

# Case Study: Assessing the Energy Consumption of Cloud Gaming vs. Local Gaming in both Xbox and PlayStation consoles in 2025.

## Introduction

### What is the purpose of this article?

Over the past few years, cloud gaming has become a solid alternative to local gaming for many users worldwide, with many companies adopting it such as the subject of this case study: Microsoft and Sony. [1]. Although both cloud gaming and local gaming make use of the same hardware at face value, that being the games console used by the consumer, they have different ways of achieving their respective purposes. As a result, these two ways of interfacing with a videogame through a console consume different amounts of energy in their entirety. This discrepancy will be studied in this article.

### What do you mean by cloud gaming and local gaming?

Cloud gaming is the act of streaming a game from a server to a console (which is the client machine). This allows the user to play a game that is not installed in their console, but rather being fully streamed to their console from the aforementioned server. [2]

Local gaming on the other hand, is the act of downloading a game into a console's secondary storage, or inserting an external drive (often optical such as DVD or BluRay) and playing the game from this aforementioned storage. No streaming is involved. [3]

### Why Xbox and PlayStation?

The PlayStation 2 has gone down in the history of gaming as the console with the most units ever sold [4], proving the popularity of Sony's consoles as a whole. Additionally, the PlayStation 4 and 5 are still widely used today. [5]

The Xbox, although less popular, is still a widely used console worldwide [6], with many PlayStation titles being ported to Xbox and vice-versa.

Additionally, both Sony's PlayStation and Microsoft's Xbox have cloud gaming services, those being PlayStation Plus Premium [7] and Xbox GamePass [8], respectively. These services make these brands the best case study for this article's topic, as we can use them in a comparison to their local gaming counterparts.

## The Data

### Energy Consumption of Local Gaming

Firstly, we must understand how much energy these consoles use up by themselves (we will be using PS5 and Xbox Series X as they are recent.) This will reveal the energy used for local gaming, and will give us an initial idea for cloud gaming.

The PS5's maximum power rating is 350 watt-hours. This means it consumes 350 watts of energy per hour. [9]

On the other hand, the Xbox Series X's maximum power rating is 315 watt-hours. [10] This means that for local gaming, these consoles use up 350 and 315 watts per hour respectively, as these are the power ratings of the consoles themselves, which are the only hardware necessary to locally run a game.

## Energy Consumption of Cloud Gaming

For cloud gaming, things get a bit more complicated, as the consoles aren't the only hardware needed. We also need servers to stream these games from, which are located in server farms. A server farm is a place where many servers stay together. [11] It is optimised for cooling the servers and making them run as smoothly as possible. This cooling process is the second most energy-consuming aspect of a server farm, just behind the servers themselves. [12]

Sony and Microsoft are both massive companies which own server farms from which they can stream video games to their customers' consoles. This means that on top of the energy consumption of the console itself, which was mentioned previously, we now have to take into account the additional energy consumption of the server farms used for streaming.

According to [11], the annual energy consumption of data centers in the US is about 90 billion kilowatt-hours per year. This number can be divided by the amount of hours in a year to yield the hourly energy consumption of these data centers, or server farms, which gives us approximately 10,274,000 kWh.

## Conclusion

### The Final Verdict

Although cloud gaming has its benefits, such as an unified multiplayer experience across that company's services, and taking up less storage space on users' consoles, ultimately, the hourly energy requirements to keep a server farm running are much more intensive than running a console by itself. As we can see, local gaming does not consume much energy at all when compared to cloud gaming. Gamers should stick to downloading games locally, or buying game discs, if they want to use their consoles sustainably. Local gaming beats cloud gaming in every way when it comes to sustainability.

### What can be Improved?

If companies want to keep providing these cloud gaming services, the only way to reduce environmental impact would be to source all of the energy used sustainably. This can be done by using renewable sources of energy such as wind, solar or nuclear.

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