

The Galaxy Team has decided that in order to advance the research on Pokemon and the Pokedex, Jubilife village needs a brand new power plant. Luckily, Professor Laventon has discovered that the Pokemon, Voltorb, is the best candidate to help power the village. Voltorbs can cleanly and efficiently produce electricity. An average Voltorb is about 0.5m (1'08") tall and weighs 10.4 kg (22.8lbs). However, they are uncommon and are only found in the Sacred Plaza.

**Objective: How many Voltorbs will you need to catch to fully power the village. Describe each step in your thought process.**

### Initial Thoughts

The first thing I thought about when I heard this question was physics. Since I saw keywords such as power, the size of the Voltorb, and powerplant, I assumed that there would be information given to complete the problem. The problem also gave me two links that I could use, a link to Jubilife City and Voltorb on Bulbapedia. While looking through the two links, I found that there was almost nothing that could help me with the problem. This is when I realized this was more of a creative thinking problem.

### Looking for any type of useful information

Next, I scanned through the two links trying to find anything that could be relatively useful in estimating the number of Voltorbs needed to power Jubilife City, things like the stats of the Voltorb, mainly the attack and attack speed where I would use that to estimate the power a Voltorb can produce. Now I just need information that can tell me how much energy Jubilife City needs. While scanning the web, I found information such as the size of the city in pixels and the population, however, this information doesn't really provide much value to the question since there isn't a specific function or correlation to the amount of power needed.

### Finding out Jubilife City is not the same as Jubilife Village

While looking through the city, I found that the previous name of Jubilife City was Jubilife Village. When I saw the question on the IGN Code Foo website, I thought the naming of Jubilife Village was a typo but it made much more sense since the whole question was named Hisui's Power Plant, Hisui, the former name of Sinnoh. This means that the question is referring to the Jubilife Village in history before it became Jubilife Village. Through Bulbapedia, I went to the Jubilife Village page instead of Jubilife City and found that the game *Pokemon Legends Arceus* was recently released on January 28th, 2022 and it was based in the Hisui region.

### Finding the 'size' or population of the village

I researched more about the game and I couldn't find tangible information about the size of the villages, but finally, I decided to do my calculations on the population size of the humans in the game. This number is vastly different from the actual population because there are

probably regular citizens who aren't NPCs in the game. This question seemed to point towards the game since it was recently released and is about the Hisui region so I decided to use this theory. I used this [website](#), and I counted the number of human NPCs in the game where I got the number 38 (Hayes).

#### Calculating the amount of energy Jubilife Village uses

Now I thought about how I could use the population in relation to power. I needed to estimate the rate Jubilife Village uses power. While checking out some youtube videos about Jubilife Village, I found out that the Pokedex was a journal instead of a digital device. Using this [video](#) about Galaxy Hall in Pokemon Legends Arceus, I found that the only things that seemed to use electricity were some of the light bulbs and a few other machines (MrNazreen92). I also know that in Bulbapedia, Jubilife village has been established for only 2 years so I decided to use the country that uses the least electricity per capita according to the World Bank's statistics in 2014 ("Electric"). The country of reference that I decided to use was Haiti, a country located in the Caribbean Sea and their energy usage is 39.06 kWh per year. Although there are probably other countries that have lower electricity per capita, the data was not as easily accessible or as trustworthy compared to the world bank data. Now I have the amount of energy that Jubilife village uses in a year which is  $38 * 39.06 \text{ kWh} = 1484.28 \text{ kWh}$  per year.

#### Calculating the amount of energy a Voltorb produces

Next, I need to find the rate of production from the Voltorbs. The first thing I looked at was the base stats, the attack power of 30 at level 1, and the attack speed of 55 at level one. After some thought, I believed that the most logical measurements were a wattage of 30 per cycle and 55 cycles per hour. Although when pokemon battle, they attack right after each other, that's when they are basically battling as hard as they can. In this case, where the Voltorbs are just producing energy, I assume that they are not pressured to put as much effort. Another factor is the amount of time Voltorbs are 'working'. I will be assuming the Voltorbs are working 8 hours a day just like the 8-hour workday that humans use and Voltorbs will also have rest so 6 hours of actual work in a day. The calculations for this are  $30 \text{ watts} * 55 \text{ cycles per hour} * 6 \text{ hours of work in a day} * 365 \text{ days in a year} = 3,613.5 \text{ kWh}$  per year. That is the amount of electricity a Voltorb produces.

The stats of the Voltorb were based on a level 1 Voltorb and there is also the idea of EV(Effort Values) and IV(Individual Values) that can raise the stats of the pokemon. Although these were variables, I decided to use the minimum value of lv 1 base states since using the minimum values would get me the number of Voltorbs that is guaranteed to power the whole village.

#### Why this makes sense

With the data that was collected, the power needed to power Jubilife Village is 1484.28kWh per year, and a Voltorb produces 3,413.5 kWh per year, the number of Voltorbs

required is just one. Just one Voltorb is needed to power Jubilife Village. Going back through the information, I thought about the reasons why this would make sense. In pokemon, Voltorbs are able to produce enough electricity to injure other pokemon, this means that the amount of power they produce is pretty high. The number of technologies or electricity-driven objects that I've found in Pokemon Legends: Arceus were just the light bulbs. Although I've never played the game, the videos that I saw while researching show that Jubilife Village isn't that developed and is probably not that reliant on electricity. Regarding the light bulbs, the lights in the Galaxy Hall released orangish light, this indicates that the lightbulbs were incandescent and incandescent lights use about 60 watts per hour (Gerhardt)(MrNazreen92). This is about 525.6 kWh per year if the light bulb was on for the whole year and about 87.6 kWh if the light bulb was on 4 hours a day. This means that lightbulbs don't use that much energy and it shows how Jubilife Village's citizens don't use much energy.

### Conclusion

One Voltorb is required to power Jubilife Village. Many assumptions were made such as the population size only consisting of the NPC in the game, the stat conversions into kWh for the Voltorbs, and the comparison to Haiti for its energy per capita. Although the answer that I got is One, there is a multitude of other variables such as the appliances the people use and the efficiency of the powerplant and its operation. This is all just speculation and not a fact however, the answer that I concluded is that One Voltorb is required to power Jubilife Village.

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