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How Green is Your Fridge?

Display fridges are generally left on 24/7 to keep the contents cool. While on, fridges cycle on and off to maintain the internal temperature. For display fridges, lights are usually kept on overnight, increasing the internal temperature and making the fridge work harder.

Relevant for:

- Vending Machines
- Alcoholic Drinks
- Soft Drinks + Water

Not relevant for:

- Dairy
- Food

By leaving the machine on overnight, you consume between **25-40%** more energy daily than is necessary. For example in Table 1, turning an upright display fridge off overnight can save around **$150 each year**. This is the equivalent of effectively giving away 60 cans of soft-drink each year.

For non-perishable items, it is possible to turn your fridge off every night whilst ensuring the quality of the items, keeping the machine healthy and saving yourself money in reduced electricity bills.

Table 1: Savings by turning OFF fridge overnight

		Rated Power (kW)	✖ Hours/ day	✖ Days/ year	✖ Duty Cycle[1]	= Energy (kWh/year)	Cost ($/year)[2]
ON 24/7	*Normal operation*	0.5	24	365	40%	**1,752**	**$438**
OFF Overnight	*Normal operation (4.30am-7pm)*	0.5	14.5	363	40%	1,053	$263
	Cooling down (4am-4.30am)	0.5	0.5	363	100%	91	$23
	Off (7pm-4am)	0.5	9	363	0%	**0**	**0**
	Total					**1,144**	**$286**
					Daily savings	**1.7**	**$0.40**
					Yearly savings	**608**	**$152**
					Lease term savings	**3,040**	**$760**

What's involved?

You can capitalise on energy savings in a few ways – the best option depends on the number of fridges, layout of the store, and if any other appliances will be connected to a non-essential circuit. Compare the options in Table 2.

Figure 1: 24 hour timer

For tenancies with few non-perishable fridges, we recommend installing either:

a) Fridges with inbuilt "standby" modes - where the internal set-point temperature of the fridge is set closer to room temperature than normal after operation and the lights turn off, or:

b) 24 hour timer at the wall connection point for each fridge.

[1] The duty cycle is the proportion of the time that the machine works at rated power while cycling on and off.
[2] Assuming an electricity cost of $0.25/kWh

For tenancies with multiple non-perishable fridges and many other non-essential units which can be turned off overnight we suggest installing all fridges on a separate, non-essential circuit and installing an automatic timer on this circuit at the EDB. This is the most expensive option, but removes complexity for the user.

Figure 2: Digital timer in EDB

Table 2: Options to reduce fridge energy consumption

What's involved?	Additional Costs	User Burden	Comments
1. **Manually** turn off each appliance every night and on every morning.	$0	High	At risk of staff forgetting. Staff may need to come in early to pre-cool. **Best for:** Only 1 fridge, dedicated staff.
2. Install an **efficient** machine with inbuilt "eco" or "standby" modes.	$?? Prices vary heavily between manufactures and suppliers.	Mid	No electrician required. At risk of staff changing controls. Unfamiliar machines are required. **Best for:** Few fridges that are difficult to consolidate together.
3. Install an automatic timer between at the wall connection point.	$10-$30 / timer	Low	No electrician required. At risk of staff changing controls. **Best for:** Few fridges that are difficult to consolidate together. Few other non-essential circuits.
4. Install fridge on a separate, non-essential circuit. Install an **automatic** timer switch between the circuit and the EDB.	$100-$500/ timer $60-$100 labour[3] $50 + parts[4]	Low	An electrician is required to install a timer between machine and EDB – under 1 hour. **Best for:** Multiple fridges that are close to each other. Many other appliances to be put on non-essential circuits.

What are other people doing?

Coca-Cola Amatil	25% savings	Developed 'Energy Management Device' for fridges: ▪ Turns on fridges 2 hours before trade. ▪ Standby mode at end of trade increases fridge's set-point temperature overnight ▪ LED lighting
Bottle King Liquor Store Victoria	$1,000/year savings (7 fridges)	Installed 7 manual timers, turning fridges off from 11pm to 8am.
Pretzel Zone Fast Food, SA	N/A	Installed 2 manual timers.

[3] This is based off a basic tenancy and an hourly rate – the amount of time to connect all non-perishable fridges to a separate circuit will depend on complexity of tenant layout and number of fridges.

Quality of drinks and safety

Fridges are designed to contain cool air – so when the doors are kept shut (and the machine is leak-free) the internal temperature remains cold. Tests have demonstrated that the temperature inside drink fridges increase around 5°C when turned OFF overnight[4] - from a set point temperature around 4°C up to 9°C.

The increase and decrease in temperature is gradual, and for non-perishable items such as drinks, this will not affect the taste or safety.

By putting the fridge on a timer, or implementing an internal timer in the machine, the machine will automatically turn itself back on an hour or two before trade to make sure drinks are cool for the first customers. A well-maintained machine without leaks should take 30 minutes to cool back down to the set point temperature.

Longevity of the machine

In general, the best way to maintain the internal components is to use them less. Turning the machine off at night reduces the work load by the compressor, leading to increased longevity of the product. The temperature change overnight should be small and gradual enough not to cause significant thermal stress in the machine.

[4] Sustainable Fridge Timer Project, Hume Environmental Heath, Victorian Government