1. The Challenge

The 10 states of central and eastern Europe that joined the European Union in 2004 and 2007 never did like the package of energy and climate agreements agreed in Brussels in late 2008, which passed into law in 2009. They demanded, and won, concessions allowing them slower implementation and softer targets on some aspects of Europe's post-2012 energy and climate regime. They thus accepted the overall package while still, for the most part, regarding climate change as a rich man's concern, a legitimate goal, perhaps, for the older member states from western and northern Europe but irrelevant and ill-suited for developing countries such as themselves.

The general economic downturn of 2009–10 has brought temporary relief to all EU member states – new as well as old – from the economic pressure of carbon constraints. In the current phase (2008–12) of Europe's Emissions Trading Scheme (ETS), most of Europe's industrial companies have been allocated (for free) more carbon allowances than they need. Those few, mainly in the power sector, which are short of allowances, can buy extra CO_2 permits on the ETS at a rate of Euros 11–15 per tonne of CO_2. This is generally well below the level which would force them into less carbon-emitting types or uses of energy. The downturn has also made it very easy for most new member states to stay within their emission targets in sectors outside the ETS – chiefly transport, services, and agriculture. Therefore, in the fight against climate change, Europe is treading water rather than making headway.

However, the recession has merely postponed the challenge for central and eastern Europe (also referred to here as the EU-10 or the new member states, though two others in that group, Cyprus and Malta, lie outside this study). Precisely because the carbon constraints are not biting at present, there are some moves within the EU to try to ensure that they do in the near future.

The Copenhagen climate summit of December 2009 produced no firm reciprocal offers by other countries to match Europe's unilateral commitment to a 20 per cent cut in overall emissions by 2020, let alone Europe's conditional extra offer to raise the reduction to 30 per cent if others followed. EU governments then, in early 2010, asked the European Commission to analyse the impact of increasing the EU reduction to 30 per cent. The

Commission produced a report in May 2010. The thrust of this report showed that, with the downturn in economic activity and in emissions (which fell 11 per cent in 2009), the recession has already accomplished some of the 20 per cent cut, and greatly reduced the extra economic cost of raising the reduction to 30 per cent. Moreover, the report argued convincingly that exploiting the recession and raising the EU's level of ambition before 2020 will avoid more drastic emissions reduction action after 2020. For the time being, the report remains a report. The Commission decided that turning it into a formal proposal for a unilateral 30 per cent emission reduction by the EU would not win sufficient political support among EU governments, though a few, such as the new UK coalition government, favour this. However, sooner or later, the issue of a bigger emission reduction will return to centre-stage. It has to if Europe is to get anywhere near its ambition of pushing emissions to 85–90 per cent below the 1990 level by 2050.

'If you didn't like 20 per cent, you'll hate 30 per cent'

What is significant, for this study, about any raising of the EU emission reduction goal is that Brussels will look to the new member states to provide much of the additional increase. This is not surprising because:

- The greatest energy efficiency savings are, logically, to be found in the least energy efficient countries, e.g. those in central and eastern Europe.
- More of Europe's renewable energy potential lies in the forests, farms, and rivers of central and eastern Europe than in western Europe.

In its May 2010 communication,[1] the European Commission made clear that it would look east for the main physical, though not financial, contribution to a 30 per cent cut:

'As regards the geographical distribution, the emission reduction potential for moving from 20 per cent to a 30 per cent target is proportionally higher in the poorer member states [i.e. those in central and eastern Europe]. Several of these are projected to overachieve their 2020 targets for emissions from the non-ETS sectors without additional efforts beyond business as usual [i.e. no further policy changes]. This means a significant emissions reduction potential remains untapped, even after implementation of the [2009] energy and climate package.' However, the Commission acknowledged that 'it will be necessary to mobilize the public and

[1] European Commission communication May 2010.

private financial resources to enhance emission reduction without jeopardizing economic growth [in central and eastern Europe].' In other words, the new member states will need to be paid for doing more on climate, a point stressed by this study (see conclusion).

This study raises such questions as: how much can the poorer member states contribute to a low carbon economy in Europe? How hard should Brussels push them on energy and climate policy? How hard should they let themselves be pushed? Is it unfair to ask such relatively poor countries to undertake such expensive energy policies, and to expect what are essentially developing countries to endanger their growth rates? On the other hand, might it be in the long-term self-interest of central and eastern Europe to have EU policies that force the pace of their adjustment and make up for their 40 years of indifference to energy efficiency under communism? Might it be an advantage to the general cause of mitigating climate change for EU policy-makers to have such a large orchard of low-hanging fruit – in terms of potential efficiency improvement and renewable energy increases – within their grasp in central and eastern Europe?

2. The Context

Climate scepticism

In few of the 10 central and eastern European new member states is climate change a priority. For instance, in August–September 2009 a Eurobarometer opinion poll asked a sample, taken from across the 27 EU states, about what was 'the most important problem facing the world'.[2] Across the EU an average of 47 per cent thought climate change was the global priority. Only two new member states, Slovenia (70 per cent)[3] and Hungary (52 per cent) were above this average; the other eight were below. One of the eight, the Czech Republic, has the famously climate-sceptic (and Euro-sceptic) Vaclav Klaus as its president.

Concern about energy security

This has been the major energy policy concern of the new member states. To their dismay, on joining the EU, they found Brussels far more preoccupied with energy market liberalization and climate change. The concern of the EU-10 centres on their energy dependence on Russia. The three Baltic states rely on Russia for 100 per cent of their gas (and for most of their electricity and oil imports). Russia is also the source of all gas for Slovakia and Bulgaria, and for over half the gas going to the Czech Republic, Poland, and Hungary. At best, energy security concerns have been a distraction from climate policies, as EU-10 states focus on diversifying their sources of gas. At worst, energy security worries have run counter to climate policies, with countries like Poland and the Czech Republic seeking to maximize use of their own coal and lignite deposits (and to minimize gas and oil imports). 'We are caught between the rock of western Europe's carbon obsession and the hard place of our own energy security' is how one Polish minister puts his country's dilemma.

Developing country mentality

Responsible leaders in the EU-10 countries do not accuse the European Commission and western and Nordic member states of trying deliberately to sabotage their economic growth. However, many of them do claim that the extra cost of the EU climate programme will

[2] http://ec.europa.eu/public_opinion/archives/ebs/ebs_322_en.pdf

[3] On most of the issues in this study Slovenia is the outlier. This is not surprising given its geography and the fact that, as part of Titoist Yugoslavia, it was never, like the others, exposed to the full centralized command economy of the Soviet bloc. As a sort of Slav version of Austria, it has few problems in common with central and eastern Europe. In meetings of central and eastern Europeans to coordinate a common approach on EU climate policy, Slovenia has been described by its partners as 'present but not active'.

prevent them from achieving the extra rate of economic growth which they need in order to catch up with the older EU states. Gordon Bajnai, Hungary's technocrat caretaker prime minister in 2009–10, claimed that new member states need to grow consistently at 2 percentage points faster than the EU average to achieve this catch-up. In practice, he said that this meant countries like Hungary growing at a rate of at least 4 per cent a year. A Polish minister expressed horror, in private, at discovering that the European Commission had modelled its climate programme on an assumed annual rate of growth for Poland of 2.9 per cent, which he complained was far too low. A similar fear, sometimes heard, is that the region is swapping fuel dependence on Russia for technology dependence on western Europe, chiefly Germany. It is certainly true that assembling and installing wind turbines and solar panels imported from Germany provides relatively little local employment. However, while Germany is so far reaping the benefit of green technology jobs, it is also shouldering the initial development costs of these technologies.

Complaints

It still rankles with new member states that western Europe does not pay due regard to what happened to their economies in the painful post-communist transformation in the 1990s. That was the period when, in central and eastern Europe, output plummeted, unemployment soared, energy prices rose, many energy-intensive metal-bashing factories closed, and energy consumption fell – as did carbon emissions. When the Kyoto protocol was negotiated in 1997, emission reduction targets given to central and eastern European states – not yet EU members – were easy to meet, because the reductions were based on the years of 1988–90, the last highpoint of communist heavy industry. However, when the EU came to re-design its own climate programme in 2008 – now including central and eastern European within the Union – it chose 2005 as the new base year for all future emission reductions by EU states. (The Commission had one good argument for using 2005, which was that this was the first year for which there was reliable data on actual emissions.) The new member states complained that basing future reductions on 2005 wiped out all recognition of their pre-2005 'national sacrifices', or effectively subsumed them into an 'EU achievement' in emission reduction. A group of seven central and eastern European states, led by Hungary, therefore proposed a uniform 18 per cent emission cut for each and every state, based on 1990, as the fairest formula. However, the old member states, plus the Commission, retorted that the 1990s transformation of the eastern half of the EU could not be properly termed a 'sacrifice', because there was nothing voluntary about it, merely the inevitable consequences of

communism's collapse. The new member states' counter to this was to point out that the 1990s – however termed – was a period of severe hardship for them, at a time when western EU states of almost comparable economic level, such as Spain, were booming and, under Kyoto, allowed to increase emissions.

This wrangle between old and new member states might have been safely left to the history books, were it not for new pressure on central and eastern Europeans which would deny them, as they see it, not only political credit, but also financial credit for their painful transformation. Kyoto gave the states of central and eastern Europe (as well as Russia and Ukraine) allowances (called Assigned Amount Units (AAUs)) to emit carbon up to their Kyoto targets. However, they do not now need anything like their total number of AAUs. The EU-10 states all regained their 1989–90 level of GDP by 2000–5, but have all reduced the energy intensity of their economies and their industrial sectors. They all therefore have surpluses of AAUs to spare, and to sell to others – such as western European countries, and Japan – who are in difficulty with Kyoto targets. Among the more active sellers of these credits are Hungary, the Czech Republic, Poland, and Romania. They have put, or promised to put, the proceeds of AAU sales into green investments.

Now, however, there is pressure on the EU-10 states from Brussels, and some quarters in western Europe, to cancel or scrap these AAUs, on the grounds that putting these allowances on the market just adds to the imbalance of supply over demand and depresses the carbon price. In its May 2010 communication, the European Commission said that it would prefer the new member states to be able to draw directly on EU funds for renewable energy, energy efficiency, and promotion of public transport 'as an alternative to the use of surplus AAUs as a source of funding, which undermines the environmental integrity of the carbon market'. At present, new member states feel more secure in hanging on to their Kyoto AAUs, to which they have a legal right, rather than in relying on the outcome of some future EU budget negotiation, in which getting money for non-farm purposes is notoriously difficult (see conclusions).

Concessions

The new member states were given a series of concessions in the 2008 energy/climate package. However, some of these concessions were less generous than they might appear:

a. The Emissions Trading Scheme This is the most centralized part of the EU programme, covering some 10,000 industrial emitters across the 27 countries, with a common cap or emission reduction applying to all. In the third phase (2013–20) of the ETS, the cap is supposed to bring emissions down to 21 per cent below the level in 2005, by 2020. The centralized nature of the ETS made it hard to differentiate in favour of the new member states. Moreover, most new member states still tend to have relatively larger industry shares in their GDP than older member states (see table below); only a couple of Baltic states have industry shares well below that of the most industrialized old member state, Germany. Therefore, relatively more of new member states' overall emissions is likely to be caught in this centralized system.

Table 1: Shares of industry & services in GDP in 2008

	Industry as % of GDP	Services as % of GDP
Bulgaria	30.5	62.2
Czech Republic	37.5	59.9
Estonia	29.1	68.0
Hungary	29.4	66.2
Latvia	22.7	74.2
Lithuania	32.8 (2007)	62.8 (2007)
Poland	30.8	64.6
Romania	35.3 (2007)	55.9 (2007)
Slovakia	38.0	58.9
Slovenia	34.4 (2007)	63.3 (2007)
France	20.4	77.6
Germany	30.2	69.0
Italy	27.0	71.0
Spain	28.9	68.3
United Kingdom	23.7	75.6

Source: World Development Indicators, http://data.worldbank.org/indicator

However, in the post-2012 ETS there are a couple of offsetting concessions to the new member states. First, their governments will collectively be given slightly more (12 per cent) carbon allowances to auction than their countries' share in overall EU emissions represents (and old member states correspondingly less). This will be a revenue boost to the EU-10. Second, new member states – defined as those with power sectors heavily reliant on a single fossil fuel and/or with relatively low income per head – have been granted the right to phase in the auctioning of carbon allowances for their power sectors gradually. This was the result of Poland's non-negotiable demand that its electricity generators – 95 per cent coal-dependent – could not afford to start paying for all their pollution permits. Since the actual

cost will end up on consumers' bills, Warsaw effectively said that it did not dare risk the impact of a big cost rise on the competitiveness of Polish industry, and on the incomes of ordinary Poles.

However, any free permits will be allocated administratively. After 2012 this allocation will be performed by the European Commission, not as now by national governments. The way in which the Commission will allocate free permits for the power sector – and for any other sector like steel (which might get free permits on the grounds that it faces foreign rivals without any carbon constraint) – is that permits will be free up to a technical threshold set by Europe's 10 per cent most efficient operators. Almost invariably these operators will be in western Europe. Therefore, even where companies in eastern Europe appear to be getting a free ride, the reality is that they will have to do some buying of allowances on the ETS. This will increase if the EU decides to go for that 30 per cent emission reduction.

b. Non-ETS sectors. In sectors outside the ETS – transport, agriculture, services – the new member states are to be allowed to continue increasing emissions, in contrast to the older member states which will have to cut. Therefore, by 2020, the poorest of the new member states, Bulgaria, will be allowed to increase emissions in non-ETS sectors by 20 per cent and Romania by 19 per cent, with smaller increases as new member states go up the income ranking, with Slovenia being allowed only a 4 per cent increase. However, as Table 1 above shows, these increases apply to services sectors that are relatively smaller than those in western Europe. Moreover, if the total emission cap is lowered via a 30 per cent reduction on 1990 levels, the new member states are then likely to find their non-ETS targets squeezed. This could be a particular problem in transport, because over the past 15 years the shift from public to private transport, from rail to road, and from bus to car has been more marked in the new member states than in the older ones (Section 3.4).

c. Renewables. The new member states were given less demanding stretch targets, from what their renewable share of energy was in 2005 and what it should be in 2020 than were older member states. This was in recognition of the extra cost of renewable energy. At the two extremes, Romania is asked to make only a 6.2 per cent point increase in its renewable share, and the UK a 13.2 per cent point increase. At the same time, if you were looking for the most cost effective increase in renewable energy across the EU, there is no doubt that you would look east, where new member states have made relatively little effort so far to 'go green', but

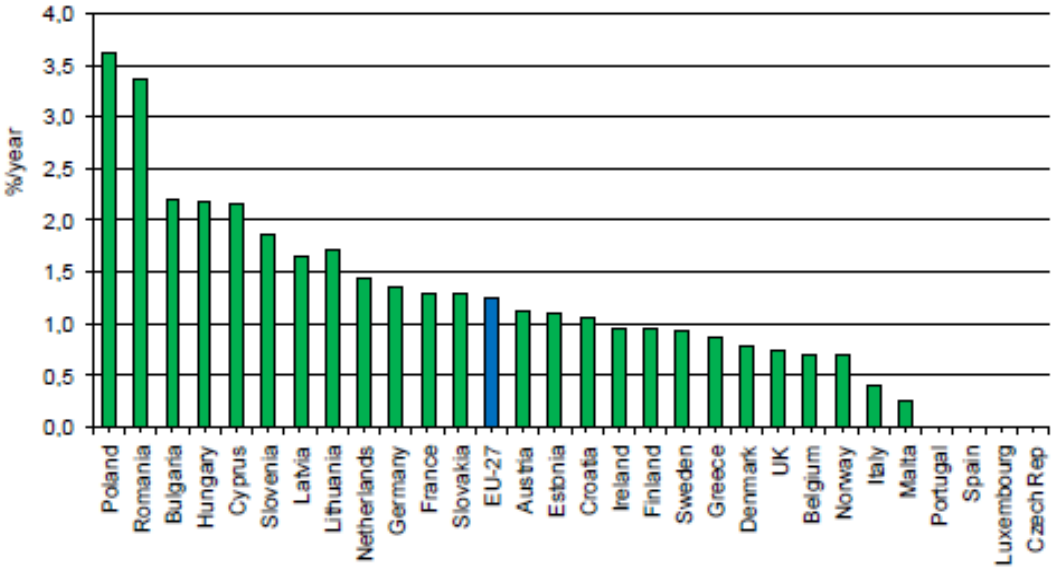
have the best potential (mainly biomass) to do so. Over and above what was agreed in 2008, new member states might be ready to make further increases in renewables to help meet a 30 per cent reduction goal. However, as a group they will not be enthusiastic. One advance – a surge in solar photovoltaic (PV) installation in the Czech Republic – has been made almost by accident, the result of setting a mistakenly high feed-in tariff some years ago, which regulators are now desperately seeking to cut (see Section 6.2). The EU-10 group also includes Latvia, the only country in the EU where the share of renewable power is actually falling (though from a high level), because a large amount of hydropower capacity was built before 1990, but none since.

3. The Current Situation

In the 20 years since they abandoned communist central planning, the 10 central and eastern European member states of the EU have made enormous strides in energy efficiency. They started, however, from a low point. The Soviet bloc economic system virtually guaranteed energy inefficiency. Marxist economics placed little value on natural resources (the factors of production that counted were capital and labour), and prices were set, not by the interplay of supply and demand, but by government fiat within, and between, Soviet bloc countries. The prices of Soviet oil and gas sold to central and eastern European allies were pegged to a formula that lagged world price movements, and were therefore generally well below those set by OPEC. Central and eastern European states often further subsidized prices, especially to households who paid low, flat rates for their energy. However, it is not easy to make up for lost time, for the 40 years of indifference to energy efficiency in central and eastern Europe. The new member states are certainly converging with the older member states, but closing the gap in energy efficiency/intensity is another matter. Merely hoping that the general application of capitalism – privatization, liberalization – will do the job is not sufficient.

As the EU-10 began to turn themselves into market economies, there was vast potential for improvement in energy efficiency, and for the most part it has been realized. Energy consumption has grown less fast than GDP, and this de-coupling of the input of energy and the output of national wealth is most marked among the new member states. This is clear from Figure 1 below (based on the ODEX index developed by the Odyssee programme and used by the European Commission and Eurostat).

Figure 1: Energy efficiency improvements by country (1996–2007)

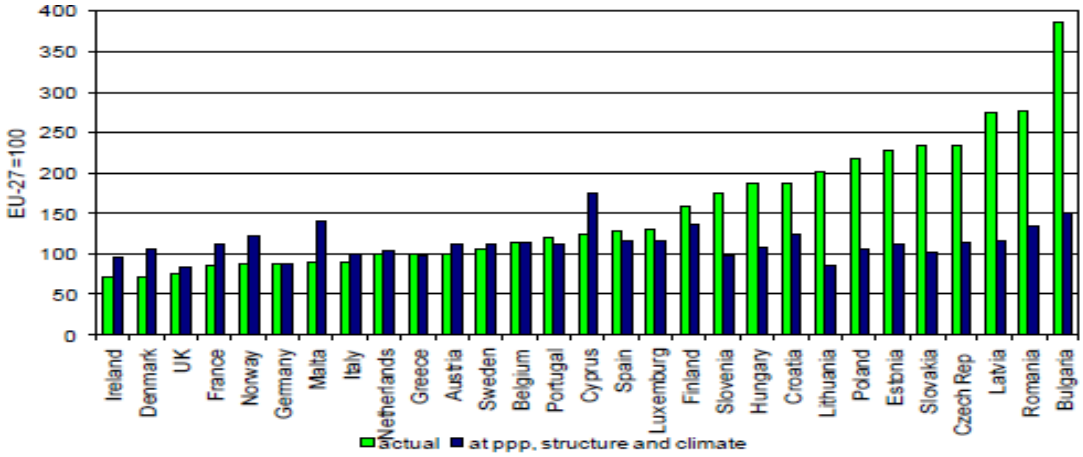


Source: Odyssee-Mure project 2009, www.odyssee-indicators.org/publications/PDF/publishable_report_final.pdf, page 25

The EU-10's efficiency improvements are, however, just relative – relative to their communist-era starting point, and relative to the performance of the western Europeans. What is significant for their ability to meet the challenge of EU energy/climate policies – the subject of this paper – is the actual level of energy intensity of their economies: the amount of energy need to generate a euro of GDP. As Figure 2 below shows, in absolute terms (the light colour bars) the newcomers still have energy intensities well above those of the older member states.

The gap between eastern and western European countries in Figure 2 can be made to virtually disappear if you make adjustments for the facts that eastern Europe generally has colder winters (being either more northerly or more land-locked), still has a slightly higher ratio of energy-intensive industry, and has lower prices and incomes. If you use purchasing power parity standards to level out the prices among the EU-27 – taking into account the fact that Euros 100 buys substantially more in Bulgaria than in Denmark and that Euros 100 worth of Bulgarian GDP counts for more, in Bulgaria, (and will have less wage cost in it) than Euros 100 worth of Danish GDP in Denmark – then Bulgaria no longer looks five times as wasteful as Denmark. It is these sorts of adjustments which produce a much more even result in the darker colour bars in Figure 2. Yet while this is, in a sense, a fairer way of comparing the relative energy efficiency *efforts* of the new member states with the older ones, what counts in a competitive world is *results*, the actual energy efficiency or intensity results of countries.

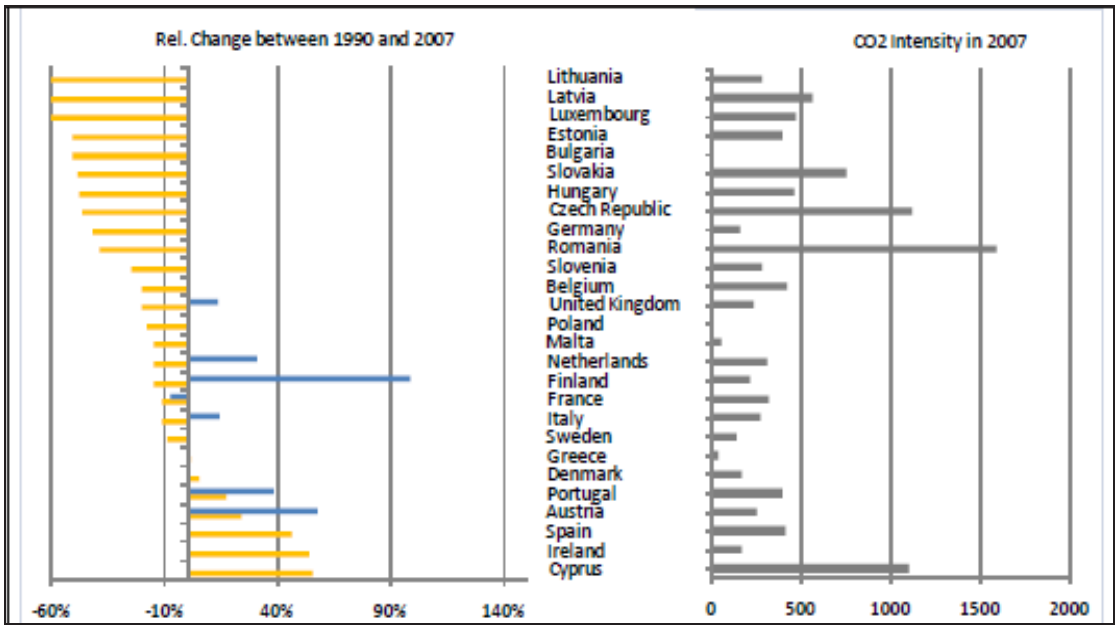
Figure 2: Adjusted final energy intensities (2007)



Source: Odyssee-Mure project 2009, http://www.odyssee-indicators.org/publications/PDF/brochures/macro.pdf

Moreover, for the EU-10 and their climate commitments, what matters even more than general energy intensity is the carbon intensity of their economies. A measure of this is provided in Figure 3, which charts changes in the energy-related CO_2 emissions of industry. It is no surprise that, among the EU-10, the smallest decrease in this category of CO_2 emissions between 1990 and 2007 has come in Poland, which is still 95 per cent dependent on coal-fired electricity (see Section 6.1).

Figure 3: Energy-related CO_2 intensity of industry per Euros 1m of output



Source: European Environment Agency, Greenhouse gas emission trends and projections in Europe 2009, Annex 6, page 110

3.1. Drivers of change

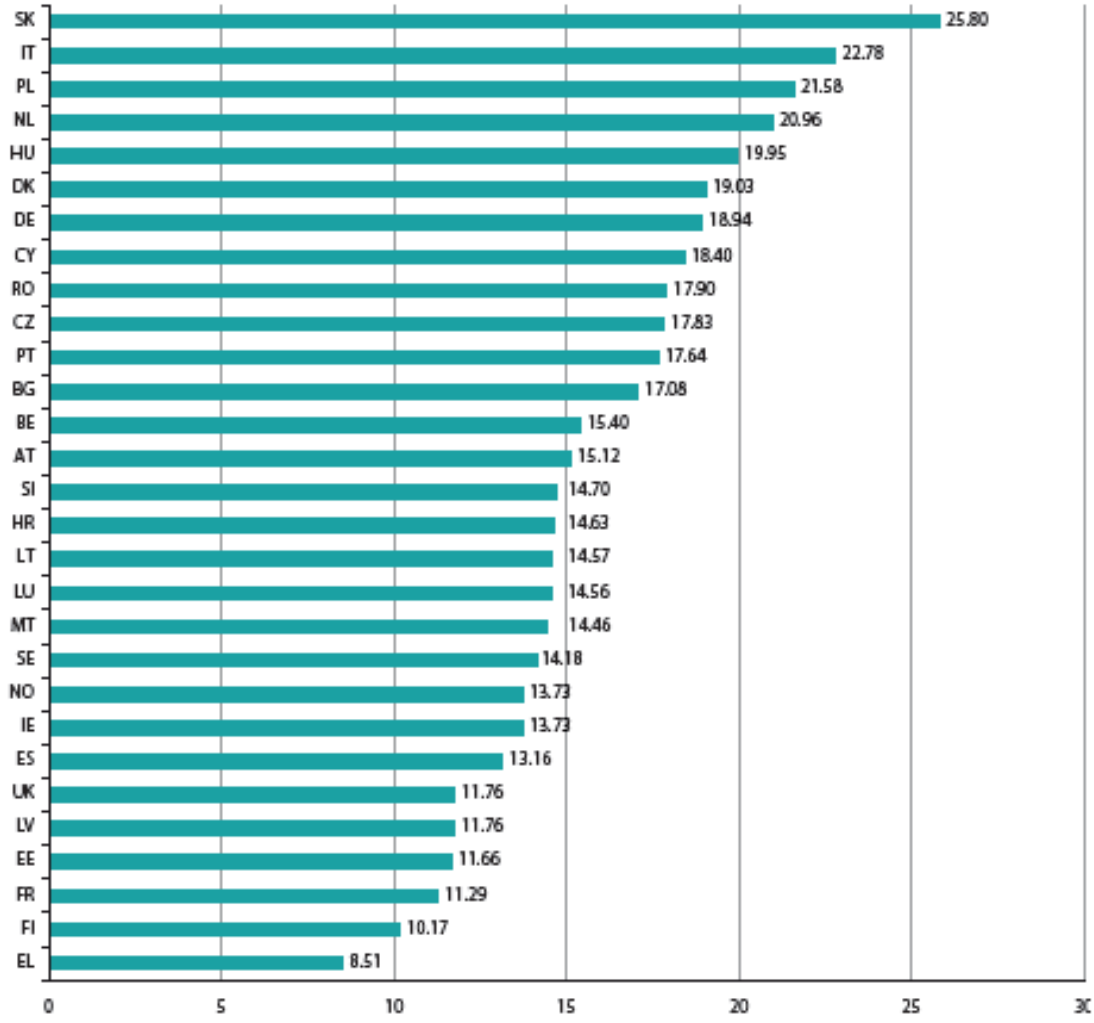
Prices

In general terms, the biggest jump in energy prices during the period under consideration was in Russian gas, and came in the 1990s as Moscow phased out the Soviet-era price subsidies. Some countries, such as Poland, were quick to raise prices. The Czech Republic also increased prices quite quickly. Slovakia kept its gas prices stable for almost the whole of the 1990s, and then increased the household gas price by 600 per cent between 2002 and 2006.[4] Hungary, also, was slow to adjust, and indeed is only in 2010 phasing out a gas price subsidy for households (see Section 6.3). Energy prices in the new member states are now generally slightly below the level in western Europe, in absolute terms. However, the gap is very small where markets between eastern and western Europe are well-connected, such as between the Czech Republic and Germany. If adjusted, through a purchasing power parity standard, to take account of lower incomes in the newer member states, electricity and gas prices can be said to take the same bite out of incomes in both eastern and western Europe. Petrol and diesel prices are also fairly equal in purchasing power terms because, roughly speaking, the richer the country, the higher the tax on transport fuels (as in states like Finland, Denmark, the Netherlands, Belgium, and the UK), and the poorer the country, the lower the tax (as in Bulgaria and Romania).

Higher prices have led to less waste. In electricity, the transmission losses in high voltage power are small in both eastern and western Europe. However, according to experts at the European Bank for Reconstruction and Development, the additional losses in low voltage electricity distribution amounted to a further 10–20 per cent in eastern Europe before privatization, compared to 7–8 per cent in western Europe. In Bulgaria, the average distribution loss before privatization was 22 per cent, and now is around 12–14 per cent, largely because private owners are less willing than public owners to tolerate commercial loss through theft, as distinct from technical losses of voltage leaking into the ether.

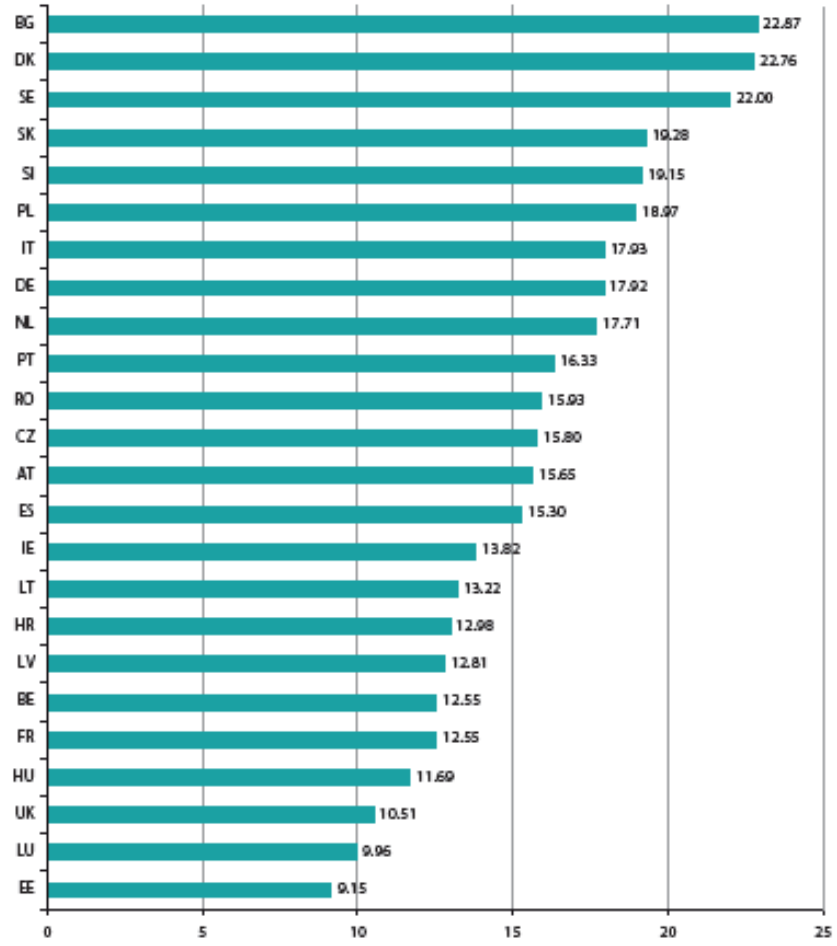
[4] Impact of the 2004 Enlargement on the EU Energy Sector, REKK (Regional Centre for Energy Policy Research), Budapest 2008, page 128.

Figure 4: electricity prices for household consumers on 1/1/2007



Source: Panorama of Energy, 2009, p.107 Eurostat
Note: Table of electricity prices in euros for household consumers on 1/1/2007, all taxes included, in purchasing power standards per 100 kWh. (based on a standard consumer using 3,500 kWhs a year). Shows that among the top 10 EU countries with the highest prices relative to incomes are Slovakia, Poland, Hungary, Romania, and the Czech Republic.

Figure 5: gas prices for household consumers on 1/1/2007



Source: Panorama of Energy, 2009, p.110, Eurostat
Note: Table of gas prices in euros for household consumers on 1/1/2007, all taxes included, in purchasing power standards per GJ (based on standard consumer using 83.7 GJ a year). Shows Bulgarians paying the highest effective price for their gas in the EU, and Slovaks the fourth highest. The two countries were also the hardest hit by the 2009 cut-off of Russian gas, because of their high dependence on Russian gas.

Fuel poverty

This cannot be ignored in the new member states. They are all relatively poor and have a legacy of particularly inefficient housing stock, while removal of communist-era subsidies has raised their energy prices faster than has been the case in western Europe. There is no universally accepted definition of fuel poverty, but a commonly-used financial measure, developed by Brenda Boardman in the UK context, is 'the inability to obtain adequate energy services for 10 per cent of a household's income', which in the UK is roughly twice the median share (5 per cent) of household expenditure on energy. Unfortunately, there seems to be no EU-wide survey using this financial benchmark. One of the few new member states to make such a measurement is Hungary, where the average household spending on energy in the period of 2000–7 was 9.7 per cent. This average is held below the 10 per cent mark because the country's 20 per cent richest households spend much less on energy. The result is

that, according to a study by researchers at the Central European University in Budapest, 'if the 10 per cent threshold currently in use in the UK is applied to Hungarian data, the average of all but the two highest deciles (i.e. 20 per cent) would be defined as fuel poor'.[5] Classing 80 per cent of Hungarians as fuel poor seems rather excessive, particularly in the light of other survey material coming from the regular Income and Living Standards surveys complied by Eurostat (see Table 2). This shows the percentage of the population who report themselves as unable to keep their homes adequately warm, as in arrears on their utility bill payments, and in accommodation with leaking roofs, damp walls and so on.

Table 2: Share (%) of population reporting energy-related household problems: 2008

	Inadequate heat	Energy bill arrears	Energy-related housing defects
Bulgaria	34	33	30
Czech Republic	6	3	14
Estonia	1	7	17
Hungary	10	14	31
Latvia	17	12	26
Lithuania	22	6	25
Poland	20	10	23
Romania	25	24	24
Slovenia	6	14	30
Slovakia	6	4	9
EU-27 average	9	8	17

Source: Survey on Incomes and Living Standards, Eurostat

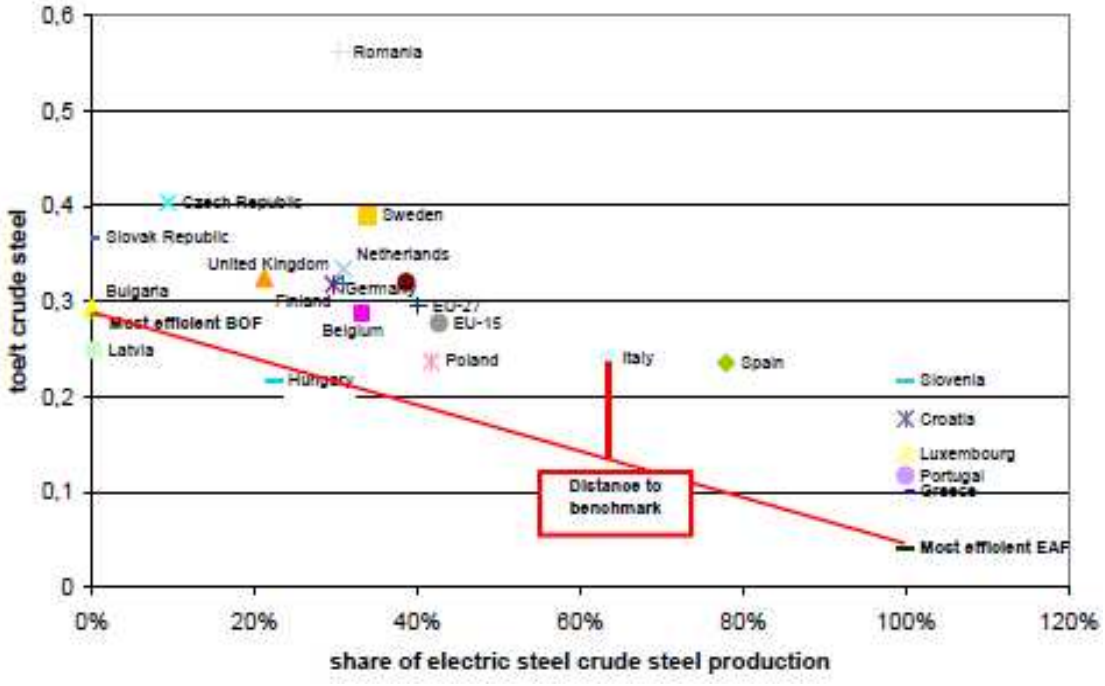
There is nothing very scientific about these surveys, in which another group of relatively poor EU states – the southern Europeans – also report problems on these energy issues. However, they do, in a general sense, confirm fuel poverty as a concern of the new member states. It is also a preoccupation of their national energy regulators, who would feel more comfortable raising energy tariffs to reflect real market costs if they knew that the poor were better protected from such increases. Dr Gabor Szorenyi is director of the Hungarian Energy Office, and is also president of the Energy Regulators Regional Association (ERRA), whose memberships stretches from central and eastern Europe into Russia and CIS states. 'All the ERRA regulators agree on the need for vulnerable customers to be defined and protected with remedies such as social tariffs, so as to make governments more comfortable with market pricing', he says.[6]

[5] *Fuel poverty in Hungary: a first assessment*, Sergio Tirado Herrero and Prof. Diana Urge-Vorsatz, CEU, 2010.
[6] Author interview. March 2010.

3.2. Technology – the case of steel

All the new member states have reduced the amount of energy going into, and the level of emissions coming out of, their steel industries, but progress has been uneven, depending on the level of foreign investment and the type of technology. Across all 27 EU countries, CO_2 emissions from iron and steel fell by 18.4 per cent between 1990 and 2007. This is largely due to the advance of the electric arc process, which essentially recycles scrap, at the expense of the traditional blast furnace method, which starts from scratch with the original ore. The former process is much less energy intensive than the latter, and as an industry average, the electric arc process generates about 600 kg of CO_2 per tonne of steel, compared to two tonnes of CO_2 (and more in some older eastern Europe plants) per tonne of steel forged in blast furnaces. Figure 6 shows the energy savings to be made, in terms of the ratio of oil equivalent tonnes to steel output, from adopting electric arc technology. Of the new member states only Poland and Slovenia have switched significantly to the electric process. Hungarian steel-making is efficient, despite its 80 per cent reliance on blast furnaces. Other central and east European states have stayed largely wedded to blast furnaces, leaving considerable scope for energy efficiencies in the case of Romania and the Czech Republic.

Figure 6: New EU members mostly stick to traditional ways of making steel



Source: Odyssee data base
Note BOF = blast furnace; EAF = electric arc furnace.

3.3. Structural shift

Across Europe, indeed throughout the industrialized world, the general trend in energy efficiency has been one of considerable improvement in industry, modest progress in households, and worsening in transport. This pattern is particularly marked in the new member states, for reasons related to their adaptation to market economics and to their re-orientation towards, and integration with, western Europe.

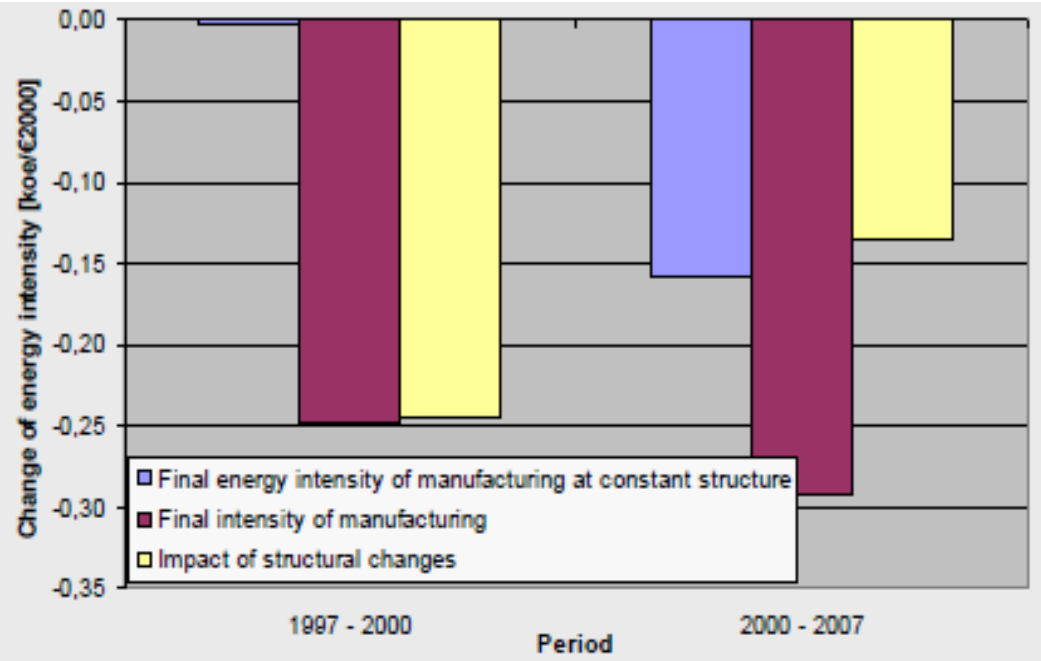
Quite a large part of the new member states' energy efficiency improvement is due to a switch of activity. They have abandoned, or reduced production in, sectors of industry such as the making of steel, heavy machinery, and chemicals, which had been built up on cheap Soviet energy that was no longer available – and shifted to less energy-intensive sectors. Hungary, for example, gave up making its own aluminium – a metal that consumes electricity in its fabrication – and shifted to the relatively energy-light activity of making or assembling, components for electronic companies, such as GE, Samsung, Philips, and car companies like Audi and Suzuki. However, this structural contribution to energy efficiency improvements in Hungary and other new member states has two important consequences for this study:

- Firstly, it flatters the energy efficiency improvement of the past 20 years, because abandoning energy-intensive activities has been the easy part of the improvement. It was not easy in a social sense – far from it, it has been miserable for hundreds of thousands of well-qualified people across central and eastern Europe, who were thrown out of jobs in the 1990s. However, it was relatively easy in the technical sense that the improvement in the country's overall energy efficiency required no change of technology or behaviour, just cessation of certain energy-gobbling activities.
- Secondly, precisely because it tends to flatter past improvement, it risks exaggerating the potential for further energy efficiency improvements. It would be a mistake to simply extrapolate past efficiency improvements into the future, because the structural changes in EU-10 countries' industry are most unlikely to continue at the pace experienced in the last 20 years for the next 20 years.

This structural contribution to energy efficiency can be gauged by estimating what the energy intensity would have been had the structure of industry stayed constant, and then comparing this estimate with the actual development of energy intensity. The structural contribution varies, according to the reports complied on the Odyssee database, from country to country.

In two countries, structural shifts accounted for a major part of energy efficiency improvements. In the Czech Republic, the structural contribution to higher efficiency in industry was dramatic. As Figure 7 shows, structural change (the very light colour bar) accounts for almost 100 per cent of the improvement in the energy intensity in Czech manufacturing (the dark colour bar) between 1997 and 2000, and for nearly half the improvement between 2000 and 2007.

Figure 7: Impact of Structural Changes in Industry



Source: Report on Czech energy efficiency 2008, Odyssee data base.

In Romania, structural shifts accounted for about half of energy intensity improvements in the Romanian economy over the whole period 1992–2007, as the country scaled down some of the megalomaniac industrial schemes of the Ceausescu era. However, in neighbouring, but less-industrialized, Bulgaria, structural shifts in manufacturing made little difference to the country's energy efficiency.

The part played by structural changes also varied over time. For Hungary, the structural contribution to lower energy intensity was bigger between 1992 and 2000 (when it was responsible for 30.9 per cent of improved energy efficiency) than it was between 2000 and 2007 (24.5 per cent). In Poland, structural shifts seem to have contributed more to efficiency in the 2000s rather than the 1990s, which may have something to do with the gathering pace of foreign direct investment bringing in more energy-efficient technology (see Section 6.1).

In other new member states, energy intensity – which measures how much physical energy is used to generate a euro of GDP – has been very much influenced by growth in GDP or in high value sectors. Latvia and Estonia showed big decreases in energy intensity when their GDP recorded double digit growth for a couple of years in the late 2000s, while Slovakia, largely because of its growth in high value car production, managed to reduce its energy intensity by 57 per cent between 1993 and 2007. Energy consumption by Slovak industry has

remained constant, but it has been used to produce higher value goods. In contrast to the post-communist Czech Republic (which if anything has de-industralized), Slovakia has been industrializing for the first time, especially in cars (its car production rose by 308 per cent between 2000 and 2007).

3.4. Lost Opportunities

A potentially valuable inheritance left by communism to the new member states was a pattern of collective energy consumption in transport and heating. If continued and developed, such collective consumption could have offered economies of scale in energy use. This, however, has not happened.

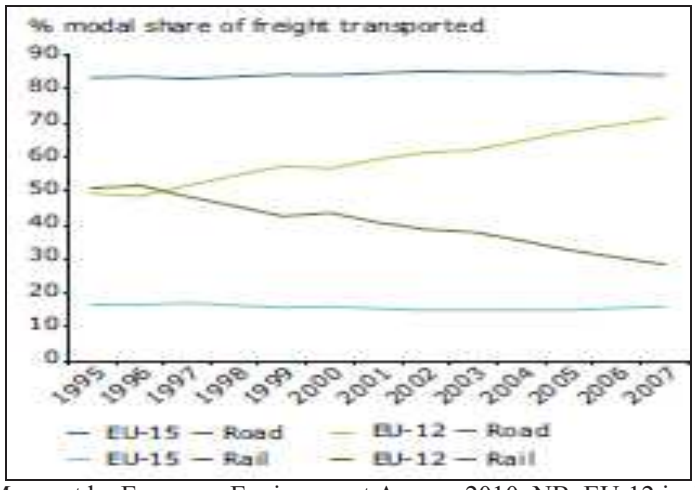
Transport

Changes in the new member states have been considerable. As central and eastern Europeans have become richer, they have tended to abandon the bus and the railway for the private car. This parallel growth of incomes and car ownership is part of a worldwide trend, but it has been accentuated in the EU-10 countries because of the desire of their citizens to visit many destinations in western Europe that were poorly linked with their Soviet-era rail system. More dramatic has been eastern Europe's abandonment of rail for freight transport, and its move to western Europe's longer-established habit of carrying almost all cargo by road. The two middle lines in Figure 8 show eastern Europe's progressive shift from a 50/50 split of road and rail freight towards western Europe's 85/15 split in favour of road (the top line) over rail (the bottom line). This change is partly due to the inadequacy of eastern Europe's rail links to western Europe and to the decision to supplement this with new roads, but it is also significantly related to the integration of central and eastern European industry into the organization and production methods of western multinationals.

Before 1990, Comecon, the Soviet bloc economic body, organized a broad division of labour between eastern European countries, so that Hungary, for instance, specialized in buses, Bulgaria in fork lift trucks, and so on (though the Soviet Union itself usually maintained some parallel production of every product). Nonetheless, in those days, Hungary's Ikarus bus company (once the fourth largest in the world, see Section 6.3) made most of its components in-house or within Hungary, just as Skoda made most of its components in Czechoslovakia. Now, however, companies like Skoda (part of Volkswagen) are part of the western multinational pattern of production, which involves making components in specialized

factories in several countries and then trucking them by road back and forth across borders for further elaboration or assembly.

Figure 8: Progressive preference for road over rail

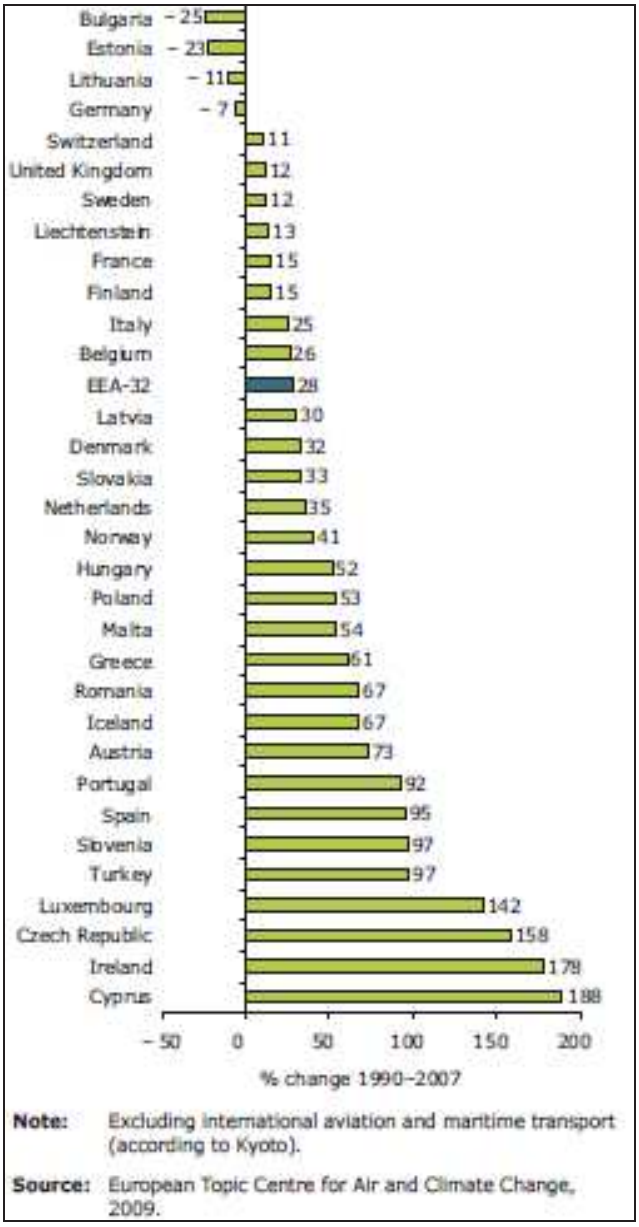


Source: Eurostat, TERM report by European Environment Agency 2010. NB: EU-12 includes Cyprus and Malta

Evidently, multinationals prize the superior flexibility offered by 'individual' truck transport above the lower unit cost in energy and emissions provided by the more 'collective' system of rail transport.[7] However, in terms of their EU climate commitments, the EU-10 countries, or most of them, are paying a price. The energy intensity of their manufacturing will have diminished, even if this is only due to the higher added value of their industrial output, but for most of them, their transport emissions are rising faster than the EU average, as Figure 9 shows. Part of the reason for the stability of the rail/road split shown for the older member states in the past 15 years (shown in Figure 8) is that western European industry has long adopted the pattern of intensive cross-border road transport logistics to which eastern Europe is still adapting.

[7] For insight into the transport shifts in central and eastern Europe, I am indebted to Dr Elek Laszlo of Energia Kozpont Nonprofit Kft, Budapest.

Figure 9: Trends in transport greenhouse gas emissions by country 1990–2007



Source: European Topic Centre for Air and Climate Change, 2009

District heating

This form of collective heating can be cheap and efficient, particularly when associated with combined heat and power (CHP) systems that make use of waste heat produced in the course of generating electricity. Such systems generally work well in Nordic countries, where the penetration of district heating (DH) is high (see Table 3). However, in much of post-war central and eastern Europe 'the Soviet era, when energy was considered a right and virtually cost-free, helped spoil DH systems and kept them pretty primitive', according to Alexander Lega, a DH specialist with the European Bank for Reconstruction and Development (EBRD).

The legacy DH systems in the EU-10 often have several problems – inefficient boilers, uninsulated pipes (compared to modern systems with pipes that are pre-insulated with a plastic coating), and a pipe lay-out that sometimes makes temperature control impossible. Sometimes there is just one pipe running through a building, with no parallel pipes going off to individual radiators or apartments. The only temperature control is therefore to shut off the entire hot water pipe system or, the usual remedy, to open the window.

Impracticable in rural areas, DH systems make sense in cities and towns, but precisely because they are embedded in urban planning and architecture, they are complicated to build or to renovate. However, they can be very effective in reducing emissions, either linked to CHP, which can have an energy conversion ratio of 80 per cent, or to solar panels (as the EBRD is discussing in Romania) or to geo-thermal energy (as the EBRD is discussing in Hungary). Wind power is generally less used in DH systems, because sources are usually remote from major cities. Some major renovations of existing DH systems are being carried out. In the Bulgarian capital, Sofia, a project by the EBRD and the World Bank has saved 30–35 per cent of heat consumption by installing thousands of control substations and better distribution pumps, by replacing 100 km of pipes, and by changing the billing system to paying for actual consumption. However, the process of turning a theoretical advantage of the EU-10's communist past – collective consumption of energy for heating – into one of practical benefit is proving to be a long haul.

Table 3: Some examples of district heating penetration

Country	Houses supplied by DH (2000) %
Iceland	95
Denmark	60 (2005)
Estonia	52
Poland	52
Sweden	50
Slovakia	40
Finland	49
Hungary	16
Austria	12.5
Germany	12
Netherlands	3
UK	1

Source: EBRD

4. The Way Ahead

This paper has laid the groundwork for an examination of the future energy and emission challenges facing the new member states in meeting their EU climate commitments, by painting a picture of the energy intensity gap that still remains between eastern and western Europe. It has highlighted the big relative improvements made by the new member states, especially in industry, but has also pointed out that some of this improvement is illusory. This is partly due to the abandonment of certain energy-intensive sectors such as metallurgy and chemicals by new member states rather than increased efficiency in these sectors. It has also underlined that improvements in industry have largely been offset by increased energy use and emissions in transport. We now turn to the new member states' prospects for moving towards a low carbon energy system in general, and for meeting their 2020 commitments in particular.

4.1. Renewable energy

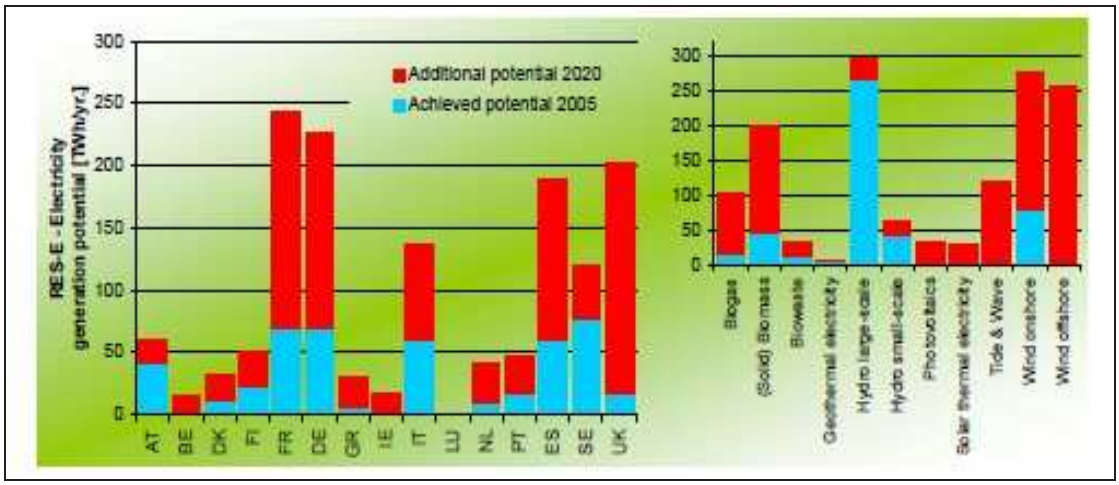
In the current economic recession, all EU targets for reducing emissions and boosting low carbon energy have become easier to achieve. The recession has had significant consequences for the Emissions Trading Scheme, as the supply of carbon allowances is outstripping demand and has depressed the price of allowances. Less affected by the recession than the ETS has been the 2020 target of a 20 per cent renewable share of overall energy consumption – although 20 per cent of lower overall energy consumption is obviously an easier renewable target to hit. The likely result is that renewable energy targets will play a more important part in reducing total emissions in the European economy than was predicted when it was thought, pre-recession, that the ETS would be more effective.

In view of the higher cost of renewables, the new member states were all given easier renewable targets than their richer western European counterparts. Of the EU-10 states, the Czech Republic, Hungary, Latvia, Romania, and Slovenia predict that they will meet their 2020 targets. The other five – Bulgaria, Estonia, Lithuania, Poland, and Slovakia – forecast that they will exceed their 2020 targets, giving them a surplus of green energy to sell to western European states like Italy and Luxembourg, which expect to fall short of their 2020 targets.

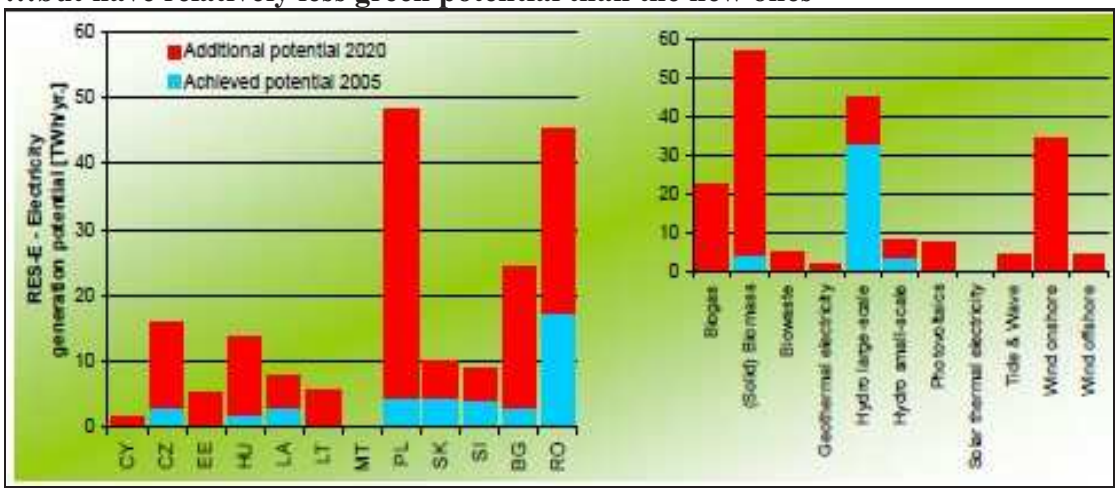
However, this comfortable position for the new member states will not survive the ratcheting up – which is likely to come sooner or later – of the EU climate programme from an overall cut of 20 per cent (on 1990 levels) to 30 per cent. The Commission's claim that the potential for further emission reductions is 'proportionally higher' in the new member states is based on the analysis shown in Figure 10. These charts measure (in the light colour bars) what had been achieved by 2005, and what more (in the dark colour bars) could be achieved by 2020, in renewable electricity generation. (There is some uncertainty about how much biomass would go into electricity, because it can also be used for heat and transport in the form of bio-fuels. This calculation also assumes some restraint, for environmental reasons, on EU cultivation of biomass, made up with some imports from outside the EU.)

Given the smaller economies and populations of the new member states, the charts show their 'proportionally' greater potential in renewables. Up to now, they have done little. Most of the existing renewable electricity in central and eastern Europe is large-scale hydropower, mostly in Romania, but also with some in Latvia, the Czech Republic, Slovakia, and Slovenia. Since large-scale hydro possibilities are mostly exhausted, new renewable power will be concentrated in biomass, biogas and onshore wind, and mainly in the region's two largest economies – Poland and Romania. Little is expected from the maritime renewable energy sources of offshore wind, tidal, and wave power, because many new member states are land-locked, because offshore wind is more expensive than onshore wind, and because tidal and wave power are still experimental.

Figure 10: The older member states can still do more in renewable energy….



…but have relatively less green potential than the new ones



Source: Futures-e project, 20% RES by 2020, by Energy Economics Group, Vienna University of Technology and others, 2008

In the early 1990s there was a statistical jump upwards in the renewable share of energy in central and eastern Europe. In the big 'transition recession' of the early 1990s heavy industry collapsed, total energy consumption dropped, and conventional fossil fuelled energy production decreased, but renewables with low running costs – such as hydro-electricity generation and wood-burning for heat – stayed constant. This caused the new member states' renewable share to rise from 2 per cent in 1991 to 4.5 per cent in 1994.[8] However, nothing was done to add to these traditional forms of renewables. Governments were slow to take even the basic step of defining, and endorsing, what is renewable by issuing so-called 'guarantees of origin'. In 2004 eight of the 10 central and eastern European countries joined the EU, but by late 2006 none of the eight had put a guarantee of origin system in place, despite a directive requiring them to have done so by 2003. Only once they had a guarantee of origin system in place could they introduce renewable investment support schemes. Biomass and wind power only begin to show up in national statistics as measurable sources of electricity after 2005.

Not surprisingly, renewable energy progress has been modest. The new member states started off with easy national targets for their non-ETS (i.e. non-industrial) emissions; to varying degrees they are all allowed to increase emissions in non-industrial areas such as transport, agriculture, and services. There is then the impact of the recession, depressing emissions

[8] See REKK study cited above, page 181. Here the new member states include Cyprus and Malta, but exclude Romania and Bulgaria.

further. As the Commission said in its May 2010 communication, 'several poorer member states are projected to overachieve their 2020 targets for emissions from the non-ETS sectors without additional efforts beyond business as usual'. Hardly, therefore, a sense of urgency to pursue crash renewable energy programmes.

Very occasionally, a new member state's efforts to stimulate renewables have produced too much of a good thing. Czech scepticism about climate change – personified in Vaclav Klaus, the country's famously climate-sceptic president – and Czech doubts about the feasibility of alternatives to fossil fuels, have been reinforced by an ill-judged solar PV scheme with very high tariffs and little legal scope for tariff reduction (see Section 6.2). At least 40 per cent of total Czech renewable support is currently being spent on a project that so far only provides about 7 per cent of renewable power. This scheme has brought about a surge of solar PV investment in the country, but has added significantly to Czech electricity bills. Czech regulators are now cutting the tariffs as fast as they can, and little new solar investment is expected after 2010.

4.2. Nuclear

The countries of central and eastern Europe are generally well-placed for nuclear power to contribute to emissions reduction. The one big exception is Poland, the country that most needs nuclear power to dilute the carbon intensity of its coal-dominated energy supply, but which is only now going ahead with its first reactors, due for completion at some time after 2020. (A initial decision to build a nuclear reactor was taken by the martial law government of General Jaruzelski, but this was thwarted by the first Solidarity government – see Section 6.1). The new member states are also well-disposed to nuclear power, their public opinion being generally in favour of it, according to polling surveys. The Czech and Slovak governments competed with each other to host the European Nuclear Energy Forum – set up by the Commission in 2007 as a talking shop to revive interest in nuclear energy issues – and in the end they agreed that the forum should alternate between Prague and Bratislava.

Indeed, just as they feel pushed forward by the EU into renewable energy, some new member states feel held back by the EU on nuclear power. In particular, there is lingering resentment in Bulgaria, Slovakia, and Lithuania that the EU – more precisely a combination of some western European governments and many members of the European Parliament – forced them to close some of their older Russian-designed reactors as a condition of joining the EU. Though some efforts were made in the 1990s to improve these reactors' safety measures and

design, these reactors were deemed by the EU to be unsafe, largely because, like the Chernobyl reactor, they lacked an outer containment shell. This resentment flared up again in Bulgaria and Slovakia at the time of the cut-off of Russian gas through the Ukraine in January 2009, because these two countries, having no other source of gas, had been hit the hardest of all EU states by the cut-off of Russian gas. The Bulgarian and Slovak governments both threatened to try to re-start their shut-down reactors, but were told by Brussels that this was impossible because their reactors' closure was written into their accession treaties, one of the most embedded forms of EU law.

With some help from other international bodies, the EU has provided a total of Euros 2.83bn in compensation, and in help with reactor decommissioning, energy efficiency, and alternative energy, to the three countries. Bulgaria has found it slightly harder to get the money out of the EU than have Slovakia and Lithuania. Bulgarian officials put this difficulty down to what they see as their country's 'tactical mistake' of closing down its Kozloduy reactors in 2006, the year before Bulgaria joined the EU, when it would have been able to bargain as a full member – in contrast to Slovakia and Lithuania whose reactor closures came after EU accession. Nonetheless, on the basic issue of closure, Brussels was ultimately no less inflexible with Slovakia and Lithuania. Two years after its EU accession, in 2006 Slovakia was forced to close down two of its six reactors at Bohunice. Lithuania long appeared to believe that Brussels was bluffing in insisting on the shutting down of the Ignalina reactors on which the country was highly dependent (see Table 4), but it was finally forced to close its last remaining reactor at Ignalina in December 2009, more than four years after it joined the EU.

Table 4: Nuclear power as % of domestically generated electricity

	1999	**2009**
Bulgaria	47.1	35.9
Czech Republic	20.8	33.8
Hungary	38.3	43.0
Lithuania *	73.1	76.2 (0% in 2010)
Romania	10.7	20.6
Slovakia	47.0	53.5
Slovenia	37.2	37.9
Estonia	-	-
Poland	-	-
Latvia	-	-

* Last reactor closed end-2009
Source: World Nuclear Association

Money is a major problem for any country wanting to build reactors. Nuclear costs are rising fast, as Finland has found with its Olkiluoto reactor being constructed by the French. In the current financial climate, credit is scarce. One reason for EU hesitance in providing compensation money to Bulgaria is that Bulgaria may again opt for a Russian-designed reactor, because it is cheaper and comes with an offer of credit. (EU concern relates to the safety of Russian technology, even though it has been re-designed since Chernobyl.) Lithuania is likely to draw Latvia and Estonia (and possibly Poland) in as partners in a new 'Baltic reactor' at Visaginas to replace Ignalina, but Lithuania is still finding it hard to attract outside funding, partly because several other countries have similar plans to increase nuclear power in its region and therefore there is some possibility of over-supply. In addition to Finland's Olkiluoto reactor underway, Poland is planning at least two reactors of its own, and Russia is also planning a new reactor in its Baltic enclave of Kaliningrad.

Over the long term, nuclear power is set to generate a larger share of electricity across central and eastern Europe, where the Czech Republic and Romania also plan new units on existing reactor sites at, respectively, Temelin and Cernavoda, and where Hungary is extending the life of its Paks reactor. However, in the medium term to 2020 – the time horizon of the EU's current energy/climate programme – it does not look as though there will be much extra nuclear capacity to reduce the carbon content of the region's energy systems.

4.3. Gas

As the least polluting of the three main fossil fuels, gas could play an important part in the new member states' energy and climate strategy. Gas would play a more important part, but for the fact that the most sensitive energy security concerns of central and eastern European states relate to reliance on gas, and on Russian gas specifically. There is no surprise about this concern in the light of a) the region's high and inflexible dependence on Russian gas delivered through fixed pipelines, and b) the cut-off of Russian gas through Ukraine in 2006 and 2009.

This study will not rehearse the entire debate about Europe's gas security and the role of Russia in it. This debate has been exhaustively analysed elsewhere[9] and, moreover, energy security is relevant to this paper only to the extent that it is an obstacle to, or distraction from,

[9] See *The Russo-Ukrainian gas dispute of January 2009: a comprehensive assessment*, OIES, February 2009, and *The April 2010 Russo-Ukrainian gas agreement and its implications for Europe*, OIES May 2010.

progress toward low carbon energy systems. There is certainly evidence that energy security is a distraction for central and eastern Europeans, who feel it has a higher priority than dealing with climate change. In the consultation undertaken by the European Commission in 2008 prior to publishing its Second Strategic Energy Review (the first being on the internal energy market, the second on energy security), people were asked what they thought constituted 'major threats' to EU energy security over the next 20 years. Over half the respondents from the new member states selected 'impact of EU climate strategy' as a threat to energy security, compared to only 13 per cent from the older member states.

Equally telling were the differing priorities on ways of strengthening energy security in the gas market; respondents from new member states stressed supply-side hardware, such as new import pipelines and LNG terminals, which respondents from older member states thought were less important than measures to curb gas demand. In a sense, the eastern Europe supply-side focus on energy security is rather primitive, in that it fails to appreciate the whole EU energy and climate package as a long-term way of replacing imported fossil fuels. However, it is also realistic about solutions to what is perceived to be an immediate problem of energy insecurity; it is quicker to build a new gas pipeline than to reduce gas demand.

Many eastern Europeans had hoped that EU membership would wrap them in an energy security blanket, but they found the EU blanket nothing like as warm as they had hoped. Indeed, after the first interruption of Ukrainian gas in 2006, Poland first took its proposal for an 'energy solidarity' commitment to NATO, before eventually throwing it into the EU negotiations in 2007 that resulted in the new Lisbon treaty. The Lisbon treaty contains, for the first time in a EU treaty, some comforting words on energy security and solidarity. However, it took the serious interruption of January 2009, during which the EU temporarily lost 20 per cent of its gas (30 per cent of its imports), to galvanize the EU into some kind of action.

Table 5: Gas security is a matter of volume as well as of source

	Gas as % of primary fuel (2007)	gas coming from Russia (2008) * as % of total gas consumption
Bulgaria	15	99
Czech rep.	15	82
Estonia	13	100
Hungary	40	83
Latvia	29	85
Lithuania	32	96
Poland	13	58
Romania	32	31
Slovakia	28	117 (some re-export)
Slovenia	12	51

* Includes some central Asian gas via Russia
Source: Commission document SEC(2009)979 final; IEA Natural Gas Information

In total, 12 countries were affected by the 2009 cut-off. Within the EU, Bulgaria was the worst hit, having no storage or domestic production, and lacking any alternative source of imports by pipe or LNG. Its prime minister was reduced to going to Moscow to beg for Gazprom to turn the tap back on. The other chief casualty inside the EU was Slovakia which, frustratingly, had gas in store in the western part of the country, but lacked the technical ability to reverse the usual east-to-west flow in order to pipe the gas to its gas-starved eastern half. However, energy security issues and concerns do not stop at the EU border. Several non-EU countries had their gas supplies hit in 2009, notably Serbia and Croatia. Quite apart from the physical fact that these countries are part of the same interconnected pipeline system as EU states, the EU is politically obliged to take their energy security into account because the EU has persuaded them to join the EU-sponsored Energy Community. Originally set up by Brussels to facilitate reconstruction of Balkan energy grids after the Yugoslav wars of the 1990s, the Energy Community has become a sort of pre-accession waiting room for countries likely to join the EU. Its members are supposed to adopt the rules and procedures of the EU internal energy market, in return for which the EU implicitly underwrites their energy security.

Measures to improve gas security, which started after 2006 and accelerated in 2009, include:

- **Storage**. Countries with the greatest need for storage are those with the largest consumption. As Table 5 shows, Hungary is an exceptionally heavy user of gas; across the EU it is only matched in terms of gas use by the UK and the Netherlands, which are both much bigger gas producers. In 2006–9 Hungary increased its gas storage from 3.2 to 5.5 bn cubic metres (bcm), equal to 40 per cent of its annual consumption. Other new member states have also increased storage.
- **Cross-border interconnectors**. The big goal is to create a North–South corridor, running up and down central Europe, of linked pipelines and storage. Feeding into this would be gas from many sources. From the north, Danish gas, via the Skanled pipeline to Poland; Russian gas via the new Nord Stream pipeline from Russia to Germany, as well as the existing Yamal pipeline across Poland; and gas coming from various sources to Poland's planned LNG terminal at Swinoujscie on the Baltic. From the east, Russian gas via the existing Bratsvo pipeline across Ukraine. From the south, Caspian/central Asian/Middle East gas coming via the possible Nabucco pipeline across Turkey to Bulgaria; more Russian gas coming through the putative South Stream pipeline across the Black Sea and into the Balkans; and gas coming from various sources to Croatia's LNG terminal on the Adriatic. In order to make this at all possible, the new member states need to improve the interconnections between themselves. Bulgaria is therefore working on new links with Romania and Greece; Hungary on new connections with Romania (due for completion 2010), with Croatia (completion due 2011) and with Slovakia (2012 or later); and Slovakia on its end of the new Slovakia–Hungarian pipeline, on its own two-way gas transport system inside Slovakia, on improved connections with the Czech Republic, and a possible pipeline link to Poland. The one hitch in this seems to be Slovak indecision between going for a long new pipeline north to the Yamal pipeline in Poland and maybe the Baltic, or relying on improved connections with the Czech Republic to Germany. Much of Germany's gas, of course, comes from Russia, but there is a new tendency (see Section 6.2) in central Europe to believe that the most reliable way of getting Russian gas is via Germany, on the grounds that Germany would be the last European

customer that Russia would ever dare cut off. The idea is that central and eastern Europe can rely on Germany, and Germany can rely on Russia.

- **EU funding and legislation**. Under the European Economic Recovery Plan, Euros 1bn is being spent in 2009–10 to help finance gas interconnections (and another Euros 700m on electricity connections). This money has been spread all too thinly across the EU (the usual unfortunate result of having to rely on agreement by consensus), but a good portion of it has ended up where it was most needed: central and eastern Europe. At the same time, the EU has set about revising its complacent Gas Security Directive of 2004, which was conceived before central and eastern Europe joined the EU and at a time when people thought energy insecurity was more an issue for oil than for gas. When finalized, this legislation is likely to require more stringent national contingency plans and more coordinated EU responses, in the event of gas emergencies.

In an effort to maintain the momentum of these measures, some of the new member states held their own energy security summit in Budapest in February 2010. The summit was convened by Hungary as holder, in 2009–10, of the rotating presidency of the Visegrad group, to which Poland, the Czech Republic, and Slovakia also belong. The summit also included Austria, Romania, Bulgaria, and the non-EU trio of Serbia, Croatia, and Bosnia. (Significantly, the three Baltic members of the EU were not invited because their energy security position is so different – being dependent on Russia for virtually all their primary fuel, and still linked to the Russian electricity grid. This last fact creates a special climate policy problem – see Section 5 Conclusions.)

The summit produced a Budapest declaration that endorsed all of the measures outlined above. It, went on to say that the participants (even those outside the EU) would push for more EU energy funding of infrastructure of common interest to the region, would come up with their own ideas for projects, and would encourage closer cooperation between their energy companies. According to Ambassdor Mihaly Bayer, Hungary's ambassador for energy security, 'the message to Brussels was that "we are helping ourselves" and the message to Moscow was that "we cannot be blackmailed" '.[10] He goes on to say that: 'if we can settle energy security, then we can deal with climate change more calmly'.

[10] Author interview, March 2010.

Have the new member states settled energy security in a way that lets them deal with climate change more calmly, and possibly more effectively? With more gas security measures in place, it might be sensible for most of them to make more use of gas, the least polluting of the three fossils fuels, as a transition to a lower carbon economy. Increasing gas in the energy mix would not be rational for Hungary (which uses too much already), but it would make eminent sense for Poland to increase the paltry 12 per cent gas share in its final energy balance (to reduce the 60 per cent share of coal). This is particularly true if Poland finds any sizeable quantity of unconventional gas of its own. However, unconventional gas in Europe is unlikely to be the bonanza it has proved to be in north America. Prospects for a more relaxed view to gas use therefore turn on two factors in particular – the reliable supply, and the price of gas from Russia, which is still by far the predominant supplier to the region.

- Reliability. Ukraine is still the conduit for 80 per cent of Russian gas reaching Europe. The Russia–Ukraine agreement of April 2010 could create some stability in the rocky gas transit relations between the two countries. On gas going to Ukraine it removes the 30 per cent general Russian duty on gas exports, thereby effectively giving Ukraine a 30 per cent cut in the price of Russian gas. In return, Ukraine has extended Russia's lease on Sebastopol for its Black Sea fleet. It is hard to see that Moscow is getting much value for its money. However, if – and it is a purely political factor wholly out of the realm of energy policy – the Russian state considers the loss of gas export duty worth around $3bn a year a price worth paying for Sebastopol, then Ukraine will at last get gas at a price that its shaky economy can afford, removing the previous temptation to steal or divert transit gas bound for Europe.
- Prices. Gazprom is currently struggling to keep its gas pricing's traditional link with oil or oil product prices, despite the fact that the spot price of gas, pushed down by recession and current oversupply, has sunk to nearly half the oil-indexed price of long-term Russian gas. For its very best customers, such as its long-time partners, Eon of Germany, Gazprom has been willing to relent to the extent of pricing up to 15 per cent of gas volumes at the spot market rate. Such concessions are essential where a spot market exists, otherwise gas consumers will go straight to the spot market instead of to Gazprom's partners like Eon. However, Gazprom is only making concessions where it has to. Sergei Komlev, head of Gazprom Export's contract and pricing division, says that Gazprom logically 'cannot, and will not, offer spot pricing to

countries that don't have a local spot price'.[11] Unfortunately, such countries include those in central and eastern Europe. Their markets are in the process of becoming better connected, but the gas flowing through them is almost entirely under long-term contract. Therefore, despite their best efforts to create a wider, more diversified gas market, the new member states do not seem to have diluted Gazprom's pricing power.

[11] Author interview, May 2010.

5. Conclusion

Central and eastern Europe has come a long way in the past 20 years. The 10 new member states of the EU have improved their energy efficiency vastly, and are narrowing the gap with the older member states. However, part of that improvement was due to a one-off event, the abandonment of Soviet-era heavy industry. Further reductions in energy intensity are harder, and, as with development of renewable energy, will require upfront money which is currently scarce in a region hard hit by the financial crisis. The new member states have shed that indifference to energy waste which was a hallmark of their 40 years under communism. They now have cost-reflective energy prices, but they have also failed to exploit, or maintain, certain scale economies inherent in communism's collective energy consumption habits in transport and heating. At the request of the new member states, much of the EU's structural aid to the region has been spent on roads, and their railways have been neglected, while little EU financing has gone to improve energy efficiency. On the supply side, the prospects for a substantial increase in low carbon energy in the new member states by 2020 are good in renewables, but poor in nuclear (essentially because of the need to rebuild safer reactors at a time of scarcity of public cash and private credit), and still uncertain in gas.

Yet, given eastern Europe's considerable remaining potential in emissions reduction, it would be most surprising if the region were not asked to contribute proportionately more to the fight against climate change than it has so far. It is also obvious that an increase in the EU's emission reduction target to, say, 30 per cent would pose problems for the new member states.

A tightening of the emissions cap in the ETS would have a greater effect on the new member states as it would require their less efficient companies to buy more allowances than cleaner industries in the older member states. In 2009, the new member states won some temporary concessions, but the 2009 energy and climate package might be unhelpful to them in the longer term. The reformed post-2012 ETS will create a pan-European allocation of carbon allowances by auction or benchmarking according to technology. Either way, eastern European companies will find themselves up against the richer treasuries and cleaner technologies of western European companies in the competition for emission allowances. At the same time, the 2009 package left the current system of purely national subsidy schemes

for renewables largely untouched, and failed to create the sort of pan-European system in which money could freely flow from the richest region (western Europe) to be invested in the region with the most potential (eastern Europe).

A higher emission reduction target would create a very specific problem in the three Baltic EU states. Increasing the carbon costs of Baltic electricity generators would expose these power companies to severe competition from Russian energy companies, which will not be burdened with any such carbon costs. This exposure exists because the three Baltic states are still synchronized with the Russian grid, not the UCTE (Union for the Co-ordination of Electricity Transmission) grid of the rest of Europe. More generally, too, higher energy costs in the new member states could lead to some displacement of jobs or market share to Russia or to Ukraine.

Central and eastern Europe was never going to be able to compete, on the basis of cheap energy, with Russia which will always have lower costs for energy, raw materials, and labour. As for Ukraine, the new member states of the EU should regard it less as a competitive threat than as a policy warning. Ukraine is as energy-inefficient as Russia, but lacks Russia's virtually inexhaustible natural resources. It stands as a cautionary tale to the new member states of what they might have been, had they stayed outside the EU. The new member states' long-term self-interest lies in having the EU set a framework for their energy adjustment.

At the same time, the EU cannot force the pace of this adjustment. In the negotiations on the 2009 energy and climate deal, the central and eastern European states showed that they could form themselves into a blocking minority to obtain concessions. If the new member states are to be required to increase their contribution to emission reduction, they are perfectly entitled to expect commensurate extra financial aid from western Europe through the EU budget or by other means. This could be done in two ways:

EU structural funds

There is no chance, in the current fiscal climate, of funding a big increase in energy saving and low carbon energy in the EU-10 through an increase in the overall EU budget. However, there ought to be every chance of funding such an increase through a re-direction of EU structural funds. These stand at a projected Euros 344bn for the 2007–13 period, or nearly a

third of the entire EU budget, and most of it goes to the new member states. Very little of the total, however, will be spent on energy – only Euros 10.8bn. For instance, Poland, the most populous of the poorer states, is due to get Euros 65bn in 2007–13, but only Euros 2.2bn of that will be spent on energy efficiency and renewable energy.

Why so little? Part of the reason is the traditional emphasis of the structural funds on helping poorer countries to participate in the single market – by improving cross-border infrastructure, some of it in energy but mainly in transport and telecommunications – rather than in funding areas seen as purely national – such as house insulation or green electricity. In 2009 it was counted a minor triumph that the share of EU structural fund available for energy efficiency and renewable energy in housing was doubled, but only from 2 to 4 per cent! However, new member states are also culpable. They are seriously slow in absorbing what EU money is earmarked for energy projects. Their politicians' passivity is partly to blame. They seem to feel that they get a better political return in using EU funds on road transport rather than energy efficiency, on constructing, say, a new highway, on which they can erect a sign proclaiming their success in getting pork barrel money from Brussels, rather than on installing invisible insulation.

This must change., and a good opportunity to start will come in 2011. As it happens, the rotating presidency of the EU will be held by Hungary in the first half of 2011 and by Poland in the second half. Coincidentally, the EU will soon have to begin preliminary negotiations on its next financial settlement for 2014–20. Budapest and Warsaw should take the initiative, a rarity for new member states, to say that if the EU is stick to its declared priority for climate change policies, its budget should reflect this by giving more help to the new member states on energy. Having willed the ends, Europe must will the means.

Europeanizing national renewable energy subsidies

This was the aim of the European Commission in 2008, when it proposed a system of pan-European trading of guarantees of origin for renewable energy, akin to the pan-European system of trading carbon allowances which the Commission created in the form of the ETS. The trade was to be in the guarantees, the pieces of paper certifying the renewable energy, not in the renewable energy (mainly electricity) itself, because there is no way of checking the precise flows of electrons across Europe's borders. The idea was that, for instance, a Romanian producer of solar power could present a guarantee of origin in Germany and get

the German feed-in tariff on solar power, without the Romanian solar power necessarily ever entering the German grid. However, the Commission proposal foundered in 2008 on the opposition of member states which feared losing control of the operation and cost of their national subsidy schemes. EU governments therefore agreed a very restrictive form of cross-border trade in green energy, with any inflow and outflow kept tightly in their hands. States falling short of their renewable target can buy a 'statistical transfer' of renewable energy from states in excess of their national target. On current projections, this will produce a very modest transfer of renewable energy subsidy money – with about four of the old member states (plus energy-deficient Malta) buying small statistical slices of renewable energy from sellers which could be western European as well as eastern European states. Older eastern Europeans will recognize this kind of government-controlled trade as something that they had under Comecon. Like Comecon, it deserves to be abandoned.

In the interest of developing economies of scale in renewable energy across Europe, of encouraging wider competition for available subsidy, and of giving the market a role in deciding where the best return on renewable investment lies – which will often be in the new member states – the EU should reconsider the Commission's original plan. There is now less substance to fears that energy consumers in states with the highest feed-in tariffs would be asked to write blank subsidy cheques to renewable producers in other states. Some of the highest feed-in tariffs for solar power – in Germany, Spain, and Italy – are being cut to reflect technical progress and falling production costs. Western Europe would not find itself presented with an avalanche of renewable certificates from eastern Europe to subsidize, because a gradual de facto harmonization of renewable support schemes is taking place across Europe. There would be some transfer of renewable energy subsidy from west to east, but this would increase eastern European demand for the wind turbines and solar panels of the big western European renewable technology companies. It is unlikely that many jobs would move east with the subsidy. Western Europe would tend to keep the skills and manpower needed to design and manufacture wind turbines and solar panels, whose assembly in eastern Europe requires relatively little labour; indeed that is precisely the complaint in some new member states. Any new wave of green jobs in eastern Europe would be more in improving energy efficiency in buildings.

Clearly a pan-European system of tradeable renewable energy certificates would be as incompatible with any precise system of enforceable national renewable targets as carbon

permit trading in the pan-European ETS would be with national industrial emission targets. It would be the market, not governments or the European Commission, which would primarily decide where renewable generation, as well as emission reductions, would take place. However, is the precision of the current national renewable targets so important? For instance, in purely economic terms, it is obvious that the new member states' targets have been set too low, and how, in the end, are national targets going to be enforced? Surely not with the standard EU infringement proceedings and threat of fines in the European Court of Justice. The one renewable target, on which Europe's credibility will be judged in the court of international opinion, is its collective goal to raise the renewable share in Europe's overall energy use to an average of 20 per cent by 2020. The best way to deliver that would be through a Europe-wide green energy system, marrying western Europe's financial resources with eastern Europe's natural resources.