# Ubuntu 22.04 laptop battery documentation

*This document goes over general documentation of my experience with battery performance and activity while using Ubuntu 22.04 on a System76 Pangolin laptop (from 2022 June 8th to the present (Sunday, 2022, June 26th) Please note that this range will not be updated unless the document is updated. I will still be using Ubuntu past 2021 December 13h*

**Battery mode in use:** `Battery life`

**This section was last updated on 2022 Sunday, June 26th at 8:50 pm (V1)**

1) Slowly charges 1-2 (sometimes 3) percent at a time up to 90%, slowly charges onward
2) 98% takes over 20 minutes to go to 100%. Further data is required
3) Battery has not dropped 2% at a time with high or normal CPU usage, unlike my last system
4) Battery charges 1, 2, to 3% at a time commonly, this is normal.
5) The battery estimate is currently almost always over 20 hours, despite never lasting more than 5 hours
6) Ubuntu 22.04 has 3 battery modes: Battery life (strict) Balanced (medium) High Performance (drains fastest)
7) Ubuntu battery performance vs Windows 10/Windows 11 battery performance: I am not able to 100% tell on this, as I have different batteries for different systems, and I don't have a Windows 10 laptop anymore. From my research, Windows performs better, as there is dedicated drivers for improved battery life that Linux unfortunately has not received yet. This is unconfirmed, and I can't find the source I got this from right now. Linux battery life is still pretty OK, 3-5.1 hours of battery life is good with heavy usage (it lasts over 14 hours when idle. I cannot test for Windows 11, as there are no devices running Windows 11 in my household
8) The battery color is **green** while charging, unlike Ubuntu 20.04, which is white
9) New difficulty: finding the battery screenshot via thumbnail (in dark mode) searching for a black box on a græy background, instead of a white box on a græy background
10) The battery never showed the status "estimating" until 2022 June 14th, 6 days into usage as my daily driver
11) The time it takes for the system to recognize the charger is plugged in is no longer 2 seconds, but is nearly instant (less than 0.1 seconds)
12) Large estimate definition: on XPS 13: 20 hours or higher | On System76 (device 1) 24 hours or higher
13) I switched over 2022 June 8th, images from this day are on both devices (the System76 Pangolin, and the original XPS 13)
14) Ubuntu says the system has low battery at 29% (the battery icon turns red) which is a pretty high amount compared to most other operating systems (iOS 4-6, Windows 10: 20%, Android: 15%) this is the same for both Ubuntu 20.04 and Ubuntu 22.04

here is the battery at 30%
**Insert image here**
Now here is the battery at 29%
**Insert image here**

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# Thesis

Thesis currently unavailable.

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# Other important battery advice

## For Lithium Ion batteries

1) Lithium batteries degrade over time. Do not buy a replacement battery while your current battery is in perfect health, as the backup battery will degrade/rot in storage, then by the time you need to use it, it will not work very well/at all.

2) Based on general advice, it is recommended to not let your battery drop below 20% and not charge above 80% this is best for the batteries health. If you can't follow the step of stopping every charge at 80%, you can at least plug your device in when it gets low (for example: lately, always plug mine in at 23-29% battery)

3) MacOS 11.0 (Big Sur) and subsequent versions (MacOS 12.0 Monterey, MacOS 13.0 Ventura) have a built-in feature to limit battery discharge at 20% and battery charge at 80%. I don't know of any other operating system that forces this rule (Ubuntu says it does, but it actually doesn't, as I have used my device with less than 11% battery before)

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# File info

**File type:** *OpenDocument Format (*.odt)*

**File version:** 1 *(2022, Sunday, June 26th at 8:52 pm PST)*

**Page count:** 2 *(according to LibreOffice Writer, it may differ depending on what program you are using to read this document.)*

**Article language:** *English (US) with basic Rich Text Formatting, a numbered list, and 0 image files in PNG format.*

**Word count:** *806*

**Character count:** 4,461

*This section was last updated on 2022 Sunday, June 26th at 8:50 pm (V1)*
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