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# Power Management

Stable, reliable electric power is a basic requirement to deliver effective connectivity over the Internet for all organizations. This may seem to be something that is overstated but unstable power can create many issues in the electronics on which your library depends.

Basic steps in power management are as follows:

1. Install a dedicated 110v electric circuit to the secure room in which you place the modem, firewall, router and switch equipment. Do not add any other equipment to the circuit. The aim is to provide an isolated feed in order to create a stable supply free from interference by other use of power in the building.
2. Install a UPS on the dedicated circuit, appropriately sized for the equipment being supported. A UPS is an Uninterruptible Power Supply.

The UPS protects your investment in the connectivity equipment because poor power is the primary cause of degradation and premature failure of the communications equipment.

A UPS has 2 functions:

1. acts as a power conditioner to remove spikes and lulls in voltage such as might occur in bad weather
2. continues to deliver power to attached devices if disconnected from primary Hydro feed by using battery support if Hydro fails to the building. The length of time that power delivery from the battery lasts is dependent on the amount of battery capacity in the UPS, usually chosen by the client to last from 20 minutes to 24 hours. The choice is driven by operational needs of the organization and ability to pay for the extra batteries, which can be expensive

Sizing of UPS is best done by a skilled electrical service company, usually a dealer for UPS systems. It is important to understand that this choice should not be a consumer level product designed just to protect a single computer. It is best to protect the circuit, rather than any individual device or computer.

All UPS batteries degrade over time. Select a model with batteries that can be maintained and replaced. The 6 main makes with systems suitable for BC Library network protection are

- [<https://www.apc.com/shop/ca/en/categories/power/uninterruptible-power-supply-ups-/network-and-server/N-15e4jmd>][APC]
- [<http://powerquality.eaton.com/About-Us/Markets/Network-Closets/solutions.asp?cx=5>][Eaton]
- [<https://www.triplite.com/company/contacts>][Tripp Lite]
- [<https://www.vertiv.com/en-ca/products-catalog/critical-power/uninterruptible-power-supplies-up/s/#/?FacetApplication=Network%20Closet>][Liebert UPS Systems - Vertiv Uninterruptible Power Supplies]
- [<https://minutemanups.com/>][Minuteman UPS]
- [<https://www.cyberpowersystems.com/products/ups/>][CyberPower - also sold by Dell Canada]

Ensure that you protect the investment in UPS with a maintenance contract that includes regular testing of the function, the loading on the circuits and with replacement of batteries if needed.

As an electrical device, UPS systems are covered in the Electrical Code of Canada and adopted by BC as the BC Electrical Code 2018. This is a CSA Standard last updated in 2018 and in full effect January

1st, 2020.

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Last update: **2020/11/09 20:51**

