
Impact of the Improvements Developed during IEA SHC Task 54 on the Levelised Cost of Heat ($\text{LCoH}_{\text{sol,fin}}$)

TASK 54

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Agenda

- $LCoH_{sol,fin}$ formular used in Task 54
- Showing impact of different measures on the $LCoH_{sol,fin}$
- Impacts of performance improvements
- Combining different approaches to increase cost reduction
- Conclusions

LCoH_{sol,fin} Equation IEA SHC Task 54

Initial investment (€)

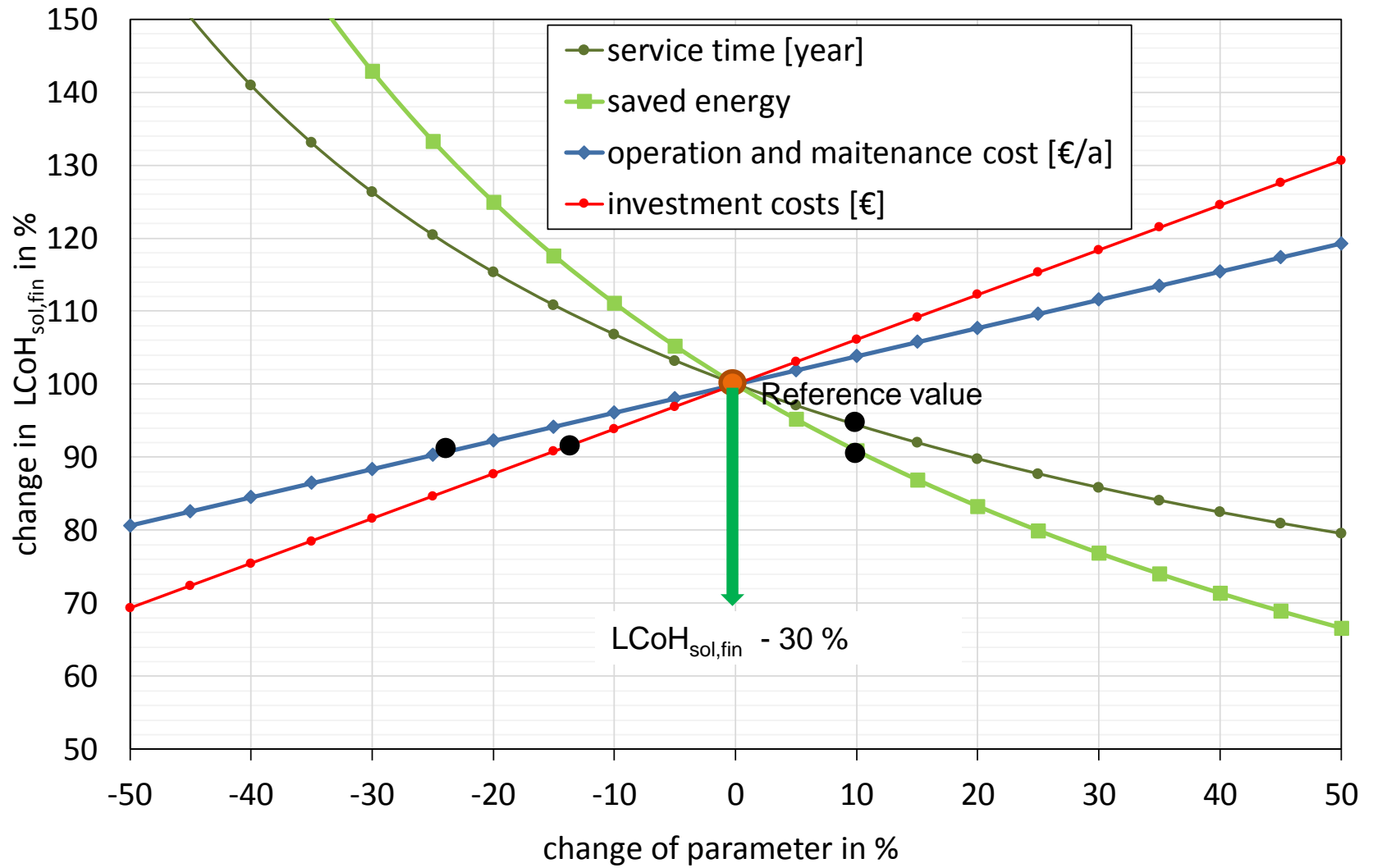
O&M costs (€/a)

$$LCoH_{sol,fin} = \frac{I_0 + \sum_{t=1}^T C_t}{\sum_{t=1}^T E_t} \frac{\text{€}}{\text{kWh}}$$

Period of analysis
(years)

Saved final energy
(kWh/a)

LCoH_{sol,fin} impacts based on SDHW System GER



Case Study 1: Collectors with overheating protection

Cost reduction potential heatpipes-systems

Levelized Cost of Heat (LCoH) – SDHW System

$LCOH_{sol,fin}$ Reference System (without VAT)	0.113 €/kWh
$LCOH_{sol,fin}$ Heat pipe system (without VAT)	0.081 – 0.093 €/kWh
Cost reduction potential für solar heat	18 - 28%

Case Study 2: Standardization

Cost reduction potential for SDHW systems

Levelized Cost of Heat (LCOH) – SDHW System

$LCOH_{sol,fin}$ Reference System (without VAT)	0.113 €/kWh
$LCOH_{sol,fin}$ “standardised” system (without VAT)	0.080 €/kWh
Cost reduction potential für solar heat	29%

Improved System performance – more saved energy

Example SDHW System GER

Reference system/ changes	Initial investment [%]	f_{sav} [%]	saved fuel [kWh/a]	$\text{LCoH}_{\text{sol,fin}}$ [%]
Reference system	100	40	2226	100
Micro circulation inhibitor	101	42	2337	96
Storage efficiency label „B“	104	45.7	2539	91
more efficient collector	103	45,1	2508	90
Storage efficiency label „B“ + more efficient collector	107	50,7	2818	82
Storage efficiency label „B“ + more efficient collector + micro circulation inhibitor	110	50,7	2889	80

Combining measures

Performance
increase

Overheating
protection

Standardisation

- Mirco circulation inhibitor
- Heat storage efficiency class B
- More efficient collector
- High efficiency pump

Combining measures

Example SDHW system Germany

	Reference System	Performance increase
Investment system components [€]	2600	3055
Investment installation [€]	1250	1250
Maintenance costs [€/a]	77	77
Operation costs [€/a]	20	10
Saved final energy [kWh/a]	2226	2889
service life time [a]	25	25

Combining measures

Example SDHW system Germany

	Reference System	Performance increase	Overheating protection
Investment system components [€]	2600	3055	2695
Investment installation [€]	1250	1250	1100
Maintenance costs [€/a]	77	77	47
Operation costs [€/a]	20	10	10
Saved final energy [kWh/a]	2226	2889	2889
service life time [a]	25	25	25

Combining measures

Example SDHW system Germany

	Reference System	Performance increase	Overheating protection	Standardisation
Investment system components [€]	2600	3055	2695	2426
Investment installation [€]	1250	1250	1100	990
Maintenance costs [€/a]	77	77	47	42
Operation costs [€/a]	20	10	10	10
Saved final energy [kWh/a]	2226	2889	2889	3033
service life time [a]	25	25	25	27.5

Combining measures

Example SDHW system Germany

	Reference System	Performance increase	Overheating protection	Standardisation	Change
Investment system components [€]	2600	3055	2695	2426	-11%
Investment installation [€]	1250	1250	1100	990	
Maintenance costs [€/a]	77	77	47	42	-55%
Operation costs [€/a]	20	10	10	10	-50%
Saved final energy [kWh/a]	2226	2889	2889	3033	+36%
service life time [a]	25	25	25	27.5	+10%

Combining measures

Example SDHW system Germany

Levelized Cost of Heat ($LCOH_{sol,fin}$) – SDHW System

$LCOH_{sol,fin}$ Reference System (without VAT)	0.113 €/kWh
$LCOH_{sol,fin}$ Heat pipe system (without VAT)	0.059 €/kWh
Cost reduction potential für solar heat	48%

Combining measures

Example SDHW system Germany

Levelized Cost of Heat ($LCOH_{ov,fin}$) – SDHW System

$LCOH_{ov,fin}$ Reference System (without VAT)	0.113 €/kWh
$LCOH_{ov,fin}$ “Combined” system (without VAT)	0.110 €/kWh
Cost reduction for solar assisted SDHW	-3%

Conclusion

- Reference systems available as benchmarks
- $LCoH_{sol,fin}$ calculation procedure available to compare different approaches/systems
- Higher investment costs might save money in the long run
- Different approaches for significant solar heat cost reduction available
- Combination of different measures enhances cost reduction
- Cheaper solutions as conventional system possible

Possibilities are there!

Let's do it!

Thank you for your attention!

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More on Task 54:

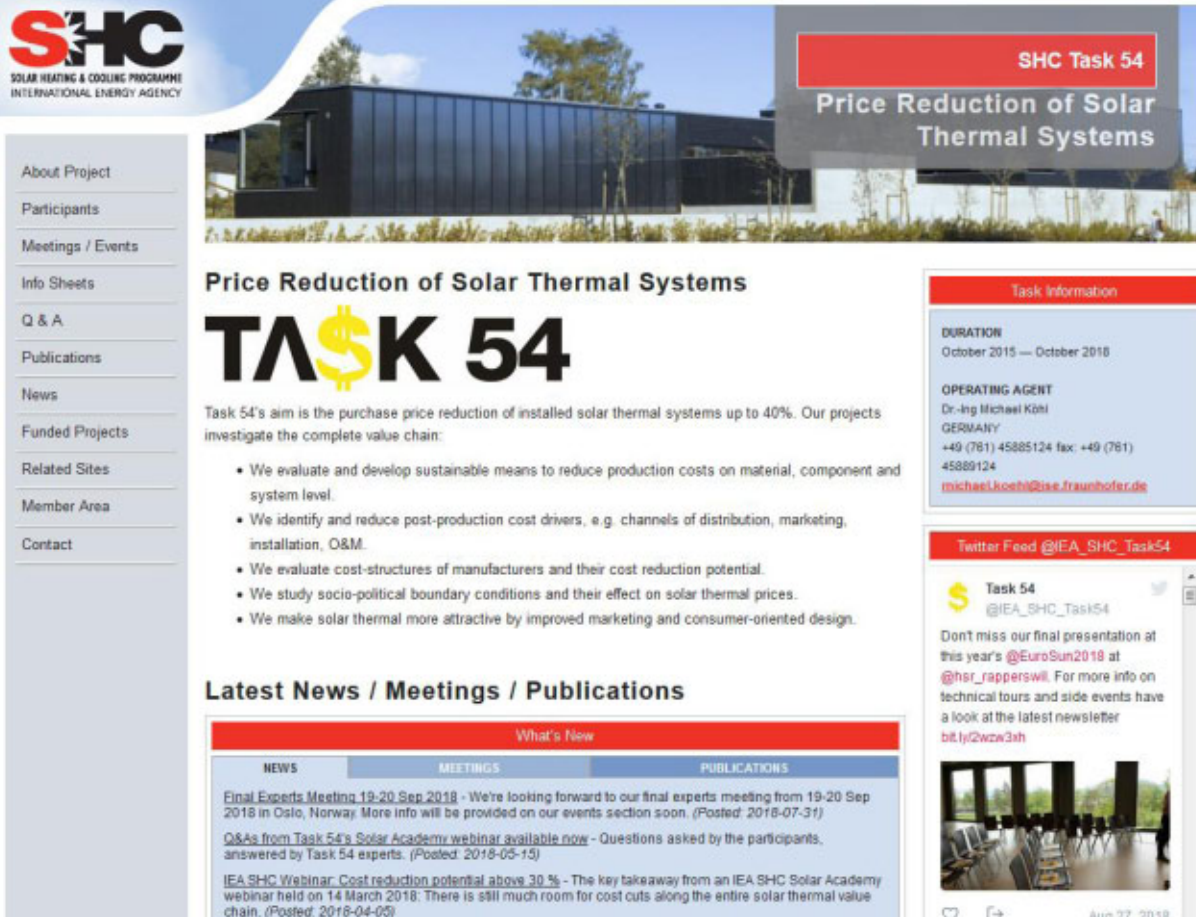
<http://task54.iea-shc.org>



https://twitter.com/iea_shc_task54

Task 54 activities

 <http://task54.iea-shc.org/>



The screenshot shows the SHC Task 54 website. At the top left is the SHC logo (Solar Heating & Cooling Programme, International Energy Agency). The main header features a large image of a modern building with a red banner that reads "SHC Task 54 Price Reduction of Solar Thermal Systems". Below this, the title "Price Reduction of Solar Thermal Systems" is followed by "TASK 54" in large, bold letters, where the 'A' is a yellow dollar sign. A paragraph describes the task's aim: "Task 54's aim is the purchase price reduction of installed solar thermal systems up to 40%. Our projects investigate the complete value chain:". A bulleted list follows, detailing evaluation of sustainable means, identification of cost drivers, cost-structure evaluation, socio-political boundary conditions, and marketing improvements. Below this is a "Latest News / Meetings / Publications" section with a "What's New" sub-header and three tabs: NEWS, MEETINGS, and PUBLICATIONS. The NEWS tab is active, showing three items: "Final Experts Meeting 19-20 Sep 2018", "Q&As from Task 54's Solar Academy webinar available now", and "IEA SHC Webinar: Cost reduction potential above 30%". To the right of the main content is a "Task Information" box with details on duration (October 2015 - October 2018), operating agent (Dr.-Ing Michael Köhl, Germany), and contact info. Below that is a "Twitter Feed @IEA_SHC_Task54" showing a tweet from August 27, 2018, about a final presentation at EuroSun2018.



Info Sheets

Twitter

Final Task54
Meeting in
September
19, 2018

Publications