The European point of view

The most likely energy scenario for the European Union in 2030 is that at least 65% of primary demand will still be satisfied by hydrocarbons. With the enlarged European Union (EU) of twenty-five countries and the North Sea energy resources well into depletion by this date, dependency on external sources will have reached 88% for crude oil and 81% for natural gas, in other words, levels roughly the same as those prior to the first oil crisis of 1973 (European Commission, 2004).

Such energy dependency will make European economies and societies highly vulnerable for at least three reasons. First, tensions on the world oil market will be inevitable because of increasing demand from the emerging economies in Asia and diminishing available capacities resulting from insufficient investment (Clô, 2004). Second, Europe’s entire transport system relies on oil and, on top of this, 40% of power generation will be gas-fired by 2030. Third, by this date most oil and natural gas imports will come from the Middle East, a region that in all likelihood will remain politically unstable, and from Russia and the Caspian countries which may not have fully completed their transition to market economies.

Most of these hydrocarbon supplies will reach their destination via long land or sea routes passing through several foreign countries, or via straits (e.g.Ormuz, Bab el-Mandeb, Suez, Bosphorus) exposed to the risk of accidents or terrorist attacks (Hueper, 2004).

This prospect of increased vulnerability is cause for concern for the EU and its members, who are well aware of the high macroeconomic cost of energy insecurity, even if the contribution of imported energy sources to GDP has dropped considerably since 1973 (Costantini and Gracceva, 2004a). It is not surprising then that security of supply, along with economic competitiveness and environmental protection, has become one of the three central objectives of all European energy policies. Security of supply refers to a situation in which all end-user demand can be met by a supply in sufficient quantities at a reasonable and relatively stable price. It thus comprises two aspects, one physical and the other economic. The first is fairly precise (availability of energy sources when and where the consumer needs them), but the second is not quite so clear-cut, unless it is limited to the absence of any sudden price increases. In guaranteeing the security of supply for the final consumer, the reliability of internal networks (oil and gas pipelines) has a role to play, but, since this aspect falls within the province of national or community authorities it is less worrying than the reliability of oil and gas imports, which are influenced by international relations and geopolitics (Laponche et al., 2001).

External energy security can be pursued along different paths (Noël, 1999a, 1999b). The United States (US), which has greater domestic hydrocarbon sources than the EU as well as the most powerful oil industry in the world and unrivalled military strength, tends to accept its dependency. However, it has attempted to guarantee the security of the international markets from which it obtains supplies by eliminating (either through diplomatic or military channels) any obstacles to freedom to conduct business and trade. Most European countries do not have the same capabilities on the international scene, and until now, have had to safeguard the security of their supplies by reducing external dependency and establishing special relationships with certain exporting countries. This European bilateralism, contrasting with American multilateralism (Prodi and Clô, 1975), has given rise to lively debate within the International Energy Agency (IEA) but has remained a permanent feature of the EU even
though it was qualified somewhat in a recent Green Paper of the European Commission: “Security of supply does not seek to maximise energy self-sufficiency or to minimise dependence, but aims to reduce the risks linked to such dependence. Among the objectives to be pursued are those balancing between and diversifying the various sources of supply by product and by geographical region” (European Commission, 2000).

However, since the Union is still without any general authority in the field of energy policy, it is at pains to translate its approach to energy security into action. Consequently, certain EU members are questioning whether the political conditions are in place that would enable Europe to define a community-wide policy (i.e. to speak with one voice on the international scene and to act collectively) as the US, Japan or China are able to do.

In order to really understand the special nature of the European approach to energy security, it must be placed in the context of the insecurity experienced by most European countries since the beginning of the Twentieth century (see Section 7.2.1). In 1968 the ordeals suffered by these countries led them to create special instruments for managing supply crises. These instruments were accepted by the IEA in 1974 but the EU is now seeking to redefine them (see Section 7.2.2). Rather than having to deal with energy crises, Europe would prefer to prevent them. Therefore, in the longer term, its aim is to create energy systems that are more resilient by being less dependent on oil imports (see Section 7.2.3). After a certain success in this direction, Europe has recognized the persistency of its dependency and has attempted to reduce the associated vulnerability by diversifying its hydrocarbon suppliers and concluding cooperation agreements with some of them (see Section 7.2.4).

But the somewhat limited and uncertain results of this international action have come out on the side of those in favour of safeguarding energy security through market liberalization (see Section 7.2.5). Is this complex, open-ended approach to energy security suited to the oil and gas geopolitics of the next fifty years? The question remains open and merits further discussion (see Section 7.2.6).

### 7.2.1 The difficulties of geopolitics and lessons learned from insecurity

Whether individual or collective, behaviour is always shaped by experience and experience has not been the same in all of the countries of Europe.

Even today, the United Kingdom or the Netherlands do not share the same views as France, Germany or Italy when it comes to energy security. However, since the beginning of the Twentieth century, they have all been confronted with the same difficult geopolitical environment. One difficulty is that until the discoveries in the North Sea, European hydrocarbon resources were inaccessible. Also because, even as a group, the European countries have never been leaders in the world oil industry. They discovered the consequences of this situation both during the First World War and much later with the succession of supply disruptions and price shocks that occurred between 1956 and 1979. On each of these occasions, either through debate or conflict, they furthered what might be called the ‘European approach’ to energy security.

### European dependency on the US oil industry

Compared with the US and Russia, which in 1900 produced 8.5 and 10.7 Mt (Million of tons) of oil respectively, Central and Western Europe had difficulty reaching 0.7 Mt, and this production was concentrated in Austria and Romania. There was some exploration but the continent’s rare resources were not exploitable with the technology of the time. The European countries were thus compelled to satisfy virtually all of their requirements by first importing refined products and then, as they gradually established their own refineries, by importing crude oil. Imports rose rapidly at this time with an annual average growth rate of 9.5% between 1865 and 1913 (Mitchell, 1978).

About one-third of imports in 1900 came from Russia where the Nobels first, and then the Rothschilds successfully exploited the crude oil resources of the Baku region. But even at this time, supplies were starting to decline. Even the robust establishment of Royal Dutch in the Dutch East Indies and the creation, in 1907, of the Anglo-Dutch group Royal Dutch Shell, under the leadership of Henri W. Deterding, failed to help Europe in bringing new equilibrium to an oil industry that was largely dominated by the US. On the eve of the First World War, close to 80% of Western Europe’s oil was supplied by Standard Oil or companies resulting from its break-up. Their dominant position worried the governments of particular countries.

The UK government was the first to react, through the Admiralty, which was concerned about safeguarding its fuel-oil supplies following the conversion of its vessels to this new fuel. In 1914, Winston Churchill, First Lord of the Admiralty,
signed an agreement with Anglo-Persian comprising a long-term contract to supply the Navy, and which also included an acquisition by the government of 51% of the capital of the company, which was later to become British Petroleum (BP). Shortly afterwards, judging its war effort to be threatened by insufficient deliveries from Standard Oil, the French government took similar steps. In 1923, having become owner of the oil assets of Deutsche Bank in Iraq, it created the Compagnie Française des Pétroles (CFP) in which it retained 35% of the capital and 40% of the rights to vote. Three years later, the Italian government set up Azienda Generale Italiana Petroli (AGIP) which laid the foundations of a national industry from which Ente Nazionale Idrocarburi (ENI) later emerged.

These direct interventions from states in the organization of the oil industry were not motivated solely by security concerns; although, security did play a central role in a context of diplomatic and military confrontations over the control of crude sources in Latin America, the Middle East and later in Africa. In addition to their mission to develop the refining industry and distribution networks in their home countries, the new state-owned companies had the task of looking for hydrocarbons in territories under their country’s national sovereignty (i.e. colonies) and competing with multinationals elsewhere; this included offering producing countries more attractive exploration and production agreements than the usual concessions. During this period, which extended until the 1960s, security of supply was measured in terms of the proportion of oil imports that were controlled by national firms. In France, state-owned companies were committed to meeting at least 50% of national oil demand. Not all of the European countries went so far, since they did not all share the same confidence in the virtues of interventionism, but they all considered that oil was too serious a matter to be left in the hands of industry alone. Oil supply must not depend solely on the market because it is also a “reason and arena of political contrast” (Clô, 2000).

**Dependency on the oil producing countries**

After the Second World War most of the European countries maintained their desire for national oil companies that could defend their interests in the face of the multinationals. Yet, this goal was now part of a broader issue, that of security, since dependency was becoming generalized, bringing with it greater vulnerability.

Inspired by the so-called ‘American way of life’, economic growth became a huge consumer of oil products. These products were needed to run the rapidly rising number of vehicles on the road and the power stations that were doubling their electricity output every ten years. Apart from the natural gas that Italy, France, Germany, the UK and the Netherlands were starting to produce, these hydrocarbons were imported. Compared with the oil consumption of Western Europe on the eve of the first oil crisis, these imports corresponded to a dependency rate of 97%, which was infinitely greater than in North America (30%) and even more than in Australasia (93%). Given the pre-eminence of oil, total energy dependency had now reached 60%, a spectacular leap from the 3.2% in 1925 (Darmstadter et al., 1971). This average dependency rate varied from one country to the next, depending on the extent to which coal was still used or on the part played by natural gas: 30% in the Netherlands, 49% in the UK, 50% in Germany, 77% in France, 84% in Belgium and 85% in Italy (Prodi and Clô, 1975).

The oil which Europe had grown to depend on for its energy supply no longer came from Russia (which had become the Soviet Union) or North America, but from the Middle East and Africa. In this period of the 1950s marked by struggles for political independence and economic development, the countries in these regions were determined to make their voices heard, notably through OPEC (Organization of Petroleum Exporting Countries). Western Europe, which bought roughly half its oil consumption from these countries, thus discovered its vulnerability:

- In 1951, with the nationalization of the oil industry in Iran.
- In 1956, with the closure of the Suez Canal, one of the main oil transit routes.
- In 1967, with the Six Day War and the second closure of the Suez Canal.
- Between 1971 and 1973, with unilaterally imposed price rises, nationalization of certain oil assets and the embargo imposed on the Netherlands and Portugal during the Arab-Israeli war.

These events brought differing responses. While the US recommended that the consumer countries, embodied by the IEA, should take a united stand against OPEC, Europe became divided over the issue.

### 7.2.2 Instruments for managing oil crises

What can be done in the case of a sudden and unexpected disruption of oil supplies? This question
First obligations to maintain stocks in 1968

The idea of acting together to combat the increasing vulnerability of the European economies was by no means accepted by all of the European governments. Several countries (i.e. UK, Scandinavian countries, Iberian Peninsula and Greece) were not yet members of the EEC. Among those that were, most were not prepared to give up their energy policy prerogatives, or else they preferred to consult each other in the context of the Energy Committee of the OECD (Organization for Economic Cooperation and Development). In 1967, however, the second closure of the Suez Canal in a little over ten years sounded the alarm. On 20 December 1968, following consultations with the oil companies which gave their agreement, Council Directive 68/414/EEC obliged EEC members to maintain emergency stocks of crude oil and/or petroleum products equivalent to at least 65 days consumption, based on their average daily consumption in the previous year. Added to the stocks normally maintained by oil companies, total available stocks would cover approximately four months consumption. In the case of disruption of imports from the Middle East alone, the EEC countries could meet their needs for over two years, provided consumption was reduced by 10%.

Against a background of rising oil uncertainty, and following the entry of the UK, Ireland and Denmark into the EEC, the question was taken up again at the October 1972 summit and resulted two months later in the publication of Council Directive 72/425/EEC. This Directive increased the emergency stockpiling requirement to the equivalent of 90 days consumption. It was followed in July 1973 by Council Directive 73/238/EEC, obliging member states, in the event of disruption of supplies, to use their stocks adequately, to regulate prices to prevent abnormal rises, to give priority to supplies of petroleum products to certain groups of users, and to impose specific restrictions on consumption. They were also urged to develop power generation facilities that could use fuel other than oil in case of an emergency (Willenborg et al., 2004). In accordance with this directive, in 1973 and 1974 most Western European countries imposed speed limits on their roads, heating and lighting restrictions and petrol rationing, and in some cases driving was even prohibited on certain days. Finally, a few years later, Council Decision 77/706/EEC and Commission Decision 79/639/EEC specified that the reduction in oil consumption in the EEC was normally fixed at 10% for no more than two months, but in the event of a serious crisis, further reductions could be imposed.

EEC takes a back seat behind IEA

After the start of the Arab-Israeli war in October 1973, the retaliatory measures decided upon by OPEC were of considerable concern to the European states. Meeting in Copenhagen in December 1973, they discussed the possibility of a more voluntarist policy to deal with the vulnerability of their economies to oil supplies. Two opposing points of view were expressed. France favoured Euro-Arab dialogue and bilateral agreements in order to avoid confrontation with the exporting countries. Practically all the other countries, however, supported the US position in favour of the consumer countries taking a united stand, with their interests being defended by the IEA, as it was created for this purpose. All of the European countries apart from France, Finland and Iceland, agreed to this solution and, in November
1974, signed the International Energy Program (IEP) Agreement. Essentially, they were eager not to dissociate themselves from the US, which was wary of any European initiative in the Middle East. Some also saw it as an opportunity to prevent the Commission from encroaching too much on their national sovereignty in the area of energy policy (Willenborg et al., 2004). In 1975, the system for managing oil crises that the EEC had started to put in place was complemented by the IEA system. It was more ambitious but so complex that it has never actually been used, except partially and unofficially in 1990. The IEA system is based on two agreements: the IEP and the CERM (Co-ordinated Emergency Response Measures).

The aim of the first agreement, IEP, was to promote “secure oil supplies on reasonable and equitable terms”. It contains numerous measures, ranging from establishing an information system on the international oil market and consulting with oil companies, to much longer term programmes to reduce dependence on imported oil. Some of the measures concern emergency situations characterized by a 7% reduction in world oil supply. Known as the Emergency Sharing System, these measures concern the capacity to sustain consumption for at least 90 days with no net oil imports, a programme for restraining demand and allocating available oil among participating countries on an equitable basis. The 90 days self-sufficiency are to be covered by industry stocks (commercial and obligatory), government stocks held exclusively to respond to emergency situations, and stocks managed by agencies on the basis of cooperative and cost-sharing arrangements. The commitments of the participating countries can also be met in two other ways:

- By fuel switching capacity, provided that this capacity can be brought into operation within one month, using secure supplies of fuel, and subject to government control.
- By stand-by oil production defined as “a participating country’s potential oil production in addition to normal production within the country’s jurisdiction”.

The programme of restraint measures for reducing final consumption, which must be respected by each country, can be implemented by raising taxes on petroleum products, rationing deliveries to bulk users or through public education campaigns. Required reductions in consumption can vary between 7% and 10%, in line with the variation in loss of supply. Finally, in the event that participating countries have available reserves in excess of or below their requirements by comparison with other countries, compensatory mechanisms can be activated.

The CERM, adopted in 1984 by the governing board of the IEA, was created for two reasons: first, procedures for activating the measures provided for in the IEP would be too long and complex in the event of an oil crisis; second, the economies of the participating countries could be seriously harmed by disruptions that might escape the IEP trigger of a 7% loss in world supply, as happened at the time of the second oil crisis. The CERM thus provides for simpler and more rapid responses than the IEP. Among them, the use of oil stocks is the most effective, and it also acts as a threat to speculation, but other measures can be used if drawing on stocks proves inadequate: discouragement of abnormal spot buying, demand restraint, short-term fuel switching, etc. The CERM could have been triggered in January 1990, at the time of the First Gulf War, since it provided a framework for preparations made by all of the IEA member countries, plus France, Finland and Iceland, but it was never officially activated.

**New proposals from the EU**

The EU mechanism for managing oil crises has a number of flaws compared with that of the IEA: it does not specify a level of oil supply loss to be used as a trigger for drawing on stocks; no authority is in place to implement stock-drawing measures; it can only act with respect to stocks in excess of those provided for in the IEP as all the EU members (15), including Greece since 1977, Portugal since 1981 and France since 1992, have subscribed to the IEP. Furthermore, the mechanism makes no provision for situations resulting from price shocks.

However, the IEA system does not altogether escape criticism. First, because only its non-European members (US, Japan, Korea) have completed it by adopting national mechanisms aimed at using their strategic reserves to stop speculative price increases. Second, several European countries feel that the stockpiling imposed by the IEA is too costly for oil companies that are used to operating on a just-in-time basis, especially during periods of extreme price volatility. Last, because the IEA does not take into account the risks of disruption that could come from the natural gas market (Costantini and Gracceva, 2004b).

In the new context brought about by the creation of the Internal Energy Market (IEM) and building on the recommendations of the 2000 Green Paper, the Commission of the European Union has
therefore taken the initiative, since 2002, of proposing two new directives, one on oil supply security (COM/2002/488) and the other on natural gas supply security (2004/67/CE).

**Oil**

The first directive is intended to deal with any risks of disagreement with the US, Korea or Japan that could make the IEP inoperative and also to resolve some of the shortcomings in the EU oil crisis management system.

To make this system more effective, the stockholding requirement would be gradually increased from 90 days to 120 days of internal consumption by 1 January 2007, in other words, 30 days more than the level imposed by the IEP. But these stocks would also have to be more clearly defined (operational and strategic stocks) and distributed (refineries and distributors) in order to avoid distortions that might be harmful to competition. The directive requires that each member state therefore set up an agency to manage at least one-third of the volume stocked, with this central body being financed by a levy on oil products charged to end-users or by compensation from the state budget. In addition, crisis management would become a community affair, with the Commission, rather than national governments, being responsible for setting the emergency system in motion. Finally, given the cross-border movements of goods, the directive proposes a harmonized accounting system for the stocks held, irrespective of the location of refineries.

**Natural gas**

Natural gas supply security has never been treated in the same way as oil security. But this does not mean that it has been ignored. In 2000, Western Europe had ninety-four underground storage facilities with a total capacity of 60 Gm³ (billion of cubic meters), equivalent to approximately 50 days of average gas consumption (Arima, 2004).

Most states have generally complied with the obligation to maintain their industrial gas stock at a minimum level or with the requirement not to exceed the ceiling applicable to imports from each gas supplying country (Luciani, 2004). However, a few states have been more cautious than others. In Italy, imports from non-EU countries are authorized only when storage capacity is at least equivalent to 10% of the volumes imported annually. In Spain, gas transportation companies and traders must diversify their supply as soon as they reach a level where 60% of their supply of gas is coming from a single country. The Netherlands controls the use of reserves in order to guarantee the availability of the Groningen reserves in the event of supply problems. The proposed directive confirms the need for storage, but specifies that the level should take into account the geological and economic storage possibilities in each member state. On the other hand, it is much more precise concerning differentiation between consumers: those considered to be vital consumers, because they have no replacement options, should be guaranteed supply to cover 60 days consumption – in average weather conditions – in the event that the single most important source of gas supply is interrupted.

If the directive is adopted, it will help to clarify the distinction between interruptible and non-interruptible customers, who purchase their gas at a different price (Luciani, 2004).

Is it really necessary to go as far as the Commission proposes in managing the risk of energy crises? Arguing on the grounds of the high cost of the new measures, the Council of the European Union and the European Parliament rejected the proposal in 2003 and suggested improving coordination between the EU and IEA mechanisms. Nevertheless, the Commission can be expected to return to the attack if the situation worsens on the international markets. But the best solution most probably lies elsewhere, in the construction of long-term energy systems that will be more resilient because they are not based solely on oil.

### 7.2.3 Construction of more resilient energy systems for the long term

The best way of avoiding the costly management of oil insecurity is to minimize the risk of crises by constructing more resilient supply systems, in other words, systems that can resist any shocks from their external environment. But, given the inertia of infrastructures and energy technologies, such systems require long lead-times, often incompatible with market demands and political conditions. It was only with the oil crises of the 1970s that the calls to reduce the energy vulnerability of the European economies were heard. When oil prices increased four-fold in just a few months, the European governments reacted by adopting two types of strategy: reducing the energy intensity of economic activity; replacing imported oil with other energy sources, either produced in Europe or imported from more reliable sources.
The results expected from these strategies varied considerably from one country to the next, as did the relative contributions of these results to market mechanisms (prices) and regulations (standards). Between 1975 and 1990, efforts remained largely national and were influenced by each country’s resources and industries as well as the nature of their traditions, whether interventionist or liberal. With the 1986 oil countershock, growing environmental concerns, and the beginning of energy market liberalization, the EU’s calls for greater dialogue and coordination started to be heeded. The Green Paper of November 2000 made energy security part of the strategy for sustainable development.

**Less energy-intensive economies**

In 1974, after tackling the most glaring cases of energy waste, most of the European governments changed their tax systems, regulations and subsidies in order to improve energy efficiency in industry, transport and the residential-tertiary sector. In some states, special agencies were created to inform and educate consumers and coordinate national programmes *in situ*. While industry adapted spontaneously to changes in relative prices of energy, some national governments introduced measures that went a long way towards reducing energy intensity: insulation standards in residential buildings and generalization of energy audits, minimum performance requirements for boilers, compulsory labelling of household appliances, obligation to reduce fuel consumption of vehicles, incentives to develop public transport, etc.

Because it was the only consensual response to the challenge posed by energy dependency (Commission Européenne, 1995), the EU’s action gained influence in the early 1990s. This action was expressed through three main tools:

- Directives obliging member states to amend legislation in favour of greater energy efficiency (dwellings and household appliances) and encouraging them to use public procurement and third party financing.
- R&D, demonstration programmes, diffusion and promotion of best techniques, such as Thermie and SAVE (Specific Actions for Vigorous Energy Efficiency).
- Voluntary agreements with manufacturers of energy-intensive goods, the best known being the ACEA/JAMA/KAMA (Association des Constructeurs Européens d’Automobiles/Japanese Automobiles Manufacturers/Korean Automobile Manufacturers Agreement), which is between the European, Japanese and Korean automobile industry.

Finally, more recently, the EU has attempted to reconcile market liberalization and energy efficiency by conferring greater responsibility on industrial and financial operators. Given the time required to renew housing and household appliances, the full impact of most of the directives adopted between 1995 and 2003 will not be felt for a few years time.

By facilitating reductions in the energy intensity of economic activity through their energy efficiency policies, national governments and the EU have helped stem the rise in energy consumption and, in doing so, have also helped to reduce energy dependency ([Table 1](#)).

But the expansion of the EU to include countries aspiring to rapid modernization, particularly of their transport sectors, will lead to new rises in energy consumption. The Green Paper thus recommends stepping up efforts to reduce

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**Table 1.** Evolution of final energy consumption (Mtoe) and final energy intensity (koe/US$95ppp)¹
(Enerdata, 2003)

<table>
<thead>
<tr>
<th>Region</th>
<th>Consumption 1971</th>
<th>Consumption 2000</th>
<th>Annual Growth (%)</th>
<th>Intensity 1971</th>
<th>Intensity 2001</th>
<th>Annual Variation (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>West Europe</td>
<td>794</td>
<td>1,173</td>
<td>1.2</td>
<td>0.17</td>
<td>0.12</td>
<td>−1.2</td>
</tr>
<tr>
<td>Denmark</td>
<td>16</td>
<td>15</td>
<td>0.0</td>
<td>0.19</td>
<td>0.10</td>
<td>−2.2</td>
</tr>
<tr>
<td>France</td>
<td>125</td>
<td>172</td>
<td>1.1</td>
<td>0.18</td>
<td>0.12</td>
<td>−1.4</td>
</tr>
<tr>
<td>Germany</td>
<td>183</td>
<td>250</td>
<td>1.1</td>
<td>0.18</td>
<td>0.12</td>
<td>−1.4</td>
</tr>
<tr>
<td>Italy</td>
<td>89</td>
<td>133</td>
<td>1.4</td>
<td>0.14</td>
<td>0.10</td>
<td>−1.1</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>140</td>
<td>164</td>
<td>0.5</td>
<td>0.20</td>
<td>0.12</td>
<td>−1.7</td>
</tr>
</tbody>
</table>

¹ Kilo of oil equivalent by US$ 1995 value (purchasing parity power).
energy intensity since “only a policy geared to controlling demand can lay the foundations for a sound energy supply security policy” (European Commission, 2000). Horizontal policies (completion of the internal market, energy taxes, energy saving schemes, dissemination of new technologies) and sectoral policies (new balance between modes of transport, major energy savings in buildings) will all help to control demand. Several directives, in particular COM(03) 739, are being prepared to oblige member states to demonstrate greater dynamism in all of these areas.

**Substitutions for oil**

Reducing the vulnerability of European economies by restraining growth in energy demand would not have sufficed without action to change the structure of supply. The members were incapable of acting in unity as they were urged to do by the EEC (European Commission, 1974): each member state acted as it saw fit, playing what it thought was its best card to take advantage of the competitive prices of other energy sources following the steep rise in oil prices. The impressive results that certain countries obtained in the two decades after the first oil crisis now seem particularly fragile in light of forecasts for 2030.

The UK, Germany and Belgium-Luxembourg, where coal still represented 25-35% of primary supply, all produced nationally in the first two cases, boosted consumption and production of this fuel. In Italy, a non-producing country, the government supported the conversion of 8.3 GW of fuel-oil to coal, notably through the expansion of port infrastructures. These measures slowed down (but have not stopped) the decline of coal in European energy consumption. Poland’s future accession to the EU should not change the decline in mining activity. There is still the possibility of importing coal and, according to the Green Paper, given the present facilities and technologies, imports should increase slightly to maintain a certain diversification of electricity generation.

Natural gas rarely exceeded 10% of primary supply in European countries in 1973, except in the Netherlands, where it already represented more than 40%. By 1985, the figure had reached 20%, not only because it could be easily substituted for oil products in thermal generation, but also because abundant supplies quickly became available (Criqui and Kousnetzoff, 1987). Production from the Po Valley, Lacq and Groningen gas fields was supplemented by North Sea gas. Furthermore, governments took an active part in developing trade with Algeria and the USSR, while safeguarding supplies, by interconnecting the gas transportation networks. Gas has without a doubt made the most effective contribution to energy supply diversification in Europe since 1973. The rapid growth in gas consumption forecast for the next decades (2.9% per year until 2010, and then 1.6% in successive years) means that it will continue to play an important role. But the exhaustion of North Sea gas fields will also bring the risk of excessive dependency and price tensions.

In the 1950s nuclear energy was presented as the real successor to oil and it widely penetrated the electricity generation market in many countries: UK (22.1%), Spain (23.6%), Germany (28.1%), Sweden (49.6%), Belgium (55.5%), France (77.7%). It thus made an effective contribution to the diversification of European energy supplies until 2003, but this phase is now drawing to a close. With Italy, Austria, Belgium and Germany now turning away from the nuclear option, the wait-and-see attitude of the UK, and the modest commitments of Finland in 2002 and France in 2004, the share of this energy source in primary supply will be halved by 2030.

The options that remain are new energy sources and renewable energy sources (i.e. biomass, wind, solar, small-scale hydropower), which, despite seeing their production increase rapidly since the mid-1980s, still make only a small contribution to Europe’s energy supply as a whole; although, their contribution is more significant at a national level in a few countries such as Portugal (15.7%), Finland (21.8%), Austria (23.3%) and Sweden (28.8%). The broad consensus concerning these substitute fuels, not least because of their limited environmental impacts, explains why the EU has made them a political priority. The Green Paper advocates financial and fiscal incentives to reach the goal of 20% by 2020. The objective set by the renewable energy directive is to increase the share of green energy sources in primary supply from 6% to 12% (that is from 14% to 22% of power generation) by 2010. Can these objectives be reached? Nothing could be less certain, since, as the Green Paper points out, “these forms of energy do not have the same development facilities that other sectors had” (European Commission, 2000).

The movement away from oil in the energy supply market was very rapid until around the mid-1980s, but then slowed down as oil again became abundant and people became less
concerned about security of supply. But even so, the structure of Western Europe’s energy supply has changed appreciably, with less dependency on oil. The future is not likely to be quite so rosy, however, if the Green Paper has it right. Coal is arousing distrust, nuclear power is falling from favour, and renewables are taking off very slowly, which leaves only natural gas to diversify energy supply (Table 2).

7.2.4 Diversification of imports and cooperation with exporting countries

Given the limited possibilities when it comes to creating more resilient energy systems, Western Europe has no choice but to seek more secure external supplies. But since it is aware that it has little influence on international oil and gas market organization, it has opted for diversification of suppliers and cooperation with some of them.

Successful though precarious diversification

To reduce their vulnerability, most European member states have sought to diversify their oil sources by reducing imports from the Middle East, which were felt to represent an excessive share of total imports. The success of this policy is clear: for the EU as a whole, this share fell from 66.6% in 1973 to 30.9% in 1983 and to 22.6% in 2003. The main beneficiaries of diversification have been the former Soviet Union and the OECD countries, which saw their respective contributions leap from 3.1% and 2.2% in 1973 to 25.8% and 30.4% in 2003, thanks in particular to the rapid expansion of North Sea output (Table 3).

However, this trend is now coming to an end. The location of oil reserves recoverable in the first decades of the twenty-first century will mean that production capacities will shift to the Persian Gulf (+77%), the former Soviet Union (+79%) and Africa (+115%), regions still subject to conflicts, and in some cases terrorist attacks. Moreover, the reality of the ‘one great pool’ of oil means that diversification has lost some of its interest.

This new vulnerability will not be alleviated by substituting oil with natural gas since, with the exhaustion of the UK’s resources, gas will also increasingly come from abroad. Supplies from Norway could be increased from 52 Gm³ in 2000 to

<table>
<thead>
<tr>
<th>Solid fuels</th>
<th></th>
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<td>431</td>
<td>303</td>
<td>300</td>
<td>28</td>
<td>18</td>
<td>15</td>
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<tr>
<td>Liquid fuels</td>
<td>596</td>
<td>636</td>
<td>674</td>
<td>38</td>
<td>39</td>
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<tr>
<td>Natural gas</td>
<td>259</td>
<td>376</td>
<td>628</td>
<td>17</td>
<td>23</td>
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<tr>
<td>Nuclear</td>
<td>197</td>
<td>238</td>
<td>185</td>
<td>13</td>
<td>14</td>
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<tr>
<td>Renewables</td>
<td>69</td>
<td>96</td>
<td>169</td>
<td>4</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>1,552</td>
<td>1,649</td>
<td>1,956</td>
<td>100</td>
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</table>

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<tr>
<th></th>
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</thead>
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<tr>
<td>Middle East</td>
<td>66.6</td>
<td>30.9</td>
<td>22.6</td>
</tr>
<tr>
<td>Iran</td>
<td>13.9</td>
<td>8.4</td>
<td>6.4</td>
</tr>
<tr>
<td>Iraq</td>
<td>7.0</td>
<td>3.2</td>
<td>1.6</td>
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<td>Kuwait</td>
<td>11.0</td>
<td>1.0</td>
<td>1.0</td>
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<tr>
<td>Saudi Arabia</td>
<td>25.6</td>
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<td>11.3</td>
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<td>9.1</td>
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<td>1.8</td>
<td>7.2</td>
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</tr>
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<td>Norway</td>
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<tr>
<td>Others</td>
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<td>0.2</td>
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<tr>
<td><strong>Total</strong></td>
<td>100.0</td>
<td>100.0</td>
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EU cooperation with its suppliers

The idea of dialogue rather than confrontation with producing countries is not new, but the underlying reasons have changed. Initially, certain European countries wished to safeguard security of supply (which they believed the multinationals could not guarantee them) by concluding direct agreements with producing countries. The idea had been sufficiently convincing for the EEC to take it up in the form of Haferkamp’s proposals in April 1971, followed by Simonet’s proposals in June 1973. Immediately after the first oil crisis, it was decided at the Copenhagen Summit in December 1973 to start discussions with OPEC, while certain European countries started talks with producing countries such as Iran and Saudi Arabia. This two-fold approach provoked violent opposition from the US. With the backing of the UK, the US divided the European nations and convinced them, with the exception of France, to join the IEA (Chatelus, 1974).

Subsequently, regular but informal contacts were maintained between EEC and OPEC representatives, but the desire of the producing countries to export refined products rather than crude oil became a stumbling block. The second oil crisis revived the idea of a price stabilization agreement but, as prices began to fall, it was not pursued (Brondel, 2003).

Since 1990, cooperation with oil and natural gas producing countries has again become one of the key elements in Europe’s approach to energy security, but the basis for such cooperation has changed. With insufficient political and economic weight to influence world markets, the EU has to help its partners become attractive in the eyes of the companies whose investments are essential. To do this, the producing countries have to set up institutions guaranteeing the transparency and stability of regulations and tax regimes. In addition to Norway, three major regions are concerned: Russia and the former Soviet republics, the Gulf States, and the Mediterranean countries. Norway was encouraged by the EU to subscribe to the rules of the 1994 directive on hydrocarbons licensing which sought to establish equal access to hydrocarbon exploration.

Eastern Europe

The cornerstone of European energy cooperation with the Eastern-bloc countries should have been the Energy Charter Treaty (ECT) signed on 17 December 1994 in Lisbon. This treaty followed on from the European Energy Charter, which had been presented to a meeting of the European Council in June 1990 by former Dutch Prime Minister Rudd Lubbers. He had wanted to make it “a catalyst for economic revival in Eastern Europe and the USSR” (Axelrod, 1996). The initial idea was to deal with the disorder expected to result from the collapse of communism by encouraging Western Europe, an energy importer, to transfer capital and technology to the energy-rich former Soviet Union. However, such investment was not possible without a legal framework to ensure that companies would be treated fairly and to remove trade barriers in energy materials and products. Rules would thus protect foreign investment against political risks (discrimination, expropriation, nationalization), breaches of contract, losses due to war, and unjustified restrictions on transfer of capital. Most of the rules adopted by the ECT were modelled on those of the General Agreement on Tariffs and Trade (GATT), superseded by the World Trade Organization (WTO), and notably on the principles of the Most Favoured Nation (MFN). They applied to trade, trade related investment measures, transit, transfer of technology, access to capital, investment promotion and protection, environment, and transparency. Given the difficult relations between Russia and Ukraine, the guarantee of safe transit was particularly important (Commission Européenne, 1995).

Although signed by fifty-one countries, the ECT did not meet the expectations of its promoters for a number of reasons. First, the treaty was extended to the US and Canada (neither of which signed it), and to Japan, Australia and a few other countries, and therefore deviated from its initial purpose of

100 Gm³ with additional compression in the existing pipeline, but other requirements will have to be met by gas imports from Russia, the Caspian area, Algeria, Libya, Nigeria, Egypt, and LNG (Liquefied Natural Gas) from Qatar and maybe even from Venezuela. This wider range of import sources will only help safeguard Europe’s supply security if potential suppliers can export the required volumes at a reasonable cost. To do this they will need to invest massively since they have to mobilize more remote reserves, often at a high cost (Yamal Peninsula and the Shtokmanovskoe field in the Barents Sea), or set up liquefaction chains (Arima, 2004). The World Energy Investment Outlook (WEIO) has drawn up estimates of the enormous investments required, which only large national or multinational companies are in a position to make. But will they do it? Will it suffice for gas-producing countries to open up to the rest of the world? The EU considers that more must be done and that the way forward is through economic and political cooperation.
enhancing cooperation between Eastern and Western Europe on the basis of their energy complementarities. Second, Russia, the main partner, after first having doubts about signing the treaty, never ratified it because it felt that certain aspects of its sovereignty were threatened by too much free enterprise. In particular, Gazprom was opposed to the transit protocol, which would have imposed a disturbing level of competition (Townsend, 2003).

But despite these disappointments, the ECT brought rewards in the form of other EU cooperation agreements either with Russia or with the former Soviet republics.

With the latter, the INOGATE ( Interstate Oil and Gas Transport to Europe) programme, set up in 1995, and TRACECA (Transport Corridor Europe-Caucasus-Asia) have proved to be useful instruments for safeguarding the energy security of Western Europe. The technical, economic and legal information collected by INOGATE, as well as the feasibility studies performed under the programme, have helped reduce risks related to consolidation of the gas pipelines between Kazakhstan and Central Europe via Russia and Ukraine, between Ukraine and Belarus, the Baltic States and Poland, Slovakia and Hungary. Both programmes have provided precious aid for the design of new pipelines and the rehabilitation of old ones. Furthermore, twenty-one countries in the region have signed an Umbrella Agreement aimed at harmonizing the rules applicable to hydrocarbon transport infrastructures.

With Russia, the Commission has attempted to develop a strategic partnership from the difficult dialogue started at the time of the ECT. To this end, Commission President Romano Prodi (October 2000) tried to restore an atmosphere of confidence between the EU and Russia with the aim of encouraging European companies to invest in the production and transport of Russian hydrocarbons. The EU has drawn up a list of priority projects, known as projects of common interest, under the Trans-European Energy Network (TEN-E) programme. High on the list is the project for a northern trans-European pipeline carrying gas from the Barents Sea to Germany and the UK. But the Commission would like to go further by seeking greater technical harmonization and interoperability between Russian and Western European gas networks, a subject under discussion by the European Gas Regulatory Forum in Madrid.

**Gulf Cooperation Council (GCC)**

At the end of the 1980s, despite the fall in crude oil prices and the reduction in imports from the Middle East, Europe maintained its interest in the region. Two important factors were the region’s strong buying power and the role of the Gulf Cooperation Council (GCC), a regional organization comprising Saudi Arabia, United Arab Emirates, Kuwait, Qatar, Bahrain and Oman. The GCC originated as a security pact, and has subsequently promoted economic cooperation. In 1989, the EU and the GCC concluded a Cooperation Agreement whose objective was to facilitate trade relations and market access, and more generally to strengthen stability in the region. However, the results did not match the expectations of the signatories, since over the following years trade relations did not significantly intensify, and EU-GCC cooperation on oil and gas supply brought no concrete results.

However, such cooperation appears even more essential now that hydrocarbon imports from the Middle East are set to increase. For the EU, a politically stable and economically prosperous region, open to investment from European companies in hydrocarbon exploration, production and transport, would make an effective contribution to safeguarding supplies. In this respect, EU-GCC cooperation should be possible since both parties have mutual interests. They are interested in preventing conflicts which could interrupt oil and gas flows and threaten the energy security of importing countries and the revenues of exporting countries. They are also interested in reducing price volatility and, if possible, keeping prices in a range that will simultaneously encourage energy conservation, rational use of traditional fossil fuels and the development of nontraditional fuels and other sources of energy (Luciani and Neugart, 2005).

To achieve progress in this area, several proposals have been put forward. In addition to continued dialogue on all questions related to political stability and security in the region, including proper governance and human rights, the EU and the GCC should speed up Free Trade Agreement (FTA) negotiations, in parallel with the WTO accession of Saudi Arabia and the completion of the GCC customs union. The EU could make an effective contribution by abandoning duties on imports of petrochemicals and aluminium originating from the GCC against reciprocal concessions from the GCC side. Furthermore, EU and GCC dialogue could focus on “improving the transparency of the oil market in order to build capacity in advance of actual demand and to avoid tensions on prices and production volumes; establishing guidelines for the accumulation and...
liquidation of stockpiles and supporting investments in transportation facilities in order to avoid bottlenecks or emergencies; encouraging vertical integration downstream and upstream, and negotiating an appropriate instrument to regulate and protect cross investment” (Luciani and Neugart, 2005).

**Euro-Mediterranean energy partnership**

In 1969-71 the EEC showed the first signs of interest in the neighbouring southern Mediterranean countries. In 1986 an important step was made following the accession of Spain and Portugal as efforts were made to promote an economic, political, social and cultural partnership. The resulting agreement, the Barcelona Declaration, was finally made official on 28 November 1995 and was adopted by the fifteen European Union member states and the twelve Mediterranean partners, from Morocco to Syria, but excluding Libya. The declaration included three objectives: the definition of a common area of peace and stability through the reinforcement of political and security dialogue; the construction of a zone of shared prosperity through an economic and financial partnership and the gradual establishment of a free trade zone; the rapprochement between peoples through a social, cultural and human partnership (Sfligioti, 2003).

At first sight, Europe’s energy security was not concerned by the construction of such a partnership. For the EU, the Euro-Mediterranean area is first and foremost a hinterland, providing Europe with additional growth capacity and extra clout in dealings with North America or the Pacific countries. In the eyes of the EU, the southern Mediterranean countries would have everything to gain in terms of political stability and economic development. Not entirely convinced, however, these countries insist that the energy sector, which is their main asset in dealings with the northern countries, should have a pivotal role in the economic partnership, and that the appropriate framework for investments and the activities of energy companies should be created.

Almost ten years after the Barcelona Declaration, the multitude of ministerial meetings, the reports and the communications from the European Commission have produced so few results that some observers have even qualified it as a complete failure (Bertelsmann Group for policy research/Center for applied policy research, 2000). So little progress has been made in terms of economic reform and better governance that the region is among those that attract the least capital.

In 2000, it accounted for less than 5% of all foreign direct investment in emerging economies; whereas it has considerable needs in terms of hydrocarbon exploration and production and the development of new energy infrastructures like the Hassi R’Mel-Spain and Hassi R’Mel-Italy gas pipelines or new liquefied gas carrier terminals to accommodate more Algerian LNG.

Will the decisions made in 2002-2003 to better target the use of the MEDA (Mesures D’Accompagnement) budget, which accompanies the measures of the partnership, and to set up ad hoc groups to propose specific energy policy actions or energy interconnections, be sufficient to bring some success to the Euro-Mediterranean energy partnership? Certain observers still have doubts, believing that oil and gas supply cannot form the main basis of regional partnership in the present context of globalization of trade. Neither the obvious complementarity between the northern and southern Mediterranean nor the geographical proximity of the two shores (factors put forward to justify the partnership) can change the technical and economic reasoning underpinning the formation of costs and prices. Even the argument of confidence, brought about by a certain social and cultural proximity, appears shaky in view of the frequent conflicts between neighbours (Chatelus, 1997).

### 7.2.5 Market liberalization and supply security

Policies to encourage cooperation and help open up oil and natural gas producing countries to European companies capable of investing in exploration, production and transport will only effectively improve energy security if Europe remains an attractive market for these same companies. Nothing would do more for achieving this goal than a large unified market, which has been the aim of the EU since the Single European Act of 1986. Hence, the conviction that an effective market is the lowest cost way of addressing most long-term energy security threats (Andrews-Speed, 2004). In this perspective, market liberalization, unbundling of the large vertically integrated state-owned companies, the opening up of networks to competition, and privatization all contribute to energy security since they increase the number of operators and diversify the networks. The resulting flexibility in oil, gas and electricity supply provides a guarantee of rapid adaptation to any disruption, whether caused by external or internal factors. In the case of natural gas, flexibility is further
enhanced by the increasing number of LNG supply sources and the installation of trading hubs (IEA, 2002).

Even if it proves to be correct, this view of the situation does not yet correspond to reality. New operators have indeed appeared on the energy markets, but at the same time those that are able to invest outside Europe have tended to fall in number, since liberalization has promoted recomposition and, through it, industrial concentration. Furthermore, networks (in particular gas networks) have continued to develop but there has been little progress in terms of improving interconnections, which are essential for interregional transfers. Half of the natural gas consumed in the EU crosses at least one border before reaching the end-user; but numerous regions are not connected to any others. The situation is even worse for electricity, with only 8% of total generated power being traded between member countries. “The construction of new transmission lines often raises local opposition at strategic points, for example, around the Pyrenees or the Alps” (European Commission, 2000).

Even if these obstacles were overcome, it is unlikely that market operation alone would be able to guarantee energy supply security. Dynamic markets can be an incentive for companies to invest, but there is no guarantee that this will lead to greater flexibility. Why support the cost of a new transport infrastructure that might benefit possible competitors? Finally, the authorities must continue to clearly define the responsibilities of the different players and ensure that decisions dictated by the market do indeed contribute to security of supply (Esnault and Pirovska, 2004).

### 7.2.6 Results, limitations and uncertainties of the European approach

For the last hundred years, the risks surrounding Western Europe’s hydrocarbon supply have not disappeared, but they have changed profoundly. These risks are no longer related to the weakness of the European oil industry in the face of the all-powerful US industry as: Shell, BP, Total, ENI, Statoil and a few others are now openly competing with ExxonMobil and ChevronTexaco. There is no longer fear of possible embargoes decided upon by a few producing countries, because today these countries are numerous and, more importantly, extremely dependent on the revenues from their hydrocarbon exports. “No one country makes up a significant portion of the oil market, certainly not like the US did for the industry’s first century. It is unlikely that any group of nations could make common cause to declare embargo that would be effective any more” (Lynch, 2004).

Today, the remaining risks are elsewhere. Disruptions of oil supply and also of natural gas cannot be discounted given the vulnerability of tanker itineraries and pipeline routes to terrorist attacks or sabotage. Volatility of supply and price tensions are also to be feared. On a tight world market, because of the time lag between investment commitments and a surge in demand driven by the emerging economies, a few strikes or local disputes would be enough to send prices spiralling and deprive consumers of supplies at a stable and reasonable price (De Lestrange et al., 2005).

Where does the European approach to security stand in the face of such risks?

The measures that have been set up to manage temporary disruptions (lasting a few months) are satisfactory, although, it is unfortunate that the EU lacks the autonomy to trigger the application of these measures and to organize solidarity between member countries. Cooperating directly with the other IEA countries is certainly essential, but why give up the possibility of doing this in a united manner, especially if the EU’s interests do not coincide with those of the US, Japan or Australia? Why not fight abusive speculation by threatening to place some of the stocks, held at the scale of the EU, on the market?

In the longer term, and in the context of a genuinely global oil market, it is understandable why the EU (in contrast with its post-1973 strategy) is no longer insisting on energy self-sufficiency. The idea of self-sufficiency is nevertheless not anachronistic when it takes the form of a resilient energy system combining security of supply, environmental protection and economic competitiveness. This is precisely what can be found in the Green Paper of 2000 but it is not stated strongly enough to carry conviction. The margins for manoeuvre that the Green Paper finds too limited could be broadened:

- In terms of controlling energy demand with a more ambitious transport policy than the one in the White Paper of 2001 (the transport sector will account for 60% of oil consumption by 2050 if energy use patterns remain unchanged).
- In terms of diversification of supply, by adding nuclear energy and clean coal to natural gas and renewable energy sources. As far as the EU’s international actions to improve its energy security are concerned, Commission officials have clearly understood that,
Despite its efficiency, the market would never on its own be able to guarantee supplies of oil and natural gas, both of which are subject to changing geopolitical forces. They have also understood that the producing countries are not the only ones entering into this geopolitical arena. They have been joined by the transit countries, which will have increasing influence in the coming decades. Strategies concerning the movement of oil and gas are therefore necessary, not only with respect to the countries that suffer from being practically landlocked (i.e. Iraq, Caspian area) but also those through which these commodities have to transit (i.e. Ukraine, Turkey). The EU thus made a wise decision in devising cooperation programmes suited to each of the regions that might contribute to its security of supply (Chatelus, 1997). Unfortunately, its intentions have not always been followed up by actions. The ECT deviated from its path by opening up to North America and Japan. In the Middle East, EU-GCC cooperation has not given rise to a European strategy to deal with the diplomatic and military omnipotence of the US. Nor has Euro-Mediterranean dialogue been any more effective. However, progress would be possible if an increasing proportion of hydrocarbon imports were transacted in euros, and if the EU made a firmer commitment to financing major transport infrastructures.

There is nothing mysterious about the EU’s lack of power. Although the energy sector was at the origins of the European integration project (ECSC and EURATOM), it has never been the driving force. The Green Paper deplores the fact that “the EU lacks the means to negotiate and exert pressure. The Union suffers from having no competence and no community cohesion in energy matters […] As long as the EU fails to develop means to reduce the influence of the international markets, this situation will remain the Achille’s heel of the European economy and its ability to influence dialogue at world level will remain limited” (European Commission, 2000).

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Jean-Marie Martin-Amouroux
Université Pierre-Mendès-France
Grenoble, France