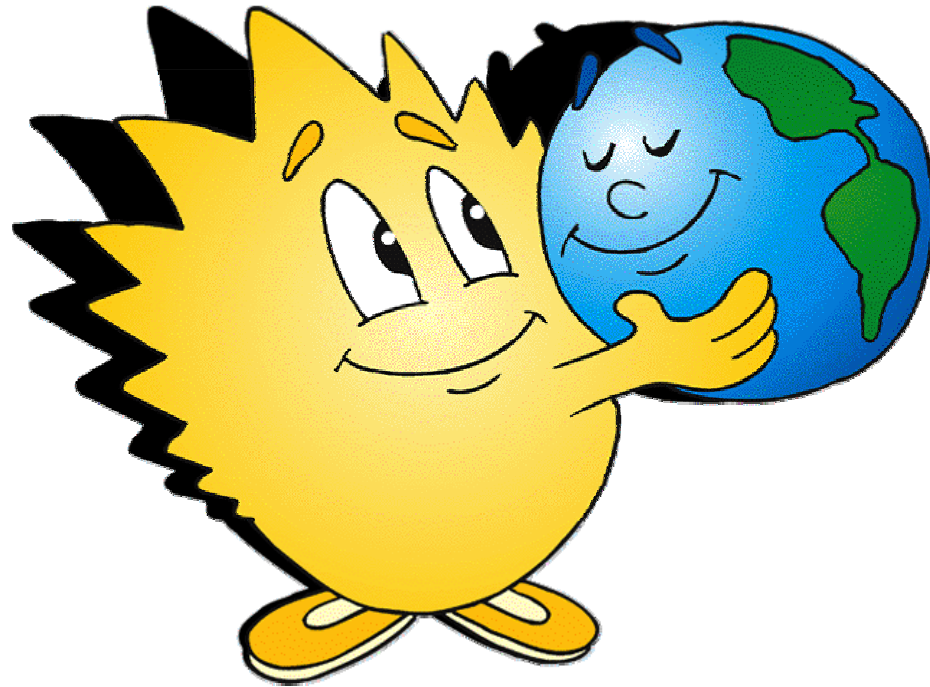




Solar Plants together with District Heating in Denmark





Leo Holm

- ☀ Engineer
- ☀ 5 years as naval officer (Engineer)
- ☀ Work with District Heating and alternative energy sources since 1988
- ☀ Chairman of the Danish District Heating Associations solar group



Jan Mayen
(Norway)

Arctic Ocean

ICELAND

Faroe Is.
(Denmark)

North
Atlantic
Ocean

Shetland Is.
(G.B.)

Northern
Ireland

NORWAY

RUSSIA

FINLAND

ESTONIA

LATVIA

LITHUANIA

DENMARK

North
Sea

SWEDEN

The island Årø

POLAND

UKRAINE

MOLDOVA

NETHERLANDS

GERMANY

CZECH
REP.

SLOVAKIA

BELGIUM

FRANCE

English Channel

GREAT
BRITAIN
(UNITED
KINGDOM)

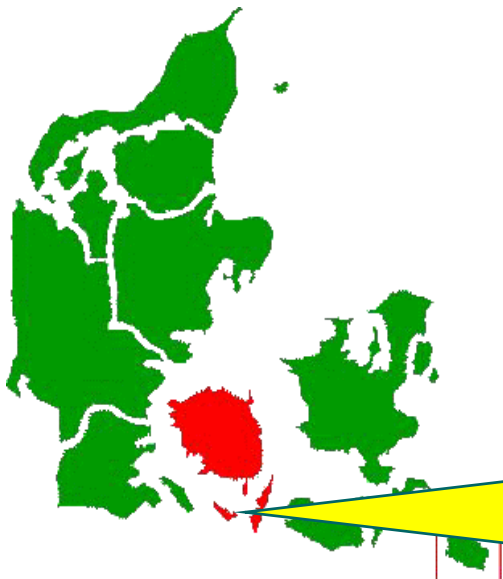
IRELAND



Marstal Fjernvarme

The world's largest heat producing solar plant.

www.solarmarstal.dk



Company data

Marstal District Heating



- ☀ Established 1962
- ☀ A.m.b.a. company
(Cooperative – consumer owned)
- ☀ 1,460 consumers
- ☀ 32 km supply main pipe
- ☀ Total heat production app. 28,000 MWh/year
- ☀ Thermal Solar cover app. 30 % of
the total heat production



Solar history

- ☀ 1994: 75 m² test plant
- ☀ 1996: 8,038 m² solar collectors
- ☀ 1999: 9,043 m² solar collectors
- ☀ 2003: 18,365 m² solar collectors



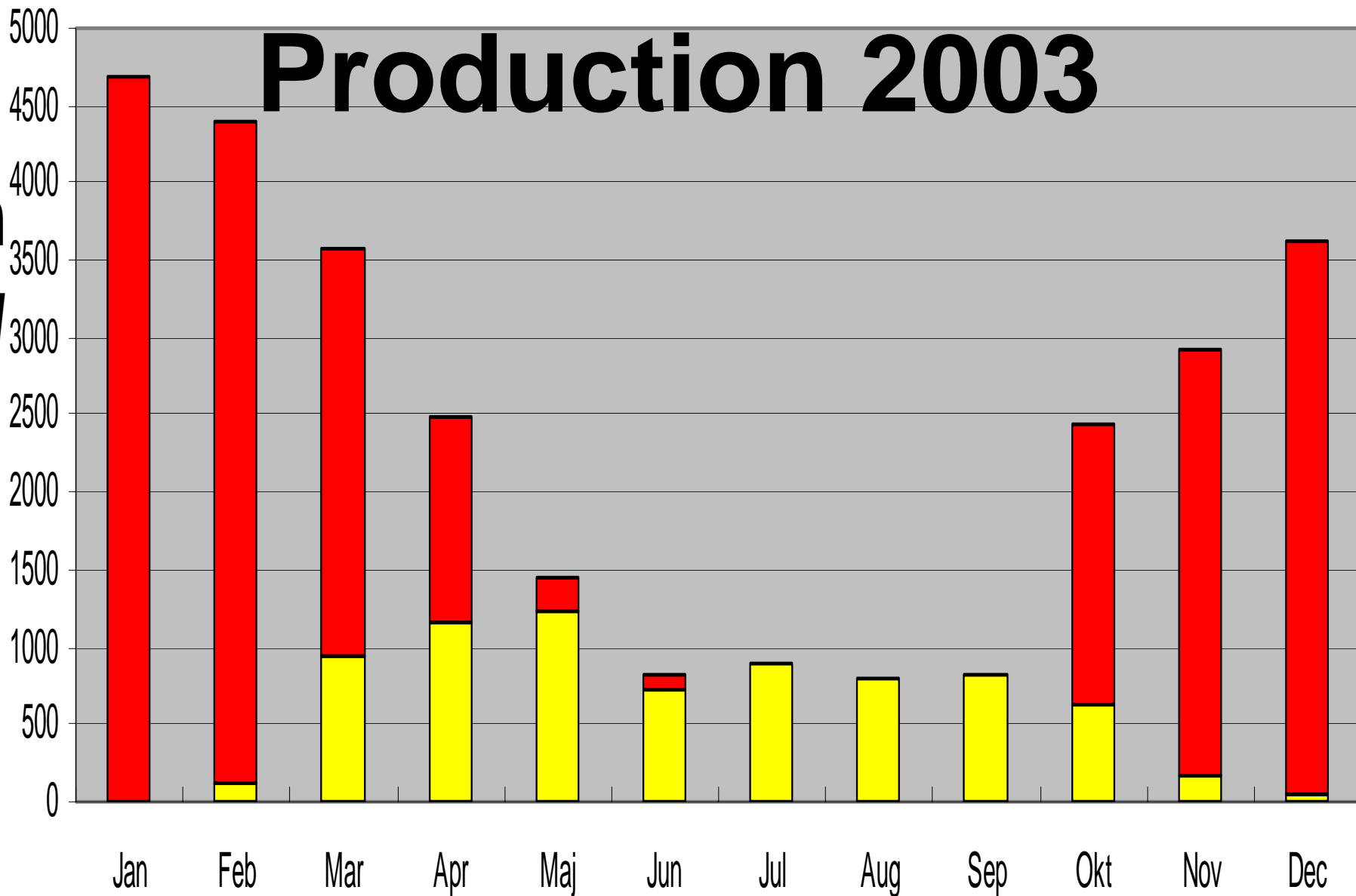






Production 2003

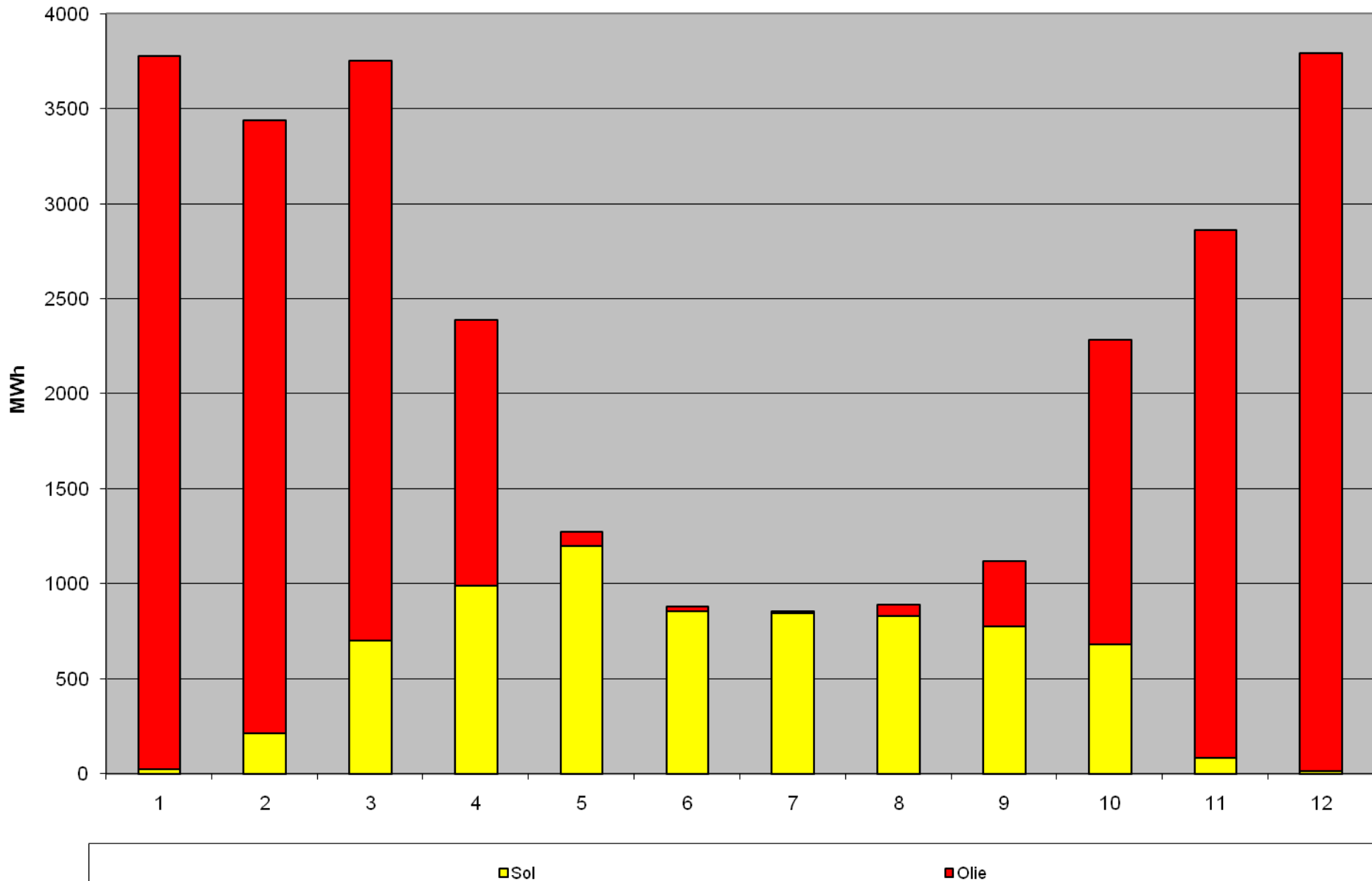
m
W
h

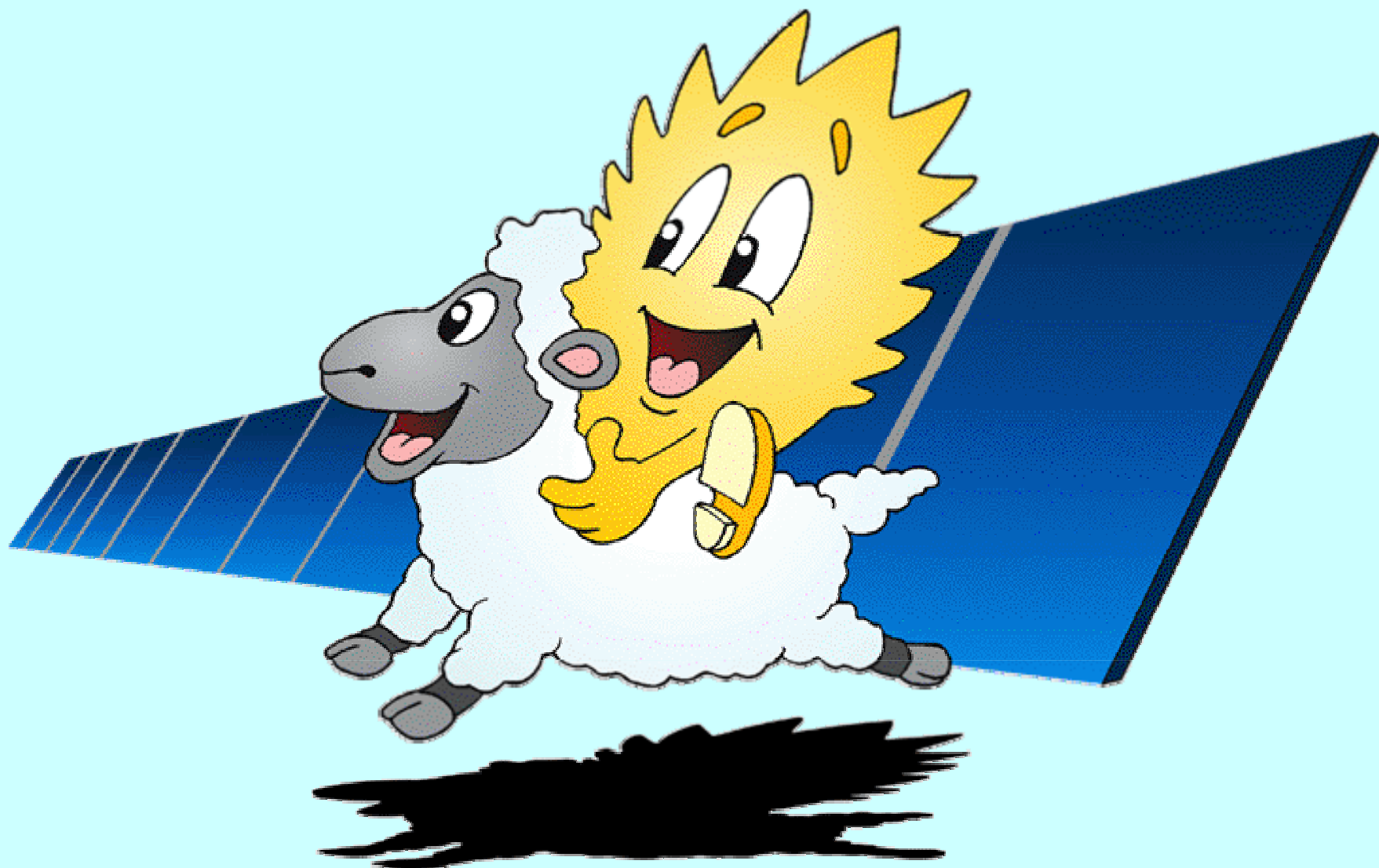


■ Sun

■ Boiler

Production 2008





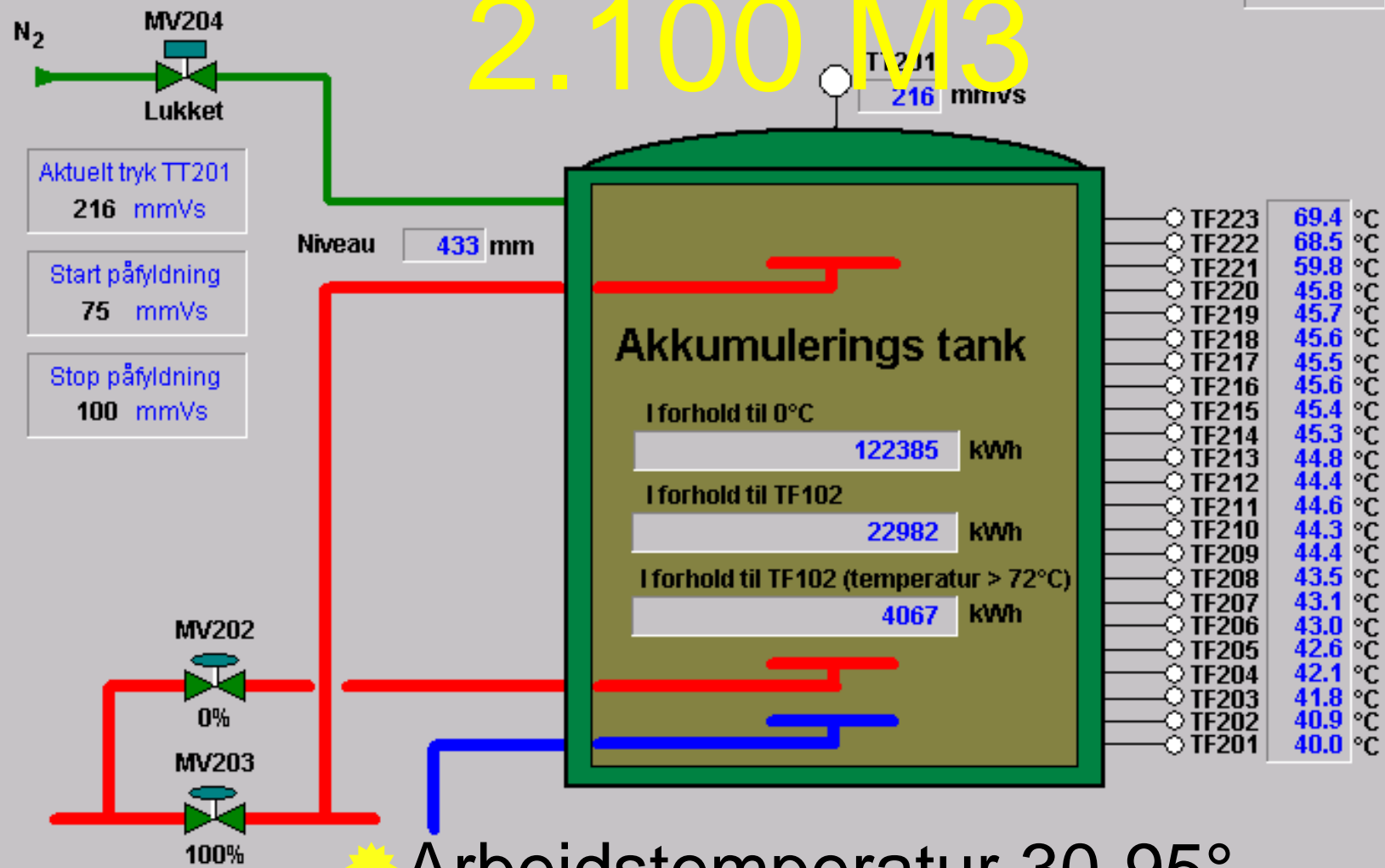
Storage

- ☀ 1996: 2,100 m³ water storage
(steel tank)
- ☀ 1998: 3,500 m³ earth pipe storage
(with water pipes in wet sand, 2,000
m³ water equivalent)
- ☀ 2003: 10,000 m³ pit heat storage

12:53:43 19-06-00

Akkumuleringsstank

2.100 M3



☀ Arbejdstemperatur 30-95°

☀ 3- 5 dages total forsyning





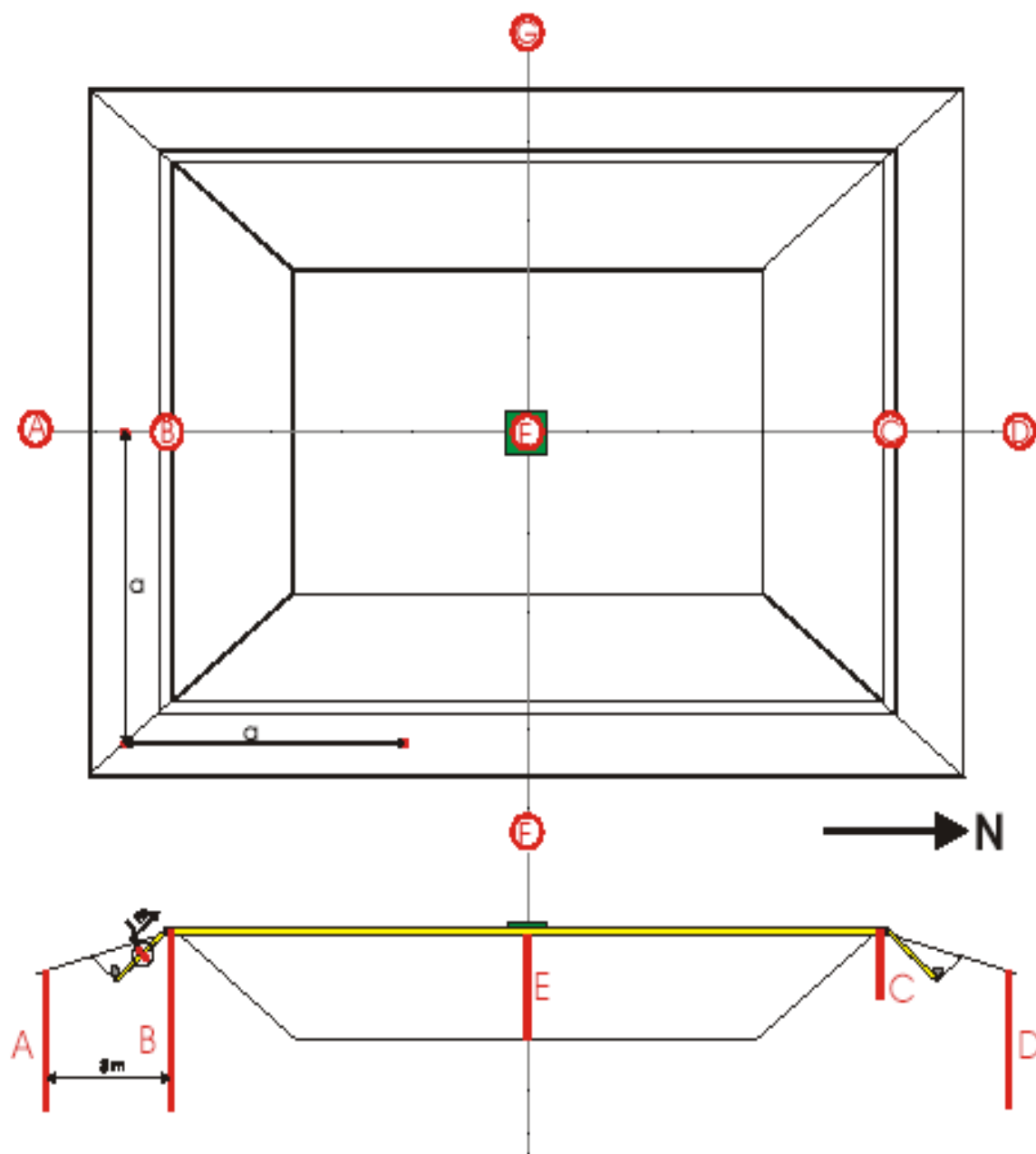




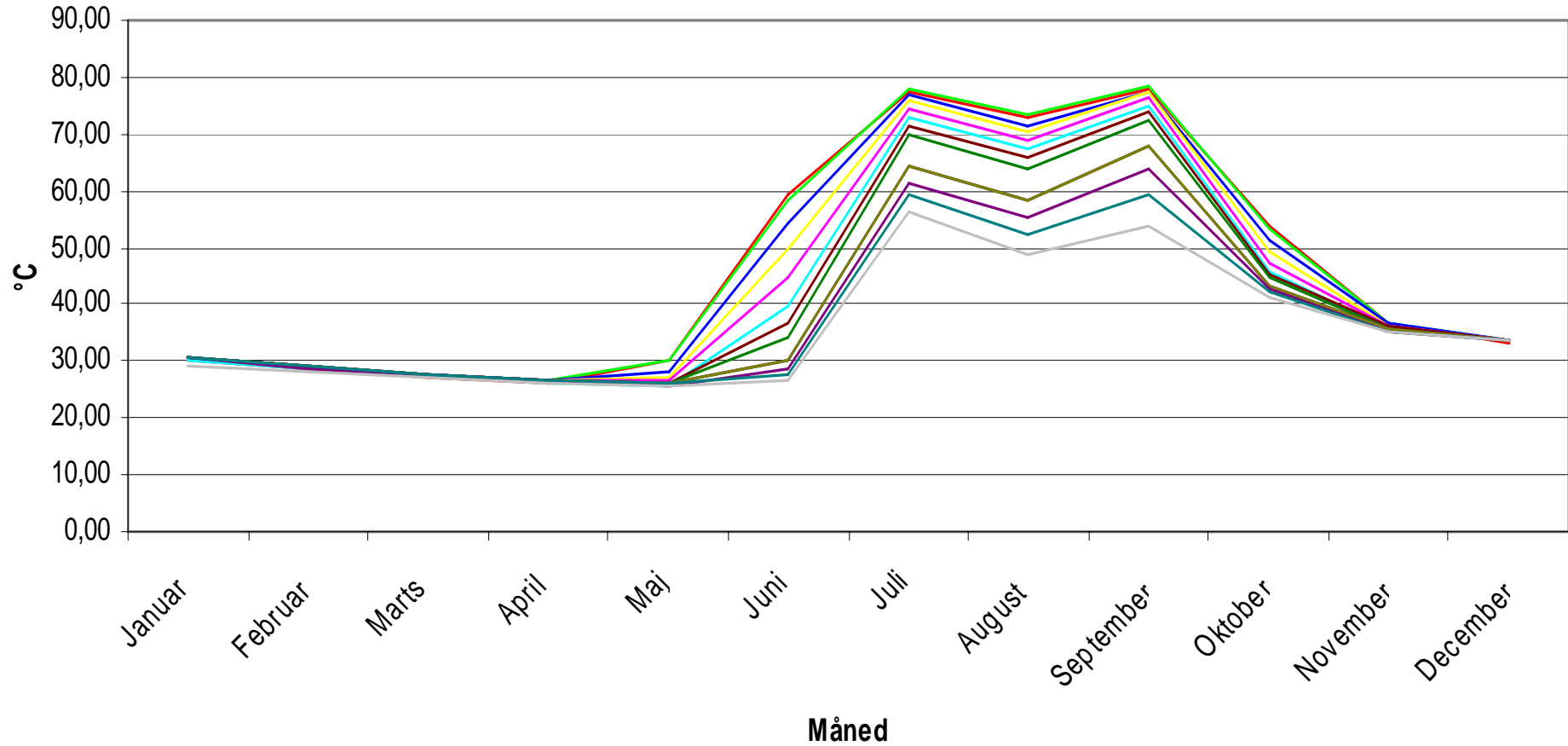




Temperature sensors in the ground



Damlager, Året



T4537 T4538 T4539 T4540 T4541 T4542 T4543 T4544 T4545 T4546
T4547 T4548 T4549



Information campaign



Visitors from the whole world



1997 - 2009 : 30,000 visitors



Participating in workshops, conferences

etc. in Denmark and abroad

District Heating on the Island Ærø



Ærøskøbing district heating plant - a 100 %
RE supplied district heating plant

Rise district heating plant – Fully automatic
100 % RE supplied district heating plant

Marstal district heating plant -The world's
largest solar plant, 100 % RE supplied heating
plant

Aeroeskoebing District Heating



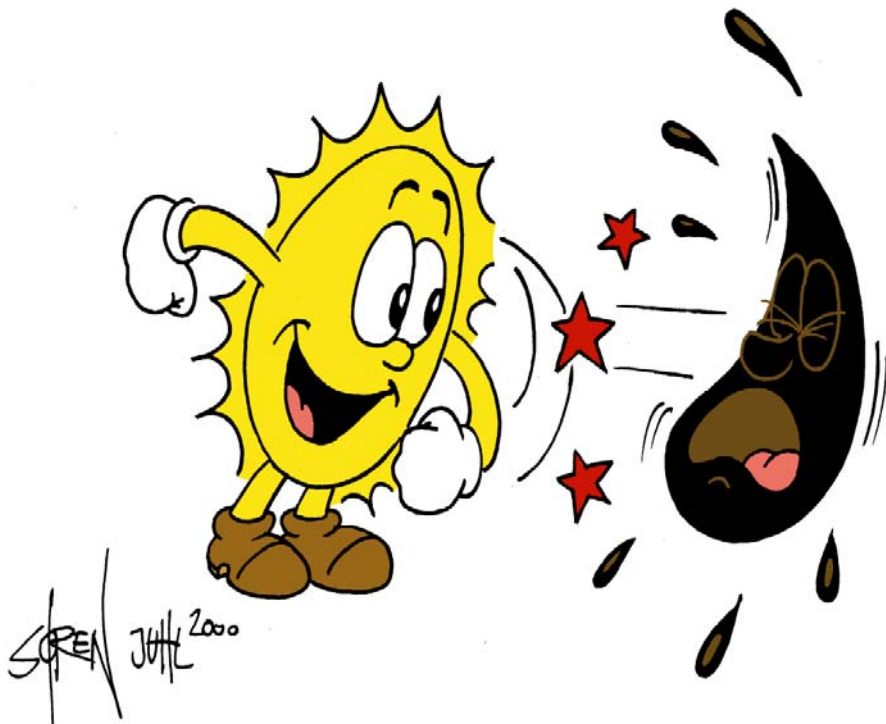
6.900 M2 Solar collectors

Rise District Heating



3.600 M2 Solar collectors

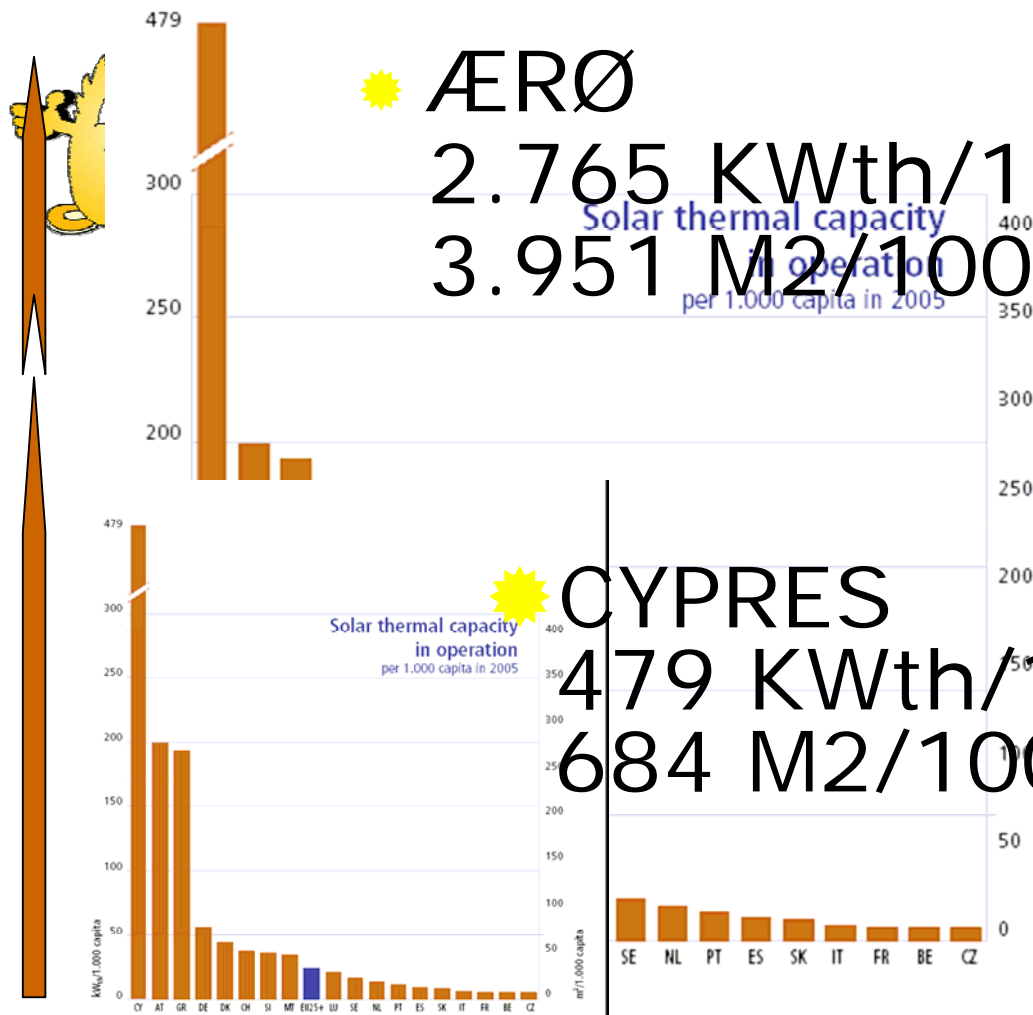
The Solar Island Ærø



Year	m ² solar/inhabitant
1996	1,02 m ²
1999	1,86 m ²
2001	2,40 m ²
2003	3,75 m ²
2009	4,35 m ²








The Solar Island Ærø





New Project SUNSTORE 4

-  15.000 M² solar plant
-  4,0 MW Wood chip boiler
-  750 kW_{el} ORC
-  75.000 M³ pit heat storage
-  1,5 MW CO₂-driven heat pump



With solar energy
we provide a cleaner
environment!

