# INDOOR ENVIRONMENT QUALITY

## A positive campaign now or damage control in the future?

*A report prepared for the Building Commission Victoria*

*June 2004*

Business
Outlook &
Evaluation

# 1. EXECUTIVE SUMMARY

Consultations with a range of stakeholders on Indoor Environment Quality (IEQ) have found that while there is broad awareness of the issue, serious engagement by industry and government in Australia is limited. This is despite substantial and rigorous international research that demonstrates a strong correlation between IEQ and worker health and productivity. The evidence is sufficient for any prudent business to seek to capture the productivity gains, or manage the risk of potential liabilities.

The Building Commission is well placed to take the lead in helping improve IEQ in Victoria and so capture increased economic value in the built environment while improving the health of occupants. This will also pave the way for national standards.

Estimates of productivity increases resulting from improved IEQ are as high as 30%. On the other hand, estimates of the cost burden on the Australian economy from poor IEQ are placed at $12 billion annually. The cost is incurred from lost productivity and increased health costs. Lost productivity ranges from minor impacts such as headaches and poor concentration, to staff absenteeism and turnover, and through to serious illnesses. The potential for litigation is also growing, with multi-million dollar damages already awarded in the United States.

The costs and benefits of IEQ have meant that international interest is growing rapidly, linked to the growth of interest in green buildings. Indeed, IEQ is now the most significant component of the business case for going green. This trend creates opportunities for Australia to improve its built environment and participate in emerging global markets, but it will need to accelerate uptake and interest in the domestic market.

Stakeholders who are fully aware of the potential costs and benefits of IEQ would welcome the Building Commission providing leadership on the issue. IEQ has been raised sporadically by relevant health and environmental authorities over the past two decades, but this has not translated into regulation or even substantive guidance to the industry on what IEQ standard should be adhered to by building owners and occupiers. The new Green Star rating system includes a strong component on IEQ, but has no clear official blessing at a national level.

The absence of standards and guidance has created a degree of market scepticism about the reality of the costs and benefits identified by research. The industry and owners/occupiers only feel the need to take action when a major problem is evident – such as acute illnesses from specific contamination, or a large number of worker complaints.

Raising industry awareness and gaining sufficient credibility to change behaviour will take time. The Commission should begin by developing a network of market leaders who understand the benefits of IEQ and can see commercial advantage in pursuing it. Their success will help convince the rest of the industry to pick up the technology and practices of good IEQ.

Key recommendations include:

1. Circulate this discussion paper to industry leaders for comment and to stimulate further interest and awareness.

2. Create a strong focus on IEQ through a major Forum where local and overseas experts can share experiences and examples of best practice IEQ.
3. Facilitate the adoption of Green Star's IEQ component as the common standard across Australia for specifying and reporting on IEQ performance.
4. Issue an advisory statement recommending the use of Green Star's 5-star rating on IEQ as an appropriate guide for responsible practice among employers, building owners and building operators.
5. Initiate work on a set of minimum IEQ standards for incorporation into the Australian Building Code that are consistent with Green Star.
6. Support further demonstration projects by government and private developers, such as the planned Melbourne Convention Centre, by way of active facilitation of the developments and of the approval process.
7. Support a campaign to alert tenants to the benefits of good IEQ. This would stimulate demand for good buildings and thus encourage speculative private developers to undertake IEQ-focused projects.

Once industry awareness has been raised and a base of support has been established, the Commission's action on IEQ can shift to capacity building and re-skilling of the industry. A detailed plan can be developed for this phase, and would include:

8. Development of further IEQ expertise in Australia.
9. Support the further refinement of Green Star's IEQ component into a form that tenants can easily use to specify the standard they require in any commercial lease.
10. As uptake of IEQ progresses, develop an information/communication campaign to promote the benefits of good IEQ and explain how professionals and consumers can achieve appropriate performance.
11. Incorporate minimum IEQ performance standards into building regulations, and require the publication of the IEQ performance of buildings in lease and sale documentation.

# 2. SITUATION ANALYSIS

## 2.1 Background and scope – consultation with key stakeholders

From its own research and promotion of 'green' buildings, the Building Commission of Victoria has identified IEQ as an emerging issue for the State. There is an emerging body of evidence linking IEQ to worker health and productivity and the Commission seeks to establish whether the Victorian building industry and the Victorian people could benefit by promoting a higher standard of IEQ.

Concern about IEQ in Australia has been raised on a number of occasions over the past two decades, primarily focused on indoor air quality. Unlike external air quality, however, no regulations have been introduced, despite estimates that people spend, on average, 90% of their time indoors. During the past two decades, the case for action has been evolving steadily, with local and overseas studies progressively documenting significant costs and lost benefits to industry, commerce and the community from poor indoor environments (see Section 2.6).

This study involved a situation analysis and stakeholder consultation on what action, if any, the Building Commission should take to improve IEQ. The consultation included a series of phone and face-to-face interviews with stakeholders identified through a brief literature survey and stakeholder analysis. The consultations were then followed by a focus group. A presentation on the current state of knowledge on IEQ and its relevance to Victoria, based on the literature review and discussions with experts, was given at the focus group as a prelude to discussion.

## 2.2 Identifying the stakeholders

The target groups for consultation was drawn from a broad range of stakeholders identified to have an interest in the field either because the issue was of commercial or regulatory relevance to them, or because they were identified during searches of publications. Specifically, the target groups covered:

- Researchers
- Employers, facilities managers, building owners
- Professional groups (engineers, architects)
- Legal companies
- Building industry associations (Property Council of Australia, Facilities Management Association)
- Real estate
- The Environment Protection Authority
- OHS community (Comcare, National OHS Commission)
- Environmental industry, scientists and professionals
- Employer associations
- Insurance industry
- Federal and State environment and health policy and regulators
- Unions

A detailed list of the stakeholders consulted for this study is in Attachment A. The list is not fully representative of the industry as those who responded to requests for interview or participation in roundtable discussions were those who were already interested in the issue. Several organisations simply did not return repeated calls. However, as this was a situation analysis, rather than an opinion survey, a representative sample was not crucial to the objectives of the study.

## 2.3 What is IEQ: some relevant standards

IEQ encompasses a range of variables, including:

- Air quality (pollutant loads, odour, etc.)
- Ventilation (air movement – closely linked with air quality)
- Thermal comfort (including temperature and humidity)
- Lighting
- Noise
- Visual environment

In addition, social and psychological factors have an impact on how the occupants of a building perceive an internal environment. This impact can vary from individual to individual, just as the reaction to physical environments varies. Social and psychological factors add to the complexity of defining IEQ.

Despite the absence of a formal standard specifically on IEQ, a number of other standards and regulations are directly relevant, especially for air quality. Internationally, the WHO standards on safe exposure to different toxic substances provide a clear starting point. In addition, the National Health and Medical Research Council has published advisory levels of safe exposure to a range of potential indoor pollutants, including formaldehyde and radon, and these were adopted in the Property Council of Australia's advice to members on the issue in 1991. However, industry awareness and use of this advice are low.

Environment Australia and the Federal Department of Health and Aged Care have both published discussion papers on IEQ and apparently have a number of research projects under way in the field[1]. However, neither responded to requests for information for this study. The national standards for external air quality, which are part of the National Environment Performance Measures (NEPMs), are also relevant to what constitutes acceptable and safe air quality. However, these are specifically excluded from applying to indoor environments.

The Australian Standard on ventilation for buildings and the Australian Institute of Refrigeration, Air-Conditioning and Heating's manual[2] on Indoor Air Quality is also relevant. Ventilation and air exchange effectively flush the internal air of a building and limit the build-up of pollutants and irritants.

The Green Building Council of Australia's Green Star rating system provides both qualitative and quantitative goals for IEQ, and probably represents the closest the industry has come to specifying best practice on the full range of IEQ factors. Green Star is a design tool, but a rating tool for building operation,

[1] Environment Australia, *State of Knowledge Report: Air Toxics and Indoor Air Quality in Australia*, Canberra 2001. Also, Department of Health and Aged Care, *Indoor Air Quality – A report on Health Impacts and Management Options*, Canberra, 2000.
[2] Indoor Air Quality Manual, AIRAH, Melbourne 2004.

based on the same principles underpinning Green Star for design, is under development and could provide a practical scale for builders, owners and tenants to specify the IEQ standards they desire in their buildings.

Comcare's Officewise publication also provides qualitative advice to businesses on how to achieve a healthy and safe workplace, which is also relevant to IEQ, but is far less comprehensive than the Green Star rating.

Overseas, some countries have set standards for emissions from indoor appliances and finishes[3]. These aim to eliminate toxic emissions at source, rather than set air quality standards as has been done for the external environment. The reasoning is that external air quality standards can be monitored through the strategic placement of a limited number of air quality monitoring stations, from which ambient levels can be reasonably extrapolated. However, it would be impossible with current technology to monitor air quality in all workplaces, so it is more economic to simply avoid the emissions in the first place.

To this end, a number of labelling schemes have emerged to advise consumers on products, finishes and equipment that do not have harmful emissions, including the Greenguard database in the US and EcoSpecifier in Australia. A number of general environmental labelling schemes also cover office products and equipment.

## 2.4 IEQ and the green building movement: is green always better?

The green building movement has become the champion of IEQ in recent years. As noted, Green Star includes a quality indoor environment as a key category of green building performance. So too do the equivalent schemes in the US and the UK[4].

IEQ has come into sharp focus as proponents of green buildings try to develop a business case for going green. Gains from IEQ are the strongest component of this case, with over 80% of the documented productivity gains from green buildings in US coming from better IEQ (see Section 2.6).

IEQ is, however, different from another key driver of green buildings, that of energy conservation. The two can conflict: many energy conservation measures over the past two decades have involved reducing ventilation in order to reduce heat loss during cold periods, and to keep cool air inside when hot. However, this reduced flushing of the air can lead to build-ups of contaminants. Increased use of natural lighting can also lead to problems of glare as weather, daily and seasonal variations come into play.

If addressed during the design phase, most of the potentially competing issues can either be reconciled or, at least, optimised over the life cycle of the building. IEQ is thus becoming crucially linked to the emerging discipline of Integrated Building Design (IBD), whereby building design is expanded beyond the traditional issues of façade, capital cost and compliance with planning and building codes. IBD seeks to optimise a broader range of variables over the life

[3] See, for example, Brown, S.K., *Indoor Air Pollution – Lowering Emissions of Chemicals Released From Manufactured Products*, Hazmat 2003 Conference, Sydney.

[4] Greenstar's equivalent in the United States is LEED, while in the UK it is the BREEAM scheme.

cycle of the building, including visual amenity, worker health and productivity, environmental, economic, technical and social performance[5].

## 2.5 The knowledge base

There is extensive technical literature on the link between IEQ and occupant health and productivity. The US National Science and Technology Council's *Indoor Health & Productivity* contains over 900 papers from more than 100 journals and conferences. Europe also has a very large body of technically sound studies and documentation linking health and productivity with specific building designs and operations.

A significant part of this body of knowledge is focused on indoor air quality, probably because this is the most easily measured and can be linked with specific health impacts. Sources of indoor air pollution typically include:

- Gases from combustion, people and products (carbon dioxide, carbon monoxide, nitrous and sulphorous oxides, ozone, etc.)
- Particulate matter (asbestos, indoor combustion soot, metals, dust)
- Organic pollutants (formaldehyde, pesticides, volatile organic compounds or VOCs)
- Biological pollutants (moulds and fungi, dust mites, bacteria and viruses)

The common sources of these pollutants include:

- Products (printers, faxes, computers, heaters, photocopiers, etc.)
- Finishes (paint, furniture coatings, carpets, etc.)
- Cleaning agents, solvents
- Build-up from external environment
- People

The effects of indoor pollution on building occupants vary according to the individual's tolerance for pollutants, and may also be influenced by the social environment. Some researchers note that tolerance to poor IEQ increases if workers have a positive social environment and a supportive employer. However, this increased tolerance does not eliminate the impact entirely.

The effects of poor IEQ can be grouped in terms of their severity and whether the impacts are temporary or permanent:

- *Short term, non-lasting impacts* such as drowsiness, headache, lethargy, nausea, poor concentration.
- *Chronic illnesses*, such as asthma and respiratory problems.
- *Permanent disabling impacts*, such as cancer, lung and organ damage.

Studies measuring these impacts cover a range of methodologies. Direct impacts on worker efficiency have been measured through observations of the

[5] See for example, the City of Melbourne's Report on the second Workshop on Green Buildings, March 2004.

impact on the performance of routine tasks while ventilation was varied. This meant that the build-up of gases such as carbon dioxide also varied.

Other studies surveyed employees on attitudes to comfort and perceived productivity. Still others examine the impact on productivity measures such as worker absenteeism and incidence of illness: two studies of over 11,000 workers in 107 European buildings analysed the health effect of worker-controlled temperature and ventilation. They found significantly reduced illness symptoms, reduced absenteeism and increases in perceived productivity, compared to a group of workers who did not have individual control over their temperature and ventilation.[6]

The research base on the issue of IEQ and worker health and productivity is substantial. The correlation between the two is well established, even allowing for the uncertainties of the health impacts and the impacts of psychological disposition and perceptions of worker populations. These uncertainties do mean that it is not possible to create a simple equation that specifies the link under all circumstances. But ultimately, it would be surprising if people's productivity was not affected adversely by stuffy air, particulate matter and contaminants, temperature and humidity.

## 2.6 IEQ: costs and benefits

A number of studies have estimated the economic consequences of poor IEQ. The costs typically include:

- Costs borne by employers, as measured by indicators such as sick leave, error rates, increased insurance premiums and litigation, increased staff turnover.
- Costs borne by the economy as a whole, including health care costs for illnesses caused by IEQ.

Estimates of productivity increases gained from improved IEQ vary from zero to as high as 30-50%. A good review of the literature and individual case studies on costs and benefits may be found in the report of California's Sustainable Building Task Force[7]. This report includes a summary of the work of Prof. William Fisk[8] of the University of Berkeley, on the breakdown productivity gains. This summary is reproduced below.

[6] A good summary of the current state of research on IEQ can be found in William Fisk, *Health and Productivity Gains from Better Indoor Environments*.

[7] Kats, Gregory et.al. *The Costs and Financial Benefits of Green Buildings- - A Report to California's Sustainable Building Task Force*, October 2003.

[8] Wiliam Fisk, op. cit.

**Figure VIII-2. Potential Productivity Gains from Improvements in Indoor Environments**

| Source of Productivity Gain | Potential Annual Health Benefits | Potential U.S. Annual Savings or Productivity Gain (2002 dollars) |
|---|---|---|
| 1) Reduced respiratory illness | 16 to 37 million avoided cases of common cold or influenza | $7 - $16 billion |
| 2) Reduced allergies and asthma | 8% to 25% decrease in symptoms within 53 million allergy sufferers and 16 million asthmatics | $1 - $5 billion |
| 3) Reduced sick building syndrome symptoms | 20% to 50% reduction in SBS health symptoms experienced frequently at work by ~15 million workers | $10 - $35 billion |
| *4) Sub-total* | | *$18 - $56 billion* |
| 5) Improved worker performance from changes in thermal environment and lighting | Not applicable | $25 - $180 billion |
| *6) Total* | | *$43 - $235 billion* |

*Adapted from: William Fisk, "Health and Productivity Gains from Better Indoor Environments"*[234]

Several studies in Australia have also estimated the impact of poor IEQ. The NSW Department of Works estimated that absenteeism as a consequence of sick building syndrome has cost the State $125 million per year. CSIRO has put the economy-wide cost of poor IEQ for Australia at $12 billion annually, which is similar to the US figures.

It is worth noting in the above figures that the greatest gains in worker performance come from changes to heating and lighting. Giving individuals the ability to set heating and lighting levels allows them to select settings that meet their individual comfort needs.

The California study also contains an excellent review of the case studies of productivity gains that come from improving IEQ. An example is the West Bend Mutual Insurance Company's new headquarters. Office productivity studies found a 16% productivity increase when workers in open-office areas were given direct, individual control over temperature and air flow in their workspaces.

Other studies also show dramatic impacts coming from natural light: for example, an increase in daylight through the installation of skylights in Wal-Mart stores was found to increase sales by 40%, while natural daylight in schools improved learning rates by over 20% and led to reduced absenteeism and better performance in tests.

Market research on tenants also points to dissatisfaction with indoor environment as a key reason for tenant and staff turnover[9]. These add significant costs to a business, yet, few companies include IEQ in the initial purchasing or leasing decision – perhaps because the decision is made by the property section rather than those who will occupy the space.

Another commercial benefit from the growing interest in better IEQ is the emerging market for IEQ friendly products. A number of countries are now

[9] See for example, *What Office Tenants Want*. 1999 BOMA/ULI Office Tenant Survey Report as quoted in *The Costs and Financial Benefits of Green Buildings*, op cit.

moving to set standards for appliances and finishes to protect the indoor environment from toxic emissions. Databases of such products, such as Greenguard in the US, are also increasingly used and suppliers that are unable to demonstrate that they meet the standards are apparently being excluded from a rapidly growing market[10].

## 2.7 Litigation

The impact of IEQ on employee health has also created the potential for litigation. Cases of poor IEQ have already been taken to court in the US and juries have awarded significant damages. A family living in a mould-infested apartment complex was awarded US$2.7 million for health problems, and workers affected by fumes from carpets, equipment and finishes have also won significant claims[11].

The potential for further litigation has led some groups to identify IEQ as a 'sleeper', that will eventually go the way of smoking and asbestos. Both these issues also started with a level of uncertainty about just what the health impacts were. Authorities and industry were slow to recognise the impacts and eventually ended with massive litigation costs on top of the pay-outs to affected individuals. Legal companies specialising in plaintiff damages in the US, in particular, but also in Australia, have already identified IEQ as a potential major area of future litigation.

However, it cannot be known yet whether IEQ will go the same way because the extent of chronic illnesses and disabling health impacts remains uncertain. It is, however, a possibility that needs consideration.

[10] Instances of this were mentioned in discussions with Dr Stephen Brown of CSIRO, with Anthony Bernheim of the San Francisco-based SWMM Architects, and with Bill Browning of the Rocky Mountains Institute.

[11] A discussion of some of these cases can be found in an article in the newsletter of the Australian Property Council in January 2003, by Andrew Walker-Morrison of RMIT.

# 3. BARRIERS TO IEQ

## 3.1 Industry scepticism

Given the costs and opportunities for business, the question is, why is business not taking action to improve IEQ? There would seem to be enough evidence for any prudent business to want to capture the productivity gains on offer, or manage the risk of potential liabilities.

Yet, it was clear from discussions in preparing this report that while there is broad awareness of IEQ as an issue, serious engagement in Australia is confined to a relatively small number of committed individuals. Action on IEQ in government and private offices is limited to those where a major problem is evident. Apart from a small number of buildings designed specifically for superior environmental performance, little attempt has been made to assure capture of the benefits of good IEQ identified by rigorous research.

Discussion with stakeholders identified a number of reasons for this. Most people accept that a correlation between environment and productivity exists (this is common sense). However, there is also a great deal of scepticism about the size of the reported benefits. Given the number of variables involved in determining productivity, many people doubt whether the broad conclusions can be applied to an individual business.

A common query about the link is how much of the correlation measured in studies might be attributable to factors other than IEQ. For example, short-term gains in productivity have been observed whenever employees move to a new building – the employees' enthusiasm picks up initially because of the stimulation of the new environment, but the effect subsides over time.

Another factor might be the 'Hawthorne effect' observed early last century: an employer that is willing to provide workers with a good environment is perceived as a supportive employer who cares for their welfare. It is this, rather than the physical environment itself, which leads to the productivity gain.

Most of the research on IEQ, however, allows for these extraneous factors and yet is able to show an impact above and beyond them. To this extent, awareness of the quality of the research to date is relatively low.

But even if the validity of the research is accepted, companies still have reason to be uncertain about its applicability to their individual businesses. Few companies know their current IEQ performance. Data collection is difficult and so the extent of the problem in any given office is unknown. So too then are the potential gains: if the building occupied has a reasonable IEQ, which the absence of staff complaints might suggest, then the potential gains will also be low.

When such uncertainty exists, action on IEQ easily becomes a lower priority compared to more pressing, tangible business pressures. This is exacerbated by the reality that office relocation, or even just internal renovations, are highly disruptive and expensive – a compelling reason is usually needed and any uncertainty about benefits is magnified.

Another source of uncertainty for employers is the lack of consistent standards to work to in Australia. Lack of regulation in the field by health and environment

agencies is taken as further evidence that research is still inconclusive. Environment, Health and Safety staff have difficulty convincing senior management of the need for action when there is no obvious worker, community or government imperative to give credence to the case.

As noted, Green Star already provides a rating in the design phase, and a tool for building operation is under development. Those familiar with the IEQ standards in Green Star felt they provided very good criteria to form initial judgements about the IEQ performance of a building. Its acceptance in the marketplace is growing but it has not yet become a common currency.

## 3.2 Resistance to change

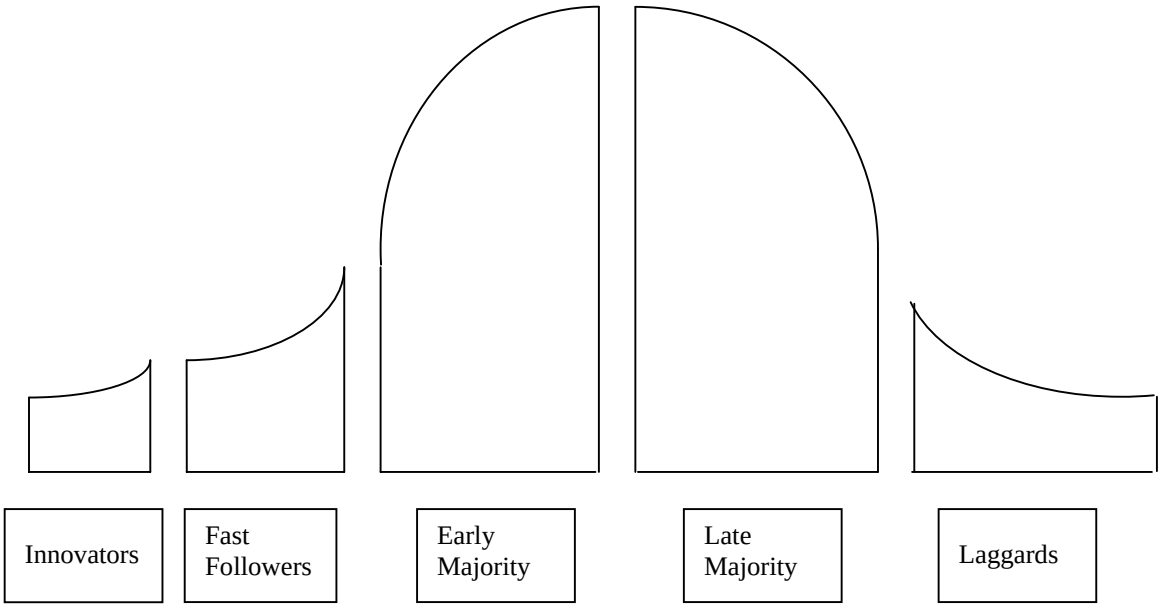
The barriers to IEQ are typical of those confronting uptake of any new technology or work practice. The correlation between cigarette smoking and cancer and heart disease, for example, was first established in the 1950s, yet smoking inside public buildings has only comparatively recently been enforced in Australia and is still allowed in most of Europe. To many people, emissions from equipment and finishes would run a distant second, although this is not an objective appraisal.

A useful analogy on the slowness of uptake can be drawn from work on the uptake of new technologies. Geoffrey Moore[12], in examining the marketing of technology products, suggested that the traditional Bell curve of technology uptake was actually segmented, rather than a smooth transition, and that the different segments needed to be marketed to separately. The segments, as shown in the diagram below, include:

- *Innovators*, who are prepared to take the financial risk of an unproven technology or new practice.
- *Fast followers*, who wait to learn from the experience of the innovators, thus reducing their risk, but are still quick to change. Fast followers are leaders among mainstream organisations.
- *The early majority*, who are sceptical of innovators and won't adopt until there is evidence of uptake by fast following mainstream organisations.
- *The late majority*, who resist change until older technologies are clearly superseded.
- *Laggards*, who won't change unless they have no choice.

[12] Geoffrey A Moore, Crossing the Chasm, Capstone Publishing, Oxford. 1999

**Technology uptake – a segmented Bell curve**




The segmentation of the market in terms of willingness to adopt new technologies has major implications for either the marketing of those technologies or any awareness campaign that seeks to accelerate adoption. Given the level of industry scepticism, IEQ would seem to be in the late stages of adoption by the relatively small number of Innovators, or perhaps in the early stage of the Fast Followers. In Victoria, for example, there are only a very small number of developments that have paid significant attention to IEQ, such as in the 60L development, the new National Australia Bank building, and the planned new City of Melbourne administration building.

This means that an information campaign targeted at the general industry, comprising the early and late majority would be doomed to failure – the early majority will not be convinced until they see successful uptake and tangible gains by the fast followers and the innovators.

This may explain some of the difficulties facing adoption of green technologies generally: for example, a Californian energy utility spent a vast amount on an information campaign to encourage installation of insulation in low income houses, but had very little success. It was estimated that it would have been much cheaper to have installed the insulation for free[13]. Evidently, targeting the majority of the industry too soon can be counter-productive and the money would be better spent on working with innovators and fast followers to boost the credibility of the new way.

This sobering reality needs to inform the plan of action on IEQ in Victoria, as described in the next section of this report.

[13] Doug McKenzie-Moore and William Smith,. *Fostering Sustainable Behaviour*. New Society Publishers, Canada, 1999.

## 4. IS THERE A NEED FOR THE COMMISSION TO ACT?

The potential benefits of action on IEQ, and the risks from inaction, justify pursuing an improved level of IEQ in the Victorian built environment. The issue is, who should pursue it – government or industry?

One stakeholder who was consulted for to this study argued that given the risks and benefits, market pressures alone **will** resolve the issue in favour of good IEQ. Indeed, a few other respondents felt that if a body such as the Building Commission even raised the issue for public discussion, this could itself stimulate litigation as tenants and employees become aware of the harm a poor IEQ may cause. This, plus a general reluctance to face another regulation led them to argue against the Government taking a lead.

The majority of stakeholders, however, gave broad support for Government action from a public policy viewpoint. They saw the slow uptake and relatively low awareness of IEQ as evidence that the costs and benefits from IEQ are unlikely to be acted upon by the market alone, unless a major litigation focuses market attention on the issue. Indeed, the case for a pro-active approach is compelling:

- The potential productivity gains from good IEQ will benefit both employers and employees.
- Good IEQ is a major driver for the development of green buildings, which will improve the economic value of the whole built environment. This benefits the building industry.
- Good IEQ improves the quality of life for all in the built environment
- A pro-active approach to IEQ at this early stage could minimise the risk of disruption and conflict that has characterised issues like smoking and asbestos, should it turn out that poor IEQ has significant long-term impact on health.
- The lack of authoritative guidance on IEQ leaves employers and building owners with no clear reference or means of protecting themselves against OHS and general damages claims. It could also add to the difficulty that Australia currently confronts in the areas public liability, workplace insurance and professional indemnity.
- Given the growing trend overseas to set standards on indoor materials, finishes and appliances, Australian products could be excluded from international markets if they don't meet these standards. CSIRO has already been called to help companies to test materials for toxic emissions.

Stakeholders also felt that the Building Commission was well placed to provide the leadership of this public policy interest. As noted, the stakeholders who were consulted were not a representative sample of the industry, but this does not detract from the logic of the case developed here. These stakeholders also provide the nucleus of a potential support network for the Commission to enact the recommendations outlined in the next section.

Another clear message from the stakeholders was that action should eventually flow through into the building regulations, but that any new standards developed should be national, rather than vary from State to State.

# 5. RECOMMENDATIONS

The Commission should adopt a strategy that recognises which market phase is IEQ at: that is, uptake of IEQ is in transition between innovators and fast followers in the market. Consequently, short-term action should focus on supporting the activities of fast followers, in order to create tangible demonstrations for others to follow. In the longer term, information and training packages can be developed for the early majority, when they are receptive to action.

## 5.1 Short-term actions: support innovators and fast followers

A first step is to facilitate the emergence of a network of individuals who understand the benefits of IEQ and can see commercial advantage in pursuing it. This network will develop projects that demonstrate good IEQ practice. The tangible examples will eventually convince the early majority to adopt the technology and practices of good IEQ.

Some actions that will help create this network include:

1. Circulating this discussion paper to industry leaders for comment and to stimulate further interest and awareness among potential fast followers.
2. Creating a strong focus on IEQ through a major Forum where local and overseas experts can share experiences and examples of best practice in IEQ.

The second step is to provide a common language on IEQ. This would provide fast followers a common point of reference by which they could easily specify the IEQ standards that they desire in projects. The power of a common standard was observed by the recent Australian Green Buildings Mission in the US, where the universal adoption of the LEED rating system is dramatically accelerating uptake of green buildings. LEED enables consumers to easily specify the standard of environmental performance they want, and stimulates competition among builders[14].

Thus, the Commission could:

3. Facilitate the adoption of the IEQ component of Green Star as the common standard across Australia for consumers and the industry to specify and report on IEQ performance.
4. Issue an advisory statement recommending the use of Green Star's 5-star rating on IEQ as an appropriate guide for responsible practice among employers, building owners and building operators.

[14] See *International Developments in Green Building*, Report of the Australian Green Building Mission, November 2003.

The Commission's support for Green Star's IEQ component will help the process of 'validating' the IEQ issue. It overcomes the problem of scepticism among employers when they see no evidence of concern on the part of relevant authorities. To add to this validation, the Commission could:

5. Initiate work on a set of minimum IEQ standards for incorporation into the Australian Building Code that are consistent with Green Star.

The transition from uptake by fast followers to uptake by early majority will require clear demonstrations of the principles and benefits of IEQ. As noted, some are already under way and overseas experience will add to the databank. However, the Commission can accelerate this through the following actions:

6. Support further demonstration projects by government and private developers, such as the planned Melbourne Convention Centre, by way of active facilitation of the developments and of the approval process.
7. Support a campaign to alert tenants to the benefits of good IEQ. This would stimulate demand for good buildings and thus encourage speculative private developers to undertake IEQ-focused projects.

## 5.2 Actions in the longer term

The actions above are designed to consolidate uptake of good IEQ by the fast followers. In the longer term, the objective must be to influence the mainstream industry. As interest in, and demand for, good IEQ grows, the Commission's focus will also need to transition to capacity building and re-skilling of the industry. A detailed plan can be developed as this stage is reached, and would include:

8 Development of further IEQ expertise in Australia.

9 Support the further refinement of Green Star's IEQ component into a form that tenants can easily use to specify the standard they require in any commercial lease.

10 As uptake of IEQ progresses, develop an information/communication campaign to promote the benefits of good IEQ and explain how professionals and consumers can achieve appropriate performance.

11 Incorporate minimum IEQ performance standards into building regulations, and require the publication of IEQ performance of buildings in lease and sale documentation.

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# ATTACHMENT A

## Stakeholders consulted for this study

| | |
|---|---|
| 1. Mr Terry A'Hearn | EPA |
| 2. Mr Tony Bainbridge | Swiss Re |
| 3. Mr Deane Belfield | Engineers Australia |
| 4. Mr Stephen Betros | Facilities Management Association of Australia |
| 5. Dr Stephen Brown | CSIRO |
| 6. Mr David Craven | SEAV |
| 7. Marc Fernando | Transfield Services |
| 8. Mr Len Ferrari | Chair, Indoor Air Special Interest Group, CASANZ |
| 9. Mr Vyt Garnys | CTEC - representing Facilities Management Australia |
| 10. Peter Gray | Gray Puksand Architects |
| 11. Ms Eloise Gucciardo | City of Melbourne |
| 12. Mr Dang Ho Dinh | Lincolne Scott |
| 13. Mr Robert Lorenzini | AIG |
| 14. Mr Howard Morris | National Occupational Health and Safety Commission |
| 15. Mr David Moulton | Telstra |
| 16. Mr Andrew Murphy | Hansen Yuncken |
| 17. Mr Jay Panditharatne | CB Richard Ellis |
| 18. Katie Patrick | APP Corporation |
| 19. Ms Sue Pennicuik | ACTU |
| 20. Mr Robert Pradolin | Australand/HIA |
| 21. Mr Jeff Robinson | Connell Mott McDonald |
| 22. Ms Pru Sanderson | Monash Property |
| 23. Mr Robin Seeley | Federal Department of Health |
| 24. Mr Kent Stuart | Property Management, ANZ |
| 25. Mr Ananda Waniganawaki | Telstra |
| 26. Mr Bruce Webb | Baker & McKenzie |
| 27. Mr John Wilson | The University of Melbourne |