Local Solar Potential on the Roofs of the Eighth Viennese District – Summary

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This paper has based itself on the question whether it makes sense to fit the roof-tops of the densly built up areas of the city with solar collectors and photovoltaic equipment in order to extract solar energy. This study was carried out using Vienna‘s eighth district (Josefstadt) as an example. Solar irradiation data was taken from various references and the roof-tops were measured using the process of photogrammetry with aerial photos.

Only roof-tops which were evidently suitable for the installation of solar collectors or solar cells were used.

Shade on the roof-tops, which can be included in the determination of energy extraction from direct radiation, was not taken into consideration.

The following four senarios were calculated for the establishment of the local technical potential:

• exclusive utilization for the solar production of warm water,
• exclusive utilization for photovoltaic energy generation,
• Variant # 1: 9.9% warm water and 90.1% energy generation,
• Variant # 2: 23.6% warm water and 76. 4% energy generation.

69% of the total amount of energy required for Vienna‘s eighth district in the middle of the year could be provided by the use of photovoltaic energy production.

In order to estimate how large the effect of shade has on the local technical potential a model calculation was produced assuming that half of the roof-tops are continuously covered by shade.

The following four scenarios were calculated:

• exclusive utilization for solar production of warm water,
• exclusive utilization for photovotaic energy generation,
• Variant # 1: 13% warm water and 87% energy generation,
• Variant # 2: 23.6% warm water and 76.4% energy generation.

54% of the total amount of energy used in Vienna‘s eighth district could be provided by the exclusive use of photovoltaic energy generation.

The information contained in Tab. 1. shows the share which the level of coverage constitutes through solar energy extraction with and without consideration of the shade factor. Comparisons with a level of coverage of 0% are senseless and are therefore not given.

	Warm Water Requirements			Energy Requirements		
	December	July	Year	Winter	Summer	Year
warm water only	81%	75%	78%	***	***	***
energy only	***	***	***	83%	77%	78%
second variant	81%	76%	79%	82%	77%	78%

Tab. 1: Comparisons of levels of coverage

The assumption that half of the roof-tops are continuously covered by shade leads to the conclusion that the levels of coverage for warm water requirements sink to around 80% in the case of no shade in December and in the annual mean to 75% in July. The levels of coverage for energy requirements sink in the period of November to April and in the annual mean to about 80% to 75% in the period from May to October. The loss caused by shade is less in winter than in summer which is favorable for solar energy extraction.

The relatively high levels of coverage for energy and warm water requirements of Vienna‘s eighth district demonstrates the same tendency as the results of the quoted study mentioned in the introduction: Solar energy could constitue a fundamental part of meeting energy requirements.