



Webinar Questions and Answers

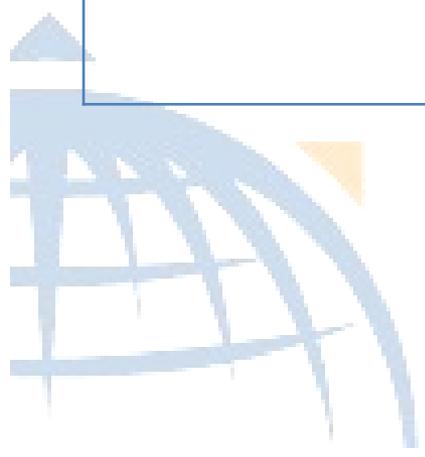
“New Business Models for Commercial Solar Thermal”

held on
09 June 2015

Webinar Questions	David Hoedeman
Are Nextility financiers the costumers and they pay you per month for the total energy income? Is there a standardized energy price (a fixed price) ?	Our rates are based on the cost of each project and the incentives available in each state. They typically range between a 20% - 50% discount to the utility rate.
Does Nextility plan to continue on smaller DHW residential and commercial, or expand to industrial projects at higher temperatures?	At this time we are focused on our core market of residential, low-temperature applications. It's taken us long enough to perfect this, so I don't anticipate a near-term move to industrial applications, though with the Federal ITC expiring, all options will be on the table for us.
Does Nextility to continue on smaller DHW residential and commercial, or expand to industrial projects at higher temperatures?	We have looked into this technology extensively and thus far determined that the ROI is not where we need it to be to pull the trigger on financing. The other issue for us is that we have back-end financiers that need to be comfortable with any new technology we invest in, and overcoming their concerns about newer technology can take time.
how does Nextility set the baseline to demonstrate the savings?	We don't set any baseline. That's what's unique about our model. We are measuring real BTUs delivered to our customers' buildings, and charging them a rate for those BTUs guaranteed to be a fixed percentage discount to their real utility rate. All savings are measured in real time to the penny, not estimated against a comparative baseline.
How does Nextility source their collectors?	Nextility has worked with many manufacturers, and favors those that provide the best pricing for top-quality panels or, preferably, manufacturers that bring potential customers and new projects to the table.
Are customers happy to rely on Nextility's own reporting of performance?	Nextility uses only OIML-certified meters, and we freely share the data with the customer. They will do some of their own comparison to previous year's utility bills on occasion, but for the most part trust our meters much like they trust their utility's meters.
What is the political climate in US - will heat incentives expand to other states?	We have seen some expansion of ST incentives over the past five years, but so much of the lobbying efforts in the US are geared toward solar PV that it's difficult to say how whether thermal will continue to grow or not. Frankly, we're not terribly optimistic.

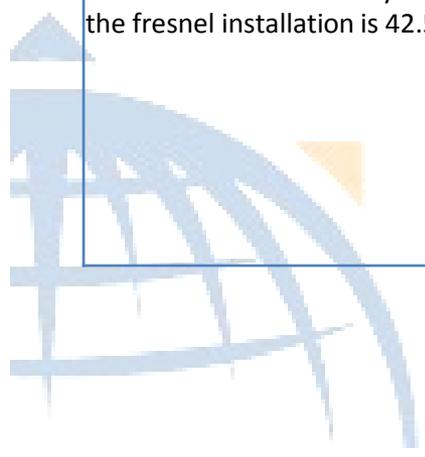
Webinar Questions	Nicholas Wagner
Do hybrid Solar Thermal and Biomass make sense anywhere?	Not really explored in the roadmap, but could be an emerging technology.
Climate wise GCC -UAE region is good for LT solar thermal or not? When competing against LT application, is fuel cost in the major reason to consider for region ?	Please see fig 14/15 for UAE. fuel cost is main driver when looking at substitution cost since solar resource in GCC is very very good
Cyou please let me know your opinion about GCC especially UAE for LT solar thermal ? - climate wise, competitiveness wise	Actually we have a very recent report on RE in UAE and covers ST, please see http://www.irena.org/remap/IRENA_REmap_UAE_report_2015.pdf
We are investigating a high temperature solar thermal system with storage. Can you tell us something about your investigations into solar thermal applications in the temperature range 400-1000°C?	I did not really explore ST options for HT heat, see appendix b, section 2.2 http://www.irena.org/remap/IRENA_RE_Potential_for_Industry_BP_2015.pdf
How does IRENA calculate the LCOE for thermal energy?	Please see section 3.2 here http://www.irena.org/remap/IRENA_RE_Potential_for_Industry_BP_2015.pdf
How we can overcome the challenges for industrial solar heating in developing countries that has no infrastructure for the system design, implantation and operation. Most of the system components are imported for abroad.	complicated question, one method is target setting, see http://www.irena.org/menu/index.aspx?mnu=Subcat&PriMenuID=36&CatID=141&SubcatID=602

Webinar Questions	Tobias Schwind
<p>What happens to the infrastructure after the life time of 20years?</p>	<p>It can be used after 20years</p>
<p>At what minimum total company heat demand can a client start considering solar thermal solutions for the options to make economic sense? I would also like to find out if one installation can cater for plant needs with varying temperature demands (i.e a mix of medium temperature and high temperature)</p>	<p>Actually we are targeting system sizes > 0,5 MWth peak power. Our collector can deliver variable temperatures of up to 400 °C</p>
<p>1. What is the installation cost - USD/100Kcal for low temp applications? Typical - 10 - 20 Kg/cm² steam applications in developing country like India. 2. For power generation – what is the driving fluid? Maximum average operating hours?</p>	<p>Installations costs depends on system size and costs for local workers and their performance, fluids are pressurized water, steam or thermal oil.</p>
<p>In calculating the 0.07 €/kWh LCOE, which location and cost of installed collector/m² is Industrial Solar using?</p>	<p>The 0,07€ / kWh is a taken from a study done from Fraunhofer ISE</p>



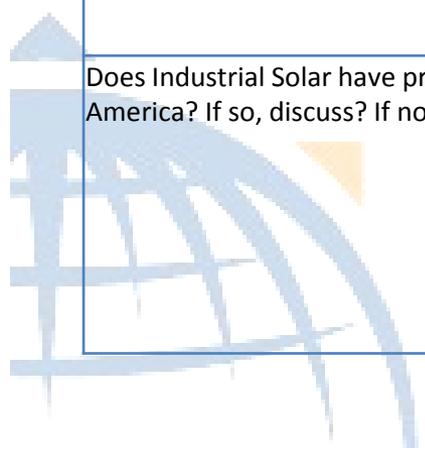
Webinar Questions	Tobias Schwind
What location in the world has DNI of 2,500?	There are many locations/Countries with a DNI of 2500 such as Egypt, South Africa, Jordan, Chile etc.
Can you demonstrate that the projections are accurate by showing the energy production statistics of one of the projects that are already running, as discussed at the start of the presentation?	Yes
Please clarify: are you using DNI or GHI???	Concentrating collectors have to use DNI, as the can't benefit from diffuse irradiation
The main question for industry process heat vs. solar thermal: how can we be sure the industrial production process will stay stable for the next 20 years, this duration being the basis for IRR calculations?	Even if the production process might change, the process will still require heat
Such an increase of fossil fuel price yearly increase of average 7,5% is very high for the next 5 years. Which source is used to size this value ?	The average compounded growth rate over the last 10 years for energy costs was 10%. In many countries even higher.
Is the LCOE of 3 - 7 cents kWh thermal or kwh electric?	Thermal
Is cleaning the system necessary with demi water?	No

Webinar Questions	Tobias Schwind
Is there a minimum size requirement?	Minimum energy revenue needed. Amount depended on region/country risk/ customer profile ranging from EUR 20.000/year in our backyard up to EUR 100.000.-- in more difficult environments.
Petrol cost increase of 7.5% is too high to forecast !	The average compounded growth rate over the last 10 years for energy costs was 10%. In many countries even higher.
How quickly do conventional fossil fuel based solutions for process heat, payback? (clue: never?!)	Good question, that really depends on the business case and general set-up and mind-set,
Which location are the local data energy costs considered to? Central Europe?	It was no specific location/country considered
Why did they apply an interest rate of 10% in the example? Any relation with what the banks are demanding for financing of these systems?	10% was selected as many of industrial customers put in this figure
Would it be correct to say the capacity factor of the fresnel installation is 42.5%?	42,5% is the yearly average efficiency of the system

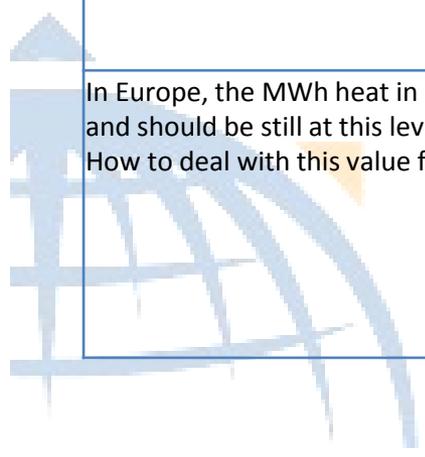


Questions and answers from ISES webinar

Webinar Questions	Tobias Schwind	Dr. Christian Holter
What would be the solar heat costs including the investment costs (the excel tool only showed operation and maintenance costs)?	In this "Partner & customer tool" we do not calculate the LCOE, this is included in our more sophisticated tool and thus not calculated in this specific example	
Could you estimate - just in general- the price Cent/kWh were not only operation and maintenance but also investment is included? over a fixed period of time?	Depending on location, system size and local tax credits/incentives. In general it is between 3-7 €Cent per kWh	
Why is SOLID not offering concentrating collector technology? Would your model fit for CSP?		We did not run in application where this pays off.
What happens in factories with 24 hour schedule? Factories where thermal energy is required during night as well?		In any case you need a fossil-fuel system as a back-up in case of a rainy-season. The solar fraction can be increased by integrating a storage.
Does Industrial Solar have projects in North America? If so, discuss? If not, why not?	Not yet, as local energy costs are very low, but North-America is an interesting ESCO market and we expect increasing energy costs	



Webinar Questions	Dr. Christian Holter
what is the refresh CAPEX on the solar field?	4,5 m€ in the given example
What is the annual ENERGY output of the installation, not the power?	You find that in the table, thermal energy earnings in MWh per year
What is the temperature from the flat plates for this project, and what is the energy output in kWh/m ² ?	Inlet temperature collector 65°C, out 80-100°C depending on request. Annual Output in Austria up to 500 kWh/m ² in this application. Flat Plates are double glazed.
What temperatures are being used for district heat in austria, and what % of it is coming from the flat plates?	Supply summer 80°C/ Winter 120°C, Return 55-60. Some projects have up to 15% solar
How are the savings by SOLID calculated?	Customers savings on conventional energy costs need to exceed total fees paid to SOLID.
How well does the SOLID system operate in Winter, when the ambient temperatures are below 0°C?	Depending on solar radiation. When the sun is out, okay, otherwise :-{
What are the actual maintenance costs, in €/m ² for the SOLID system?	€/m ² is a wrong indicator. This is fixed costs plus electricity+ insurances + costs depending on complexity of the system.
In Europe, the MWh heat in process is of 40 USD and should be still at this level in the next 5 years. How to deal with this value for solar thermal ?	We sell most district heating heat at prices between 35 and 40 EUR/MWh.



Questions and answers from ISES webinar

Webinar Questions	Dr. Christian Holter
In order to get to the minimum range (2-5MEuros) have you done a portfolio of projects? (several projects with several clients-offtakers) If so, how does are the key points and how do the banks react to that?	We tried. That was not too successful but we might do again.
Is the ESCO model based on fixed alternative cost or varying depending on fossil fuel or similar?	We use indexation often using a consumer price index mixed with energy price index.
While calculating payback period what is the cost of finance or interest rate of loan borrowed considered?	Cost of finance or interest rate of borrowed money was considered to be 10%
What is the concentration ratio of those Fresnel collectors?	approx. 75
What software is used by SOLID to model the plant and estimate the theoretical production?	We developed our own software, and use many experiences from daily life to calibrate calculations.
Does ESCO need on-site full time monitoring staff to pilot the plan	No. Actually, some plants we visit 2 times a year only.
If a heat pump is used, do you use a grid and system protection device to prevent your plant of any damage?	We don't use electric heat pumps. Solar cooling works with absorption chillers.

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