This is research that most people will find interesting and useful, unless of course you live in an igloo or somewhere without electricity ☺

It’s about lightbulbs, or to be more specific, energy efficient lightbulbs. You may be wondering why I'm looking into this, as everyone on the planet knows there's something wrong with the climate, and this is one way we can help.

Now, I'm not going to look into the whole climate issue, as I don't have the time for it, but this is one thing I will look at. Why? Well, it’s all because a few months ago, I was popping in a few lightbulbs at home, and we noticed that they hardly last that long compared with the old fashioned type of bulbs. So, I decided to take a bit of a look.

So, for this type of research, I'm hoping to look at a few things: The background on why the old fashioned bulbs are being replaced; what are the many options of replacement bulbs; how long they state vs how long a typical household will use them; how much they cost; what are they made of; how are they recycled, and the costs involved.

As you can guess, this may be a lengthy bit of research, so hopefully I won't bore you all completely ☺

So, without further ado, let's begin.

Firstly, the old fashioned lightbulbs. I say old fashioned, as there are a lot of the younger generation that will have no idea that they even existed, and what they are. Well, for many years, there was only really one type of bulb, the bayonet. The screw appeared at a much later date, but the actual bulb itself is of the same type of material.

It basically had a wire filament that when heated to a high temperature, then began to burn brightly. The filament was protected by a glass bulb, which was filled with an inert gas or vacuum. The typical bulbs were of the wattage 40, 60 and in some cases 100, although that was very bright.

According to this website, you can see the lumens, L/W and efficiency of each type of bulb wattage:

https://web.archive.org/web/20120423123823/http://www.ccri.edu/physics/keefe/light.htm

Scroll down near the bottom, and you'll see this small table:

Watts	Lumens	L/W	Efficiency
40	505	12.6	1.86%
60	870	14.5	2.13%
75	1190	15.9	2.33%
100	1750	17.5	2.6 %

But, they were fragile. Many a time, when you were putting in a new bulb, if the fitting was old, you could be scared that the bulb will smash in your hands (rarely happened), or if you dropped it, the bulb smashes. As it was just glass, the shards could be very sharp, and you had to be careful to make sure all were picked up. Add to the fact that the actual filament inside was fragile as well, one tap too much, and you could see it break, and then it's a useless bulb.

And then we come onto how to recycle them. Well, you didn't. They were just chucked into the normal household waste. This is because of the glass and filament that were too fragile, so in this current world of 'we must recycle everything', this was a waste.

And in case you don't know what one looked like (and it seems you can still buy them):

https://www.lightbulbworld.co.uk/light-bulb-100w-bayonet-cap-clear-10877-p.asp

But from that site, they're not cheap. Anyway, I digress. Let’s move on to the next main part of the research.

Now, there are a lot of different types of energy efficient bulbs out there, ranging from tiny ones that sit in your cooker (when you open the door and the light appears) all the way to massive spotlights in the garden. And each have different types of fittings, lumens, energy efficiency and of course, price.

For example, in the old fashioned one posted above, there was just originally the bayonet. Eventually, screw types appeared, but these were normally for lamps, not for the main light in the house. Nowadays, you have to know the exact size, and if you happen to have spotlights in your bathroom, you need to ensure they’re a specific voltage, otherwise the power may not be enough and they appear dim.

So, with this in mind, I’m just going to focus on one bulb. Only one, I hear you yell. Yep, because hopefully the findings for this will be usable in all others.

Here it is from a company that many in the UK will have heard of:

https://www.homebase.co.uk/tcp-led-classic-40w-es-warm-2-pack_p500310

And the box looks like this:

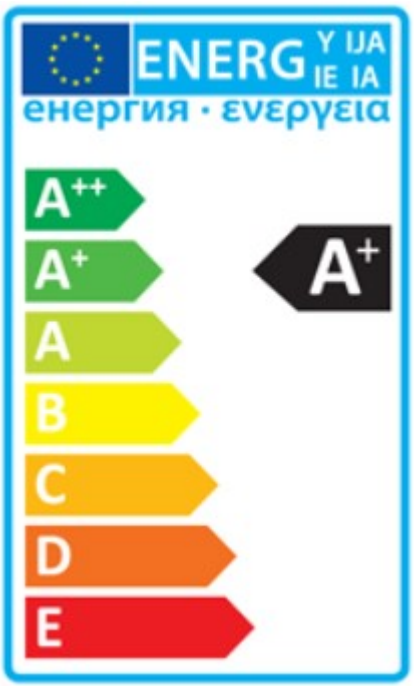
Now, in case you're as confused as I tend to be with these type of lights, the actual supplier (TCP) has a great page of info:

http://tcpi.eu/lighting-technology

It explains what each type of bulb is, life, and cost effective. So, in the case of this one here, there is actually no mercury used, so that's a good thing. It has an energy saving level of A+.

So, for this, it's using that handy diagram we've all seen on many products these days. Interesting, but this is actually an EU rating scheme, to summarise the energy efficiency of buildings in the EU. Now, the UK recently has left the EU, so this shouldn't come as a surprise unless you've been living under a rock for the past 4 years. So, the partial query is, will the UK still use this chart, or adopt their own?

Who knows, but at the moment let's pretend we're still using it ☺



So, this bulb is an A+, so pretty darn good.

It states it has a long life of 25 years, so instantly it’s a seller.

This is what it looks like on the back, it’s a bit grainy for the wording at the bottom, but all the main details are there:

All looks pretty impressive, but why is it we still have to buy them? What I mean is, if this bulb lasts 25 years, but only costs £6 for a pack of two bulbs, how on earth can the companies that produce them make any profit?

Well, it's in the famous small print of course.

So, on the front of this box, you can see an asterix just after the years:

And if you then look at the back of the box, it states on the first line at the bottom:

*25 years if used 2.7 hours per day.

Now, who on earth only uses a lightbulb for less than 3 hours a day? When it gets dark at 4pm some parts of the year, all the way till bed, which for most is 11pm (not me, I'm a night owl, up till 1am most nights).

Also, it states that it has a maximum of 15,000 On/Off switch.

So, can we actually determine some things out based on this? Well, yes we can. Lets look at the 25 Years bit to begin with.

Remember on the back it states 25,000 hours, as its lifetime. But this isn't years. 25,000 hours is actually 2.85 calender years, which is 34 months or 2 years 10 months.

Well, that's interesting, what happened to the 25 years bit?

Its from that little bit about the 2.7 hours per day:

2.7 hours x 365 days = 985.5 hours.

985.5 x 25 = 24, 637

Roughly the 25,000 hours they brag about.

So, if you only turn it on for that very short period a day, you're sorted. But what happens if you leave it turned on for a typical evening, say from 6pm to 11.30pm (5hr 30mins):

That's roughly twice of the allocated time (2.7 x 2 = 5.4). So, we have to divide the 25,000 by 2 to get 12,500.

And then that calculates to half the amount of years, which will be 12.5 years. But that still doesn't seem to make any sense, as I'm pretty sure most of us haven't had the same bulb for over 10 years.

The on/off switch doesn't cause any issues according to what I've read when looking up on this, but then why does it state 15,000 on/off's?

The reason I ask this, is if you switch it on and leave for 2.7 hours, then switch it off, that would be 2x switches. So, with this in mind, using it for a typical 25,000 hours (as stated on the box), that would be:

15,000 divided by 2 (to get the on/off per use) = 7,500 times that you can turn it on and off again.

7,500 x 2.7 (amount of hours that you can use when turning on/off for time stated) = 20,250 hours.

Hmm, but that doesn't make sense either. So, I did something that I know a lot of people out there will hardly do…..I contacted the manufacturer ☺

To: Information <info@tcpi.eu>
Subject: LED Classic information help

Dear Sir or Madam

I'm hoping that you can help clarify something regarding LED light bulbs.

I have just purchased the TCP LED Classic 40W ES Warm bulbs, and was looking at the information on the back of the box.

Whilst I understand about the bulb life being affected by the amount of hours used (i.e. if I go over the stated 2.7 hours per day, then the lifetime will diminish), I'm a bit confused with the On/Off being only 15,000x.

Is that calculated as switch on and then off, equals 1x. Or switch on and then off, equals 2x?

I'm trying to figure out if the on/off affects the lifetime (25 years in this case), because if it doesn't, why is it stated.

I look forward to any reply on this issue.

Kind Regards

Eddie

And the reply:

Customer Service <customerservice@tcpi.eu>
Tue 10/03/2020 08:03
You; Information; Customer Service

Good Morning,

The lifetime of the bulb is affected by switching on and off many times but mainly by the left of time the bulb is on and in use.

Both will lower the lifetime,

The lifetime has to be stated on the packaging by law but this does not mean that the bulb will last this length of time.

Regards

Tracey
Commercial Services

Technical Consumer Products Limited

Now, this is very interesting indeed. Check out what the reply was for each thing:

Yes, the lifetime of a bulb IS affected by switching off and on many times. Now, if you search in Google about the same question, everyone comes back and says it doesn't affect the life of the LED bulb.

For example, here on the official government website:

https://www.energy.gov/energysaver/save-electricity-and-fuel/lighting-choices-save-you-money/when-turn-your-lights

The operating life of a light emitting diode (LED) is unaffected by turning it on and off. While lifetime is reduced for fluorescent lamps the more often they are switched on and off, there is no negative effect on LED lifetime. This characteristic gives LEDs several distinct advantages when it comes to operations. For example, LEDs have an advantage when used in conjunction with occupancy sensors or daylight sensors that rely on on-off operation. Also, in contrast to traditional technologies, LEDs turn on at full brightness almost instantly, with no delay. LEDs are also largely unaffected by vibration because they do not have filaments or glass enclosures.

Well, that is a load of rubbish, as the manufacturer said it is affected.

It's also affected by the length of time it's left on, which is the 2.7 hours bit. Longer than that, reduced the bulbs lifetime, which we already know, so that's good to see they said the same.

But the real crunch of the reply was this bit:

"The lifetime has to be stated on the packaging by law but this does not mean that the bulb will last this length of time."

So, there you have it. Even though there is a lifetime on the packet, if you use it for more than 2.7 hours a day, turn it off/on more than 15,000 times, then the life will diminish. Or, they also have to put this down as a rough estimate, as no-one knows how long any person will leave a light switched on.

For example, we have one in the porch. Used for less than 2.7 hours a day, so you would assume it'll last longer. But then we'll be switching it on/off when coming in, then a bit later may go back to get something, coat etc., switch it on/off again, go out and come back in the dark, so switch it on/off again. So, in the space of say 2.7 hours, we've switched it on/off three or more times, which will reduce the lifetime a lot.

So, there you go. You can probably look at light bulbs in a whole new way, as in looking for the small print for hours, and on/off. And taking that lifetime with a pinch of salt, and realise that yes, not in 25 years but a year or so you may have to splash the cash on a new bulb ☺

I hope you enjoyed this bit of research, please comment etc., and thank you all.