Dear Reader,

After busting the most common myths on renewable energy in the first edition of this series, ISES is now happy to move forward in highlighting the real value solar and other renewable energy sources have in fighting climate change. With this new set of infographics focusing on the potential of solar thermal heat application for productive uses, ISES wants to introduce you to the many great technologies already being implemented today and to give you an outlook into future technological developments. Additional infographics highlighting more and more applications of solar thermal heart will be added to this dynamic set of infographics over time.

In many parts of the world, the transformation of the energy system has mainly focused on the electricity sector. The heating/cooling, transport, industrial, and agricultural sectors are often overlooked. This significantly slows down the energy transformation as, for example, nearly half of final energy consumption is spent on heating & cooling. In the future, more focus needs to be put on sector coupling and a carbon reduction plan for all aspects of our society.

Thermal energy, namely for the heating of industry processes, accounts for nearly 10% of global carbon emissions. The Sun, utilizing solar thermal panels to produce hot water or steam, or photovoltaics with resistance heating or heat pumps can help meet the industry processes needs in a carbon-free way. The good news is, that about 30% of the total industrial heat demand is at temperature levels below 100°C which can be provided with commercially available solar thermal collectors.

This set of infographics will introduce several examples of solar thermal heat applications used for industry processes from all around the world and we are excited to add more and more infographics to this set in the future!

We hope you find this document helpful when discussing renewable energy with your friends, family, or colleagues.

In this document, we have collected all references used to create the infographics and the information they contain. The references are grouped for each of the infographics.
Please note, any graphics not specified differently are ISES property.

SOLAR THERMAL HEAT FOR BEER BREWING

The beer brewing process requires many steps to produce your favorite after work or weekend drink. Many require some degree of thermal energy, either to pre-heat brewing water, cook the ingredients together, or prepare hot water for cleaning. For example, numerous breweries around Germany and Austria use solar thermal energy as a core energy component in their beer brewing process. They have done this not only for the environment, but because it's simply the lower cost option.

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Solar Process Heat Installation Hofmuehl brewery in Eichstätt, Germany.
http://www.solar-process-heat.eu/fileadmin/redakteure/So-Pro/Installations/ISE_Hofmuehl.pdf

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SOLAR THERMAL HEAT FOR THE ELECTRONICS WE USE

The extraction of raw materials for the electronics we use daily is a thermally intensive process. Mined minerals, like lithium for batteries and copper for electrical wires, must be broken down, heated for separation, and dried to create their final product. This all requires energy which can easily be provided by solar thermal energy. Best of all, it is already being done at a massive scale in Chile.
Take a look at the Gaby Copper mine in the Atacama Desert. It has installed nearly 40,000 m2 of solar thermal collectors to support the electrolytic refining process of copper, making this solar project larger than 12 soccer fields.

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ISES Webinar: "Medium to High Temperature Solar Heat for Industrial Processes"
https://join.ises.org/content/medium-high-temperature-solar-heat-industrial-processes

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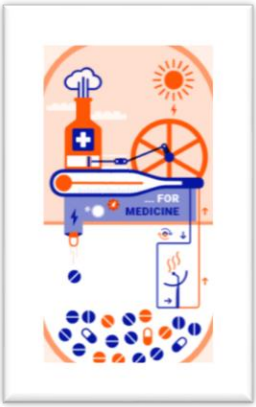
SOLAR THERMAL STEAM FOR PHARMACEUTICALS

Covering another essential part of our day-to-day lives, solar thermal heat is also used to make steam. This plays a significant part in many industrial processes such as the production of pharmaceuticals, an industry with a substantial energy demand.

To achieve this, solar thermal heat is used to create steam as water is pumped through the solar thermal collector field, where it partly evaporates due to the concentrated solar irradiance. This "solar steam" is then stored in a steam drum and is released to the factory through a pressure-controlled valve within the manufacturing processes.

One highly successful example of solar steam for industrial processes is the located in Amman, Jordan. Here, RAM Pharma installed a Direct Steam Generation System in 2015, helping to offset use of its diesel fired steam boiler. This new system provides up to 340 mega-watt hours per year, reducing diesel consumption by 42% while simultaneously buffering demand fluctuations and reducing the cooling load of the complex via rooftop shading (where the collectors are installed).

This award-winning project, the first of its kind in the MENA region, is a great example of the massive benefits solar steam can have in industry processes.



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