Solving Employment Problems in the European Union: The Role of Energy Efficiency

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ABSTRACT

This paper is based on a project funded under the European Commission's SAVE (Specific Actions for Vigorous Energy Efficiency) programme. The project is looking at the employment implications of energy efficiency programmes, using a large number of case studies throughout the nine European Union (EU) countries participating in the project. Various modelling techniques are being used to investigate policy scenarios.

The EU is particularly interested in looking at employment potential of energy efficiency at the present time. Traditionally, jobs in the environmental sector have only been seen as occurring in 'end-of-pipe' type industries, such as pollution control; but a large potential for employment opportunities has now been recognised in the energy efficiency sector.

Included in the study will be a detailed discussion of the quality, as well as the quantity, of jobs created, i.e. what skill levels will be required and the types of people who would wish to undertake the work. The qualitative aspect of jobs will be looked at for their suitability for solving EU and country specific problems, such as long term unemployment of unskilled workers.

This paper will present some initial results from the study and discuss the issues raised by it and by other recent work in this area. Such issues include not only the types and numbers of jobs directly created through the programmes, but also indirect effects on the local, national and international economies. The negative effects, such as the reduced energy usage effect on the supply industry will also be examined.

Introduction

The overall aim of the project is to characterise the amount and type of employment which may be generated by investment in energy efficiency in the European Union. The project will achieve this by conducting a series of case studies of energy efficiency investment schemes. The objectives are to determine from these case studies the number of jobs created by specific types of scheme, and the characteristics of these jobs (such as the level of skills required and the types of person wishing to undertake the work). The project will then go on to model the wider impacts of energy efficiency via the use of household consumption functions; and to investigate a series of investment policy scenarios using a general equilibrium model. The results of the differing approaches to employment impact estimation will then be compared.

The use of a number of different methods of estimation will facilitate critical assessment of the results generated by each approach, leading to a robust overall assessment of employment impacts. The method will also allow investigation of the impacts at different geographical scales, and the description of some of the important, qualitative, aspects of the jobs involved.

In this paper, some of the initial findings from the case studies are presented. At this stage it is only really possible to talk about qualitative issues that have been raised by the study. The paper also describes the current concerns about unemployment in the EU and how these types of programmes can help to solve some of these problems.

Employment Issues in the EU

Unemployment in the EU as a whole has been falling since the high level reached in the early 1990s. Although in most countries the trend for the last few years has been downward, some countries have yet to experience a significant drop even though their economies have, in general, recovered from the recession earlier this decade.

Despite the recent falling unemployment, the level in most EU countries remains above what is considered acceptable to those countries (see Figure 1).

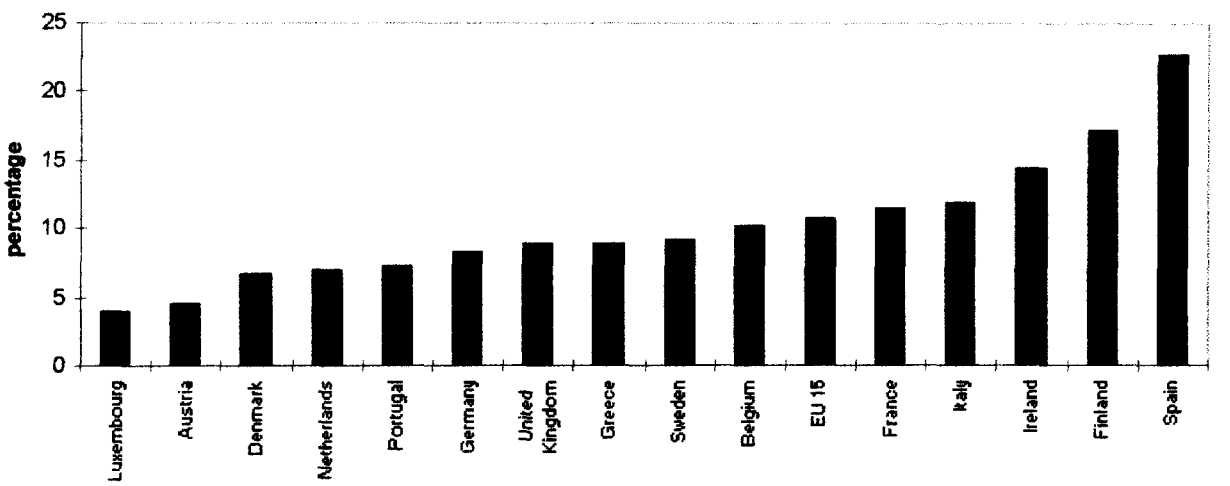


Figure 1. Unemployment in the EU (1996) (Eurostat 1997)

In addition to the level of general unemployment, there are specific concerns about employment in many of the countries studied. Unemployment amongst the young seems to be a problem particularly in France, Greece, Spain and the UK. Unskilled or low skilled workers are identified as problem groups

in France, Germany, the Netherlands and the UK. Greece and the UK also have problems amongst those who have never worked in their lifetimes and therefore lack any work place skills. Regional unemployment is also identified as a problem in many countries.

The issue of long-term unemployment and skills shortages will be investigated in particular in this project to see if the types of programmes that involve energy efficiency are suitable for addressing these problems.

Choice of Case Studies

Case studies were chosen on the basis of a set of criteria which included ability to access information on employment effects of the programmes. A wide range was required in order to cover all types of policy instrument across the countries involved. The result of the studies will be an analysis of the amount, type and duration of jobs created by each type of energy efficiency programme. This information could be a useful additional tool to aid to policy makers in deciding whether to invest in energy efficiency and if so, in what type of programme.

In order to choose which case studies to analyse further, each partner country was asked to describe all possible schemes that could be used in their country. From this initial assessment, a list was drawn up which covered all types of scheme - subsidy programmes, levies on energy supply industries, taxation programmes, loans, grants, regulations, standards, agreements and information/education programmes. Several of each type of programme were chosen in order to compare the results both across sectors and countries.

The case studies will look at issues involving direct employment impacts and energy saved. They will also look specifically at the type of work involved in the scheme, the type of people involved in this work and how it will impact on local and national employment issues. The case studies will not look at the impact on the wider economy and issues such as indirect employment. This effect will be analysed using the Input-Output model with the use of household consumption functions for the residential sector and using the GEM model to simulate the effects on the whole economy. This model will also look at the possible negative effects that may occur with such schemes.

The case studies must be able to say what happened as a result of the scheme compared to what would have happened under a business as usual scenario. It may not be necessary to specify this scenario explicitly, but the effects of the scheme recorded must be only the incremental effects. This may be done by making reasonable assumptions about what would have happened in absence of the scheme.

For comparability between case studies, the output must include a measure of how much employment has been created per unit in relation to a fixed quantity. This may be per unit of expenditure or per unit of energy saved. If each case study is recorded in both these ways, the achievement of the two aims (employment generation and energy saving) can be analysed - some

schemes may achieve one of the aims very well, but not the other. This could be a useful tool for decision makers.

Each case study is collecting an extensive set of data in order for it to be analysed and compared and the results used in the two models. These data will include details on: public expenditure; private expenditure; categories of what money was spent on (e.g. administration, materials, marketing), employment by occupation, wages paid, energy saved, value of energy saved.

In addition to these quantitative results, we will also be concentrating on qualitative issues and lessons that can be learnt from the case studies. The studies should also record the theoretical potential of the scheme compared to the results achieved, the replicability of the schemes and an assessment of who the main beneficiaries/losers are in the scheme.

A number of case studies are described below. These are all taken from the UK because specific details from other countries remain confidential at this stage. However, a number of issues raised from the studies in other countries are included.

Some Preliminary Results from Case Studies

Standards of Performance for Energy Efficiency Programme

The Standards of Performance (SoP) for Energy Efficiency programme was set up by the Energy Saving Trust in the UK in order to 'stimulate the provision of cost-effective energy saving measures throughout all sectors of the franchise market' (EST 1994). The Office of Electricity Regulation set an electricity saving target for each Public Electricity Supplier (PES), with the cumulative lifetime (discounted) savings equal to 6,103 GWh.

The programme aims to provide insulation and other energy saving measures and to promote and subsidise installation of such measures. The whole programme is overseen by the Energy Saving Trust (EST), which also promotes some of the schemes. The PESs can choose to participate in these national schemes and/or design and run their own schemes. Examples include subsidisation of compact fluorescent lightbulbs (CFLs), free cavity wall insulation for those on benefits, high efficiency lighting schemes for schools and cashback (rebate) schemes for condensing boilers.

The scheme covers all franchise customers - that is, customers using less than 100 kWh. The necessary finance is raised by a Special Allowance of up to £1 per franchise customer per year for the period 1994-1998, giving a total of £102 million over the four year period (compared to about £16 billion yearly income from the residential sector - about 0.2%).

The PESs should give priority to projects likely to exert general downward pressure on the charge per kWh to consumers, in order to encourage demand side management measures. All

customers should be included, but priority should be given to those receiving passport benefits (EST 1994), i.e. unemployment benefit, disability allowance etc.

Three categories of jobs are included. Firstly, the work created in the PES itself (including any work contracted out) and the EST; this includes project development, marketing, management of installation schemes, telephone advice connected with SoP, administration of the schemes, monitoring of schemes carried out and financial and information technology time devoted to the programme.

The second category relates to the work undertaken by the installers of the energy saving measures employed by the PES, or the stockholder.

Thirdly, the local authority, or other stockholder whose properties are being improved by the social housing schemes, also has extra work because of the scheme. This is mainly administration and data collection. The PESs spoken to for this study agreed that most stockholders had very little previous knowledge of their stock and most of the time spent by these groups was in collecting information in order to identify potential measures. Further work involved the tendering of contracts and overseeing the results. These are highly unlikely to be new jobs however, but are more likely to involve a reallocation of time within the authority, as the spending is fixed in a given year. This work is therefore excluded from the job creation figures.

This is an important issue that has been raised in many case studies. If a programme generates more work for a person but no one new is employed, should this be counted in the generated employment figures? In some cases the work may prevent jobs being lost. In general where extra work has been created, it has been included. In the particular case of the SoP scheme, the work prevents other work being done, so has been excluded. This is an issue that must be decided on a scheme-by-scheme-basis.

The methodology used in the SoP study is to look at each measure (e.g. cavity wall insulation, CFLs and draught proofing) individually and, using figures obtained from the installers involved, estimate the amount of time each scheme would take to implement and hence the number of person years of employment created.

The person years involved in installation in all 14 PESs are shown in Table 1. The total number of person years per year, for the installers was 176; and 210 person years per year for the administration by the PESs (including outside consultants and EST). The total of all jobs, per year, is therefore 386.

Table 1. Summary of all PESs schemes 1994-1998 (for measures included in the analysis) (EST 1998)

Measure	Number of installations	Number of person years
CFLs	6,610,920	0
Other lighting measures	184,667	0
Cavity wall insulation	128,045	319.2
Loft insulation	83,397	101
Hot water cylinder insulation	58,364	30.4
Draught stripping	37,643	56.8
Heating controls and storage heater upgrade	32,667	108.4
Night blinds	3,123	0
Double glazing	3,225	105.8
Tank and pipe lagging	1,100	1.6
Replacement pumps; variable speed drives	309	0
Floor insulation	549	5.0
Other insulation	708	5.4
Total	7,144,717	734 person years
Average total per year	1,786,179 measures	183 jobs (person years per year)

The expense per job can be calculated by examining the cost of the programme. The employment created by this programme falls into two categories - the project management, marketing and administration jobs, which includes both the higher qualified and higher paid managers and the administration support (such as telephonists); and the semi-skilled or unskilled manual jobs in the installation business.

The total number of direct jobs created by the Standards of Performance programme is calculated to be 386, at a typical cost to the PESs of £28,800 labour cost per installation job (plus £43,200 on materials) and an average cost of £24,100 per job in project management, marketing and administration. These latter types of jobs seem to cost less than the installation jobs, this may be due to a significant proportion of these being at the lower paid end of the administration scale - such as telephone support. It may also be because in the estimates for installation jobs, conservative estimates of times and costs have always been made. For example the estimates of the number of jobs being completed per day may be over-optimistic and the employment required under-estimated.

The Wise Group

The Wise group runs the leading energy employment initiative in the UK. Its overall objective is to create an intermediate labour market. That is, to recruit and provide training and work experience for unemployed people so they can improve their own prospects by moving into a job or further

education. The group is funded from a variety of sources, including UK local and national authorities and the European Commission, as well as from commercial sales of their services.

Heatwise is responsible for the Jobs and Energy Project and has the following aims (Wise Group, 1995):

(1) To identify the extent of, and develop solutions to, the problems of cold, damp and expensive to heat housing.

(2) To identify employment and training opportunities for local people through improving the heating and the insulation characteristics of the local housing stock.

(3) To put together funding packages to initiate heating and insulation improvement projects.

The Heatwise group appears to be successful in terms of its employment figures. 58% of its trainees who finish the course go on to permanent employment or further education within three months of leaving, this compares with a national average figure of a 5% chance of a long term unemployed person finding permanent employment.

In 1994 the group employed a total of 795 people. 230 of these were permanent employees, and 565 trainees on their various programmes. The expenditure for 1994 was £12.8 million, implying a cost of £16,100 per employee.

The Green Estates Challenge

The Green Estates Challenge is a programme run by Newark & Sherwood District Council designed to improve the energy efficiency in the council's housing stock. The programme, which commenced in 1988 is funded entirely by the council. It was originally planned that a total of £16.4 million would be spent – in fact the project had to be abandoned in 1995 due to lack of funding, with a total of £8 million having been spent.

A study by the council estimated that a total of 311 job years have been created by the programme, including direct and induced employment effects. This figure is reached by using methods set out in a 1992 American study, plus figures from British Gas on employment generated from the installation of boilers (Pickles 1997). The programme has involved partnerships with Newark Chamber of Commerce, Sherwood Energy Ltd (non-profit training organisation) and HEES contractors.

The cost per job year can be calculated as £25,700. However, the Council's study also estimates savings to the health service at £2.2 million and unemployment cost avoidance at £2.8 million, giving a net cost of just £9,700 per job year.

Routes to Work

Routes to Work (Derby) Ltd is an intermediate labour market organisation which was set up in 1995. The company operates as a business concern, but with additional objectives to:

- Better equip unemployed trainees to secure permanent jobs
- Make full use of the range of funding for skills training and personal development
- Work in partnership with the public, private and voluntary sectors
- Involve local communities in the work being carried out in their area.

The work programme includes improving the energy efficiency of local authority and other housing association stock. Areas where fuel poverty is prevalent are the priority (fuel poverty is generally defined as when a household has to spend more than 10% of its income on fuel). Within the Energy Efficiency Department, training modules lead to NVQ levels 1 and 2 qualification in loft insulation, pipe lagging, hot and cold water tank lagging, draughtproofing and combustion air vent fitting. Utilising the experience of managerial and supervising staff previously attached to a network installer and Heatwise in Glasgow, trainees are also trained in survey skills and energy advice as well as inter-personal skills. To date, the Energy Efficiency Department has carried out energy efficiency works in over 600 dwellings in Derby through the City Council's planned maintenance and Home Energy Conservation Act (HECA) Action programmes.

In addition, Routes to Work (Derby) Ltd are applying, with the full support of the city council, to become a local Home Energy Efficiency Scheme operator, which will enable them to expand their operations into the private sector.

The organisation is funded as follows: 52% from the Single Regeneration Budget, 10% from City Challenge, 14% from the European Social Fund (objective 3) 21% project work and contracts and 3% from other sources, such as the Southern Derbyshire Chamber of Commerce Training and Enterprise.

A total of 100 short term worker places have been created plus 25 management, supervisory and support services jobs, across all the sectors of work that the company is involved in.

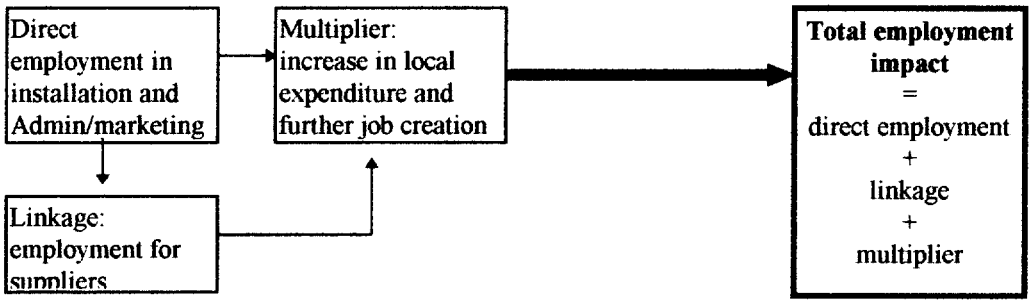
Indirect Job Creation

Employment will be increased, above the level calculated for the direct jobs, by two main phenomena. The first is the linkage effect, where an increase in employment in the installation business (or the other sectors with increased workloads directly as a result of the programme) leads to other employment being created in supporting industries, such as suppliers of goods and services used by the installer firms.

Secondly there is the multiplier effect, where the increase in spending, both from those newly employed and from the savings made in the reduced fuel bills of those benefiting from the schemes, benefits the economy and generates further jobs. Some of these benefits will accrue to the local economy, others will be 'lost' to the national economy.

These two effects are illustrated in the diagram below:

Multiplier and linkage effects



The value of the local multiplier is dependent upon a number of factors, and can be calculated using a set of parameters. The Department for Education and Employment (DFEE) in the UK have identified the parameters as being (DfEE 1996): the current rate of personal taxation allowance; the marginal rate of deductions for those in employment compared to those not in employment; the marginal propensity to consume - defined as 95% (i.e. 5% saved); the propensity to purchase goods and services from outside the local economy - defined as 70%; the proportion of firm turnover accounted for by wages - defined as 25% on average (calculated from Central Statistical Office 1994).

Using these parameters for the UK case, a figure of 0.17 is obtained for the multiplier and linkage effect. Thus, for every 100 jobs created directly through this programme, a further 17 will be created indirectly. This value is far less than even the more conservative ones previously estimated - 0,4 (i.e. 40 indirect jobs for every 100 direct jobs) for the multiplier and linkage effects combined has been widely quoted previously (ERL 1983).

However, this figure does not include the additional indirect effect unique to energy efficiency schemes. This is where the household saves money through the installation of the energy efficiency measure and has more disposable income as a result.

The indirect employment effects are therefore a significant factor to consider when analysing these programmes. It can be an important part of a local regeneration strategy. The indirect impacts will be analysed in detail when the project goes on to use the I-O model. This will look at the spending patterns for households and how these are affected by increases in direct employment.

Negative Employment Effects

The likely kWh loss to the supply industry in the programmes described in the case studies is far less even than the predicted growth in electricity use in the UK, therefore the question is not really how many jobs would be lost, but whether any that would have been created from further growth are in fact prevented.

The loss in sales of kWhs to the electricity industries through the SoP programme, for example, is about 0.5% of total volume sold. Because only 50% of distribution costs and 25% of supply costs are related to volume of sales in the UK, the actual loss in profit is a very small proportion of the industry's turnover. The effect of the restructuring of the industry since privatisation has already led to huge job losses and the industry in the UK is now highly efficient in terms of number of people employed per unit of electricity sold. It is doubtful that any job losses will occur as the labour required in the supply industry has little to do with the number of kWhs supplied.

However, if a larger programme is implemented, the models used in this study may show that there is an effect on the supply industry. Of course, the size of this effect will depend on the structure of the energy supply industry and the price regulation mechanism in the country under investigation. EU countries are at various stages of liberalisation, from Norway which is fully liberalised, to France which is still a state monopoly. Where jobs have already been shed through increased efficiency resulting from liberalisation, there will be less of an effect from a programme that reduces the amount of energy to be supplied.

There may also be savings in time for landlords of social housing, after the initial high work load arising from implementing the programme. The advantages are that the maintenance costs are reduced - such as the need for anti-condensation measures, the replacement of rotting windows and redecoration. Management costs are also reduced, including fewer complaints to deal with, fewer transfer requests and fewer empty properties. On a small scale, case studies have shown that job losses did not occur, the free time was spent more productively on other activities and the stock holders reported higher job satisfaction and staff morale because the tenants were more satisfied (DoE, 1995). However, were a larger programme to be implemented, the effect these savings would have would undoubtedly cause job losses in this sector.

Both the negative impacts in terms of employment will be modelled in the I-O model and the General Equilibrium Model later in the study to see how large an impact they will have.

Free Riders and Other Economic Effects

There are some other factors to consider in the analysis of the programme, which may reduce the employment impacts, these are the natural rate of unemployment, free-riders, displacement effects and alternative programmes which could have been funded with the money raised.

However, if we are comparing this programme with other employment generating initiatives, these effects will be present in all programmes. There is no reason for them to be more significant in an energy efficiency programme than any other type of government investment.

Indeed, if the long term unemployed are particularly suited to a programme, as is the case for many energy efficiency programmes, the effects on the economy are even more positive. The benefits to the Treasury of taking a long term unemployed person off passport benefits can be as high as £8,000 in the UK (Gardiner, 1997). On top of this, there are also savings to be made in terms of reduced health costs for those who are newly employed, as well as those that have benefited from warmer homes, and reduced costs of crime associated with unemployment. There will also be increased tax revenues for the Treasury.

Again, these issues will be picked up in the modelling approaches in terms of figures, but from a qualitative point of view they are an important factor.

Conclusion

Case studies have shown that energy efficiency programmes are particularly suited to the long term unemployed with few, or no, skills or work experience. This advantage makes energy efficiency a key policy for solving some of the EU's employment problems.

Many countries in the EU suffer not only from high unemployment, despite currently relatively strong economies, but also specific problems with long term unemployed and a lack of skills. Energy efficiency programmes can be set up to include a training element to solve the construction skills shortages that exist. Regional unemployment can also be targeted, particularly because the areas that have high unemployment are also often those with the worst housing which would benefit from energy efficiency measures. Areas affected by coal mine closures in the UK are a good example of where the local economy would benefit from energy efficiency programmes which equip former miners with construction skills, thus also softening the political blow of reducing coal use, as must occur with the EU's commitment to CO_2 reduction.

The study described here will be completed in mid 1999. The case studies will be used as inputs for the two modelling approaches and policy scenarios will be investigated. The results will be enormously helpful for decision makers to have additional information about the social and economic effects of energy efficiency programmes as well as the more well known environmental effects.

The figures that the models will produce are important, but the most useful output from this study is the qualitative issues raised in the case studies. These are the issues that have most influence politically.

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