

Reactive power compensation of photovoltaic(PV) for energy saving

C6 - ACTIVE DISTRIBUTION SYSTEMS AND DISTRIBUTED ENERGY
RESOURCES
PS 1 – Q.1.3

Can voltage regulation with PV inverters also be realised in winter months, when the loads are resistive and the PV production is lower? Can the method also be used for grids where heating is done using heat pumps??

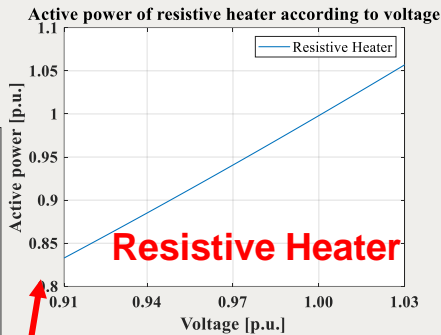
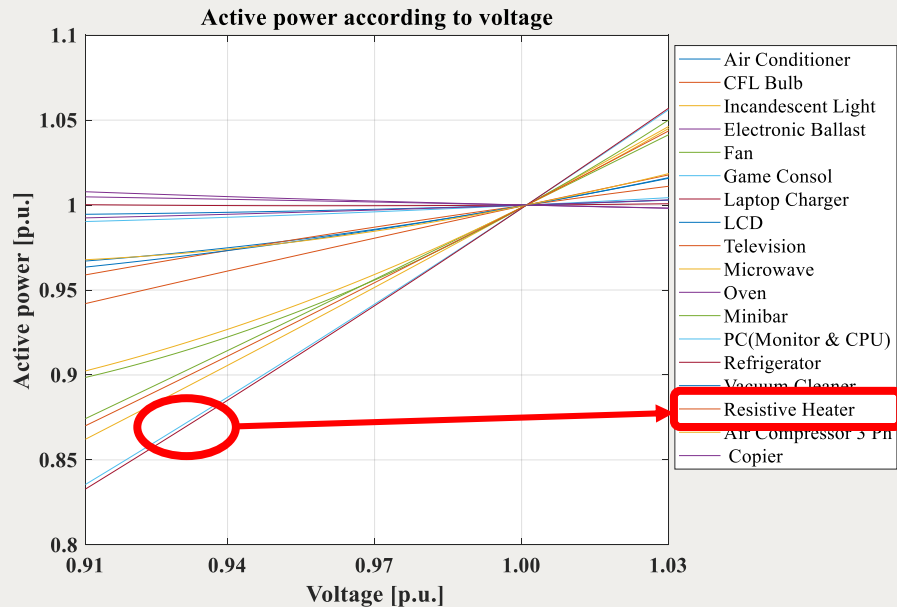
Saehwan Lim (South Korea)

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Q 1.3 : Can voltage regulation with PV inverters also be realised **in winter months**, when the loads are **resistive** and the PV production is **lower**?

Load characteristic according to voltage

$$P = P_0 * (Z_P * (\frac{V_i}{V_0})^2 + I_P * \frac{V_i}{V_0} + P_P)$$

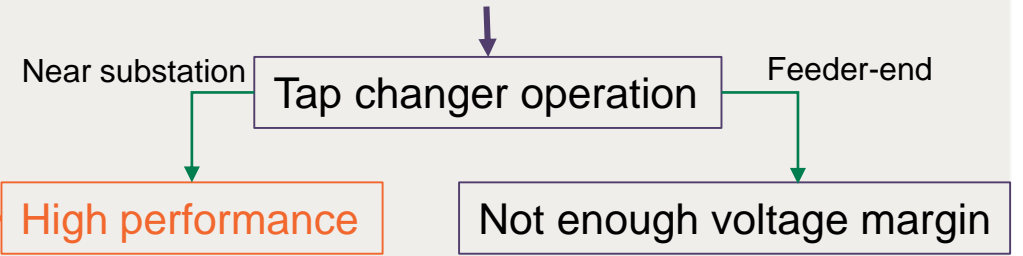


Leads to lots of energy saving

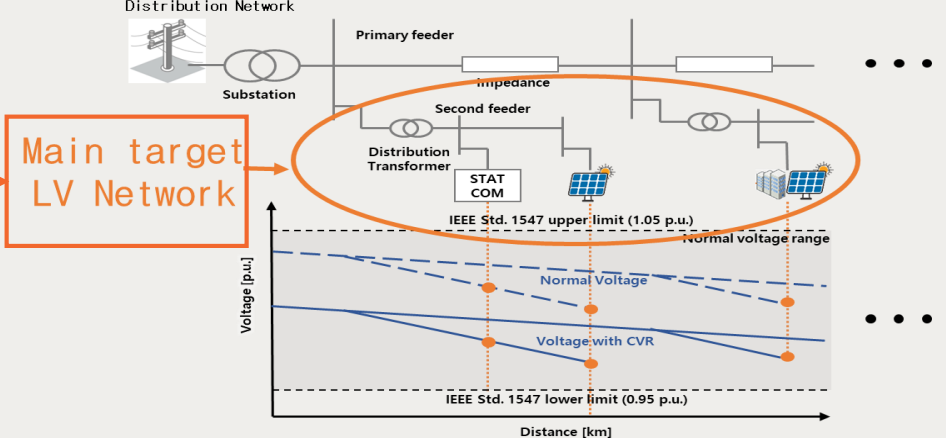
< Active power according to voltage >

Group Discussion Meeting

Low PV production → low voltage



Coordination control between MV/LV network



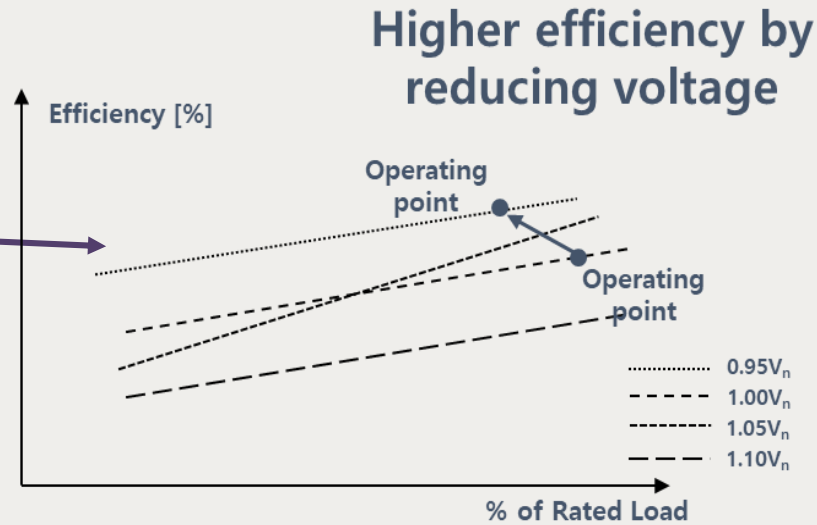
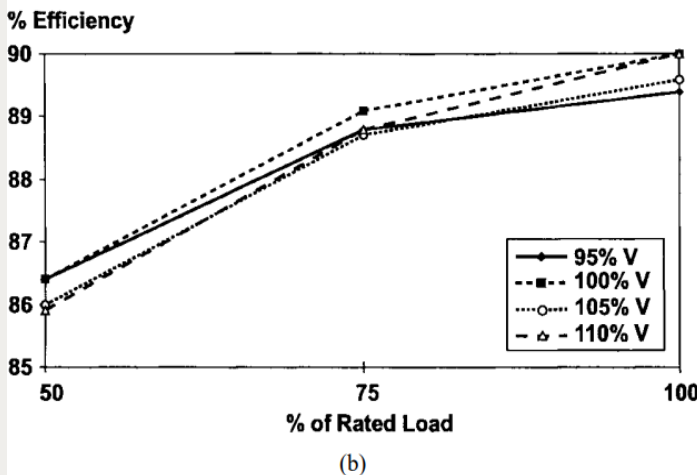
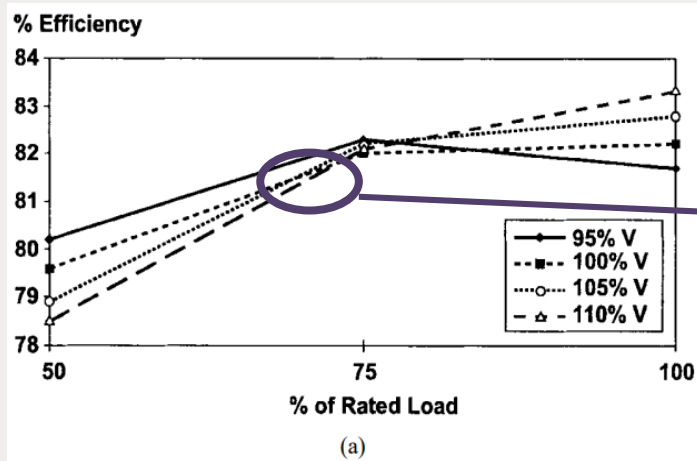
< Main target network >

In winter, the performance of CVR strategy is **effective**

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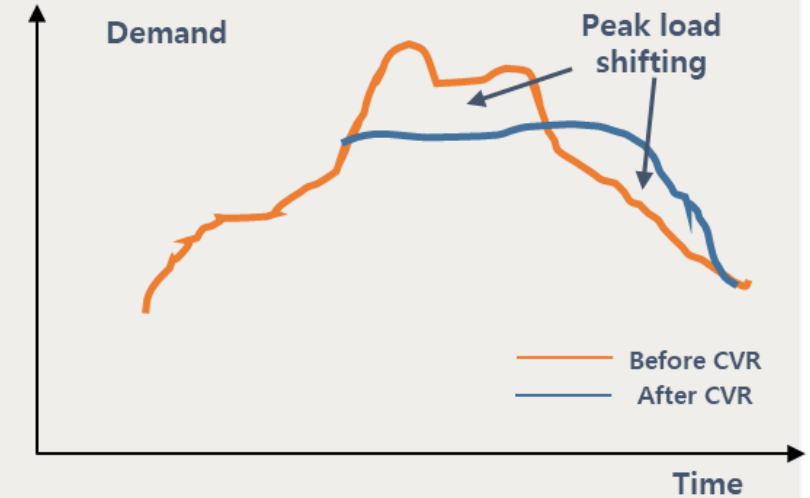
Q 1.3 : Can the method also be used for grids where heating is done using **heat pumps**?

Motor efficiency according to voltage & rated power



Optimal voltage management using PV for high performance of pumps

Peak load shifting



Peak demand ↓, time of heating ↑
energy of heater = constant

The proposed method can be used with heat pumps

Hamer, Paul S., Debra M. Lowe, and Stanley E. Wallace. "Energy-efficient induction motors performance characteristics and life-cycle cost comparisons for centrifugal loads." *IEEE Transactions on Industry Applications* 33.5 (1997): 1312-1320.