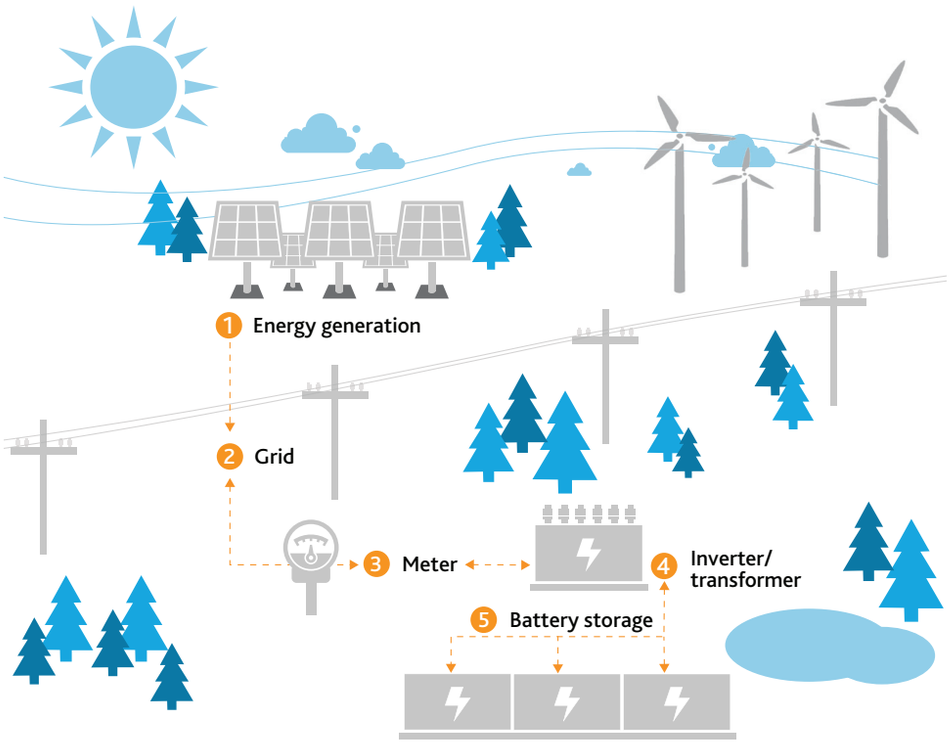
# Energy Storage 101

## Building an Energy Storage Facility

The steps to construct an energy storage facility include:

- **Civil Works.** The ground area is prepared to ensure the facility is built on a flat surface.
- **Perimeter Fencing.** A fence and safety signage is installed around the perimeter of the facility.
- **Foundation Work.** Concrete slabs will be installed as foundations that will accommodate the battery modules and electrical components.
- **Battery Installation.** Modular containers that host the batteries are installed in conjunction with a power conversion system (PCS) and medium voltage (MV) transformer.
- **Electrical Components.** Balance of electrical equipment includes a project substation with High Voltage (HV) metering, breakers, main power transformer and control building. Alternating current (AC) collection cables are used to interconnect the project substation to the battery system rows.

## How does an Energy Storage Facility work?




1. Energy is generated from sources including wind, solar, natural gas, hydro, nuclear, etc.
2. This energy enters the grid.
3. The electricity is constantly metered and monitored.
4. If there's more energy supply than demand, energy from the grid is converted from alternating current (AC) to direct current (DC) for storage in the battery system.
5. The energy is stored and a management system runs continuously to monitor and control the flow of energy and optimize how batteries are charged/discharged. BluEarth's Remote Operating Center monitors the status of the storage facility and determines when to charge, store, and discharge energy as required by the electrical grid. When electricity is needed, it flows through the power conversion system (PCS) where it is converted from DC back to AC for distribution, and use in homes and offices.

## Did you know?

Storage provides reliability and stability to electricity systems by storing surplus energy during off-peak periods of high supply or low usage and providing electricity during critical peak periods.

# Frequently Asked Questions
## *Battery Storage*

### What is energy storage?

Energy storage is the concept of capturing and retaining energy at one point in time, so that it can be used at another point in time. Energy storage provides reliability and stability to electricity systems by storing surplus energy during off-peak periods of high supply or low usage and providing electricity during critical peak periods.

### What are the common energy storage technologies?

The most common forms of energy storage technologies are battery, pumped hydro, compressed air, and flywheel. Batteries, specifically lithium batteries, represent the most scalable form of energy storage technology because they can be installed nearly anywhere, have a small footprint, and are relatively inexpensive.

### Why is energy storage needed?

Energy storage provides reliability and stability to electricity systems by storing surplus energy during off-peak periods of high supply or low usage and providing electricity during critical peak periods.

### What are the benefits of energy storage?

Energy storage helps balance supply and demand on the electrical grid and can provide the following benefits:

- **Cost Savings:** Increases the efficiency and capabilities of existing electricity generation and transmission networks.
- **Reliability:** Improves grid reliability by providing backup power during grid disruptions and other emergencies.
- **Flexibility:** Energy storage can inject or extract electricity from the grid to exactly match demand patterns. This pairs well with renewable generation sources such as wind and solar.
- **Lower Environmental Impacts:** Relying on energy storage to regulate the electrical grid allows all generating facilities to operate more efficiently, which can reduce fuel consumption from conventional gas fired facilities.

### How much energy will be stored and for how long?

The amount of energy stored depends on the overall project capacity, which is influenced by a variety of factors such as project location, land size and interconnection constraints. BluEarth is currently considering a power capacity range of up to 200 MW, with a targeted storage duration of four hours. That equates to energy storage capacity of approximately 800 MWh, which is enough to power approximately 184,000 homes in Ontario for four hours during times of grid instability.

### How long do storage batteries last?

Batteries used in energy storage last approximately 20 years, or 7,300 cycles of charging. As the battery ages, the performance will gradually decline with time and based on the frequency with which it charges, similar to batteries used in everyday electronics such as your smartphone. To compensate for this aging process, batteries can be replaced or additional batteries can be added to a storage project in order to maintain overall storage capacity.

### What happens to the facility and batteries once they are retired?

Once the storage facility has reached the end of its usable life, the facility will be decommissioned. Decommissioning includes de-energizing the facility, removing all above ground equipment and structures, and restoring the land to its prior condition. At the end of a battery's useful life, up to 95% of the battery can be recycled for use in new batteries.

**If you have additional questions, please reach out to our Project Team at 1-844-214-2578 or projects@bluearth.ca.**
**To learn more about BluEarth and what community partners think about working with us,**
**visit our YouTube channel.**

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