

ISEC

3rd INTERNATIONAL
SUSTAINABLE ENERGY
CONFERENCE 2024

SOLID
solar energy systems

Operating Experience of the Largest Ground-Mounted Solar Plant in Austria Feeding into District Heating of Mürzzuschlag

11th of April 2024
Messecongress Graz, Austria

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Who is SOLID?



~ 30 employees

30 years of experience

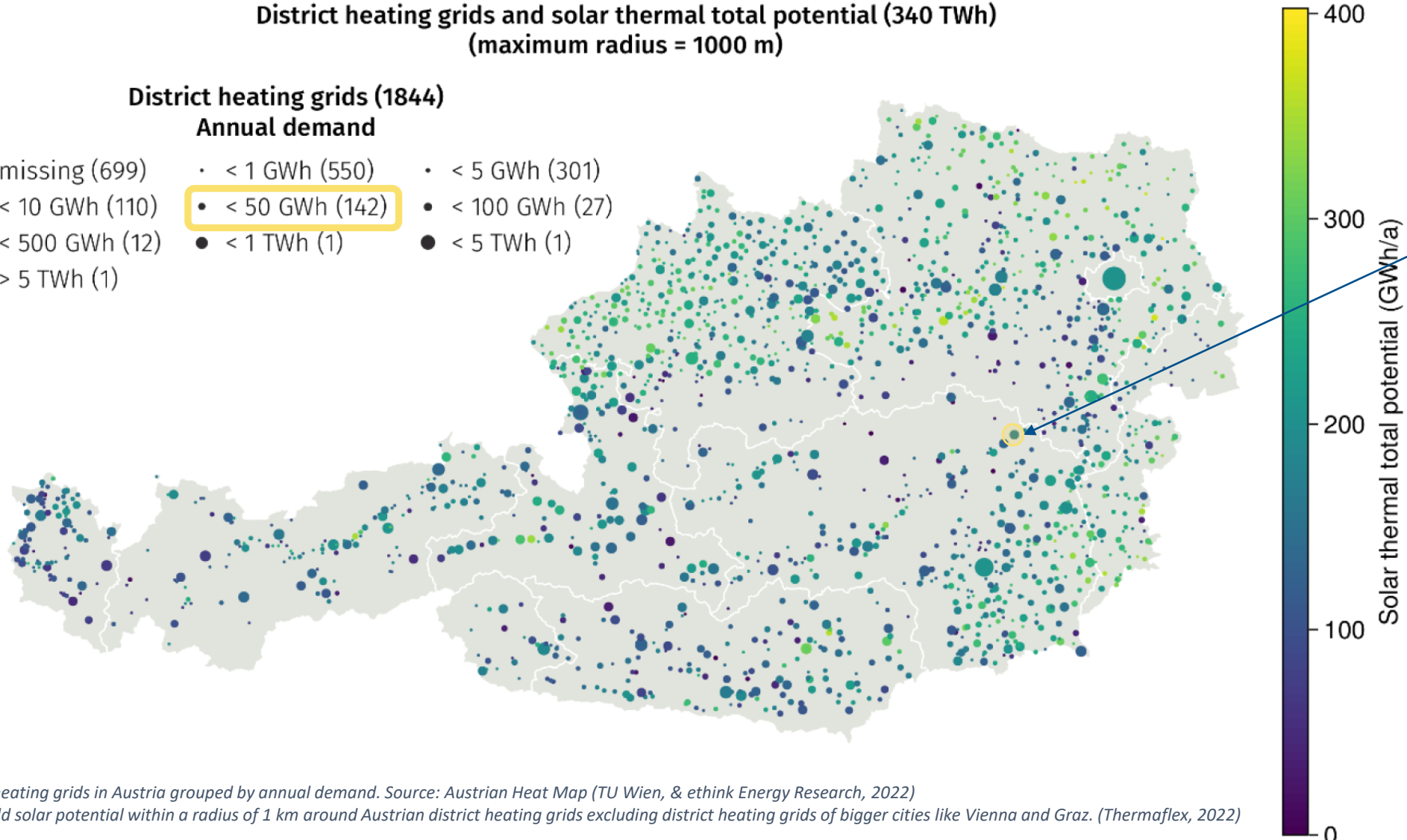
Topic for today



District heating grids and solar thermal total potential (340 TWh) (maximum radius = 1000 m)

District heating grids (1844) Annual demand

- missing (699)
- < 10 GWh (110)
- < 500 GWh (12)
- > 5 TWh (1)
- < 1 GWh (550)
- < 50 GWh (142)
- < 1 TWh (1)
- < 5 GWh (301)
- < 100 GWh (27)
- < 5 TWh (1)

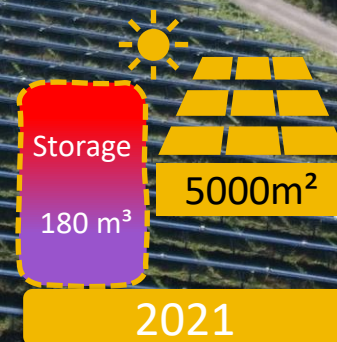
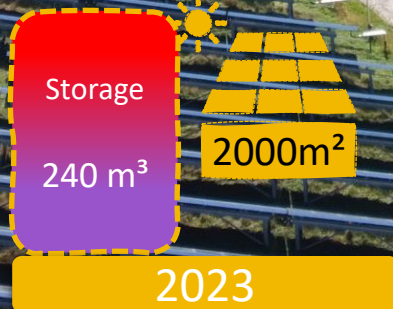
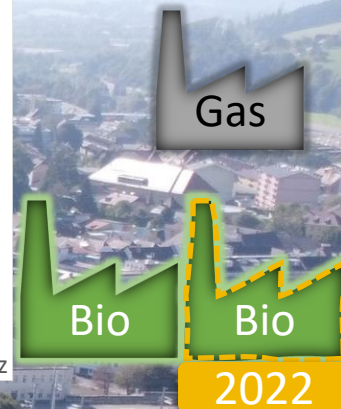
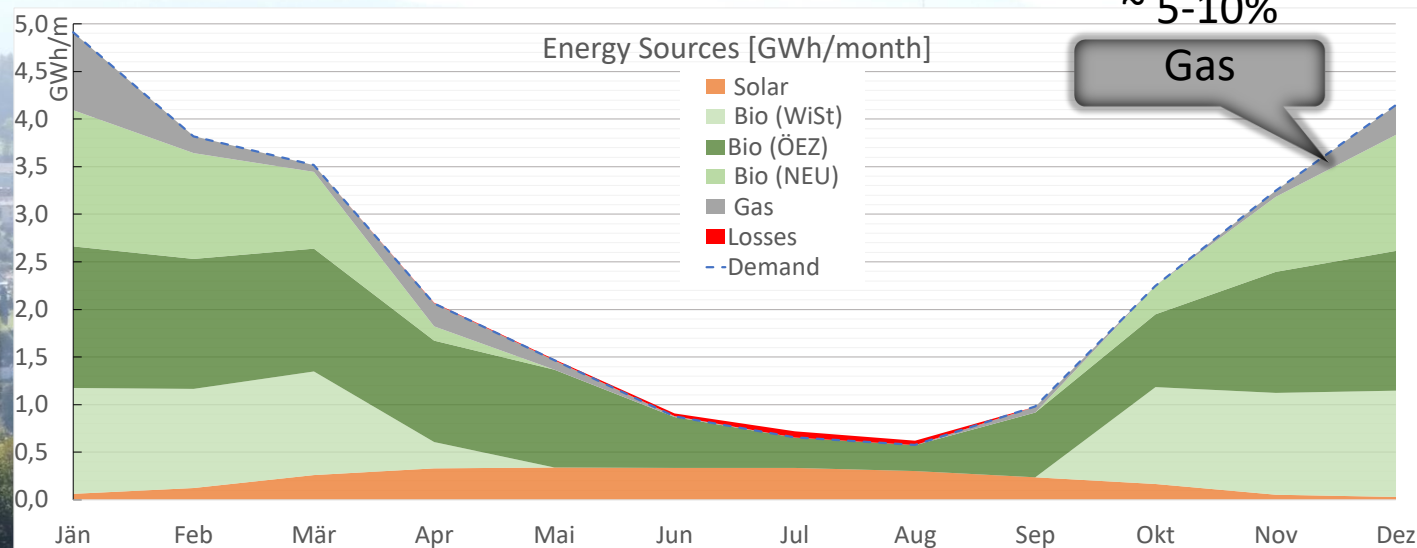


District Heating
Mürzzuschlag



~ 30 GWh/a demand
~ 3 GWh/a solar

District Heating Mürzzuschlag Heat Generation



Storage Operation

- Substitution of gas in winter/transition periods
- Use solar storage for DH cover morning peak demands

2021: 5 MWh
2022: 16 MWh
2023: 88 MWh
2024: 116 MWh (Jan-Mar)

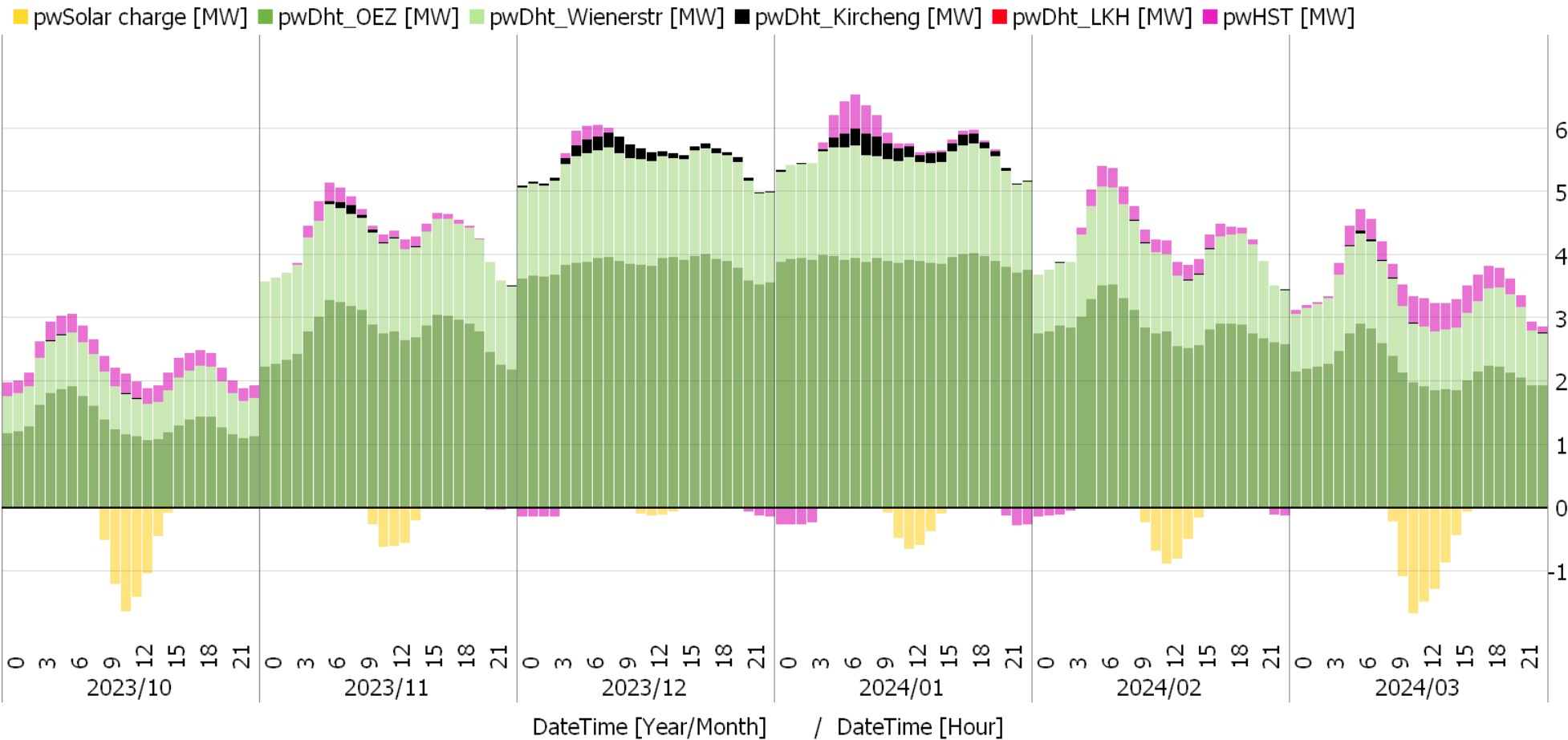
Estimation:

300 – 600 MWh/a Gas substitution
~ 75 - 150 t_CO2/a (@249 kg/MWh)
~ 15.000 – 30.000 €/a (@ 50 €/MWh)

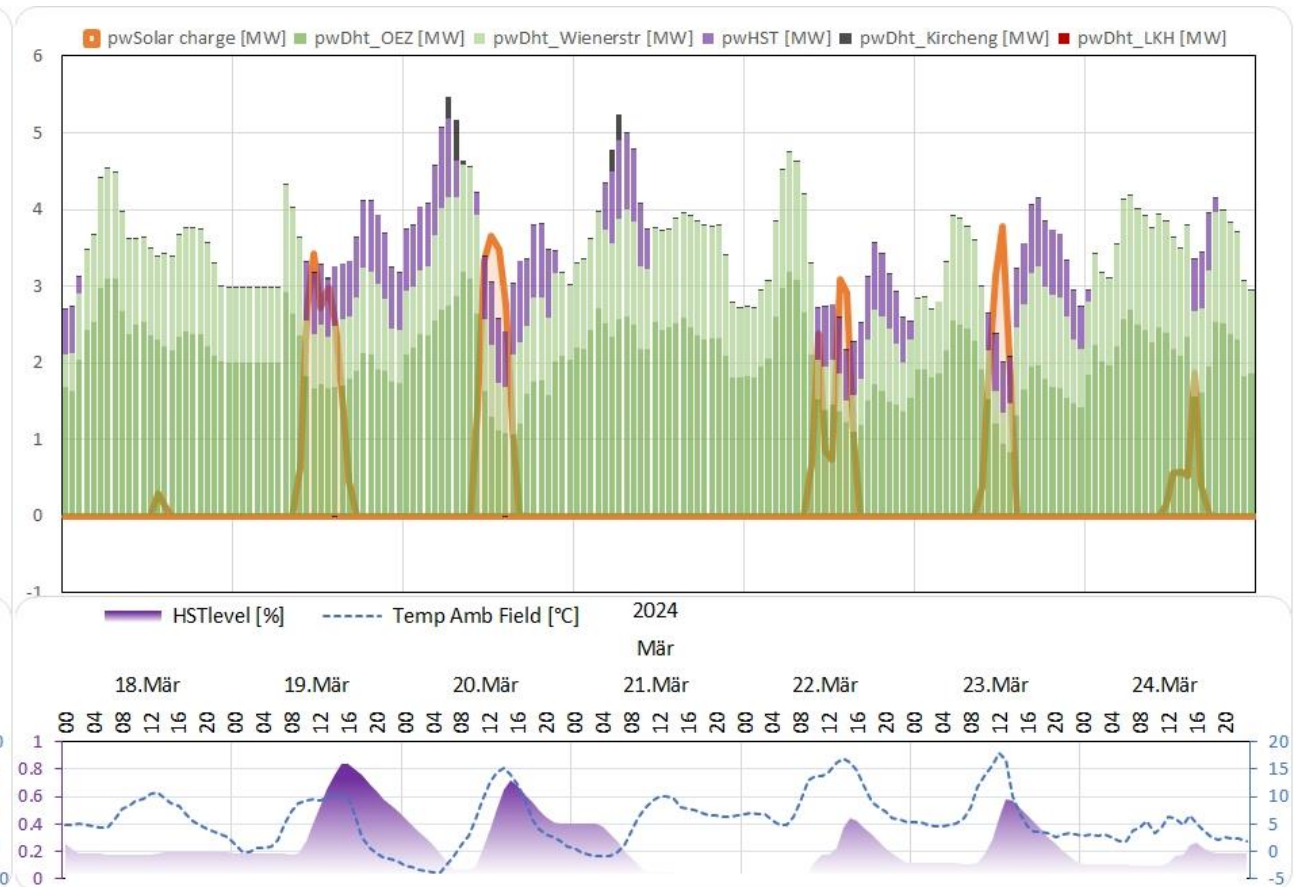
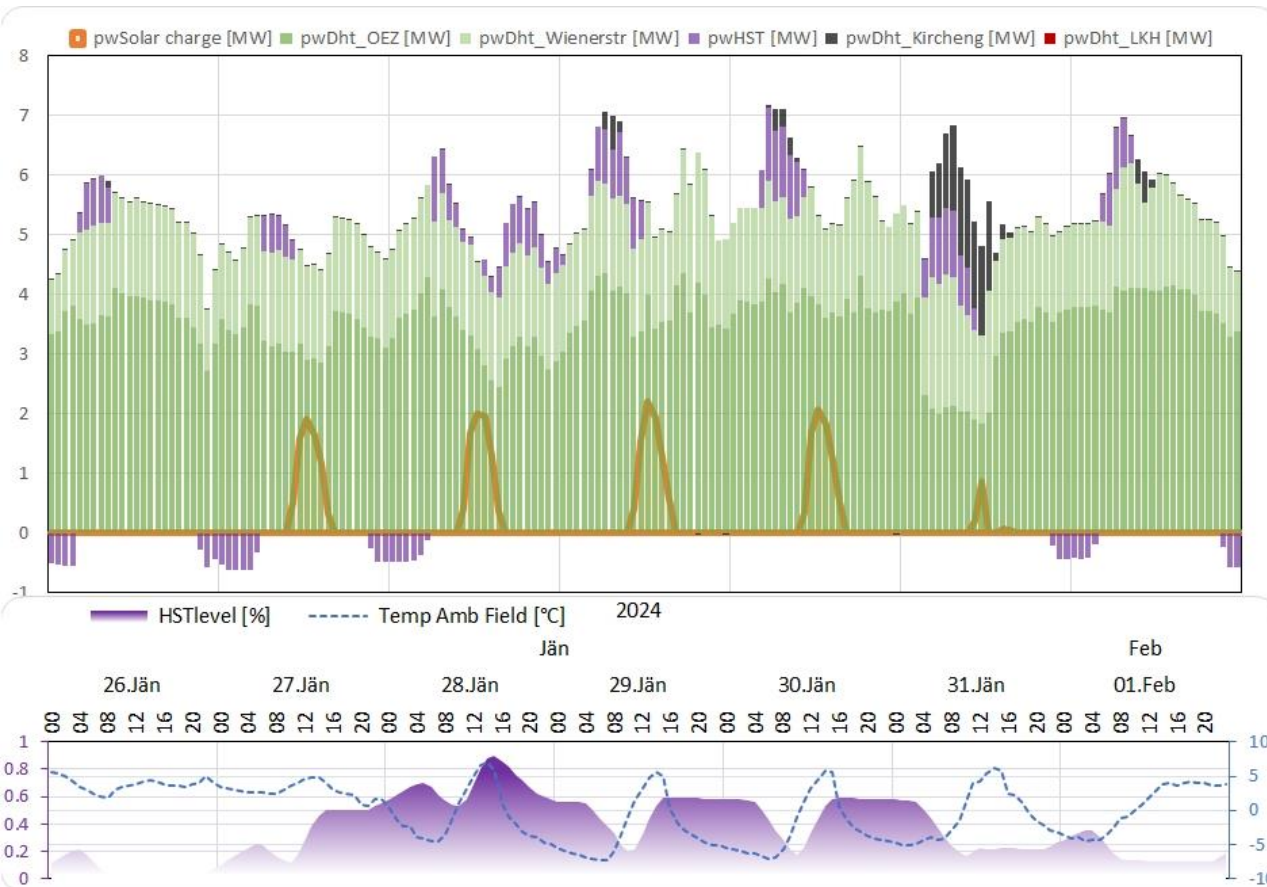


Storage Operation

Average daily production profiles grouped by month



Storage Operation



Monitoring – Solar Operation

Daily Solar Peak Power [MW]

2022	8	3.3	3.9	3.8	2.7	2.8	3.3	3.0	0.1	2.8	2.8	3.7	3.5	3.1	4.4	3.3	3.6	2.8	2.8	3.4	2.8	0.1	0.0	1.0	3.5	3.7	3.6	3.4	3.6	3.9	3.0	0.0
	9	3.3	3.5	2.8	3.7	3.6	3.6	3.2	2.8	2.6	4.0	0.2	3.9	3.0	0.0	3.7	0.0	0.0	3.4	3.9	4.2	3.7	2.0	2.8	3.3	0.4	0.0	0.0	3.1	1.2	3.2	
2023	8	0.0	4.6	0.0	0.0	0.0	5.5	1.0	7.5	0.7	6.5	4.2	4.1	4.9	4.0	3.9	4.5	4.7	5.3	4.8	4.9	3.9	3.7	4.6	4.1	4.5	5.1	4.9	4.7	0.0	6.6	4.8
	9	5.9	4.8	4.2	5.3	4.0	3.9	3.9	4.0	3.9	3.8	3.5	3.8	4.3	1.0	5.0	5.6	4.1	4.7	2.9	3.6	3.6	4.1	0.6	0.0	4.3	3.9	3.7	3.8	3.6	2.5	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

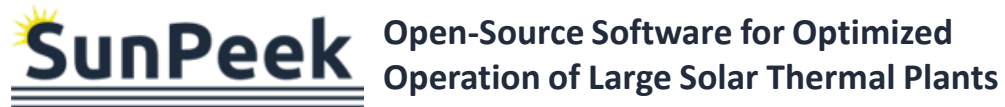


Daily Solar Energy [MWh/d]

2022	8	9	5	10	11	13	3	8	0	15	12	9	1	6	5	9	8	15	10	5	3	0	0	1	10	7	13	4	7	6	14	0
	9	6	12	12	11	11	11	8	3	1	7	0	8	10	0	3	0	0	3	5	5	3	0	11	4	0	0	0	8	1	2	
2023	8	0	8	0	0	0	3	1	13	0	19	23	22	11	21	20	6	7	12	18	18	19	16	10	15	17	14	17	9	0	10	8
	9	14	14	5	16	21	21	20	20	20	19	16	14	11	0	14	10	16	12	1	15	14	4	0	0	5	14	14	16	13	2	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Day of Month

Solar yields - collector performance

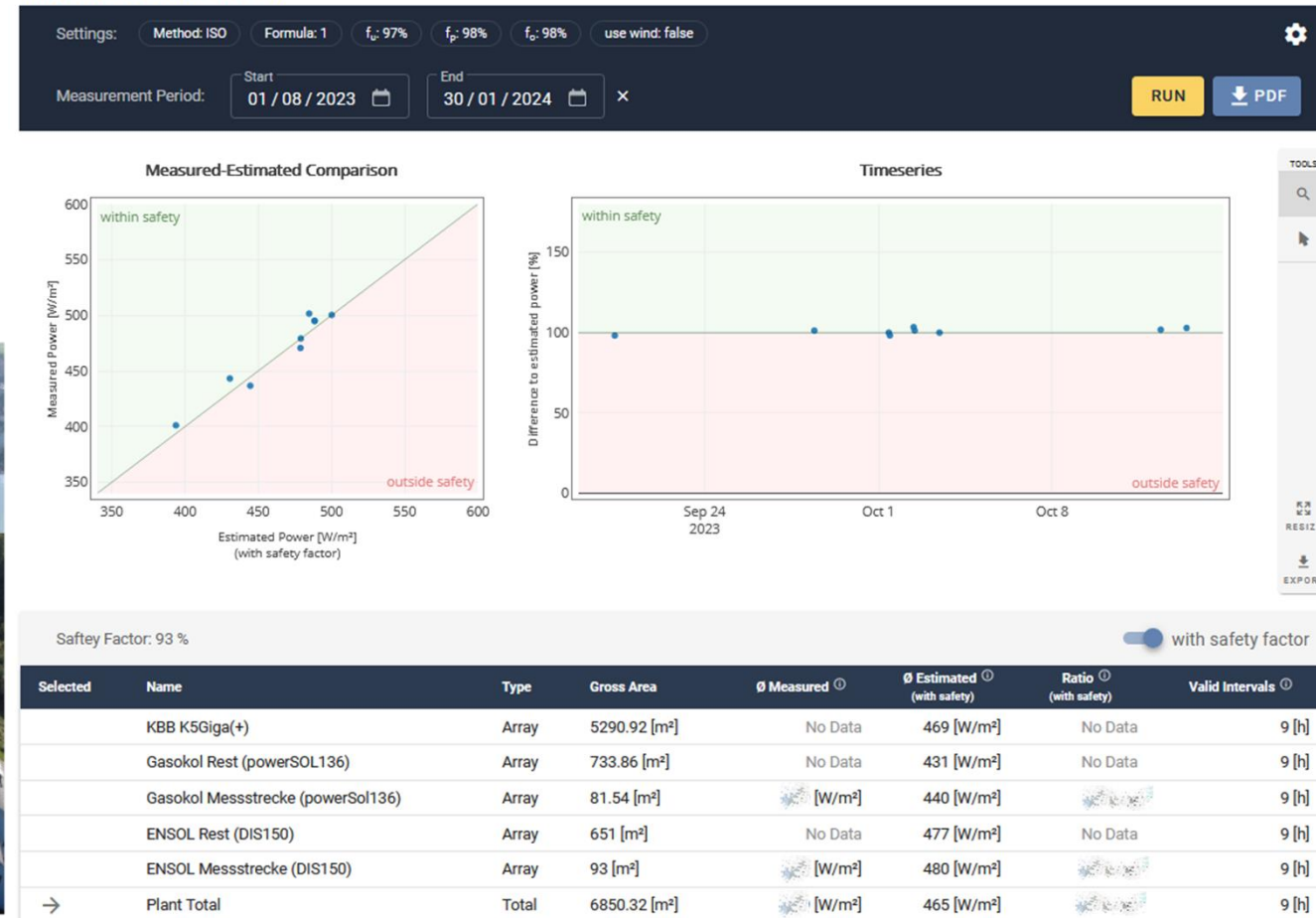


Implements ISO 24194 (Thermal Power Check)

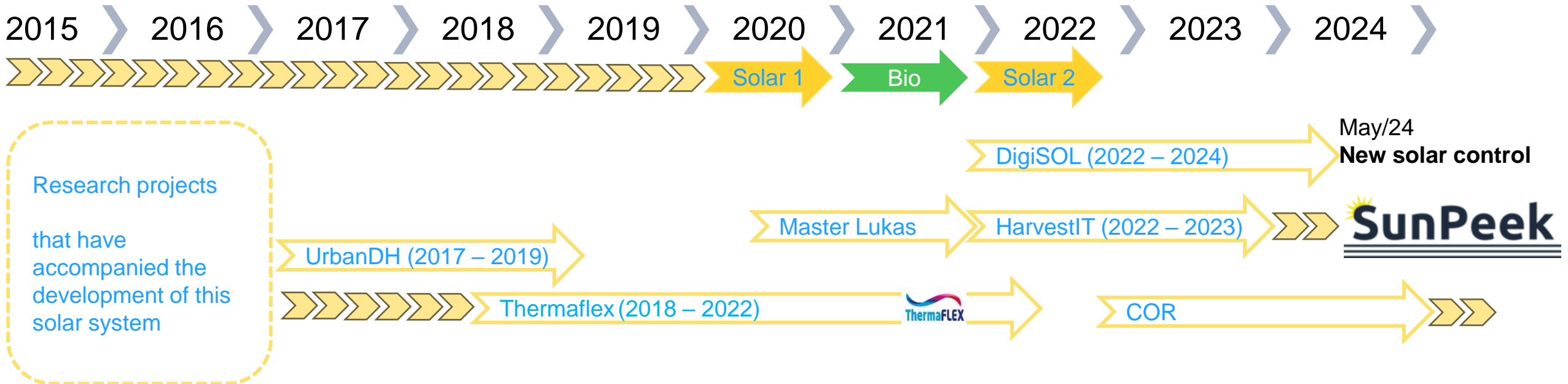
- SunPeek: <https://sunpeek.org/>
- HarvestIT: www.collector-array-test.org



Thermal Power Check[Ⓢ]



Final slide



Research Topics

- Control system
- Monitoring
- System simulation and -design
- SCADA and decision support



Future Topics – looking for partners ...

- Cloudtracking
- Temperature reduction
- Innovative collector cleaning
- Inspections with drones
- Automatic fault detection
- Wireless sensors

THANK YOU FOR YOUR ATTENTION

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SunPeek

