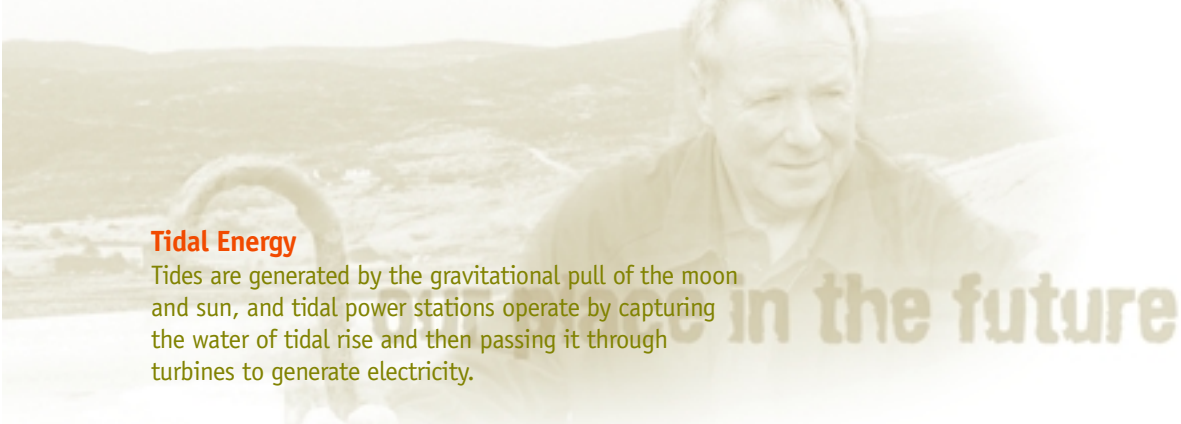
Biomass
Biomass fuels are biofuels produced solely from organic matter and include energy crops and forestry and agricultural residues.

Energy Crops
Plants grown specially for use as fuels: for example, willow coppice or miscanthus.

Forestry and Agricultural Residues
By-products of forestry and agricultural operations burnt for energy, such as straw, chicken litter and felling residues. Also covers wet waste such as manure used in anaerobic digestion.

Energy From Water
Using the movement of water to produce power is one of the oldest energy technologies. Today, power is extracted from water in three main ways: through tidal, wave and hydropower devices.

Hydro Power
In hydropower schemes, the turbines that drive the electricity generators are directly powered by water either from a reservoir or the “run of the river”.



Tidal Energy

Tides are generated by the gravitational pull of the moon and sun, and tidal power stations operate by capturing the water of tidal rise and then passing it through turbines to generate electricity.

Wave Energy

Waves are created by the passage of the winds over the surface of the sea and energy is present in their height and movement. Wave power devices are designed to absorb this energy and convert it into electricity.

Fuel Cells

Fuel cells convert the chemical energy of the reaction between a fuel and an oxidant directly into electricity.

Solar Energy

Solar radiation is the ultimate source of energy for the majority of renewable energy sources. The term “solar energy”, however, is usually taken to refer only to those energy sources that derive directly from the sun’s light and heat.

Passive Solar Design

Employs collectors to capture and store the sun’s heat primarily for space and water heating.

Photovoltaics

Involves the direct conversion of light energy from the sun into electricity by means of specially prepared semi-conductors.

Wind

Power can be extracted from the wind by the use of a wind turbine. As air flows over the turbine blades, it creates a turning force on the rotor assembly which can then be used either to drive pumps, for example, or more conveniently to generate electricity.

Wind farms are currently predominantly located onshore, but can potentially be developed in offshore locations. The technology for offshore deployment is similar to that for onshore.

1. Renewable Energy in the Scottish Highlands & Islands

Resources

It is now recognised that the rural Highlands and islands are extremely resource rich when it comes to renewables. This is a pleasant change for areas so often characterised as 'fragile' and 'difficult'. The wave power potential in the Western Isles, Northern Isles and north coast mainland is second only to Tierra del Fuego, South America . Wind power potential across the Highlands and Islands region is also very high and the high rainfall means that hydro power remains a potential growth area.

Production

Britain has one of the lowest contributions from renewable sources of any country in the European Union – just 2% of supply. In view of current hydro production, Scotland fares better, with 10% of power needs met from renewable sources. The European average is 14%.

In Denmark, the wind power industry alone employs 15,000 people in generation and manufacturing and the sector is growing. In the UK current demand is still being met from coal, oil and nuclear production. Scotland currently leads the world in wave power technologies and has the human skills and natural resources to not only produce power, but also jobs and new industries in a new engineering field. The Highlands and islands should seek to be a major force in that development.

Consumption

Current electric consumption and production is dominated by the large utility companies supplying individual customers. Only in locations where commercial supplies were not provided for commercial and cost reasons, have alternatives developed. In 2000 the Isle of Muck completed a community wind power scheme, backed up by a diesel generator. This now supplies the homes of the 38 full time residents. The Scoraig peninsula in Wester Ross relies on household wind turbines and has developed great expertise in meeting climatic challenges like gusting with appropriate technologies. Scoraig Primary School is supplied by a wind turbine installed by Highland Council. In Alness a community heating system is now being piloted.

In comparison to Denmark, Scotland has a long way to go in discovering the new patterns of production and consumption.

Opportunities

The rich resource base provides a very significant opportunity. Scotland's engineering culture and the human resources created by that provide skills and opportunity. The Highlands and Islands therefore have both the human potential and the necessary natural resources. The new Scottish Land Fund and the Land Reform Bill should also be seen as very significant opportunities. There is more to land ownership than grazings rights, and imagination will be required to create and seize opportunities.

Barriers

The current National Grid is not capable of receiving power produced in the rural Highlands and islands. It was designed to only deliver power. This is a very significant and expensive problem to solve, and it must be dealt with urgently.

Land ownership will have a strong influence on who actually benefits from the growth of this emergent sector. Communities and community groups will need to be inventive and vigilant in recognising and pursuing opportunities. By using the potential of the Scottish Land Fund and the Land Reform Bill, it will be possible to pursue opportunities but the relevant skills and expertise must be developed, bought in and borrowed to meet the pace of change – and to avoid disappointment.

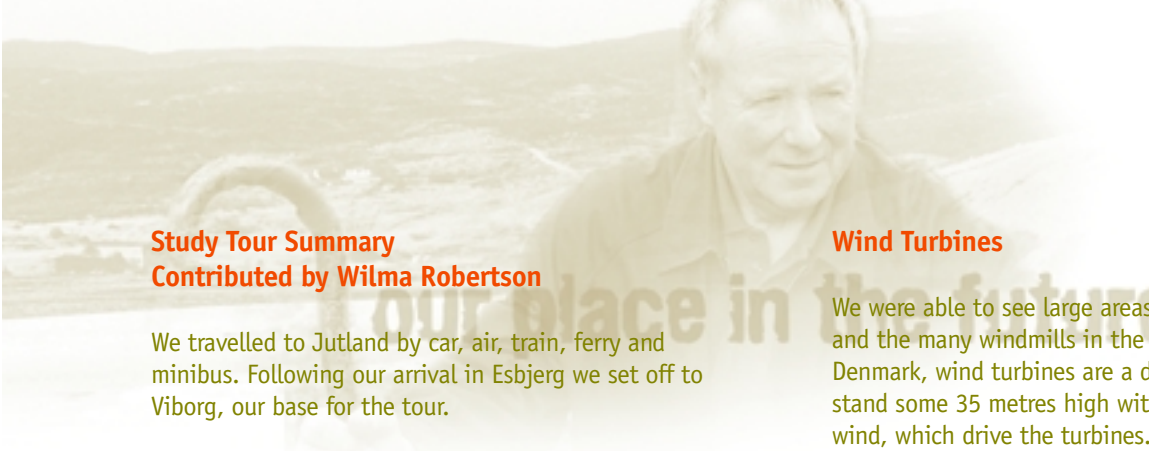
New patterns of power use may emerge in the long term as production methods change. The lessons from Jutland can help to overcome the conceptual and practical barriers that established production and consumption patterns present.

Conclusion

This is an exciting time to contemplate Renewable Energy in the Highlands and Islands. New opportunities are emerging and this region should benefit from these developments. Community groups need to equip themselves to make the most of emerging opportunities and lobby to highlight barriers as they are identified. Lessons from elsewhere will help in this task.

2. Jutland Study Tour Diary

Day	Date	Itinerary
Day 1:	Sunday 28th May	Getting There
Day 2	Monday 29th May	Briefing & Introduction Lunch on Boat 1400 Arrive Esbjeg - Visit Ribe Cathedral & Old Town 1520 Dept Ribe 1745 arr Viborg - Gymnastik og Idrishjskolen – Folk High School Dinner: Briefing on Week's Programme The School & It's Heating System The Folk High School Movement (Ole Elmose) Overnight at Folk High School
Day 3	Tuesday 30th May	0930 Viborg - County Regional Planning (Bay Chrisensen) 1130 Viborg – Viborg Energy & Environment Centre Briefing on local activities (Ole Christensen) Sandwich Lunch Briefing on SEK (Karsten Pliedrup) 1300 Skive: Solar Heating in large Schools (M Pteresen) 1500 Kjellerup: Woodchip District Heating Project (F Lauritzen) 1600 Tandskov: Landfill gas: High technology production (A Jorgenson) 1730 Aarhus: Visit Aarhus & Dinner Overnight in Viborg
Day 4	Wednesday 31st May	9.00 Viborg: Vestas Wind Energy: Assembly of Turbines (K South) 1030 Hodsager: Biogas & Woodchip Heating of Entire Village 1200 Hurup Lunch & Visit: Guide Jane Kruse Folkcentre for Renewable Energy 1800 Viborg – Overnight & Dinner
Day 5	Thursday 1st June	0930 Knubdy: Photovoltaics: 39 Homes (Gertryud Tessing) 1050 Lasstrup: Large Pig Farm – Riisgaard Biogas 1145 Spiseriet : Lunch & Briefing (Johs Molleskov) 1400 Silkeborg: Museum, Asger Jorn, Modern Art 1530 Lakes Tour 1800 Viborg – Dinner & Overnight
Day 6	Friday 2nd June	1000 Sinding: Biogas (Stirling Motor) 1330 Kolding: Large Apartment Block: Photovoltaics Town Planning Issues (Georg Unna) 1630 Esbjerg Overnight Boat
Day 7	Saturday 3rd June	Getting Home



Study Tour Summary
Contributed by Wilma Robertson

We travelled to Jutland by car, air, train, ferry and minibus. Following our arrival in Esbjerg we set off to Viborg, our base for the tour.

While there, we stayed at the Folk High School, which are unique to Denmark, and are designed to encourage community co-operation. One of our guides gave us a briefing on the week's tour , and showed us the schools heating system which he had designed.

The next day, we visited the Viborg county planning office where two officials explained the planning system both at regional and central levels. We then moved to the Viborg Energy and Environment Centre where people can come and get advice regarding renewable energies (traditional energies also have advisors in the centre).

Solar Heating

We visited Gymnastik og Idrishjskolen secondary school where they had installed solar panels on a small section of its roof. These provide all the school's heating and hot water from April to October. This system had paid for its capital cost within 10 years. Later in the week we visited Skive where we had a presentation on solar heating in large schools.

District Heating Systems

In Kjellerup we were introduced to the use of woodchips as a means of providing a community heating system. The system is fully automated and requires only 1/2 hour maintenance each day. It supplies hot water and heating to 150 houses. We saw this system in action again when we visited Hodsager, where woodchips with the addition of bio-gas provide heating and hot water to the local community. These heating schemes are very efficient and cost effective, but are quite expensive to set up.

Biogas

Biogas plants play an important part in Denmark's renewable energy programme. Animal manure and waste from food industries produce methane gas that is then burnt to produce electricity. When this process is over, the remaining treated slurry is returned to the land as an agricultural fertiliser. Everything made during the process is reusable - the system is in fact almost perfect as there is no waste and no disposal problems.

Wind Turbines

We were able to see large areas of the Danish countryside and the many windmills in the landscape. Throughout Denmark, wind turbines are a dominant feature. They stand some 35 metres high with propellers rotated by the wind, which drive the turbines. We visited the Vestas factory in Viborg where our guide gave us a tour of the wind turbine assembly line. We were amazed at the size of these turbines once they were encased in their containers - like touring caravans!

Wind turbines produce 10% of the total electricity used in Denmark. Despite a preconceived notion that they would be noisy and would spoil the look of the countryside, they were actually relatively quiet and seemed to have their 'place' on the landscape. However, many new developments are to be built offshore to try to get more benefit from them without overloading the land.

Photovoltaic Cells

We visited a large apartment block in Kolding, which was powered by cells mounted on the roof. A cold bright day produced the most electricity, and sunlight was not a necessity, which means it could be a viable option for here! This was a project that I found very interesting to see in action.

In Knudby we visited a house partly powered by photovoltaic roof panelling. Also 10 of the villagers had purchased a wind turbine which had paid for itself within 7 years and was now making money for its enterprising owners.

Other Schemes

Other schemes visited were a pig farm which uses the manure to convert into methane gas and then electricity - there are approximately 23 million pigs in Denmark!! We visited a renewable energy Folkcentre in Hurup. We saw many ideas - an underground house, a straw house, hydrogen powered cars, and our guide's personal car which runs on rape seed oil.

Our final visit was to Sinding where we were shown a biogas system starting?? with manure from local farms which was converted into electricity (via methane gas). The electricity powered a large section of the town and the resulting treated slurry was then re-applied as fertiliser to the land.

Conclusion

Despite all the visits and the shortness of our trip we still had time to dine out in a Danish brewery and visit a couple of local, traditional pubs, and to visit a museum of Modern Art. The visit was enjoyed by everyone and certainly opened our eyes to how many ways there are to create power on a large scale other than the ways that we use in this country. I was amazed at how many ingenious ways there are to cut down on the use of fossil fuels. These projects are definitely the way forward and hopefully we will be able to employ some of these schemes in our area in the future now that we have some idea how to go about it.

Key Facts from Study Tour
Contributed by Ian Willoughby

Day 2 - Monday, 29th May

Viborg - Folk High Schools & Lifelong Education

Lifelong learning is seamless and integrated with community action. Thus a capability is built, through membership of associations for Community Enterprise. For example, most of the local energy projects (such as the prevailing small groups of wind turbines) are community initiated, promoted, supported and used.

The certainty of obtaining planning permission is thus secured.

Viborg Folk High School has a special heating system. The school buys natural gas, burns it to produce heat for the entire school and at the same time generates enough electricity to power the entire school. Additionally, there is a surplus equal to 22% of the output which the school sells to the National Grid. Only in that latter part is the school taxed.

The Folk High School founded in 1950, with 150 students, is what we would call a college for 20-25 year old? students, voluntary and fee paying. It is mainly concerned with IDRAD (folk gymnastics) i.e. citizenship and ball playing. Played?? by themselves and towards voting as knowledgeable citizens.

Twenty years ago the students doubted the use of Nuclear Power as alternative energy, so they plumbed for Wind Power. The original one has been running for 20 years.

Key Facts

- Natural gas for heating is taxed.
- Natural gas for making electricity is not taxed.

They are taxed for using electricity but not if you make it yourself. By 2030 35% of electricity in Denmark?? will be from Renewable Energy! Folk High School Renewable Energy - 100,000 hours of run and very convincing.

Day 3 - Tuesday, 30th May

Viborg - Regional Planning: Danish Regional Authority

Key Facts
- Political Governed
- Mainly Tax financed £400 million
- 6,500 employees in Viborg

Regional Planning - Main Tasks
- Health Care (Hospitals - Medicine)
- Education (High School for Adults)
- Social (Special Institutions)
- Roads, Environmental & Planning (approx. 3.3% turnover)
- Permissions from community (Department of Planning)

Unemployment
- 4% unemployment in Denmark
- 3.3% " in Viborg County

Population
- 23 million pigs
- 5 million people

Renewable Energy Use, Resources & Environmental Impacts
- 5,000 windmills giving 10%-20% of energy for Denmark some parts 100% energy for district
- 4 years to pay the windmill then clear money, and they last for 25 years
- Drinking water not from rivers only from ground wells 20-40m deep
- Phosphorous in cities down to almost zero
- Nitrogen in agriculture down by 30%.
- With fertilisers and draining, soil levels go down and flooding takes over

Viborg- Energy and Environment Office

Key Facts
- Offices are set up to give free information on grants and savings towards setting up your own BIOMASS, BIOENERGY etc.
- Government Subsidy for Solar Heating = 20% of Cost!
- Windmills on the landscape

Skive - Solar Heating Large Public Schools

Key Facts
- Heating for rooms and hot water supply
- 24W DC/ 24 volts

Kjellerup - Woodchip District Heating

Key Facts
- Produces 97% of heat in town, a few buy oil or gas
- 1957 - first Fuel Oil
- 1986 - choice - Natural Gas or Woodchip? - Voted for Woodchip

Woodchip Details
- 8 containers per day - price 150 Kr/load
- 2 400 cubic m. - water content high
- Loads within 45 Km area
- Pollution is less
- Totally automatic
- Efficiency is 115%!
- Price for plant is 16 million Kr.
- Price for Natural Gas Plant is 4 to 5 million Kr.
- Temperature - 75° out; 35° return

Tandskov - Landfill Gas, High Technology Power Production

Key Facts
- 30 acres established 1997
- 54 openings in the ground
- From 1985 to present, 250 cubic metres/hour
- About 50% efficient
- 550 KW/hr
- 5 years payback
- 20 Kr/Trailer
- Waste moved 6 to 8 times and is separated
- 8 to 9 months to complete process
- 80% for sale (i.e. compost)
- 20% for covering the Biogas area and for new areas

Day 4 - Wednesday, 31st May

Viborg - Vestas Wind Energy, Assembly of Turbines

Key Facts
- 150 kW Turbine
- Alternative energy (political issue)
- Philosophy is to have as much know-how as possible
- 6 Engineers working for future
- Fast investment for your money

Wind Tower Details
- Tower height up to 55m (180 feet)
- Rotor diameter 39, 42, 44, 47m (154 feet)
- 660 kW

Hodsager - Biogas and Woodchip Heating of Entire Village

Key Facts
- Supplies 150 houses
- Slurry producing gas
- Nitrates for plants
- Back-up system - woodchip - oil - biogas-burner
- Capacity 40-45 cubic metres biogas per day
- Plus Woodchip burning facility from forests around Hodsager

Hurup - Folkecentre for Renewable Energy

Key Facts: Housing
- Underground House seats 200 people
- Low energy
- Electronic curtains
- Straw Home
- Muscle shells under concrete for drainage
- Building blocks made of clay, chalk, and straw
- Waste Water Treatment Plant (dyke pond system)

Key Facts: Energy House
- Produces more energy than it uses per year!
- Has mobile polystyrene pellets
- Fish nutrition from Biogas
- Digested animal manure

Key Facts: Oil Seed Rape for diesel car
- Starts with diesel - then oil from rape introduced
- Car runs for 90,000 km - 5 years and no problem!
- Gas for fuel
- Gas for furnaces to produce electricity

Key Facts: Electricity from wind power
- Producing hydrogen and oxygen from water
- Hydrogen back to electricity through generator
- Cars on electricity generated by windmills

Key Facts: Wind Turbines
- 10 to 12 small scale windmills suitable for individual houses, being tested daily, they produce all the electricity required for the entire centre
- In this area 180 privately owned wind turbines producing approximately 70 million kW hrs equal to consumption of 17,000 houses!

Day 5 - Thursday, 1st June

Knudby - Photovoltaic for 39 local houses

Key Facts

- 43 people owning and sharing one Wind turbine
- Solar cells for lighting
- 3,800 kW per year
- 3,400 w per hour
- DC to AC converter

Laastrup - Large Pig Farm (intensive)

Key Facts: Biogas

- Pigs manure to Energy
- Produces more energy than you need together with Heat
- Methane contains carbon dioxide and nitrogen
- 1 cow gives 7 kW per day
- They have 4,500 pigs in this farm including 500 sows, all in substantial buildings out of the elements
- Slurry from stable to reactor then heated
- 1 cubic metre of manure = 22 cubic metre gas

Day 6: Friday, 2nd June

Studsgard - Biogas (Stirling Motor) Plant

Key Facts: Biogas

- Waste plant (slurry etc) piped from farms and back to farms as compost (60% from pigs and rest from cows) + food processing industry (slaughterhouses, organic waste from homes).
- One tank for household waste, one for slurry etc.
- Imported vegetable oil from Europe is treated here.
- Environmental benefit (slurry is recycled).
- Manure is free from sickness and poisons etc so goes back on to land.
- Trucks are cleaned so no cross-contamination.
- Most pigs are intensive (some are free).

Key Facts: Feed the Process.

- Temperature 52° - kills disease from slurry and kills BSE (15 days to ferment) (prions)
- Denmark does not have BSE
- 70° would not destroy prions
- The plant is computerised
- 60 cubic m. gas/day much more than other plants because of extra wastes used
- KFK Herning compresses gas (contains sulphur)
- Wash gas with slurry to remove S and produce S2, which is taken out and goes to farms in compost

Kolding - Photovoltaic for large blocks of flats and bioplant water recycling

Key Facts: Bioplant Water Recycling

- Surface water used for washing and toilets etc
- Inside Glass Pyramid they have fish and plants
- Water collected and aerated
- 140 flats connected to the system (250 people)
- The people do not pay for water if they take care of their dirty water (i.e. reduce use of bleach etc.)

3. Lessons Learned

Contributed by Donnie Johnson

Wind Energy

Wind turbines are a well proven source of electricity. There is no doubt that individual or small clusters could be put to use in North Uist, Trotternish and North Sutherland.

SNH and RSPB are likely to be the main objectors. In Denmark no more land-based wind turbines will be given planning permission. They intend to have all future sites off-shore. In Trotternish and North Sutherland the potential impacts on landscape and environment will have to be examined and the off-shore option considered. There is great potential for having such sites in the sea to the west of Uist.

Biogas

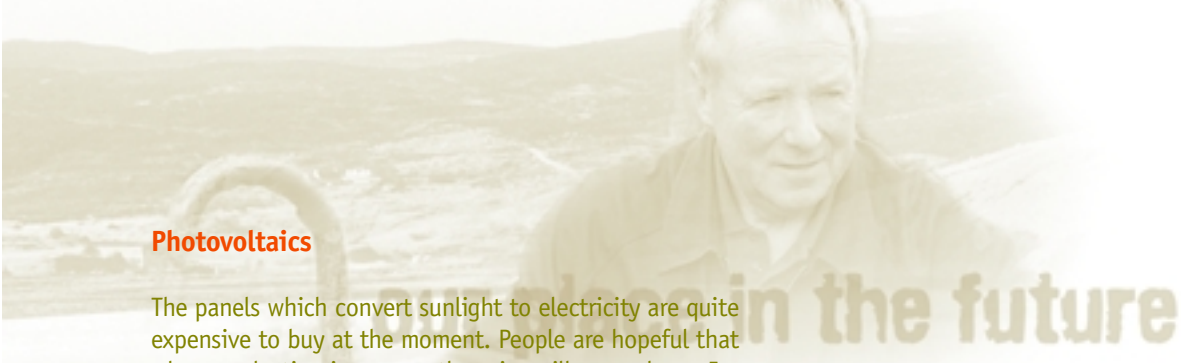
Denmark has large generating plants fuelled by gas from domestic waste and farm slurry. They depend to a great extent on pig slurry. They have a population of 5 million people but have 20 million pigs. As we do not have an integrated sewage system and little prospect of manure collection, we are at a disadvantage. There may be a viable use of rotting seaweed collected from the beaches which, after the gas has been removed, could still be used as fertiliser. Increasing interest in waste minimisation and our need to protect our high value local environments through waste management may well provide new opportunities in the future.

Woodchip

There is not much forest in North Uist older than 10 years. However, beyond the “in-bye” grazing towards the middle of the island, the land is virtually unused compared to how it was some 30 years ago. Apart from about 1 square mile, it is still in crofting tenure. It could provide a vast amount of timber. The advantage of Woodchip is that it can run on commercially low grade timber. Trotternish only has 1% of land in woodland or forestry at present. Future development of native woodlands might well provide a suitable resource for future generations. In North Sutherland there is strong interest in community woodland and the North Sutherland Community Forest Trust has been established. Past management has radically reduced the woodland cover there too, but with local effort moving ahead, future generations may be able to consider this.

Oil Seed Rape

We saw a very impressive demonstration of oil being extracted by a small press machine and then put into the tank of a car which ran very efficiently. However, I do not think that the crop could be grown in sufficient quantity in North Uist, Trotternish or North Sutherland.



Photovoltaics

The panels which convert sunlight to electricity are quite expensive to buy at the moment. People are hopeful that when production increases, the price will come down. In the meantime, North Uist Renewable Energy Strategy Group has bought panels. These will be used for lighting fish tanks in the new marine centre which is being developed by Comunn na Mara. The Group are keen to demonstrate new renewable technologies locally.

Solar Panels

These panels take heat directly from the sun to heat water for domestic and other uses. They could easily be used in North Sutherland, Trotternish or North Uist.

Wave Power

Denmark has no Wave Power Generators, mainly because they do not have big enough waves. I believe that this will be our greatest source of energy in the future.

Conclusion

We have a long way to go in exploring the best options for our own local circumstances. The Jutland Study Tour has made us aware of the variety of technologies available. In North Sutherland and North Uist, wave power has enormous potential. In all three areas we have huge potential for renewable energy production.

An equally important lesson from the Jutland Study Tour is the way in which people and public agencies there have organised themselves, their policies, their taxation, their resources and their money in order to create local benefits and local control of production and consumption of renewable power. We are not yet in that position and must try to find out how to achieve that. Many of the necessary decisions and debates are not conducted at local level and we must rely on local authorities, public agencies and politicians to find a way.

What we can do is make these people aware of the huge local potential for renewable energy and our own interest in pursuing that development potential. We can also begin to seriously consider what sort of renewable technologies we can use in new local developments. In North Uist this is being done by the Strategy Group, in partnership with Comunn na Mara. The proposed Marine Centre is in itself an exciting new idea which will benefit fishermen and tourism. In Trotternish the Strategy Group are focusing on what can be achieved locally through their Eco-house project. This project focuses on using eco building techniques and local materials to create affordable and appropriate local housing to meet housing needs.

4. Conclusions

The Dùthchas communities are rich in renewable resources. This Study Tour has illustrated the diverse possibilities available through renewable technologies. Through this opportunity much has been learned about these technologies. The way in which production and consumption of power, heat, water and light is currently organised at home has a strong influence on the choices which community groups have available to them at present. There is a growing interest in this sector in Scotland. Some development can be taken forward at the local level. The demonstration in North Uist using photovoltaic panels and the Trotternish Eco-house project are good examples of this. Other opportunities and barriers need to be tackled at a regional or national level. In these cases, lobbying will be necessary.

Since this Study Tour and the subsequent Dùthchas Renewable Energy Seminar (Trotternish, July 2000), Comhairle nan Eilean Siar have proposed that the Western Isles become a

"designated zone with a fiscal regime designed to attract research, development and innovation in the generation, distribution, storage and use of alternative energy."

Comhairle Convenor Alex MacDonald said

"The Western Isles are ideally placed to capitalise on the alternative energy market with our wind, wave and tidal resources. Now is the time to make it a reality. We will be consulting government, industry and others to look at our proposals to introduce a scheme to make the western isles a designated energy zone. There are a range of incentives which could be introduced to make the islands attractive to companies to locate here. Examples could include business tax relief for alternative energy projects, non domestic rate relief for locally based staff. At a local level there could be tax relief for electric/alternative energy vehicles and tax exemptions for energy 'filling stations'."

This is hugely encouraging to the North Uist Group – and to all those in the Dùthchas communities, with an interest in this subject. In March 2001, Prime Minister Tony Blair announced that,

"Green technologies are on the verge of becoming one of the next waves in the knowledge economy revolution. The global market for environmental goods and services is projected to rise to £440 billion by 2010. Shell estimates that 50% of the world's energy needs could be met by renewables by 2050. Wind power is already a £1.5 billion industry. By 2010 the global solar market could be worth up to £150 billion."

On the subject of development and the barriers faced in achieving this he added,
"The government's programme for incentivising renewables will create a new market worth over £500 million through the Renewables Obligation, Climate Change Levy exemptions and the Non Fossil Fuel Obligation. We have already announced £100 million to support off-shore wind and energy crops. Last year I asked the Performance and Innovation Unit to undertake a major study into the future of UK renewable energy. Today I can announce a further £100 million to support those technologies identified by the report. ... This new money will help us to promote solarPV, give a boost to offshore wind, kick start energy crops, and bring on stream other new generation technologies. This investment in renewable technology is a major down-payment in our future, and will help open up huge commercial opportunities for Britain."

The conditions for development of renewable technologies are improving at a rapid rate. Our communities and representatives must be alert to these opportunities and identify development choices suited to local needs. The benefits of this coming revolution must not pass by the very places which are most rich in the necessary resources. This Study Tour has made an important contribution to our understanding of this emerging sector and to some of the choices we are likely to encounter in the future.

For further information on this subject, please see the Dùthchas Renewable Energy Seminar Report.

Life

Dùthchas
Our Place in the Future

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