

Fact sheet

Appliance efficiency

Giving consumers options in the way they use electricity

The AEMC Power of choice review is proposing reforms to the National Electricity Market to give families, business and industry more control over the way they use electricity and manage their bills.

Understanding the difference between kilowatts and kilowatt hours for household electrical appliances

When most consumers purchase a new electrical appliance they are attracted by the appliance's features, brand reputation and initial price. Some consumers are also starting to place more importance on the energy efficiency of the appliance, identified through the minimum efficiency star rating labelling program.

The choice of appliance will influence the consumer's total electricity bill. But it will also affect the costs involved in supplying that electricity to the consumer's household, through the rate it consumes that electricity. This fact sheet explains the relationship between electricity consumed (which is measured in kilowatt hours) and the rate which the appliance consumes that electricity (which is measure by watts or kilowatts).

How appliances impact electricity bills

Kilowatts (kW) measure the rate at which an appliance is consuming energy at given time (also referred to as the power rating) while the kilowatt hours (kWh) measure the accumulated consumption of period of time (typically a year). The average household in Australia tends to consume around 7,500 kWh over a year.

The relationship between the kW and kWh of the appliance will depend upon the length of time the appliance is used. This can be demonstrated in the following examples of a typical heater and a typical small TV that consume energy at rates of 2,000 W (or 2kW) and 25 W respectively.

The total energy used by these appliances depends on how often they are used. For instance if the heater were used for 1 hour a day for 5 days then the total energy consumed would be 10 kWh (ie $2 \times 1 \times 5$). Similarly, if the TV is used for 4 hours a day for 100 days then it will also consume a total of 10 kWh (ie $25 \div 1,000 \times 4 \times 100$).

The cost to a consumer of operating an appliance is determined by the electricity prices paid. A typical retail electricity tariff is 20c/kWh. Therefore, in the example of the heater and TV above, the cost to the consumer of consuming 10 kWh would typically be \$2. Having an electricity price which is based upon kWh means that the total energy consumed by the appliance will determine the electricity bill. Hence consumers are likely to understand the link between the energy efficiency of the appliance and electricity bills.

However, the cost of supplying energy to a consumer can also be influenced by the power rating of an appliance. This is especially the case if the appliance is used during periods of high loading on the electricity network. The electricity network is normally most heavily loaded in the late afternoon and early evening when people come home and use cooking appliances, heating/cooling, lighting and entertainment systems. The cost of building the electricity network is driven by how heavily it is loaded at these times. Therefore the kW of the appliance will drive the costs of the poles and wires used to supply electricity to the consumer, and hence the cost of supplying the electricity. This higher network costs for supplying is recovered from all consumers by raising the network tariff.

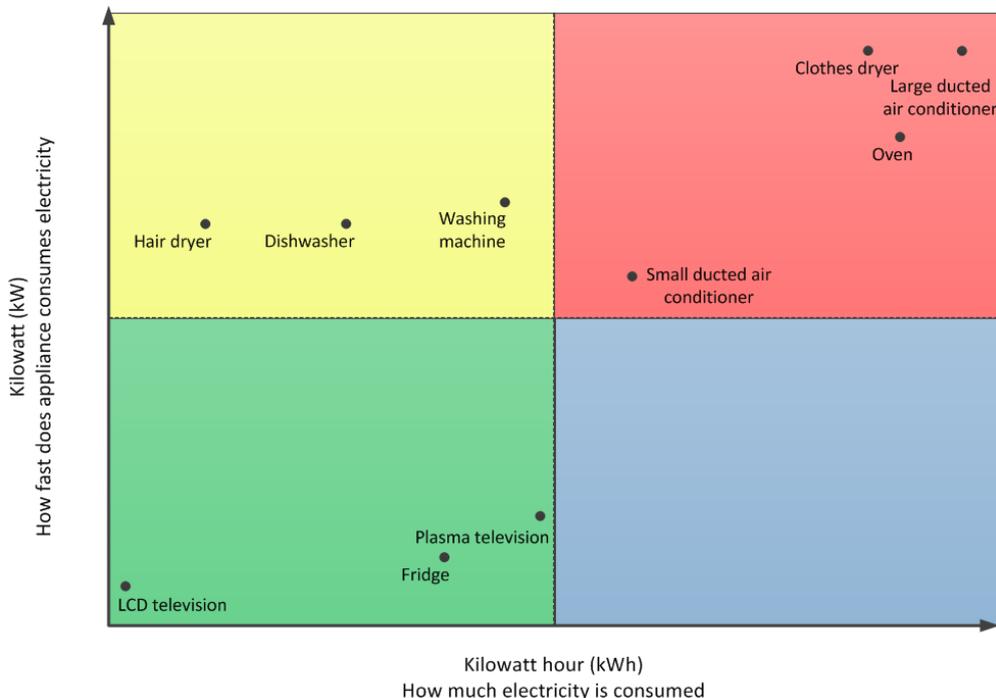
AEMC engaged Ernst and Young to provide estimates of some changes in consumption due to household appliance use between 2010 and 2020. The report shows that installation of certain appliances will have an impact on total levels of consumption. In particular, the installation of new televisions is expected to result in a 117 per cent increase in electricity consumption out to 2020.

How appliances impact electricity bills (continued)

One of the drivers of the rising electricity bills for households has been the increase in investment in poles and wires. A factor behind this has been an increase in the use of appliances that have a high kW rating. Analysis conducted for the AEMC by Ernst and Young indicated that high kW appliances such as air conditioners are a key driver of peak demand growth across networks in the NEM and a major driver of capital expenditure.

The following chart shows the consumption of some typical domestic appliances and how the relationship between kW and kWh differs depending on the type of appliance. The vertical axis shows the rate of power consumption (in kW) while the horizontal axis shows the anticipated annual energy consumption (in kWh) based on approximate usage.

Figure 1: Typical kW/kWh for household appliances



The appliances:

- In the top right are the larger appliances that can run regularly, such as air conditioners and ovens, and can cost over \$100 a year to operate as well as having a significant impact on network costs.
- Towards the bottom right are the appliances (like heavily used plasma TVs and large refrigerators) that have a lower power rating but operate much of the time and therefore can consume over \$100 of electricity in a year.
- At the top left are the larger appliances (like vacuum cleaners and hair driers) that do not cost a lot to operate because they are not used for long periods but can have a significant impact on network costs because of their high power rating.
- At the bottom left are appliances that have a low power rating and do not operate for enough time to cost a lot to operate.

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