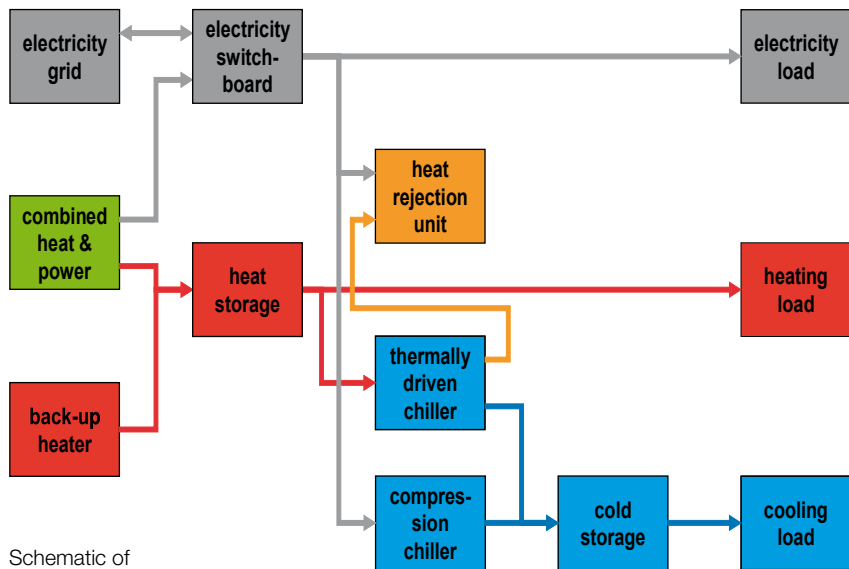




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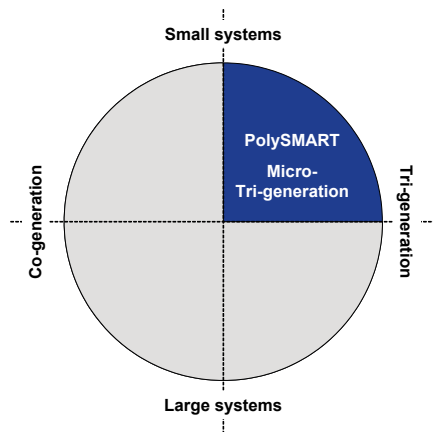
PolySMART® – POLYgeneration with advanced Small and Medium scale thermally driven Air-conditioning and Refrigeration Technology



Schematic of a tri-generation system

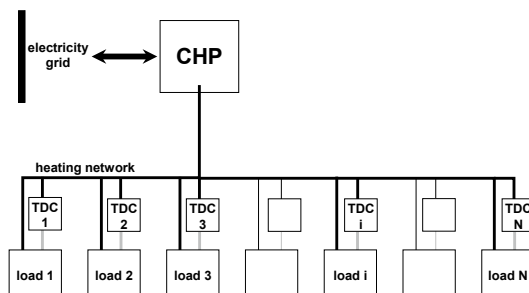


An Integrated Project partly funded by the European Commission under FP6, DG “Energy and Transport”

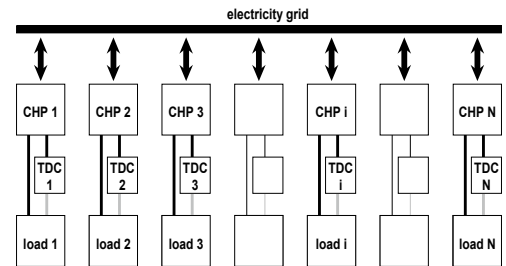


PolySMART[®] is a project partly funded by the European Union where 32 partners have decided to collaborate in order to develop a set of technical solutions for a new market segment for poly-generation, in particular the market for small tri-generation systems.

Tri-generation denotes in the present case the combined production of power, heat and cooling in a single system (CHCP). The key components of a CHCP system are the co-generation unit, also called combined heat and power system (CHP), used to produce heat and electricity and the thermally driven chiller used to convert the CHP heat into useful cooling.



small TDC-units to develop so called micro-CHCP systems. System typologies covered in PolySMART[®] are shown in Figures 2 and 3.



THE KEY GOALS OF THE PROJECT ARE

- to demonstrate the technical feasibility of small tri-generation systems and
- to characterise economically viable applications. For instance, further financial benefits can be achieved due to the increased number of annual operation hours of the entire system gained by using around the year the produced heat for heating, cooling and other thermal applications (e.g. hot water, pool heating etc.).
- to provide tools and guidelines for transfer of the newly developed systems into practical application

The motivation of the project is twofold: on the one hand nowadays CHCP is restricted to high-capacity applications. It is used in industries or district heating and cooling networks.

On the other hand small co-generation systems in the range of some kW are becoming more and more popular. Besides this small thermally driven cooling systems (TDC) with cooling capacities of 30 kW down to a few kW have been developed by a number of European companies and are recently being transferred into the market.

Therefore it is a logical next step to combine small CHP-systems with

Figures from left to right:

1) Scope of the PolySMART project

2) Decentralized cooling (TDC) with centralized combined heat and power production (CHP)

3) Decentralized CHP and TDC

THE FOCUS WITHIN THE PolySMART® PROJECT COVERS THE FOLLOWING MAIN ASPECTS:

- Elaboration of state of the art technology survey (CHP, TDC, other key components) and their application range according to different loads, climates, co-generation systems, heat sinks and resulting technical boundary conditions.

Work Package (WP) 1 System Classification;

WP Leader University of Malta

- Analysis of potential markets and applications and the related cost benchmarks.

WP 2 Potentials & Markets;

WP Leader Politecnico di Milano

- Demonstration of the technology and assess the technical viability by running 12 demonstration plants in 7 countries using different technical solutions and supplying different types of consumers. This includes an extensive monitoring of each single plant.

WP 3 Demonstration;

WP Leader Fraunhofer ISE

- Development of rules for measurement and evaluation of micro-CHCP systems, which will be applied in the demonstration systems. Development of typical performance figures and design guidelines for engineering professionals.

WP 4 Technical Assessment and Design Guidelines;

WP Leader Ikerlan

- Development of models and sizing tools for micro-CHCP systems.

WP 5 Engineering Tools;

WP Leader ECN

- Dissemination and training activities by means of national workshops and seminars, a project website, contribution to conferences and providing a database for producers of components for micro-tri-generation. Carry-out of a cross-evaluation and documentation of European activities in the field of polygeneration and making this information available by polygeneration-website.

WP 6 Training & Dissemination;

WP Leader PSE AG

Different technologies for combined heat and power production (CHP) and thermally driven cooling (TDC) will be assessed in the course of the PolySMART® project.

COMBINED HEAT POWER SYSTEMS (CHP)



Tedom



Avesco

THERMALLY DRIVEN COOLING SYSTEMS (TDC)



Climatewell



rotartica



Pink



Sortech



ECN



AoSol



Robur



Phönix

Partners



Fraunhofer-Institut für Solare Energiesysteme ISE, Germany



Högskolan Dalarna, Sweden



Besel S.A., Spain



ClimateWell AB, Sweden

Fredrik Setterwall Konsult AB, Sweden



Kungliga Tekniska Högskolan, Sweden



IKERLAN Technological Research Centre, Spain



Rotartica S.A., Spain



Joanneum Research-Forschungsgesellschaft m.b.H., Austria



FA TEC Thermic Energy-systems & Consulting GmbH, Austria



Behältertechnik Pink Ges.m.b.H., Austria



Schneid GmbH, Austria



S.O.L.I.D. Gesellschaft für Solarinstallation und Design m.b.H., Austria



Weingut Ing. Johannes Peitler, Austria



PSE AG – projects in solar energy, Germany



Sortech Aktiengesellschaft, Germany



Technische Werke Ludwigshafen am Rhein Aktiengesellschaft, Germany



TEDOM-VKS s.r.o., Czech Republic



Energy research Centre of the Netherlands, Netherlands



National Energy Conservation Agency, Poland



Instituto Nacional de Engenharia, Tecnologia e Inovacao, Portugal



AO SOL - Energias Renováveis, LDA., Portugal



EuroSolar - Energias Alternativas, Lda., Portugal



Politecnico di Milano, Italy



Avesco AG, Switzerland



M. Conde Engineering, Switzerland



Swiss Federal Laboratories for Materials Testing and Research, Switzerland



ROBUR S.p.A., Italy



Bavarian Center for Applied Energy Research, Germany



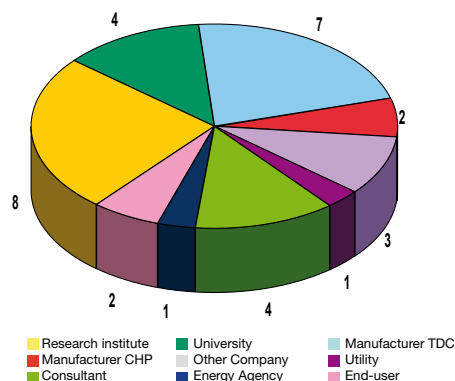
Phoenix SonnenWaerme AG, Germany



Technische Universität Berlin, Germany



University of Malta, Malta



32 partners are collaborating in the PolySMART® project. The project is managed by Fraunhofer Institute for Solar Energy Systems ISE in Freiburg (Germany). It started in June 2006 and will last for four years until June 2010.

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