Savo-Solar Plc is offering solar thermal energy solutions to industrial sized installations

- Savo-Solar was founded in 2009
- Awarded from the innovational absorber solution in the Intersolar Award in 2011
- The most efficient solar thermal collectors in the world, acknowledged internationally
- Listed on Nasdaq First North Sweden & Finland
- Subsidiaries in Denmark (2014) and in Germany (2017)
- About 40 employees
- Revenue in 2016: 5,4 million euros
The highest efficiency in markets:

- The unique absorber construction allows us to make selective optical coating on complete absorbers working with direct flow principle -> much more efficient heat transfer than with other products
- Collector size up to 15 m² allows us:
  - to reduce installation costs
  - to get higher energy density of available land/roof area
Solar thermal and District heating
Solar thermal and District heating

COLLECTOR FIELD
$T_{out}$ up to 100 °C

HEATING PLANT

HEAT STORAGE

PROCESS HEAT

DISTRICT HEATING
Heat storages – buffer tank and seasonal storage
Our customers are facing:

- Constantly rising energy prices
- Business models without the possibility to forecast energy costs
- Public pressure and legal obligations to lower greenhouse gas emissions
- Politically dependent fuel costs and fuel availability
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- Constantly rising energy prices
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Savosolar offers:
- Complete solar thermal systems with local partners
- The best performance on the market
- Lowest long term energy cost – 25 to 45 €/MWh
- Energy price stability over 25 years
- Emission free energy, independence of fuel costs, less political dependency and environmentally responsible image
Denmark is the world leader in solar district heating

- Over 1000 MW\textsubscript{thermal} of solar thermal collectors connected to DH network
- Very good experiences with SDH during last two decades

German speaking countries
- Energiewende => Wärmewende
- Copying Danish model
- A lot small fields in realization, large ones coming
- Graz 450 000 m\textsuperscript{2} (200 M€)

Other countries
- France: small DH plants with solar thermal
- Poland: solar thermal growing in DH
- China: Moving towards large fields
- Balkan countries: Several studies about integrating solar to DH
City of Graz: 280,000 inhabitants
Collector area: 450,000 m²
System to be realized: 2018 - 2019
Solar coverage: ~20% of total heating need
Total capital expenditures: ~200 M€

Graz, Austria – system concept optimum
Helsinki, Finland – School center heating with solar + ground heat pumps + oil burners as reserve
Frohnleiten, Austria – Savosolar collectors installed as rain shield of brewery

Thermal energy is stored in 12 m³ water storage and used in brewery processes
Lahti, Finland – 240 m² collector area
Small amount of installed PV panels produces enough electricity for needs of solar thermal system
Løgumkloster district heating plant, Denmark – 15 300 m² Savosolar solar collectors
(other heat sources: pellets, natural gas, heat pumps – from ST 20% of network annual heating energy need)
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<table>
<thead>
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<tbody>
<tr>
<td><strong>Annual energy demand</strong></td>
<td>35 000 MWh</td>
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<tr>
<td><strong>Maximum heating load</strong></td>
<td>12 MW</td>
</tr>
<tr>
<td><strong>Customers</strong></td>
<td>1550 buildings</td>
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<tr>
<td><strong>Solar field peak power</strong></td>
<td>13.5 MW</td>
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<tr>
<td><strong>Estimated solar production</strong></td>
<td>8 000 MWh annually</td>
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</table>
Jelling district heating plant, Denmark – 15,300 m² Savosolar solar collectors
(other heat sources: wood chips, natural gas, heat pump – from ST over 20% of network annual heating energy need)
• Our installation in Jelling broke the Danish daily production record during its first week of operation!
• 5 kWh/m² were produced during one day

Jelling district heating plant, Denmark – 15 300 m² Savosolar solar collectors
(other heat sources: wood chips, natural gas, heat pump – from ST over 20% of network annual heating energy need)
Lolland Forsyning, Søllested, Denmark – 4 700 m² Savosolar solar collectors

The first installation with Savosolar double-glazed collectors
The sun rises in the North!

Thank You!

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