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Prospects for a
Sustainable Energy Policy
in the European Union

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**Collier: *Prospects for a Sustainable Energy
Policy in the European Union***



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EUROPEAN UNIVERSITY INSTITUTE, FLORENCE

ROBERT SCHUMAN CENTRE

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Abstract

The European Union's Fifth Environmental Action Programme has designated the energy sector as one of the five sectors particularly crucial on the path 'Towards Sustainability'. Current energy trends are clearly unsustainable. Not only are energy activities implied as major culprits in numerous environmental problems, including acid rain and the greenhouse effect; the wastefulness of the system (due to inefficiencies in power stations, in industrial processes, buildings and domestic appliances) is also sub-optimal in economic terms.

There are a range of opportunities for improving efficiencies and reducing environmental impact, both through technological solutions and behavioural changes. However, a number of barriers need to be overcome to realise these opportunities. Some of these are caused by institutional and regulatory structures, others by market failures. Clearly, some major changes are required, challenging in particular the supply-side orientation of the energy industry and requiring a better internalisation of external costs. However, as the European Commission has acknowledged, sustainable energy development is very challenging in a situation with abundant fossil fuel supplies at low cost.

This paper examines energy policy developments at EU level and in five member states (Germany, UK, France, Italy and Spain), focusing on a number of sustainability indicators (CO₂ emissions, energy efficiency and renewable energies). The aim is to identify the main constraints to, as well as facilitating factors for their improvement. While there are differences between the five countries, some general observations can be made. The paper will show that while there has been much rhetoric about sustainable development and energy, and some small steps in the right direction are being taken, there is no evidence of a real shift towards a more sustainable energy policy. Concern about short-term economic costs and the disproportional influence of industrial lobby groups are major obstacles, which under the current economic climate seem unlikely to change.

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Introduction

Energy production and use is a major contributor to a number of environmental problems. Detrimental effects can result during all stages of the energy cycle, from exploration to the final use of energy and the disposal of waste products. Of particular concern is the contribution of emissions from fossil fuel combustion to both air pollution and atmospheric changes, expected to lead to global climate change. In the UK, for example, fossil fuel combustion is responsible for 97% of carbon dioxide (CO₂) emissions, 95% of nitrogen oxides (NO_x) and 99% of sulphur dioxides (SO₂) (Department of Trade and Industry, 1995). A large proportion of these emissions (30%, 24% and 65% respectively) occurs at power stations, some in industry and the domestic sector, as well as a growing proportion in the transport sector (22% of CO₂ and 56% of NO_x emissions)¹.

In the case of SO₂ and NO_x, end-of-pipe technologies can, albeit at a relatively high economic cost, lead to substantial emission reductions. In the case of CO₂, emission abatement is a much more complex process, requiring fuel switching, efficiency improvements and a greater role for renewable energies. In some cases, such changes make economic sense, in others less so. Another important issue related to energy use is that of resource conservation. Fossil fuel resources are limited and although they may yet last for several hundred years (at least in the case of coal), current levels of usage nevertheless means living off the capital of future generation. Also, there are equity questions in that OECD countries account for over half of world energy consumption, with only one-third of the global population. Per capita energy consumption in Europe is 2.3 times the global average, that of the US even 5.4 times the global average (World Resources Institute, 1995).

At the same time, energy production and use pervades all economic activities. While its significance as an input factor in industrial production has declined as a result of the shift to a more service based economy, it nevertheless remains important, especially in the form of electricity. Electricity has become an indispensable, if often unnoticed, element in our daily lives, reducing both the time needed to perform daily chores as well as allowing us access to the information highway. In view of the environmental and economic importance of energy, it is clear that it needs to be at the centre of any sustainable development strategy.

¹ While the transport sector is included in energy use statistics, it does not usually come under the mantle of energy policy, but instead is separately dealt with under transport policy. This paper deals exclusively with energy policy issues.

Energy's pivotal role in the quest for sustainable development has been acknowledged almost universally, as statements from the EU, member state governments, industry and environmental pressure groups demonstrate. The EU's 5th Environmental Action Programme (EAP), for example, states that:

Energy policy is a key factor in the achievement of sustainable development. The challenge of the future will be to ensure that economic growth, efficient and secure energy supplies and a clean environment are compatible objectives (European Commission, 1992).

While there appears to be a consensus that change is necessary, the exact way of bringing it about is undetermined, with some advocating a focus on regulatory measures, some the use of market based instruments, while others feel that energy sector liberalisation will deliver the necessary changes. Particularly controversial is the role of nuclear power, which some consider the answer to the climate change issue, while others warn of the potential risks of accidents and problems of waste disposal.

The aim of this paper is to examine the integration of sustainable development objectives into energy policy, both at EU level and in a number of EU member states. The analysis of the implementation of the sustainable development concept can be approached from different angles. Firstly, one can look at the changes in decision-making processes, focusing on four areas which Smith (1996) has identified as the main themes of Agenda 21: the integration of economic, social and environmental considerations in decision-making; participation, capacity building and empowerment. Secondly, one can analyse the effectiveness of the policies and the instruments applied in relation to some quantitative sustainability indicators, in the case of energy relating to trends regarding energy efficiency, renewables and fossil-fuel use, for which governments have already set some targets. This paper focuses in the latter, although some attention is also afforded to decision-making processes.

The paper commences with a discussion of the sustainability issue as relevant to the energy sector, with reference to some key indicators, targets and instruments. This is followed by a discussion of the EU's role in a sustainable energy policy. The main part of the paper consists of an empirical analysis of energy policy developments in five member states, drawing on the results of the Climate Change Policies project recently completed at the European University Institute. Developments in Germany and the UK will be discussed in some detail, while the situation in France, Italy and Spain will be considered more briefly. Conclusions will then be drawn about the constraints to and opportunities for a more sustainable energy policy in the European Union member states.

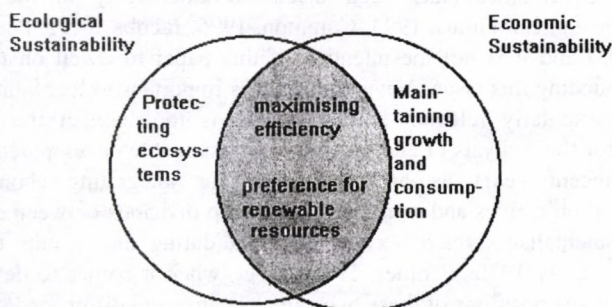
Sustainability and energy

Sustainable development has been discussed extensively in the academic literature (see e.g. Bartelmus, 1994, Common, 1995, Jacobs, 1991, Pearce, 1993, Turner, 1993) and it is not the intention of this paper to dwell on the general debate surrounding this issue. Nevertheless, it is important to highlight a number of points particularly relevant to energy, so as to establish the contextual framework for the analysis of energy policies. Sustainable development has been hailed in recent years as an opportunity for integrating economic and environmental objectives and overcoming the deep divisions between economists and environmentalists, which became apparent during the 'Limits to growth' debate of the early 1970s (Collier, 1994a). Yet, when it comes to definitions of sustainability, the positions of these two camps continue to differ fundamentally.

In the environmental sciences, sustainability essentially relates to the preservation of ecosystems. The objective is to cause as little disturbance to the natural environment as possible. Ecosystems have some resilience to disturbance, but industrialisation and economic development have already caused some fundamental changes. Hence, the concern of environmentalists is not just with maintaining the current status quo, but also with reducing environmental damage and improving or even re-creating certain habitats, as well as preventing future damage. The concept of ecological carrying capacity can be employed in this context (Jacobs, 1991). However, as Common (1995) points out, ecological sustainability is not a well-defined state, to be attained by following some simple rules. Hence policy-makers generally have to deal with a degree of uncertainty.

Meanwhile, economists are mainly concerned with the continuation of current patterns of economic growth and consumption, which is influenced by various resource limits. Their calculations focus on a finite stock of non-renewable resources and ways to sustain consumption despite this. Common (1995) has argued that the attainment of this kind of sustainability could be consistent with massive environmental degradation, as long as this does not in turn influence the performance of the economic system. However, even from an economic viewpoint, current energy patterns are unsustainable, at least in the long-term, as they rely on non-renewable resources and are wasteful. As far as energy is concerned, there is thus some common ground despite differing interpretations of the sustainability concept, as figure 1 illustrates.

Figure 1: Ecological and economic sustainability spheres



These two perceptions of sustainability² are reflected in the distinction made in the EU between sustainable 'growth' (as in the Treaty on European Union) and sustainable 'development' (as in the 5th EAP). While the two terms appear sometimes to be used interchangeably, sustainable development as a concept is much broader and includes quality objectives, while sustainable growth focuses on quantity (Bartelmus, 1994). This distinction between quantity and quality is particularly relevant in the energy context. The overall quantity of energy produced and used is not necessarily related to economic, environmental or social indicators. For example, the useful energy obtained from burning one tonne of coal can vary from between 20% (in a very inefficient power station, e.g. in Poland) to 85% (in an efficient combined heat and power (CHP) station, supplying both electricity and heat, e.g. in Denmark, Germany or Sweden). At the same time, an equal amount of electricity can operate a similarly sized refrigerator for five hours, or only for one hour, depending on the appliance's efficiency.

Within this context, it has to be understood that energy consumers, whether industrial or domestic, are generally not very bothered about how the energy they use was produced. They are not even very interested in energy *per se*, but want to have a functioning machine, appliance or a warm house, with cost as a major factor of interest, as well as ease of use. Energy quite clearly is not a desired good as such, but a means for providing a service. Sometimes, the same service can be supplied either through so-called 'negawatts' (i.e. energy efficiency

² This typology is somewhat simplistic. In reality, the sustainability spectrum contains at least four different positions, varying from very weak to very strong sustainability (Pearce, 1993).

improvements), or by supplying additional kWh (von Weizsäcker, Lovins and Lovins, 1995). When addressing the issue of sustainability in the energy sector, the quality of the energy service supplied is thus of crucial importance.

There has actually been almost universal agreement by policy-makers at EU and member state level that the key objectives of a sustainable energy policy have to be the following:

- improvements in energy efficiency;
- a move towards a less carbon-intensive energy structure;
- particular emphasis on renewable energy options.

Energy efficiency is considered a particularly important cornerstone as it offers the greatest promise for compatibility between economic and environmental objectives. As the International Energy Agency (IEA, 1991) has shown, there are still large cost effective efficiency potentials. In terms of shifting to a less carbon-intensive energy structure, nuclear energy and renewable energies are the obvious options. However, nuclear power remains the most controversial energy source. In sustainability terms, issues such as the environmental effects in case of an accident, the limited availability of uranium in the long-term, as well as the high economic costs, give this energy source bad credentials. Renewable energies vary considerably in their potentials between EU member states (see European Renewable Energy Study, 1994) but clearly have to form the cornerstone of long-term sustainability. Meanwhile, natural gas, when used in efficient combined heat and power stations and direct applications, can offer an interim³ solution, as Flavin and Lenssen (1995) have argued.

Targets and instruments for a sustainable energy policy

While there is a reasonable consensus on the key elements of a sustainable energy strategy, the extent of change necessary, and the instruments to be employed, have been debated fiercely. Obviously, the demands of environmentalists far exceed the targets set by policy makers. For example, Friends of the Earth, in a report on 'Sustainable Europe', elaborated by the respected Wuppertal Institute, proposes the following targets for a sustainable energy future:

³ While natural gas has a carbon content of around 60% that of hard coal, emissions are not eliminated, methane leakage can be a problem and resource limitations are an important issue. An energy system extensive based on natural gas can thus not be considered sustainable.

Table 1: Friends of the Earth sustainable energy assumptions

	1990	2010	2030	2050
CO ₂ emissions (t/cap/year)	7.3	5.4	2.3	1.7
Primary energy use (GJ/cap/year)	123	98	73	35
Renewable energy use (GJ/cap/year)	7	20	36	35
Fossil fuel use (GJ/cap/year)	100	78	37	25

Source: Friends of the Earth, 1995

The targets are based on the need for eventual reductions in CO₂ emissions of 70-80% in order to stabilise concentrations in the atmosphere during the next century, as identified by the Intergovernmental Panel on Climate Change. Clearly, these targets can be disputed in view of the huge uncertainties associated with climate change, but at the same time cannot be rejected out of hand. Meanwhile, it is generally accepted that current trends in CO₂ emissions and energy consumption are not sustainable and a number of targets have been set to bring about changes. At EU level, the targets within this context are as follows:

- stabilise CO₂ emission by 2000
- 8% share of renewables in total energy supply by 2005
- a tripling of electricity generation based on renewables by 2005

These targets were set in 1992 as part of the climate change strategy discussions, but it now seems unlikely that they will be achieved (see below). One problem is the disagreement about the type of policy instruments to be applied to achieve these targets. It is not the aim of this paper to examine the issue of appropriate policy instruments in any detail but a number of observations are important for the empirical discussion in later sections.

Traditionally, intervention in relation to energy efficiency and renewable energies has consisted of grants and subsidies, as well as regulatory intervention, for example in the shape of building standards. As the sustainable development issue is coinciding with a growing concern about the negative economic effects of various forms of state intervention, and a resulting pressure for deregulation or at least re-regulation, economic instruments, such as carbon taxes, have received much interest (Collier and Golub, 1996).

The use of taxes as a means of internalising the clear external costs associated with energy appears promising. However, the valuation of these external costs is far from straightforward (Stirling, 1992) and there are other problems such as the high price elasticity of energy demand (Barker, Ekins and Johnstone, 1994), as well as a range of other market failures (Jackson, 1992). To be effective, a carbon tax would probably have to be set at a level which would be highly socially regressive, economically damaging and politically unacceptable. However, a greater degree of internalisation of the external costs of energy production and use is clearly desirable to re-dress the balance between renewable and non-renewable resources, and between demand-side management and supply expansion. Carbon/energy taxes have a place in a sustainable energy strategy, especially if some of the receipts are used to support other measures (e.g. subsidies for renewable energies), but they will have to be applied gradually and with compensatory measures.

It has been argued, for example by the UK government, that current trends towards greater competition and liberalisation in the energy sector will almost automatically lead to a more sustainable energy system (Department of Trade and Industry, 1995). It is indisputable that the supply-side orientation of the energy sector, which in most countries has been operating as a public monopoly, has been a major obstacle to demand-side management and the development of renewable energies (Collier, 1994a). However, with the many market failures existing in the energy market, competition alone cannot provide environmental protection (Collier, 1997a, Eikeland, 1995). There is thus a need for an effective regulation of energy companies. In the US, a wide experience with demand-side management has been gained over recent years (see e.g. Hirst, 1994) and some valuable lesson for regulatory changes can be learnt.

The implicit assumption in the rest of this paper is thus for comprehensive public policy measures to promote a sustainable energy path. These can take various forms, such as subsidies, taxes, regulatory standards and provisions or voluntary agreements, with such instruments generally being complementary rather than effective on their own.

The lack of an EU framework

When discussing progress towards a sustainable energy policy at EU level, it has to be recognised that EU as a supra-national body has limited energy policy competences. Member states have been very reluctant to cede sovereignty in this sensitive area of economic policy (Collier, 1994a, McGowan, 1996). The Treaty on European Union talks specifically of 'measures' rather than a 'policy' in the energy area. While around 100 directives, regulations and decisions are in existence relating to energy, these have been relatively inconsequential, with the real power remaining with the member states. Nevertheless, there are a number of measures in the areas of energy efficiency and renewable energies, as well as a technology R&D programme, with a focus on environmentally beneficial technologies. Furthermore, there have been various Commission Communications and Council Resolutions on the theme of a common energy policy, including periodical resolutions setting common energy objectives, although member states have seldom taken much notice of these common objectives. Environmental concerns were first mentioned in the 1973 'Guidelines and priority actions for Community energy policy'. The most recent common objectives were agreed back in 1986 (to be achieved by 1995), and included the need to achieve balanced solutions between energy and the environment (Collier, 1994a).

The theme of integrating an environmental dimension into EU energy policy subsequently gathered speed, mainly as a result of the climate change concern. A Communication on Energy and the Environment in 1990 was followed in 1992 by Commission proposals for a climate change strategy. This promised some real progress towards greater sustainability, providing for a carbon/energy tax, an energy efficiency programme (SAVE), and a renewable energy programme (ALTENER). However, the realisation of the proposals has proved difficult (Collier, 1996). Firstly, the carbon/energy tax has had a troublesome time. Industrial opposition resulted in some early concessions for energy-intensive energies but the member states have found no agreement. A number of member states (Austria, Denmark, Finland, the Netherlands and Sweden) have introduced their own carbon taxes and are still keen on pushing for a common tax. However, other member states, in particular the UK and Spain are unlikely to change their opposition. A common approach to cost internalisation is thus likely to remain elusive.

Secondly, ALTENER is a very weak programme. Renewable energies have featured in EU energy discussions since the mid-1985, but it was not until 1993 that specific numeric targets were adopted in conjunction with ALTENER (Grubb, 1996). According to this, in order to reduce CO₂ emissions by 180 Mt by 2005, the following are to be achieved:

- increasing renewable energy sources' contribution in the coverage of total energy demand from 4% in 1991 to 8% in 2005
- trebling the production of electricity from renewable energy sources (excluding large hydro)
- securing for biofuels a market share of 5% of total fuel consumption by motor vehicles (European Commission, 1993b)

To assist the achievement of these objectives, 40 million ECU of EU funding has been allocated over the first five years, mainly to be used for various pilot studies. Considering Grubb (1996) has estimated that achieving the electricity sector target alone would require the redirection of over 20 billion ECUs of investment from 1995 to 2005, this sum appears very modest, in particular in view of the current low energy prices and the failure to agree on the carbon/energy tax.

The situation is similar as far as the SAVE programme for energy efficiency is concerned. This consists of financial assistance for various pilot projects (a total of 40 million ECU for the period 1992-1996)⁴ and a so-called framework directive, which leaves member states so much flexibility in its implementation that the Commission itself has already commented that the estimation of the effects of SAVE is highly uncertain (European Commission, 1994). The Commission proposed a budget of 150,000 ECU for the period 1996 to 2000 (SAVE II), aiming at energy savings of 60-70 million toe per year by the year 2000. However, the proposal failed, mainly because of German opposition to increased expenditure, and a budget of only 45 million ECU was approved. It is thus unlikely that SAVE II will be any more effective than SAVE I.

There is also a directive on energy efficiency requirements for electric refrigerators and freezers, which was initially proposed by the Commission in December 1994. The standards were weakened by the Council, then scaled up by the European Parliament, with the Council adopting the directive in 1996 on a compromise level, requiring an initial energy efficiency improvements of 15% (compared to average consumption rates) within three years⁵. While this level is far below what the best appliances in the market are already achieving, appliance manufacturers were lobbying Brussels heavily to renounce the proposals in favour of voluntary agreements.

Furthermore, there is a proposal concerning rational resource planning in the gas and electricity industries, an idea which was first discussed in the Commission in

⁴ For example, 30 least cost planning studies were financed.

⁵ *Europe Environment* No. 472, 7/3/1995, p.II,1.

1991. However, the proposal was not published until September 1995, mainly because of opposition by the Industry Commissioner Martin Bangemann⁶, concerned about the compatibility of the proposal with parallel proposals for energy market liberalisation. Opposition from the energy lobby, in particular the electricity association Eurelectric continues and there are doubts that this proposal will ever pass through the Council. The proposal draws on the US experience with Integrated Resource Planning (IRP), which obliges energy companies to consider demand-side management (DSM) when planning new capacity needs. The directive would require member states to establish procedures whereby electricity and gas distribution companies have to periodically present integrated resource plans to the competent authorities. Furthermore, member states are expected to review existing legislation to ensure mechanisms are established which permit the companies to recover expenditure on energy efficiency programmes (European Commission, 1995).

It is not clear how rational resource planning could operate in an ever more competitive market, as in the US IRP is required from companies who have regional monopolies. The introduction of competition in California, for example, is now threatening DSM programmes (Collier, 1997a). Market liberalisation has been on the EU agenda since the late 1980s within the context of creating an Internal Energy Market (IEM). After a long deadlock, the Council finally agreed on market liberalisation in June 1996. National energy markets, currently in most countries dominated by monopoly supply companies, will now be gradually opened up⁷. This does not mean unrestricted competition but rather access for large industrial consumers to the supplier of their choice (Third Party Access TPA). The ultimate aim of the IEM is to achieve lower energy prices as a means for improving industrial competitiveness, which would provide an even greater disincentive to energy efficiency. In general, the negotiations for greater energy sector liberalisation have paid little attention to environmental concerns (Collier, 1994a).

The need to reconcile between competitiveness and environmental protection objectives in energy policy has been one of the themes of the recent Commission White Paper on energy policy. This stresses the need to meet environmental challenges but offers little in terms of actual measures:

Exploring the complementarities between energy and environment must be done in the framework of sustainable development; there is, in particular, scope for a

⁶ *Europe Environment* No. 462, 3/10/95, p. 1, 15-17.

⁷ Initially (as of 1999), 23% of markets are to be opened up, increasing to 33% after six years.

closer interface between competitiveness, job creation and environment (European Commission, 1995a).

The White Paper proposes a number of initiatives, namely:

- a Communication and possible proposals on a taxation policy to promote energy efficiency - but not until 1998
- a Communication on a strategy for the promotion of cogeneration (1997)
- a Communication on energy management in the cities and regions, and on the islands (1997)
- a Communication on a strategy to promote renewable energy sources on the market

However, Communications alone are unlikely to make much difference, as past experience denotes. The Commission itself, in a recent review of the 5th EAP, admits that despite the existence of potentially effective instruments to bring about change, an incentive to move to a more sustainable approach is missing in the energy area (European Commission, 1995b). Especially in view of the subsidiarity debate, it appears unlikely that the member states are going to accept stronger measures in these areas at the EU level. Hence, the onus for implementing sustainable energy policies will remain with the member states. The next sections will explore how they are faring to date.

Energy policy developments in the member states

A main reason for most member states having been so reluctant to concede energy powers to the EU can be attributed to the heterogeneous nature of the energy sector in different member states, both in terms of structures and fuel use. Energy policy priorities vary both in relation to these and other economic factors (McGowan, 1996). In general, the energy sector has been one sector which has seen a particularly high level of state intervention, both through regulation and, possibly more importantly, through the public ownership of energy companies, which is now being increasingly challenged (Collier, 1997a). This has coincided with the increased attention afforded to environmental issues and the notion of sustainability, and some tensions are evident.

The discussion in the following sections will centre on developments regarding CO₂ emissions, energy efficiency and renewable energies in a selected number of countries. It has been decided to not focus the analysis on the member states generally known for their commitment to environmentally compatible

developments (namely the Netherlands, as well as Denmark and Sweden) but to cover the five largest member states, who because of the high share of emissions (e.g. 80% of total EU CO₂ emissions), high energy consumption (78% of the EU total) and high fossil fuel consumption (except in the case of France) are the major culprits for the unsustainability of current trends in the EU as a whole.

First of all, two detailed case studies of Germany and the UK are presented. Comparing these two countries is particularly interesting for a number of reasons. Firstly, from an environmental point of view, they are the two largest CO₂ emitters in the EU, together accounting for nearly half of total CO₂ emissions (1990 levels). Secondly, they both exhibit a high dependency on coal in electricity generation. Yet, at the same time they contrast in a number of areas. Germany is generally seen as an environmental 'leader' country, while the UK is considered a 'laggard'. Furthermore, the UK has gone furthest along the privatisation and liberalisation path, while Germany still has a monopoly system, as well as a high degree of public ownership. Shorter case studies of France, Italy and Spain are then presented.

Germany - the leader of the pack

Germany is generally considered one of the environmental policy leaders in the EU (Héritier, Mingers, Knill and Becka, 1994). As far as air pollution from the electricity sector is concerned, Germany has the strictest legislation in the EU and during the 1980s has embarked on an expensive programme of retrofitting existing coal fired stations with flue gas desulphurisation units and low NO_x burners. In response to the climate change issue, Germany has set the most ambitious reduction target in the EU, aiming at a 25% reduction of CO₂ emissions by 2005, based on 1990 levels. In energy policy, environmental protection is officially accorded priority with security of supply, economic viability and resource conservation (Bundesministerium für Wirtschaft, 1992). However, according to Mez (1995), there is a large gap between policy formulation and implementation.

Germany does not have a comprehensive energy policy incorporating sustainable development. A main problem is political dissension about the role of nuclear power. Currently, nuclear power supplies 40% of energy needs. The opposition parties SPD and *Die Grünen* have promised a shut-down of the nuclear plants, and have delayed licensing procedures in a number of *Länder* (federal states) where they are in power. An attempt has been made to resolve this impasse, the Government embarked on the so-called energy consensus talks in 1993, including representatives from the opposition parties, the energy companies, industry and environmental groups in an attempt to frame the future energy policy. However,

no agreement could be found regarding nuclear power and the talks came to a halt in late 1995 (Huber, 1997). Also, they almost entirely centred on supply side options rather than seriously discussing a possible greater role for demand-side management (von Weiszäcker et al, 1995).

Nevertheless, Germany shows some positive trends with regards to sustainability indicators. Between 1990 to 1994, the use of coal fell by 27.7%⁸ and CO₂ emissions decreased by 11.5% during the same period (Bundesministerium für Wirtschaft, 1995). In terms of CO₂ reductions, Germany is thus ahead of the other EU member states. However, these trends are almost exclusively attributable to the collapse of the industrial sector in the former GDR subsequent to unification, rather than specific policy activities (Huber, 1997). Industrial restructuring is resulting in a much less energy-intensive economy, although energy consumption is expected to resume an upward trend towards the end of the 1990s. Furthermore, restructuring of the energy sector itself is yielding environmental benefits. The energy sector in the ex-GDR was dominated by inefficient brown coal power stations, as well as heat only plants. Energy efficiency both in homes and in industry was poor. Now, most old electricity plants are replaced by efficient combined-heat and power (CHP) plants, often gas-fired, and energy efficiency criteria are being included in the renovation of buildings.

At the same time, in the rest of Germany, energy efficiency has been somewhat neglected, at least as far as federal policy is concerned (Collier, 1994a). The situation should improve somewhat through a new law introducing tax breaks for various energy efficiency investments and renewable installations in owner-occupied housing, which came into force in January 1996. Also, a number of Länder and local authorities have drawn up ambitious energy efficiency programmes. Overall, Germany has the largest public sector energy end-use efficiency budget (both in total and per capita terms) in the OECD (IEA, 1995). However, as Jochem, Gruber and Mannsbart (1996) point out, these figures are dwarfed by the large subsidies for domestic coal.

Renewable energies are currently only contributing 4.7% of electricity consumption, 3.9% of which comes from hydropower. Although Germany has a smaller potential than a number of other EU countries, it has now the largest installed wind capacity in Europe (1127 MW at the end of 1995). While windpower has benefited to some extent from government subsidies, the main boost for renewable energy was provided through the *Einspeisevergütung*

⁸ Although, while there has been an overall fall in fossil fuel consumption, oil and gas consumption have seen substantial increases, of 8.5% and 11.9% respectively.

according to the *Stromeinspeisungsgesetz* (energy feed law) of 1991. This law obliges the public energy companies to buy renewables-generated electricity into their grids at a fixed percentage (90% in the case of wind) of the end-price to customers⁹. It has been estimated that this is equivalent to a 150 million DM.¹⁰ However, a number of regional energy companies have refused to pay these higher fees and brought a court case, questioning the constitutionality of such a measure. The issue remains unresolved and the situation of renewable energies uncertain, in particular in view of liberalisation moves.

As Germany has a strong federal structure, it is important to look at policy developments at regional and local levels as well. In fact, it is at the local authority level (at least in a number of cases) where sustainability is taken more seriously. This concern precedes Rio and the Local Agenda 21 discussion, with many local authorities involved in drawing up environmentally-focused local energy plans since the early 1980s, initially both because of opposition to nuclear power and the oil price hikes¹¹ (Collier, 1994b). German local authorities are indeed well placed to implement local energy policies in that most of them own local energy companies (*Stadtwerke*) as shareholders, the investment choices of which they can to some extent influence politically. These are primarily responsible for energy distribution but, especially in the larger cities, can also be important electricity generators. In recent years, local energy plans have become increasingly focused on climate change, as well as the sustainable development issue.

It is beyond the scope of this paper to discuss local energy plans in any detail, so only one example will be given, the town of Saarbrücken (population 192,000). Saarbrücken has won a number of prizes for its efforts to promote a sustainable energy system, including a UN prize at the Rio summit. The 'Zukunftskonzept Energie' was originally conceived in 1980, with a major focus on the heating sector aiming at the replacement of oil-fired boilers through the expansion of district heating and gas. Particularly interesting in climate change and broader sustainable development terms is the commitment to utilise coal, which is a local resource (both for security of supply and job protection reasons). The environmental effects of this policy are minimised through the use of efficient CHP plant. A subsidy scheme for photovoltaics also exists, aiming at the installation of 1000 kW (0.5% of overall demand) by 2000. Furthermore, there

⁹ e.g. for electricity from solar or wind, generators receive 17.28 Pfg./kWh, while the companies argue that their avoided costs amount to less than 10 Pfg./kWh.

¹⁰ as reported in *Renewable Energy Report* 8, 9/12/94, p.10

¹¹ In Germany, the heating sector has been heavily based on oil, which is slowly being replaced by district heating and gas boilers.

are various energy efficiency information activities and grant and loan schemes. Through these activities, some impressive results were achieved, including the reduction of CO₂ emissions by 15% between 1980 and 1990 and a reduction of heat requirements from 1870 to 1550 MW_e, despite a growth in the number of households (Collier, 1994a).

A further reduction of CO₂ emissions by 25% by 2005 has been set as a target but it appears unlikely that this can be achieved under current circumstances. Apart from local authority budget cuts, a main problem is the low level of energy prices which is determined by regional authorities, but also highly influenced by industrial lobbying and federal framework measures. Discussions about the imposition of a carbon tax have made little headway in the face of industrial opposition and energy prices will decrease through the abolition of the *Kohlepfennig*, a 8.5% surcharge on electricity bills to support domestic hard coal¹², linked to an obligation on producers to use a certain tonnage of domestic coal. Discussions took place between various municipal energy companies and the regulatory authorities at the Land level to allow them to maintain at least part of this surcharge for financing demand-side management options. However, as the larger energy companies refused to go along with the idea, this plan had to be abandoned (Brück, 1995). Thus, although many local authorities have the political commitment to sustainable energy development, they are very constrained in their actions through the regional and federal policy context.

While CO₂ emissions are on a downward trend, a recent study by the Prognos Institut suggests that they will only be reduced by 10.5% by 2005¹³, which constitutes a considerable short-fall to the federal target. Jochem et al (1996) argue that there are major contradictions in national policies, stemming from the divergent approaches and concerns of different ministries. Recently, sustainable development has hardly featured as a priority issue in government policy making, which is becoming ever more pre-occupied with finding short-term solutions to current economic problems and is very perceptive to a strong industrial lobby.

¹² The *Kohlepfennig* was declared unconstitutional by the Federal Constitutional Court. In principle, the abolition of this subsidy should be beneficial in that electricity producers can now freely choose other, less carbon intensive options. However, at the same time lower energy prices will act as a disincentive to energy efficiency improvements.

¹³ As reported in *Stromthemen* 2/96, p.3

The United Kingdom - liberalisation as a panacea?

In contrast to Germany, the UK was long known as the 'dirty man' of Europe, mainly because of high SO₂ emissions from the power sector. However, now the UK government prides itself for being at the forefront of international efforts to reduce CO₂ emissions, with emissions projected to fall by up to 8% by 2000, exceeding the government target of emission stabilisation. Furthermore, considerable importance appears to have been attached to the sustainable development issue. The Government published a sustainable development report in 1994 and subsequently has established an independent Round Table on Sustainable Development, aiming at a dialogue between all relevant actors, including industry, NGOs and regulators. Energy has been an important focal point of both activities. A recent government energy policy report stresses the need for 'secure, diverse and sustainable energy supplies' (Department of Trade and Industry, 1995). A number of targets have been set which promise some steps towards greater sustainability:

- 1500 MW of renewable energy by 2000
- 5000 MW of CHP by 2000

Similarly to Germany, the projected emission reductions are a windfall, little to do with specific policy action. The basis of energy policy in recent years has been the privatisation and liberalisation of the electricity and gas sectors, with little attention afforded sustainability issues in this process (Collier, 1997b). Pre-privatisation, UK energy trends were clearly unsustainable; electricity generation was dominated by coal, investment in renewables was almost non-existent and there was little attention paid to energy efficiency. The main result of electricity privatisation has been a large scale investment in combined-cycle gas turbines (CCGTs), accompanied by a reduction in coal-fired capacity.

While this development has environmental benefits, it does not exactly meet sustainability criteria. Although CCGTs are more efficient than conventional coal plant (up to 50% compared to 38%), none of the new CCGT plant will operate as CHP plant, thus resulting in a substantial resource wastage. The more liberalised energy system has provided some incentive for smaller scale CHP plant, but it currently looks as if the government target of 5000 MW of CHP capacity by 2000 will not be reached (Collier, 1997b). Resource conservation issues have never featured in the liberalisation debate and investments are driven by short-term economic considerations only.

There are also negative effects in the area of end-use energy efficiency. The Government's sustainable development strategy clearly states that 'energy

markets should operate within frameworks which do not undermine efforts to improve energy efficiency' (HM Government, 1994, p.131). However, the evidence so far is that privatisation has done little to promote energy efficiency and may result in doing the opposite. The Government set up the Energy Saving Trust (EST) in 1992 which was supposed to be funded by a surcharge on gas and electricity consumers and result in £400 million of energy efficiency investments per annum by 2000. However, regulators for both sectors refused to collaborate fully, and the EST has had to substantially scale down its plans. The regulators' line of argument was that as supply is being liberalised, the market will provide incentives for companies to promote energy efficiency. Considering the existence of other market failures, this argumentation is rather dubious. Meanwhile, the government decided to support the Trust with £25 million, with a further £100 million of grants available through the Home Energy Efficiency Scheme. Yet, both measures have been cut back severely in the last budget and there the Government's energy efficiency policy is essentially in tatters (Collier, 1997b).

There is little doubt that the UK has one of the greatest potentials for renewable energy in the EU. Its island and specific geographic position ensures high wind speeds (both on and off-shore), large tidal ranges as well as waves with high energy densities. A government appointed renewable energy advisory group suggested that by 2025, around 20% of electricity supply could be provided by renewables (Renewable Energy Advisory Group, 1992). Privatisation saw the introduction (if somewhat reluctantly) of a new subsidy system under the so-called Non-Fossil Fuel Obligation (NFFO). This certainly has improved the situation for renewable energies, which previously had only received inadequate research and development support. However, Mitchell (1995) argues that there has been too much emphasis on costs, and not enough on environmental impacts, diversity and longer-term options. Even though the target for 2000 may be achieved, the contribution of renewables in electricity will remain marginal.

As far as the local level is concerned, UK local authorities have been very active in the sustainable development debate and many have drawn up Local Agenda 21 strategies, with a major focus on the energy sector. One problem is that in comparison with German local authorities, the UK ones have relatively little scope for action, due to the lack of influence on the privatised energy companies. Nevertheless, there is a large potential for energy efficiency improvements in municipal buildings and facilities (Fleming, 1994). A number of towns and cities (notably Cardiff, Leicester and Newcastle) have been very active in developing sustainable energy plans. However, as in Germany, local policies cannot operate in isolation and their effectiveness will be limited while there are negative developments at the national level, especially as concerns energy prices and budget cuts.

Meanwhile, nuclear power has been a clear loser, as electricity sector privatisation has exposed its true economic costs. No new nuclear plant are likely to be built under current market conditions. While this can be seen a positive development in sustainability terms, the overall assessment of the UK situation has to be much less favourable. There is no clear government strategy as to a sustainable energy policy and market forces are being relied on. Without any attempts at cost internalisation, this strategy will not work. According to Manners (1995), more attention needs to be paid to the use of market instruments and regulatory intervention in certain key sectors of the energy market. The problems have also been recognised by the Round Table on Sustainable Development, which has argued that the energy regulators must be given a clear sustainable development mandate and a major coherent policy effort in the energy efficiency field is necessary¹⁴.

France - relying on nuclear power

French energy policy is characterised by the overall priority allocated to nuclear power. France is the only member state in which nuclear power has not encountered any major problems, resulting in a substantial generating overcapacity and France becoming a large electricity exporter of electricity. Currently, nuclear power accounts for 45% of energy supply, with just over 80% of electricity generation provided by nuclear power. An additional 15% of electricity is generated with hydropower. Consequently, France has low per capita emissions of CO₂ and air pollutants. The French government prides itself for having reduced CO₂ emissions by a quarter since 1980. However, as discussed earlier, nuclear power with all its associated risks and costs cannot necessarily be considered a sustainable energy source even if it has benefits as far as emissions are concerned. Sustainable development in general has received little attention but the need to better integrate environmental concerns into energy policy was recognised by the 1994 Sauviron Report, the outcome of a government initiated national debate on energy policy. According to Finon (1996), the report reflects a certain change of the balance of concerns regarding energy and environment policies. Some of the report's recommendations are now being implemented (IEA, 1996). Furthermore, an Interministerial Committee was set up to elaborate France's climate change strategy.

Both the Sauviron Report and France's climate change strategy stress the need to improve energy efficiency policies. In principle, energy efficiency has been one of the cornerstones of French energy policy (Giraud, 1997). The policy has relied on high taxes on fuels, information programmes, subsidies, as well as building

¹⁴ As reported in *ENDS Report* No. 252, January 1996, pp.8-9.

regulations, with an active role for the Energy and Environment Agency ADEME (*Agence de l'Environnement et la Maîtrise de l'Energie*, also responsible for renewable energies). However, efforts to date have been inadequate and in recent years ADEME's budget has been cut back severely¹⁵, at the same time as falling energy prices have meant reduced market incentives for energy efficiency investments. There are some signs of improvement. New building standards will be introduced in 1997, allowing improvements of 10% (domestic sector) and 25% (commercial sector). Furthermore, a number of demand-side management pilot projects are being run by *Électricité de France* (EdF), the public monopoly electricity company, although funding has been less than a third of that planned (IEA, 1996). A main problem is that because of the existing generating overcapacity, EdF has no incentive to invest in demand-side management.

Renewable energies currently play a minor role, with 3.5% of primary energy requirements, provided mostly from hydropower and biomass, especially wood burned in domestic heating systems. EdF has an obligation, based on a degree of December 1994, to purchase co-generated and renewables-based power from independent producers. Previously, Government support for renewables had been very modest compared to many other EU member states. Currently, most of the renewables grants and subsidies are directed towards biofuels (mainly as substitute fuels for the transport sector), although various reports have raised doubts over both the cost-effectiveness and the environmental benefits of such a programme (IEA, 1996). Here, the governments concern is less with realising a sustainable energy policy, but more with reforming agricultural policy, as also exemplified by the aim to increase the share of wood in energy consumption (from 9 to 13 mtoe between 1990 and 2000, Finon, 1996).

Giraud (1997) has argued that the development of renewable energies is hampered by EdF's desire to increase electricity consumption because of nuclear overcapacity. Nevertheless, there are signs of the Government taking a greater lead on renewable energies. In 1994, the Ministry of Industry launched a subsidy programme for the installment of 20,000 solar water heating systems by 2000, focusing particularly on the French overseas departments. Furthermore, an agreement has been drawn up between ADEME and EdF for the development of renewable energies in rural areas, with an annual budget of 100 MF. Additionally, an expert group on wind energy was established in 1995 and in early 1996 a call for tender for 250 to 500 MW of wind energy by 2005 was launched¹⁶.

¹⁵ The budget was cut by 60% from 1992 to 1993 and has remained at more or less the same level since.

¹⁶ As reported in *Europe Environment* no. 470, 6/2/96, p.4.

There is thus some evidence of a rethink in French energy policy, although driven mainly by concerns about the long-term economic costs of nuclear power rather than specific sustainable development considerations. Overall, French energy policy continues to be rather unbalanced and environmental concern remains low. CO₂ emissions are on an upward trend (with a projected increase of around 7.5% by 2000), due to inadequate policies in the transport sector, as well as the lack of substantial improvements in energy efficiency.

Italy - budgetary problems

Italy, together with Spain and Greece, is generally considered a laggard country in environmental policy, especially as far as implementation and enforcement are concerned (Pridham, 1996). However, in terms of per capita energy consumption, Italy fares much better than the previously discussed three countries and has the lowest energy intensity of all EU member states. Environmental awareness has been growing in recent years and the government published a sustainable development programme in 1993, as well as a climate change strategy in 1994, aiming at a stabilisation of CO₂ emissions by 2000.

Italian energy policy changed focus after the 1987 nuclear referendum, which resulted in the shutdown of Italy's nuclear power stations. Subsequently, in 1988, a National Energy Plan (NEP) was elaborated, with specific emphasis on energy efficiency and renewable energies. The OECD, in its environmental performance review of Italy, has praised Italy for its well integrated energy and environmental policies (OECD, 1994), on account of its emphasis on energy efficiency, especially as concerns the funding provisions under law 10/1991. However, while the plan might be impressive, its effect has been limited, due mainly to a lack of adequate budgetary resources to implement the legislation. Between 1991 and 1994, only 30% of the previously planned funds were allocated to energy efficiency, and in 1994 Italy had the lowest public sector funding for energy efficiency in the EU (IEA, 1995). The new Prodi government substantially increased the 1996 allocation, but then imposed new cuts in the face of the continuing Italian budget crisis. Signorino (1996) also points to further problems related to the diffused nature of responsibilities for energy efficiency and a lack of coordination between different competent authorities and actors.

Silvestrini and Collier (1997) have found that even in the absence of incentives, energy investments in industry have increased. To some extent, there are natural incentives for energy efficiency as Italy has the highest energy taxes in Europe, resulting in high energy prices for the domestic sector. Also, some funds have been available through ENEA, the government controlled energy and environment agency. Furthermore, a number of local authorities have become

more heavily involved in energy management, although, again, they suffer from budget constraints. Overall, there is a need for a comprehensive policy approach to exploit what the IEA (1995) has estimated to be a significant potential for cost-effective government measures in energy efficiency.

Italy has a good renewables resource, both for wind (especially on the islands) and solar power. However, to date only hydropower (2.3%) and geothermal energy (2%) make a significant contribution to primary energy requirements. The 1988 NEP set a number of renewables targets for 2000, including 300-600 MW of wind power, an additional 1.5 mtoe from biomass, as well as an additional 10 TWh from hydropower and 6 TWh from geothermal energy. The production of electricity from renewables was thus to rise by 44%, helped by grants amounting to 20-40% of investment costs. Again, similar to the energy efficiency situation, the incentives made available to date have been far less than initially promised. At the end of 1994, only 22 MW of wind power had been installed. However, Silvestrini and Collier (1997) expect the situation to improve rapidly as a result of increased reimbursement rates for wind generation and funding through the EU structural funds.

There are plans to privatise the state-owned electricity company ENEL, and the newly established regulatory authority has been given responsibilities for ensuring the integration of environmental concerns. The exact structure of the privatised industry is still unclear. In the meantime, after the last elections (April 1996), a green activist has been appointed as the president of ENEL. While there are signs that environmental concerns will be taken more seriously by the Prodi government, the situation in Italy has to be analysed with regards to general problems of a lack of implementation of policies and plans, both because of budgetary and administrative obstacles. These obstacles are unlikely to disappear in the near future.

Spain - trouble in store

Environmental concerns have not been high on the political agenda in Spain, which can be linked both to lower environmental pressures and high levels of unemployment, making fast economic growth an overriding priority. Labandeira (1997) argues that energy policy in Spain is primarily considered an economic development policy, with the aim of providing sufficient and affordable energy to fuel economic growth. This is typified by Spain refusing to fall in line with the EU target of stabilising CO₂ emissions. Instead, it proposed to limit emission reductions to 25%, although this target was tightened to 15% in December 1995.

Until recently, there has been a general lack of policy coordination between energy and environment ministries, with the first links between the two ministries established during the elaboration of Spain's climate change strategy. However, there are some signs of improvement and in March 1995, a Strategy for Energy and Environment was issued by the Ministry of Industry and Energy. Also, similar to Italy, the country does not fare badly compared with other EU countries as far as energy sustainability indicators are concerned. Spain currently has the second lowest per capita CO₂ emissions in the EU (above Portugal) and has a relatively low per capita energy consumption. The energy intensity of its economy is lower than that of Germany, France and the UK. However, CO₂ emissions per unit of GDP are relatively high and there are projections for a fast growth in CO₂ emissions and energy consumption.

Spain has had a nuclear moratorium since 1984 and has a high dependence on fossil fuels, especially on coal in electricity generation. Substantial state subsidies are paid to domestic coal producers (IEA, 1996), creating distortions in the electricity generation system. The 1991 energy plan was the first to include environmental protection as an objective, with the Savings and Energy Efficiency Programme (PAEE) as a major instrument. This focuses on subsidies for energy efficiency investments, fuel substitution, CHP and renewable energy. To date, most has been achieved in the area of industrial CHP, which now meets almost 6% of total electricity demand. However, this development has not found approval amongst the energy companies and recent regulatory changes are likely to provide a disincentive to further developments (Labandeira, 1997). Environmental issues have not been able to influence this negative decision.

In the energy efficiency field, a savings objective of 4833 ktoe by 2000 was set by the PAEE, but in the first three years of operation, less than one-tenth of this figure was achieved. As in Italy, lack of coordination and budget problems have been a negative influence. The public sector budget for improving end-use efficiency saw severe cuts between 1992 and 1994, although there have been new budget allocations since. Also, voluntary agreements for energy savings are being negotiated with industrial sub-sectors. Furthermore, the Ministry of Energy has provided 5,000 million pesetas for electricity producers to carry out pilot projects in demand-side management.

Renewables currently contribute around 3% of total primary energy demand in Spain, 2.3 % of which comes from hydropower. The objective of the PAEE is to increase the non-hydro contribution by 1.1 mtoe by 2000. At the time of writing, some renewables had already surpassed their initial year 2000 targets (wind power achieved 110.3% of the target and photovoltaics 112.4%). However, geothermal power had only reached 4.4 per cent of its target of 443 toe/year.

Some regional governments are very active in promoting renewable energies and the availability of finance from the EU structural funds is important. However, these positive developments will be more than compensated by the fast growth in energy consumption (and CO₂ emissions), originally estimated at around 25% between 1990-2000, expected as a result of economic growth. While, as a result of the economic recession, this growth is likely to be less marked, Spain's record regarding a number of energy sustainability indicators will nevertheless worsen. There has been no discussion about the possibility of a more sustainable type of development rather than economic growth at any cost. It is unlikely that the recently elected conservative government will pay any greater attention to the issue of sustainability.

Towards energy sustainability?

As the above sections have shown, there are some positive developments in the countries examined. It is useful to translate the findings into figures, so as to allow a more quantitative assessment of the progress towards energy sustainability. There are many uncertainties as regards, for example, the influence of energy efficiency measures (energy intensity is a rather inadequate measurement) or the scale of investments in renewables. Nevertheless, an attempt has been made in table 2 to summarise the likely situation for 2000 regarding a number of key indicators for the five countries, as well as the EU as a whole.

Table 2: Sustainability trends

	Ger	Fr	It	Sp	UK	EU15
	<i>(per cent)</i>					
1. CO ₂ emissions (1990-2000)	-10	+13	+3	+15	-8	+5
2. Coal consumption ^a (1990-2000)	-30	-5	+36	-32	-28	-21
3. Renewable share ^a (2000)	2.25	6.5	6.63	7.75	1.16	5.7
4. Energy intensity ^b (1990-2000)	-24.4	-3.3	-5.1	-9.8	-4.0	-20.1

^a in gross inland consumption
^b gross inland consumption/GDP (toe/1985 MECU)

Sources: Collier and Löfstedt, 1997 (1),
 Directorate-General for Energy, 1996 (2,3,4)

As can be seen, according to current projections, CO₂ emissions are on an upward trend, except in Germany and the UK. As regards coal use, trends vary with some countries increasing their consumption, others decreasing it. In the latter case, there are matching increases in gas consumption and, overall, fossil fuel use remains high. The share of renewables (other than hydro) will remain marginal, despite some major growth between 1990 and 2000. Energy intensity is falling, but not very fast and none of the countries is likely to experience a decrease in overall energy consumption. Longer term trends are even more difficult to predict, but it seems unlikely that under current policies, a more sustainable energy system will be realised.

While there are some differences between the five countries examined, some common observations can be made. Firstly, there is a major gap between the objectives and targets set in energy policy statements and/or sustainable development strategies, and the actual implementation of these objectives through policy measures. Out of the five countries, Germany has made the most ambitious announcements, especially as concerns the CO₂ target. However, as far as measures to promote energy efficiency are concerned, its policy is clearly lacking and incentives have been further reduced with the decision to lower energy prices after the abolition of the *Kohlepfennig*.

The same tensions exist in the UK, where privatisation and liberalisation in the energy sector has brought some short term benefits, in terms of lowering the carbon intensity of electricity generation. However, at the same time it has undermined the government's energy efficiency objectives, with the situation further exacerbated by the Government's preoccupation with cuts in public budgets to fund tax cuts. The UK, despite much rhetoric about its commitment to sustainable development, has so far failed to provide evidence of long-term sustainability thinking. Both the UK's and Germany's energy policies are characterised by various ad hoc policy measures but no coherent approach to integrating various objectives.

Meanwhile, in France, Italy and Spain, security of supply and economic issues continue as the main driving forces in energy policy, with scant attention to sustainable development objectives. The French focus on nuclear power is rather dubious in sustainability terms, and there is limited progress as far as energy efficiency and renewables are concerned. In Italy, severe budget constraints have hampered the implementation of what could be termed laudable plans and it seems unlikely that the situation will improve in the near future, considering continuing political and budgetary uncertainties. Political uncertainties are also an issue in Spain and the general message is one of growing energy consumption,

mainly to be met by fossil fuels, with some energy efficiency improvements and a reasonable growth in renewable capacity.

In general, it can be observed that the integration of environmental concerns into energy policy has been inadequate. While there has been an increased dialogue between environment and energy ministries, especially for the preparation of the climate change strategies, many energy policy decisions (e.g. on energy prices and the regulation of the energy industries) are still taken without much attention given to environmental concerns. Also, when policy tensions occur, the environment is almost always a loser. One problem might be that despite better integration in process terms (e.g. through interministerial committees), economic and industry ministries which are responsible for energy, still have not really grasped the concept of qualitative growth. Effectively, a value change is needed, away from a supply-side orientation.

Furthermore, powerful finance ministries tend to put the brake on budget expenditures. While budget problems can be serious, alternative funds can be made available, for example through third part financing models or through appropriate energy sector regulation¹⁷. Quite obviously, short-term thinking prevails amongst decision-makers, who are preoccupied with economic growth and industrial competitiveness, and influenced by a strong industrial lobby. As far as energy efficiency and renewable energies are concerned, some small steps into the right direction are being taken but they are insufficient and often hampered by other developments.

Some positive developments are also occurring at the local level in some countries (Germany, Italy and the UK) where a greater commitment to sustainable development than at the national level appears to exist. While such local initiatives are clearly important, especially in view of the Agenda 21 ideas about empowerment and participation, they cannot function in isolation. A sustainable energy system can only be achieved if European, national and local level activities are mutually supportive. At the moment, local authorities are operating in an essentially unfavourable context, especially as far as energy prices are concerned.

So what needs to happen for energy policies to become more sustainable? Clearly, the integration of environmental concerns needs to be taken more seriously, with further improvements to institutional cooperation and processes (e.g. through Strategic Environmental Assessment), as well as participatory

¹⁷ For example by allowing companies higher profits or prices increases (depending on the type of regulation) if they invest in demand-side management or renewables.

systems. The focus must be on making energy policy much more demand-side oriented. Energy companies have to be regulated so as to encourage demand-side management in preference to supply extension. The wider use of energy efficiency standards can also play a role. Steps have to be taken towards the internalisation of environmental costs into energy prices. Suggestions for a broader tax reform (e.g. European Commission, 1993) are interesting in this context. Renewable energies would likely to be a beneficiary of this, although in the short-term at least, support systems will need to continue¹⁸. Last but not least, efforts aiming at greater public awareness about energy efficiency have to continue, aiming to establish an energy saving culture. Here, local level activities are important.

But how likely are such changes? The current economic climate in Europe is not particularly favourable towards the above mentioned measures. Especially in the energy sector, there is substantial opposition to new forms of regulation, as exemplified by Euroelectric's opposition to the EU's rational resource planning proposals. Competition and deregulation continue as priority themes and a strong industrial lobby will continue to oppose any attempts to raise energy prices through taxes, even with compensatory measures. There is very little recognition of the contradictions between the pursuit of low energy prices and the need to improve energy efficiency. Unless the pre-occupation with energy prices *per se* (as opposed to energy costs more generally) changes, no real progress can be made. Some EU countries like the Netherlands, Sweden and Denmark have taken steps through the imposition of carbon taxes, showing that with enough political will, industrial opposition can be overcome.

Conclusions

This paper has shown that in the EU, to date, there is limited evidence of the implementation of sustainable development objectives through energy policy. On the positive side, the last few years, especially in response to the climate change issue, have seen a greater policy emphasis on energy efficiency and renewables. However, energy efficiency measures are taken on an ad hoc basis, often with no targets set and no concerted effort at demand-side management. While renewable energy capacity is increasing, its role will remain marginal for some time to come. CO₂ emissions are on a downward trend in some countries, but the reductions are

¹⁸ Again, budgetary problems can be overcome. An interesting alternative to the general type of subsidy system can be found in the Netherlands where some energy companies are giving their clients the option to pay a premium for 'green' electricity which is then used directly for investment in renewable energies.

coincidental and likely to be short-lived. Furthermore, there are some contradictory developments. Low fossil fuel prices and regulatory, as well as institutional, frameworks for the energy sector constitute major obstacles. A main problem is the short-term thinking of decision-makers and the strong influence of the industrial lobby.

Finally, it is also important not to divorce the issue of energy system sustainability from wider economic issues. Despite the possibility of a certain decoupling of energy consumption and growth, energy consumption still remains inextricably linked to issues of consumption of economic goods. While much can be achieved by improving energy efficiency and developing renewable energy sources, major changes are also necessary in other areas, such as industrial structure, levels of recycling and re-use, as well as the consumption of consumer goods. It is not possible to pursue a sustainable energy policy in isolation. Instead, sustainable development needs to be a focus of all economic decision-making.

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