

## 2021 Q24

## (BLADE INSPECTIONS, SD CARDS)

One Energy's dedication to maintenance and safety does not stop at a certain height! Our turbines reach 405 feet tall. While we can inspect our tower via climbs up the inside, the blades require different inspection methods. We can't climb the blades, and rappelling down the blade takes too much time; instead, we use drones to take pictures of all the blades! Our FAA licensed drone pilots can fly our drones up and down all the sides of a blade to snap high-resolution pictures. We can easily monitor all parts of the outside of the blade to check up on their health; this allows our inspections to be much faster than other methods.

These pictures are stored on an SD card that the drone carries as it flies. SD cards store images in units of bytes, just like your computer and phone. These storage units increase to kilobytes, megabytes, gigabytes, and beyond! SD cards excel in holding a lot of data in a small space. They allow the cameras on our drones to hold massive amounts of pictures, so operators can take as many pictures as they need to before swapping SD cards. Similarly, the lack of moving parts in SD cards make them very sturdy and resistant to data damage; they can fly around in our drone, and all their data will be retained. A typical hard drive, like one in an old computer, uses a lot of moving parts, so if they get jostled around too much, the data may be lost. SD cards are the perfect solution for our fleet of drone pilots!

*Our drones can also snap neat images like this, giving us beautiful views of the construction of our projects that we otherwise would not be able to see!*



**Level 1:** Inspecting one side of a blade uses about 0.7% of a 128 gigabyte SD card that blade inspectors bring on-site. Knowing that each blade has three sides to take pictures of, how much of an SD card would an entire blade take? What about an entire site with three turbines of three blades each?

**Level 2:** Most of the time, prefixes indicate units of 1,000. For example, a kilonewton is 1,000 newtons, and a meganewton is 1,000 kilonewtons. However, computers can treat these prefixes differently. For storage on computers, including SD cards, each prefix means 1,024 of the previous; therefore, a kilobyte is 1,024 bytes, and a megabyte is 1,024 kilobytes. A table is included below to help illustrate this. How could you express 512 kilobytes in terms of megabytes? If we take 110 pictures on one side of a blade, how many 1 terabyte SD cards would we need for an entire site? Assume one picture is about 6.5 megabytes.

Name of Unit	Multiplicator
Byte	Base Unit
Kilobyte	1,024 bytes
Megabyte	1,024 kilobytes
Gigabyte	1,024 megabytes
Terabyte	1,024 terabytes