

CiQuSo

City Quarters with optimised solarhybrid
heating and cooling systems

DI Tim Selke

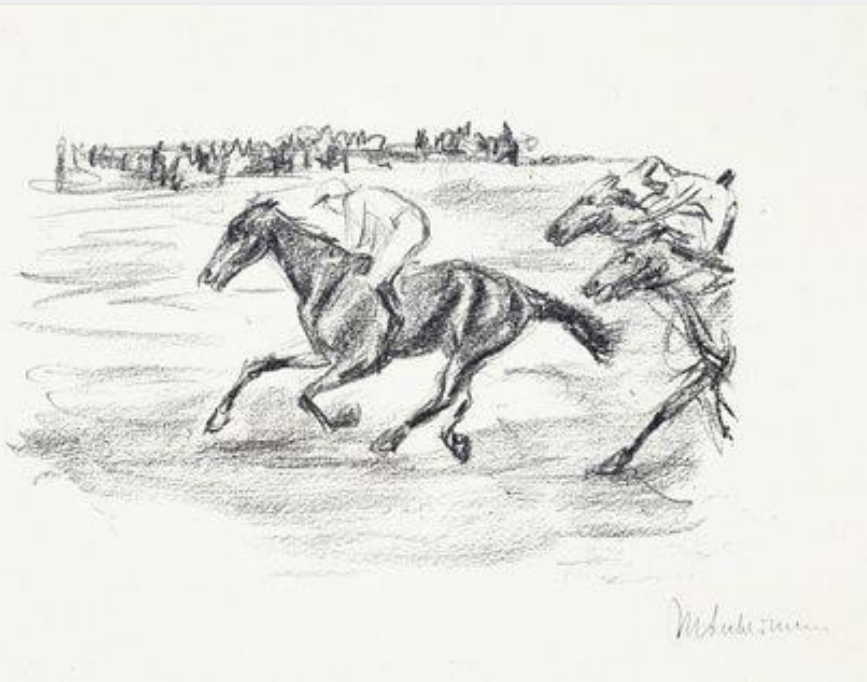
IEA SHC TASK53

1st Experts Meeting

07. / 08. October 2014

Västerås at University of Mälardalen, Sweden

Solar Heating and Cooling Systems – Quo Vadis?



Challenge

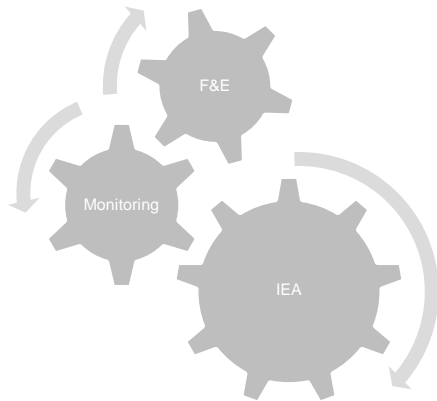
- Transformation of the existing energy system into an affordable, secure, sustainable, reliable one based on renewable energy sources and energy efficiency
- Urban integrated solar systems (Solar thermal, Photovoltaics) are key technologies for energy transformation process in Austria
- What mix of solar technologies is sustainable especially in cities?

Max Liebermann

Berlin, 20. Juli 1847 - 1935, Berlin

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Genesis CiQuSo



- **Successful Austrian shc demo-projects**
(many .. 100 percentage solar heat for buidlings ..)
- **Active Networking IEA SHC**
(national and international participation)
- **Monitoring projects**
(REALITY CHECK by energy monitoring)
- **Roadmaps**
(Writing of technology roadmaps for solar systems)
- **Optimization and R&D of Technology**
(improved primary energy use and economic)
- **SHC system on a city quartier level**
(new concepts, energy exchange of building neighbourhoods ..)

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City Quarters with optimised Solar hybrid Heating and Cooling Systems

National Call – Stadt der Zukunft

Budget 1.2 Mio Euro

Duration 07/14 till 06/17

Partner

- Austrian Institute of Technology GmbH/ Energy Department
- AEE INTEC
- Universität Innsbruck
- Cofely Kältetechnik GmbH
- Salzburg Wohnbau GmbH
- S.O.L.I.D. Solarinstallation und Design GmbH

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SYNOPSIS

- The project CiQuSo aims to develop, evaluate and optimize concepts for solar energy systems to provide energy for buildings and cities.
- Comparing and aligning the energy demand (heating, cooling, domestic hot water, electricity) and the production in terms of dynamic behavior and spatial distribution enables the optimization of the energy performance of the entire city.
- Based on solar thermal and solar electrical systems new and highly innovative solar hybrid concepts will be developed and will be applied in HVAC systems for buildings.
- The applications will be evaluated on city level in order to identify further optimization potentials gained by intra-building energy exchange as well as load shifting strategies.
- The applicability of the developed methods and concepts will be shown as an example at Itzling, a part of Salzburg city.

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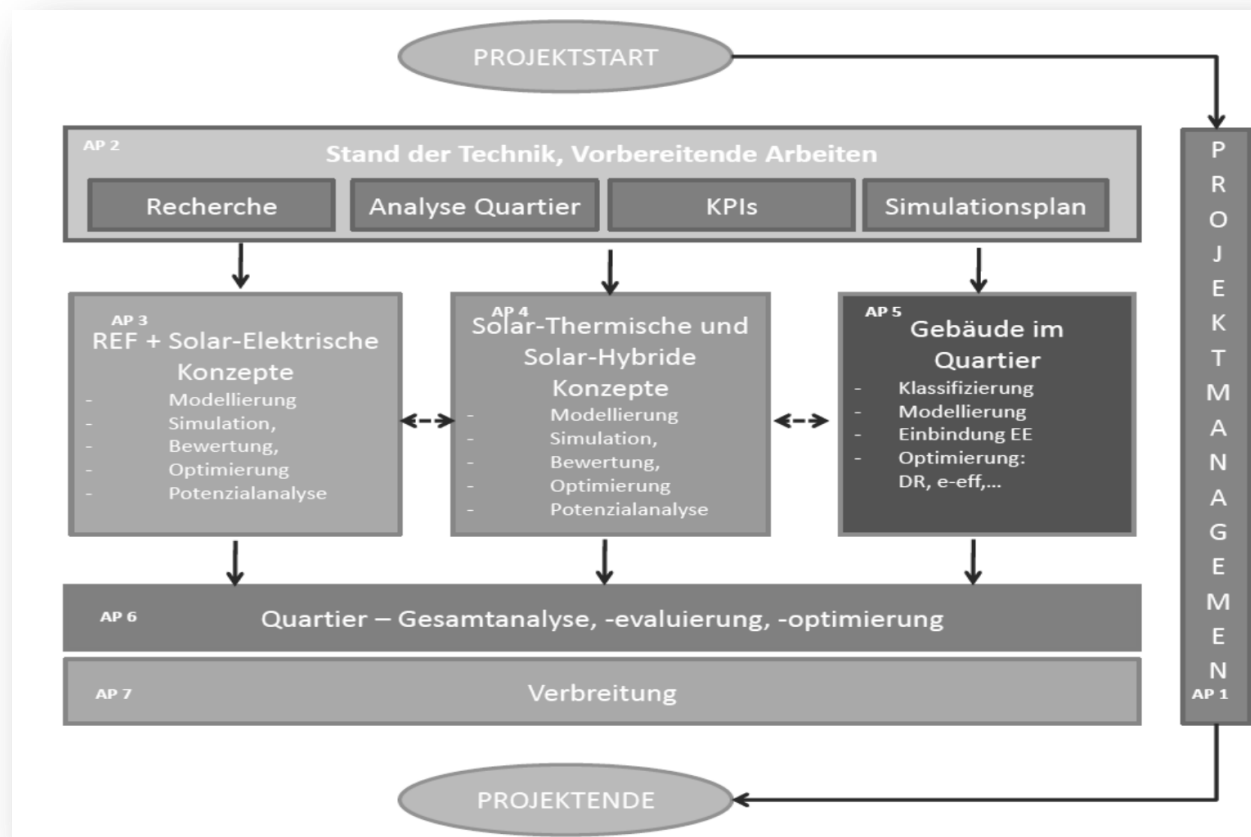
The main project targets:

- Quantification of the optimization potentials of the application of solar energy systems on city level considering intra-building energy exchange and load shifting strategies
- Sound comparison of the considered system concepts (solar thermal, solar electrical, solar hybrid) regarding providing energy to the city
- Development, analysis and further optimization of new highly innovative solar hybrid energy system concepts.
- Usage of storage potentials in buildings, systems and the city in order to improve the energy performance of solar systems.

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Work packages



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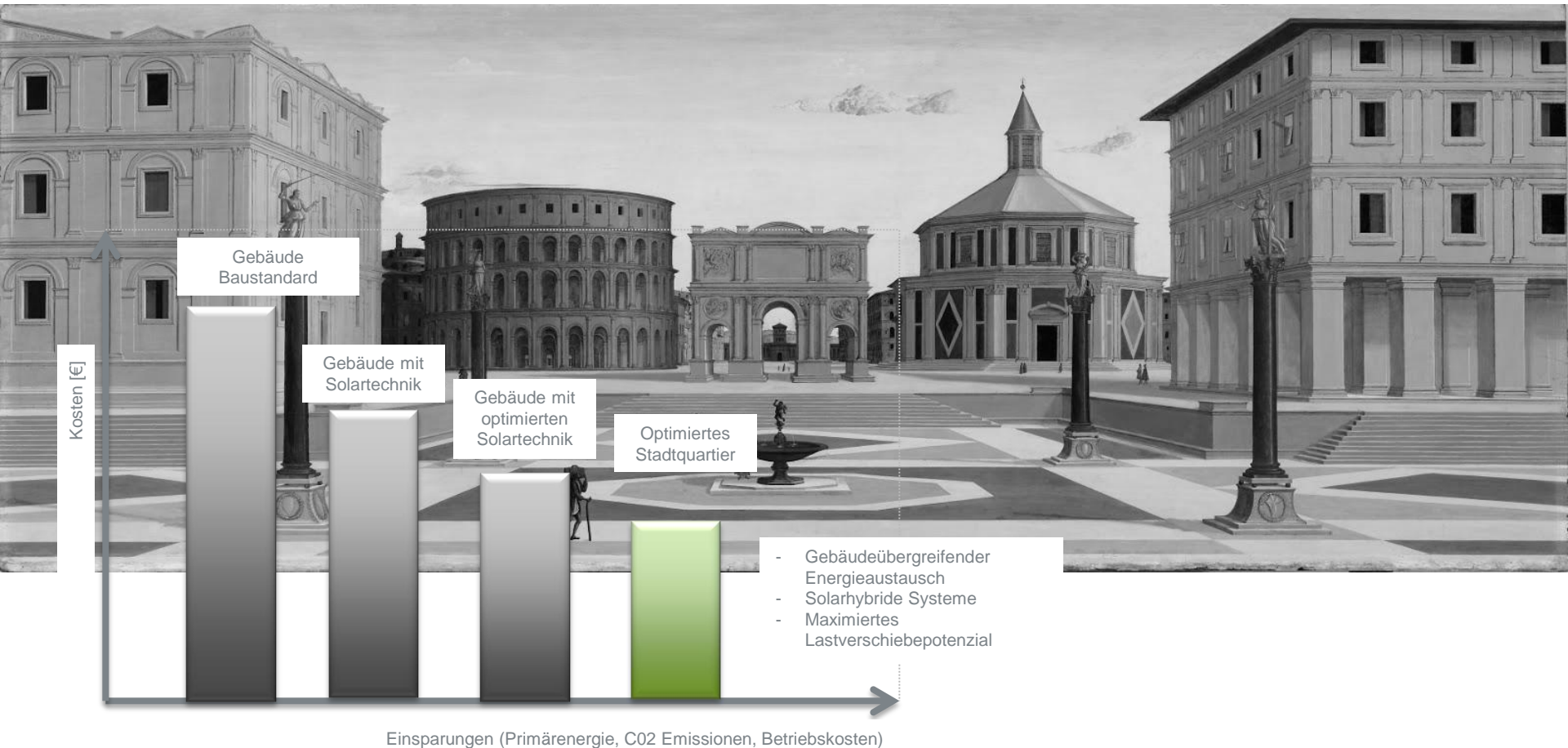
City Quarters with optimised Solar hybrid Heating and Cooling Systems
 Salzburg City quartier Itzling



- Residential building blocks
- Education buildings
- Trade fair
- Sport

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City Quarters with optimised Solar hybrid Heating and Cooling Systems
 SHC Technologies for Cities – Solar Cities



IEA SHC TASK 53 Kick-Off

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Expected Contribution for SHC TAS53 Subtask A

- **A1 Reference systems**
(not only small scale, different building types ..)
- **A2 New system configuration**
(not only small scale, solar hybrid solution, different building loads, ..)
- **A3 Storage (use of building mass ..)**
- **A4 System integration (building and urban integration ..)**

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Expected Contribution for SHC TAS53 Subtask B

- **B1 Reference condition** (different building types .., Austrian climate and economics)
- **B2 Grid access and ..**
(load shifting strategies and management, ..)
- **B3 Models of components & System simulation** (strong modelling an simulation part .. Solar thermal and PV heat pump ..)
- **B4 Control strategies** (strategies on simulation level have to be developed ..)
- **B5 system inter comparison ..** (Energy and economic analysis ..)

Submitted project proposal

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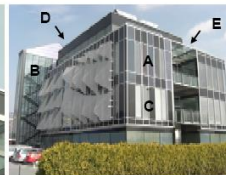
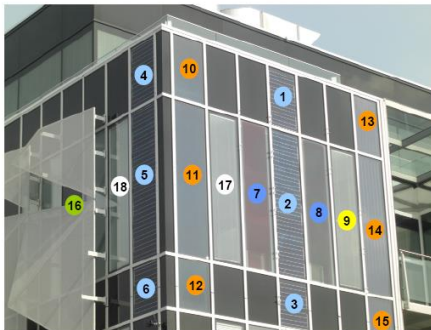
COOLSKIN

Partners TU Graz, AIT, Reinberg ..

Submitted September 19th

Call Energieforschung

The objective of the research project COOLSKIN is the investigation of façade-integrated systems for space-cooling. The solar irradiation onto the façade is converted directly or time delayed to electrical energy, which is used to cool the adjacent room. Energy supply is energetically autonomous and is not dependent on energy from external sources. The project is based on elaborated system simulations and experimental work with a functional model of the system as well as field tests under real operating conditions.



- A .. Testfassade Prototyp 1
- B .. Stiegenturm Prüfstand
- C .. Innovationslabor mit Warmwasserspeicher
- D .. Fassadenprüfstand
- E .. Entwicklungsräume der „predictive control“



IEA SHC TASK 53 Kick-Off

SHAPE PV

Partners AIT, ATB-Becker EU, Arch. Reinberg ..

Submitted Exploration - September 19th

Call Energieforschung

Concept study for a project chain dealing with the use of building-integrated photovoltaic (BIPV); in view of an overall, systematic analysis for implementing innovative BIPV in Austria the project (I) defines the requirements and future targets for BIPV firstly for the Austrian market and its stakeholders (with the perspective of the European market) (II) develops together with a group of key-players a necessary research and implementation roadmap and (III) drafts a concept for a first implementation phase. Existing know-how, current initiatives, obstacles and chances are analyzed systematically, the activities of potential stakeholders are submitted to a screening and all relevant partners are integrated. Based on these findings a chain of R&D follow-up projects will be defined which will have to be elaborated synergetically.

AIT Austrian Institute of Technology

your ingenious partner

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