

WORKING GROUP SUSTAINABLE CONSTRUCTION METHODS & TECHNIQUES

BARRIERS AND RECOMMENDATIONS FOR MORE SUSTAINABLE CONSTRUCTION LISTED BY ACTOR

CONTRACT NUMBER:

B4-3050/2003/352567/SER/B4

Reference: ENV.B3/SER/2003/0007r

FINAL REPORT - ANNEX 1: BARRIERS AND RECOMMENDATIONS LISTED BY ACTOR

The following actors of construction sector listed below were identified by this WG as relevant for the mainstreaming of more sustainable construction. The actors are organised in five clusters:

Cluster 1: Ownership-related actors:

- Property management companies
- Owner (not end user)
- Real estate agent and valuer

Cluster 2: Production-related actors:

- Promoter (including the maître d'ouvrage)
- Design team
- Contractor
- Manufacturer of building components / products / materials
- Labour force
- Utilities (including waste disposal companies)

Cluster 3: Policy-related actors:

- Urban planner
- Municipality / Local authority
- Health and well being
- Member states
- Inter-governmental organisations
- European institutions

Cluster 4: Market-related actors – Consumer /Communication / Information / Education:

- Occupier
- Education and training
- Research
- NGOs, local opinion groups and neighbourhoods
- Media

Cluster 5: Finance-related actors:

- Insurance companies
- Banks / Mortgage institutions

The input of each of these actors is by no means similar in quality, quantity or importance. Some actors are listed mainly because of the barriers they pose to others or because of the barriers they suffer that in turn are imposed by other actors, and others again because their potential beneficial role could be relevant in mainstreaming good practice. Annex 1 lists each of the above actors in the vertical chain of action of the construction process. The barriers are divided into two groups: those barriers that the specific actor experiences and those barriers the actor himself creates. The recommended actions are listed with the actor that can take the action in order to overcome specific barriers.

ON CLUSTER 1: OWNERSHIP-RELATED ACTORS:

PROPERTY MANAGEMENT COMPANIES

Barriers experienced:

- Not all property is managed by professional companies and not all professional real estate management companies manage property in a sustainable way.

Barriers created:

- These companies become one more bureaucracy filter for information;
- When managing several properties, a single solution could be chosen without making the effort of adapting it to each specific / local situation (i.e. demolition and building new ones).

How can other actors help overcome these barriers:

- The aim is to reduce the need for refurbishment by competent operation and maintenance. Property management companies have their finger on the pulse of a building's ageing process. In order to create an incentive for efficient operation and maintenance, these companies could benefit from a considerable VAT reduction.

Recommendations:

- Property management companies should train their staff to interpret the early symptoms of future failures in buildings and to interpret the reactions of the end users, in order to intervene in prevention rather than after situations have become critical;
- This actor should be made responsible for contributing to public awareness by communicating improvements to which the owner / occupier can contribute with his / her everyday actions;
- Monitoring of the building should be ongoing, and therefore property management companies should be made responsible for monitoring of buildings, interpreting the data and communicating the resulting information back to the end users.

OWNER (NOT END USER)

Barriers experienced:

- When buying a building for investment (and renting it out to end users), the prospective building owner is not aware of the building's performance characteristics, and even if made aware, has no incentive to choose a building with a lower running costs as this cost will be supported by the end user;
- People perceive sustainable construction as more expensive. This doesn't need to be true and is therefore prejudicial to the image of more sustainable construction;
- The value of the future cost using a discounting process is so low that there is no incentive for the owner to spend more money on construction to reduce operation / maintenance costs later;

- The current tax system only takes into consideration the initial cost, ignoring completely the subsequent operation and maintenance costs.

Barriers created:

- As the owner who doesn't use the building there is no real motivation to improve comfort levels and to reduce running costs. Any improvements become difficult to attain.

How can other actors help overcome these barriers?

- CO₂ credits – the reduction of CO₂ emissions into the atmosphere - should revert as an inverted tax, to the benefit of the building owner;
- Tax systems could take into account operation and maintenance costs, in order to encourage the reduction of these (this could also have a positive impact on refurbishment);
- This actor should also be targeted by an education and awareness raising campaign.

Recommendations:

- Life cycle costing can change the current perspective that only takes into account the initial construction cost, to a broader view, including running and maintenance costs;
- Make the owner share the cost of energy / running of the building, by changing the contractual tradition; It is important that the user also shares the cost in order to motivate efficient use.

REAL ESTATE AGENT AND VALUER

Barriers experienced:

- Technical information about the performance of the building being sold by this actor is not always available in a clear and quantified way, in order to positively assist the sale of the building and to be communicated to the potential buyers as a differentiation selling point.

Barriers created:

- In the pressure to sell m², real estate agents sometimes transform the technical characteristics of buildings to suit their purpose, reducing the credibility of their own words;
- The house buying public looks onto sales people with a lot of suspicion and doesn't believe what they say.

How can other actors help overcome these barriers?

- Create an incentive to involve real estate agents in the energy certification of buildings process.

Recommendations:

- Increase the level of training required of the real estate sales teams, so these can contribute to increase public awareness and communicate real building performance data.

ON CLUSTER 2: PRODUCTION-RELATED ACTORS:

PROMOTER (including the 'Maître d'ouvrage')

Barriers experienced:

- Different perspectives in terms of the life span and of the interests of the different actors: some will aim at having long lasting 'products'; others will look for a sustainable activity (and not a sustainable product);
- Lack of research and development concerning refurbishment and renovation techniques;
- The initial changes in the building brief and in the processes in order to achieve more sustainable construction, represent an added risk for the promoter. There are no incentives to make up for this larger risk;
- Poorly informed promoters perceive sustainable construction as more expensive than conventional construction, yet this is only sometimes the case. The real parameters of the extra cost need to be clearly set out so as not to be dissuasive by ignorance (extra costs versus added-value and lower operation / running costs);
- Some worthwhile measures to make a building more sustainable are an added cost that doesn't have a short term pay back period, and they ought to be stimulated;
- When buildings are promoted to be sold, there is no clear advantage for the promoter to invest in the long term quality of the building, nor in its efficient performance, mainly because the market doesn't pay more for the added value;
- Refurbishment, rehabilitation and renovation are an area of the construction sector with a high risk, although these have the largest potential in terms of improving building performance on a large scale;
- Most bodies involved in granting building permission are not able to recognise the added value of more sustainable construction.

Barriers created:

- Lack of awareness and lack of information associated with the construction process, produce some very unsustainable buildings, which are neither suited for their use, nor integrated into the context they occupy, resulting in built environments that bring out the worst in people.

How can other actors help overcome these barriers:

- VAT reduction, can encourage the refurbishment of existing buildings and it can also support new buildings that perform better than or according to a set of quantified sustainability indicators or on the basis of criteria set at EU or MS level;
- Municipalities should encourage sustainable construction measures; This could imply shorter approval time, municipal tax reduction and allowing an increase in the gross surface area under construction, to encourage the promoter to invest a supplementary budget in sustainable measures;

- Make it an advantage for the promoter to increase the long term qualities of the building even though he / she may not be the end user. Energy certification of buildings will begin to make a difference in market perceptions;
- Widen the scope of energy certification to a building passport to incorporate beyond energy, other building performance parameters, such as indoor air quality (materials' and systems' emissions), comfort (thermal, visual and acoustic) waste disposal, materials life cycle.

Recommendations:

- Always supply a user manual to the end user, with the aim of giving him / her the know-how relevant to making the most of the comfort, systems and services the building can offer; (In some MS this is obligatory);
- Certain investment funds promote and support the label 'socially responsible' – if these invest in real estate, then it should be in more sustainable buildings that comply with pre-set quantified performance indicators;
- Promoters should include local awareness raising campaigns in their marketing and publicity campaigns;
- Promoters can involve local opinion groups at an early stage in their decision making process.

DESIGN TEAM

Barriers experienced:

- Although not relevant to all EU MS, cultural characteristics (such as the Beaux Arts school for Architects) don't encourage multi-disciplinary teams to work together from an early stage of design;
- Simple guidelines for architects and technical engineers for making sustainable choices are not yet easily accessible to all. Most designers and companies can't afford time-consuming research and development work concerning ecological matters during the design phase;
- In professional education, sustainability is, generally and at best, a vertical subject, making the approach to sustainability an isolated rather than an integrated one;
- Specialists don't always work towards the same goals, resulting in an approach lacking integration within the design team;
- Client's (promoter's public or private) perception of sustainable construction as more expensive can limit the scope of measures, techniques and components the specialists are permitted to implement in the design;
- Incorporating new solutions to improve building performance may require more design time and possibly a bigger project budget.

Barriers created:

- When a design does not incorporate the state of the art in sustainable construction, it is often a 100 year missed opportunity.

How can other actors help overcome these barriers?

- Motivating and rewarding design teams to produce more sustainable buildings:
 - Municipalities must encourage more sustainable construction, possibly by reducing the time of approval for projects that contribute to the local CO₂ reduction targets (this could well be all projects);
 - All prizes for buildings should contemplate the dimension of the building's environmental performance;
 - Special prizes should be created to raise the profile of sustainable construction;
 - A building energy certification passport should include other performance areas of the building: indoor air quality, health, water consumption, materials, etc... this will emphasise the need for a technically good team as opposed to the attitude that "just any team will do";
- Fix the fee of the mechanical engineer in order not to dissuade him / her from seeking appropriate sizing of the systems; Perhaps even link the mechanical engineer's fee to the excellence of the buildings' performance – offering a royalty on the energy saved?
- Could there be building codes based on performance (not prescriptive)? Architectural, European design codes?

Recommendations:

- Architects considering sustainability issues in depth are future-oriented and will be more successful in the long run. The example of leading international architects pushing this issue forward is very promising;
- To address the design team: An all encompassing data base of sustainable construction needs to be created and actively made available EU wide and a universal and adaptable method of assessment of sustainable construction needs to be made actively available to the construction related professions (such as an accessory programme included in all Auto CAD and Archi-CAD software). Alternatively, a unified structure for the existing data together with a toolkit which can be attached to any software, in order to facilitate access to data from different sources;
- The capacity of the design team to work together towards a common goal (architect, specialists, promoters, manufacturers and even contractors), from an early design stage is critical for the creation of more sustainable buildings;
- Create awareness that the environmental performance of the building is no less important than the aesthetic result;
- Create awareness and make tools available to design for durability, flexibility (adaptability), re-usability, deconstruction and accessibility;
- Create conditions for the end-user to participate from an early stage in the design process – in an interactive relationship;
- Develop and/or use a management system (such as ISO 14000/9000) to be addressed per site/project;
- Make an eco-label for design services;
- Education and training of the design team on concepts like participation, environment and health are essential and training should be ongoing;

- Post-occupancy evaluation and monitoring should be designed into the project and the feedback should be communicated to the design team.

CONTRACTOR

Barriers experienced:

- Difficulty to communicate with and control large numbers of sub-contractors in major building projects;
- Difficulty to have an overview of the waste produced during construction;
- Difference in the levels of skilled operatives working simultaneously on any one building site results in increased risk of misinterpretations and serious mistakes.

Barriers created:

- Lack of flexibility: narrow focus on cost of construction and liability makes it difficult to introduce improvements during the construction process;
- Limited approach to the quality of the final product (the building) makes the dialogue and optimisation of new systems very difficult;
- Waste on site is sometimes poorly managed and can be a potentially valuable resource;
- Lack of knowledge about the best available construction methods and techniques tends to make construction prices rise on the basis of the risk factor attached to that which is unknown;
- The lack of know-how in implementing the above can lead to poor execution;
- A contractor has a short-term relationship with a building and has therefore little interest in taking into account the life cycle costing of components. Especially when the contractor and manufacturer are in a product development position, the running costs resulting from the options taken are not their concern – rather they are the concern of the occupier;
- Waste produced on site is valued in the context of either its resale value or its disposal cost as the case may be; the commercial implications of its re-use normally taking precedence over environmental considerations even when the legislation in force is faithfully respected.

How can other actors help overcome these barriers?

- Performance-based design needs to be implemented in practice. Therefore appropriate control mechanisms need to be adapted in order to verify that the construction works correspond with the design specifications;
- Taxes or other mechanisms need to be created or adapted, to reduce the waste that leaves the site¹. These need to reflect the real economic cost of transforming that waste into components that can be integrated in the eco-system, in order to encourage the rethinking of the relevant aspects of national construction processes;

¹ The Symonds Report of February 1999, commissioned by DG Environment, came out against aggregate taxes for reasons of ineffectiveness and distortions of trade (see paragraph 9.10 of the Report).

- Effective mechanisms that oblige contractors to rectify mistakes, should be respected.

Recommendations:

- Best practices in national construction processes need to be identified and be more widely debated and adopted between the EU member states;
- Increased emphasis in national construction processes is required in order to raise the sustainability of construction methods and techniques, thus promoting more efficient use of time, labour, materials...
- Information needs to be disseminated on how to attenuate the creation of waste on construction sites and on how to re-use or re-cycle it whenever circumstances allow;
- Develop and/or use management systems (such as ISO 14000/9000) to be addressed per site/project where appropriate.

MANUFACTURER OF BUILDING COMPONENTS / PRODUCTS / MATERIALS

Barriers experienced:

- One of the main barriers to increasing the rate of recovery of demolitions waste is the lack of separation of materials via planned deconstruction as opposed to “ball-and-chain” type demolition. However, deconstruction is viewed by many as uneconomic and its adoption is slow. Once separated, the mineral fraction is 95% recoverable, from both technical and economic points of view. However, some smaller non-mineral waste streams, e.g. plastics and metals, are both costly and technically difficult to collect and process;
- The problem with prefabrication in refurbishment is that every existing building is different, and adapting to these specific needs of each building makes prefabrication uneconomical.

Barriers created:

- Although there are some manufacturers that already use Environment Product Declarations (EPDs), which are based on LCA methodology, this is not yet generalised because of a lack of confidence with regard to LCA methodology in general. Furthermore, straightforward environmental comparisons of construction products per se has a large number of limitations, mainly because construction products are used in combination to produce a building, for example, with an optimised overall environmental impact, and not just used in an isolated way.

How can other actors help overcome these barriers?

- Voluntary agreements between MSs and industry on reducing construction and demolition waste going to landfill (cf. Germany); standardisation by CEN of methods of environmental assessment of buildings based on EPDs (see pages 5 and 21-22 of Final Report);
- Tax reductions for R&D on sustainable products (on process and the result);
- At the risk of leading to some internal market distortions (that exist in any case in most MSs) the WG recommends there should be a reduced tax (for example VAT) for materials that are relevant to improve

the performance of buildings (such as insulation, higher performance glass, shading systems, heat exchange ventilation systems...), as this communicates a clear top down message: use resources efficiently.

Recommendations:

- It is important to design buildings which lend themselves to refurbishment, for example: de-mountable partitions and flooring...
- Performance based design and construction require good information about the performance of the different components and on how these are produced. It is important to continue to engage the manufacturers responsibility for the information required by more sustainable construction – about the way the components / materials contribute to the overall performance of the building. Contractors frequently use technical descriptions and these existing vehicles can be further explored;
- Assessment methods of construction materials help to comprehend sustainable factors and give a chance for several applications concerning different actors;
- User manuals should accompany materials / building components in order to encourage good practice in use.

LABOUR FORCE

Barriers experienced:

- As the construction sector is very labour intensive and can take in a very wide spectrum of levels of skill, it becomes a non-harmonious, difficult to manage group of people;
- The construction sector is seen as tough, unhealthy and dangerous for workers, and it is therefore not attractive for young, qualified people.

Barriers created:

- Difference of the levels of skill operating simultaneously on any one building site results in an increased risk of misinterpretations and serious mistakes.

How can other actors help overcome these barriers?

- Improved conditions for the labour force include the areas of security, hygiene, insurance and overall dignity, resulting eventually in an improved image.

Recommendations:

- Skills training and education have to become a permanent and accessible reality for the construction sector's labour force;
- Working conditions must be improved and the training of the workforce enhanced, ongoing / continuous training provided, included in all aspects of sustainable construction;
- Encouragement of good practices and training to better perform in sustainable ways of building;

- Develop and/or use a management system (such as ISO 14000/9000) to be addressed per site/project.

UTILITIES (including waste disposal companies)

Barriers experienced:

- The quantity of waste the end user separates adequately is often below what it could be.

Barriers created:

- Due to the global privatisation process of utility companies, the profit making objectives still tend to compromise demand side management best practice motivation and the dissemination in the reduction of consumption levels;
- The price for energy is too cheap and doesn't reflect the real price, taking into consideration its environmental impact and other externalities...
- Information on correct procedures on waste separation is not easily available.

How can other actors help overcome these barriers?

- Energy and water utilities should be encouraged to disseminate demand side management as well as to finance and operate local, de-centralised energy production, relying on clean energy sources, as much as possible renewable and de-centralised grey water recycling systems, guaranteeing a full quality service to the end user;
- Don't further reduce the price of energy and water, when present price doesn't take into account the cost and infrastructure impact of peak usage;
- Consumers should be encouraged to select their providers taking sustainability into account (examples UK and Denmark).

Recommendations:

- Utilities could be made responsible for ongoing monitoring of energy and water demands and waste disposal and for bringing the information to the end user in a clear and transparent way;
- All billing should be informative and transparent, also in terms of the external costs of energy / water and waste disposal);
- Utilities may well share the investment cost of renewable energy systems with the promoter / owner, while in return the latter will operate the system and billing for the end-user (this will ensure that professionals will be running and maintaining the system);
- Projects for new buildings should include the relevant infrastructure to maximise the potential reuse of waste – for example facilitate the separation of waste and the use of organic waste as fuel;
- Public infrastructures for local waste disposal should be included in Urban planning;
- Information campaigns on adequate waste separation and incentives (like Pfand Preis);
- Waste transformation companies that use organic waste as a fuel to produce energy, ought to provide the free service of collecting the waste to developments that provide the organic waste;

- Co-ordination of the maintenance works of all the different urban infrastructures, so that resources are efficiently used.

ON CLUSTER 3: POLICY-RELATED ACTORS:

URBAN PLANNER (to be linked with the work of the WORKING GROUP ON SUSTAINABLE URBAN DESIGN)

Barriers experienced:

- Values and indicators that classify the quality of the built environment are neither consensual nor widely available;
- There is no consensus yet among urban planners as to the objectives of sustainable urban planning;
- Tools for sustainable urban design for the planner are available but not sufficiently harmonised and don't cover all relevant areas resulting in their being little used.

Barriers created:

- Generally planning is focussed on 'what not to do' and what terrible mistakes to avoid, rather than on defining targets / goals for the qualitative performance of the built environment. Most urban planners don't work with quantifiable indicators. The result is that an unclear and mostly arbitrary sounding message reaches the promoter and the design team, who follow the rules but don't identify with them;
- When urban planning is prescriptive and doesn't incorporate the appropriate flexibility for implementation of more sustainable construction, it is a missed opportunity for improving the quality of life of many generations.

How can other actors help overcome these barriers?

- Terms of reference with a set of quantifiable and other less quantifiable sustainability indicators must be defined and adapted to each different local context and followed by the developers and design teams. These should include thresholds and integrated objectives for quality of life (air, noise, ...);
- Participation of the end-user in the planning process is fashionable since the 70s, but it needs continuity and the establishment of a common language, so that the values to be aimed at are consensual.

Recommendations:

- In order to make the promoter and design team an ally of the urban planner, it is necessary to establish a common language and a context in which an ongoing, active dialogue can be held, so that the values can be established within this dialogue and the implementation will follow naturally from the consensus;
- Since urban planning is critical for more sustainable construction, building physics and the performance of the built environment need to become part of the know-how of urban planners;
- Land use and soil management are critical for the sustainability of the built environment. Land Taxes should compensate for the public value certain sites offer to the public;
- Integration and harmonisation of existing tools and definition of tools in areas where there are none in existence;
- Urban planners need to work towards a quality vision for their cities and involve the end-users in a regular awareness raising dialogue.

MUNICIPALITY / LOCAL AUTHORITY

Barriers experienced:

- The technical team working in municipalities is not always willing to implement changes;
- Often the role of preservation of the quality of the built environment is a barrier for the implementation of sustainable construction in refurbishment;
- Tools for sustainable urban design and management are available but not sufficiently harmonised and don't cover all relevant areas resulting in the fact that they are therefore not generally used.

Barriers created:

- Increasing insulation in a building envelope is an increase (or corresponding reduction) of the gross useful floor area and therefore – in some MS something has to go because of it, which is sellable, like for example a car parking space – the promoter prefers to have one more car parking space to sell than the insulation no one is yet asking for;
- Buffer zones on the façade, such as terraces / verandas / greenhouses are all counting as gross construction area in some MS, and although they play an important role in the indoor climate, in the attractiveness of the buildings and in the quality of life of people, because they are not spaces one can use all the year, they can't have the same market value (only seasonal use is possible), but should be encouraged by planning.

How can other actors help overcome these barriers?

- NGOs should engage in a regular awareness raising dialogue with the municipalities, in an effort to establish common sustainability goals for their cities.

Recommendations:

- Municipalities should adopt their share of responsibility for the Kyoto protocol commitment, by quantifying their share of CO₂ reduction and setting building performance targets which they can transform into incentives for promoters. In order to get the municipality to encourage sustainable construction within their role of approving projects, for example in terms of CO₂ emissions reduction, could be translated into the accumulation of 'points' for the municipality and used in negotiations to increase their annual government budget;
- Sustainability can be linked with being granted planning permission. The municipality, if motivated to reach their share of the Kyoto protocol commitment, should translate this goal into incentives for the promoter, which could include:
 - Increase of surface area: Permission to increase the surface area (with a maximum % to be defined at local level) in proportion with the reduced environmental footprint of a building project. Permission to increase the surface area in the amount of thermal and acoustic insulation used in the building project; In the calculation of the construction area, buffer zones (green houses, terraces and verandas) should not count as long as they don't go over 5% of the overall gross surface area;

- Reduction of municipal taxes: When a local grey water recycling system is to be implemented, there is a specific extra cost - as the impact of the development on the local infrastructures will decrease, a proportional reduction of taxes can be put in place;
- Timing for granting construction permits: In certain MS the timing for granting construction permits are not a known variable in the risk calculation of any promoter – for construction that has a reduced environmental impact these timings should be fixed and shorter;
- Building permits should be delivered based on an enlarged set of criteria including environmental and social ones and aiming towards sustainability. That permit should be linked with other MS-specific existing tools, such as buildings' environmental impact assessment;
- The creation of a sustainable environment (good environment) in any given municipality will also increase the demand for becoming a resident of that municipality, while increasing the value of its resources. Define indicators and targets for these other aspects of building performance;
- In order to facilitate the market penetration of sustainable construction in refurbishment of buildings, five areas of refurbishment were defined, with all due respect for the cultural dimension of historic buildings:
 - a) Important historical buildings (constituting about 1 to 2% of the stock) which can only be restored, with original and appropriate construction techniques;
 - b) Old / existing buildings with a special character worthy of preservation, to which a new building / part of a building is added (see examples of Carlo Scarp);
 - c) Old / existing buildings with part that can be kept and refurbished and part that needs demolishing and replacing;
 - d) Old / existing building that can take the new demands in terms of use, function and comfort and therefore only needs a face lift;
 - e) Make a new building that looks as if it were old (although common practice, this is not a culturally defensible option);
- If permits for the refurbishment of buildings could be drastically simplified (also reducing the time it takes to obtain approvals) and if the information the municipality has on the building itself would be made readily available, the risk of this kind of operation could be reduced and refurbishment promoted. A refurbished building, if energetically upgraded, can have a stronger impact than new energy efficient buildings because the comparison is direct – vis à vis the previous stage of its existence the energy saving and the increase in comfort can be clearly demonstrated;
- Public buildings have to set the example. Public procurement methods should take into consideration the point of view of sustainability and in appropriate cases the competition brief should include the LCC perspective from the outset;
- Municipalities should cease to impose minimum car parking spaces on new construction projects; (or better ban them altogether - as in Central London now for many years - thus forcing more people to use public transport!);
- Integration and harmonisation of existing tools and definition of tools in areas where there are none in existence.

HEALTH AND WELL BEING

Barriers experienced:

- Nobody is held liable for indoor air quality, which is the cause of most respiratory (and not only) diseases, which have cost implications for the Health care system, for social security and the business sector.

Barriers created:

- As health care functions predominantly by reacting to and not by preventing ill-health, it hasn't been possible to create an institutional connection between indoor air quality and health.

How can other actors help overcome these barriers?

- The integration of health and indoor air quality targets in the various tools used in the building process from planning and design through to demolition;
- In order to obtain a healthy indoor environment, the costs of ill-health should be transformed into a penalty tax for buildings that (with random monitoring) prove to have low indoor air quality.

Recommendations:

- Definition acceptable thresholds of indoor air quality relevant for the various uses of buildings and integration in European criteria for more sustainable construction projects;
- Similarly a prize could be given to buildings that are found to have a high indoor air quality;
- Education and training needs to include the parameter of health and indoor air quality.

MEMBER STATES

Barriers experienced:

- Unclear links between environment and economy for many daily activities impacting the environment.

Barriers created:

- Lack of international co-operation relating to sustainability in the construction sector, especially common actions and strategies;
- Lack of good and encouraging pilot projects, also from the economical point of view (LCC);
- Building regulations in some MS are very prescriptive and this creates severe constraints to the design team's creative role;
- Insufficient effort of the public sector to set an example in public building projects, sends a negative top down message to the market.

How can other actors help overcome these barriers:

- Not every MS is at the same level of understanding the relevance of more sustainable construction and the need for it to become a stream – let alone a main stream – it is therefore necessary that the mechanisms are put in place for the experience of those MS that are more developed in this respect can share their experience with those MS that are not.

Recommendations:

- Translate the Kyoto Protocol commitment into local CO₂ targets and make agreements with the Municipalities regarding their share of responsibility in achieving these targets as well as the time frame they need to be achieved in;
- Clear top down message should be communicated in favour of more sustainable construction – taxes and incentives should be harmonised to reflect coherently the MS targets;
- In dialogue with the municipalities, define the positive tax tools that will allow those targets to be achieved within the time frame required;
- Lack of economic inducements; Sustainability may demand further economic investments in the construction phase, some of which pay themselves back sooner or later but some may not be economically beneficial even in the long run. Sustainable actions should be categorised also by the economic benefit. Relevant non-beneficial actions should be promoted by state through fiscal measures, taxes or economic subsidies;
- Public buildings have to set the example. Public Procurement needs to be addressed: define guidelines and good practice for sustainable construction: tenders, terms of reference; design teams should be eclectic; performance based building codes; sustainability assessment tools; specific audits and certification tools – all to be clear and transparent from the early stages of each procurement;
- Create an agency for the promotion of sustainable construction (with ambassadors) in every MS. Such an administration allows for more continuity, also by using the existing infrastructures (example of MIQC in France);
- Create observatories in those MS where they are not in place, which will keep their finger on the pulse of the environmental commitments and of the established indicators / targets – and make sure that the information flows to the actors that need to work towards achieving the targets;
- Provide sustainability in building codes and technical regulations, focussing on performance rather than on prescriptive rules, as a methodology of regulating construction. Promote a sustainable construction programme;
- The buildings energy performance directive, which introduces the energy certification of buildings, should ultimately apply to all buildings, no matter what size.

INTER-GOVERNMENTAL ORGANISATIONS

Recommendations:

- Inter-governmental organisations can be instrumental in reaching a common assessment methodology of building performance for Europe, which can then be adapted to the specific cultural and climatic reality of each MS.

EUROPEAN INSTITUTIONS

Barriers created:

- Because the top-down message arriving at member states and multinational organisations (banks, utilities, insurance companies) is not clear about moving towards increased sustainability, there is no collaboration of these very influential stake holders in the construction sector. For these institutions there is no clear connection between their responsibilities in every day practice and the environment;
- The lack of co-ordination among the departments and with other international institutions causes redundancies, gaps and incoherence in different laws (directives, ...) and doesn't promote synergies in their implementation in the MS and by relevant actors;
- Lack of commercial and technical systems to ensure the availability of materials, products, tools and standards to categorise them (label systems; tendering examples, public procurement; post-occupational auditing, etc.) to create the conditions to kick start a genuine market for more sustainable construction;
- Assessment methodology of building performance is different in every MS and sometimes there are even different ways to assess buildings within the same MS.

How can other actors help overcome these barriers?

- NGOs and professional organisations should continue the regular awareness raising dialogue with the European institutions, in an effort to establish common sustainability goals for the built environment.

Recommendations:

- Stricter and quantified results must be required from the MS if any considerable improvements in the performance of buildings are to be expected; CO₂ emission reduction should be connected with "excellence performance targets" that can be linked to tax advantages;
- The European Commission needs to work on a common assessment methodology of building performance for Europe, which can then be adapted to the specific cultural and climatic reality of each MS;
- A European observatory on the environmental performance of the construction sector should disseminate its findings to the key actors that can contribute to achieving the European environmental performance targets;

- A platform should be set up, to accompany the implementation of all the recommendations made by the Urban Thematic Strategy Working Groups in their final reports; The European Commission DG ENV, having drafted the Urban Thematic Strategy, should become an agent to implement the resulting recommendations;
- A better co-ordination and co-operation should be developed between the European departments and other international institutions;
- European institutions should make available more funding for research in the construction sector.

ON CLUSTER 4: MARKET-RELATED ACTORS – OCCUPIER /COMMUNICATION / INFORMATION / EDUCATION:

OCCUPIER

Barriers experienced:

- Comfort, health and energy consumption are issues that the end user can understand because they have an expression in their daily life. But the message of long-term targets such as CO₂ emission levels reduction, has not yet reached the end user;
- Lack of knowledge of how to optimise the performance of the building – security, thermal, energy, lighting... and lack of interest to use the buildings efficiently, as the benefits don't show clearly enough;
- Lack of knowledge of how best to use the available systems (for example: recycling waste) and how to contribute to the improvement of the quality of the built environment;
- Complexity and user-unfriendliness of modern HVAC-systems.

Barriers created:

- Lack of pro-activity and participation in the decision-making process makes the adopted solutions less well tailored for the end user;
- Due to lack of knowledge and awareness, the specific contributions to the decision-making process are not always adequate, nor in the interest of future generations.

How can other actors help overcome these barriers?

- Make the end user aware of the benefits and responsible for the correct use of the building (promoter's user manual);
- Raise awareness of the end user through information, education, training, leisure (games), labelling and certification of energy performance of buildings;
- Adequate procedures for feed back from the end user are needed.

Recommendations:

- Focus on constructive improvements of the built environment by defining a set of occupier required indicators and targets.

EDUCATION AND TRAINING

Barriers experienced:

- Because the academic sector can be far removed from the day to day reality of the business world, there may be no clear message as to the relevant tendencies to follow;
- On the other hand, the rigorous analysis of the academy may find little sympathy in a marketplace distorted by unequal competition and other failures.

Barriers created:

- In professional education, sustainability may be taught, as a vertical subject, making the approach to sustainability an isolated rather than an integrated one;
- Many of the existing games motivate very unsustainable skills;
- In some MS Architects are not trained to sustain a continuous dialogue with the engineers and they don't have a common language – this is not only a Beaux Arts phenomenon, because it affects North European MS as well as the Southern MS.

How can other actors help overcome these barriers?

- Some of the most commercially successful games (computer and traditional) could be adapted to sustainable ethics in the construction sector (but not exclusively), in an effort to raise awareness for the environment and help form a sustainable attitude in leisure as well as in business. Sustainable communities can't live on the 'live and let die' instincts people are trained with.

Recommendations:

- Sustainability should be a topic addressed at all levels of education, reaching across all subject areas;
- Universities should include sustainability as a horizontal theme in all the disciplines, in order to allow the professionals to internalise sustainability as a permanent, holistic and integrating process. Universities should further encourage project based work with the relevant architect-engineers (multi-disciplinary) teams, so that the dialogue is also learned (see overleaf example DK school of architecture);
- Universities should also encourage project based work with the relevant architect-engineers (multi-disciplinary) teams, so that the dialogue is also learned (see overleaf example DK school of architecture);
- Universities should encourage multi-thematic and multi-disciplinary approaches in education and life - long learning of professionals (architects, engineers and all the others);
- Raising awareness to form a more sustainable attitude should also be included in primary and secondary education. The younger the child, the more open the mind is to take into consideration alternative behaviour patterns.

RESEARCH**Barriers experienced:**

- Lack of co-ordination of existing information;
- Lack of resources.

Barriers created:

- Lack of dissemination of the results obtained by research projects, so as to create an advanced platform for future research;
- FP6 makes little provision for building research and emphasises break-through research, while many of the answers for the future lie in further incremental research and in building on existing break-through achievements.

How can other actors help overcome these barriers?

- There needs to be a central research pool / database, to which all actors in the construction sector that are developing research in a particular area will contribute.

Recommendations:

- It is necessary to develop tools and indicators for more sustainable construction and to harmonise databases;
- A lot of information exists from previous research. This information needs to be made available in a way that is attractive to the actors that benefit from it; Re-packaging and marketing existing information is one way to make the investment in research worth while. The Final Report (1997-2001) for the “Targeted Research Action for Environmentally Friendly Technologies” is a good example of how this can be done. The recent creation of the “European Research Area” should act as a vehicle to further develop this objective;
- Monitoring results also need to be made widely available and the information tailored for the actors for whom it is useful;
- The Commission (DG Research) should promote the setting up of a European Technology Platform (ETP) for construction, which should inter alia address the barriers mentioned above;
- Research strategies for improving the sustainability of buildings are published in the Final Report of EnerBuild RTD, 2003.

NGOs, LOCAL OPINION GROUPS AND NEIGHBOURHOODS**Barriers created:**

- Uninformed opinions can become obstacles even for sustainable development.

How can other actors help overcome these barriers?

- Promoters can include local awareness raising campaigns in their marketing and publicity campaigns;
- Promoters can involve local opinion groups at an early stage in their decision making process.

Recommendations:

- Raising awareness among all stakeholders is important;

- Giving room for stakeholders to take part in the decision-making process as consensus is a critical step before implementation.

MEDIA

Barriers experienced:

- Complexity of the themes of environment and of construction;
- Too much information versus little “technical” knowledge in these areas.

Barriers created:

- The general public is stimulated by the media to give more importance to life style and design than to sustainability issues, especially because sustainability issues are not fashionable (although this doesn't apply to all MS it is a relevant symptom).

How can other actors help overcome these barriers?

- More information and clear indicators / targets have to become available regarding the impact of the construction sector on the environment.

Recommendations:

- The media message can change the value given to sustainability by making sustainability fashionable and disseminating the sustainability indicators and examples of successful good practice;
- Raise awareness of the local media through information, education, training, leisure (games), labelling and certification of the energy performance of buildings;
- Campaigns to increase public awareness and for the implementation of renewable energy systems should be part of the obligations of the global media;
- Adequate procedures for feed back (not only based on “audimat”) from the local media are needed.

ON CLUSTER 5: FINANCE-RELATED ACTORS:

INSURANCE COMPANIES

Barriers experienced:

- In the traditional construction process, the way in which liability is insured tends not encourage innovation nor improvement of sustainability in construction.

Barriers created:

- Insurance companies are completely unaware of the added value of more sustainable construction.

How can other actors help overcome these barriers?

- Member states' administrations, public contracting authorities as well as private clients and their consultants should be made aware of the advantages of single point liability insurance arrangements, in order to promote innovation, reduce waste in the design and promote more sustainable construction.

Recommendations:

- Insurance companies should distinguish between conventional construction and sustainable construction, which should benefit from lower ... due to the lower risk factor of building failure and due to the improved building performance;
- Insurance companies should be encouraged to play a significant role in promoting the introduction and widespread use of single point liability insurance policies.

BANKS / MORTGAGE INSTITUTIONS

Barriers created:

- Complete ignorance and unawareness of the need for sustainable construction (example: banks don't distinguish between sustainable buildings and unsustainable ones when approving a mortgage).

How can other actors help overcome these barriers?

- Banks and mortgage institutions should be made co-responsible for the potential building failures in performance and their negative impact on the environment; (issue to be accommodated in a realistic time frame) The interest rates for sustainable construction should be lower, reflecting the reduced risk of failure (decreasing the value of the collateral) on the long term – such as the fact that lower running costs that allow the building owner to accommodate his mortgage payments;
- The incentive could be improved conditions conceded by the MS national bank, proportional with the improved environmental performance of the buildings.

Recommendations:

- Raise awareness and information sent out by banks and mortgage institutions, in order to ensure participation of their clients in the decision-making process;
- Reduce interest rates for more sustainable construction (with support from the World Bank);
- Increase the financial support for more sustainable construction developments.

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