

**Reducing energy use comes at a cost —
the EU case**

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Why reduce energy use?

- Energy confers economic benefits on its users. Why should the governments of energy-consuming nations wish to curtail energy use?
- The key reason in Europe is to reduce CO₂ emissions, which are deemed to cause global warming.
- In the United States, which has not ratified the Kyoto Protocol, the main objective of the Bush Administration is to reduce dependence on energy supplies (especially oil) from unstable regions of the world.

Major threats to peace and good order

- **Islamist extremists** operating in Iraq, Afghanistan, Pakistan, the M. East, Europe, Algeria, Morocco, etc ...
- **'Rogue' nations** in search of nuclear weapons (North Korea, Iran, Syria? ...).
- Radical **neo-Marxist environmentalists** wanting to take our societies back to an idealised pre-industrial era.
- **Protectionists** trying to reverse the integration (globalisation) of the world economy.
- **Resource nationalism** having as an aim the control of scarce and exhaustible resources (Russia, Venezuela).

A reminder of CO₂ commitments

- Under the Kyoto Protocol of 1997, the industrialised countries that ratified the treaty committed themselves to reducing their CO₂ emissions below the 1990 levels by 8% (on average) by 2008 - 2012.
- The EU is the Protocol's most enthusiastic supporter. Its leaders have gone way beyond the Protocol to pledge a 20% cut below 1990 CO₂ levels by 2020. In 2006, the EU-27's emissions of CO₂ were 0.3% above the 1990 level and on the individual fossil fuels' trends since 1990 they will be 6% above by 2020.
- The EU has targeted 20% of fuel use to consist of renewable energy by 2020. Also, 10% of transport fuels should be biofuels by the same date.

Growth in fossil fuel consumption adjusted for CO₂ emissions

	1990-2006	
	% change	% p.a.
USA	17	1.0
OECD-US	17	1.1
Euro-27	0.3	0.02
Japan	18	1.1
UK	-0.7	-0.04
China	86	5.4
M. East	74	4.6

Sources : BP and CGES

The track records of the United States and the rest of the OECD are identical. Japan's performance has been worse than the US', due to Japan's problems with nuclear power, while in the UK fossil fuel use fell marginally. China and the M. East are exempt from the stipulations of the Protocol.

A comparison of fossil fuel shares in 1990 and 2006 (adjusted for CO₂ emissions)

Sources : BP and CGES

	Euro-27		Japan		U. Kingdom	
	"06 Shares	"90 Shares	"06 Shares	"90 Shares	"06 Shares	"90 Shares
Oil	46	42	49	62	38	38
Gas	24	16	14	10	33	19
Coal	30	42	37	28	30	44
	100	100	100	100	100	100

	US		China		M. East	
	"06 Shares	"90 Shares	"06 Shares	"90 Shares	"06 Shares	"90 Shares
Oil	41	40	16	12	54	68
Gas	22	23	2	1	44	30
Coal	37	37	82	86	3	2
	100	100	100	100	100	100

Europe has done relatively well in meeting thus far its Kyoto commitments by boosting its use of gas at the expense of coal. In Japan, coal's share of fossil fuel use grew, because of the problems encountered by its nuclear industry. In the US, the shares of fossil fuels have remained the same, whereas in China oil's share rose at the expense of coal.

Assessing the EU's CO₂ emissions — business as usual

	2006		2020	
	mbpdoe	% shares	mbpdoe	% shares
Oil	14.6	46	15.8	46
Gas	7.8	24	11.1	33
Coal	9.6	30	7.2	21
TOTAL	32.1		34.1	

Based on the demand trends established between 1990 and 2006, gas' share in the European Union will continue to rise at the expense of coal. However, overall CO₂ emissions will have grown by 6% between 2006 and 2020. Obviously this will not do.

Cutting the EU's CO₂ emissions by 20% below 1990 levels

	2006		2020	
	mbpdoe	% shares	mbpdoe	% shares
Oil	14.6	46	10.7	42
Gas	7.8	24	10.2	40
Coal	9.6	30	4.6	18
TOTAL	32.1		25.6	

To reduce CO₂ emissions by 20% below 1990 levels, Europe would have to slash coal usage (coal emits 48% more CO₂ than oil and 68% more than natural gas), cut oil consumption and increase gas' share in fossil fuel demand dramatically. Taking coal's share to 18% yields the scheme presented above.

The cost of reducing oil use in the EU

- To reduce oil consumption by around 30% (3.9 mbpd) from the level of 2006 by 2020 would require average retail oil prices in Europe to rise from **\$100/bbl** in 2006 to **\$272/bbl** in 2020 — more than 2.5 times.
- This is calculated on the basis of a long-run price elasticity of demand of -0.4 and inflation of 2.5% per annum.
- However, this does not take into account the growth in oil demand that would have occurred; this adds another 7% that has to be taken off oil usage. Retail oil prices would have to rise from **\$100bbl** to **\$306/bbl**, i.e. three times, to effect a 37% overall reduction in oil consumption.
- To give you a flavour of what such an increase would mean, it would take the UK price of gasoline from £1.10/litre (€1.40/litre) to £3.37/litre (€4.28/litre). To fill a car with 50 litres would cost €214 in 2020 versus €70 today — an increase of almost €7,500 per annum!

Increasing EU dependence on gas imports

- In 2005 the Euro-25 imported 244 mn toe of natural gas. Around half (49%) was imported by pipeline from the Russian Federation and 16% of imports was in the form of LNG from outside the EU. Approximately 25% came from Norway (pipeline) and 10% from Algeria (also by pipeline).
- If in 2020 50% of fossil fuel use in the EU-25 is accounted for by natural gas, then there will be a need for an additional 253 mn toe of gas over 2005 levels.
- On the assumption that the Euro-25 countries' production of gas will decline by 1.2% p.a. (half the rate since 2001), the EU's natural gas imports will more than double versus 2005. If half of these continue to come from the Russian Federation, the EU's imports from this source will rise to 293 bcm in 2020 from 134 bcm in 2005.

The implications of reducing coal use drastically

- In 2005, the Euro-25 nations consumed almost 300 mn toe of coal. The following countries had coal shares of 20% and above in primary energy — Poland, Germany, Denmark, Greece, the Czech Republic, Slovakia and Bulgaria.

	2004		2020 projection from IEA	
	Share of capacity	Share of elec. output	Share of capacity	Share of elec. output
Coal	26	31	21	27
Oil	10	4	5	2
Gas	20	19	28	26
Nuclear	18	31	12	22
Hydro	18	10	14	10
Renewables	7	5	20	13
of which wind	5	2	15	9

- Coal in 2004 accounted for around 26% of the EU's generating capacity and 31% of its electricity production. To reduce drastically coal's use in the EU (by 73%) would require a huge expansion in gas, or nuclear, or renewables generating capacity. The IEA's projections do not go anywhere near what would be needed.

Conclusions

- 1.** If the European Union gets serious about curbing fossil-fuel emissions it is not enough to rely on cap-and-trade systems and clean development mechanisms.
- 2.** It would have to impose swinging taxes on the use of oil in the transport sector or find other ways of restricting the utilisation rate of vehicles and curb air travel.
- 3.** A huge increase in taxes on gasoline in Europe would be immensely difficult to achieve politically.
- 4.** To back coal out of power generation would require a massive increase in gas-fired capacity or nuclear power. Large increases in gas consumption would require a doubling of gas imports from the Russian Federation. Nuclear power is probably the only answer, but it must be sold to a sceptical public.