Sustainable renovation of the existing housing stock

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In 1995, there were roughly 150 million dwellings in the EU (15 Member States) 32% of this stock was built prior to 1945, 40% between 1945 and 1973-75 and 28% since 1973-1975 (2). Also interesting is the ratio *housing starts/existing housing stock* (1) (in some selected countries)

	Housing starts (A) 000s	Existing housing stock (B) 000s	A/B
Australia	107 (1998)	7.012 (1997)	1,7%
Canada	1501 (1999)	11.768 (1999)	1,3%
France	286 (1995)	27.807 (1995)	1,0%
Germany	603 (1995)	28.413 (1995)	2,1%
Japan	1.201 (1999)	48.922 (1997)	2,8%
UK	199 (1995)	24.442 (1995)	0,8%
USA	1.667 (1999)	115.253 (1999)	1,4%

There is no generally accepted definition of 'an existing house', but we probably could agree that a house no longer is a new one after twenty years because many materials need either replacement or maintenance as from 20 years of age. A survey of architects in the UK was undertaken n 1999 (3), which gave the following results

Average frequency of building works	
Category of work	Average frequency of work in years
1/Decoration	7
2/Internal remodelling	10
3/Replacement of services	13
4/Replacement of external non-structural elements	29
5/Structural alterations, conversions and alterations	25

This same survey also found that restaurants, bars and retail buildings have the shortest 'life period' without modification, and that public buildings had the longest period between interventions.

Looking at the reasons for the renovation works, the same survey found the following

Motivation for renovation works	%
Maintenance:	20
Statutory requirements	3
Increase economic value	11
Increase and improved use of space	30
Update to current technologies	5
Improvement of bld performance	9
Improve appearance	16
Follow fashion, trends	8

56% of the dwellings in the EU are owner-occupied, but the figures vary seriously between Member States from 42% in the Federal Republic of Germany to 80% in Spain. More details can be found in the OECD report (1)

	Households by tenure	
	Owned	Rented
Australia	70%	30%
Canada	64%	36%
France	60%	40%
Germany	42%	58%
Japan	62%	38%
UK	67%	33%
USA	67%	33%

After these introductory figures, I will look at two particular aspects of *Sustainable renovation of the existing housing stock*, namely the energy problem and the matter of waste

ENERGY

The CO_2 emissions caused by energy use for heating of commercial and residential buildings in the EU is roughly 600 million-tonnes/year (4) or 57% of all energy used in households (5)

In a slow reaction to the energy crisis of 1973-1975, local and national governments have introduced building regulations with requirements for thermal insulation for the new constructions. In many countries, these standards are insufficient by far, and poorly implemented even for the new buildings. And above all, only 28% of the dwellings in the EU are constructed after 1973-1975. This group of (older) buildings ought to be addressed as a matter of priority in order to reduce the huge energy consumption for heating. Hereafter, we give five routes to follow. (6)

But first of all, we would like to point out that the structural elements of a building last at least 50 years; thus, energy saving investments in the envelope in the envelope of the building will bring about energy savings and environmental improvements during at least 50 years. The consequences of this fact are two-fold:

- Incremental, step by step slow improvements (as is appropriate for consumer goods) are not appropriate for the building envelope; there is just no other chance to strengthen the situation 5 or 10 years later.
- All measures and standards have to be good, severe and very demanding from day one onwards, precisely because the building envelope will last for at least 50 years.

An instrument mix

The trust of our proposals and suggestions is that a mix of instruments is needed because there are many stakeholders in energy-efficient buildings, and because there are many levels of (regulatory) competence.

Instrument one: **TO MAKE THE REAL COST TRANSPARENT**

The cost of heating and cooling is often unknown to a person who buys or rents a dwelling. These costs are not only the (private) energy costs, it are the (societal) environmental costs as well. What is more, the landlord has no incentive whatsoever to invest in energy savings, as long as he can hide from the potential renter the costs of operating the building. In other words, the market does not function properly.
In some countries or regions, the local authorities have imposed the obligation for an energy audit at the occasion of change of hands of the building (sales; rent). Indeed, Council Directive 93/76/EEC (the SAVE Directive) imposes a (rather vague) obligation upon Member States to introduce energy audits. Time is ripe now to go further, and to pick up again the Draft Directive on Energy Audits in Buildings (COM (87) 401 final). This proposal by the Commission did not meet the approval of the Council of Ministers and was subsequently withdrawn by the Commission.
But the situation has changed since 1987. Indeed, with growing volatility of energy supply and with the problem of Climate Change, the time is ripe for re-introduction of this draft Directive and to bring it back on the agenda of the Council of Ministers. Such an energy audit ought to be compulsory when a legal act is passed (sales or rent) and whenever a building permit is required (new building and/or major renovation works)

The absolute very minimum at this moment is that the Council approves the draft Directive on energy efficiency of buildings {COM2001 226final, of 11 May 2001} Basically, this new proposal of the Commission repeats the requirements of SAVE 93/76/EEC, and a renewal of the vows is the very least one is entitled to expect these days. First discussion at the level of Ministers is early December next.

This proposed route makes the market transparent, it does not interfere in the competence of Member States and it assures that citizens and businesses that move abroad and expand in other Member States are well informed about the service they buy or rent. Also, the energy-efficient building has a higher sales value (as soon as the intrinsic qualities of the dwelling are know). Thus, the energy efficiency of the building does affect the internal market of buyers and consequently, is within the sphere of competence of the European authorities.

Instrument two: **TO APPLY THE POLLUTERS PAY PRINCIPLE**

The European Union adheres to the *Polluters Pay Principle*. As with many principles, the introduction and the implementation require a transition period. Also, international competition requires a prudent policy in order not to endanger the industrial fabric of the Community, nor its employment opportunities. Making energy use pay for its real costs, as is the basic idea of the Commission's proposal (1997 the Monti proposal) for an EU-wide harmonisation for energy products, can be implemented for the housing sector without endangering Europe's competitiveness. Indeed, The Netherlands has a 'kleinverbruikertaks' for energy products used for the heating of all buildings (small users' tax). These small users' tax for heating oil and gas makes the owner very aware indeed of the true costs of heating/cooling and drives the owner into the direction of efficient energy use. This kind of a tax ought to be implemented win combination with the appropriate incentives for energy efficiency (see route hereafter)

In the same domain, the VAT for energy saving products in five Member States is higher than the VAT on the energy product itself; in other words, the VAT rates in these countries favour the energy waste rather than the energy savings. Modification of this anomaly is obviously a competence of the Member States concerned, but the European Commission should also contribute and address a recommendation to these Member States.

Instrument three: **TO IMPROVE BUILDING REGULATIONS**

Member States have technical regulations concerning thermal requirements of new buildings; indeed, the above-mentioned Council Directive 93/76/EEC puts a vague obligation upon Member States for such regulations. But these technical requirements are out of date and do not take into account the pressing need to combat Climate Change. We notice with satisfaction that France and Germany are improving (i.e. severing) these requirements but the potential is far from being achieved.
What is more, buildings are often renovated. The technical requirements for thermal insulation do not cover major renovation works. Thus, the building regulations be made up-to-date in two respects:

- better, more severe technical requirements for thermal insulation (so-called environmental standards), and
- building regulations for both new buildings and major renovation works (whenever a permit is required)..

Adopting the building regulations to environmentally appropriate ones is the first step to take and very much a no-regret policy in matter energy, and a first step as well in implementing the Kyoto promises.

In this respect, the Construction Products Directive (89/106) requires performance based building regulations. In many domains, the Member States still have prescriptive building regulations. So, the implementation of the CPD requires anyway the Member States to amend their building regulations. This process can and should be used to improve the thermal requirements of the buildings. The European Commission has the important task to oversee the transition to performance based standards in the Member States; the Commission has the leverage to turn this

operation into one which not only helps to bring about the internal market (the CPD), but one which improves the energy policy as well.

Instrument four: **TO PROVIDE FINANCIAL SUPPORT**

Investments in energy savings are an up-front cost, the benefits of which are enjoyed both by the society and by the owner; but for the latter only on a long-term period and the former does not pay. Thus, a scheme of mortgage relief for additional investment in energy savings in buildings certainly would help to make the appropriate decisions. The European Commission could encourage such developments by making Recommendations, and indeed voluntary agreements with the European banking and mortgage industries.

Instrument five: **TO LEAD BY EXAMPLE**

According to the OECD (1999), public procurement represents on average 12% of GDP in the EU Member States. A very substantial part of this is buying and renting of buildings in all kind of forms: offices, hospitals, schools, dwellings, etc. Public authorities should apply the up-dated building standards and thermal insulation standards in all the buildings they occupy. By this way, the public at large will see the example, indeed the incentive, to make similar investments to save energy.
The new draft Directive COM (2001) 226 final mentioned above, stipulates that public authorities have to show the energy use of the building to the public; it is a good proposal.

SUMMARY

Public authorities constantly have to choose between regulatory measures and incentives. Hereunder we give a suggestion.

INCENTIVES	***BY***
Mortgage support	European voluntary agreement
Energy efficient public buildings	Recommendation on Public procurement
REGULATORY MEASURES	
Energy audits	European Directive
Building regulations	National/regional regulations
Small users' energy tax	European Directive
VAT equality	European tax harmonisation

WASTE

Renovation brings about waste; a complicating factor is that this demolition waste is 'produced' within the built urban environment where there is often little space for separation and processing.
It is estimated that the demolition waste in the EU will increase from 160 Mtonnes in 1995 to 330 Mt in 2010 and 500 Mt in 2060. However, this presentation is about renovation, not about the total cycle of buildings and materials. Therefor, I only deal with the upstream of renovation, not with the downstream (the waste problem)

Basically, there are two ways to address the matter of sustainable renovation, the first is prevention (as little renewal and renovation as possible); and secondly make the renovation, when it happens, as sustainable as possible °

Instrument one: **PLAN FUTURE RENOVATIONS BEFORE NEW BUILDING**

A good renovation is planned and designed long before the renovation work; indeed, it is designed from the very concept of the new building. The key for success lies in the hands of the architects. But a good maintenance can often prevent renovation as well.

Instrument two: **RE-USE**

A route to think about is a better re-use of existing buildings for entirely other purposes. Real life examples are a school turned into shopping centre (or vice versa) and a former textile factory turned into a music recording installation.

Instrument three: **LONG LASTING BUILDING PRODUCTS & COMPONENTS**

Prevention also has a regulatory component. Building products have to last 50 years under the Construction Products Directive (89/106/EEC), but the CPD can of course be amended so as to increase the duration of the product and its characteristics. The latter is crucially important: not only has the product last longer, also it has to perform its essential requirements for the increased life-time.

Instrument four: **DISCOURAGE LANDFILL**

Another way to prevent too much renovation is to make dumping on landfill of the demolition waste more difficult and/or more expensive. There is an EU Directive in this respect, which is soon to be implemented. The Directive offers instruments to both EU and national authorities.

We are still (or may be again!) in the infancy of sustainable renovation. A bit of a cultural revolution does help and should be encouraged. In this respect we think about

best practice schemes and all kind of other peer pressure amongst architects, contractors, manufacturers, local authorities, civic societies, etc, etc.

But regulatory work will be indispensable. First of all, a proper renovation permit scheme is needed (not also for the renovation work proper, but also for reasons of energy conservation (see above). Secondly, the contractors for renovation work need to be subject to a specific licensing scheme. And last but not least, demolition permits (already required in many countries) have to become a general regulatory tool, with a lot more descriptive requirements, as is the case to-day.

Finally, just like for energy policy and renovation, the problem of waste prevention and renovation requires a good mix of policy. The concluding Summary might help in choosing the *'courses for horses'*

SUMMARY

Prevention:	
INCENTIVES	BY
Design of buildings	National curriculum of architects
Maintenance of buildings	National, regional and local tax schemes
Re-use of buildings for other purposes	Local zoning laws
REGULATORY	
Long lasting building products	Directive 86/106/EEC (CPD)
Reduce quantity on landfills	EU landfill Directive
Operation:	
INCENTIVES	
Best practice schemes (peer pressure)	Regional authorities, professional and trade associations
REGULATORY	
Demolition permits	Local authorities
Licensing renovation contractors	Regional authorities
Renovation permit	Local authorities

° This part and the summary draws heavily on the OECD paper, see footnote 1

(1) OECD, Policy Instruments for Environmentally Sustainable Buildings, April 2001, ENV/EPOC/WPNEEP(2001)6
(2) Sciotech (1998); quoted by C Hamans, IHS, 28-09-2001
(3) Summary of a study of the suitability for designing for recycling and designing for durability, Paper by Ms Paola Sassi, presented at the Sustainable Building 2000 Conference
(4) Source: the European Commission in reply to Parliamentary Question E-1218/97) (1997)
(5) The environmental impact of housing and construction, C Hamans, IHS, 28-09-2001
(6) Inspired by the Reaction of EURIMA to the Green Paper of the European Commission on Energy Supply {COM(2000)769}

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