



## CONFIDENTIAL

### SOLUTION FOR INDUSTRIAL PROCESS WASTE HEAT RECOVERY

Thermagine is proposing to offer a solution for process waste heat recovery. This survey is designed to assess the potential demand for waste heat recovery amongst industrial process heat use at your plant. In order to do this we are looking for information on the quantity and form of process heat currently being used in your setup.

We offer novel heat storage solutions that will allow for savings of up to 40-50% in fuel energy consumption with minimal payback times. Your input will help us define the solutions that we wish to propose to you.

All information provided will be kept confidential and will not be forwarded to anyone outside of Thermagine.

The survey consists of multiple-choice 'tick box' questions, and space is provided at the end if you need to expand on your answers. It should take about 10 minutes to complete.

**IMPORTANT: Please don't forget to save this PDF file when you are finished with it.**

<b>Company Name</b>	
<b>Address of Registered Office</b>	<b>City / Postcode</b>
	<b>Country</b>
<b>Contact Name</b>	<b>Position</b>
<b>Contact Person's Email</b>	<b>Telephone</b>
<b>Company Website and Email</b>	



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1. Do you use heat in your production processes (Process Heat)? If no, please go to question 18.

Yes      No

2. What form do you use to provide/transport the heat in?

Hot Water                                      Direct Heat  
Steam    Thermal Fluid (not water)  
Hot air    Other, please specify:\_\_\_\_\_

3. What is the installed capacity of your process heat generators?

< 0.4MW (400kW)                               > 10MW – 20MW  
 >0.4MW – 3MW                                       > 20MW  
 > 3MW – 10MW                                      Please specify exact capacity if you know it:\_\_\_\_\_ kW

4. What is the required temperature of your process heat demand?

< 20 °C     20 – 120 °C  
 120 - 250 °C     250 – 400 °C  
 > 400 °C    Please specify exact temperature if you know it:\_\_\_\_\_ °C

5. What is the major heat demand for process heat?

Cooling     Heating

6. Approximately what quantities of heat do you use each year (e.g. kWh), and what is your approximate annual fuel bill for process heat?

\_\_\_\_\_

7. What percentage of the variable cost of your final products are directly attributable to fuel costs for process heat?

< 5%     15% – 20%  
 5% – 10%     20% – 25%  
 10% – 15%     > 25 %

Please specify exact percentage if you know it:\_\_\_\_\_ %



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8. What fuels are currently used to provide this process heat and approximately what percentages?

- |   |   |
|---|---|
| <input type="checkbox"/> Gas _____%         | <input type="checkbox"/> Refuse Derived Fuel (purchased) _____% |
| <input type="checkbox"/> Oil _____%         | <input type="checkbox"/> Biomass (purchased) _____%             |
| <input type="checkbox"/> Coal _____%        | <input type="checkbox"/> Combustible production waste _____%    |
| <input type="checkbox"/> Electricity _____% | <input type="checkbox"/> Other (state) _____%                   |

9. Approximately what percentage of your heat energy use is process heat?

- |                                   |                                   |
|-----------------------------------|-----------------------------------|
| <input type="checkbox"/> <10%     | <input type="checkbox"/> >50%-90% |
| <input type="checkbox"/> 10%- 50% | <input type="checkbox"/> >90%     |

Please specify exact percentage if you know it: \_\_\_\_\_%

10. How much (if any) of your process heat is produced by Combined Heat and Power?

- |                                   |  |
|-----------------------------------|--|
| <input type="checkbox"/> None     | <input type="checkbox"/> > 50%-90%                     |
| <input type="checkbox"/> <10%     | <input type="checkbox"/> >90%                          |
| <input type="checkbox"/> 10%- 50% | Please specify exact percentage if you know it: _____% |

11. What are the approximate operational hours of your process heat generation and for how many days/week does this operate? (**Tick both columns** please.)

- |   |  |
|---|--|
| <input type="checkbox"/> < 7 hrs/day    | <input type="checkbox"/> < 3 days/week |
| <input type="checkbox"/> 7 – 15 hrs/day | <input type="checkbox"/> 5 days/week   |
| <input type="checkbox"/> > 15 hrs/day   | <input type="checkbox"/> 7 days/week   |

12. Is the process in which the heat is used in your process a batch process (All components are completed at a workstation in the production line before they move to the next one)?

- Yes                       No.

If "Yes", how many complete batch cycles does your process operate in one day?

- |                                 |  |
|---------------------------------|--|
| <input type="checkbox"/> 1      | <input type="checkbox"/> 10 – 20                         |
| <input type="checkbox"/> 2 – 5  | <input type="checkbox"/> > 20                            |
| <input type="checkbox"/> 5 – 10 | Please specify exact number if you know it: _____ cycles |



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13. How long is the average peak cycle in your batch process (when most energy is used as compared to the average load)?

- < 10 mins
- 1 – 2 hrs
- 10 – 20 mins
- 2 – 5 hrs
- 20 – 60 mins
- > 5 hrs

Please specify exact time if you know it: \_\_\_\_\_

14. Do you currently recover waste heat in your process?

- Yes
- No.

If yes, please briefly describe how:

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15. Can you estimate the energy efficiency of your process?  Yes  No.

If yes, can you specify the percentage of heat wasted:

- 10 – 20%
- 40 – 50%
- 20 – 30%
- 60 – 70%
- 30 – 40%

16. Would you be interested in utilizing the heat that is wasted and/or optimizing your manufacturing process to be more energy efficient?  Yes  No.

17. What is the maximum simple payback time be for the investment in any waste energy recovery solution, should you choose to invest in it?

- 1 – 2 Years
- 3 – 4 Years
- 2 – 3 Years
- 4 – 5 Years

18. Would you be interested in installing a pilot system in one of your plants?  Yes  No.

19. Would you be interested in Thermagine analyzing your plant's setup in order to propose a complete solution and cost savings you would incur?  Yes  No.

If "Yes", **please include a detailed heat/steam flow sketch/schematic of your plant. A hand-drawn is fine.**



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**Please Note: Thermagine requires this information to analyze & estimate the potential energy savings at your plant. The analysis will be carried out by our team of experts at the German Aerospace Centre's Institute of Technical Thermodynamics located in Stuttgart, Germany.**

In the schematic, please include:

- (a.) Temperatures, pressures and mass-flows at each step of the production process, and
- (b.) An hourly heat/steam demand chart from your heat generator/boiler over a 24 hour period, showing what is consumed by the plant in a normal production day.

**Note:** If you would like Thermagine to recuperate waste heat from the incinerator/boiler exhaust, we would require the temperature and mass flow of the exiting flue gas.

**Please understand that without this data, we cannot propose a solution for you.**

20. Do you control energy purchase and decisions? Yes No.

If you checked "No", are these decisions made:

- In-house
- Through an energy/utilities contractor

21. Do you require further information or assistance on more efficient systems for your process heat?

Yes No. If Yes, please describe your needs in more detail:

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22. Please feel free to give us any other comments:

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Please email the form and plant schematic(s) to: [info@thermagine.com](mailto:info@thermagine.com)

**We thank you for your time and will contact you in short order.**