ANALYSIS OF THE PV SYSTEM OPERATION USING THE system efficiency factor – ηSF

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OUTLINE

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INTRODUCTION

- Performance assessment of PV systems

- The solar PV modules in urban area are often exposed to different sources of performance degradation

- Connection faults, mechanical defects, aging, manufacturing tolerances, shading, soiling effects, atmospheric conditions

- Long-term outdoor operating conditions (delamination, discoloration and corrosion

SYSTEM EFFICIENCY FACTOR

- Identifying the fault operation of PV system
- It enables the compensation of different mid-term and long-term degrading effects
- Empirically compensate time-varying operational and physical system properties related to the system-to-system comparison under the clear sky conditions

SYSTEM EFFICIENCY FACTOR

- Ratio of the estimated total horizontal irradiance G_M under the detected clear sky conditions and the reference irradiance value G_0

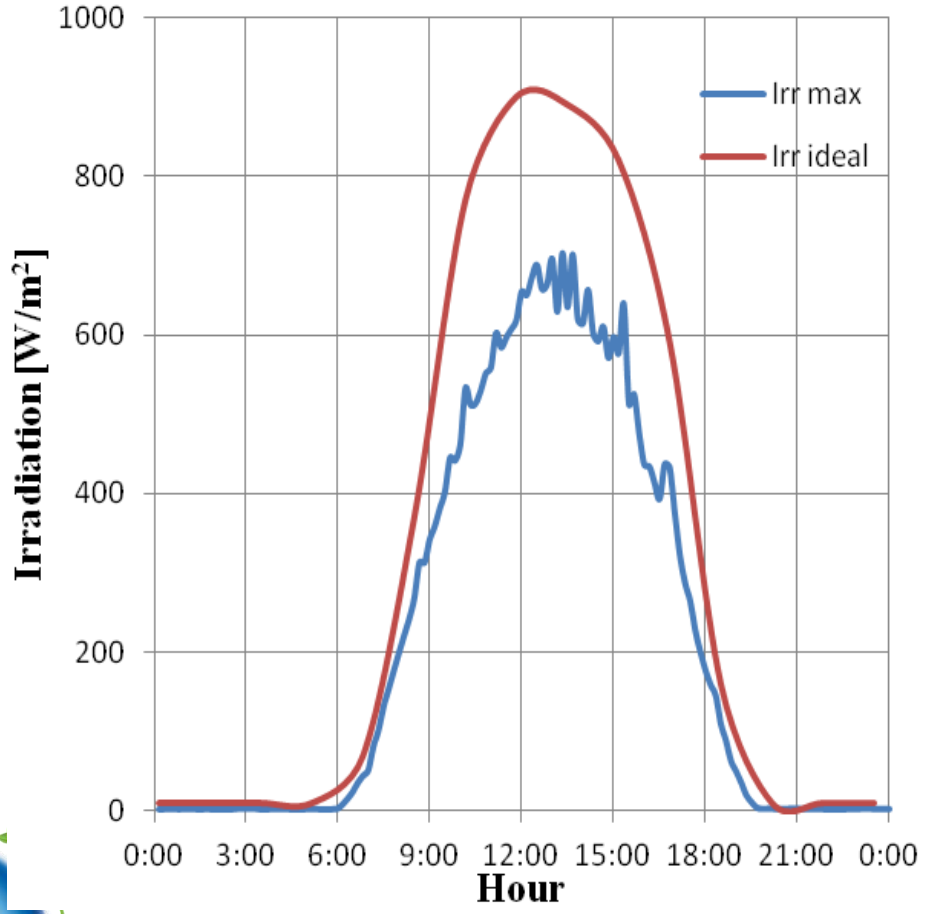
$$\eta_{SF} = G_M/G_0$$

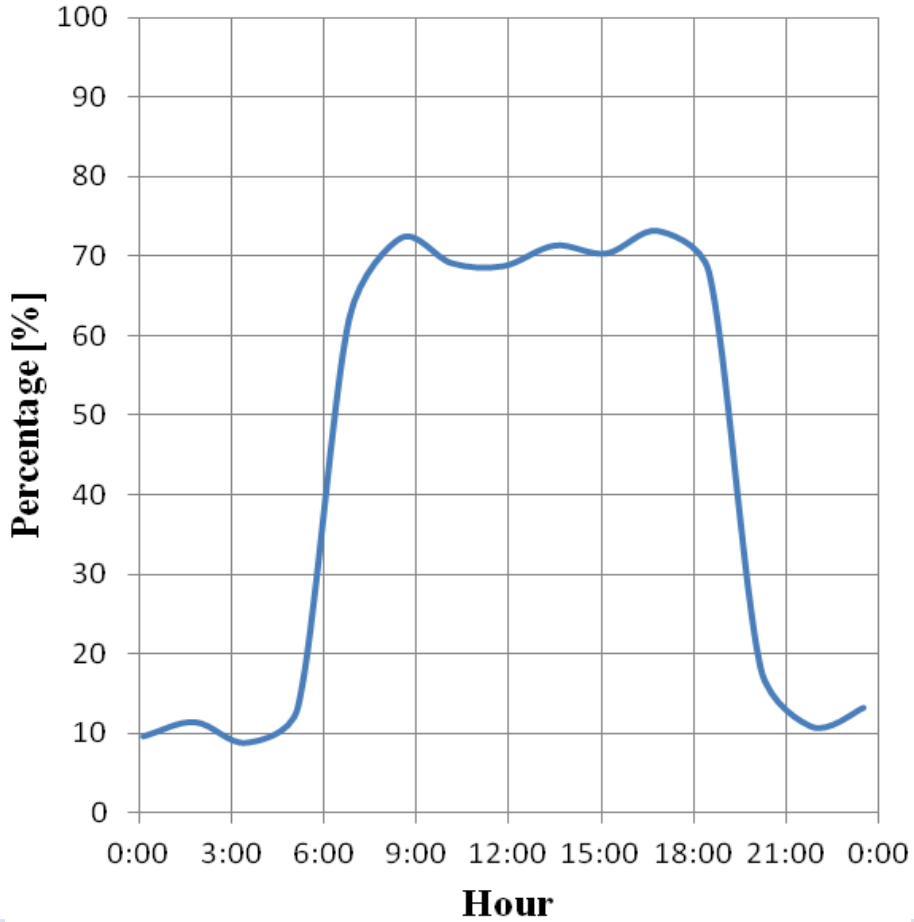
- Influences would be compensated by choosing the relevant **observation period** as a sliding window for correct determination of the system efficiency factor value

PERFORMANCE ASSESSMENT

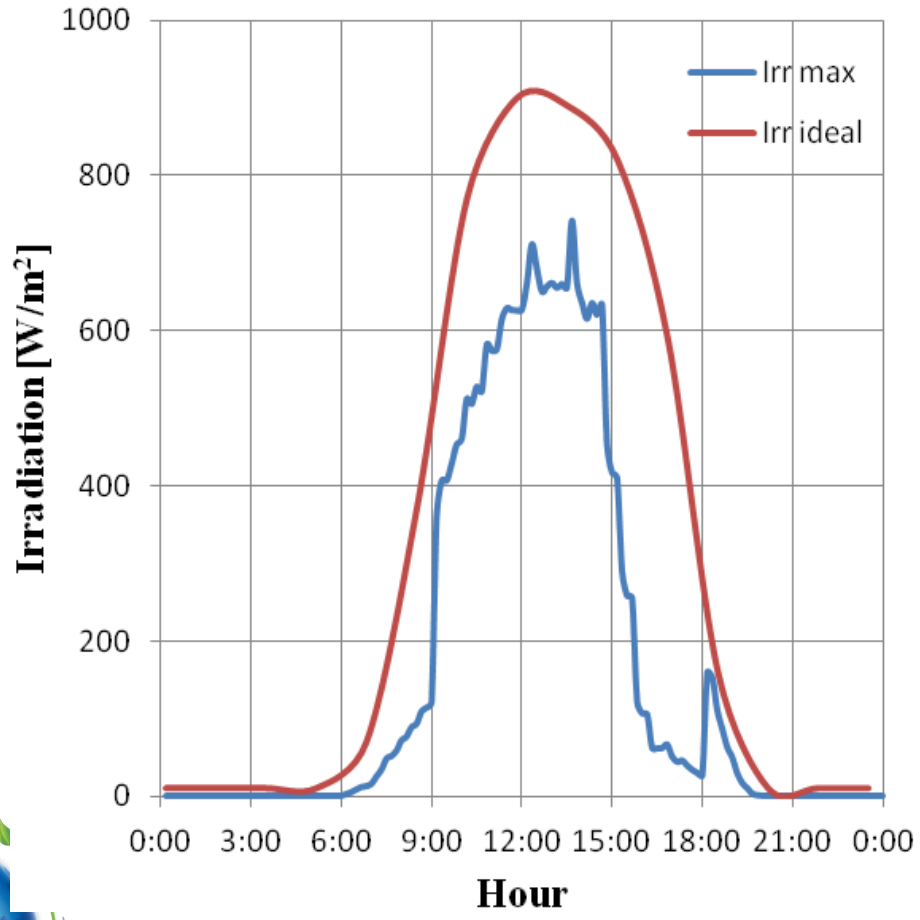
- Daily profile of the total horizontal irradiance found from the measured averaged estimates G_M (blue curve) and clear-sky model G_0 (red curve)
- The measurement station is based at the park surrounding in the city of Belgrade
- 10-minutes averaged estimated values

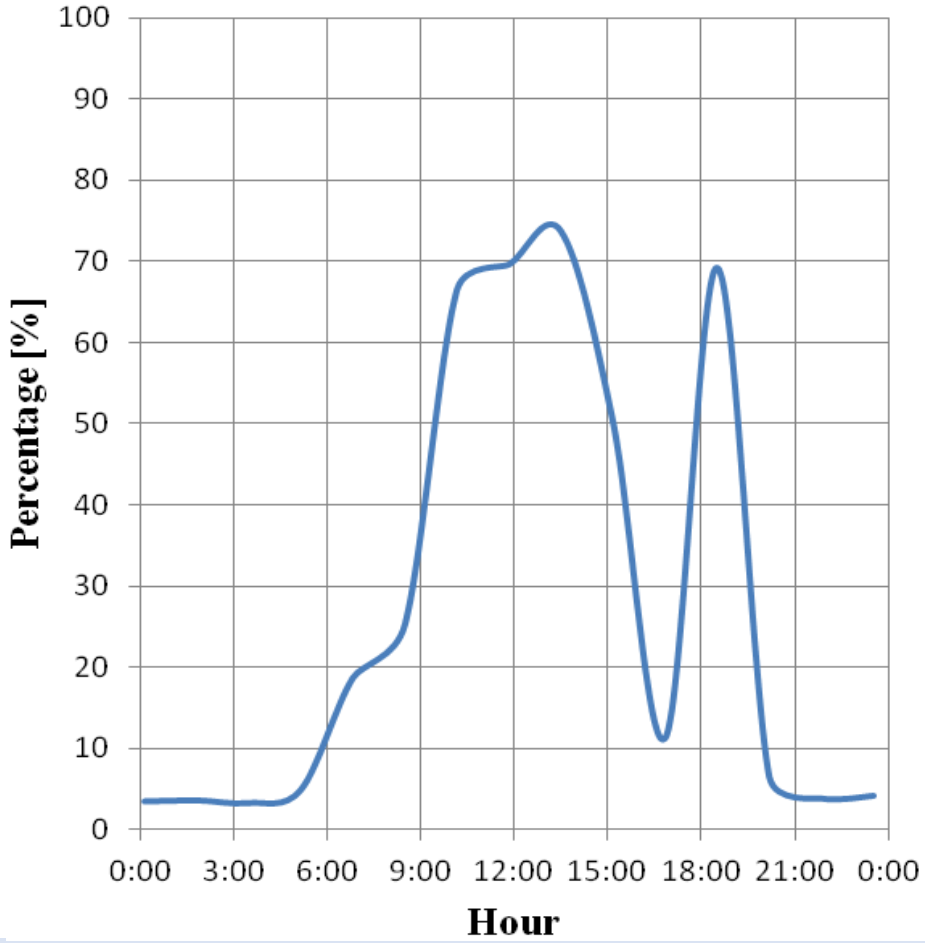
PERFORMANCE ASSESSMENT





PERFORMANCE ASSESSMENT





CONCLUSION

- Different mid-term and long-term degrading effects, including manufacturing tolerances and measurement imperfections are compensated by the introduction of the system efficiency factor
- Enables the detection of various PV system operating conditions caused by physical failures, shading operation, aging processes
- Establishes the flexible framework for future work in the field of performance assessment of PV systems in urban surroundings

Thank you for your attention!!!