

Sydney 2000 Olympic and Paralympic Games Environmental Benchmarks

Guidelines, Achievements and Lessons
for Environmentally Sustainable Building and Events

Sydney 2000 Olympic and Paralympic Games

Guidelines, Achievements and Lessons for Environmentally Sustainable Building and Events

Who should use these?

These Benchmarks are recommended for consideration by housing, commercial building and venue developers, project managers, architects, engineers and environmental consultants; major event organisers, public place managers; and consent authorities. They cover key features of the building development process (planning, design, construction, environmental control, waste, materials, appliances), being undertaken by the government, community and private sectors. In the arena of public events the Benchmarks (merchandising, waste, transport, sponsors) apply to events such as sport or music, fairs or other public or community events, as well as the public domain.

What are benchmarks?

Benchmarks are goals that can inspire planners and developers and of course, allow consent authorities and the community to assess the environmental qualifications of projects. Those who commission projects or contractors who purchase materials; or event organisers and sponsors, have a major role to play in achieving environmental sustainability.

Why have benchmarks?

Adoption of benchmarks is essential to allow the emerging sustainability industry to gain a voice in the construction and event sectors, and provide new jobs and economic activity. Application of green building and event practices will reduce the 'ecological footprint' of development, leading to less environmental impacts and waste and increased efficiency in the use of resources.

A healthy sustainability industry will also have significant export potential, as other countries tackle the environmental challenge.

How were the Benchmarks arrived at?

The Environmental Guidelines for the Summer Olympic Games (Sept 1993) were the starting point. Each Benchmark reproduces the relevant Olympic Guidelines which **should be regarded as the minimum goal**. The achievements under the Sydney 2000 Olympic Games planning, development and event management areas are then described. The third and final part of each Benchmark explains the 'lessons' – providing insights into implementation, including improvements on the Olympic Guidelines or barriers that need to be overcome by new projects.

The signatories to the Benchmarks are the members of the Olympic Environment Forum, which met for several years every two weeks to discuss emerging issues; share up-to-date information on environmental practices and attempt to resolve disagreements about implementation of the Environmental Guidelines. Further information may be obtained from any of the parties.

Achieving the benchmarks

There is a significant reservoir of expertise in the design and development community as a result of the Sydney 2000 Olympic developments. They are also in a much improved position to assess costs and benefits of green building practices.

Environmental Benchmarks

Overall the Benchmarks show that significant advances in environmentally friendly construction, building use and event management are practical and should be replicated in other developments. There are also challenges for developers and government regulators to make a consistent commitment to applying the Benchmarks and for building managers to ensure that occupational behaviour is compatible with the environmental objectives.

*Olympic Coordination Authority
Total Environment Centre
Greenpeace
Environment Protection Authority
Green Games Watch 2000
SOCOG*

The Benchmarks

Planning and development

1. **Tendering**
2. **Environmental Management Plans**
3. **Construction waste**
4. **Life Cycle Costing**
5. **Renewable energy**
6. **Water conservation**
7. **Timber**
8. **Refrigerants**
9. **PVC**
10. **Biodiversity**
11. **Athletes' Village environmental targets**
12. **Stakeholder and community involvement**

Sustainable Event Management

13. **Merchandising**
14. **Event waste management**
15. **Transport**
16. **Sponsors**

Tendering

Environmental Guideline

· companies tendering for construction contracts will be required to submit details demonstrating how they will satisfy the requirements of the Environmental Guidelines

Achievements

■ The Environmental Guideline was applied to all major projects and elicited serious responses from tenderers, particularly since each tenderer was not told how much weighting would be given to environmental features.

■ The tender process encouraged research into the various ecologically sustainable development (ESD) issues and new fields of information.

■ It had an educational value across the construction industry with environmental consultants brought in to join the design teams, raising environmental awareness generally and about the need for clear and specific project management processes.

Lessons

■ There was a choice between:

- defining specific green measures and obtaining alternative prices for them, or
- setting minimum performance standards and allowing the competing teams to propose their preferred way of achieving these, or
- asking each tenderer to propose their own goals.

Generally the third approach was taken and while this was probably the most practical method at the time, there is the risk that no tenderer will reach an appropriate standard. The second approach would allow greater achievement of best practice and would work particularly well with frequently repeated building types.

■ It is important to ensure that tenderers also provide evidence of Environmental Management Plan systems, that can assure implementation of undertakings. This will require a commitment to involve environmental consultants throughout the design and development process (see Environmental Benchmark 2).

Environmental Management Plans (EMP)

Environmental Guidelines

· *no specific guideline - EMPs are a management tool to meet a range of Guideline objectives*

Achievements

■ EMPs have a proven role in the design and implementation process, including - ESD education of the design team; setting ESD goals; monitoring achievement of goals; ESD reviews of the project's requirements and elements; independent auditing; assuring compliance with relevant legislative requirements and guidelines; research and information provision during the project; and identifying ESD opportunities as the design evolves.

■ The Athletes' Village and Sydney Showground projects in particular, used sophisticated and effective EMPs to minimise environmental damage from construction. The projects' EMPs contained procedures to address each key environmental issue and a comprehensive set of plans, programs, checklists, monitoring system, etc to benchmark each contractor and create a hierarchy of implementation and management.

■ Environment managers were appointed with authority to reject contractor plans, arbitrate on environmental matters and provide input to manuals and procedures. Internal audits of work, including by sub-contractors, were also undertaken.

■ Training included videos (e.g., 'Working Greener', OCA) and courses for thousands of workers.

Lessons

■ If environmental impacts are to be minimised and guidelines or development consent conditions fully implemented, it is essential to have an effective EMP with a hierarchy of control down to the site-worker level, with training and monitoring and internal audits. The systematic process is far more preferable than ad hoc approaches.

■ Tenders should call for such EMPs with evidence that project managers can fulfill them.

■ An electronic document tracking system (developed for use at the Sydney Showground project) allowed an easy recording and retrieval system and can be used to inform future large projects.

Construction waste

Environmental Guideline

· *waste avoidance and minimisation*

Achievements

- A new benchmark has been set in the recycling of construction waste material. The high performers include the Sydney Showground, Sydney SuperDome, Athletes' Village and Stadium Australia with over 90% recycled or reused.
- Some sub-contractors have identified new business in recycling such as in crushed concrete from slurry and cut outs.
- A number of suppliers have been introduced to the concept of extended manufacturer responsibility, for example return of styrofoam and cardboard waste.

Lessons

- An on-site waste separation system is essential. This eliminates contamination to create ease in collection and once established, significantly reduces waste disposal costs. There is clearly a market for such materials and these markets are made more competitive and viable by reducing cross contamination.
- It is important to set targets for recycling and minimisation which allow project planning and inventory/materials management to maximise reuse on site and collection by recyclers.
- The construction waste recycling program should be made the responsibility of the project manager, with auditing and control exercised through the Environmental Management Plan.
- Training for on-site workers is beneficial.
- There are significant financial savings for developers through the avoidance of landfill costs.

Life Cycle Costing (LCC) (also known as Life Cycle Assessment)

Environmental Guidelines

- *building material selection being subject to consideration of environmental implications, for example timber should be from sustainably managed sources*
- *selection of components that go into new projects will be subject to life-cycle costing and consideration of environmental implications during manufacture, use and disposal*

Achievements

- Several projects notably the Sydney Stadium, Sydney Superdome, Sydney Showground and the Village utilised various models of life cycle costing involving questionnaires to manufacturers, eco-rating systems and independent advice.
- This first attempt to apply LCC to major projects was largely successful as it was found practical and influenced the choice of materials without a significant management cost burden.
- The application was a ‘wake up’ call for domestic manufacturers in view of international developments in this area. It also made them more aware of the environmental impacts of their products, including waste and greenhouse emissions.

Lessons

- Manufacturers were naturally unfamiliar with the new system and further efforts should be undertaken to make its application more commonplace and easily understood by industry.
- The lack of standardisation and easily quantifiable measurements requires further work on LCC, so that an independent consistent system can be developed and implemented. In the interim, the approach used for Olympic construction should continue to be applied.
- One first application could be for frequently repeated building types (e.g., schools, offices, hotels, project homes).
- The initiative of including LCC on future projects will depend on clients and regulatory authorities as much as designers and contractors; and should be included from the beginning as a design tool in tender documents and supply contracts.

Renewable energy

Environmental Guidelines

- *energy conservation and the use of renewable energy sources*
- *passive solar building design wherever appropriate*
- *selection of appropriate development densities*
- *selection of materials for thermal performance*
- *use of insulation and natural ventilation*
- *the widest possible use of renewable sources of energy*
- *high efficiency lighting systems with maximised use of natural light*
- *use of energy efficient appliances*

Achievements

■ The most impressive sporting venue for renewable energy is the Sydney SuperDome because it has the biggest single solar electricity installation. Solar electricity is also used in the lighting of the Olympic Boulevard.

■ Most venues are buying Green Power (at varying quantities), including 100% purchases by the Sydney SuperDome, Stadium Australia and Novotel.

■ Daylighting at the Sydney Showground, Dunc Gray Velodrome and Sydney International Shooting Centre, which reduces artificial lighting requirements.

■ The Sydney SuperDome has energy efficient lights and also computerised lighting controls.

■ The Athletes' Village has substantial passive solar design to reduce energy consumption to about 50% of comparable homes.

■ Solar electricity panels and hot water (gas boosted) systems are extensively used at the Athletes' Village, with solar power being fed back into the grid. Insulation and good thermal performance of materials were also an achievement.

■ Energy efficient light globes and appliances are able to be used in the Village.

Lessons

■ It is difficult to strictly apply passive solar design to sporting venues due to their size and sporadic needs and thus other avenues for energy conservation and greenhouse gas reduction are required (for example, Green Power; and energy efficient lighting which is undergoing significant advances).

■ Integrated urban subdivisions can provide significant passive solar design advantages and the practice should be widely used. However, this largely applies to detached dwellings and further work is required for apartments which did not receive similar treatment (for example, there is no energy conservation standard for apartments).

■ In order to support the decisions to install solar electricity and energy efficient light globes at residential level, the pay-back period with energy savings is important, but the up-front cost may still require economic and policy incentives to combat cheaper fossil fuels, until industry achieves a suitable economy of scale. However, energy efficient appliances can currently compete.

Water conservation

Environmental Guidelines

- *encouragement of sound sustainable water resource management through public and industry education programs*
- *water conservation and recycling practices*
- *protecting the useability of recycled water by minimising the use of pesticides in landscape maintenance*
- *recycling of treated stormwater and sewage effluent*
- *landscape design that decreases water requirements in parks, gardens and other recreational areas with emphasis on selection of plants appropriate to climate*
- *use of water conservation devices such as dual flush toilet systems, roof-fed water tanks, water-saving shower roses, and appropriate irrigation devices*
- *selection of low water-use appliances including dishwashers and washing machines*
- *introduction of pricing policies that reflect the real cost of supplying water*
- *building and infrastructure design to collect waste water for recycling*
- *use of artificial wetlands or other appropriate methods to remove pollutants from waste water prior to recycling*

Achievements

- Stormwater from the venues and public domain areas at Sydney Olympic Park is diverted to detention basins for removal of sediment and then some stormwater flows through wetlands (which help reduce pollution) to local creeks and drains; and the rest to the Brickpit storage for the Water Reclamation and Management Scheme (WRAMS) for reuse treatment.
- WRAMS also recycles and treats sewage from the Athletes' Village and Sydney Olympic Park venues and has the capacity to mine adjacent sewer systems for more resource.
- The Athletes' Village houses use a range of water saving appliances.
- Stadium Australia irrigates the arena pitch with stormwater collected from its roof area and has required heavy fertiliser use to occur only during low rainfall times to reduce potential pollution.

Lessons

- There are very significant savings to be made with reuse of water both in terms of individuals, businesses and households paying for water and consumption demands on the water supply system. These savings can be achieved with little additional cost, especially if integrated at an early stage in the design process.
- With large sites, a system like WRAMS can be effectively built to conserve water and this can be applied to other major urban development projects.
- Water saving appliances and systems are proving popular not only at the Athletes' Village but also in other parts of Sydney that have adopted them, demonstrating the value of public education and stated minimum requirements.

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Achievements

- Landscaping around the Athletes' Village is designed to increase local filtration, to reduce runoff and local native species have been planted to optimise water use.
- A dual pipe system has been installed at the Athletes' Village and venues at Sydney Olympic Park (including the rail station) to supply recycled non-potable water for toilet flushing, irrigation of gardens and other outside water use.
- Recycled water has a supportive price structure.

Lessons

- The use of local native plants and mulching is of great assistance and in addition gives an area a local ecological identity.
- Haslams Creek was regenerated from a toxic concrete drain into a functioning natural area, with natural tidal flows, without adverse impacts on flood mitigation for the site or the upper catchment.

Timber

Environmental Guideline

· *building material selection being subject to consideration of environmental implications, for example timber should be from sustainably managed sources*

Achievements

- Widespread use of softwood plantation timbers in the Newington Village.
- Recycled timber used for example in the Sydney International Shooting Centre, Clydesdale Pavilion in the Sydney Showground, panelling for the Olympic Park Railway Station.
- Laminated plantation slash and radiata pine in the Sydney Showground Dome.
- Imported Forest Stewardship Certified timber used in specialised applications in some venues and the public domain.

Lessons

- There is still considerable controversy about whether native forests are sustainably managed on the grounds of adequacy of conservation reserves, environmental prescriptions and harvesting levels. This affected agreement about the use of native timbers. For example, controversial use of turpentine in the Sydney International Regatta Centre and Blackbutt for fencing at the Sydney International Equestrian Centre.
- Plantation and recycled timber clearly compete with native forest timbers in a wide variety of applications.

Refrigerants

Environmental Guideline

· *use of CFC, HFC and HCFC-free refrigerants and processes*

Achievements

- The Athletes' Village, Novotel and Sydney SuperDome use environmentally friendly fridges.
- A number of venues, including the Sydney Showground Pavilions, Dunc Gray Velodrome and the Athletes' Village are designed to avoid the need for air conditioning, by maximising natural ventilation.
- A change in the policy of major international corporate sponsors to stop the use of HFCs in refrigeration equipment.

Lessons

- The widespread non-compliance on major refrigerant use in many venues including the Sydney SuperDome, resulted from a failure to plan the site in an integrated fashion to allow for a centralised green refrigerant plant. Such a plant would avoid the claimed safety issues involved in some alternative gases, as it could be placed not in close proximity to people.
- The refrigerant industry should actively investigate and adopt alternative refrigerants to overcome perceived barriers. Wider use of natural refrigerants in other parts of the world, such as Europe, was not applied to Sydney. In the future, existing plants can be regassed using alternative refrigerants.

PVC

Environmental Guideline

· *minimising and ideally avoiding the use of chlorine based product (organochlorines) such as PCBs, PVCs and chlorine bleached paper*

Achievements

■ Significant substitution with PVC alternatives for pipes, electrical insulation, flooring, in Stadium Australia, Novotel, Athletes' Village, Sydney Super Dome and the Sydney Showground.

Lessons

■ Acceptance of PVC alternatives in the construction industry and its performance qualities has been demonstrated but is at an early stage and more effort will have to be expended to upgrade use through education of the design and engineering sectors, installation training and improved industry standards to accredit use of alternatives to PVC.

Biodiversity

Environmental Guidelines

- *preservation and protection of the integrity of natural ecosystems including native bushland, forest and waterways*
- *assessment of habitat and species with special attention to endangered species and ecosystems that are subject to international conservation treaties*
- *implementation of non-chemical pest control at Olympic sites*
- *landscape programs that minimise disruption of wildlife habitat and protect indigenous plant species, with selection of species to complement existing habitats*
- *preservation of existing landscape features*
- *rehabilitation of wetlands*
- *use of extensive indigenous planting to attract birds and other animals*
- *establishment of buffer zones between recreation and conservation areas*
- *control of feral animals and weed invasion*
establishment of a management plan for the protection of natural ecosystems
- *use of low wash ferry transport to minimise impact on mangrove ecosystems*

Achievements

- Restoration of wetland systems along Haslams and Boundary Creeks (previously toxic drains).
- Return of tidal flushing to saltmarsh in Silverwater Nature Reserve has regenerated the ecosystem.
- Breeding recorded for endangered Green and Golden Bell Frog in good seasons (but long term monitoring needed).
- Establishment of a significant Silverwater Nature Reserve.
- Mosquito control based on non-chemical program involving naturally based larvicide and reintroduction of tidal flushing.
- Evidence of recolonisation by bird and frog species of remediated and newly landscaped areas.

Lessons

- It is important to preserve high quality habitat from development rather than try to artificially replicate it, as there will almost always be a reduced diversity of plant species and new locations may not fit the needs of animal species.
- Development consents could be very clear about the required controls for landscaping and protective measures during construction and occupation; and project environment management plans utilised.
- There are insufficient controls on cats and dogs and feral animals living near conservation areas (e.g. Silverwater Nature Reserve) and the buffer zone and its management may prove inadequate. Further monitoring is necessary and action may be required.
- Maintenance of ecosystem function, including restoration of function (eg. of wetlands and reducing surface runoff) should be integrated into site design at the beginning of the planning process.

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Achievements

- Indigenous plants (to the region) used in landscaping.
- Ecological impact assessment and management plans are in place.

Lessons

- A holistic approach needs to be taken to protect and enhance significant flora and fauna. The success or otherwise of the achievements above are as yet not conclusive due to the dynamic nature of natural systems. Scientific studies over a period of time will need to be conducted to determine if the measures have been successful.

Athletes' Village environmental targets

The development strategy included specific commitments and quantifiable targets which provide useful targets for assessing new residential development. These included:

- a generic outline EMS that can be used as part of the 'greening industry' initiative;
- 100% of management and site workers to receive environmental skills and due diligence awareness training;
- 50% reduction in consumption of potable water against conventional designs;
- total annual average residential water consumption of less than 275 l/person/day;
- energy demand in permanent dwellings reduced 50% compared with standard project homes;
- 90% of permanent dwellings (excluding units) oriented with living areas 20°W-30°E of north;
- 90% of permanent dwellings (excluding units) meet 80MJ/m²/yr for heating energy to 20°C;
- no air conditioning to residential buildings;
- 100% of permanent dwellings in 2000 (excluding units) to generate their own household energy demands (1600kWh/yr) by rooftop PV;
- 100% of major building materials/systems to be assessed using LCA techniques;
- in the order of 40% reduction in PVC use;
- zero irrigation demand in public areas after a three-year establishment period;
- 90% of landscape planting in public areas from native species;
- to provide a new benchmark in the environmental management of construction projects;
- importation of topsoil eliminated by reconstituting existing soil;
- CO₂ emissions reduced by 2000 tonnes/yr;
- no increase in lux levels in Newington Woodlands as a result of the Village;
- no increase in nitrogen, phosphorus, potassium and gross pollutants entering Homebush Bay as a result of the Village;
- infiltration to groundwater equivalent to 40% of rainfall runoff volume;
- project construction waste: 90% recycling of hard waste, 60% of soft waste;
- per capita residential waste to landfill reduced 50% and 50% increased recycling.

Stakeholder and community involvement

Environmental Guidelines

- *environmental and social impact assessment, with community participation in the planning process*
- *planning to minimise any adverse impacts of Olympic sites and events on nearby residents*

Achievements

■ In-depth participation of environment groups with government agencies in the drafting of the Environmental Guidelines for the Summer Olympic Games (1993) and consultation on enabling legislation.

■ The NSW and Commonwealth Governments provided financial support for the creation of Green Games Watch 2000 (GGW2000) to act as a community watchdog for, and adviser to, Games organisers. GGW2000 has a board with representatives from five environmental non-governmental organisations.

■ Expert panels and working groups were created to monitor and provide advice on issues such as waste education, ecology programs and venue design and construction - including energy, materials, construction and demolition waste. Membership was drawn from government, industry, academia and community sector organisations including GGW2000 and Greenpeace.

■ The Olympic Environment Forum (OEF) was created in June 1997 to provide a high level forum for discussion and liaison between community interests - represented mainly by Greenpeace and GGW2000; Games organisers and developers - represented by SOCOG and OCA; and the Government's lead environmental policy, education and regulatory agency - the NSW Environment Protection Authority (EPA).

Lessons

■ It is important to gain broad and detailed stakeholder support for the project from the earliest, goal-setting stage. The Environmental Guidelines for the Summer Olympic Games are a direct result of such a participative approach and are a strong legacy upon which future urban planners and developers, and event managers, can build.

■ The processes used for community information, consultation and participation were experienced by participants as being mainly positive and constructive. However, stakeholders at times felt that more information could have been volunteered about issues at an earlier stage, to improve environmental assessment and that Games organisers could have strived harder to include them in planning decisions. For their part, Games organisers at times felt that stakeholders could have provided earlier notice of issues they wanted clarified and that there were more efficient and direct ways of communicating with stakeholders on some issues.

■ Stakeholder participation has proven to be a vital ingredient in the delivery of a major event and development program. Stakeholders and the community provided specialist and local knowledge and expertise, improving critical evaluation and the integrity of the project. In addition, stakeholders such as Greenpeace often were able to provide an important international perspective. The

Achievements

■ The Homebush Bay Environment Reference Group (Homborg) was created by OCA in 1998 as part of its commitment to provide for local community and stakeholder review of, and consultation about OCA's ecology and remediation programs for the Homebush Bay Olympic site. OCA also is working to deliver a significant community legacy in the form of an easily accessible data base that includes remediation and ecological data alongside oral histories about the Homebush Bay Olympic site.

■ Olympic Landcare - a three year project to plant at least 2 million trees across Australia. 40,000 volunteers from 4,500 country and urban Landcare groups, and 3000 staff from Olympic sponsor and other organisations, participated in the program. The project was co-ordinated by Landcare Australia and involved the Australian Trust for Conservation Volunteers and Greening Australia. Funding was provided by National Heritage Trust and seven Olympic sponsors.

Lessons

formal information, participation or consultation processes helped to build support for the event and for its organisers' aims.

■ As a result of the formal and informal processes, strong networks developed around the Sydney Olympics that have the potential for helping to deliver better environmental outcomes into the future.

■ Normal planning and development processes, with community rights for court appeal or a commission of inquiry and environmental impact statements were varied (by removal of court/inquiry rights and replacement of EIS with statements of environmental effects) to meet uniquely tight deadlines. This affected community confidence in the process and should not be repeated in other situations.

Merchandising

Environmental Guidelines

- *appropriate environmental standards for manufacture, use and disposal of all official merchandise*
- *avoiding unnecessary waste generated by products with a short useful life or unnecessary packaging*
- *not using materials from threatened environments or species*
- *maximum use of recyclable and recycled materials*
- *promotional clothing being made from natural fibres wherever possible*
- *every company tendering for a merchandise contract will be required to provide environmental information in its submission in relation to manufacture, use and disposal*
- *the design and packaging of products will embody an educational message about the environment wherever possible*

Achievements

- Some merchandising involved reduced or environmentally improved packaging.
- Innovative colour-coded recycling and waste management messages on take away food. and drink packaging.

Lessons

■ Despite significant mention in the Environmental Guidelines and in the tendering documents there was widespread failure to produce environmentally responsible merchandising, for example PVC childrens toys and mugs, paper components and many other items. Neither the merchandising industry nor the client had the capacity or motivation to upgrade performance. The client's budget did not include provision for specific controls on this aspect of merchandising. Such performance is a very new area; often involved small firms who find it difficult to change and is further complicated by contracting to overseas firms.

■ Ecodesign of products and existing standards such as ISO 14000 are well established areas but have yet to be translated into action. This may require much greater enforceability of environmental requirements on contractors; clear recognition and appreciation of the green market for such goods; education of the marketing sector; and improved monitoring of the performance of marketing divisions by senior management with linkages to waste management.

■ Government and industry funding or sponsorship of major sporting and other events could be accompanied by a requirement for environmentally responsible merchandising.

Event waste management

Environmental Guidelines

- *tickets printed on recycled and recyclable paper, using non-toxic ink*
- *minimal packaging of foodstuffs subject to appropriate health standards being maintained*
- *use of recyclable or reusable packaging*
- *minimising waste and maximising recycling*
- *education of athletes, officials, media and spectators on correct waste disposal*
- *best practice waste reduction and avoidance, with performance criteria to apply to services, materials and appliances*
- *the co-operation of sponsors and service providers in developing responsible corporate purchasing and waste management policies*
- *best practice recycling of waste including use of colour-coded waste recycling stations, use of compost from organic waste in landscaping, use of recycled paper, and public education on waste minimisation*
- *the design and packaging of products will embody an educational message about the environment wherever possible*
- *recyclable packaging will be suitably identified to facilitate separation from other recyclables and assist ease of collection*
- *recycling bins for waste will be supplied at all Games venues, supported by education programs on proper disposal methods*
- *information will be carried electronically where possible to reduce unnecessary use of paper, supplemented by effective paper recycling procedures*
- *special procedures will be adopted for the disposal or recycling of chemicals film and other photographic materials*

Achievements

- Development of integrated waste management strategy with an 80% diversion from landfill target (a useful model for future events and public places subject to post-Olympic analysis).
- Liaison with sponsors has led to improved packaging practices (e.g., minimising polystyrene and Visy cardboard containers and furniture) as has work with suppliers (e.g., cornstarch plates and cutlery).
- Introduction of colour coded waste separation bins at venues and public spaces consistent with

Lessons

- Integration of waste management and catering responsibilities has proven a key innovation that advances waste minimisation and recycling.
- Educational material on ticketing, merchandise and programs about responsible waste management should be actively pursued at an early stage and reinforced at the event.
- The standardised system for public event waste management throughout the metropolitan area would, if broadly adopted by councils, and major event and public place

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Achievements

the guidelines being introduced by Sydney councils, and in Victoria and Queensland.

Lessons

managers, improve compliance as people become familiar with the system.

- Electronic booking can help overcome the need for massive mailouts (for instance a significant portion of the Olympic ticketing book was wasted).

- Education and involvement in publicity of athletes, officials, media is likely to be an important education tool.

- A detailed report on the implementation of the system at the Games should be completed as soon as possible in order to facilitate widespread adoption of the system.

Transport

Environmental Guidelines

- *location of games facilities close to public transport systems*
- *provision of satellite car-parking sites to facilitate use of public transport*
- *provision of cycle ways and pedestrian walkways at Olympic sites*
- *the successful implementation of transport strategies to ensure efficient movement of the Olympic family and spectators*
- *selection of specific Olympic transport systems which minimise energy use and reduce pollution*
- *urban consolidation and planning strategies supported by improved public transport to reduce car dependence and associated air pollution*
- *introduction of low pollution transport fuels such as electricity and gas*
- *ticketing systems integrating event admission with public transport*
- *public transport will be the only means by which spectators will be able to directly access events at major Olympic sites*
- *special concession transport tickets will be available allowing spectators to use all forms of public transport for a defined period sale of admission tickets and public transport tickets will be at the same outlets*

Achievements

- New public transport infrastructure has been put in place at Homebush Bay making the new suburb of Newington, as well as the parklands and sporting venues, more sustainable in terms of their accessibility.
- The Olympics have proven that hundreds of thousands of people can be transported by public transport to the site safely and efficiently.
- Integrated ticketing for events has been shown to be effective and encourage public transport use.
- Park and ride facilities have been provided.
- A ceiling was placed on car parking spaces at Olympic Park and fees helped deter excessive demand. The control on car parking greatly improved the urban design qualities of the site.

Lessons

- A powerful single transport authority was established to overcome territorial divisions between public transport types (rail, bus etc). This proved effective and could be applied in other situations.
- The Olympic vehicle fleet is conventionally fuelled and does not meet the Guidelines. This came about because of the failure to inform the privatised vehicle purchasing arm, of the Environmental Guidelines and of the sponsor (Holden) to respond proactively. Efforts to avoid such problems in future, should be made.
- Despite preconceptions that the public is not favourably disposed towards public transport, the Olympic system has shown otherwise. The features that helped achieve this should be replicated.

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Achievements

- 300 or more compressed natural gas buses will be used (a small portion of the total bus fleet), but of sufficient size to support permanent fuelling infrastructure.
- Permanent cycleways and walkways at Homebush Bay.

Lessons

- The configuration of Olympic Park Station allows efficient and rapid departure and embarkation of passengers and should be further used as the system is upgraded or expanded.

Sponsors

Environmental Guidelines

The Summer Olympic Games should be a showcase for high environmental standards. They generate an enormous amount of economic activity and offer unparalleled opportunities for sponsors and suppliers to take a leading role in environmental protection through innovative marketing strategies and actions. By adherence to responsible criteria for processes, products and packaging, industry can share environmental responsibility and take credit for investing in ecologically sustainable development.

Achievements

- Environmental criteria were included in submission guidelines for prospective sponsors.
- Olympic Sponsors Environment Network created in 1998 as a forum for sponsors to discuss issues, share ideas and information, develop joint initiatives.
- Four businesses with international and complementary experience in waste management were sponsors and developed the Sydney 2000 Integrated Waste Management Solution.
- New products, such as food packaging, beverage containers and other products.
- Use and showcasing of new technology, including refrigeration (several significant multinational companies used the Olympics to announce the global phase-out of greenhouse polluting HFCs) and low emission fuels.
- Support for community initiatives, including seven sponsors supporting Olympic Landcare, and another sponsor supporting Greener Sydney 2000.

Lessons

- Sponsors are critical players in the planning and staging of events, through the provision of products and services, and they need to be engaged early about environmental objectives, preferably prior to formal negotiation of agreements. Final agreements should strive for detailed undertakings and action plans by sponsors.
- Introduction of environmental goals for sponsors can initiate a dialogue between the corporate sector, the community, environment groups and the government.
- Large events represent big showcasing opportunities for sustainable technologies and services and opportunities for announcement of major sustainable development policies.
- Knowledge about and the capability to incorporate environmental considerations into new guidelines for products and processes, varies considerably between and within industries. With large global companies it is essential to engage both the national and international offices.
- Sponsors should be encouraged to highlight related environmental messages in their advertising. There should be a form of recognition for outstanding sponsor activity that involves non-government group assessment.