

Increased Accuracy of Hosting Capacity Calculations

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Uncertainty in hosting capacity calculations

The calculation of the hosting capacity contains several **uncertainties**, which result in an uncertainty in the resulting value of the hosting capacity. This may lead to **additional barriers** to the integration of renewable electricity production.

One way of reducing the uncertainty is to obtain **additional information from measurements**.

Another way is to shift from a 100% value to a **high-percentile** for the performance index.

Example

Installation: Solar-power to LV or MV grid

Performance index: Overvoltages

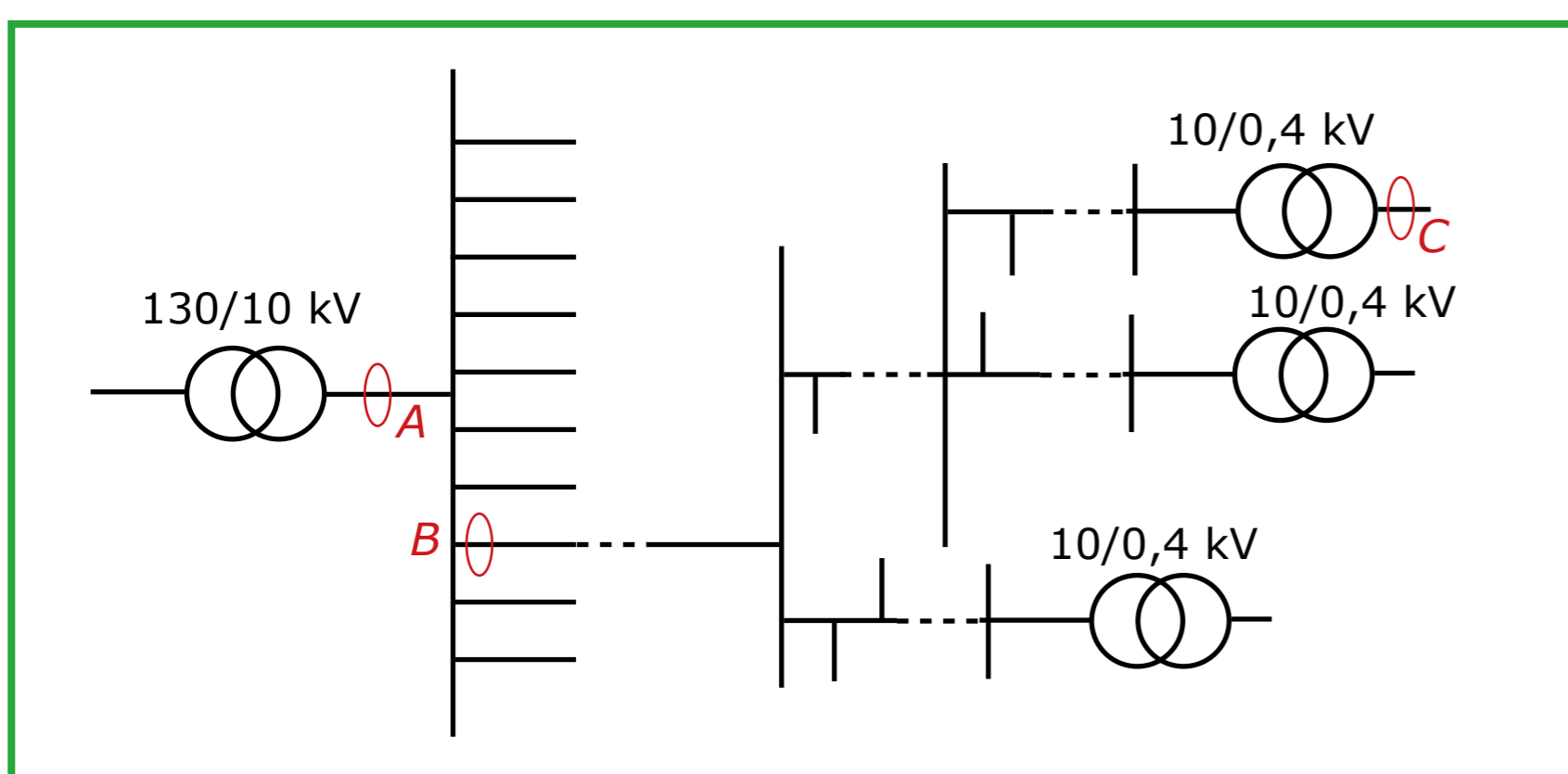
Limit: 10%

$$P_{\max} = \frac{U^2}{R} \times \delta_{\max}$$

P_{\max} : The hosting capacity
 U : Nominal voltage at C

R : Resistance between A and C

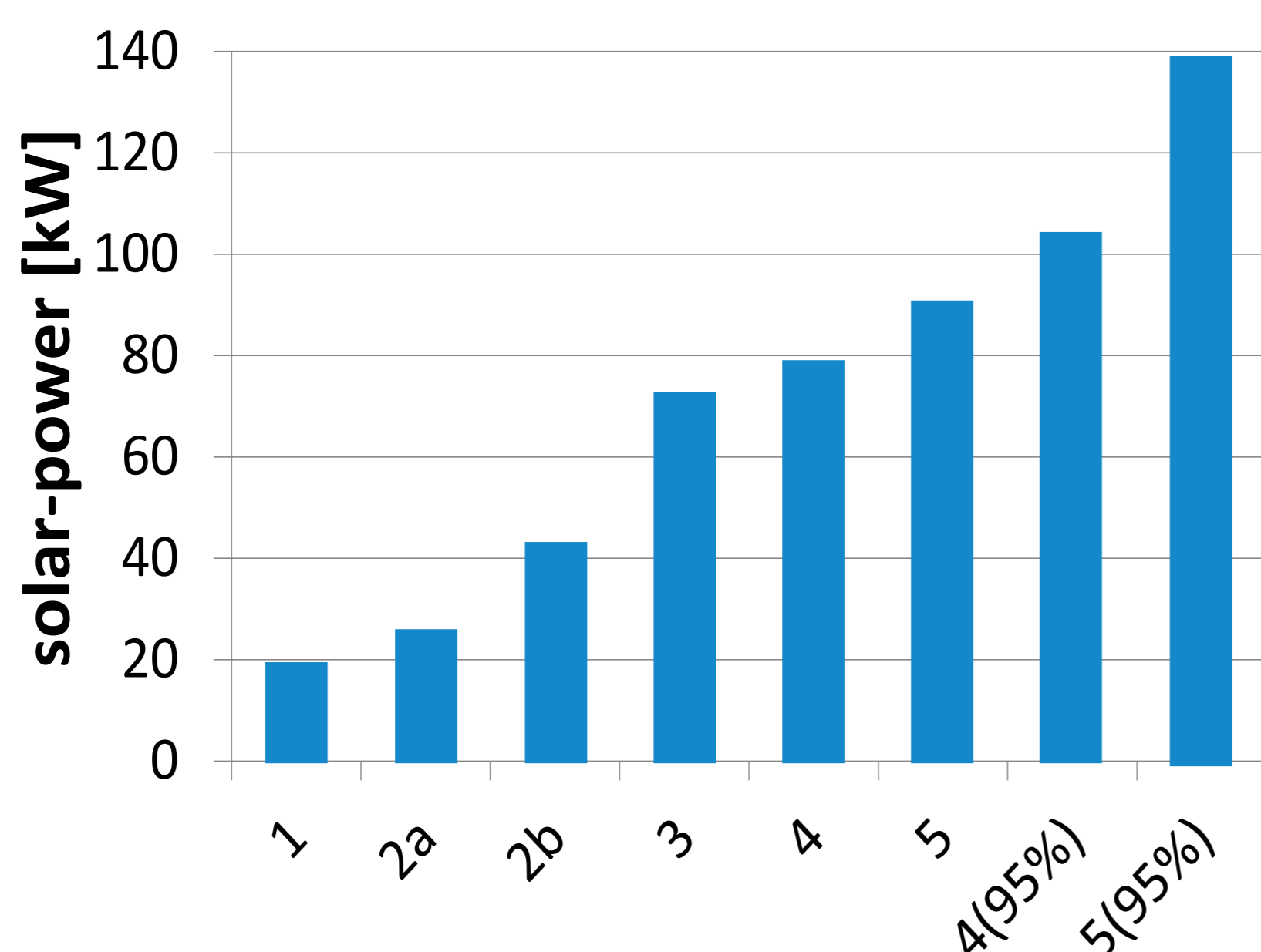
δ_{\max} : The relative overvoltage margin



Several calculation approaches can be chosen like:

1. Conservative case with no need of measurements
- 2a. As case 1, but including voltage drop based on $I_{A\text{ meas}}$ divided evenly over the outgoing feeders
- 2b. As case 1, but including voltage drop based on $I_{B\text{ meas}}$
3. δ_{\max} based on UC meas max
4. δ_{\max} based on time series of $U_{C\text{ meas max}}$ the calculated P_{\max} is compared to $P_{PV\text{ sunny day}}$
5. As case 4, but P_{\max} is compared to $P_{PV\text{ actual}}$

Results



- There is a large difference in HC depending on the method used.
- Simply by using measurements of current in the main substation a noticeable increase in HC can be seen.
- Method 4 gives similar results as method 5 if 100% values are used.
- When using method 4, the HC increases with over 25% if 95% values are used. The corresponding value for method 5 is over 50%.

Conclusions

The use of measurements in the calculations greatly increases the hosting capacity, compared to when using assumptions based on a "worst case".

Shifting to a high percentile increases the hosting capacity further, compared to when using 100%.

MANAGING PARTNER



PROJECT PARTNERS



FUNDING PARTNERS

