(Approx. 1561)

President's Corner

Wyzedom - The Wisdom of Battery-Powered Products

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Batteries are the new normal. Throughout history, humans have found different ways to power their devices. Humans initially provided the power but soon enlisted animals to plow, power mills, and pull wagons. The industrial age was powered by burning fuels like coal and oil, which brought significant progress but released a lot of carbon dioxide into the Earth's atmosphere. We must transition to low- or carbon-free energy to reduce climate change. Electricity is the best medium to distribute that energy, and batteries are the primary way to store it. As we move into an all-electric world, we will need more electricity, batteries, and some good strategies for charging and disposing of those batteries.

A white and blue electronic device

Description automatically generated with low confidenceWhen I look around my house, I see many things that are now powered, or now powered by electricity, but were not when originally invented. Toothbrushes, razors, can openers, corkscrews, safes, clocks, clothes washers – all these things were originally human or mechanically powered but now have electrically-powered versions.

Stoves cooked by chemical processes (burning fuel) and clothes were dried by natural processes (outdoor air on a clothesline). Still, these tasks are predominantly accomplished by using electricity (or soon will be, with the eventual elimination of residential natural gas). Automobiles, trucks, trains, and planes were all powered by burning fuels but are now on the path to eventual electrification. Many of these things are mobile, or at least would be hindered in use by being tethered by a cord, and so will need batteries to operate.

My house now has several electric items it didn't have before. My wife has bought some electric soap dispensers for the kitchen and bathroom. Instead of pressing down on the top of the bottle to dispense some liquid hand soap, you put your hand under the nozzle, and a sensor detects it and squirts some in your hand. It is more hygienic, but it has batteries that require replacement or recharging periodically, and it is just another device that can break. Do we really need it?

How many battery-powered devices do you think you have in your home? Ten? Twenty? Fifty? One hundred or more? I don't know how many I have, but it could well be that last guess. I pondered this question recently as I sat on the only seat in our master bathroom. From that vantage point, I could see nine devices that contained a battery, with another two that I knew were nearby in cabinets. Multiply 11 by the number of "rooms" in our house, and we would have over one hundred batteries to deal with.

These bathroom devices I found are probably a fairly representative sample of the types of battery-powered devices we own and fall into two classes, depending on if the batteries can be removed. Six of them (two electric toothbrushes, a shaver, a Bluetooth speaker, a face scrubber, and one hair trimmer) have rechargeable batteries that can't be removed. The other five (wall clock, clock/thermometer, flashlight, another hair trimmer, and a bathroom scale) have replaceable batteries. These five typically use disposable single-use batteries, though all but the wall clock (which is powered by a coin cell battery) use AA or AAA batteries, which would allow the use of rechargeables.

A picture containing indoor, sitting, toothbrush, tool

Description automatically generatedBeing powered by batteries does not limit the usefulness of any of these bathroom devices. The toothbrushes are charged inductively through their holders and can stay charged constantly; their charging is transparent to the user. The other four devices that don't have removable batteries must be plugged into a wall outlet to recharge, but since a full charge typically provides many uses, we are seldom caught with a dead battery. My shaver, for example, can go for well over a week of normal use on one charge, so I typically plug it in to charge after I have used it on Sunday mornings. It charges fully in an hour or so before I need it again. Like the hair trimmer and face scrubber, it also can be used in a pinch while charging; having a cord does not significantly degrade its usability. The remaining devices with removable batteries either have a long battery life (typically years for the clocks and scale) or rely on a quick battery change to keep going.

A picture containing scale, toilet

Description automatically generatedMoving from the bathroom into the bedroom, I find only slightly fewer battery-powered devices. There are remote controls for the TV, cable box, DVD player, ceiling fan, and window air conditioning unit. A couple of flashlights, a clock, and a cordless phone are in its charging base. These fall into the same two battery categories and present no particular problems to the user by being powered by batteries (other than having some replacement batteries on hand when needed).

Moving from the bedroom to the hall, I see one of my favorite battery-powered devices, the Wyze night light. These small stick-on lights can be used to illuminate your path at night. They detect your motion and turn on, and can be linked to turning on a series of them when triggered. I have a set of three on my stairs (top, middle, and bottom) to keep me from falling and breaking my neck in the morning when it is dark, and I don't want to wake my wife by turning on the ceiling light fixtures.

I love my Wyze lights, but keeping them charged can be problematic. In normal use in my stairs location, they run for about three weeks on a charge. I have come to rely on them to light my way, and so I do not want to wait until they are discharged. I initially tried charging them on a two-week schedule, taking them down (they are magnetically attached and easily removed) every other Sunday. They must be charged during the day when not needed and take about 2 hours to charge fully from a USB charging source. The Wyze lights have a USB-C connector, and to protect that connector, I use USB magnetic charging cables and adapters.

The problem in charging the Wyze lights came from having to charge each one separately. I initially used one USB AC charger and cable and had to charge the three lights sequentially. This took at least six hours, and I had to be around most of the day on Sunday to swap them on the charger. Occasionally I was not, so I sometimes had problems getting all three lights charged before dark.

I celebrated with the First Lady most of the day on Mother's Day and did not get my Wyze lights charged before dark. I decided to find a better way to charge these lights. Possible solutions to my problem included:

1. Faster charging – The process would not take all day if each light could charge faster. This would require some investigation to determine if this would be possible.

2. Parallel charging – If I could charge all three lights simultaneously, it would take 1/3 of the time, and I would not have to hang around to swap lights on the one charging station. It would require buying a three-output USB charging station and two more USB charging cables.

3. Have an alternate set of lights – If I bought a second set of Wyze lights, I could charge the alternate set over the two weeks and then swap them all out at once. This would be the fastest and most versatile but requires buying another set of lights.

I first investigated if faster charging was possible. I bought a MakerHawk USB 3.0 A picture containing cable, electrical wiring, electronics, power plugs and sockets

Description automatically generatedTester from Amazon a while ago; it can be used to test USB-powered devices and USB cables and to monitor USB charging. Connected between a USB charging source and a device to be charged, it can display the voltage, current, power, charging mode, and other things.

I used the USB 3.0 tester while trying to charge a Wyze light with several different power sources (USB AC charging cubes and USB power source batteries) and several other USB cables. No matter what combination of source and cable I used, the power into the Wyze light remained between 0.951 W and 0.976 W. A higher power into the light would be needed to charge faster, so it appears speeding up charging is not possible.

I found another dual-output USB charging block and a couple more cables in my household stock and set them up in the spare bathroom I use for charging. This method worked well, and I could set them up and walk away, knowing they would all be charged when I remembered and returned.

Using another set of Wyze lights as a charging spare might be slightly easier, as I could charge them sequentially at my leisure over the two-week operating period. It would, however, require buying another $26 set of lights, and I'd still have to keep track of which lights are charged and which are not.

Ultimately, I've found the parallel charging method works the best for me. It gets the lights all charged at once and has the benefit of having the "charging station" set out for less time, which makes my wife happier. I've now adopted this charging method for my bike lights and switched to charging my front and rear rechargeable safety lights simultaneously rather than sequentially.