

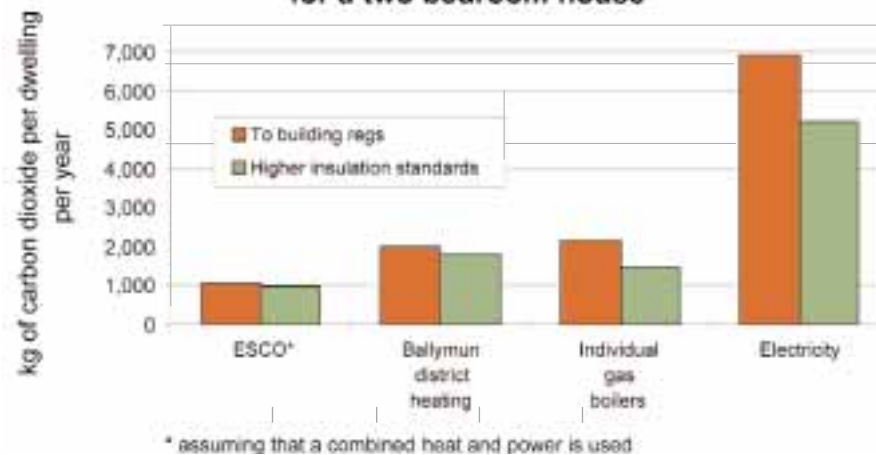


**21.5.5 EMISSIONS TO ATMOSPHERE**

Figure 5 shows a comparison of the carbon dioxide emissions of the various options for the heating system. These are based on conversion factors of 0.2 kg of CO<sub>2</sub>/kWh of delivered energy for gas and 0.82 kg of CO<sub>2</sub> /kWh of delivered energy for electricity. This clearly shows that the emissions of carbon dioxide associated with the electrical storage system are over four times those of the other systems. The combined heat and power system, which it has been assumed is used by the ESCOs to supply heat produces nearly half the amount of carbon dioxide of the individual gas boilers and almost one eighth of the carbon dioxide emissions of the electrical storage heaters.

The other significant atmospheric pollutants associated with the generation of energy are the oxides of Nitrogen and Sulphur. Individual gas boilers emit NO<sub>x</sub> at a rate at least five times lower than power stations. Gas boilers also emit no oxides of sulphur whereas the power stations in Ireland which burn oil have a SO<sub>2</sub> emission rate of 5.7 mg/kWh of electricity produced.

**Figure 5 - Carbon dioxide emissions related to the production of heat for space heating and hot water for a two bedroom house**



**21.6 STRATEGIC CONSIDERATIONS**

**21.6.1 Liberalisation of the EU Energy market**

The liberalisation of the energy market will have the effect of opening the gas and electricity supply market, which in turn, permits consumers to buy gas and electricity from any of a number of energy suppliers. The process can be compared with events in the telecommunications market, where deregulation allows customers to have telephone accounts with a choice of competitive servers. In Ireland, it is anticipated that the large industrial consumers will be the first to benefit from the liberalisation of the energy market.

In Britain, large parts of the country are already free to buy gas from the 21 registered suppliers now in the market, although not all companies operate in all areas. To date 283,000 households have switched from British Gas and it is reported (Independent on Sunday, 11 January 1998) that significant savings of 20% to 30% can be made by shifting from British Gas to a competitor. However, the pricing structures offered in the gas market are complex, varying according to region, consumption and method of payment. Savings may also be available when the electricity market is opened up in the UK, later in 1998, although these may be smaller than for gas.

In the Netherlands, there are a number of independent energy companies. One such company is Nuon nv (plc), with its head office in the city of Arnhem. Nuon supplies electricity to more than a million customers and many of them also get their gas, heat, water and cable television from the same company. Nuon produces a proportion of the electricity itself using cogeneration, wind and water power, landfill gas and the company is a partner in the city's waste-to-energy incinerator.

The structures for liberalisation of the EU energy market are being put in place by the Energy Council of the European Union. It held a special meeting (Luxembourg, 27 October 1997) on the proposal for a Directive on the internal market in natural gas with a view to establishing guidelines which would make it possible to adopt a common position. Substantial progress was reported in the negotiations and the Council confirmed its political willingness to reach a common position at the subsequent Energy Council meeting on 8 December 1997.

**21.6.2 Energy ESCOs and third party finance**

Energy Service Companies (ESCOs) are public or private companies which are set up specifically for supply of energy services, such as heat, gas and electricity to a user. The user may be a Local Authority, a commercial consumer or an industrial process. By the end of 1995 there were 25 ESCOs in Europe working in the field of energy savings, 8 of which are in the UK and 5 in Spain.

The ESCO provides a combination of engineering, financial and marketing expertise. It assumes responsibility for and finances measures, such as new more efficient plant, which reduce energy consumption and cost. The financial savings are taken up by the ESCO to recover the total cost of the investments, including its profits. The users enjoy the benefits of a modern efficient services system, without effecting their balance-sheets. The idea is simple and is referred to as third party financing (TPF). The European Commission has long recognised that TPF can be a powerful incentive for energy efficiency investments and has now identified TPF as one of its priorities under the SAVE programme of DGXVII. Under this structure, the European Commission itself provides the contractual framework for the deal and assumes the role of project superintendent for the operation. This helps in providing the guarantees, which some companies may need, before entering into a TPF contract.

**21.7 THE END USER**

Promoting energy efficiency and reducing costs has been developed in great detail from a technical viewpoint. The end user as the other side of the equation can also make a huge difference in increasing energy efficiency and reducing costs.

**21.7.1 Education**

To date tenants have not had control over their heating system and a change over in heating system with perhaps separate billing will require educating the user. Producing a small booklet, in a graphical illustration format, with instructions for handy reference is essential if low fuel bills are to be achieved in practice.

**21.7.2 Training**

Training would also be required for coaches so that they can run a programme aimed at instructing tenants to gain the maximum benefit from their heating system making full use of controls, ie timers, thermostats, booster switches and control switches to achieve maximum comfort and energy efficiency at low cost. This could be linked in with an overall programme that enables householders and individuals to change their resource use habits and live more sustainable lifestyles.

Participants of this programme can learn how to use less energy, reduce the amount of waste they produce, use less water and to travel and shop more sensibly. The international non profit making organisation Global Action Plan can run such a programme and have achieved the following savings in one area of Dublin for this programme for the year 1996-1997:

- 22% reduction in water consumption
- 24% reduction in waste
- 14% reduction in energy used
- 30% reduction in transport

Investment would be required to train coaches who could be sourced locally to run courses.

**21.7.3 Employment**

With an overall investment over £200 million in Ballymun. There are opportunities to create employment in the energy area to benefit the community.

This can include utilities supplying energy who could undertake to provide a number of apprenticeships to locals. These apprentices should ideally be school leavers with leaving certificates in the 17-18 year age group. Full opportunities should be available for training with relevant organisations and technical colleges in the normal one day release system or equivalent. Similar projects in Dublin have been very successful. Due to the fact that Ballymun is principally a domestic construction project we would recommend that apprentices would be placed on a different site.

There is also an opportunity for creating employment in the area of maintaining the heating systems.

**21.8 CONCLUSIONS AND RECOMMENDATIONS**

The key requirements of the new housing development is to provide the tenants with individual control of their heating systems at a cost which is no greater and

preferably significantly lower than at present. The present cost of heating and hot water for a two bedroom flat is £275 per year. This study has shown that the only system where the heating would be a similar cost would be for a house insulated to standards higher than building regulations with an individual gas boiler. This is illustrated in figures 2 and 3.

Of the two options for paying for this gas, standard billing or pre payment, the pre payment card system is the cheapest as the standing charge associated with standard billing system (£132 per year) becomes very significant when the quantity of gas used is reduced. This is also the payment system preferred by the tenants.

It is therefore recommended that the new housing development is insulated to standards higher than building regulations, as described in section 21.2 and section 21.4.3 and fitted with individual gas condensing boilers with payment by the pre payment card system. It is believed that these measures will ensure that the annual running costs to the tenants will be less than they are at present.

There is scope for a combined heat and power system to serve the new business park to the north of the site and the leisure facility. It is particularly applicable as there would be a demand for the heat produced by the CHP unit in the summer to heat a swimming pool and also possibly for absorption chillers for cooling the offices. This concept needs to be developed at a later stage.

Further work needs to be done to ascertain the implications of pruning back the system over the period of construction of the new housing. This will have implications due to the cost of providing heating to the remaining dwellings. It may be necessary to demolish the boiler house before all the buildings to which it supplies heat are taken out of use in order to free up the land.

It is understood that the swimming pool, the school and the shopping centre are all served by the district heating scheme. The heat source for these needs to be considered if present heating system is phased out.

It is possible that there will be an additional costs associated with decommissioning the boiler house and the district heating system if there is any asbestos present. We are not currently aware of any reports which state that there is no asbestos present in the boiler house or the pipework.