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In AtoN solar energy systems, the battery is designed to supply energy under specified conditions for periods of time without or with minimum solar insolation.

The minimum battery capacity will depend on the choice made or imposed for the following design constraints:

- **Maximum daily depth of discharge** (depending on the battery type can be from 80% to 40%).
- Lowest acceptable level of charge during the winter months.
- **Allowance for 'no sun' days** (from meteorological or insolation data). According to the IALA, 20 days is a acceptable value for medium latitudes (less in lower latitudes and more in higher ones).
- **Ease of access to the AtoN** (higher capacity on remote sites should be considered, to improve reliability of the system and reduce maintenance visits).

It should be noted that:

- The maximum battery capacity will usually be determined by consideration of cost, available space, weight, and handling capacity. Higher is not always better.
- As a rule, the number of batteries in parallel should be kept to a minimum, all connection should be in series if possible.
- Use of lead-acid batteries may require an increase in battery capacity to prevent deep discharge during winter months, but in this situation the effect of low temperature on the battery should be considered. For these reasons other typology batteries should be considered for the worst cases (very high latitude in the northern and southern hemispheres and very low temperature).
- Batteries with low self-discharge become important when the design requires a long autonomous period for the system (in sites with very long periods without sun irradiation).



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When calculating the required battery capacity, the following items should be considered:

- **Required daily / seasonal cycle (there may be restrictions on the maximum depth of discharge).**
- **Time required to access the site.**
- **Ageing.**
- **Temperature impact.**
- **Future expansion of the load.**
- **Local weather conditions.**

To sum up, battery capacity is not the only thing to be considered when choosing a battery, a calculated and well-informed decision is necessary, in regard to typology, situation, discharge and more, according to the information showed on this article.

