

Introduction to the AURI2027 -calculator

AURI2027 - New EPBD-compliant Solar Energy and Energy Flexibility
Solutions for Public Buildings

1.4.2025-31.7.2027

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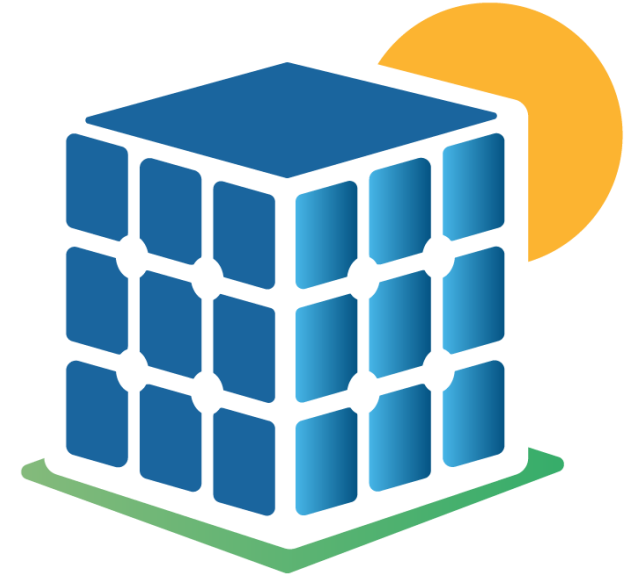
22.9.2026



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AURI2027

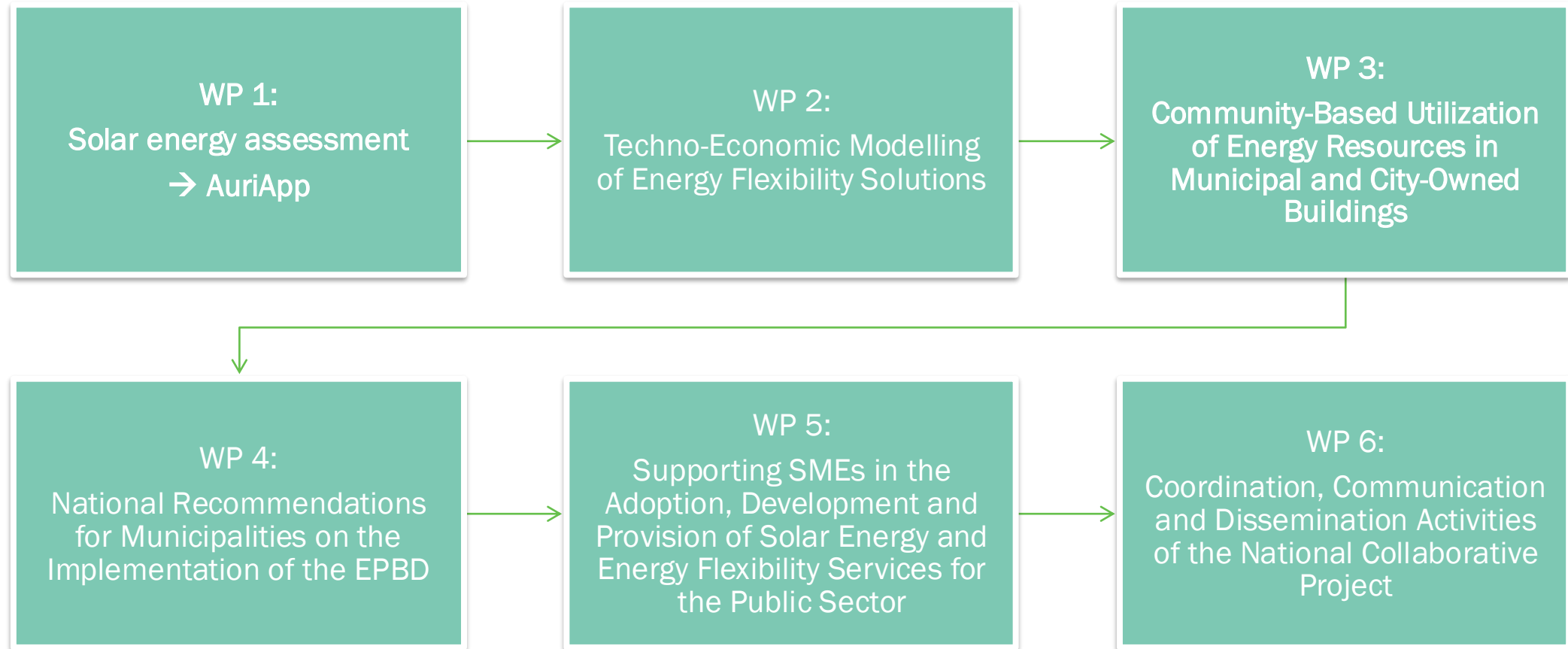
- Funding
 - EU regional and structural policy funds – European Regional Development Fund
 - Economic Development Centre of Northern Finland
- National consortium project
 - Head partner Metropolia University of Applied Sciences
 - Project partners Karelia, LAB and Oulu University of Applied Sciences
- Idea of the AURI2027 is to support Finnish Municipalities to meet the requirements of EPBD



AURI2027



Work packages



Background of the tool

- Analysis based on hourly data
- First-year cost calculation
- Determines the best installation angles
- Solar radiation data
 - Photovoltaic Information System (PV*GIS) – ERA5
 - Joensuu
- Dropdown menu for choosing consumption profile

	N	O
2	Swimming hall	Consumption
3	School	
4		
5	Swimming hall	
6	Health centre	
7	Library	
8		
9	Assisted living facility	
10		
11	Government office	

AURI2027 -Calculator for Determining the Most Profitable Installation Angles

Instructions

- > The second and third worksheet contains the input data used in the calculations.
- > Calculators are in sheets four to seven
- > The Excel file currently uses the hourly production data of a 1 kWp solar PV system for the Joensuu region as background data. (European Commission 2025).
- > Calculator 1: Own hourly consumption
- > Calculator 2: Consumption profiles
- > If the potential of different installation angles is to be assessed for another region, the hourly production data should be updated in the Excel sheet on the second worksheet.
- > Cells that can be edited are highlighted in light purple 
- > Cells B19:I40 contain summary tables of the profitability of different installation angles for the site.

Sources

- Spot prices from year 2023 to 2025. Original source Nord Pool.
<https://porssisahko.net/>
- Solar radiation data for Joensuu region
- Solar irradiation and PV production estimates are based on PVGIS data provided by the European Commission Joint Research Centre (JRC), using the ERA5 reanalysis
European Commission. 2025. PHOTOVOLTAIC GEOGRAPHICAL INFORMATION
https://re.jrc.ec.europa.eu/pvg_tools/en/#DR
- Consumption profiles
- > Data collected and averaged in Auri2027 -project



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Remarks

- > The impact of snow cover on energy production has been taken into account by removing production during December to February for all systems except vertically mounted installations.
- > Accurately predicting the impact of snow is challenging, and snow cover is likely to reduce energy production in March as well.
- > The Excel tool calculates only the first year's energy production and its distribution.
- > The Excel tool is intended to support the selection of installation orientations and more detailed profitability analyses.
- > In public buildings, the electricity price may often be fixed, in which case spot market electricity prices only affect revenue from surplus electricity sold to the grid.
- > Electricity distribution charges vary depending on the contract type and distribution area. The Excel tool uses the distribution tariffs of the PKS network area according to https://pkssahkonsiirto.fi/wp-content/uploads/pkss_verkkopalveluhinnasto_01042026.pdf

Examples of the calculators

Spot prices and own hourly consumption

			Solar PV system size (kWp)	90
Consumption	558 775	kWh		
Annual electricity price	77 861 €	/year		
Distribution charge	0.055 €	/kWh		
Electricity tax	0.023 €	/kWh		
Total distribution charges and taxes	0.077 €	/kWh		

Electricity price	€/kWh
January	0.0800 €
February	0.0800 €
March	0.0800 €
April	0.0800 €
May	0.0800 €
June	0.0800 €
July	0.0800 €
August	0.0800 €
September	0.0800 €
October	0.0800 €
November	0.0800 €
December	0.0800 €

Fixed prices and consumption profile

			Solar PV system size (kWp)	120
Consumption	558 775	kWh		
Annual electricity price	82 436 €	/year		
Distribution charge	0.045 €	/kWh		
Electricity tax	0.023 €	/kWh		
Total distribution charges and taxes	0.068 €	/kWh		

Installation angles	System Yield (kWh)	Own Consumption (kWh)	Grip Export (kWh)	Own power consumption (%)	Yearly savings from self-consumption	Income from Electricity Sales	Total annual savings
South (45°)	95 797	92 097	3 700	96 %	13 587 €	197 €	13 784 €
South (30°)	92 058	88 832	3 226	96 %	13 105 €	118 €	13 224 €
South-West/South-East (45°)	90 179	89 069	1 110	99 %	13 140 €	53 €	13 193 €
South-West/South-East (30°)	89 276	88 044	1 233	99 %	12 989 €	57 €	13 046 €
South-East (45°)	91 606	85 703	5 903	94 %	12 644 €	326 €	12 969 €
South-East (30°)	90 393	86 419	3 974	96 %	12 749 €	210 €	12 959 €
South-West (45°)	88 752	86 964	1 788	98 %	12 830 €	70 €	12 899 €
South-West (30°)	88 160	86 843	1 317	99 %	12 812 €	50 €	12 862 €
South (15°)	87 524	86 171	1 353	98 %	12 713 €	62 €	12 774 €
South-East (15°)	85 066	83 392	1 673	98 %	12 303 €	79 €	12 382 €
South-West/South-East (15°)	84 397	83 483	914	99 %	12 316 €	40 €	12 357 €
South-West (15°)	83 728	82 984	744	99 %	12 243 €	29 €	12 272 €
East (15°)	76 169	74 361	1 808	98 %	10 971 €	64 €	11 035 €
Flat roof	75 307	74 344	963	99 %	10 968 €	33 €	11 001 €
East-West (15°)	74 877	74 128	749	99 %	10 936 €	26 €	10 962 €
East (30°)	76 664	73 270	3 394	96 %	10 810 €	123 €	10 933 €
South (90°)	74 242	73 651	591	99 %	10 866 €	27 €	10 893 €
West (15°)	73 585	72 745	840	99 %	10 732 €	23 €	10 755 €
South-West/South-East (90°)	71 042	71 022	20	100 %	10 478 €	2 €	10 479 €
South-East (90°)	72 682	69 913	2 769	96 %	10 314 €	160 €	10 474 €
West (30°)	71 637	70 581	1 056	99 %	10 413 €	26 €	10 439 €
South-West (90°)	69 402	69 130	272	100 %	10 199 €	14 €	10 212 €

Key Findings and Tool Benefits

Key findings and tool benefits

- Most cost-effective angles
 - South and south-east
 - Tilt angle 30-45°
- Spot electricity versus fixed electricity contracts

Future Use & Development

- Radiation data is only for one region
 - Hard to update for larger area
- Future is not predictable
- Shadings



Solutions for Tomorrow

Contact Information

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