Country:	Australia
Technology:	Laundry Dryers
Sub Category:	Vented and condenser electric models

Introduction

The first stage in the Mapping and Benchmarking process is the definition of the products, i.e. clearly setting the boundaries that define the products for use in data collection and analysis. Doing this ensures that comparison between the participating countries is done against a specific and consistent set of products.

The summary definition for this product is:

Laundry Dryers defined as:

'An energy using appliance for use in households designed to remove the moisture of a (given) load of clothing or other textiles'.'

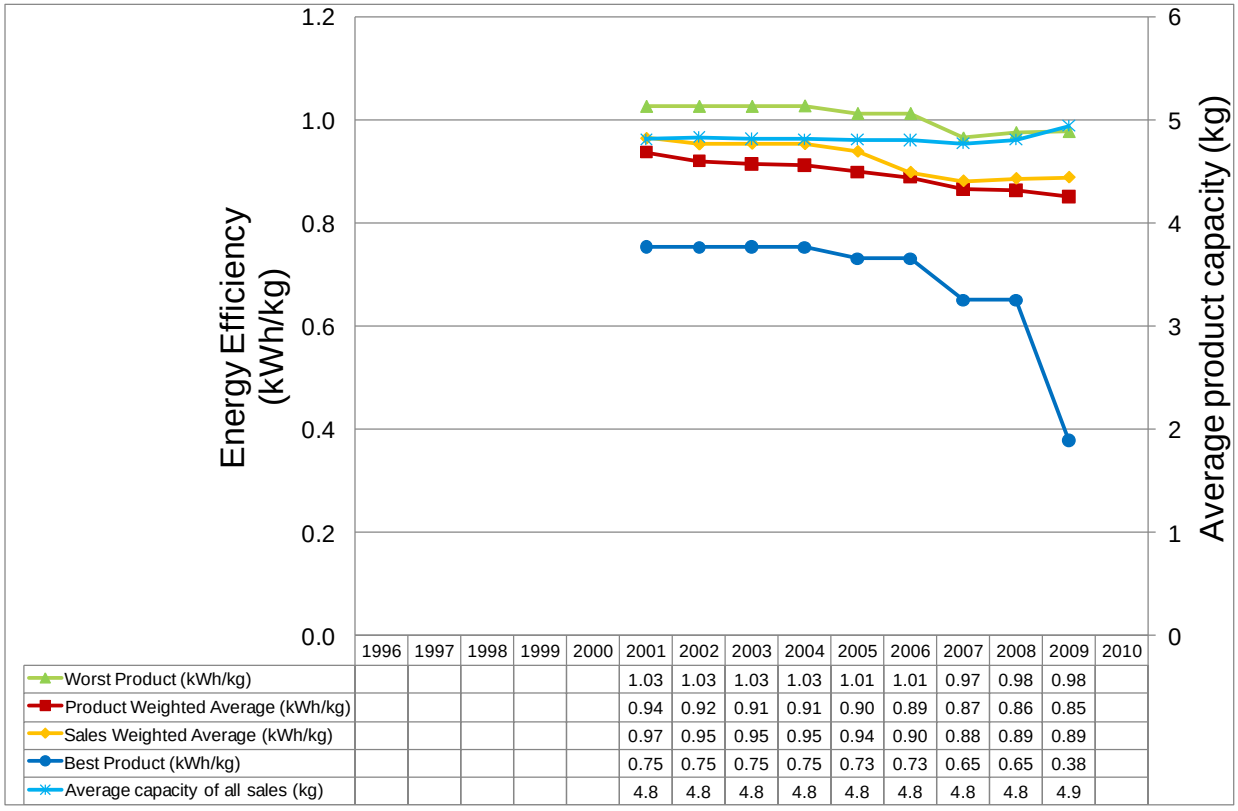
Data will be analysed for the following types of washing machine :

Laundry Dryers	Heat source	Electricity	
	Mode of drying	Tumble dryer	
	Air usage	Vented (fresh air is heated, passed through textiles and exhausted from the appliance)	Condenser (noting whether air condenser, or heat pump condenser) (air used for the drying process is dehumidified by cooling and reused)
Functionality	Layout	Noted whether top loader or front loader.	
	Capacity (dry load)	Less than 10 kg. Full analysis only for appliances with capacity between 4 kg and 10 kg.	
	Wash capability	Washer dryers are excluded from the analysis.	
	Automation	To be noted whether the appliance has moisture sensor, load sensor or just timer /manual control.	

The detailed product definitions can be found at the Annex website:

http://mappingandbenchmarking.iea-4e.org/matrix

Energy Efficiency of New Laundry Dryers Australia

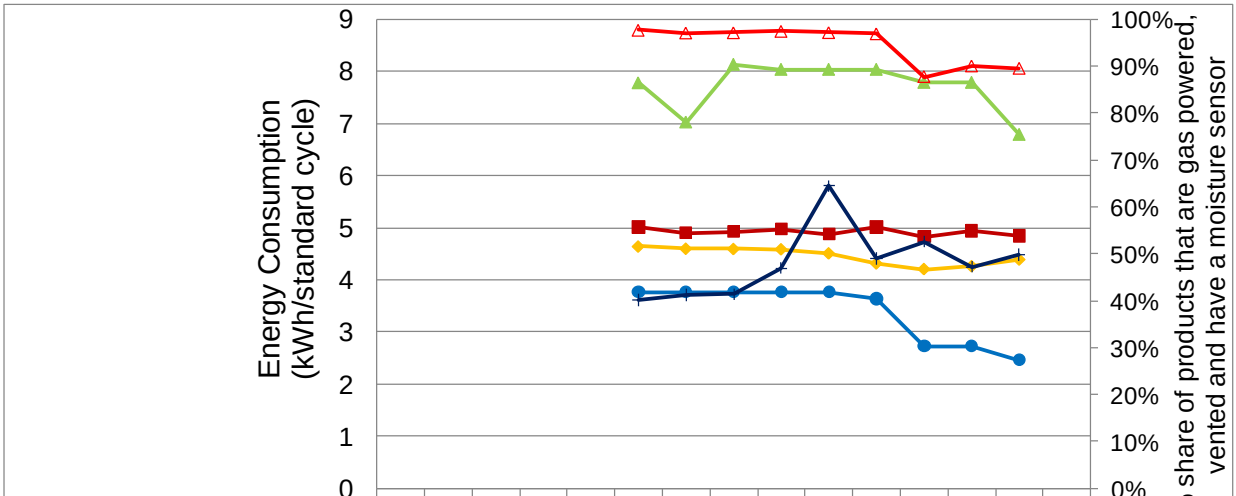


	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Worst Product (kWh/kg)						1.03	1.03	1.03	1.03	1.01	1.01	0.97	0.98	0.98	
Product Weighted Average (kWh/kg)						0.94	0.92	0.91	0.91	0.90	0.89	0.87	0.86	0.85	
Sales Weighted Average (kWh/kg)						0.97	0.95	0.95	0.95	0.94	0.90	0.88	0.89	0.89	
Best Product (kWh/kg)						0.75	0.75	0.75	0.75	0.73	0.73	0.65	0.65	0.38	
Average capacity of all sales (kg)						4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.8	4.9	

Key notes on Graph (see notes section 1)

- The sudden improvement in best performing product in 2009 is due to the introduction of a heat pump dryer.
- In order to indicate a 'Worst' performing product that reflects the broad market (as opposed to representing perhaps a single unusual or wrongly reported product), the 'energy efficiency of worst product' is the energy efficiency of the product at the 'worst 5%' point of a ranked list of products (ie not sales weighted) in the dataset. The 'Best' performing product is a single product with the best energy efficiency.

Energy Consumption of New Laundry Dryers Australia



	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Worst Product (kWh/standard cycle)						7.8	7.0	8.1	8.0	8.0	8.0	7.8	7.8	6.8	
Product Weighted Average (kWh/standard cycle)						5.0	4.9	4.9	5.0	4.9	5.0	4.8	4.9	4.8	
Sales Weighted Average (kWh/standard cycle)						4.6	4.6	4.6	4.6	4.5	4.3	4.2	4.3	4.4	
Best Product (kWh/standard cycle)						3.8	3.8	3.8	3.8	3.8	3.6	2.7	2.7	2.5	
% of sales using gas power															
% of sales that are vented products						98%	97%	97%	97%	97%	97%	88%	90%	89%	
% of sales with a moisture sensor						40%	41%	41%	47%	64%	49%	53%	47%	50%	

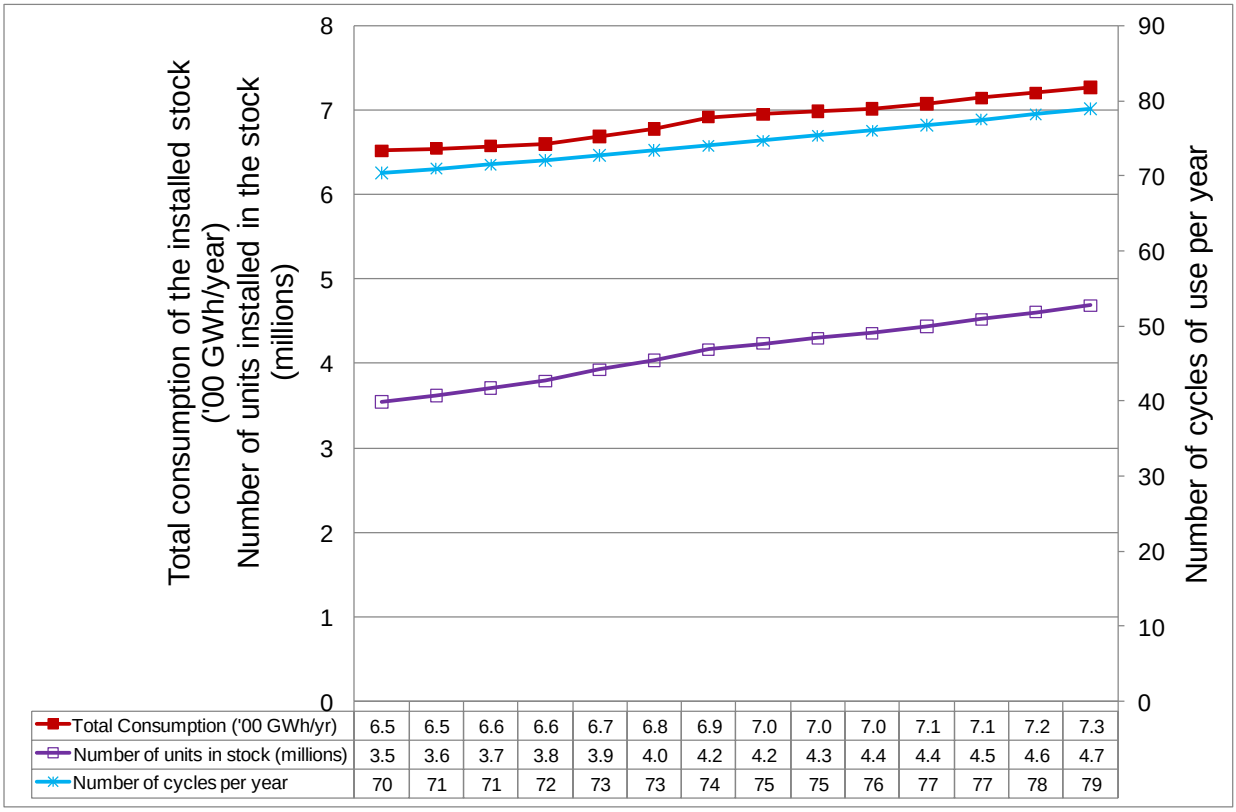
Key notes on Graph (See notes section 2)

- In order to indicate a 'Worst' performing product that reflects the broad market (as opposed to representing perhaps a single unusual or wrongly reported product), the 'energy efficiency of worst product' is the energy efficiency of the product at the 'worst 5%' point of a ranked list of products (ie not sales weighted) in the dataset. The 'Best' performing product is a single product with the lowest energy consumption per cycle.
- Data is not collected on gas dryers in Australia but it is believed that virtually no gas dryers are available in the market.

Energy Efficiency in the Installed Laundry Dryers Stock Australia

No data on the unit energy efficiency of laundry dryers in the installed stock was available to the Mapping and Benchmarking Annex at the time of publication.

Energy Consumption in the Installed Laundry Dryers Stock Australia



Total Consumption ('00 GWh/yr)	6.5	6.5	6.6	6.6	6.7	6.8	6.9	7.0	7.0	7.0	7.1	7.1	7.2	7.3
Number of units in stock (millions)	3.5	3.6	3.7	3.8	3.9	4.0	4.2	4.2	4.3	4.4	4.4	4.5	4.6	4.7
Number of cycles per year	70	71	71	72	73	73	74	75	75	76	77	77	78	79

Key notes on Graph (see Notes Section 4)

- Results are based on market survey, sales databases and product databases combined using modelling techniques,

Major Policy Interventions (See notes Section 5)

It is currently mandatory for electrical rotary clothes dryers to carry an approved energy label. Gas dryers are not required to be labelled.

There are two relevant standards:

- AS/NZS2442: Performance of household electrical appliances- Rotary clothes dryers Part 1: Energy Consumption and Performance
- AS/NZS2442: Performance of household electrical appliances- Rotary clothes dryers Part 2: Energy labelling requirements

Part 1 of the standard defines the test procedures for the determination of energy consumption and performance of clothes dryers in Australia (see summary below).

Part 2 of the standard sets out the requirements for energy labelling of clothes dryers in Australia. An approved Energy Label for clothes dryers must be displayed on all products which are offered for sale in Australia.

There is a mandatory minimum standard efficiency level embedded within the labelling requirement of 1.36 kWh per kg of moisture removed[1], but this is considered to be a relatively weak requirement.

[1] See http://www.energyrating.gov.au/cd1.html.

Cultural Issues (See Notes Section 6)

Australia is a relatively wealthy country and this is apparent with the level of household ownership of cloth dryers: more than half (56%) of Australian households have a clothes dryer with both the number of households and percentage ownership increasing over time.

For many white goods (refrigerator, freezer, clothes dryer) Australian households rank energy efficiency above price or brand when buying, according the Australian Bureau of Statistics (ABS 4602). For laundry dryers the two main factors considered when purchasing/replacing were purchase cost (44.3%) and energy star rating (45.4%) (ABS 4602, March 2008).

Compared to northern Europe, laundry dryer usage is relatively low, since Australia has a relatively warm and dry climate, though this varies across different states.

Around one-fifth (20.6%) use their appliance once a week, whilst around one half (49.9%) of householders use is dependent on weather/season. A significant number of households (12.6%) never use their dryers. (ABS 4602, March 2008).

Notes on data

Section 1: Notes on Product Efficiency

1.1 Test methodologies, Performance Standards and Labelling Requirements

Laundry dryers in Australia are tested to Part 1 of AS/NZS2442 as amended in 1999. Part 2 of this test methodology is also the basis of Australian energy labelling for laundry dryers. The key elements of the test methodology including those that impact on energy consumption are summarised in the table below:

Standard details	AS/NZS 2442.1:1996 (Amendment 2 1999)
Source	http://www.energyrating.gov.au/cd2a.html
Date of introduction	1999
Ambient temp	20 ±2°C
Ambient relative humidity	60 ±5%
Test cloth	Cotton
Load	Rated capacity
Initial moisture content	90% ±20g of bone dry
Final moisture content	6% of bone dry

The initial and final moisture level requirements were changed when the standard was last updated in 1996.

It is mandatory for electrical rotary clothes dryers to carry an energy label in Australia. The labelling regulation also carries a requirement that "*Energy efficiency - the dryer tested energy consumption (kilowatt hours per kg of moisture removed) shall not exceed 1.36*".

1.2 Product Efficiency Graphic

1.2.1 Data Source:

Data analysed comes from a combination of the following sources:

- GfK sales data which in turn is from retailers sources.
- The E3 registration database with the model-specific data are ultimately sourced from manufacturer or independent testing laboratories.

1.2.2 Data Clarifications

Notes on sales (and model) data provided (1996-2009)

Data available to the Annex for years prior to 2001 is only for the largest selling models. As a result the data does not cover a sufficient percentage of the total market to be considered representative and has not been presented here. Other relevant details of the data provided are listed in the table below:

Capacity	dry bone mass
Energy consumption	from the label data
Energy efficiency	Calculated from the declared values for capacity and energy consumption
Energy efficiency label	AU fractional star rating
Heat source	electric products only, no gas dryers are registered
Air/HP/Condensing	No data provided
Orientation	not recorded, but all are believed to be front loading
Automation	three options recorded, autosensing, timer or manual (rare)
Standby	No data provided as this is not currently recorded (due to be in next iteration of standard)

1.2.3 Glossary of energy metrics for laundry dryers:

The key metrics for laundry dryers and the key calculations undertaken in the wider Annex analysis are described below. Some metrics and/or calculations are not relevant to all data sets due to absence of data or for other reasons.

Declared Unit Load Capacity: Unit load capacity in kg is defined by local regulations and declared by manufacturers Unit kg).

(Note: This capacity is defined using the mixture of materials defined in the local regulations which is not necessarily in line with the mixture of material used elsewhere (for local load mix, refer to Section 1.1 on “Notes on Data”)).

Unit Energy Consumption (UEC): Unit Energy Consumption is the energy consumed by the unit to complete one drying cycle as defined by local test conditions (Unit: kWh/cycle).

Sales Weighted UEC of New Models: Value calculated by [Sum of (UEC multiplied by sales volume of Model in year) for all Models] divided by [Sum of (sales volume of all Models in year)]. Unit kWh/cycle.

Product Weighted UEC of New Models: Value calculated by [Sum of (Model UEC for all models sold in year)] divided by [Sum of (Number of Models sold in year)]. Unit kWh/cycle.

Unit Energy Efficiency (UEE): Value calculated by dividing UEC by Declared Unit Load Capacity (kWh/Kg/cycle).

Sales Weighted UEE of New Models: Value calculated by [Sum of (UEE multiplied by sales volume of Model in year) for all Models] divided by [Sum of sales volume of all Models in year]. Unit kWh/kg/cycle.

Product Weighted UEE of New Models: Value calculated by [Sum of UEE for all models sold in year] divided by [Number of Models sold in year]. Unit kWh/Kg/cycle.

Section 2: Notes on Product Consumption

2.1 Test methodologies, Performance Standards and Labelling Requirements

No further information available.

2.2 Product Consumption Graphic

No further information available.

Section 3: Notes on Efficiency of Stock

No further information available.

Section 4: Notes on Consumption of Stock

Sources:

- The stock data are combined from various sources including modelling. The stock ownership data are modelled and based on tri-annual ABS ownership surveys and ABS household numbers (based on census surveys). Other stock data outputs (eg national energy consumption) are based on modelling assumptions (eg 16 year average lifespan for turnover).

Section 5: Notes on Policy Interventions

Further overview and details of these testing standards are available at:

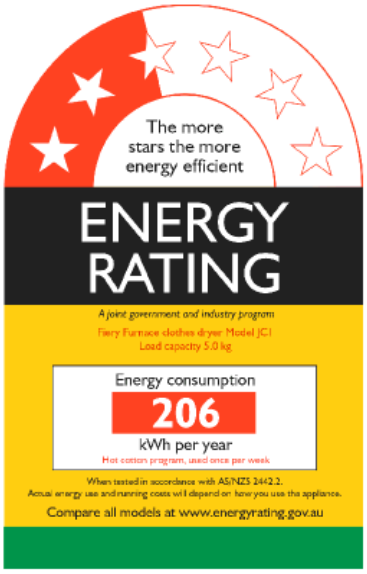
http://www.energyrating.gov.au/cd1.html

http://www.energyrating.gov.au/cd2.html

http://www.energyrating.gov.au/cd2a.html

Picture of the clothes dryer energy label is at:

http://www.energyrating.gov.au/cd3.html



No further information available.

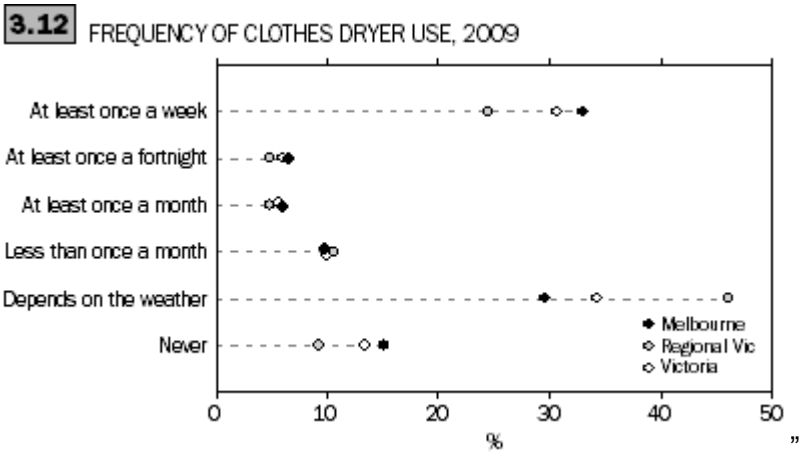
Section 6: Notes on Cultural issues

Typical usage figures vary by state: as an example a quote from recent extract from Victorian analysis (Victoria is one of the two largest states in Australia):

> *"34% of Victorian households varied their use of the clothes dryer depending on the weather. Households in regional Victoria were more likely to vary using their clothes dryer depending on the weather or season (46%). 31% used their clothes dryer at least once a week while 13% of Victorian households never used their clothes dryer.*
>
> *Frequency of clothes dryer use varied across household size, whether or not children resided in the household and income. Households with six or more persons or with children had higher rates (43% and 39%, respectively) of clothes dryer use, at least once a week, compared with the 27% of both one person households and households without children. Households in the lowest annual household income range were more than twice as likely to never use their clothes dryer (21%) than those with the highest income (10%)*
>
> *In Victoria, 1,168,500 households had a clothes dryer. Melbourne and regional Victorian had similar rates of households with a clothes dryer at 55% (833,800 households) and 57% (334,700 households), respectively.*
>
> *Within Melbourne, the Statistical Region[2] of Mornington Peninsula (covering Frankston down to Sorrento and Portsea) and Outer Eastern Melbourne (including*

[2] The Statistical Region (SR) is an Australian Standard Geographical Classification (ASGC) defined area which has sufficient population to be suitable for the presentation of both population Census and labour force statistics within the frameworks for standard statistical outputs from these collections. SRs cover, in aggregate, the whole of Australia without gaps or overlaps.

areas such as Ringwood, Healesville and Warburton) had higher rates of households with clothes dryers at 65% and 64%, respectively. North Western Melbourne SR, which covers Brunswick and Coburg out to Sunbury, had a lower rate (44%) of households with clothes dryers.



Usage of laundry dryers

There are few data on the usage rates of laundry dryers. Surveys by ABS (as shown earlier) provide some insight, though these are more qualitative questions. The labelling regulations use a figure 52 per annum to demonstrate indicative annual consumption, though this will vary by state. An Australian average is likely to be higher than 52, and the 2008 analysis used a figure of around 80 per annum in 2010.