



VAASAN AMMATTIKORKEAKOULU
UNIVERSITY OF APPLIED SCIENCES

Lämpöenergia Auringosta

Aurinkolämmön Mikro-kurssi

Osa 1: Yleiskatsaus ja
Tiedonlähteet



VAASAN AMMATTIKORKEAKOULU
UNIVERSITY OF APPLIED SCIENCES

Shekhar, S 2023



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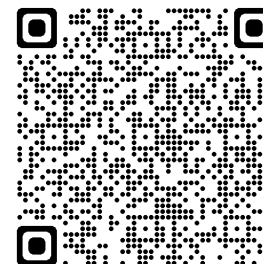
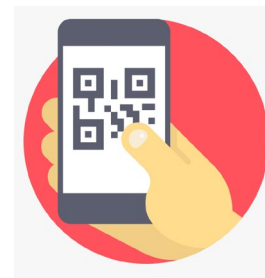
Mikrokursin tarkoitus

- Lyhyt ja tiivis kurssi, joka keskittyy tiettyyn aiheeseen
- Jatkuva oppiminen, ajasta ja paikasta riippumaton, täsmällinen.
- Täsmällisesti suunniteltu tarjoamaan nopea ja helppo tapa oppia yhtä juttua.

Tällä mikrokursilla kerron teille auringosta saadun lämpöenergian hyödyntämisestä.



- Harmaala, M. M., Lassila, S., & Sukanen, M. (2022). Mikrokoulutukset ovat avain nopeaan itsensä kehittämiseen: <http://urn.fi/URN:NBN:fi-fe2022092259856>



Shekhar Satpute



Sr. Lecturer, Dept. Of Engineering, Energy and
Environmental technology

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- ❖ Born and brought up in India, basic education from Mumbai,
- ❖ Technicians Diploma, Industrial Electronics, 1996, Pune India
- ❖ Arrived to Finland in 1997 to study Bachelor of Engineering, Industrial Engineering, 2001, VAMK
- ❖ Masters of Engineering, YAMK Project management, 2022, VAMK
- ❖ 22 years working in engineering field as R&D and design engineer, Team lead and Project manager,
- ❖ Worked for ABB Adtranz, KWH Pipe, Sandvik Mining & Constructions, Wärtsilä, Mervento, Citec.
- ❖ I am a workaholic, but I enjoy woodworking, repairing machines, watching sci-fi movies, and occasionally doing research work in my free time.
- ❖ Families: Wife and two children

Aurinkoenergia: Sähkö / Solar PV (Photo voltaic)



- [Aurinkosähköjärjestelmät | Turvallisuus- ja kemikaalivirasto \(Tukes\)](#)
- [Aurinkosähköä kotiin \(aurinkosahkoakotiin.fi\)](#)
- <https://www.thinglink.com/scene/1724392983953932774>



Aurinkoenergia: Lämpö ja sähkö

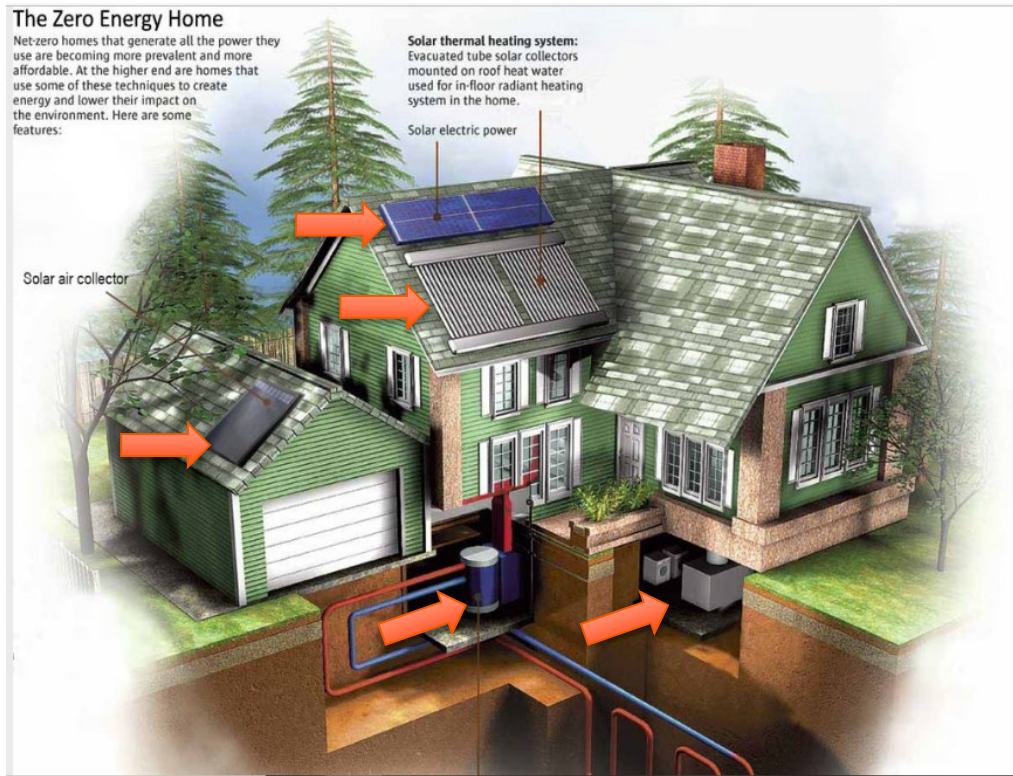
The Zero Energy Home

Net-zero homes that generate all the power they use are becoming more prevalent and more affordable. At the higher end are homes that use some of these techniques to create energy and lower their impact on the environment. Here are some features:

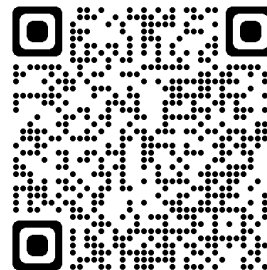
Solar thermal heating system:
Evacuated tube solar collectors mounted on roof heat water used for in-floor radiant heating system in the home.

Solar electric power

Solar air collector



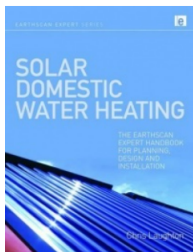
- **Nollaenergiatalo** = tuottaa energiaa yhtä paljon kuin kuluttaa.
- **Plusenergiatalo** = tuottaa energiaa yli oman tarpeen.



<https://www.thinglink.com/scene/960138339288088578>

Kirjallisuutta aiheesta

e-kirjat



Solar domestic water heating : the Earthscan handbook for planning, design, and installation

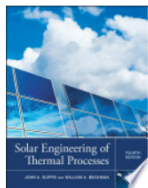
👉 Ebook Central Academic Complete

📖 Kirja
Laughton, Chris
Earthscan 2010.

"Solar Domestic Water Heating is a comprehensive introduction to all aspects of solar domestic water heating systems. As fossil fuel prices continue to rise and awareness of climate change grows, interest in domestic solar water heating is expanding. Solar water heating technology is USÄÄ ▾



✦ Lisää suosikkeihin ✉ Läheta sähköpostilla 📄 Vie viite 🗉 Viitetiedot 📁 Tulosta 📄 QR-koodi



Solar engineering of thermal processes

👉 Ebook Central Academic Complete

👉 O'Reilly for Higher Education (Create an account using VAMK)

📖 Kirja
Duffie, John A. ; Beckman, William A.
Wiley & Sons 2012. 4th ed



Mikä on aurinkolämmitys?

Auringon säteily ja resurssit.

Aurinko Käyttöveden lämmitysjärjestelmät.

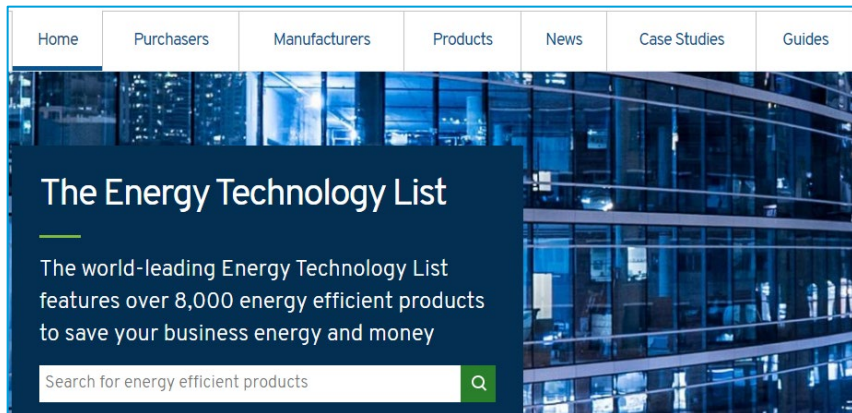
Erilaisia aurinkokeräimiä.

Järjestelmän asettelut, mitoitus ja suunnittelu

Asennus ja talous.

Netissä

Komponentit, valmistajat ja tietoa Euroopan tasolla




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The Energy Technology List

The world-leading Energy Technology List features over 8,000 energy efficient products to save your business energy and money

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Solar Heat Europe

Solar Heat Europe's mission is to achieve high priority and

Solar Heat Technology

The basic principle common to all solar heat systems is simple: solar

Services

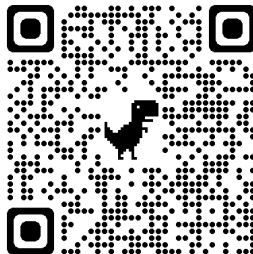
Services to its members are the key work of Solar Heat Europe.

Publications

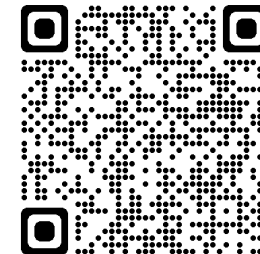
Solar Heat Europe is recognised in the Solar Heat sector for publishing a wide range of documents supporting a better



<https://etl.beis.gov.uk/products/solar-thermal-systems-collectors>



<http://solarheateurope.eu/welcome-to-solar-heat-europe/>



Netissä: Yhdysvalloista ja Suomesta



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What We Do

The IEA Solar Heating and Cooling Technology Collaboration Programme is involved in numerous ways to promote solar energy to the world.

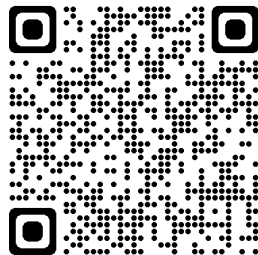
ACTIVE PROJECTS (TASKS)

The primary activity of the SHC Programme is to develop **Projects (Tasks)** to study various aspects of solar heating and cooling and disseminate. Each project (Task) is managed by an Task Manager from one of the member countries or sponsor organizations.

- Task 68 - Efficient Solar District Heating Systems
- Task 67 - Compact Thermal Energy Storage Materials within Components within Systems
- Task 66 - Solar Energy Buildings
- Task 65 - Solar Cooling for the Sunbelt Region
- Task 64 - Solar Process Heat
- Task 63 - Solar Neighborhood Planning
- Task 62 - Solar Energy in Industrial Water & Wastewater Management

>> Explore all the [Projects \(Tasks\)](#)

[IEA SHC || What We Do \(iea-shc.org\)](https://www.iea-shc.org)



[AURINKOENERGIA](#) [AURINKOLÄMPÖ](#) [AURINKOSÄHKÖ](#) [UUSIUTUVA ENERGIA](#)

Aurinkolämpö



Aurinkolämmön passiivinen hyödyntäminen



Aurinkolämpöjärjestelmät



Hankinta ja asennus



Aurinkolämpöjärjestelmän käyttö



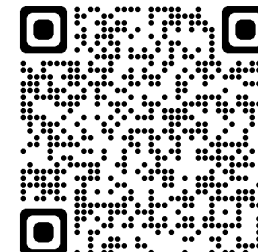
Kokemuksia aurinkolämmöstä



Säädokset



Aurinkolämpöasianto



<https://www.motiva.fi/en/motiva/strategy>



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Lämpöenergia Auringosta

Kiitos



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