SolarTech Power Solutions

# The impact of inverter on DC

## Overview

Should inverter DC to AC ratio be increased?

Since PV panel prices have fallen lately, increasing the inverter DC to AC ratio may increase its use, which may be useful in locations without constant sun hours, that is to say, to lose some AC output energy due to inverter clipping losses is worthwhile if considering the total generated energy that the user gains.

Does inverter clipping reduce AC power?

Left: Simulation of inverter clipping on 1kW DC fixed-tilt system in Broomfield, Colorado, on March 20, 2015. The following losses were considered: 10% DC losses (excluding soiling), 5% soiling losses, 5% inverter losses. The DC to AC ratio was set to 1.34. After clipping, soiling losses reduce the actual AC power by 2.3%.

What happens if the DC energy is larger than the inverter size?

When the DC energy is larger than the inverter size, a phenomenon known as “clipping” occurs . The inverter saturates and, therefore, the excess DC energy is masked and not converted into AC. Because of this masking effect, inverter undersizing has been often suggested as practical soiling mitigation strategy .

Should a solar inverter be AC or DC?

Consequently, when considering a PV project design, it would be optimal to increase the power ratio between the PV panels’ DC output power and the solar inverter’s AC output power. In addition, increasing the DC to AC ratio may also increase the energy generation at peak hours, during higher solar irradiation values.

How does inverter deterioration affect soiling?

However, the mitigation effects might increase under conditions of lower

performance losses or more pronounced inverter undersizing. In any case, one should take into account that degradation makes clipping less frequent as systems age, also decreasing its masking effect on soiling.

How does a power inverter work?

The system includes a module for computing real and reactive power from measurements, low-pass filters that filter the power computations, and controllers to implement the droop laws that yield the voltage and angle which are eventually realized at the switched terminals of the inverter.

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