Innovation in solar collectors and their standards

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Solar Collectors

Concentrating collectors

Photovoltaic Thermal (PVT)

Evacuated tube

Flat plate

Air collectors
Concentrating collectors

sunlight

concentrator

heat
Solar Trough collectors

NEP Solar - Charlestown Square
Solar Cooling Project
Micro Urban Solar Integrated Concentrators (MUSIC)

Industry and ARENA funded research project to develop a flat plate concentrating collector.

Research Partners
- RMIT (lead)
- UNSW,
- Rheem,
- CSIRO,
- Fielders,
- Arizona State University,
- University of Tulsa,
- University of California (Merced)

http://www.rmit.edu.au/aeromecheng/research/music
Photovoltaics-Thermal (PVT)

- Sunlight
- PVT Panel
- Heat
- Electricity
Flat plate PVT

Solimpeks - PowerTherm and PowerVolt

source: solimpeks.com.au
Concentrating PVT (CPVT)

Cogenra Solar T14
Beam Splitting concentrating PVT

ARNEA Funded research project to split the solar radiation spectrum allowing cool PV operation and high thermal temperatures.

Partners:
- ANU
- Chromasun
- NEP
- UNSW
- CSIRO
- RMIT

WATCH THIS SPACE

 Beam splitter
  electricity
  heat
But what about the market?
Where can these innovations be sold?
Domestic hot water

source: greenlawchina.org

source: solahart.com.au
Industrial process heat

39,000 m² flat plate field in Chile CODELCO copper mine

De Bortoli Winery with solar process heating
source: apricus.com.au

Lataria Engiadina is a SA Dairy in Switzerland
source: nep-solar.com
Solar Cooling

UWC-SEA building solar cooling project in Singapore by SOLID
source: www.solarnovus.com

Echuca Regional Heath solar cooling system with Greenland tubes
source: ecogeneration.com.au

Charlestown Square Solar Cooling
source: author
Creating a open global market

1. Harmonization of National Standards
2. Global program of certification recognition
3. Adoption
1. Harmonization of National Standards

**International**
- European Union (EN 12975-2006: Thermal solar systems and components – Solar collectors)
- Australia (AS/NZS 2712: Solar and heat pump water heaters: Design and construction)
- North America (SRCC Standard: Minimum standards for solar thermal collectors)

**International standard**
- ISO 9806:2013
  - Technical quality and thermal performance
International

Algeria (IANOR)
Argentina (IRAM)
Armenia (SARM)
Australia (SA)
Austria (ASI)
Barbados (BNSI)
Botswana (BOBS)
Canada (SCC)
Chile (INN)
China (SAC)
Denmark (DS)
France (AFNOR)
Germany (DIN)
Greece (NQIS ELOT)
India (BIS)

Iran, Islamic Republic of (ISIRI)
Israel (SII)
Italy (UNI)
Jamaica (BSJ)
Romania (ASRO)
Russian Federation (GOST R)
Saudi Arabia (SASO)
South Africa (SABS)
Spain (AENOR)
Sweden (SIS)
Switzerland (SNV)
Tunisia (INNORPI)
United Kingdom (BSI)
United States (ANSI)
Yemen (YSMO)
Europe

EN12975:2006
Thermal solar systems and components – Solar collectors
Australia

AS/NZS 2712
Solar and heat pump water heaters—Design and construction
North America

SRCC Standard 100 MINIMUM STANDARDS FOR SOLAR THERMAL COLLECTORS

SRCC Standard 600 MINIMUM STANDARD FOR SOLAR THERMAL CONCENTRATING COLLECTORS
ISO 9806:2013

Technical quality and thermal performance
Scope

1. Concentrating collectors
2. PVT collectors
3. Flat Plate
5. Evacuated tube
6. Air heaters
Performance testing

Quasi-dynamic steady-state

Mechanical Testing

Pressure tests
High temperature and stagnation tests
Thermal shock tests
Rain penetration tests
Freeze resistance tests
Impact resistance tests
Adoption

Europe: EN 12975 is being replaced by ISO 9806:2013

Australia: Waiting revision to be acceptable

North America: Awaiting revision to be acceptable

China and the rest of the world are working but we need HELP!
2. Global program of certification recognition

International Energy Agency

Solar Heating and Cooling Programme

Task 43 Solar Rating & Certification

task43.iea-shc.org/
task 43 results: new organisation

Global Solar Certification Network

Global Mark
It's a work in progress and we need help
3. Adoption

National standards accept new ISO

National certification programs accept international Global Mark.

Get involved!
Why is this important?

- Solar collectors make up majority of system cost!

- Solar cooling is one market for solar thermal collectors

- Better and cheaper collectors is the goal to enable solar cooling
Thank You!

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