Introduction

Rheem Australia supplies the Australian market with a wide range of water heater appliances, with brands including Rheem, Vulcan, Solahart and Raypak. Types of water heater include gas, electric, solar and heat pump, for both domestic and commercial applications.

Water heaters consume significant amounts of energy, up to 40% of the household total, with the lower efficiency models dominating the market.

High energy efficiency models are readily available, and are well established but with small market share. Demand for these models is restrained by their higher price, as necessitated by their higher cost of manufacture. Any change to high efficiency models has a capital cost, but a reduction in running (energy) costs.

The water heater market is approximately 75% for breakdown replacement and 25% for new buildings and considered upgrades. The replacement market need is usually unexpected and required urgently, thus reducing consideration of a change to a high efficiency model.

Approximately 30% of Australian households are in rented accommodation rather than owner occupied. In this market segment the decision maker is primarily concerned about minimising capital cost and is less concerned about the running cost of the water heater.

In order to increase the energy efficiency of water heaters, there are two approaches to design evolution.

The conventional approach, applying to both electric and gas models, is to increase the efficiency of heat transfer from the fuel to the water, and to reduce the standby heat loss from the heated water to the surroundings. The overall efficiency is however limited to less than 100%.

With electric models, the transfer efficiency is very high (over 98%). Current MEPS regulations ensure that standby losses are low.

With gas models, the combined effect of these two factors is expressed in the AGA Star rating. Current regulations require only 1 Star. Gas water heater manufacturers have voluntarily developed models with Star ratings of up to 5, by increasing the transfer efficiency from approximately 75 to 90% and by reducing standby losses. The lower Star rating models enjoy a substantial market position because of their lower purchase cost.

The other recommended approach, again applying to both electric and gas models, is to dramatically increase the energy efficiency by drawing energy from the environment as well as from the fuel i.e. from renewable energy sources. Then the overall efficiency is not limited to 100%, indeed current renewable energy models generally achieve more than 300% overall efficiency.

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Current types include solar water heaters (SWHs) in both gas-boosted and electric-boosted variants which capture solar energy, and electric-driven heat pump water heaters (HPWHs) which capture energy from the surrounding air. These models employ well established but high cost technology to deliver this very high efficiency performance.

Compared with more conventional water heaters, these models offer the following benefits:

1. An electric-boosted SWH, or an electric-driven HPWH, can reduce electricity consumption by approximately 60% to 90%.

2. An electric-boosted SWH typically will not require boosting during summer daylight periods when the electricity supply network is under peak load largely due to the increasing use of air conditioning. Of course, a gas-boosted SWH never requires electric boosting. Hence SWHs can delay the need to upgrade the electricity generation and distribution network.

3. A gas-boosted SWH can reduce gas consumption by approximately 60% to 90%. In addition to benefits in energy conservation, this provides environmental protection via reduction in greenhouse gas and NOx emissions.

Rheem Australia offers the following recommendations for consideration and action by government.

Recommendation 1
Establish building regulations which actively encourage the installation of SWHs and HPWHs in new buildings and in major renovations.

This has recently occurred in Victoria and NSW, and should be extended to the other States and Territories.

The BASIX system in NSW could be improved by increasing the points allocation for SWHs and HPWHs.

Recommendation 2
Provide financial incentive systems which reduce the capital cost of SWHs and HPWHs.
The capital cost of SWHs and HPWHs is significantly higher than that of conventional water heaters, due to the more complex components and installation. This higher cost acts as a deterrent to purchase, particularly in the replacement market which involves a “grudge” purchase . Financial incentives for the purchaser assist by effectively reducing the purchase cost, and providing a shorter more attractive payback period for the investment.
Incentive systems need not be funded by government in order to be effective; the very successful RECs scheme is an example.

Schemes should provide incentive to purchase a SWH or HPWH for replacement in existing buildings, and for new buildings.

An alternative or addition to the RECs scheme could be a scheme to tax the purchase of low efficiency models, in order to provide the funds for incentive schemes for purchasers of higher efficiency models.

Recommendation 3
Harmonise the various rating systems for SWHs and HPWHs.
There is an expanding range of performance rating systems employed by regulators and the ORER. This leads to purchaser confusion, and increases conformance costs for suppliers.
These rating systems should be harmonised.

Recommendation 4
Communicate the benefits of SWHs and HPWHs to purchasers.
There is widespread ignorance and misconception amongst purchasers regarding the costs and benefits of SWHs and HPWHs, including the financial incentive systems that are available and potential returns.

A national information programme should be undertaken, directed at building owners, builders and plumbers. The SWH and HPWH industry is simply not large enough at this time to sustain the advertising campaign necessary to convert the market.

Recommendation 5
Increase the MEPS level for gas water heaters.
Current regulations prevent the installation of gas water heaters with less than 1 Star AGA energy efficiency rating.

Virtually all gas water heaters sold now have rating of 3, 4 or 5 Stars.
Regulations should be amended to require at least 4 Star rating within 18 months.

Further movement at a later date to 5 Stars or beyond would involve manufacturers in very significant capital expenditure in order to meet the increase volume demand, and would require significant consultation.

Recommendation 6
Increase the market price for excess consumption of electricity and gas.
Tariffs should be set with increasing rates for excess consumption, thus encouraging the use of high efficiency appliances.

The marginal revenue thus collected should be a payment which is used to fund financial incentives for purchase of high efficiency appliances including water heaters.

The very low tariffs for off peak electricity in some States should be revised to higher rates more consistent with the true costs of supply.

Inquiry into Energy Efficiency

by

Rheem Australia Pty Ltd.

Nov 2004

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Inquiry into Energy Efficiency

Subjects

- Company profile.
- The market.
- The product.
- Product Efficiencies.
- Recommendations.

Inquiry into Energy Efficiency

Company Profile

- Rheem Aust.; JV Rheem US & Paloma Japan.
- 3 Plants in Australia.
- Brands; Rheem, Solahart, Vulcan, Raypak.
- Manufacture; Domestic and Commercial WH.
- 1999 Galaxy Award; Company and Products

Inquiry into Energy Efficiency

The market

– 75% breakdown - “grudge”.

– 25% new homes – considered.

– Approx.30% households are rented where the decision maker is interested capital not energy.

– Water heaters consume approx.40% of energy.

Inquiry into Energy Efficiency

<u>The product.</u>

– Type; Gas, Electric, Solar, HP water heaters.

– Storage and Instantaneous.

– Electric; MEPS.

–Gas; AGA certified.

–Solar &HP; AS2712 to gain REC’s

Inquiry into Energy Efficiency

<u>Product Efficiencies.</u>

– Electric; element is 100% - 10% heat loss.

– Gas ; Star rating T/E min. 70% to 90% - 30% heat loss.

– Solar & Heat Pumps; 300%.

Inquiry into Energy Efficiency

<u>Recommendation 1.</u>

Establish national building regulations to actively encourage the installation of SWHs and HPWHs in new buildings and in major renovations.

- Occurred in Victoria and NSW.
- Extended to the other States.
- The BASIX system increase the points allocation for SWHs and HPWHs.

Inquiry into Energy Efficiency

<u>Recommendation 2.</u>

Provide financial incentive systems to reduce the capital cost of SWHs and HPWHs.

– Need not be funded by government in order to be effective; eg. RECs scheme.

– The capital cost of SWHs and HPWHs is significantly higher - a deterrent to purchase.

– The replacement market is a “grudge” purchase

Inquiry into Energy Efficiency

<u>Recommendation 2.</u> Cont.

Provide financial incentive systems which reduce the capital cost of SWHs and HPWHs.

– Schemes should provide incentive to purchase a SWH or HPWH for existing and new buildings.

– An alternative or addition to the RECs scheme, consider a scheme to tax the purchase of low efficiency models.

– So to provide the funds for incentive schemes for purchasers of higher efficiency models.

Inquiry into Energy Efficiency

<u>Recommendation 2.</u> Cont

Provide financial incentive schemes to reduce the capital cost of SWHs and HPWHs.

– Incentive to purchase a SWH or HPWH for replacement in existing and new buildings.

– An alternative or addition to the RECs scheme could be a scheme to tax the purchase of low efficiency models to fund high efficiency models.

Inquiry into Energy Efficiency

Recommendation 3.

Harmonise the various rating systems for SWHs and HPWHs.

– There is an expanding range of performance rating systems employed by regulators and ORER.

– This leads to purchaser confusion, and increases conformance costs for suppliers.

– These rating systems should be harmonised in Australian standard AS4234.

Inquiry into Energy Efficiency

<u>Recommendation 4</u>.

Communicate the benefits of SWHs and HPWHs to purchasers.

– There is widespread ignorance and misconception amongst purchasers regarding the costs and benefits of SWHs and HPWHs, including the financial incentive systems that are available and potential returns.

– A national information programme should be undertaken, directed at building owners, builders and plumbers.

– The SWH and HPWH industry is simply not large enough at this time to sustain the advertising campaign necessary to convert the market.

Inquiry into Energy Efficiency

Recommendation 5.

Increase the MEPS level for gas water heaters.

– Current regulations; min.1 Star AGA energy efficiency rating.

– Virtually all gas water heaters rating of 3, 4 or 5 Stars.

– Regulations should be amended to require at least 4 Star rating within 18 months.

– Later min.5 Stars or beyond.

– Requires significant capital expenditure in order to meet the increase volume demand, and would require significant consultation.

Inquiry into Energy Efficiency

Recommendation 6.

Increase the market price for excess consumption of electricity and gas.

– Tariffs should be set with increasing rates for excess consumption, thus encouraging the use of high efficiency appliances.

– The marginal revenue collected should be a payment which is used to fund financial incentives for purchase of high efficiency appliances including water heaters.

– The very low tariffs for off peak electricity in some States should be revised to higher rates more consistent with the true costs of supply.

Inquiry into Energy Efficiency

The End