A Comparison of Studies Conducted in Wales and Ireland on Issues Affecting Uptake of Micro-Generation Training

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Abstract
In 2007 Irvine and Stafford [1] surveyed the attitude to the need for enhanced renewable education within groups of Electricians, Architects and Chemists in Wales. Similar groups were surveyed in Ireland in 2008. In comparing the attitudes of students in these two countries the principal differences are governmental support for microgeneration, the quantity of installed microgeneration and the year of the survey. The two countries are broadly similar in terms of geography, climate, population size, ethnicity, broadcast media, educational achievements, economy and income spread.

In Ireland there is greater support for governmental intervention and for increased levels of installation. This could be a reaction to the very low level of activity that prevails in Ireland. The rapid changes during 2008 in economic outlook and in Climate Change consensus may have impacted on the responses. In many areas addressed in the survey the disciplines adopted a consensus position that superseded the national differences.

1. Introduction
In 2007 Irvine and Stafford [1] surveyed the attitude to their need for enhanced renewable education within groups of Electricians, Architects and Chemists in Wales. Similar groups were surveyed in Ireland in 2008. In comparing the attitudes of students in these two countries the principal differences are governmental support for microgeneration and the year of the survey. The two countries are broadly similar in terms of geography, climate, population size, ethnicity, broadcast media, educational achievements, economy and income spread.

2. Governmental support in Wales.
Wales aims to be at the forefront of sustainable development. The Welsh Assembly Government (WAG) has the aspiration for all new buildings in Wales to be zero-carbon from 2011. Zero-carbon new-build will not be achieved without significantly increased uptake of renewable and microgeneration technologies. This in turn presents its own issues in the form of ensuring that an infrastructure of manufacture, supply, installation and design is in place. Training then becomes a vital element in supporting rapid microgeneration industry growth. In March 2007, the WAG published the "Microgeneration Action Plan for Wales" (MGAP) [1], in order to facilitate the uptake of small-scale renewable technologies.

An important element of the plan deals with "Expanding Technical and Professional Skills". This includes calling for a 100% increase in people gaining energy-related qualifications in areas such as installation, advice and system design every year between 2007 and 2012, and also the provision of advice and training to planners. In order to encourage uptake of training it is expected that industry will create a demand for appropriate qualifications and that school curricula will be modified to include more on climate change and low-carbon energy.

It is clear from the MGAP that PV is regarded as an important component of the microgeneration mix. The target of 10,000 micro-electricity units to be installed by 2012, and around 200,000 units by 2020 is significantly higher than predictions made by the Energy Saving Trust (EST), and this is specifically stated to be “because of the strength of PV expertise in Wales (e.g. at Sharp, G24i, installation companies and universities ).

3. WEST (Welsh Energy Sector Training)
The WEST project was initially set up with the aim of "identifying, developing and enabling the education and training of professionals in Welsh Industry in the fields of low to zero carbon energy production and efficient energy use.” During the fifteen months of the first phase of the project, CPD courses in PV, power electronics, biomass, combustion, marine energy and hydrogen were developed and piloted by members of the consortium¹. The project was supported by the WAG via KEF (Knowledge Exploitation Fund). In the next phase of the project it is hoped that activities will expand to include Further Education, and also the development of materials for a Masters course to be delivered jointly by the consortium partners.

In 2007 The Welsh Energy Research Centre (WERC) initiated and supported a PV Task Group, made up of academic and industrial partners with a wide range of interests in PV and PV related technologies. The intention of the task group was to enable rapid industry expansion, increased local

1. Welsh School of Architecture, Cardiff University, Bangor University, University of Glamorgan, Swansea University. Institute of Grassland and Environmental Research (IGER)
adoption and reduced costs by taking an innovative whole-systems approach. It is hoped that the PV Task Group will be able to continue this activity under the auspices of the Low Carbon Research Institute (LCRI) from 2009 onwards.

4. Irish governmental support and Irish Energy Sector Training
Ireland sends a mixed message on the issue of sustainable development. The Irish Government has indicated an aspiration of near zero-carbon by 2011 for all new buildings in Ireland. However, to date the Irish government has not produced an equivalent to the "Microgeneration Action Plan for Wales". Policy and other supports for small-scale renewable technologies are at the consultant writing reports which may go to public consultation stage. The activity is at state agency level rather than ministerial. There is no plan, at least in the public domain, that deals with "Expanding Technical and Professional Skills". There are no official governmental targets for increasing the number of people gaining energy-related qualifications. School curricula on climate change and low-carbon energy has not started to be considered.

Training to support the microgeneration industry is under-developed and left to individual colleges and industries. They have to find the resources out of existing budgets.

5. Potential training beneficiaries
The potential beneficiaries of improved renewables training are very various. CPD level training (strand 1) will be required by technologists, architects, planners, building services personnel and energy advisors. The recipients of technical install training are more defined, as at present C&G 2372 is only open to students with some prior NVQ Level 3 electrical training. However it should be borne in mind that future systems approaches to technology development may require input from other trades also (e.g. builders, roofers or tilers). Uptake of postgraduate study (theoretically arise from any discipline, perhaps is most likely to be mainly fed from numerate and/or technical disciplines such as physical sciences, social science or business studies.

6. Pilot Study on Issues Affecting Uptake of Future Training
A short study was undertaken, in both countries, to gather preliminary indicative data about attitudes to PV and other renewables, among various types of students who could be classed as potential future training beneficiaries. Three groups of students were surveyed via anonymous questionnaire:

23 Welsh Electrical Installation students (Llandrillo College, North Wales)

36 Welsh Undergraduate Chemistry students (Bangor University, North Wales)
54 Welsh Architecture students (Welsh School of Architecture, Cardiff, South Wales)
67 Irish Electrical Installation students (Dublin Institute of Technology, Ireland)
25 Irish Undergraduate Chemistry students (Dublin Institute of Technology, Ireland)
51 Irish Architecture students (Dublin Institute of Technology, Ireland)

No prior knowledge of renewable technology was assumed, and none of the groups received previous courses or training in this area. In the data presented below the groups will be designated WE, IE, WC, I C, WA and IA.

6.1 Function and appearance of PV
Most of the respondents in all six groups correctly stated that PV converts sunlight to electricity (87% of WE, 52% of IE, 81 % of WC, 92% of IC, 78% of WA and 84% of IA). Of all the 113 welsh and 143 Irish students, 5% of the Welsh and14 % of the Irish thought PV was for heating water (SWH), and 14% of the Welsh and 15% of the Irish were unsure. Rather surprisingly, views about the appearance of PV were very similar among groups WA, IA and WC. In these groups approximately half the respondents had no strong feelings, but about a quarter thought it attractive or interesting-looking, and only a few individuals thought it ugly or were unsure what it looked like. A high percentage had no strong feelings (WE 70%, IE 63%, IC 80%).

6.2 Advantages/disadvantages
The students were asked to identify the main advantages and disadvantages of PV. Figs 1a and 1b summarise the results. There was good understanding from all groups that PV represents a CO$_2$-saving technology (over 90% in the case of the Welsh architects). Reduction in household bills was important for all groups, but especially electricians, and reduction of dependence on large utility companies was also seen as an important advantage (cited by around 40% or over).

In terms of disadvantages, the high up-front cost was correctly identified by most in all groups, but especially by group WA, IC and IE. It emerged, however, that between 44% (WC) and 61% (WA) believed that the technology was not suitable for cooler or cloudier climates such as that obtaining in the UK and Ireland. The corresponding range in Ireland was between 42% (IE) and 52% (IC) This is an important misconception that must be
group also believed that the embodied energy (energy of manufacture) exceeded potential energy production. This is also a misconception. [3, 4]

**Figure 1a: Perceptions of Advantage of PV**

**Figure 1b: Perceptions of Disadvantage of PV**

**6.3 Interest in further study**

The students were asked if they would be interested in learning more about renewable energy as part of their programme of study. Encouragingly, 74% of Welsh electricians, 91% of Irish electricians, 70% of Welsh chemists, 88% of Irish chemist, and 80% of architects in both countries said that they would. The remainder being uninterested or unsure. Figure 2 gives the range of technologies or topics which were identified as of particular interest. There appears to be a reasonably good spread of interest among all the renewable energy technologies, with all three Irish groups and the Welsh electricians having a particular interest in PV, hydro and wind. The Welsh chemists demonstrated particular interest in PV and hydrogen, and the Welsh architects in PV and wind. Irish chemist and both groups of architects showed a greater interest in policy issues than other groups. Many respondents ticked several or all of the options listed.

**Figure 2: Renewable Energy Technologies of particular interest to each group**

**6.4 Governmental intervention [5, 6]**

A massive majority in all groups thought that the government should be doing more to support renewable energy: WE 83%, IE 85%, WC 94% IC 92%, WA 98% and IA 92%.

Respondents were invited to indicate which support methods they thought would be most efficacious:

**Figure 3: Perceptions of Most Effective Government Support Methods**

Arguably many of the responses here may reflect personal interests, either present or future. For example, the science students placed most faith in research and development. Welsh chemist and Irish electricians were least interested in support for businesses. Feed-in tariffs, which have been proven to be highly effective in Germany, were not identified as particularly important by the Welsh groups 27%. The Irish support was at 45%.

**7. Conclusions**

The small scale of these preliminary studies means that their results provide only a rough indication of prevailing attitudes among potential training
beneficiaries. However some tentative conclusions may be drawn. Firstly, it appears that general awareness, interest in, and basic knowledge of renewable technologies was good in all three groups of students.

Around 25% of people find PV attractive or interesting in appearance, irrespective of discipline. The only significant group that found them ugly were Irish architects 29%. Most are aware of the advantages to be gained. It is notable, however, that there is a strong belief that this is a technology which is not suitable for the UK climate, and this belief needs to be challenged.

Almost everyone is agreed in wishing to see more government support for these technologies, although there is no clear agreement on the best methods of achieving this.

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