

SDH 2013, Malmö

IP-Solar  
an intelligent monitoring service

## IP-Solar an intelligent monitoring tool

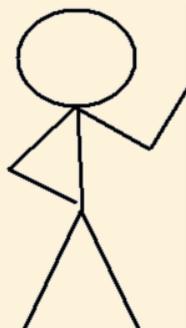
Bernhard Gerardts, Solid



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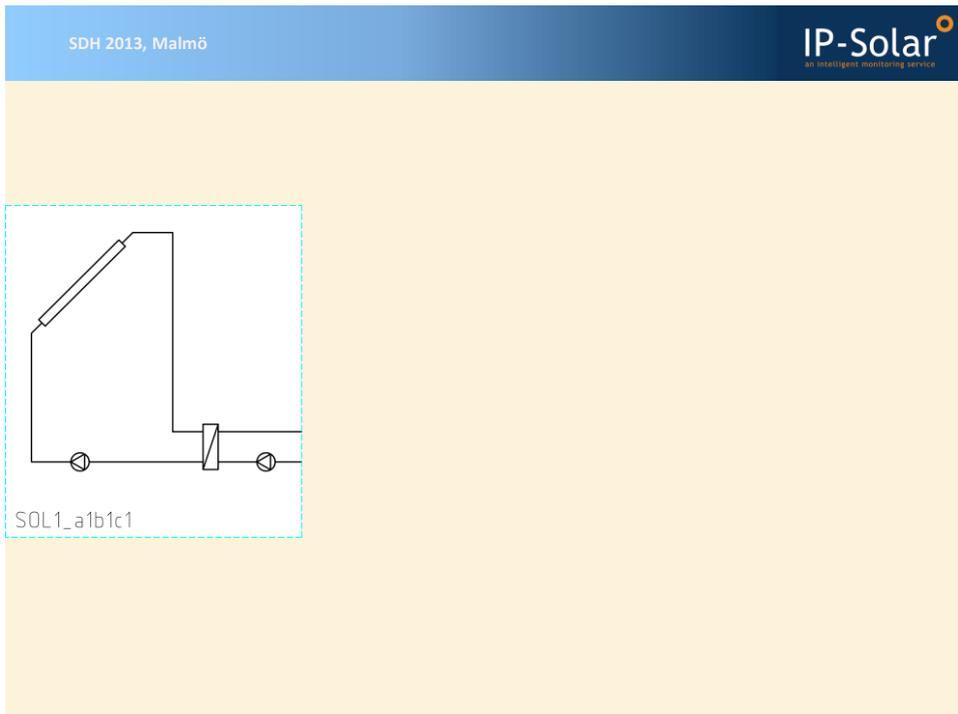
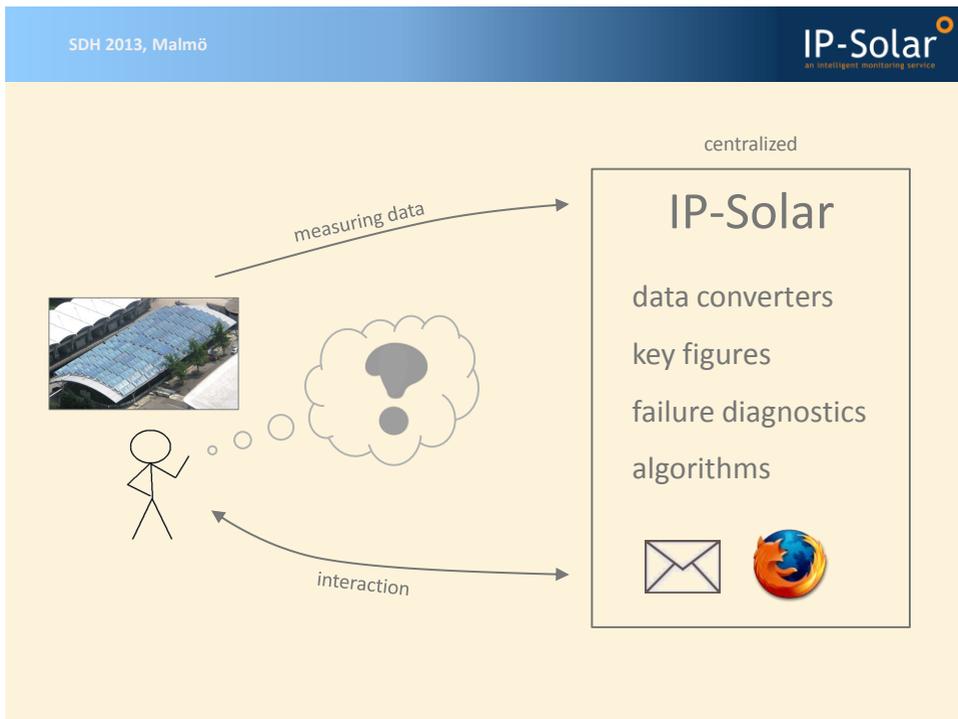
# IP = Intelligent Platform



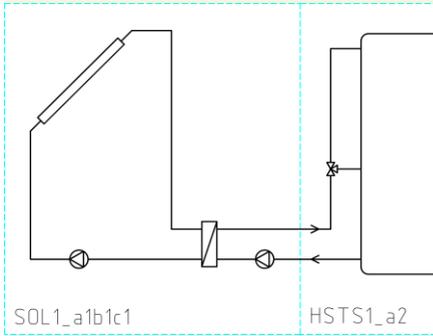
## Monitoring Options

- |                               |                              |
|-------------------------------|------------------------------|
| (1) skip or infrequent        | not a good idea...           |
| (2) manual monitoring         | good, but very expensive     |
| (3) monitoring in R&D project | good, but limited            |
| (4) long-term, computer-aided | good & inexpensive<br>but... |

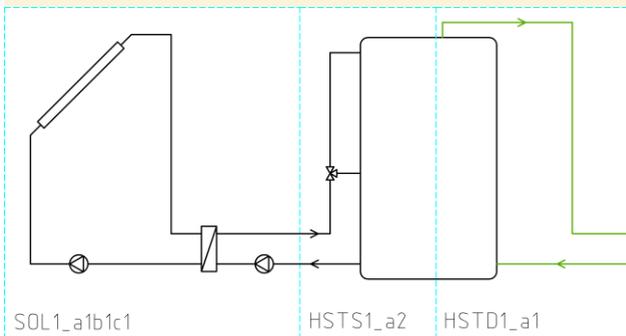


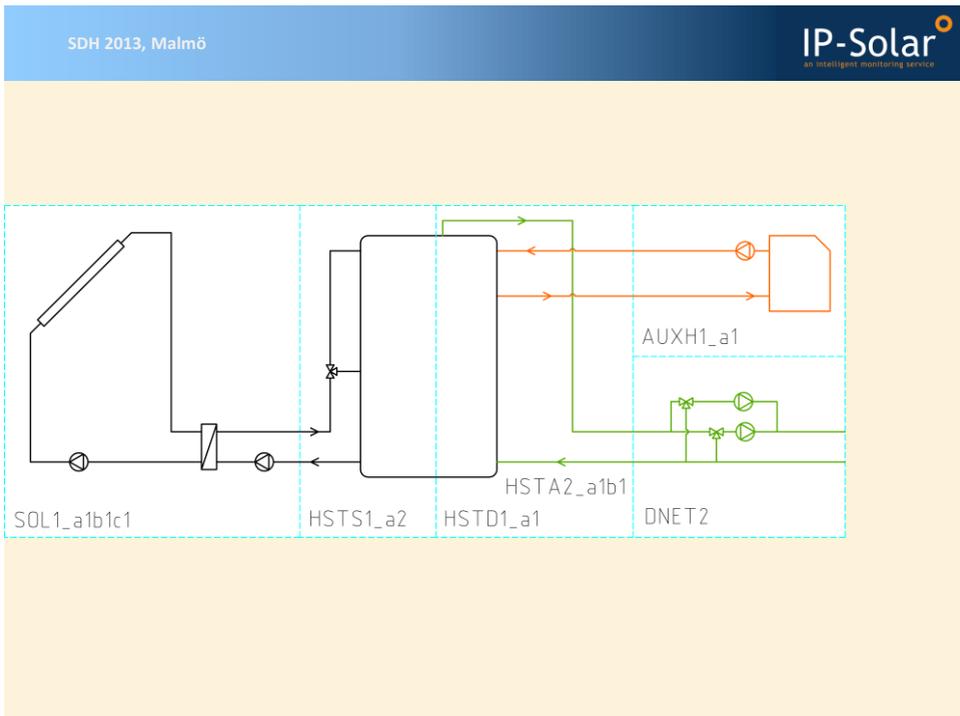
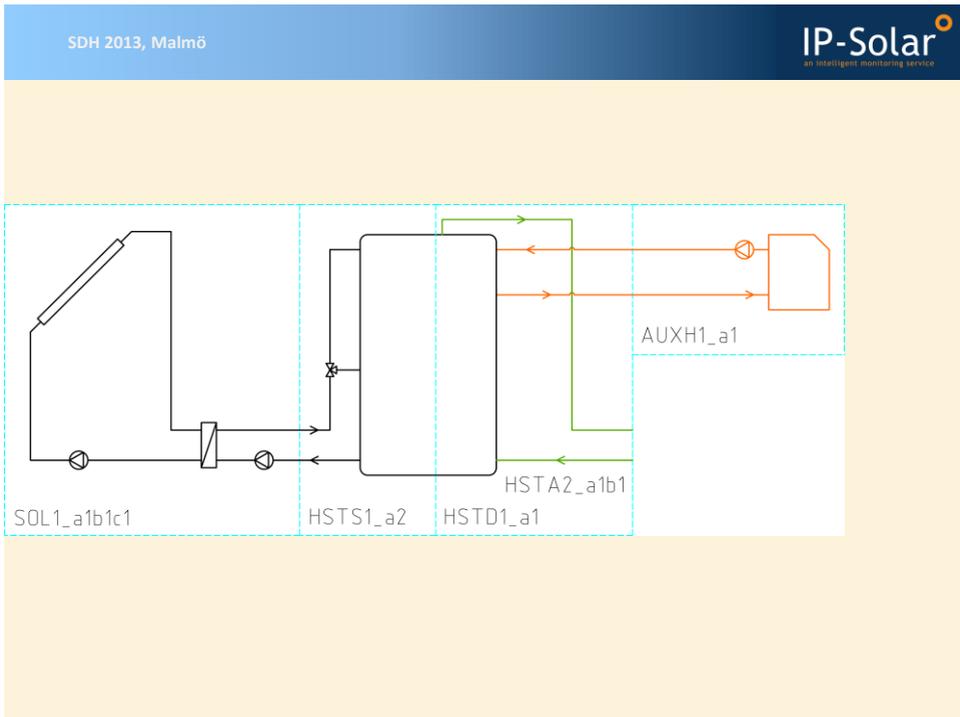


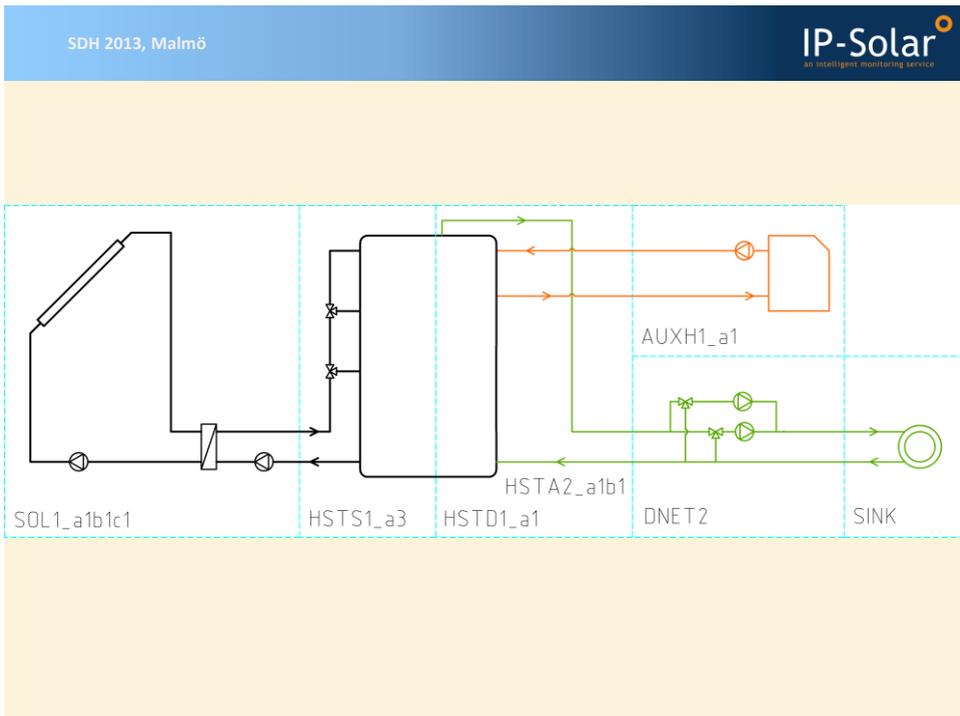
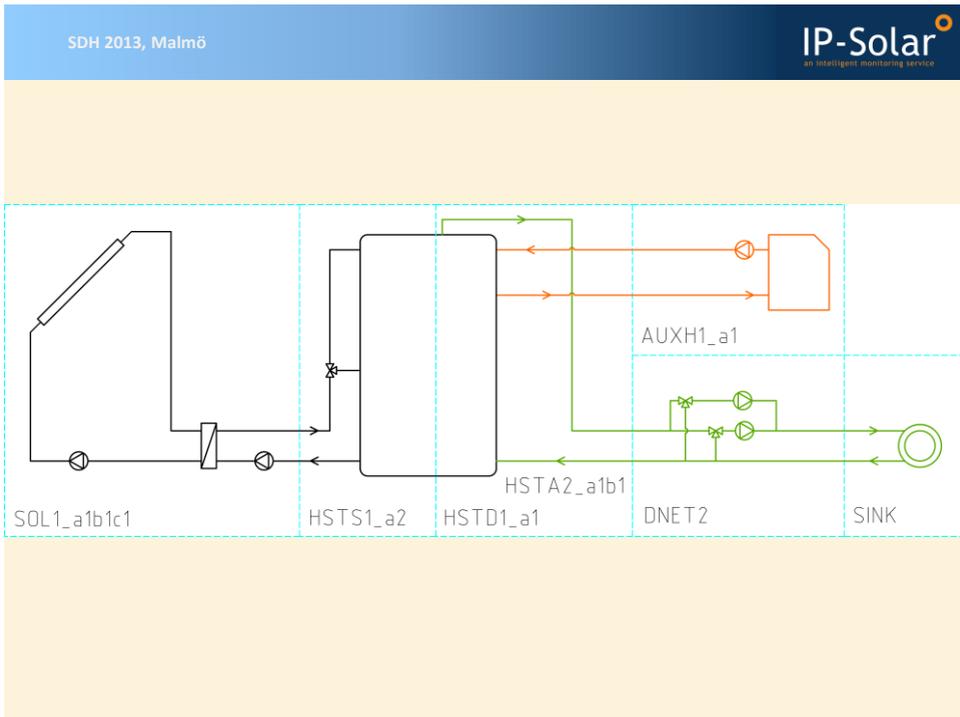
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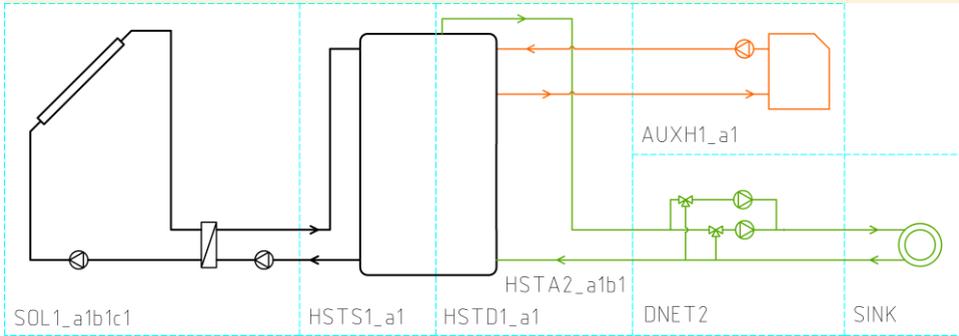
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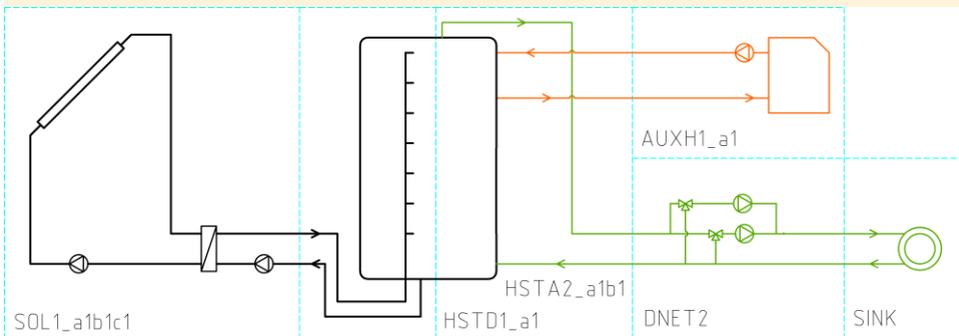




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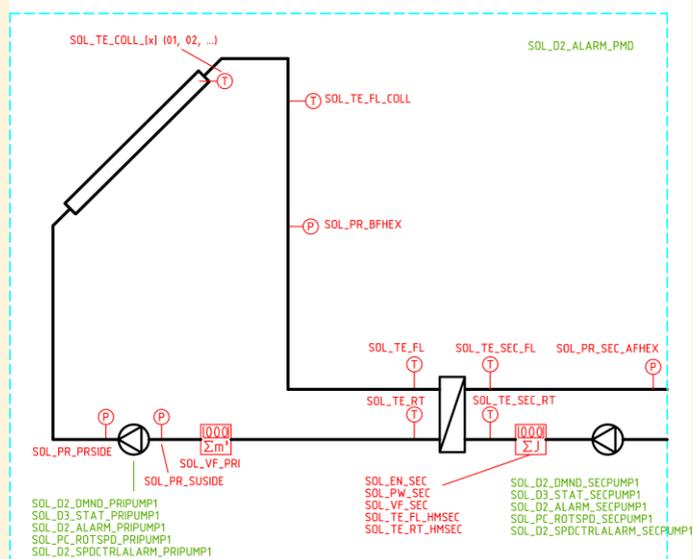
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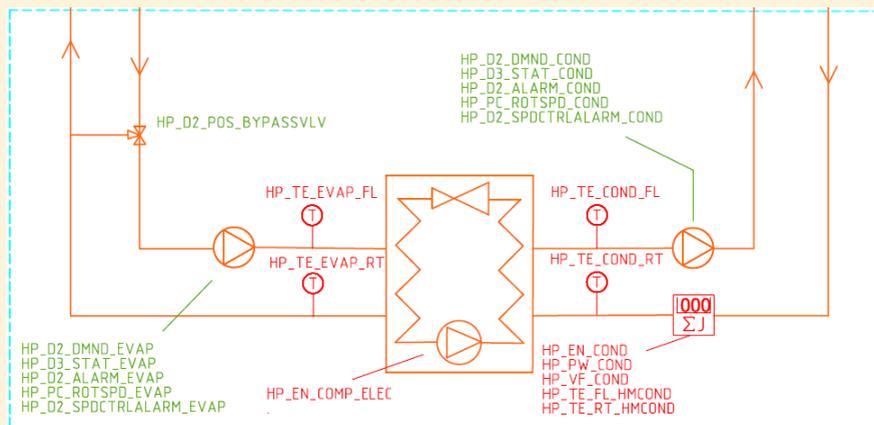
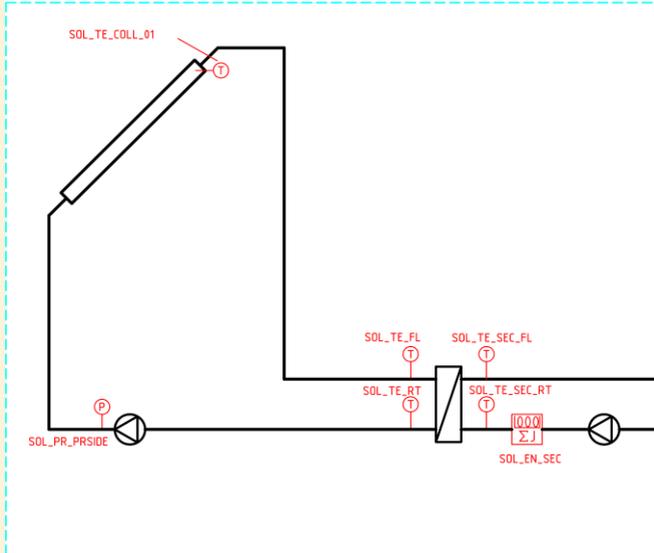
## modules

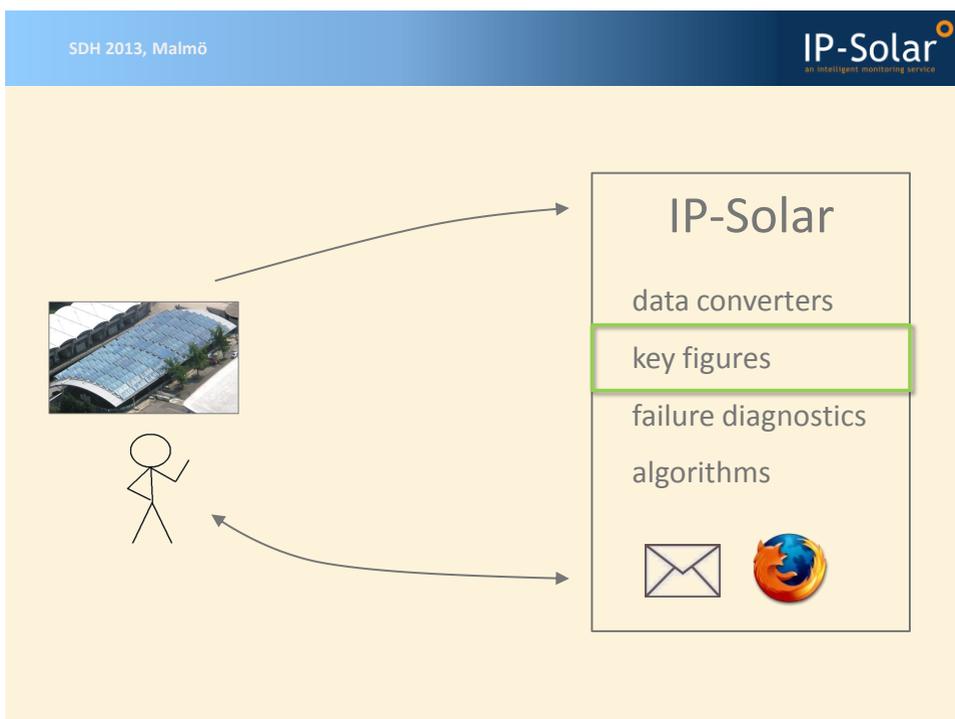
module		detail variants
SYS	system	1
SOL	solar circuit	13
HP	heat pump	2
HST	heat storage	24
AUXH	auxiliary heating	4
DHWP	DHW preparation	32
DNET	distribution net	2
SINK	sink	3
	others	4

## SOL1\_a1b1c1



SOL1\_a1b1c1



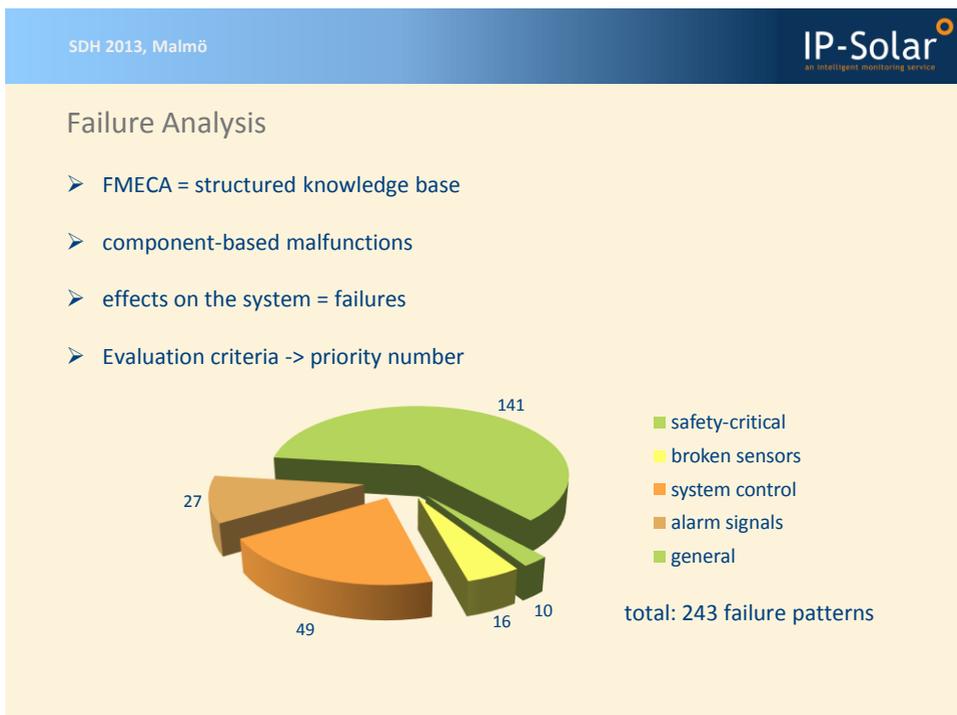
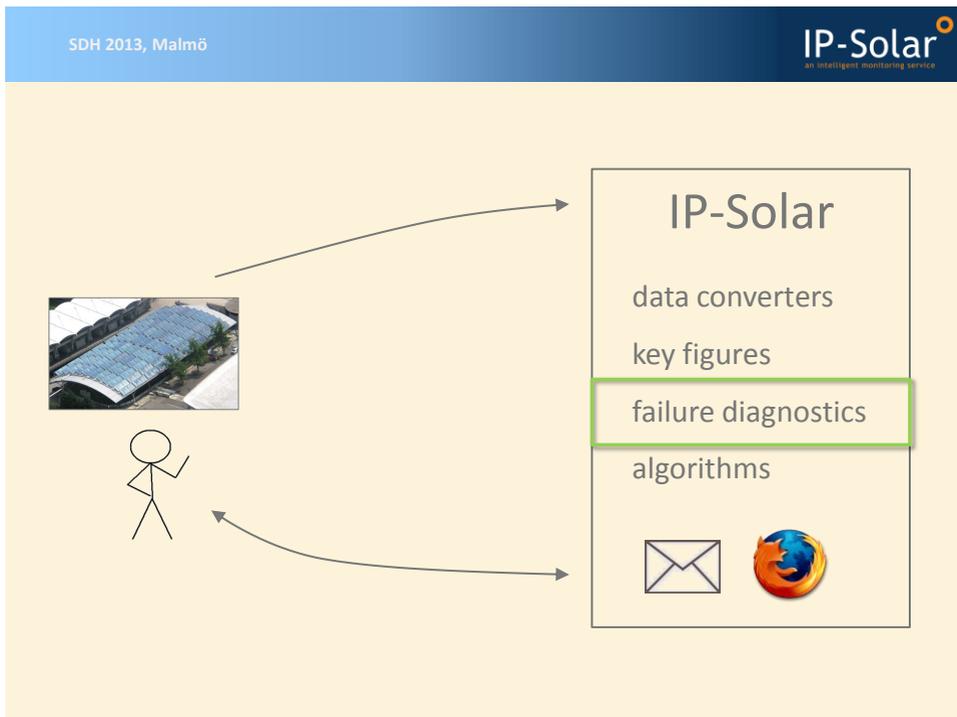


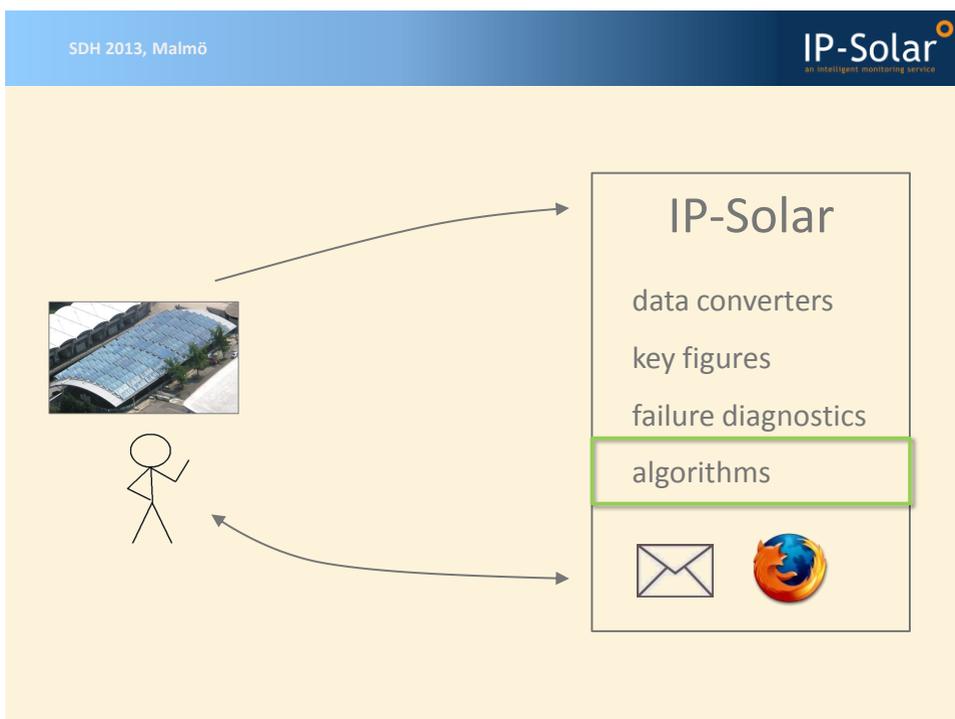
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## Key Figures

- examples
  - specific solar energy yield
  - average return temperature to storage
  - solar fraction(s)
  - number of heat storage charging cycles
  - system performance factors (IEA Task 44 / Annex 38)
    - > including electrical energy consumed by the pumps
- 117 key figures
- calculated per day, month, year
- quick system characterization & www monitoring



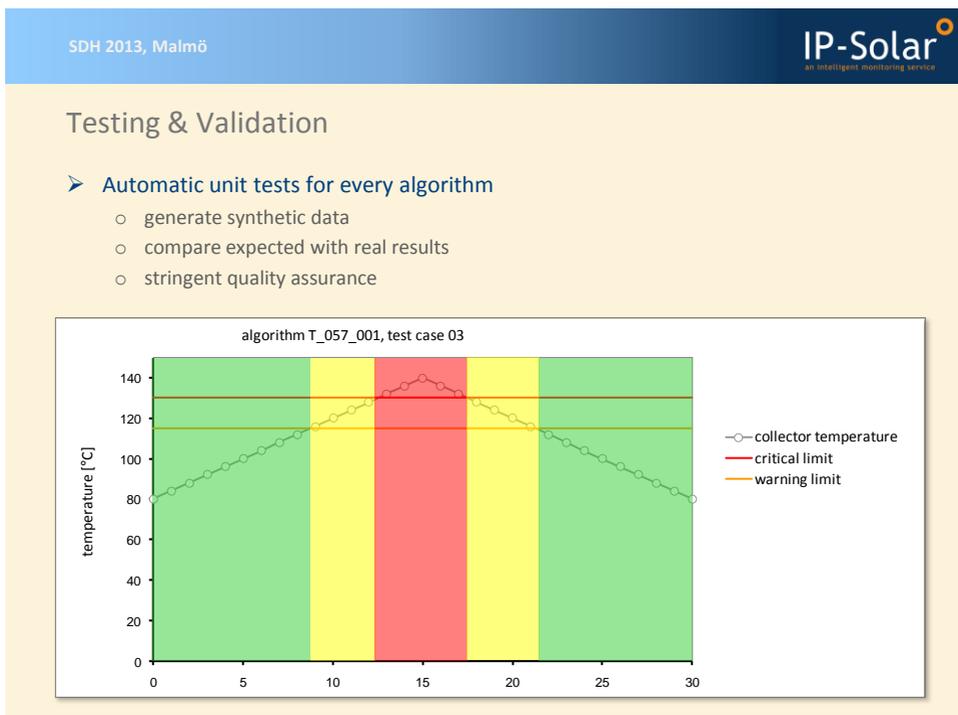
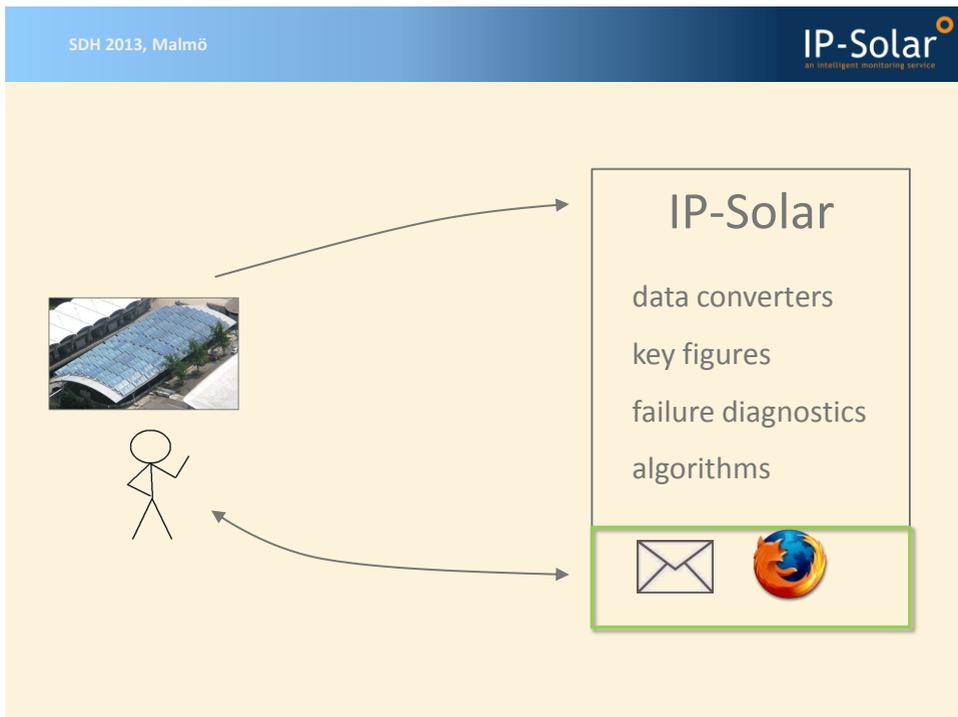


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## Algorithms

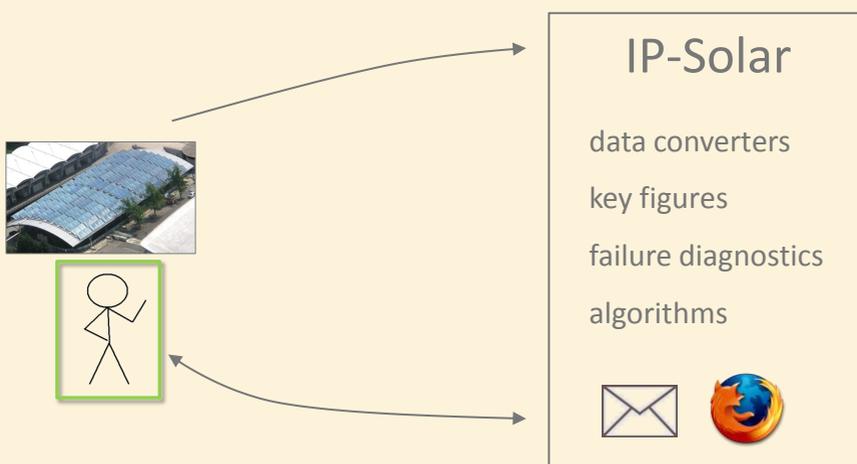
- answer failure questions
- short-term
  - collector temperature too high? last 3 minutes
- long-term
  - heat exchanger capacity decreasing? last months?
- total of 136 algorithms developed
  - ok – warning – critical
  - limits adjustable (173 parameters)
  - “criticality value” = system damage



## Testing & Validation

➤ Validation: 3 pilot plants in Graz

- DHW 114 m<sup>2</sup>
- 2-line system 153 m<sup>2</sup>
- district heating 1404 m<sup>2</sup>
- Combination solarthermal with heat pump 3885m<sup>2</sup>



## Target User Groups

- operators / end users
- public institutions / funding authorities
- scientific institutions

## Key Features

- |  |                            |
|--|----------------------------|
| ✓ independent of control system / manufacturer | standardized diagnostics   |
| ✓ understands "every" data format              | data converter / filter    |
| ✓ includes entire energy supply system         | auxiliary heating, DHW,... |
| ✓ no obligatory measurement equipment          | take what you get          |
| ✓ no extra peripheral hard- or software        | www access                 |
| ✓ permanent surveillance                       | automatic                  |
| ✓ automatic notification                       | if failure occurs          |

Thank you!