THE FOOTPRINT COMPANY™

How Green is Your Coffee?

It is common practice to keep coffee machines running 24/7 in the hospitality industry. While on, the machine continuously consumes energy – cycling on and off to maintain the temperature in the boilers - even overnight.

By leaving the machine on overnight, you waste between **25-35%** of the total annual energy used. For example in Table 1, turning a 3 group, 8kW machine off overnight can save around **$900 each year**. This is the equivalent of effectively giving away 225 (good) coffees each year.

It is possible to turn your machine off every night while ensuring the best tasting coffee, keeping your machine happy and saving yourself money in significantly reduced electricity bills.

Table 1: Savings by turning OFF coffee machine

		Rated Power (kW)	✖ Hours/ day	✖ Days/ year	✖ Duty Cycle[1]	= Energy (kWh/year)	Cost ($/year)[2]
ON 24/7	*Normal operation*	8	24	365	20%	**14,016**	**$3,505**
OFF Overnight	*Normal operation (4.30am-7pm)*	8	14.5	363	20%	8,422	$2,105
	Heating up (4am-4.30am)	8	0.5	363	100%	1,452	$363
	Off (7pm-4am)	8	9	363	0%	**0**	**0**
	Total					**9,874**	**$2,468**
					Yearly savings	**4,142**	**$1,037**
					Lease term savings	**20,710**	**$5,185**

What's involved?

You can capitalise on energy savings in a few ways – we suggest automatic timer switches. While being the most expensive to install, they can be paid back in 2-7 months, resulting in a net savings of $4,500-$5,000 over the lease term in the above example.

Table 2: Ways to cut coffee machine costs

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-heat.
2. Install an **efficient** machine with inbuilt "eco" or "standby" modes.	$?? [3]	Mid	No electrician required. At risk of staff changing controls.
3. Install an **automatic** timer switch between the machine and the EDB.	$100-$500/ timer $60-$100 labour	Low	An electrician is required to install a timer between machine and EDB – under 1 hour.

[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
[3] Prices for all machines vary heavily between suppliers and manufactures. Wega Concept "Green line" 3 group machine can be found ~ $9,500, in the higher price bracket along with a 3 group La Marzocco machine for ~$12,000, while Boema Conti ~ $6,000.

What do manufacturers say?

Manufacturers are considering the energy consumption of their machines and many now offer energy saving modes. These "eco" or "standby" modes lower the set-point temperature in the boilers to reduce energy consumption. Some offer in-built timers in the machine to turn it off completely.

We've reached out to a few manufacturers. Here's what some have said:

Sam, Boema Australia	Conti and Schaerer machines have an "Eco" mode as well as an inbuilt timer to turn off completely. - "*The machine needs to be turned off at the end of the working day as a safety measure more than an energy consumption issue*."
Frank, Wega Coffee	The Green line machines offer an "Eco" mode as well as an inbuilt timer to turn off completely. - *Machines will take between 25-30 minutes to heat up completely – it's not long.*
Chris, Slayer Coffee	The single group espresso machine has a "power save" mode. - *The power saver mode drops the energy consumption during use to 50%.*
La Marzocco	Offers an "Eco mode" which puts the machine in a standby state.

Quality of coffee

A well-maintained machine should take around 30 minutes to warm up, but the thermal stability of ALL the components is what's crucial to good coffee. This may require 1-2 hours of preheating.

Timers allow the machine to automatically turn on in the morning, so staff don't have to worry about it. Most timers are easy to adjust and some can be adjusted remotely – so the preheat time can be set to whatever you feel most confident with.

Lime scale build-up

Lime scale build up in solenoids and pipes causes blockages in the machine, making it work harder to supply appropriate pressures and can cause premature failure. It forms when minerals in the water precipitate and clump together, an effect which is exaggerated by heat.

Like any machine, it is important to install filters if the local water hardness is high as well as regular maintenance and cleaning. With a good filter machines can go up to 3 years without build-up[4].

Thermal stress

Electric elements in the machine cycle on and off multiple times a day to keep the boiler at its set-point temperature. Turning the machine off overnight prevents cycles that occur overnight and replaces them with one cycle. While the elements have to work harder in the morning than they would have done otherwise, they work less overall, potentially leading to increased longevity of the elements.

The temperature change due to turning the machine off is gradual – especially if the boilers are well insulated. The increased thermal stress on the joints and seals due to expansion and contraction should be gradual enough not to cause a significant difference over the machine's lifetime.