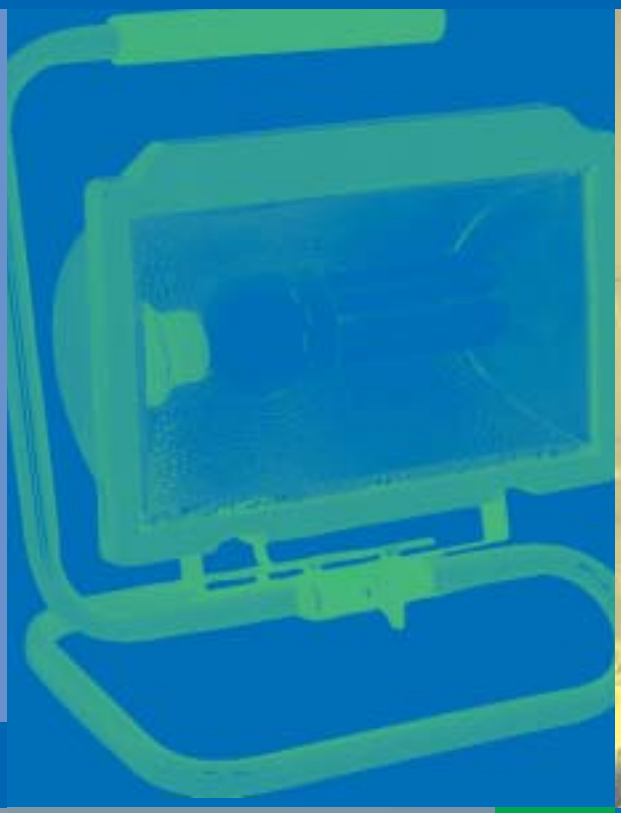
National Appliance & Equipment Energy Efficiency Program

Greenlight Australia

A strategy for improving the efficiency of lighting in Australia 2005–2015

An initiative of the Ministerial Council on Energy forming part of the National Framework on Energy Efficiency



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Australian Government

Department of the Environment and Heritage
Australian Greenhouse Office

The Greenlight Australia Strategy is available online at www.energyrating.gov.au

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Foreword

Lighting generates almost 25 million tonnes of greenhouse emissions each year in Australia. It is responsible for about a third of the greenhouse emissions from the commercial sector, and is a significant contributor to both residential and industrial sector emissions. Lighting also costs the community over $2 billion in electricity each year.

These startling statistics illustrate clearly why improving the efficiency with which Australians use energy is a priority of the Ministerial Council on Energy (MCE).

Greenlight Australia, a ten-year strategy to reduce the energy consumption from lighting, is part of a package of measures being implemented under the National Framework for Energy Efficiency and is the outcome of consultations with stakeholders in both Australia and New Zealand.

These extensive consultations established the lighting technologies and market sectors to be included in the strategy, the voluntary and mandatory measures that will be used; and priority areas and products targeted for action in the first three years.

Greenlight Australia has the support of both industry and government. The strategy sets out immediate and future priorities for consideration of specific lighting products. I am especially pleased that the Lighting Council of Australia supports the strategy, and has suggested a target of 20% reduction in energy usage over business as usual over the course of the strategy.

On behalf of the Ministerial Council on Energy, it is a pleasure to release Australia's long-term strategy to improve the energy efficiency of lighting.

The Hon Ian Macfarlane MP
Chair
Ministerial Council on Energy

11 November 2004

The Hon Ian Macfarlane MP
Minister for Industry, Tourism and Resources
Parliament House
CANBERRA ACT 2600

Dear Minister

Lighting Council Australia supports in principle Greenlight Australia – an initiative of the National Appliance and Equipment Energy Efficiency Program - believing it has the potential to significantly improve the efficiency of lighting in this country. Based on Lighting Council's understanding of Greenlight Australia, we estimate this energy saving to be in the order of 20 per cent.

Lighting Council Australia looks forward to working with Australian governments in implementing Greenlight Australia.

Yours sincerely

Russell Loane
CHAIRMAN

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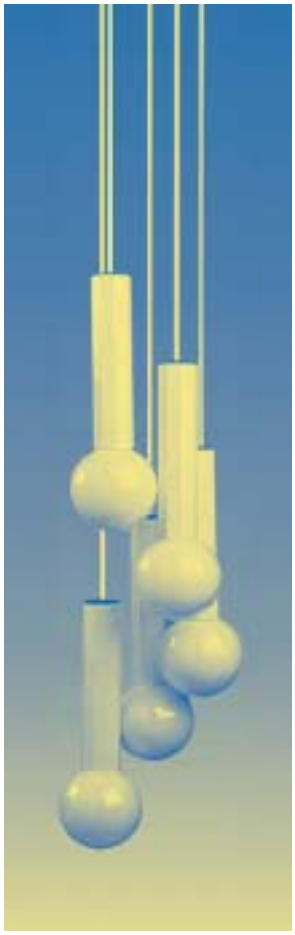


Acknowledgments

This Strategy was prepared for the National Appliance and Equipment Energy Efficiency Program (NAEEEP). It reflects the position of the Australian Ministerial Council on Energy, with New Zealand officials also examining the plan for possible adoption in that country.

The Strategy was developed by Mark Ellis & Associates with Steven Beletich Associates and input from Russell Kenery + Associates. The authors would like to thank Lighting Council Australia for its support and assistance in this project.

1. Background

The Greenlight Australia Strategy is released by the Ministerial Council on Energy. It represents the agreed Government plan of all jurisdictions for improving the efficiency of lighting products and reducing greenhouse gas emissions from lighting.

Investigating policy options for lighting systems and street lighting is part of the 2002-04 work plan of the Ministerial Council on Energy.

During the consultation phase for the Greenlight Australia Discussion Paper (NAEEEC 2004), eleven formal submissions were received from a range of organisations including Australian and New Zealand Government agencies, local councils, Standards Australia, the Lighting Councils of both Australia and New Zealand, a number of State Government agencies and non government organisations. All submissions supported the projects outlined in the Discussion Paper. A number of useful suggestions were also made which will assist in the detailed development of individual projects.

2. Strategy objectives

Strategy

The objective of Greenlight Australia is to provide a coordinated, strategic framework for reducing energy used by lighting in Australia over the next ten years, 2005-2015. The Strategy:

1 Reiterates the ten-year energy reduction target proposed by the Australian lighting industry.

2 Identifies the lighting technologies and market sectors to be targeted over the course of the Strategy.

3 Describes a number of coordinated mandatory and voluntary measures that Government and industry will adopt to reduce lighting energy consumption.

4 Outlines the specific projects to be introduced in the first three year workplan and commits all parties to continue to develop detailed three year workplans over the course of the Strategy.

5 Outlines a number of projects for introduction in later years of the Strategy.

The Greenlight Australia Strategy will be funded under the NAEEEP, drawing on resources provided by State, Territory, and Australian Governments and potentially the New Zealand Government. It provides a solid framework which will allow the Australian lighting industry and the broader community to realise the economic and environmental benefits of energy efficient lighting. It also provides an opportunity to align requirements with those of our major trading partners, many of whom are implementing similar policies. (For example the USA, China and Europe).

Discussion Paper

The Greenlight Australia Discussion Paper summarises known overseas projects and discusses a range of background issues including:

- Scope of Greenlight Australia
- Barriers and market failures
- Types of measures for reducing energy consumption
- Current lighting activities
- Overseas projects
- Lighting technology opportunities
- Prioritisation of potential projects

The Discussion Paper is available at: www.energyrating.gov.au/library/details200408-greenlight.html

3. Greenhouse gas emissions from lighting

Australia

All Australian Governments are committed to reducing Australia's greenhouse gas emissions. In 2002, Australia emitted an estimated total of 550 million tonnes of CO2e (NGGI 2002). As shown in Figure 1, electricity consumption represents one third of Australia's greenhouse gas emissions.

Lighting was responsible for the emission of an estimated 25 Mt of CO2e in 2002, which represents almost 5% of Australia's total greenhouse gas emissions.

New Zealand

In 2002 New Zealand emitted a gross total of 75 Mt CO2e, with land use change and forestry sinks reducing this figure to 51 Mt CO2e (NZGGI 2002). As shown in Figure 2, electricity consumption represents a relatively small proportion of New Zealand's gross emissions (<9%). This is partly because 60 to 65% of New Zealand's electricity supply is provided by hydro power (NZGGI 2002).

In New Zealand, lighting currently consumes around 3 TWh of electricity per annum (EECA 2004), resulting in greenhouse gas emissions of around 1.8 Mt of CO2e (based on electricity emissions factor presented in NZCCO 2003). Thus lighting represents around 2.4% of New Zealand's total gross greenhouse gas emissions.

Figure 1 Australia's greenhouse gas emissions in 2002 (NGGI 2002)

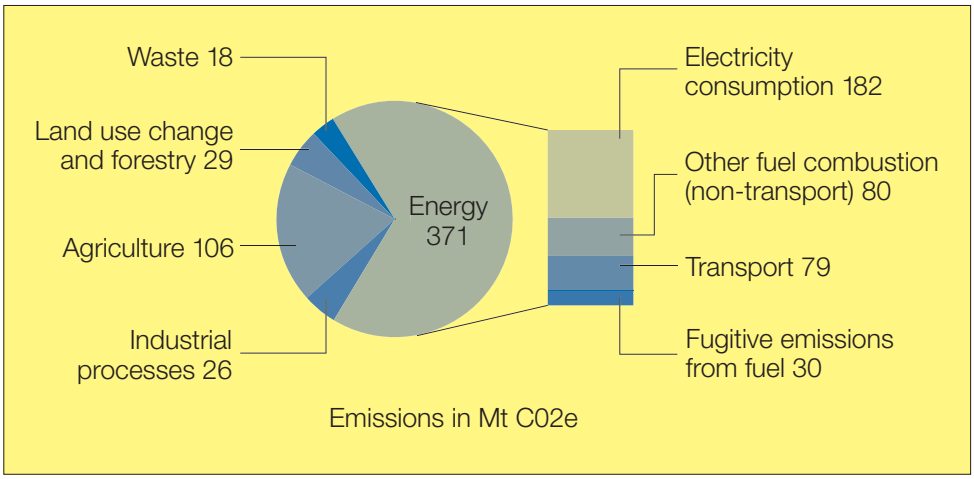
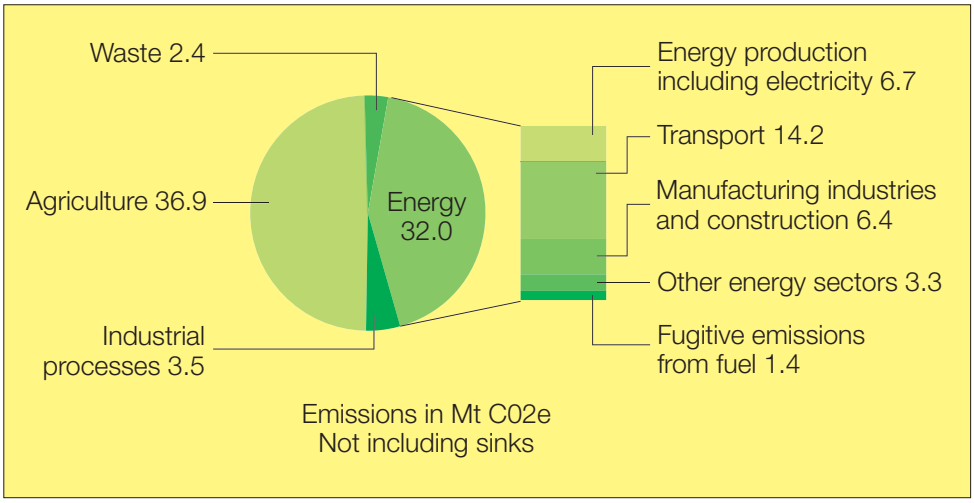


Figure 2 New Zealand's gross greenhouse gas emissions in 2002 (NZGGI 2002)



Emissions Reductions

There is significant technical potential to reduce greenhouse gas emissions from lighting in almost all market sectors. In the majority of lighting installations, efficient lighting technologies are readily available which, if adopted, would significantly reduce energy consumption. However a number of market failures exist which currently limit the uptake of these technologies as well as preventing good lighting design practice. The Greenlight Australia Discussion Paper summarises these failures and assesses the available technological opportunities.

Given the scale of greenhouse gas emissions from lighting in both Australia and New Zealand, and the potential of readily available technology to reduce energy consumption, lighting is targeted within the NAEEEP.

Australian Governments and the Australian lighting industry are committed to a 20% reduction in lighting energy consumption by 2015. This target is illustrated in Figure 3 and discussed in detail in section 6.

Figure 3 Forecast lighting energy consumption

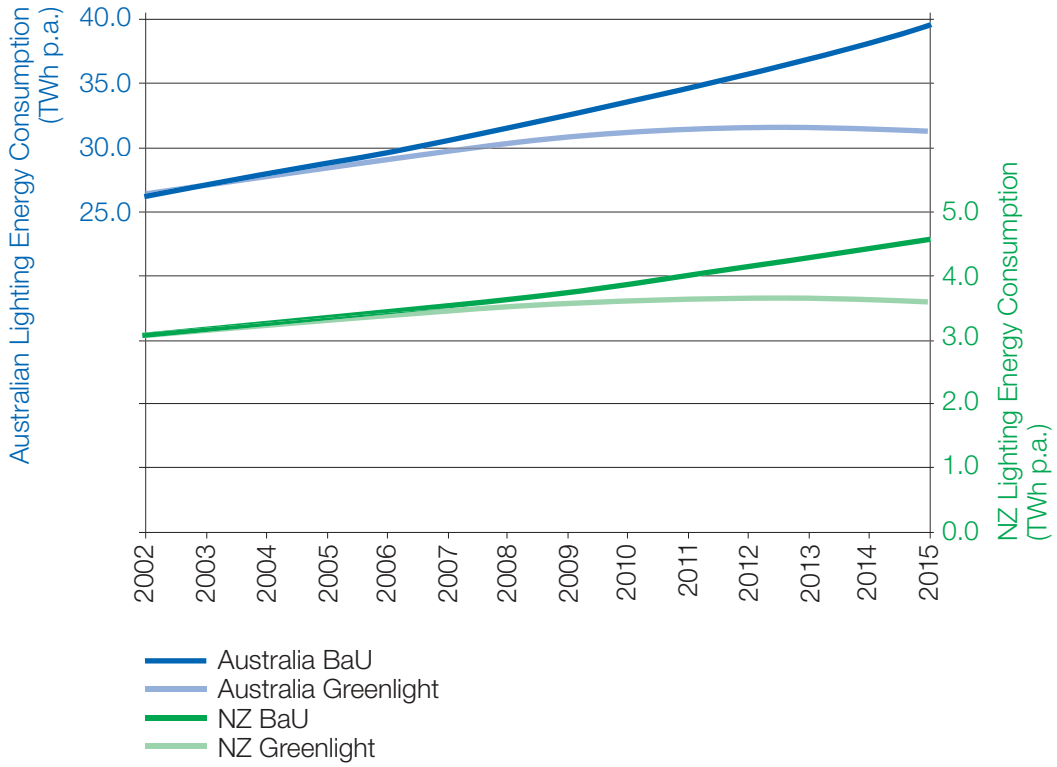


Figure 3 also includes projections for New Zealand, based on similar assumptions and a 20% reduction target.

4. Past actions

Australian Government initiatives are coordinated nationally through the NAEEEP, which is operated by officials from Australian Federal, State and Territory Government agencies and New Zealand.

Under the National Greenhouse Strategy (NGS 1998), the NAEEEP targets the energy efficiency of consumer appliances as well as industrial and commercial equipment. Any type of consumer appliance, industrial or commercial equipment is eligible to be included in the NAEEEP, provided it is likely to contribute to growth in energy demand or greenhouse gas emissions. The following criteria are also used to determine which specific technologies are eligible for inclusion in the NAEEEP:

- Potential for national energy savings
- Potential saving of greenhouse gas emissions
- Environmental impact of fuel type
- Opportunity to influence purchase
- Market barriers
- Access to accepted energy testing or measurement procedures
- Administrative complexity of projects

Whilst there are no fixed numeric targets for the NAEEEP, the philosophy underlying the Program is that Australia will at least match world's best regulatory practice, or lead the world in regulatory requirements where such action is in Australia's best economic interests and capacity.

The main tools of the NAEEEP have been mandatory regulatory measures, primarily minimum energy performance standards (MEPS) and energy efficiency labelling. The Program relies on State and Territory Government legislation and relevant technical standards to create the mandatory performance requirements for each product type.

In addition to mandatory measures, complementary voluntary measures have also been implemented, including endorsement labelling (eg Top Energy Saver Award), industry training and promotion of efficient products.

There were three NAEEEP projects operating in the lighting sector prior to this Strategy:

- MEPS for linear fluorescent lamps
- MEPS for linear fluorescent ballasts
- Best practice and training for lighting professionals

Greenlight Australia brings together these existing projects and a range of new initiatives in a coherent long term plan.

5. Australia's ten year lighting strategy

Greenlight Australia will improve the efficiency of all lighting equipment (for example lamps, ballasts, transformers and luminaires) in the residential, commercial, industrial and public lighting sectors. The Strategy also broadly considers lighting controls (such as dimmers, timers, etc.) and lighting design.

For reasons outlined in the Discussion Paper, certain niche sectors are not covered by the Strategy, such as vehicular lighting, equipment indication and pilot lighting, and special use lighting found in medical, horticultural and entertainment applications.

Table 1 outlines the guiding principles of Greenlight Australia.

Table 1 - Guiding Principles of Greenlight Australia

Guiding Principles	
• **Coverage.** Greenlight Australia may examine any lighting technology for potential inclusion in the Strategy. Inclusion is subject to community consultation, economic analyses, completion of national regulatory impact assessment processes and subsequent Ministerial Council decision-making. • **Governance.** A high level steering committee comprising representatives from the lighting industry, Australian and New Zealand Governments, and State and Territory Governments will be responsible for managing the implementation of the Greenlight Australia Strategy. • **Flexibility.** The Strategy is dynamic and capable of modification if required to ensure its effectiveness. In order to cope with changing priorities and market conditions, a detailed three-year workplan will be developed which outlines immediate activities within the framework of the Greenlight Australia Strategy. The first such workplan dealing with activities over the period 2005/6 to 2007/8 will be released in early 2005. • **Inclusiveness.** In formulating projects and plans, the Strategy will involve all necessary stakeholders from Government, industry and the wider community.	• **Transparency.** The analysis and reasoning behind project decisions will be made available through annual or project-specific reports. • **International competitiveness.** The Strategy will monitor the initiatives of our major trading partners (in particular China and Europe which represent our largest suppliers of lighting products) and will continuously improve projects and facilitate trade. • **Effectiveness.** Greenlight Australia will implement realistic projects and efficiency levels which will achieve significant and cost-effective energy savings. • **Stringency.** Regulatory projects will match world's best regulatory practice and, where economically feasible and viable, will lead the world in product regulation. • **Measurability.** The impact of all projects will be monitored and assessed in relation to the Greenlight Australia reduction target. An evaluation regime will be developed and implemented with the assistance of Lighting Council Australia. • **Reporting.** The progress of Greenlight Australia will be reported in annual reports published by NAEEEC, commencing in 2005.

6. Lighting industry target

Australian Governments have adopted Lighting Council Australia's suggestion of setting a target for energy reduction of 20%. This target represents a 20% saving in annual lighting energy consumption, by the year 2015, when compared to the business as usual (BaU) case for 2015.

Australian lighting energy consumption is predicted to increase by 3.2% pa between 2000 and 2010 (GWA 2001). This figure has also been used to forecast BaU lighting energy consumption over the Greenlight Australia period, 2005-2015, for both Australia and New Zealand.

The resultant BaU lighting energy consumption in 2015 is 39 TWh for Australia and 4.5 TWh for New Zealand. A 20% reduction in 2015 BaU emissions will result in electricity savings of 7.8 and 0.9 TWh pa respectively for Australia and New Zealand.

This will save the combined Australian and New Zealand economies more than half a billion Australian dollars annually by 2015.

Greenhouse gas savings in the order of 6.7 Mt CO2e for Australia and 0.5 Mt CO2e for New Zealand will result.

7. Measures to reduce energy consumption from lighting

The Greenlight Australia Discussion Paper describes the range of policy measures which will be used to achieve the goals of the Greenlight Australia Strategy:

Mandatory measures

- Minimum energy performance standards (MEPS)
- Energy efficiency labelling / information disclosure

Mandatory measures such as MEPS and labelling are well suited to the resources available to NAEEEC, and can effectively address many of the market barriers to efficient lighting technologies. Since the early 1990's they have been shown to deliver cost-effective, measurable results and hence they form the backbone of many NAEEEP activities.

MEPS in particular create a level playing field amongst competitors, based on an accepted, reasonable minimum performance level. MEPS can also avoid any 'slippage' in energy performance, for example though low cost, inefficient products gaining market share.

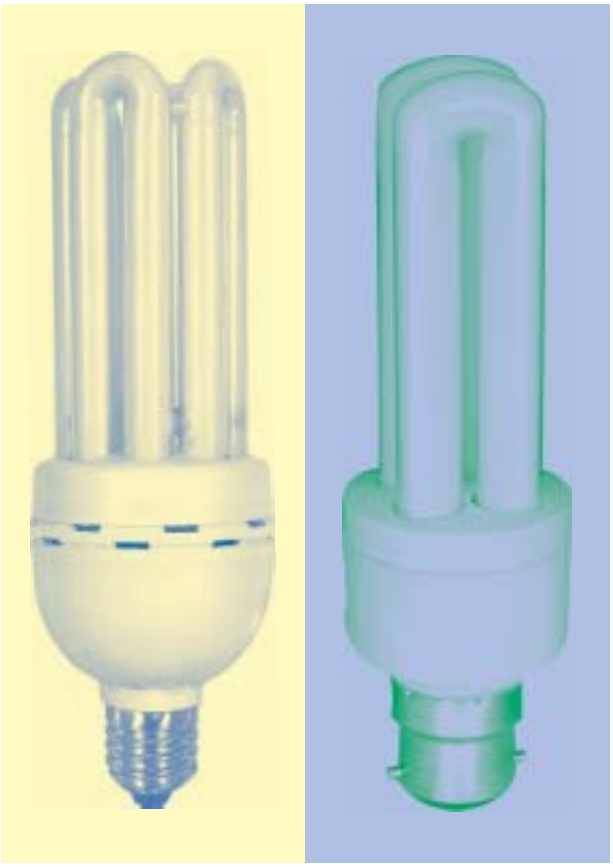
Energy labelling compliments MEPS by providing a marketing tool to promote more efficient products. By building on the brand awareness of the existing whitegood labelling scheme in Australia, similar labels for other products are expected to be highly effective.

Voluntary measures

- Information provision
- Database of high efficiency products
- Education and training
- Demonstration projects
- Bulk procurement / product development projects

Voluntary measures provide less certain results and hence are not as frequently utilised as mandatory measures. Nonetheless they are included in Greenlight Australia. It should also be noted that MEPS and labelling can also be implemented on a voluntary basis.

A flow chart for project processes is included in Appendix 2



8. High priorities

Table 2 outlines the projects for which development will commence in the period 2005/6 - 2007/8. These projects rely on current technologies and the measures available to NAEEEC, and have been prioritised according to their potential for, and certainty of, energy reduction outcomes.

Table 2 - High priorities 2005/6 to 2007/8

Project	Commence Project Development		
	2005/6	2006/7	2007/8
Existing MEPS Projects			
Linear fluorescent lamps (phase 1)			
Linear fluorescent ballasts (phase 1)*			
New MEPS Projects			
Halogen transformers*	X		
New buildings (building code of Australia)	X		
CFLs*	X		
Public amenity lighting	X		
Luminaires*		X	
Halogen Lamps (including reflector lamps)		X	
HPS lamps			X
HID ballasts			X
New Non-MEPS Projects			
High efficiency product database	X		
Education and training for specifiers	X	X	X

**These MEPS projects include some form of comparative or endorsement labelling.*

A three-year workplan will be released in early 2005 which details the specific implementation activities for the projects listed in Table 2.

9. Future priorities

Table 3 lists the projects for development in 2008-2015. The second three year workplan will take into account the state of the lighting market and the progress of the Greenlight Australia Strategy at that time.

Table 3 - Future priorities

Project
MEPS Projects
Linear fluorescent lamps (phase 2)
Linear fluorescent ballasts (phase 2)
Traffic signals (also consider bulk procurement)
Emergency egress and exit lighting (also consider bulk procurement)
Photoelectric cells
GLS lamps
Non-MEPS Projects
Comparative lamp labelling
Bulk procurement of dedicated CFL luminaires
Bulk procurement of triphosphor & CFL street lighting packages
Bulk procurement of efficient GLS lamps

References

EECA 2004, New Zealand Energy Efficiency and Conservation Authority, Energy End Use Database, accessed on 5/11/04 at www.eeca.govt.nz/enduse/endusesearch.aspx.

GWA 2001, Regulatory Impact Statement, Minimum Energy Performance Standards and Alternative Strategies for Fluorescent Lamp Ballasts, for the Australian Greenhouse Office, George Wilkenfeld and Associates Pty Ltd, August 2001.

NAEEEC 2004, Greenlight Australia - Discussion Paper for Improving the Efficiency of Lighting in Australia 2005-2015, National Appliance and Equipment Energy Efficiency Committee, September 2004.

NGGI 2002, National Greenhouse Gas Inventory 2002, Australian Greenhouse Office, 2004.

NGS 1998, National Greenhouse Strategy, Commonwealth of Australia.

NZCCO 2003, An Electricity Emission Factor, A background document by Concept Consulting, commissioned by New Zealand Climate Change Office, August 2003.

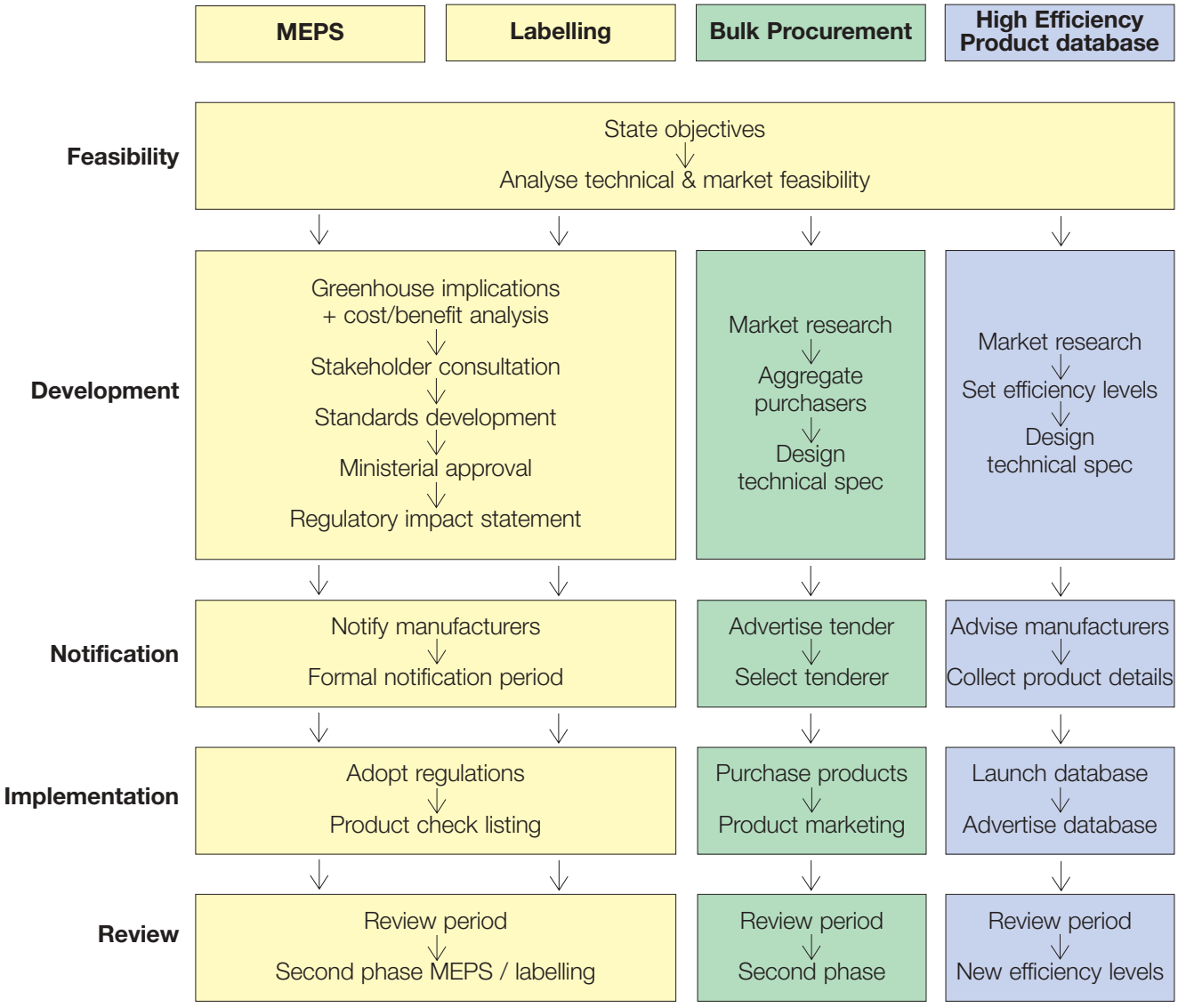
NZGGI 2002, New Zealand's Greenhouse Gas Inventory 1990-2002, The National Inventory Report and Common Reporting Format Tables, New Zealand Climate Change Office, April 2004.

Appendix 1 - Abbreviations

BaU	Business as usual
CFL	Compact fluorescent lamp
CO2e	Carbon dioxide equivalent units
GLS	General lighting service
HID	High intensity discharge
HPS	High pressure sodium
MEPS	Minimum energy performance standards
Mt	Megatonne (ie million tonnes)
NAEEEC	National Appliance and Equipment Energy Efficiency Committee
NAEEEP	National Appliance and Equipment Energy Efficiency Program
TWh	Terawatt hours (ie 1,000,000,000,000 watt-hours)

Appendix 2 - Project processes

Flow chart - processes for implementing common project types



Ministerial Council on Energy

The Ministerial Council on Energy consists of the following members:

The Hon Ian Macfarlane MP
Minister for Industry, Tourism and Resources
Commonwealth
(Chairman, Ministerial Council on Energy)

The Hon John Mickel MP
Minister for Energy
Queensland

The Hon Frank Sartor MP
Minister for Energy and Utilities
New South Wales

The Hon Theo Theophanous MP
Minister for Energy Industries
Victoria

The Hon Eric Ripper MLA
Deputy Premier; Treasurer
Minister for Energy
Western Australia

The Hon Patrick Conlon MP
Minister for Energy
South Australia

The Hon Kon Vatskalis MLA
Minister for Mines and Energy
Northern Territory

Mr Jon Stanhope MLA
Chief Minister
ACT Government
Australian Capital Territory

The Hon Bryan Green MHA
Minister for Infrastructure, Energy and Resources
Tasmania

National Appliance and Equipment Energy Efficiency Committee

The National Appliance and Equipment Energy Efficiency Committee of the Ministerial Council on Energy consists of the following member organisations:

Australian Greenhouse Office,
Department of the Environment and Heritage

NSW Department of Energy, Utilities and Sustainability

Office of the Chief Electrical Inspector Victoria

Sustainable Energy Authority Victoria

Electrical Safety Office,
Queensland Department of Industrial Relations

Queensland Department of Energy

Western Australian Department of Consumer and Employment Protection

Western Australian Sustainable Energy Development Office

South Australian Office of the Technical Regulator

Tasmanian Office of Energy

ACT Department of Treasury

Northern Territory Department of Business, Industry and Resource Development

New Zealand Energy Efficiency and Conservation Authority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