German experience on quality of solar thermal systems

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Quality issues of solar thermal systems

	Selling process	Design & installation	Operation
Customer interest	**quality products** at attractive price & **forecast** on expected solar energy yield	**optimal design** adapted to application & good **quality installation**	**high energy yield** & **high fuel savings**
Solution	**Product certification** (EU: Solar Keymark) & simulation tools	**Education and training** of professionals, on-site certification of solar systems	**Monitoring** of system performance
Challenges	Usually only collector certification schemes established – system certification is only in the beginning	Certification of design and installation quality is very costly	Monitoring must be done carefully

Solar Keymark

Objectives

- Certification of conformity with EN standards
  - EN 12975 for collectors
  - EN 12976 for factory made systems
  - EN 12977 for custom built systems
- Increase customer trust in solar thermal product
- Helping to reduce trade barrier

Status

- Solar keymark for collectors is required by most incentive programs in Europe
- More than 1800 collectors are certified

Some experiences from Germany on Monitoring

- Test and certification of collectors is easy to establish, system test and certification is challenging and not established yet
- Monitoring of solar thermal systems is usually only established in large systems, since it is to costly for small systems
- Monitoring must be done in a proper way to get reliable results
- Monitoring needs a clear concept to be helpful
- To convince industry investors, monitoring is essential

Monitoring of solar thermal systems

Objectives

- Identification of the solar energy yield: cost savings are as expected?
- Control of the performance / efficiency of the system
  => be able to identify needs of improvements / repairs in operation

Challenges

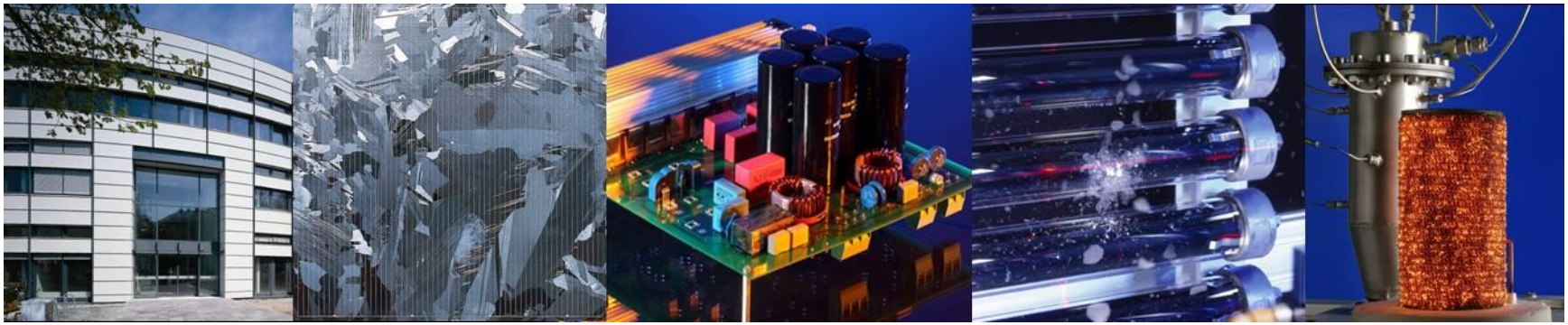
- Solar yield depends on
  - the solar system: component efficiency, system design, operation strategy
  - the environment: solar radiation, ambient temperature
  - heat demand profile
- Accurate measurement is costly
  - indicators to be measured must be carefully identified
  - accuracy of the measurement must be related to the objectives
  - installation of sensors must be done in a proper way, to get good data
- Interpretation of measurement results is challenging
  - comparison with expected results & fault diagnostics could need experts

Conclusions

- **Quality assurance** is challenging and costly
- **Quality measures must be clearly devided** in measures to support the selling process, the design & installation and the operation of solar thermal systems
- **Quality measures must be adapted** to the objectives regarding accuracy, costs,...
- **Monitoring is essential** to assure a good performance of the solar system and enable the owner to operate, optimize and maintain it

⇒ **Simple, cheap and robust monitoring concepts must be developed, SoPro is the first step in this direction**

Thank you very much for your attention!



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