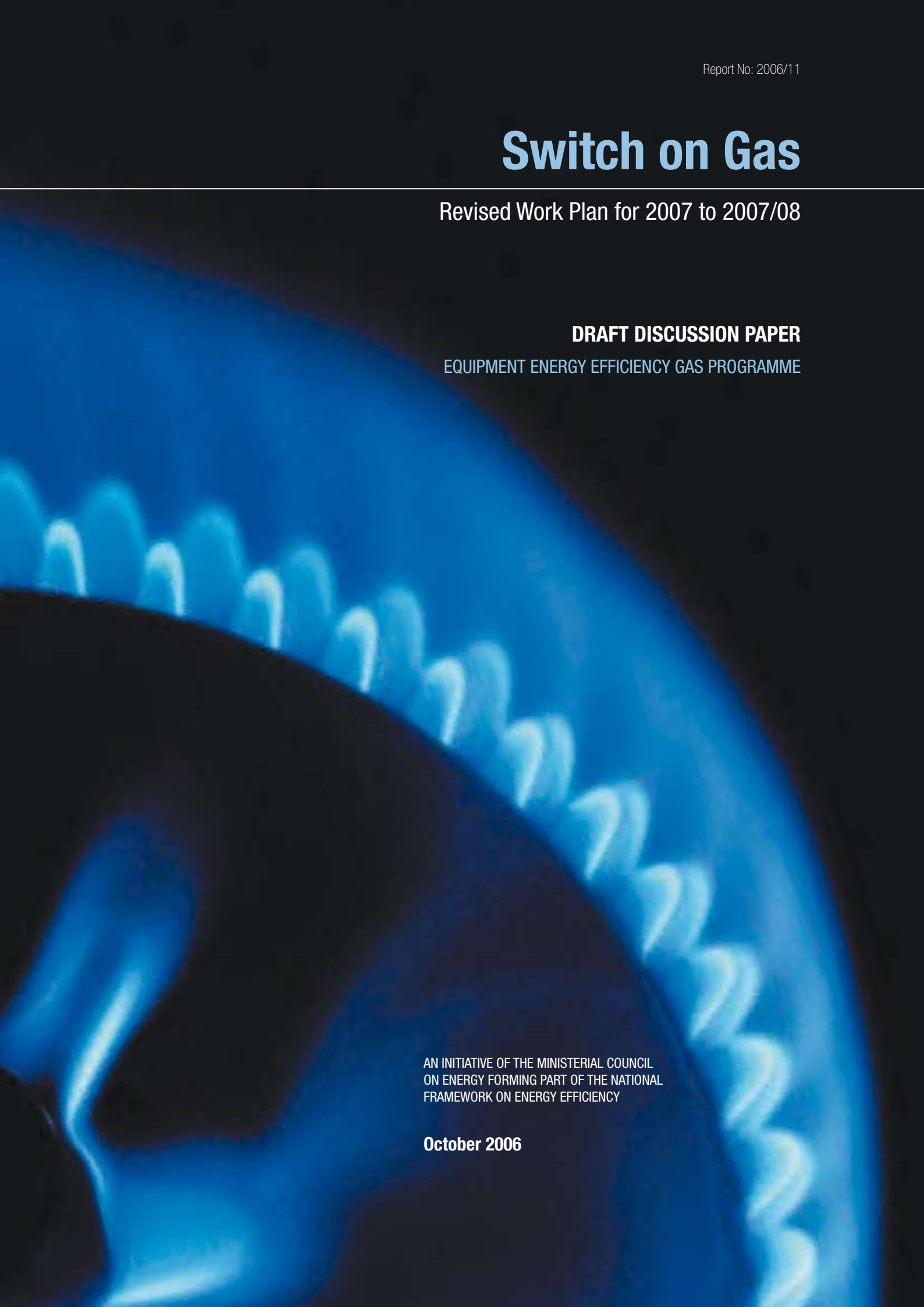
Report No: 2006/11

Switch on Gas

Revised Work Plan for 2007 to 2007/08

DRAFT DISCUSSION PAPER

EQUIPMENT ENERGY EFFICIENCY GAS PROGRAMME



AN INITIATIVE OF THE MINISTERIAL COUNCIL
ON ENERGY FORMING PART OF THE NATIONAL
FRAMEWORK ON ENERGY EFFICIENCY

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Any comments on this Draft Workplan should be submitted by 1 December 2006.

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Abbreviations

AGA	Australian Gas Association
AGO	Australian Greenhouse Office
DEH	Department of the Environment and Heritage
E3	Equipment Energy Efficiency programme
E3 Gas	Equipment Energy Efficiency Gas programme
EEWG	Energy Efficiency Working Group
GAMAA	Gas Appliance Manufacturers Association of Australia
MCE	Ministerial Council on Energy
MEPS	Minimum Energy Performance Standards
NFEE	National Framework for Energy Efficiency
BaU	Business as usual
Mt	Megatonne (i.e million tonnes)
TTMRA	Trans-Tasman Mutual Recognition Agreement
EECA	Energy Efficiency and Conservation Authority
GSSB	Gas Standards Sector Board
GTRC	Gas Technical Regulators Committee
PC	Productivity Commission

Australian Government
Department of the Environment and Heritage
Australian Greenhouse Office

A copy of this report can be obtained from www.energyrating.gov.au

Contents

1 Introduction

The *Switch on Gas* strategy, endorsed by the Ministerial Council on Energy and published in December 2004 was a blueprint jointly endorsed by government and industry outlining the actions to enhance energy efficiency of gas appliances and equipment over the next 10 years. The launch of the strategy committed:

- Governments to incorporating gas end-use product efficiency into a regulatory environment similar to that which already exists for electrical products; and
- Industry to providing world-class products within a legislative scheme for the energy efficiency of gas products, with formal responsibilities stipulated in state and territory legislation.

Switch on Gas sets the strategic direction for what has come to be known as the Equipment Energy Efficiency Gas Programme (E3 Gas), a distinct element within the broader Equipment Energy Efficiency Programme (E3). The energy efficiency of electrical and gas products is now addressed by the one Trans-Tasman scheme covering all Australian jurisdictions and New Zealand. The aim of the Strategy is to improve the efficiency of, and therefore to reduce greenhouse gas emissions from gas appliances and equipment.

The first Work Plan under the *Switch on Gas* strategy was published in April 2005 to cover the period 2005/06 to 2007/08. Key elements of this work plan which have been progressed in the first year are:

- The formation of the E3 Gas Committee, comprising representatives from the Commonwealth, State & Territory and New Zealand governments to coordinate the implementation of the programme (see Appendix 3);
- A testing programme for gas water heaters to underpin the development of new test standards and new MEPS and labelling requirements;
- Market research on consumer awareness and the influence of gas energy rating labels (as part of wider market research that also included electrical labelling);
- Investigation of options for implementing a nationally consistent legislative scheme for regulating the energy efficiency of gas appliances and equipment.

This Work Plan, which is an updated version, contains revised programme elements for the final 18 months of the original 3 year work programme. The update is as consequence of;

- The administrative and regulatory basis of the gas appliance efficiency programme;
- New information about gas appliance technology and testing;
- Gas consumer response to energy labels.

This revised document is supported and approved by the Ministerial Council on Energy and by all relevant jurisdictions in Australia and New Zealand.

2 Change in Focus

The initial 3-year work plan covered the period 2005/6 to 2007/8 and was developed on the basis that a nationally consistent legislative framework for gas appliances, similar to the model used to regulate electrical products, would be agreed and put in place by 2008. However, subsequent legal advice calls into question the existing legislative capacity of some jurisdictions to mandate consistent efficiency requirements for gas equipment and appliances.

Consequently, the MCE decision to incorporate gas appliance efficiency into a regulatory environment is likely to take more time to implement than the original work plan proposed.

Work has commenced to address this important issue. The Energy Efficiency Working Group (E2WG), which is a policy development forum reporting to the Ministerial Council on Energy, has established a task force to examine options to address this situation with the support of the Equipment Energy Efficiency (E3) Gas Committee. The task force is currently collating information about existing legal authorities within each jurisdiction and in 2007/08 will be seeking agreement to a nationally consistent regulatory framework.

Energy Efficiency regulators have agreed to explore other options to support the existing industry-sponsored scheme while this analysis is undertaken. In 2005, they commissioned studies to examine:

- the effectiveness of the present voluntary gas appliance energy labelling regime; and
- the repeatability and reproducibility of the energy measurements in the existing gas water heater standard.

Early in 2005, the Australian Greenhouse Office commissioned three NATA accredited test laboratories to perform a round-robin series of tests on gas water heater efficiency. These tests aimed to assess the accuracy of the existing water heater test procedure, AS 4552. The tests also undertook a range of comparative and development tests to guide the development of this test procedure, particularly its suitability as the basis for a regulatory programme for gas water heaters. A copy of the public report (2006/12) can be found at www.energyrating.gov.au in the electronic library.

Concurrently, the Equipment Energy Efficiency Committee commissioned a nation-wide study into consumer awareness and use of existing gas appliance label (focussing on water and space heaters). A copy of this public report (2006/08) can also be found at www.energyrating.gov.au in the electronic library.

These studies have proved very useful in revising the direction of this work plan.

3 Making the Most of the Existing System

There is significant benefit for consumers in accurate comparative energy labelling information about gas products. There is also significant benefit for all stakeholders in having the scheme underpinned by an accurate testing method.

The Australian Gas Association (AGA) and its members are to be commended for their past leadership in the energy labelling area. However, during the preparatory phase of the development of a replacement regulatory system, energy efficiency regulators should take a stronger role. The outcome of the exploratory projects reported in section 2 has highlighted the need for stronger regulatory oversight.

The outcome of the testing round-robin revealed significant variations in measured results raising serious questions about the repeatability and reproducibility of some elements of the current test method for gas water heaters. Energy Efficiency regulators believe the current water heater test, in its present form, is not suitable for a regulatory scheme.

Also, the outcome of the labelling review found that the gas label, which has been in place since the late 1980's, failed to spark any significant level of recognition amongst consumers. For example, the study found that in Victoria, which has the highest penetration of gas usage, the recognition of the label was actually falling.

These investigations prompted regulators and industry to agree new work items for the E3 gas programme. The work programme for the next 18 months will maximise opportunities to increase the energy efficiency of gas appliances within the constraints of the existing industry based scheme, notably:

- Improving the current Australian/New Zealand energy test methods and performance standards for nominated products (Appendix 1);
- Comparing and contrasting relevant international testing methodologies and product standards for adoption or at least identifying elements that could be incorporated into Australian/ New Zealand standards;
- Researching gas usage patterns, markets and consumer appliance use to determine the priority appliances for future standards development;
- Investigating the potential to increase the effectiveness of the existing quasi-mandatory labelling scheme, and
- investigating non-regulatory options for improving product energy efficiency.

The priority in the short term will continue to involve a review of test method and relevant energy standards and labelling requirements for domestic gas water heaters, with other gas products allocated a priority in the revised work plan below.

4 Raising Minimum Standards

The process for developing and implementing minimum energy performance standards and/or labelling requirements for electrical products involves review of international best practice and alignment with international standards, where such alignment may be relevant and practical for Australia and New Zealand. This is becoming the preferred approach, particularly for products that are widely traded, such as refrigerators, electric motors and air-conditioners.

Once established, the regulatory scheme for gas products will adopt the same or similar approach for implementing minimum energy performance standards. In the interim, however, there is scope to investigate with suppliers the possibility of raising minimum standards on a voluntary basis by aligning with international levels if it is in the public interest to do so. For example, it may be beneficial to align swimming pool heater performance standards with those in place in California.

Similarly, where existing industry based performance standards do not meet prospective regulated MEPS levels, there is an opportunity to encourage voluntary industry agreements to raise standards as a precursor to a regulatory scheme. As part of the process, the E3 programme will investigate options for removing the least efficient water heaters from the market.

5 Product Coverage of the E3 Gas Programme

5.1 Priority Products

As already indicated, the E3 Gas programme will focus on reviewing and revising the methods of test for a range of gas products to provide a basis for a credible and scientifically based energy labelling system and MEPS scheme in the future (as applicable). Products that consume natural gas, LPG and other gas-types will be included.

The initial priority will be to conclude the redrafting of a suitable standards and test methods to replace or improve existing standards and methods-of-test which, in their present form, have been deemed unsuitable for any future regulatory scheme for energy labelling and MEPS (Appendix 1.1) Other products identified for regulatory control include ducted gas heaters and gas room heaters (Appendix 1.2). These products are also currently subject to energy labelling and nominal MEPS levels in accordance with existing Australian Standards. As a first step, a range of ducted heater and room heater samples will be tested by a number of NATA accredited laboratories in order to obtain background information on the operation of the current gas labelling standards and to make an assessment of the technical adequacy of the current test methods.

In accordance with recommendations of the E3 Gas Committee, this revised work plan will also undertake investigative work on products that are not currently subject to the existing labelling scheme but have been recommended by that committee as sensible work items. These products include pool and spa heaters (Appendix 1.3), overhead radiant heaters (Appendix 1.4) and commercial wok cookers (Appendix 1.5). The following criteria will be taken into consideration when products are evaluated for inclusion in the programme and these will be the essence of investigative studies for these products:

1. Magnitude of gas consumption by specific product type (current or projected), and the potential for national energy savings;

2. Potential for reduction of greenhouse gas emissions and other environmental impacts;

3. Opportunities for joint achievement of other objectives, such as improved water use efficiency (eg wok cookers), and synergies with related product groups (eg swimming pool equipment);

4. Existence of a suitable test standard, or reasonable prospect of development of such a standard;

5. Opportunity to influence purchase decisions:

    - For products considered for energy labelling, the likelihood that purchasers will see and make use of the energy label in purchase decisions;

    - For products considered for registration of energy efficiency with optional physical energy labelling (typically commercial and industrial products), the likelihood that specifiers will seek out and use the information in selection decisions;

    - For products considered for future MEPS, the likelihood of setting a MEPS level which will have an impact on the market.

6. Administrative complexity of the project.

5.2 Further products to be investigated

Over the life of this revised Work Plan and the Switch on Gas strategy, additional domestic, commercial and industrial gas product types will be considered for inclusion in the E3 Gas programme either through mandatory MEPS and/or energy labelling as applicable (Appendix 4).

These products include:

Residential

- Gas boilers/hydronic heating systems
- Gas ovens and cooktops

Commercial

- Water heaters
- Heaters
- Catering equipment
- Clothes dryers

Industrial

- Boilers

Commercial gas catering equipment will be investigated as part of a 10-year product strategy covering both electrical and gas equipment. This strategy will identify products that are suitable for MEPS and/or energy labelling, in addition to any training or best practice programs.

6 Tasks and Projects

6.1 Revised Work Plan 2007 - 2007/08

The primary focus of the revised work plan will be to formally establish the Equipment Energy Efficiency Gas Programme as an element of the broader Equipment Energy Efficiency Programme. A key element which has been identified is to establish a nationally consistent legislative structure to support the programme.

Other elements to be advanced in the 18 month period from 2007- 2007/08 are set out in the table below. It is important to note that some elements of the work plan — development of a strategy for swimming pools – will have common elements with the electrical products programme.

2007 - 2007/08

TASK		MILESTONES	TARGET		
			1ST HALF 2007	2ND HALF 2007	1ST HALF 2008
Standards Development	Water Heaters	Review of international test methods (Japan, EU and USA)	✔		
		Continue investigative testing to assist with developing the new test method	✔		
		New Test Method Developed		✔	
		Conclude economic analysis of options to improve gas water heater efficiency	✔		
		Subject to above, commence new MEPS proposal as precursor to regulation			✔
	Ducted/space Heating	Commence assessment of relevant overseas MEPS levels and labelling schemes		✔	
		Review AS 4553 - Commence check-testing round-robin		✔	
		Review AS 4556 – Commence check-testing round-robin		✔	
		Review AS 4558			✔
	Pools/spas	10-year Swimming Pool Strategy developed		✔	
		Review AS 4560 – commence testing round-robin			✔
		Review options to align standard with those in place in California		✔	
		Government/industry forum to consider development of mandatory label for gas pool and spa heaters Cost/benefit analysis for proposal			✔
	Outdoor heaters	If warranted by initial research, investigate the technical potential for limiting energy used by outdoor overhead radiant heaters		✔	
		If warranted by initial research, in principle implementation of mandatory energy labelling (using the gas energy label) and performance requirements (including possible MEPS levels) for outdoor heaters, subject to satisfactory cost/benefit analysis			✔
Identify and Pursue New Opportunities		Investigate potential for regulating the efficiency of commercial wok cookers		✔	
Information and Awareness		Gov/industry forum to discuss the merits of labelling for all forms of water heaters (electric, gas and solar water heaters)	✔		
		Gas information on National website		✔	

APPENDIX 1: Work Plan Projects and Issues

1.1 Gas Water Heater Issues

MEA (2002) identified a number of issues related to the testing of gas water heaters, including the maintenance rate test, recovery efficiency for storage water heaters and treatment of start-up energy for instantaneous water heaters. The relevant subcommittee of Standards Australia is now addressing some of these issues with assistance from the AGO. The steps needed to resolve the method of test issues for water heaters and other products need to be part of the first Work Plan.

Currently the scope of energy labelling applies only to appliances with less than 50MJ/h nominal input for storage appliances and for less than 250MJ/h for continuous flow types. Consideration may also be given to assessment of the efficiency characteristics of some "small commercial" water heaters which are marginally above the threshold values but which may be used in larger households with higher demand requirements or in situations where spa baths are used in a "fill and drain" manner with no reheating of the water.

Continuous Flow Water Heaters

Current labelling tests require separate start up energy and steady state efficiency tests. When the energy label test methods were first developed, appliances generally had mechanical type controls with slow response times (i.e. It took a relatively "long" time to get the hot water up to temperature). The current range of appliances on the market includes a vast number of electronically controlled appliances with a wide range of temperature selection options. These appliances have much faster responses (through high gas input rates and lighter heat exchangers) resulting in hot water being available in a relatively "short" period of time. Due to this fast response, the measurement of the start-up efficiency becomes more uncertain and technically difficult to perform. Start-up energy is relevant for end uses such as showers but is of less importance for volume related fills. The number of assumed starts per day is also critical, so the current assumptions in the standard may need to be revisited in the light of available field data.

The current test method requires efficiency testing at a single temperature setting (nominally 45°C above cold water inlet) operating at maximum gas input (typically the highest temperature setting and maximum flow rate), whereas the majority of current appliances have a wide range of temperature control settings (typically between 37°C to 60°C) and can also operate over a wide range of water flow-rates. There are conflicting requirements with AS3498, which specify a maximum permitted hot water delivery temperature of 50°C to some parts of residential buildings (e.g. bathrooms).

Following the testing round-robin conducted in 2005/6, further testing is currently underway to investigate start up energy and steady state operating characteristics at various water flow-rates and thermostat temperature settings. Revised test requirements need to be relevant to all current continuous flow technologies.

Storage Water Heaters

Current labelling tests require a maintenance rate test (performed without draw off, similar to a heat loss test performed on electric units) and a separate recovery efficiency test (based on the energy content of a full tank of water). These tests aim to measure the generic performance parameters of the water heater, but there are many areas where improvements are required.

Areas where investigations are currently under way are set out below.

Areas which can affect the maintenance rate result are thermostat setting and thermostat bandwidth. Test work is currently being undertaken on a range of products to investigate maintenance rate of appliances under various thermostat conditions and various thermostat bandwidths. The area of most concern is the operation of the appliance under test compared to typical operation during normal use.

Other considerations may be the minimum storage temperature for prevention of Legionella since the current approval standards do not require a check of or limit for the minimum calibration setting of a thermostat (this is also covered by AS3498).

Since the majority of storage water heaters are installed outdoors, they are exposed to the effects of "wind" which may have an affect on maintenance rate and appliance efficiency (due to imbalance of delicate buoyancy forces in the flue system). Consequently the current investigations may need to be expanded to ensure that efficiency assessments are relevant to real operating conditions encountered in real life.

Another important performance parameter for storage water heaters is the recovery efficiency. The current method requires testing at a single thermostat setting of 60°C, whereas some appliances operate at much higher storage temperatures (eg. 75°C). The current method of test also measures the energy content of a full tank of hot water without any cold water mixing such as would occur during normal draw-off through the tank outlet. There are a number of related areas under investigation such as stacking (some "overheating" of water at the top of the tank which may lead to increased heat losses and lower efficiency) and whether in-use efficiency over a range of draw-off depths can be characterised adequately by a revised method.

Research on appliance selection and use – water heaters

There are several areas where the current system is inadequate with regard to the use of gas water heaters. The overall task efficiency of a water heater varies with both the total daily hot water requirement and the pattern of use (i.e. frequency of draw-offs and the magnitude of each draw-off). Also, if the user discards the initial flow before it reaches the desired temperature, the energy in that water and the water itself are both wasted.

The scheme could be improved if information on the capability of each water heater was objectively determined as part of the test method as well as the relative efficiency for small, medium and large hot water deliveries. Such information could be based on a range of physical tests together with some simulation. Such data will enable better information to be provided to consumers under a range of alternative usage scenarios. This information would most likely be conveyed through interactive website listings.

Research on hot water use in households of various size (eg 1-2 person, 3-4 person etc), layouts and appliance mixes may be of interest when reviewing the gas water heater tests and rating algorithms. It is understood that there is some existing research, but some of the data is not recent and its geographic coverage is limited.

1.2 Ducted and Space Heating

While all water heaters provide a comparable service, this is not necessarily the case with ducted heaters and space and room heaters. There is a very wide range of gas heaters on the market, and the categorisation is not entirely consistent, as Table 4 indicates.

Table 4 Alternative categorisations of gas space heater types

GAMAA Categories (a)	AGA Categories (b)	Possible GAEEP Categories (c)
Central Heaters	Ducted air heaters	Ducted
Flame fires	Flued radiant/convection	Flued – radiant/effect
Flued radiant		
Portable convection	Flueless convection	Unflued
Portable radiant	Flueless radiant/convection	
Portable radiant convection		
Power flued	Balanced flue convection	Flued – convection only
Wall furnaces	Wall furnaces	
Decorative ONLY	No efficiency criteria	AS 4558

(a) GAMAA website (b) AG 103, AG 106 (c) GWA 2004

The AGA has historically used a system based on its technical standards, whereas GAMAA uses a categorisation that more closely corresponds to the way that gas heaters are marketed. Another approach to classification is from the consumer's perspective – to group the products that are likely to be within the consumer's search criteria, so that the potential buyers can more easily compare the energy efficiency of alternatives, and understand the energy consequences of features such as flame or log effects. Again, such an approach needs the support of all parties to the standards development process, and should be backed by consumer research on the gas space heating market.

Ducted Heaters

Current labelling tests require measurement of heat output in the outlet air duct across 2 operating cycles at 2 gas input settings (if more than a single rate is available).

The current method determines heat delivery characteristics at 2 discrete load conditions (based on a 75% and 25% duty cycle). Equal weighting is applied to each test condition. The energy saving potential of "zoning" (i.e. not heating un-occupied areas) through the "heat load reduction factor" allow for a bonus of up to 1 star in the energy label determination.

Space Heaters

Current labelling tests require measurement of heat output in the flue pipe across maximum and minimum gas input settings. The current method assumes whatever energy does not escape from the flue pipe is useful (except for unflued appliances which are assumed to be 90.4% efficient - no measurement is performed). The method is performed with the flue pipe length set at the worst-case condition for efficiency (whereas installations vary). All electrical consumption to the appliance (eg used by room air fans, controls etc) is assumed to contribute to the efficiency calculations.

Unflued heaters which have greater electrical consumption achieve a higher star rating. No account of the different ventilation requirements (which increase the heating load requirements of a room) for different appliance types is included (eg. room sealed). Appliances can be installed without additional ventilation whereas open flued and unflued appliances require additional minimum ventilation, which necessarily increases heating load.

Decorative Log Fires

There are currently no efficiency criteria under AS 4558. The existing method-of-test allows the gas input rate to be as high as 70MJ/h which is half the size of a central heating system. An added problem is that many of these appliances are "open fronted" (unflued) and hence their operation may affect indoor air quality.

Decorative fuel effect log fires are sold in increasing numbers and are popular in new display homes. Their market position and potential energy consumption now warrants the attention of government with respect to energy efficiency.

Canada now mandates comparative energy labelling for these products and data indicates that efficiency varies from 20% to 70%. The Canadian scheme and test method for efficiency should be considered as part of the test method review.

1.3 Gas Pool and Spa Heaters

Gas pool heaters are essentially very large capacity instantaneous water heaters, with gas consumption up to 500 MJ/hr (max), compared with 150-180 MJ/hr for general purpose instantaneous gas water heaters. Although present in less than 0.5% of households, when installed they can be the largest gas user, using as much gas annually as central heating. Estimated national gas use by gas pool and spa heaters is nearly 1PJ/yr.

Safety and performance requirements are specified in AS4560:2004 Gas Pool Heaters, which supersedes AG110-1998 Approval requirements for pool heaters. One of the requirements of AS4560 is that thermal efficiency 'shall be not less than 70%'.

The only other country with MEPS for pool and spa heaters is the USA, which adopted a minimum thermal efficiency level of 78% in 1990. The models listed by the California Energy Commission have an efficiency range of 78.5 to 98%. A unit of 98% efficiency would use 28% less gas than a unit just meeting the AS4560 MEPS level. This significant range in the efficiency of products available suggests that energy labelling would be worthwhile.

As these products are already covered by AS4560, are subject to MEPS (ie 70% thermal efficiency) and are registered and approved by the AGA, there seems little impediment to implementing energy labelling and/or reviewing the MEPS levels.

1.4 Outdoor Overhead Radiant Heaters

Outdoor radiant heaters were originally designed to extend the usability of outdoor restaurant and café seating areas into the cooler months. In recent years natural gas variants have begun to appear on the market, most are imported. The products are also now being marketed to householders as 'patio heaters'.

The move from LPG to natural gas, and from the commercial to the residential environment, raises a number of policy issues such as;

- The lack of psychological and physical limits on the operation of natural gas models may lead to more frequent and extended use. Householders may also be unaware of the running costs (which on a per hour basis are comparable to medium to large indoor space heaters).
- Commercial models sold for residential use are designed to heat 4 tables, but will often be used over a single table in household use, so wasting three quarters of the capability (and the energy).

There is not likely to be much difference in models in the efficiency of conversion of fuel to radiant heat, but there is potential scope for developing a test which rates heaters on their ability to concentrate/focus their heat pattern over the occupied area, e.g. over 1 table only. In addition, most of these appliances are used outdoors and are subject to significant variation in performance due to wind disturbing the heat emitting panel. If this were indicated on a gas energy label, it could encourage the development of models designed for household use (eg 1 star for a 40 MJ/hr commercial product that distributes heat over 20m^2, 4 stars for 10 MJ/hr household product that distributes the heat over a 5 m^2 sector).

AS 4565-2004: Radiant gas heaters for outdoor and non-residential indoor use specifies the uniform minimum requirements for manufacturers, designers, regulatory authorities, testing laboratories and similar organizations for the safety, performance and use of radiant gas heaters with a gas consumption not exceeding 70 MJ/h for outdoor and non-residential indoor use intended for use with natural gas, town gas, tempered LPG and low pressure LPG. However, there are no tests for efficiency or efficacy (ie heat distribution), or labelling requirements.

There may be scope to apply additional rating points to devices which limit use, such as timer-controlled operation (eg a maximum dial-up of 6 hours, after which the product cannot be restarted for an hour).

Consideration could also be given to a mandatory 'Energy Warning' label, analogous to the 'Water Warning' label required under the WELS scheme for products not meeting minimum water efficiency standards. This would prompt prospective buyers of outdoor gas heaters to think more carefully about the wider resource implications.

1.5 Wok Cookers

Many commercial kitchens with high-flame wok cookers (called 'Chinese Cooking Tables' in the AGA Directory) use a constant water flow to cool the cooking surface. A spout is often left flowing constantly for wok cleaning as well.

Some buyers demand natural gas burners rated as high as 140 MJ/hr, even though heat cannot be usefully transferred into the wok at rates above about 60 MJ/hr because of the limited surface area. The excess heat creates a demand for water cooling of the cooker surface, and also increases the load on the kitchen exhaust and restaurant air conditioning systems.

The local manufacturers of wok cookers listed in the AGA Directory include B&S Commercial Cooking Appliances (Melbourne), Complete Commercial Catering (Melbourne), Cookon Commercial Catering (Brisbane) and Goldstein Eswood (Sydney), and importers include Delta Group Industries, General Catering Equipment, Itech Metal Industries, J&I Industries, T&N Catering Equipment and Tu's Brothers.

There could be approximately 8,000 units in use Australia-wide, with annual sales of about 1,000 units. At an average consumption of 5.5 kl per day (about 60% for cooling water and 40% for cleaning) the annual water consumption totals about 15.8 Gl per year, almost as much as all commercial dishwashing and pre-rinsing.

CSIRO Food Sciences, supported by Sydney Water, has developed an air-cooled wok burner with a user-activated spout, which not only reduces water consumption by 90% but also halves gas consumption. It is understood that Sydney Water is working to make the design commercially available. All models commercially available at present are of the conventional water-cooled type.

In a recent report to DEH on the potential for expanding the Water Efficiency Labelling and Standards (WELS) programme, George Wilkenfeld and Associates recommended that wok cookers be registered and labelled, and that units which are water cooled and have spouts without user-activated closures should carry a 'Water Warning' label.

The gas energy labelling and MEPS programme could also be used to encourage the take-up of water-less designs, which would consume about half the gas to perform the same cooking task.

In the longer term, there may be a case for preventing the sale of water-cooled woks altogether, but only after there are enough water-less models available, suppliers have time to change or adapt their designs and buyers come to accept the waterless design. This is not likely to happen unless there is a major campaign to promote waterless woks.

APPENDIX 2: Standards Development

2.1 Process for revising standards

The Equipment Energy Efficiency Gas Committee is the body of government officials charged with administering the E3 Gas Programme. This committee is committed to:

1. Developing Australian Standards to underpin the emerging scheme that are robust, technically relevant and reproducible; and
2. Assisting the organisations that test to these Australian Standards to measure energy efficiency and other performance indicators accurately.

Note that where applicable, local test methods should be based on relevant international methods where they exist and are creditable.

In the past year, the E3 Gas Committee has devoted a considerable portion of its budget to Standards Development projects, notably;

- Funding the gas water heater testing round-robin to assess the accuracy of the existing water heater test procedure
- Funding additional testing of gas water heaters to inform the process of revising and improving the Australian Standard AS 4552 – Gas fired water heaters for hot water supply and/or central heating
- Provision of technical expertise to Standards Committees and associated Working Groups.

Further to this work, and more broadly, the extent of Standards Development projects supported by the E3 Gas Committee in the future are likely to include;

- Funding of testing designed to develop industry competency with a new or developing Standard.
- Funding of testing programmes designed to inform the process of the setting of MEPS levels.
- Commissioning of round robin testing programmes designed to ensure that enforcement programmes are based on robust and reproducible test methods.
- Provision of technical expertise to Standards Committees.
- Assistance to Standards Australia to maintain representation on key international Standards Committees.
- Assistance in the development and maintenance of the supply of materials used in testing.

These undertakings are viewed as being essential to maintaining technically sound Australian Standards. Final published test standards must be technically robust and capable of withstanding scrutiny from technical experts in Australia and around the world.

2.2 Structure and content of standards

The general approach taken to regulated products under the E3 electrical programme, which is also proposed for gas products, is to develop Australian Standards that contain all the relevant requirements as follows;

- A Part 1 standard is developed to describe the methods-of-test to be used for establishing the product attributes performance and energy consumption.

- A Part 2 standard, also called a regulatory standard, is developed to set out either the minimum energy performance levels and/or energy labelling requirements, as applicable. The final published performance-requirement (Part 2) standard reflects governments' desire to match performance standards with our major trading partners. The parameters and broad requirements specified in this part reflect the recommendations in the relevant Regulatory Impact Statement which have been agreed by the Ministerial Council on Energy.

The advantages of this modular structure is that different parts can be updated independently;

- The Part 1 standard can be proposed to international standards bodies without the problem of including performance requirements in a method-of-test standards.
- The Part 2 standard can be changed from time to time subject to a suitable regulatory impact statement process.

As noted above, this approach is also proposed for gas energy efficiency standards in the future. However there may also be a case for having an additional part for safety requirements. Current gas product standards have general test methods, performance requirements, safety and energy requirements bundled into a single standard. Existing State gas technical regulations currently focus on safety approvals and certification. Separation of these elements into distinct parts could increase the flexibility of the regulatory regime if, for example, the energy efficiency and safety requirements were to be contained in different regulations under the same State legislation, in different State legislation or, indeed, in Commonwealth legislation.

There are a range of issues related to safety and energy efficiency that need to be considered. The efficiency, performance and "appliance safety" attributes of most gas appliances are inter-related. That is, a simple means of increasing efficiency (without introducing significant changes to the heat exchanger or gas control components of an appliance) is by reduction or restriction of excess combustion air which in turn may result in a reduction in the "safety margin" which is incorporated into the combustion system (that is, there may be an accompanying increase in the amount of carbon monoxide (a poisonous gas) that is produced in the flue products). Alternatively, reduction of the gas input rate (for a given heat exchanger) may result in increased efficiency but is also likely to result in an accompanying drop in heating performance, sometimes to the extent where the prime function of the appliance may be compromised.

Consequently it is essential that the requirements of energy labelling and/or MEPS and the related test methods be such that they encourage advances in energy efficiency through innovation and product design without compromising appliance performance or safety. In this respect, energy performance and safety are much more inter-dependent than is generally the case for electrical products, so strong linkages between the relevant parts of the standard (energy consumption, performance and safety) need to be maintained.

During the existing appliance Approval / Certification process, appliance samples are assessed against a relevant Standard which ensures that efficiency tests are performed concurrently with combustion and performance tests.

If there is a separation of safety and energy/performance standards into separate parts or sections in the future, it will be critical that fundamental safety/performance benchmarking tests (eg combustion tests, heat up time etc) be confirmed at the time of an efficiency assessment (and on the same appliance sample) as a pre-requisite for the measurement of efficiency.

In addition to the issues above, normal manufacturing tolerances which apply to key appliance components within gas appliances often have a significant impact on energy efficiency, consequently it is essential that a detailed engineering specification for the appliance and its subassemblies is available for review when the initial safety and efficiency testing assessment is performed. This enables adjustments to be made that coincide with either the most or the least advantageous condition which is likely to be encountered in normal production. It is important that these settings be maintained for all subsequent performance and efficiency tests.

The technical design of the tests will need to anticipate what type of data may be required for both regulatory purposes and consumer information.

APPENDIX 3: Operating Context for the E3 Gas Committee

The on-going development and implementation of the E3 Gas programme will be overseen by the Equipment Energy Efficiency Gas Committee, comprising representatives from Commonwealth, State, Territory and New Zealand government energy agencies and gas technical regulators. Committee member organisations are listed on the final page of this document.

The Australian Greenhouse Office (within the Department of the Environment and Heritage) provide both the Chair and secretariat to support the activities on the E3 Gas Committee.

The E3 Gas Committee's specific responsibilities include:

- oversee and coordinate the implementation of E3 Gas work plans;
- coordinate involvement with and input to standards processes relating to methods of test, MEPS levels and energy labelling algorithms for gas products;
- provide assistance to all jurisdictions, as required, in the development and implementation of regulatory and non-regulatory aspects of the programme;
- administer an effective, targeted check-testing regime and provide a forum to exchange information on enforcement and compliance issues;
- monitor programme performance and achievements;
- coordinate broad consultative processes relating to the development and implementation of E3 Gas and its specific initiatives.

During the initial establishment phase the government agencies represented on the E3 Gas Committee will work closely with a key industry stakeholders to ensure that the new national regulatory scheme meets the requirements of both government and industry.

The E3 Gas Committee has strong links with the Gas Technical regulators Committee (GTRC) who are responsible gas safety, supply quality for transmission, distribution and retailing and end use application.

APPENDIX 4: E3 Programme - 10 Year Timelines of Priorities

The table below has been updated from the Switch on Gas 10-year strategy and lists proposed projects to be addressed over that time.

High Priority 2007- 2007/08

Formally Establish the Equipment Energy Efficiency Gas Programme

- Finalise the revised E3 programme 2-year work plan, in consultation with stakeholders
- Establish nationally consistent administrative and legislative infrastructure

Projects

- Review and agree test methods for domestic gas water heaters
- Review test methods for ducted heaters, space heaters, gas pool and spa heaters, and outdoor overhead radiant heaters
- Investigate possibility of industry voluntarily retiring the least efficient domestic gas water heaters from the market
- Develop a product strategy for swimming pools, including both electrical and gas products
- Determine interim measures for the domestic gas water heater label
- Investigate potential for joint gas labelling and water efficiency labelling for commercial wok cookers
- Engage government and industry in discussions about the merits of labelling for all forms of water heaters (gas, electric and solar)

Medium Priority 2008/09- 2011/12

Pre- regulation

- Agree test methods for domestic ducted heaters, space heaters, outdoor overhead radiant heaters and swimming pool and spa heaters
- Review and agree test methods for commercial gas heaters and water heaters, industrial gas boilers, domestic gas ovens and cooktops, where inclusion in the programme is justified.
- Agree MEPS and labelling requirements for domestic water heaters, ducted heaters, space heaters, outdoor overhead radiant heaters, swimming pool and spa heaters and commercial wok cookers
- Implement actions to retire the least efficient domestic gas water heaters from the market prior to regulation.
- Develop MEPS &/or labelling proposal for domestic gas water heaters
- Develop a product strategy for commercial catering equipment, including gas products
- Commence proposal to develop voluntary/future mandatory label for swimming pool and spa heaters and outdoor overhead radiant heaters

Post-regulation

- Commence regulation of gas water heaters
- Undertake a national campaign to communicate the formation of a new regulatory scheme to industry stakeholders
- Develop a methodology to track efficiency and consumer trends in the sale of gas products
- Prepare product profiles* for commercial gas heater and water heaters, industrial gas boilers and domestic gas ovens and cooktops
- Incorporate regulated gas products into the national energy rating website
- Include gas products into a national promotional campaign targeting appliance retail stores and consumers

Lower Priority 2012/13 to 2015/16

- Undertake national campaign to communicate the scheme to consumers
- Commence targeted checktesting programme for regulated products
- Develop MEPS &/or labelling proposals for commercial gas heater and water heaters, industrial gas boilers and domestic gas ovens and cooktops, and agree on implementation dates
- Develop product profiles for gas clothes dryers and priority gas catering equipment. Develop MEPS &/or labelling proposals for these products and agree on implementation dates

** Product profile – market and technology assessment, review of international best practice, assessment of the energy impacts and feasibility of mandatory &/or voluntary measures.*

Gas Appliance and Equipment Energy Efficiency Committee

The Gas Appliance and Equipment Energy Efficiency Committee consists of the following member organisations:

Australian Greenhouse Office, Department of the Environment and Heritage

Department of Industry, Tourism and Resources

NSW Department of Energy, Utilities and Sustainability

Office of the Chief Electrical Inspector Victoria

Sustainability 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 Planning and Conservation, Department of Infrastructure, Energy and Resources

ACT Office of Sustainability, Chief Minister's Department

Northern Territory Department of Infrastructure, Planning and Environment

New Zealand Energy Efficiency and Conservation Authority

Energy Safe Victoria

Department of Transport, Energy and Infrastructure (SA)

New Zealand Ministry of Environment