2021Q26 TRENCHING

One Energy builds *Wind for Industry*® projects; that means, we build turbines near our customers to offer them behind-the-meter generation capabilities. These turbines need to be connected to the facilities that they power. How does One Energy manage to get all that cabling from the turbines to the customer's building safely and efficiently? We use trenching!

Trenching is the process of using heavy equipment to dig a long and narrow hole, or trench, in the ground. The cables are then bundled together and carefully laid in this trench. The final step involves backfilling which means refilling the trench with the dirt that was previously excavated. This dirt is compacted to make sure it is filling in the trench as much as possible. All the heavy equipment involved here allows operators to stay out of the trench and stay safe.

Lots of very specialized, heavy equipment goes into trenching as lots of dirt needs to be removed and then replaced in a safe and controlled manner. One of our most versatile pieces of equipment is the skid steer. This machine contains a hydraulic system on its front that allows for a variety of different parts to be attached.

This is OE's skid steer on site. The plate up front holds the hydraulics that allow for the versatility of attachments on this wonderful machine!

Level 1: One of the attachments used is the discharge bucket. With the discharge bucket, an operator can lift dirt and deposit it by using a conveyor belt inside the bucket that deposits the dirt out a door on the side of the bucket.

Let's say that a trench is 100 feet long, 10 inches wide, and 4 feet deep. A skid steer has a bucket that can hold 0.66 cubic yards. If all the dirt from the trench was replaced with this bucket, how many times would you have to fill the bucket to get all the dirt? Assume the removed dirt has the same density as it did in the ground, and assume the bucket is perfectly filled to capacity every time. (Hint: Be careful with units!)

Level 2: The dirt from a trench can be stacked near the trench to make it simpler to backfill the trench later. Oftentimes, when dumping that dirt, it creates a near-triangular shape. Below is a cross section of the trench and the dirt next to it. The trench has the same dimensions that it did in the Level 1 question. We also know that x is four times the width of the trench. Knowing all this information, how tall would the triangular stack of dirt (y) need to be? Again, assume that the removed dirt has the same density as it did in the ground. Note: the image is not to scale.