

# UK ENERGY POLICY

## ALSTOM UK COMMENTS ON THE ISSUES RAISED IN THE PIU SCOPING NOTE

### 1. INTRODUCTION

1.1 ALSTOM welcomes this enquiry into Britain's energy policy and the opportunity to present an industrial perspective. It is essential that such a perspective comprises a significant part of future policy if our national economic and employment interests are to be properly reflected. This is especially the case when the present investigation is intended to lead to the setting of the United Kingdom's longer-term strategic energy policy objectives.

### 2. ALSTOM

2.1 ALSTOM is the global specialist in energy and transport infrastructure. In energy, the company is active in the fields of power generation, power transmission and distribution, and power conversion; and in transport through its activities in the rail and marine sectors. The company offers its customers a complete range of innovative components, systems and services, covering design and manufacture as well as commissioning and long-term maintenance, and has unique expertise in systems integration, management of turnkey projects, and application of advanced technologies. In 2000-01, ALSTOM had annual sales of €24.6 billion and employed over 140,000 people in more than 70 countries.

2.2 In Britain, ALSTOM is one of the country's leading manufacturing employers with around 20,000 employees nationwide, and is a major exporter. The company has worldwide product centres of excellence in the UK – such as that for industrial gas turbines at Lincoln – and significant research and development activity and capability. Indeed, in the power generation sector alone, ALSTOM has over 500 research technologists working at three main R&D centres in Britain. In addition, ALSTOM's only corporate interdisciplinary R&D centre, undertaking long-reach

technology programmes, is located in the UK. Overall, ALSTOM is Britain's leading industrial company in power generation, in power transmission and distribution, and in rail transport equipment, systems and services.

2.3 The subject matter of this review is, therefore, of the greatest importance to ALSTOM, and to the company's continued presence and development in the United Kingdom. Decisions on energy policy will inevitably have a profound significance for our activities in all these sectors. In addition, it will have major supply chain implications. A recent independent study of contracts undertaken by ALSTOM in the UK found that the employment benefits were four times as great outside the company among our British suppliers, subcontractors, etc., as within.

2.4 ALSTOM also has an interest as an energy user. Annual electricity usage at the company's UK sites approaches £4m (including Climate Change Levy). The company is therefore concerned that the outcome of the review should not recommend, or result in electricity/energy prices which are uncompetitive with those experienced by our colleagues and competitors in other industrialised countries, as this can only impact adversely upon our investment, production and employment in the UK.

### **3. THE INDUSTRIAL PERSPECTIVE**

3.1 In recent years the relevance to, and impact upon industry of wider policy decisions appears not always to have been appreciated or understood, causing significant damage and employment loss. This was, for example, the case around the time of privatisation of both the electricity and rail transport industries when attendant uncertainties caused major new orders to be postponed for several years. Indeed, recently placed orders by the former Central Electricity Generating Board (CEGB) for new, advanced 900MW coal-fired power stations were cancelled. Such actions cause major disruption in the supply industry with capacity and long-term employment loss. Stop/go situations are costly and damaging to manufacturers who must necessarily respond to the actual market situation in terms of their production planning, capacity, investment and employment. This is even more so in today's highly competitive climate and Britain's open market. As business becomes more international in nature, it will be increasingly attractive for companies to supply

Britain's infrastructure requirements from overseas unless there is a moderately predictable market demand in the UK which forms the platform for a vibrant and competitive domestic supply industry. 'Short-term' reversals of policy, or the inadequate implementation of existing, agreed policies which cause major unexpected demand swings are to be avoided, therefore, if at all possible. In this context, ALSTOM would particularly draw attention to:

- The Stricter Consents Policy which was applied to consents for new power plant construction for three years from late 1997 while a review of energy sources for power stations was instituted and undertaken. This resulted in the cancellation of orders and a decimation of the domestic market with consequent long-term capacity and job losses.
- The current Government target of achieving 10GW of installed CHP capacity by 2010. Difficulties for CHP plants arising from the New Electricity Trading Arrangements (NETA), the Climate Change Levy and high gas and low electricity prices nevertheless mean that few new CHP plants are currently being ordered. Companies which have planned for a significant on-going substantial domestic CHP market on the basis of declared Government policy are, therefore, now finding that this is not being realised because of other measures taken.
- Energy from waste has an acknowledged role in meeting the target of 10% of the UK's electricity requirements from renewable sources by 2010. However, despite the progressive development of a market for energy production to the highest environmental standards from municipal solid waste in continental Europe, there have been major and continuing delays in the UK as a result of the planning/consents system. As a result, ALSTOM has had to close its relevant capability in the UK.
- In the railway sector there has been a history of stop-go procurement caused by past Government policies. In the period surrounding privatisation there was a 3-year hiatus in rolling-stock procurement which led to a loss of expertise and the closing of design and production facilities. This was followed by frenetic activity when the first wave of franchisees wanted new rolling-stock and industry

is now facing further cut-backs due to the policy of extending franchises by a few years, rather than by their renewal. The dislocation caused by such policies makes the achievement of the Government's long-term targets for the industry increasingly uncertain, with inevitable consequences for the modal transfer from road and for energy usage.

3.2 The above brief examples illustrate the desirability, from an industrial perspective, of future energy (and related) policy providing a firm, coherent and consistent framework against which industry can plan.

#### **4. SPECIFIC COMMENTS (ENERGY PRODUCTION, TRANSMISSION AND DISTRIBUTION)**

4.1 ALSTOM acknowledges the importance of the policy issues raised in the Project Scoping Note over achievement of environmental objectives, secure and diverse energy supplies and appropriate energy pricing. The following comments are offered.

##### ***Coal-fired plant***

4.2 It seems clear that, although the use of new and renewable technologies will grow, there will remain a major reliance on coal and gas as fuels to generate electricity for a considerable time. It will, therefore, be essential to continue to develop and implement technologies involving fossil and associated fuels. For example, many of the coal-fired plants currently operating in the UK are based on designs developed in the 1960s. Considerable scope exists to:

- **reduce emissions through efficiency improvement** Retrofitting coal-fired plant with advanced high-pressure turbine technology (such as has already taken place at the Heysham, Hartlepool and Hinkley Point nuclear plants) and upgrading low-pressure turbine efficiency at all such plants, would, we estimate, result in an average efficiency improvement of 3%. This would reduce emissions from those power stations by approximately the same percentage, reducing CO<sub>2</sub> emissions by 2.7m tonnes annually, NOX by 4,730 tons and SO<sub>2</sub> by 23,000 to 50,000 tons.

- **reduce emissions by installing additional equipment** All UK coal-fired plants are limited to emissions of 650mg of NOX per Nm<sup>3</sup> under EU legislation. New legislation, to be effective in 2008, will reduce this limited to 450mg/Nm<sup>3</sup>. Existing combustion technology is already available to achieve this level which would reduce overall UK NOX emissions by up to 78,000 tons annually. It will, however, be necessary for incentives to be offered if this advanced low NOX technology is to be added to plants in advance of legislative compulsion. Similarly, Selective Catalytic Reduction (SCR) and Selective non-Catalytic Reduction (SNCR) are both proven processes able to reduce NOX levels still further to 200mg/Nm<sup>3</sup>. The equipment required is, however, expensive and, without appropriate incentives, plant operators are unlikely to invest.

EU legislation will also require coal-fired power plant operators to reduce SO<sub>2</sub> emissions. Flue gas desulphurisation (FGD) technology is well proven and, indeed, capable of reducing SO<sub>2</sub> emissions further than the legislation will require. Several UK coal plants already have FGD installed and others are following, or are expected to follow. However, we currently estimate that 18,000MW of coal-fired plant could be left without FGD equipment by the end of 2004. If those plants are to continue running, the decision will have to be taken to fit FGD or to burn imported, low-sulphur coal. Installation of FGD, at a typical cost of €80K/MW would remove a further 50-100,000 tones of SO<sub>2</sub> from emissions.

4.3 The electricity market has changed dramatically in recent years and is now very largely price-driven. This will not induce investment in emissions reduction equipment unless driven by legislation and/or incentives such as capital allowances. From the point of view of the equipment supply industry, ALSTOM would urge the Government to clarify the priority to be given to the adoption of emissions reduction technology as indicated above to give a more adequate basis for forward market planning.

### ***Gas fired power plant***

4.4 While considerable attention has been paid to the role of large-scale CCGT plant in UK power generation, the role of smaller, industrial gas turbines in delivering secure and environmentally beneficial solutions has been far less

emphasised. Indeed, industrial gas turbines can be used to manage the conflict with emissions objectives. Thus, significant investment by the UK industry has already lowered NOX emissions by a factor of between 10 and 20 in the last decade. Today, UK industry leads the field and is achieving under 10ppm NOX – significantly less than UK/EU legislative requirements.

4.5 Moreover, industrial gas turbines maximise the conversion of natural gas through CHP (with 90% efficiency possible) and can be deployed in a variety of uses, including in distributed power network, thereby avoiding transmission losses and providing heat at the point of demand. Because gas turbines are able to operate on a wide range of fuels (gasified coal, biogas, liquid fuels, natural gas, etc.) they are able to provide relatively secure power. In particular biomass applications are carbon neutral with low NOX output and there is significant scope for gas turbine utilisation in coal gasification power plants and waste to energy applications with low emissions. Although power generation from coal gasification is carbon additive, it is significantly less so than conventional coal fired plant. Nevertheless, full realisation of these benefits will require further action by Government.

### ***Combined Heat & Power (CHP)***

4.6 The potential benefits of CHP in terms of security and diversity of supply, and reduced emissions, have been outlined above. ALSTOM welcomes the encouragement given by the Government to CHP through the CHP QA programme and the Climate Change Levy (CCL). However, one aspect of CCL has a seriously detrimental effect on the attractiveness of many CHP schemes while aspects of other policies also have a negative impact. Consequently, there is every likelihood that, unless changes are made, the Government's target of 10GW of CHP by 2010 will be significantly undershot. Moreover, at the present time the UK market for CHP installations is very disappointingly quiet despite the contrary expectations communicated to manufacturers through the Government's encouragement for such plant.

4.7 Electricity generated from CHP installations is normally exempt from CCL when it is used in-house, delivered to users on the same site, or supplied direct to a final user. However, CHP schemes which export electricity via a third party (e.g. the Grid) are subject to the levy. It is, however, this flexibility of general electricity

export which is critical to the economic viability of many CHP projects. The machines in CHP plants are manufactured to certain ratings and are, therefore, most efficient within relatively narrow output limits. This influences the optimum economic balance on a project between the heat and the electrical outputs and, therefore, the amount of electricity which needs to be imported or exported. In addition, the heat and power requirements of a site can vary significantly with project economics highly sensitive to surplus electricity sale receipts. This will particularly impact upon smaller plants. The non-exemption from the CCL of external sales of electricity has been a major factor in a number of otherwise cost-effective and environmentally efficient CHP projects not proceeding in recent months.

4.8 The impact of the New Electricity Trading Arrangements (NETA) has also been markedly adverse to CHP, because:

- the high penalties for under or over-supply through the balancing mechanism have a disproportionate effect upon CHP plants because of their small (but crucial) ‘export’ volume and the relative unpredictability of its availability;
- lower electricity and rising gas prices have adversely affected CHP scheme economics.

4.9 The net result is that the high energy efficiency of CHP projects is not being sufficiently rewarded at present. Both NETA and the CCL need urgent review with the aim of ensuring that CHP is sufficiently incentivised to achieved the Government’s 2010 target. At present, ALSTOM’s industrial gas turbine activity in Lincoln is being sustained by a high export volume and, in particular, the high demand from the oil and gas industry. It is uncertain how long this will continue and is important for the company, and its many suppliers, that a more normal level of demand in the domestic CHP market is restored as soon as possible.

### ***Renewables***

4.10 Renewables can provide an important contribution to the UK’s power requirement but, for the foreseeable future, this will be:

- limited and
- at a cost.

4.11 Whether the proposed Renewables Obligation and R&D programmes will be sufficient in themselves to achieve the Government's 10% target by 2010 is highly debatable. Among aspects to which ALSTOM would recommend further attention be given are the following.

4.12 Biomass can provide a plentiful, predictable fuel source of power generation and help contribute greatly to a reduction in emissions of CO<sub>2</sub> from power plant. For many years biomass has been burnt in boilers to raise steam for power generation using a conventional steam turbine generator set. It is, however, a relatively inefficient means of power generation, with schemes converting less than 30% of the energy content of the fuel into electricity, leading to high costs of electricity. The DTI have recognised the high cost of electricity as a problem for most forms of renewable energy, and identified 'route-maps' to encourage technology development to reduce the capital costs and improve efficiencies. The target for biomass is plant with an installed cost/kW of less than £1500 and electrical generation efficiencies of better than 40% to be operational by 2010.

4.13 The basic technology to achieve these objectives is already available. In particular, gasification technologies allow biomass to be used as a fuel for gas turbine combined cycle schemes. This technology, commonly known as B-IGCC (Biomass-Integrated Gasification Combined Cycle), or B-IGCHP (Biomass-Integrated Gasification Combined Heat and Power) enables higher generation efficiencies to be achieved. Technology demonstrators have proved the B-IGCC concept is technically feasible. However, while the technology concept has been proven, very little operating experience has actually been gained on B-IGCC schemes. The lack of operating experience causes B-IGCC plant to be classified as high-risk for commercial schemes, with high insurance costs and potential difficulties in obtaining finance. This high risk factor discourages developers from selecting B-IGCC or B-IGCHP technology, a situation exacerbated by the open, deregulated electricity market with its high and potentially crippling penalties for non-availability and unpredictable generation. It is, therefore, vital if the UK is to reap the benefits of higher efficiency and lower cost of power generation from biomass that B-IGCC can achieve, that full-size commercial demonstration plants are installed as early as possible to complete the technology development and demonstrate its suitability to the marketplace.

4.14 Such a successful commercially relevant demonstration plant would also promise longer-term economic and employment benefits. Estimates suggest that the biomass power generation market could be worth in excess of £100 billion over the next 20 years. By having operational demonstration plant, UK companies would gain a competitive advantage in the world market by being able to offer efficient and cost-competitive means of power generation from biomass. This would enable not only equipment suppliers to expand their opportunities, but also project developers, consulting engineers, engineering contractors, operation and maintenance service companies, banks and insurers. However, current price/cost structures, and the risks and timescale involved, all mean that a demonstrator of the nature required will not occur without substantial UK Government involvement and support.

4.15 ALSTOM would also urge the Review to consider in depth the status of and support offered to Energy from Waste. While it is proposed that the new Renewables Obligation should cover some energy-to-waste schemes, this is not so in relation to those utilising mixed Municipal Solid Waste (except insofar as the output derived from non-fossil derived material utilising new technologies such as pyrolysis or gasification is concerned). Nevertheless, we understand that all such projects will count toward achievement of the Government's 10% Renewables Target for 2010. There is a further anomaly in that landfill gas is included as a qualifying fuel source under the proposed Renewables Obligation. Consequently, waste dumped in a landfill site and left to decompose will generate a renewable energy source, whilst its incineration will not. Britain at present lags far behind such European countries as Switzerland, Denmark and Sweden in its utilisation of such waste for energy and will only meet its EU Directive commitments on reducing landfill by increasing both recycling and incineration (especially of that considerable volume of waste which is not suitable for recycling). However, at present

- the active encouragement given to appropriate, environmentally sound waste-to-energy projects is insufficient, as noted above, and
- the commercial disincentive, through the extreme delays imposed by the planning and decision making process, is high.

4.16 The latter issue is a major problem – ALSTOM obtained the award from the prospective developer of the plant for one such project in February 1999. This would have been a demonstration plant of high technology engineering and the highest environmental standards, of international relevance. The necessary consents are, however, still awaited and, because of the continuing absence of this, and other similar work in Britain, ALSTOM has very recently closed its relevant UK facility. Such experiences give entirely the wrong signs to industry as to the business-friendly environment in Britain and the Government's commitment to support the implementation of progressive and forward-looking technology benefiting the country both at home and overseas.

### ***Research & Development***

4.17 It is increasingly accepted that there will be no simple winning technology that will provide future energy needs and that a dynamic mosaic of different types will be required. If the UK is to retain (even enhance) its status as a leading industrial nation, it will be essential to maintain a domestic R&D portfolio embracing advanced conventional combustion systems mainly using fossil fuels (but also biomass and waste), new and renewable, and nuclear technologies.

4.18 These technologies (often now referred to as 'Low to Near-Zero Emission Power Generation') have the potential to produce electricity at higher efficiencies, while releasing minimum emissions. This – and the related commercial potential – has been recognised in other countries with strong power engineering sectors by such R&D programmes as the USA's Vision 21 Programme or Japan's New Sunshine Programme. This has been further emphasised by the recent US Energy Bill, which will provide support for a major extension to the Department of Energy's 'Clean Coal Power Initiative'. This initiative has an authorised funding level of \$200m annually for technology demonstration over the next 10 years, and is additional to the other major programmes, including those which cover gas turbines and near zero emission power plants, as part of the Vision 21 initiative.

4.19 While ALSTOM recognises that the provision of comparable programmes is unlikely to be feasible at the UK national level and that there is a number of smaller initiatives which have been put in place, there is a major and urgent need in the company's view for:

- a more integral approach to the energy technology portfolio. Recent initiatives targeting sustainable energy technologies need to be in a proper balance to future energy technology requirements as a whole. Thus, although the use of new and renewable technologies will undoubtedly grow, a continuing development is necessary of technologies for the clean, reliable and cost-effective use of fossil and related fuels.
- a selective concentration in those areas of technology in which there is a strong prospect of Britain, and companies in Britain, being able to make a significant future contribution to the country's overall benefit. In this context, with its fuel flexibility, low emissions and cost-effectiveness, the gas turbine will be a critical technology in the coming years. It is also a technology, below 70MW, in which the UK, through ALSTOM and Rolls Royce (and their related supply chains) have a strong indigenous capability. It is, however, a position which is under increasing threat as a result of the Government support being made available in the USA to American industry, and the continuing lack of a modest British R&D programme, despite the identification of the issues which could sensibly be so addressed and the potential longer-term benefits. ALSTOM and Rolls Royce also represent together a leading indigenous capability in solid-oxide fuel cell R&D (see below).
- all parts of the Energy Technology Chain to be addressed. New technologies need not only to be researched and developed, they also need to be demonstrated at a component and system level. The costs and financial risks of building and operating demonstration plant have increased as more complex designs push toward the technical limits, and liberalisation of energy markets has made the electricity supply industry more risk-averse. This has been well recognised in countries such as the USA, where Government support for appropriate market-relevant demonstration plant has been made available. A consequence of deregulation in the UK has, however, been the loss of national utilities able and willing to host the demonstration of innovative technologies. Their successors, being both smaller and more market-focused, are notably less amenable to such a role. In ALSTOM's view, unless the British Government encourages and provides appropriate mechanisms, including sufficient financial

incentive, for example, for a 20-40MW biomass B-IGCC plant and for smaller scale B-IGCHP plant utilising the same conversion technologies, commercial exploitation of these and other relevant technologies is likely to come from overseas. The UK needs to be ahead of the game at all stages, especially that of commercial exploitation.

### ***Fuel Cells***

4.20 ALSTOM welcomes the Project Scoping Note's recognition of the potential importance of fuel cell technology in the Energy Policy debate. The prospects for fuel cells are frequently associated with the concept of the hydrogen economy. Although there are current concerns over the practical and safe widespread use of hydrogen, the longer term covered by the Review may well see the development of efficient and safe hydrogen production, distribution and storage. Fuel cells do not, however, depend on hydrogen fuel to deliver benefits. Considerable R&D is at present being devoted to reforming conventional hydrocarbon fuels. High temperature Solid Oxide technology simplifies this process, offering the highest predicted electrical conversion efficiencies with very low emissions. It is also eminently suited to CHP. The continuing availability of a supportive Government environment to such critical innovation being undertaken in the UK is, in ALSTOM's view, essential.

### ***Transmission and Distribution***

4.21 Deregulation, emissions limits, capacity constraints and technical innovation have resulted in a trend away from large power stations feeding bulk transmission systems, towards smaller, localised plants supplying power (sometimes heat) to a specific user or area. The impact of this developing trend upon both the topology and the management of energy distribution could well be profound in the coming years. ALSTOM is currently actively involved in the further development of power electronic control devices, novel metering and control strategies and the IT systems which will enable energy trading in such a decentralised environment. It is nevertheless essential for the future, that the Government maintains a clear, consistent and stable approach to Energy Policy if such developments are to be carried through effectively.

## **5. SPECIFIC COMMENTS (INDUSTRIAL ENERGY USE)**

5.1 Industrially, much effort is being invested to improve process efficiencies. As a provider of electromechanical systems, ALSTOM is active in the more efficient conversion of energy, whether in advanced power electronic systems in the transport, transmission and distribution, and industrial drives industries, or in electrical/mechanical technologies such as motors. In the former case, the company has a major programme to explore and exploit the benefits of Silicon Carbide as a more efficient substitute for silicon in future power applications. Among initiatives towards more energy efficient machines, ALSTOM is also pursuing a programme in the exploitation of high temperature superconducting materials. Both programmes benefit from Government support for academic partners but would be significantly furthered by the availability of a direct industrial support framework such as is available in competitor countries.

## **6. SPECIFIC COMMENTS (TRANSPORT ENERGY USE)**

6.1 The Project Scoping Note recognises that energy policy must involve not only the production but also the utilisation of energy. One of the largest energy users in the UK is transport, with road and air transport being linked to liquid fuels – at present exclusively fossil fuels. The Royal Commission on Environmental Pollution calculated in 1994 that 21% of the UK's CO<sub>2</sub> emissions came from surface transport and the figure has subsequently increased, both absolutely and in relative terms. The Government, through its 10-year Transport Plan, is seeking an increase in rail passenger traffic of 50% and in freight traffic of 80% over a ten year period. ALSTOM, which employs 10,000 people in the UK involved in the manufacture and maintenance of railway vehicles and infrastructure, warmly welcomes this commitment to the long-term growth in rail usage. At the same time, it has significant implications for the Energy Policy Review and these interrelationships require close attention.

### ***Passenger transport***

6.2 Since rail privatisation, there has been an increase in the number of passengers – up 30% on many routes – which has placed the existing infrastructure under severe strain. However this has not made a significant impact on the numbers of people travelling by car and road congestion continues to increase. This is not surprising

as the capacity of rail network is only one tenth that of the road system and so a 30% increase in rail passenger traffic over 4 years is far less than the underlying growth in road traffic. The Project Scoping Note discusses a long term target of a 60% reduction in UK greenhouse emissions by 2050. This will not be achieved by present transport policies.

6.3 To make a significant impact on energy consumption at least 20% of existing road passenger mileage will need to transfer to rail which represents a 200% increase in the number of passengers carried by the railways. An increase of this magnitude cannot be accommodated on the existing routes, which are already crowded, and additional lines would have to be laid. Present infrastructure enhancements of the rail network are aimed at profitable growth for competing operators (TOCs). Enhancement to achieve modal transfer and maximum capacity of the network would result in different outcomes – possibly including doubling the maximum allowable train length to the 400 metres allowable in mainland Europe and increasing the loading gauge to accommodate double-deck trains, as used in most other European countries.

### ***Freight Transport***

6.4 The modal share for freight transport has moved in a similar way to that for passengers. In 1955 rail and road transport carried roughly equal tonne-kms whereas now road carries almost ten times as much as rail. Industrial restructuring – including outsourcing, consolidation of supply warehouses and just-in-time deliveries to industry and retail outlets – has contributed to the growth of road transport. One of the easiest ways of reducing energy use by freight transport would be to reverse the financial and regulatory incentives for long supply-chain deliveries. However, by itself, this would not be enough to meet the IPCC targets and modal transfer from road to rail would be necessary.

6.5 The UK rail network is increasingly crowded and conventional wisdom is that freight travels at night on tracks used by passenger trains during the day. However this suffers from two major problems:

- Increasing train speeds and traffic density make it more dangerous to carry out maintenance work on the railway while trains are running. The industry, encouraged by the HSE, has implemented a classification of *Red and Green*

*Zone Working.* Red Zone working (i.e. while the railway is operating) is reduced as far as possible to control the risks to the workforce and Green Zone working (i.e. when the track being maintained is barred to traffic) is used wherever possible. This policy results in a greater number of line closures during the night when passenger trains are not running, which directly conflicts with the desire to run overnight freight services.

- A major attraction of road transport is its flexibility and that delivery services can run at any time of the day or night. A policy of freight running mainly at night may be acceptable for low-value goods, such as limestone or iron ore, but is not attractive for high-value or time-critical freight.

6.6 To make a significant impact on the energy used by freight transport by switching traffic from road to rail would require new rail lines. Suggestions have been made for reopening the Great Central Main Line and for establishing new feeder routes from industrial centres but major investment of this type is unlikely if competing with a largely deregulated but powerful road traffic industry. Rail freight has the environmental benefit, in comparison with road freight, that electric haulage can readily be supplied by renewable resources. However in the UK, all recent freight locomotives, with the exception of locomotives designed for the Channel Tunnel, have been diesel powered. This is because the proportion of the UK's track which is electrified is much less than in most other European countries and the electrification that exists was aligned to passenger services, not freight services. Non-passenger electrification of this sort is unlikely to be achieved by the private sector without specific regulatory or fiscal incentive.

### ***Transport Planning***

6.7 The construction of new transport infrastructure takes many years. The first section of the Channel Tunnel Rail Link (CTRL), for which planning started in the late 1980s, is expected to open towards the end of 2003. Planning for a significant (in energy terms) modal shift in transport usage requires thinking 20-30 years ahead. It would be over-optimistic to assume that completely new transport technologies could be introduced in a significantly shorter timescale and, therefore, energy saving in the period under consideration will predominantly depend on evolution of present technology, rather than revolutionary new technologies. Current planning horizons for the rail network are around 10 years and the limited schemes currently

being considered (e.g. ECML upgrading) will have an insignificant effect on overall energy use.

### ***Regulatory, fiscal and financial aspects***

6.8 A consistent concern of the railway industry, has been that there are pricing mechanisms favouring other means of transport, particularly road, over rail. This has major relevance to the prospects for shifting road usage to rail and the consequent capture of lower energy usage and reduced emissions. Rail has to meet the full costs of service provision, albeit with a level of Government subsidy, in comparison with road where operators, particularly of goods vehicles, only pay a small proportion of costs. In parallel the safety constraints on railway operations are perceived to be much more onerous than those on the road and the environmental advantages of rail travel are given insufficient recognition.

6.9 The industry has identified a number of areas where the fixed cost of railway operation is seen to be a significant inhibitor to a level competition with road. The most significant cost-driver is the provision of a discrete infrastructure. The demands for very high levels of safety, rigorous environmental protection, and improved performance have tended to raise the cost of railway capital investment very sharply in recent years. Many of these demands are the result of changes in public policy but there is only partial recognition of this in the pattern of public investment support to railways. The 10-Year Plan capital investment projections are now widely accepted as being inadequate to meet these sharply escalating costs.

6.10 The privatised railways are also required to raise large amounts of private finance. The 10-Year Plan indicated a public investment of £14.7bn leveraging £34.3bn of private finance, a ratio of 2.3 to 1. In comparison roads were only required to produce a private investment figure of £5.0bn against Government spending of £26.7bn, a ratio of less than 0.2 to 1. It is a matter of concern whether the railway industry can achieve sufficient growth to sustain such large-scale market borrowing even with the prospect of an annual resource spend of £1.5bn to underwrite some of this borrowing and the use of the Rail Modernisation Fund to lever private investment. Roads do not find themselves faced with similar constraints. There is no direct linkage between road investment and charges to the road user.

6.11 As with fixed costs, there is a wide disparity between rail, where operating costs in all respects are borne by businesses using the system, and road, where users only pay a proportion of the costs they incur. Additionally, road users are not, at this time, penalised for using congested and popular routes or for using roads at peak hours. The railways also have to meet almost all their costs of security. This is principally recorded as a levy on the operating companies and Railtrack of some £117m per year (2000/2001 budget figure) to support the BTP. This is a unique arrangement and has the effect of adding a surcharge of between 2% and 3% on the fare box. By contrast, users are not expected to pay directly for the security costs of the road system.

### *Safety*

6.12 It is in the area of safety where rail suffers the greatest disadvantage compared with road. Rightly, much higher standards apply but these are very costly to implement and sustain. These costs are rising: the value of preventing a fatality (VPF) on the railways is approximately 3 times that on roads. The cost of new safety enhancements such as ERTMS could equate to a VPF in excess of £15m, widening the differential to 10 to 1. There are no pressures on the roads to produce increases on this scale, although to do so would reduce road deaths by thousands: such cost growth represents a very real challenge to the rail industry's financial viability.

### *Necessary actions*

6.13 For the UK transport sector to make the necessary contribution to the achievement of the targets for greenhouse gas reductions suggested by the IPCC, six issues need to be addressed:

- Planning horizons for the transport sector need to be extended to at least 30 years. A realistic and coherent strategic vision is needed of the long-term and integrated development of road, rail and air transport, in addition to short term objectives to solve current problems.
- For rail systems, which use much less energy than road or air transport and which – through electrification – can readily use energy from renewable sources, to play their full part in meeting greenhouse gas targets a much

bolder approach to their development will be needed. If there is to be a modal transfer from road, then major new lines for freight and passenger traffic will have to be constructed. Japan, which has a much higher density of population than the UK, has demonstrated that it is possible to construct inter-city rail infrastructure through densely populated areas and Singapore (also more heavily populated than Britain) continues to expand its modern metro system.

- Privatisation has introduced a new vigour into many aspects of the rail industry. However the natural objective of private companies is to maximise revenue, not to achieve the optimum modal transfer to minimise greenhouse gas emissions. The present situation, in which proposals for network developments are driven by business opportunities seen by train operating companies (TOCs), will not meet the targets discussed in the Project Scoping Note. A far more proactive input from Government will be necessary together with the recognition that private sector funding, by itself, will not be adequate to meet the objectives and a greater involvement of public finance will be required.
- The planning processes in the UK are inadequate for major strategic projects such as new urban transit systems. The cost and duration of public inquiries and their various stages of appeal, together with the need to progress Bills through Parliament leads to uncertainty of outcome and timescales that make investment in new transport infrastructure unattractive to private finance. A new approach to obtaining planning consents for major projects will be essential.
- There is a similar problem in the international standardisation, approval and safety validation of new railway infrastructure and rolling-stock. The more ambitious targets that are likely to be required for the transport sector to meet the deep cuts in greenhouse gas emissions foreseen by IPCC make reform even more pressing.
- The physical transport infrastructure must be seen as an integral part of an overall programme to achieve reduced energy usage and greenhouse gas emissions. Provision of improved train services will need to be coupled with town planning, pricing and fiscal policies to achieve the desired outcomes. Government will need to create the appropriate regulatory and fiscal environment, much of which will be contentious.

## **7. CONCLUSIONS**

7.1 ALSTOM welcomes the Government's review of energy policy and the opportunity to contribute to it. The company would be pleased to offer further information in support of the points made in this submission if required.

7.2 ALSTOM would strongly urge that the role and interests of the related manufacturing industry be an important and integral component of the review and its outcome, in view of the consequent impact upon the UK economy and employment.

7.3 Future energy policy should provide a clear, coherent and stable framework against which industry can plan and act with some confidence. This has not been the case in the recent past.

7.4 Further consideration needs to be given to the role of emissions' reduction technologies in relation to coal-fired plant. There are major environmental, industrial and diversity/security of supply benefits to be achieved through the upgrading of such plant. In the present electricity market environment, however, the related costs of environmental and efficiency improvements are a major deterrent to implementation.

7.5 In ALSTOM's view further encouragement will be necessary if the Government's target of 10GW of installed CHP capacity is to be achieved by 2010. An immediate boost would be given by the strongly canvassed disapplication of the Climate Change Levy to indirect off-site sales of electricity from such plant, especially smaller units.

7.6 Serious and urgent consideration should be given to a market-relevant B-IGCC demonstration project in view of the technology's potential contribution to the Government's Renewables Objectives, and to British employment and exports.

7.7 This review of energy policy must fully reflect the fact that utilisation of energy and its generation are two sides of the same coin. Similarly, the current reviews of rail strategy, the railway industry regulatory structure and re-franchising

arrangements need to take into account longer term energy policy. At present this does not appear to be the case.

7.8 The planning and approvals system relating both to new power plant and to railway infrastructure should be reviewed and amended to ensure that it is capable of exercise in a timely manner and is supportive of wider energy policy. This is not at present the case for example, in relation to transport systems such as urban transit or in relation to energy from waste, where there are also apparent anomalies in Renewables Policy.

7.9 ALSTOM would strongly urge a greater coherence and integrity in the Government's policy toward and support for R&D in the energy sector, balancing new and renewables with fossil fuel interests. This needs also to take account of areas of UK strength and future promise, including fuel cells and small and medium-sized gas turbines. It needs to cover not only the production of energy but also its efficiency of use including through advanced power electronic systems in transport, power transmission and distribution, and in industry.

3 September 2001