

Marstal solar district heating

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MARSTAL DH BRIEF



SDH since 1996
(later Sunstore 4)



PTES 2003 / 2012



Electric heat pump



Wood chips & ORC



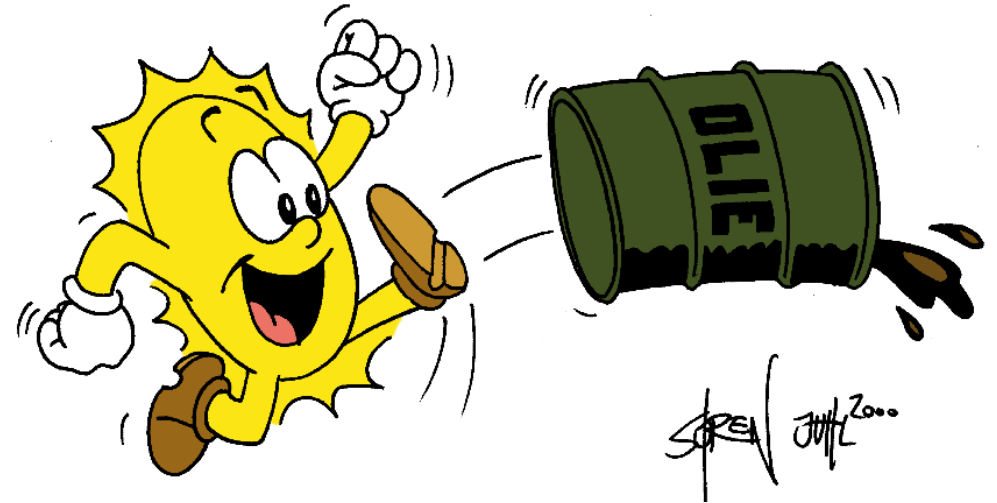
MARSTAL DH HISTORY AND OVERVIEW

- Founded in 1962
- Approximately 1,700 consumers are connected today
- Annual heat demand around 32,000 MWh
- 40 km main DH pipes network
- Annual turnover approx. 4 M€



MARSTAL DH PRODUCTION MIX

- 1960 – 1988 Fuel Oil
- 1988 – 1989 Fish Oil
- 1989 – 2007 Waste oil
- 1996 - Solar thermal
- 2007 – Bio oilie as backup (2100 tonnes)
- 2012 - Wood chips with an ORC
- 2012 - 2020 CO₂ heat pump
- 2021- Ammonia heat pump



MARSTAL DH PRODUCTION PORTFOLIO AND MIX

- The production portfolio today consists of the following:
 - 4.5 MW_{heat} wood chip boiler, which can be used to run a 0.75 MW_{el} ORC plant
 - 18.6 MW_{heat} bio-oil boilers (5 boilers in total)
 - Electric heat pumps (2 x 1 MW_{heat})
 - 33,300 m² solar thermal plant (approximately 23 MW_{heat} peak production capacity)
 - 75,000 m³ pit thermal energy storage (approximately 12 MW charging capacity)
 - Possibly new peak load production capacity
- Around 50% of the annual heat demand is covered by solar heat (both directly and through the pit storage)
- The rest is covered primarily by the wood chip boiler



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SUNSTORE 2 TEST SYSTEMS



881 m²



211 m²



108 m²



103 m²

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	Year	Collector aperture area [m ²]	Capacity [MW _{th}]	Collector manufacturer
Marstal, 1.	1996	8038	5.6	Arcon
Marstal, 2.	1999	1005	0.7	Arcon
Marstal, 3.a	2003	8019	5.6	Arcon (FPC)
Marstal, 3.b	2003	211	0.1	IST (PTC)
Marstal, 3.c	2003	108	0.1	Thermosol (ETC)
Marstal, 3.d	2003	881	0.6	GJ Vietnam (FPC)
Marstal, 3.d	2003	103	0.1	Wagner Solar Roof (FPC)
Marstal, 4.	2012	15000	10.5	Sunmark

SUNSTORE 2 PROJECT – 10 000 M³ PTES



LARGE SCALE SDH

1996: 8038 m² of solar collectors



1999: 9043 m² of solar collectors



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CONTROL SYSTEM

Collector outlet temperature

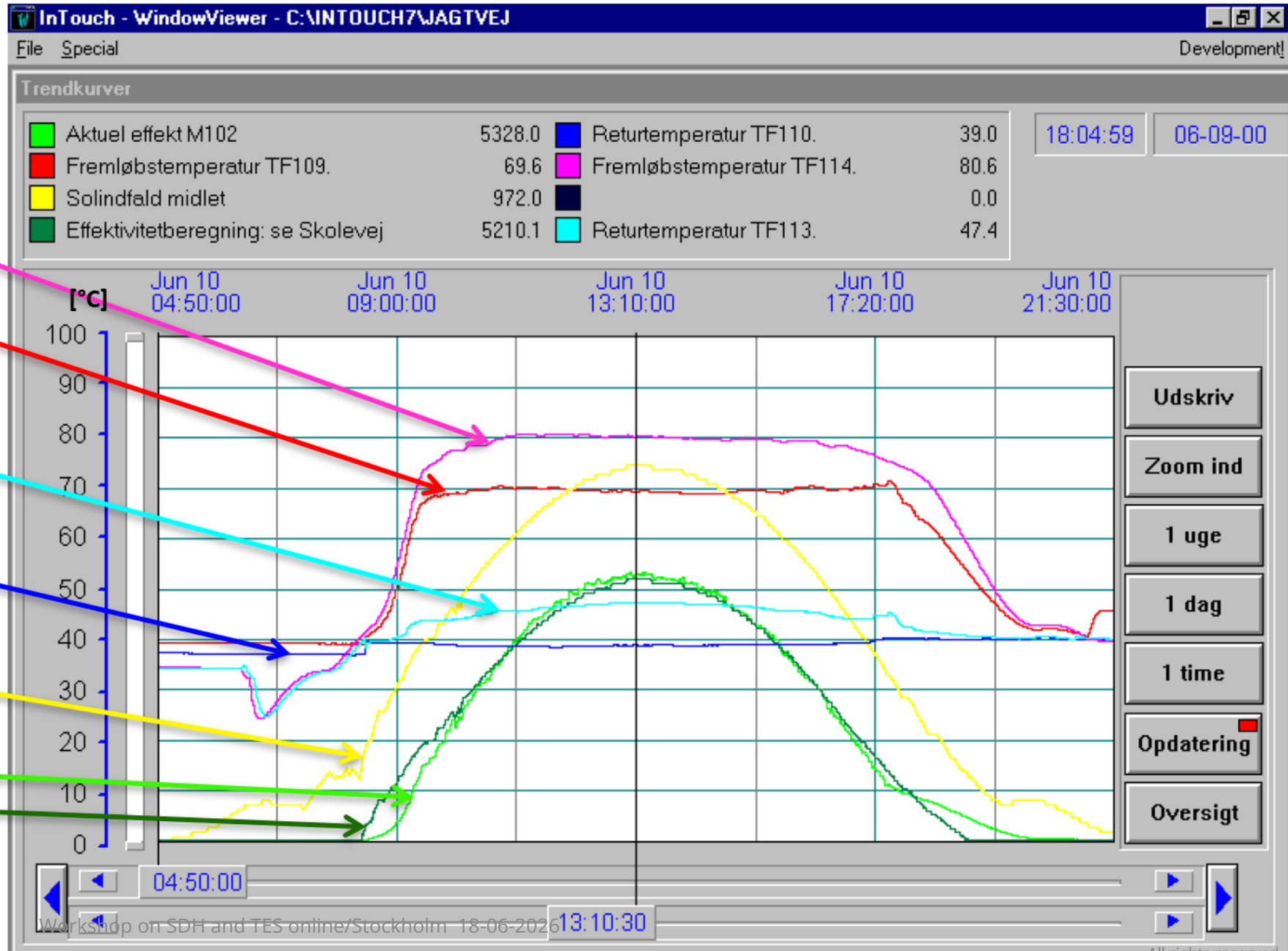
Temperature of flow to the top of storage tank

Collector inlet temperature

Temperature of flow from bottom of storage tank

Irradiation on collector surface

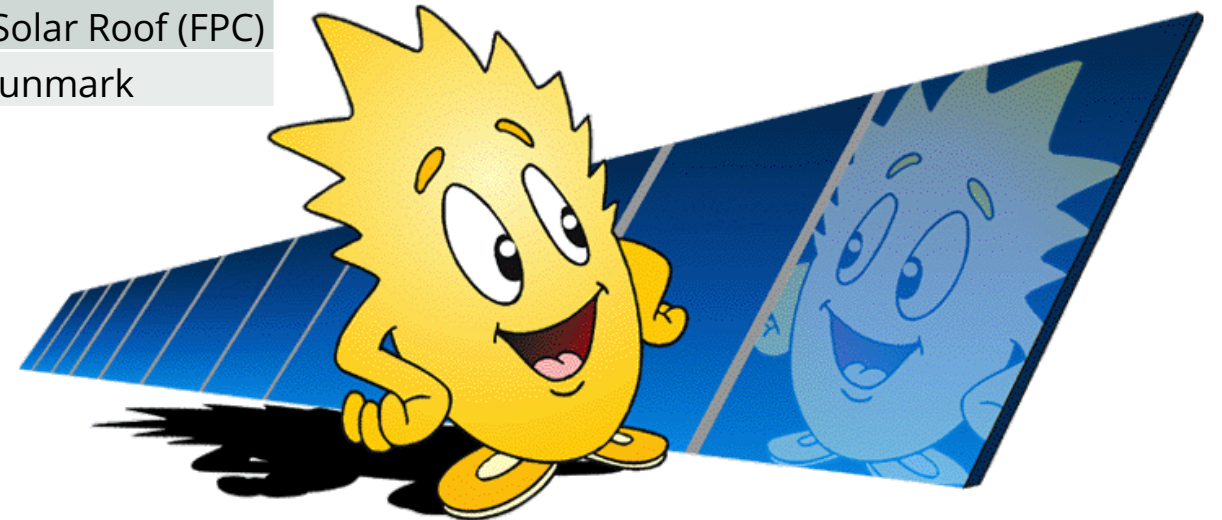
Thermal power
- actual
- calculated



SDH IN MARSTAL OVERVIEW

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(First PTES of 10000 m³ in 2003. New 75000 m³ PTES in 2012)





MERCI DE VOTRE ATTENTION

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