




Factsheet

Heat recovery transformer station UW Mitte



SINFONIA stands for "Smart INitiative of cities Fully cOmmitted to iNvest In Advanced large-scaled energy". This project has received funding from the European Union's Seventh Programme for research, technological development and demonstration under grant agreement No 609019

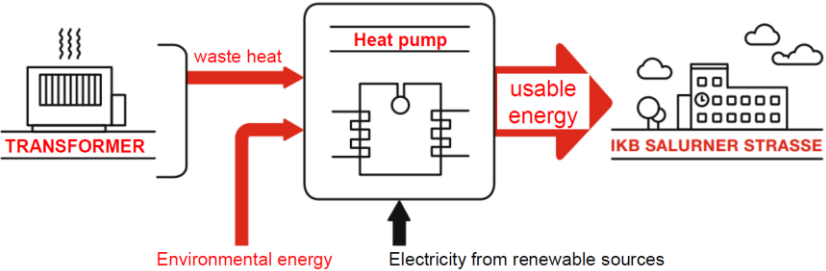
PROFILE

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| Name and address | <p><i>Administration building IKB Salurner Straße 11 6020 Innsbruck Austria</i></p> |
| Map |  <p><i>Source: Google Maps</i></p> |
| Type of installation | <p>Within the project "heat recovery transformer station UW Mitte", the waste heat from a transformer of the substation UW Mitte is used together with the energetic potential of the environment as the primary source for a heat pump process. For peak load coverage, a gas boiler system was installed as a backup. It is expected that an average of 75 percent of the annual heat demand will be covered by the installed heat pump system.</p> |
| Ownership | <p>Innsbrucker Kommunalbetriebe AG</p> |
| Capacity | <p><u>Heat pumps:</u> 87,3 kW_{th}</p> <p><u>Natural gas hot water boiler:</u> 96 - 300 kW_{th}</p> |



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| | Heat storage tanks: 4,000 litres |
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THE CONCEPT

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| <p>Detailed characteristics of the device / infrastructure / service</p> | <p>The project "Heat recovery transformer station UW Mitte" includes the following major components:</p> <ul style="list-style-type: none"> • heat pumps, • natural gas hot water boiler, • heat storage tanks |
| <p>Concept</p> | <p>The figure shows a simplified schematic representation of the project:</p>  |
| <p>Energy solutions</p> | <p>The energy supply of an administration building by an air-water heat pump system is a common solution on the market. The project receives innovative content from the additional use of waste heat from the transformer substation, which was previously unused. This leads to an increase in the efficiency of the heat pump. In addition, there is another positive effect. The use of the heat pump results in an active cooling of the transformer substation, whereby a longer life is expected.</p> |
| <p>Technologies considered in the design</p> | <p><u>Heat pumps:</u></p> |



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| | <p>The renewable heat is generated by two air-water heat pumps (with 34.9 kW and 52.4 kW) with five outdoor units, which are situated on the ceiling above the transformer substation. The regulation of the heat pumps is weather-related with a sliding operating mode.</p> <p><u>Natural gas hot water boiler:</u> Two new hot water boilers (with 48-150 kW) were installed to cover the peak load.</p> <p><u>Heat storage tanks:</u> To store the generated heat, two heat storage tanks with a capacity of 2,000 litres each were implemented. This results in the possibility of compensating an irregular operation of the transformer substation.</p> |
| Performance targets | <ul style="list-style-type: none"> - <u>expected amount of produced heat (heat pumps):</u> 300 MWh/a - <u>expected amount of produced heat (gas boiler):</u> 200 MWh/a - <u>expected amount of reduced CO₂:</u> 71 t/a |
| Financing model | Direct investment of IKB: 85%, national grant: 10 % and EC grant: 5% |

IMPLEMENTATION

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| Contracting authority | IKB Innsbrucker Kommunalbetriebe AG |
| Project manager | Sophia Neuner (IKB) |
| Manufacturer / supplier | E. Rainalter GmbH |
| Other involved companies | |
| Cost breakdown | The total investment costs are in order of 0.21 Mio. €, Estimated payback time is 10yrs |



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| Implementation planning | |
| 1 - Design | 01/2016 |
| Description of step: | Planning and preparation of engineering |
| 2 - Construction | 08/2016 |
| Description of step: | Start of the construction phase |
| 3 - Completion | 02/2017 |
| Description of step: | Hand over to operator |



Work progress

Milestones



Figure 1: indoor unit of the air-water heat pumps



Figure 2: outdoor units of the air-water heat pumps





Figure 3: two heat storage tanks with 4,000 litres capacity



Figure 4: natural gas hot water boiler for peak load coverage



MONITORING

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| Monitoring System | The entire system has a modern process control system, which connects all components with each other. All measured values required for operation are recorded in the system. In order to assess the performance of the individual components, KPIs are calculated. |
| Monitored variables and figures | The following data is recorded for the Sinfonia project: <ul style="list-style-type: none">• energy input and output [kWh_{el}, kWh_{th}]• reduction of CO₂ [t/a] |

LIFE CYCLE ANALYSIS

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| Estimated lifetime | <u>Heat pumps:</u> 20 yrs <u>Hot water boiler:</u> 20 yrs <u>Heat storage tanks:</u> 20 yrs <u>Pipe systems:</u> 20 yrs |
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