1. Converter selection and sizing:

The role of a bi-directional converter in a power system is to convert the DC voltage from PV units and battery to AC voltage that can be used at the load points.

Bi-directional converter can be used to convert AC voltage from a WTG to DC voltage to charge the battery.

1. Battery System

The capacity of the Battery storage system depends on the maximum load demand, amount of renewable energy generation, daily energy Hybrid power system usage, renewable energy input, the reliability of power supply, cost of the battery, the condition of operation, average temperature..

The optimal operation of BSS is subject to the charge and discharge limits based on the depth of discharge .

**Depth of Discharge** (DoD) is the percentage of the capacity which has been removed from the fully charged **battery**.

The BSS must operate between the minimum and maximum allowable state of charge (SOC).

The **state of charge** is defined as the ratio of the available capacity Q(t) and the maximum possible **charge** that can be stored in a **battery**,

A fully **charged battery** has **SOC** 1 or 100% while a fully discharged **battery** has an **SOC** of 0 or 0%.

Economic

ANNUALISED COST of the system--------------

The ACS is calculated by using the operating parameters

annualised capital cost (ACC), annualised replacement

cost (ARC), annualised maintenance cost (AMC) and capital recovery factor (CRF)

CRF - Capital Recovery Factor

Capital recovery factor will help to determine how much annual revenue we'll need so that the initial investment cost is recovered

Pproj – lifespan of system

ppt

COST OF ENERGY--------------

COE is cost of generating for the system. We'll consider all costs over its

lifetime : initial investment, operation, maintenance cost, etc.

When comparing COE for alternative systems, it is important to define boundaries of the

system and costs included in it.

E.g : Should R&D tax be included, costs of impact on public health and environemtal

damage be included? And at the end we'll find the minimum price at which

energy must be sold for an energy project to break even

Ppt

AES - annual energy served

FORMULA

NPC ---------------

The present value is the current equivalent value of a set of future cash flows

For example, if the real interest rate is 6%, what will the present value of a $1000 payment

twelve years in the future be is called present value. So here $1000 / ((1.06)^12) = $497.

The net present cost (or life-cycle cost) of a Component is the present value

of all the costs of installing and operating the Component over the project lifetime,

minus the present value of all the revenues that it earns over the project lifetime.

FORMULA

What is ACS – annualized cost of system

Salvage value is the estimated resale value of an asset at the end of its useful life.

It is subtracted from the cost of a fixed asset to determine the amount of

the asset cost that will be depreciated.

Mptt should be used

At peak time take additional expenses.