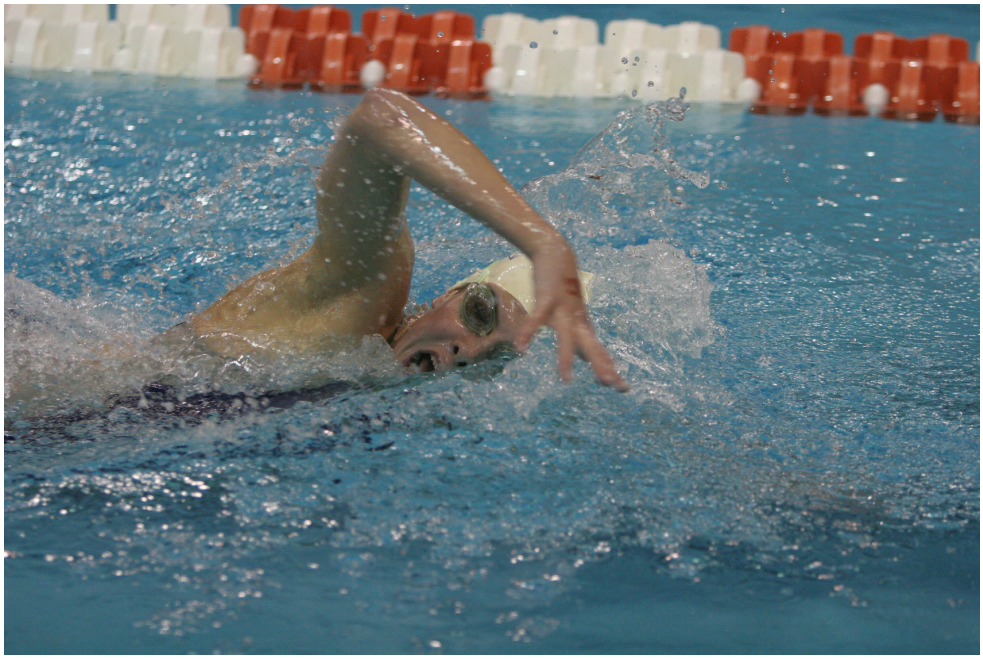
SolarVenti®



Solar Air Collectors

for swimming pools and waterparks

SolarVenti Professional

www.solarventi.com

The purpose:

To solve ventilation and dehumidifying tasks in an economically affordable way.

The present problem:

Swimming pools and water parks use a lot of energy.
There are several reasons:

1. Guests must experience a comfortable indoor climate in terms of optimized temperatures in the water and the air.
2. The ventilation rate must be high to avoid moisture problems in construction of the building.
3. Fresh air supply must be optimized to avoid high contrations of cloride etc.

The facts above result in high running costs in swimmeng pools and water parks.
Heating is supplied, often even in summertime, to obtain optimal indoor conditions. Supply of heat is often by means of district heating or gas. Furthermore there is often large windows in indoor swimming pools, which contribute to the heat suppluy in sunny weather.
In most parts of the year, however, the demand for heat is always expensive in indoor swimming pools and waterparks.

The normal solution:

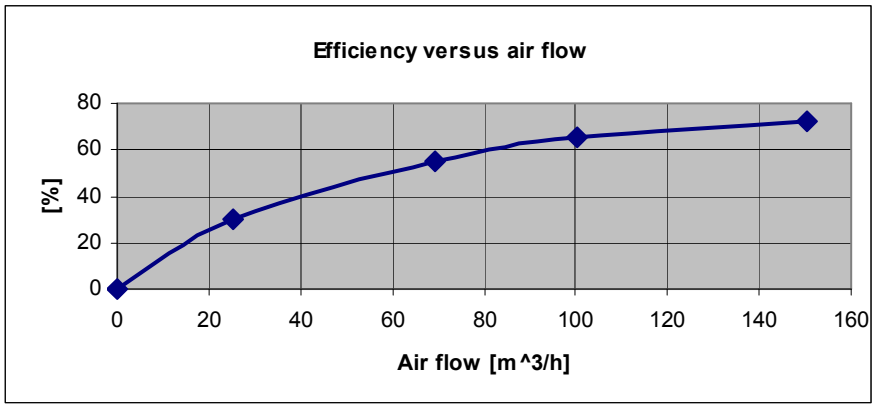
Different methods are used for obtaining the neccesary ventilation rates in indoor swimming pools and water parks.
1. Heatpumps with mixing unit for partly recirculation of the expensive warm air.
2. Heat recovery systems for swmming pool and mixing unit for recirculation.
3. Heat recovery system with mixing unit for recirculation and heat pump.
The three solutions above have one thing in common: heating the cold fresh air and obtaining a good indoor climate is expensive.

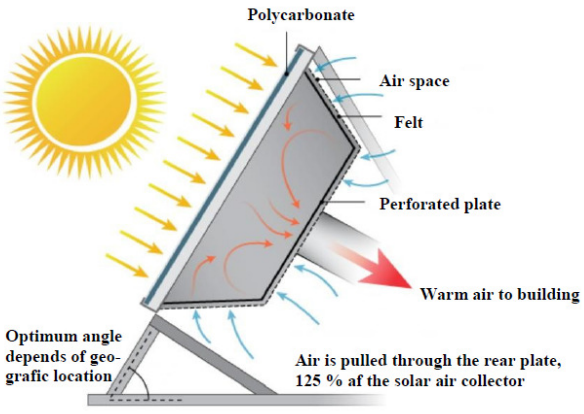
The optimized solution:

Installing SolarVenti® Professional solar air collectors on the roof or facade of the building is an effective way of reducing the overall building heating costs. The system is designed for the individual application making an optimized solution for the customer.
Heating the cold outdoor air using the energy from the sun, makes this a very cost optimized solution. In the examples (see next page) we calculate with an indoor temperature of 29 degrees C (common for indoor swimming pools) and compensate for high outdoor temperatures.

Maintenance free:

The filter (which is also the absorber) is automatically cleaned by the heat from the sun when the fan is turned off, and the temperature exceeds 80 degrees C.
The system is thus maintenance free.





SolarVenti®

Function:

The air enters the collector through a patented double-perforated rear wall.
The air passes through the absorber, made of a black technical material, which is resistant to high temperatures. The material is also an effective air filter.

Unique to this collector is the conversion of solar energy to warm, fresh air.
The air gap between the rear wall and the absorber provides sufficient thermal resistance to transfer heat energy to the incoming air, eliminating the need for insulation.

The recommended air volume is 80-150 $m^3/h/m^2$ collector area.

Case 1 : Pool, small: 200 m2	**Without heat recovery**				**With heat recovery**			
Recirculation of ventilation air	No		Yes, 30% fresh air		No		Yes, 30% fresh air	
Size of solar air collector (m^2)	50		15		50		15	
Air flow (m^3/hour)	5.000		5.000		5.000		5.000	
City	**Hamburg**	**Munich**	**Hamburg**	**Munich**	**Hamburg**	**Munich**	**Hamburg**	**Munich**
Heat power in angle 60º (kWh) *	25.600	34.900	9.600	12.700	23.400	30.700	14.400	17.000
Reduction in heating costs - oil (Euros) **	3.371	4.595	1.264	1.672	3.081	4.042	1.896	2.238
Reduction in heating costs - gas (Euros) **	2.658	3.624	997	1.319	2.430	3.187	1.495	1.765
Reduction in heating costs - electricity (Euros) **	7.732	10.540	2.899	3.836	7.067	9.272	4.349	5.134
Size of pool room (m^2)	200		200		200		200	
Height of room (m)	5		5		5		5	
Air change (times per hour)	5		5		5		5	
Investment in Euros (approx.)	**€ 20.000**		**€ 6.000**		**€ 20.000**		**€ 6.000**	
City	**Hamburg**	**Munich**	**Hamburg**	**Munich**	**Hamburg**	**Munich**	**Hamburg**	**Munich**
ROI (pay back time) with oil in years *	**5,9**	**4,4**	**4,7**	**3,6**	**6,5**	**4,9**	**3,2**	**2,7**

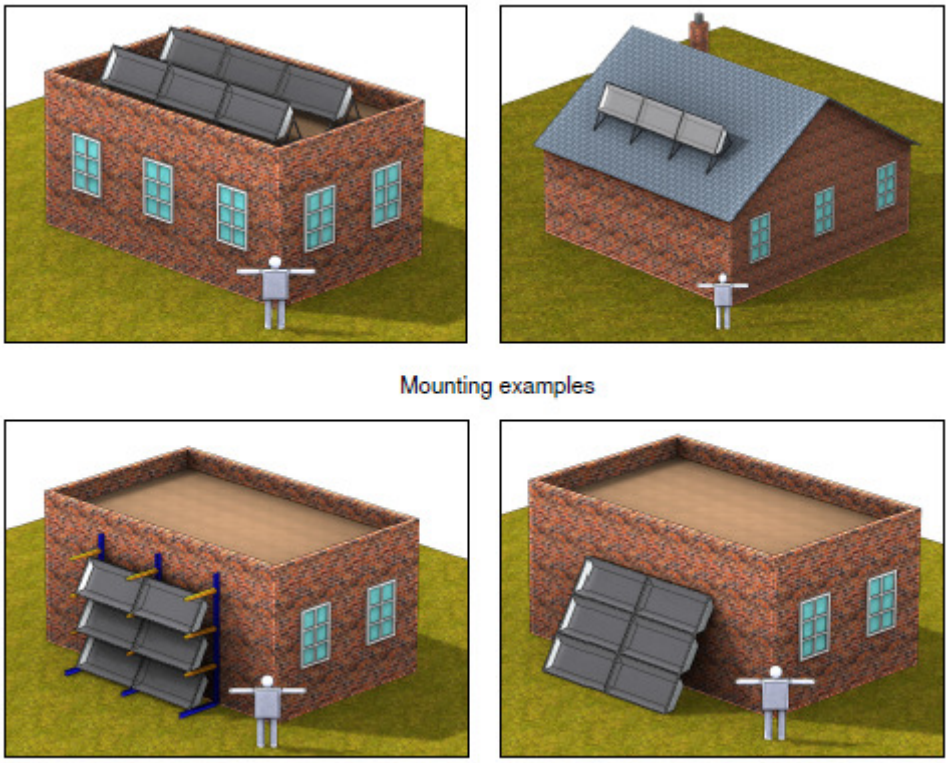
Case 2 : Water park / pool, large: 400 m2	**Without heat recovery**				**With heat recovery**			
Recirculation of ventilation air	No		Yes, 30% fresh air		No		Yes, 30% fresh air	
Size of solar air collector (m^2)	100		30		100		30	
Air flow (m^3/hour)	11.000		11.000		11.000		11.000	
City	**Hamburg**	**Munich**	**Hamburg**	**Munich**	**Hamburg**	**Munich**	**Hamburg**	**Munich**
Heat power in angle 60º (kWh) *	53.500	72.300	19.300	25.500	49.800	64.600	30.400	35.500
Reduction in heating costs - oil (Euro) **	7.044	9.520	2.541	3.358	6.557	8.506	4.003	4.674
Reduction in heating costs - gas (Euros) **	5.555	7.507	2.004	2.648	5.171	6.707	3.156	3.686
Reduction in heating costs - electricity (Euros) **	16.158	21.836	5.829	7.701	15.040	19.510	9.181	10.721
Size of pool room (m^2)	400		400		400		400	
Height of room (m)	5		5		5		5	
Air change (times per hour)	5		5		5		5	
Investment in Euros (approx.)	**€ 40.000**		**€ 12.000**		**€ 40.000**		**€ 12.000**	
City	**Hamburg**	**Munich**	**Hamburg**	**Munich**	**Hamburg**	**Munich**	**Hamburg**	**Munich**
ROI (pay back time) with oil in years *	**5,7**	**4,2**	**4,7**	**3,6**	**6,1**	**4,7**	**3,0**	**2,6**

* Hamburg and Munich, Germany, Calculated in the software RetScreen.

** Prices August 2013, DK / Oil Eur 1,33/Liter and Energistyrelsen www.ens.dk

Benefits:

- Short payback time.
- Powerful dehumidification, and free supplementary heated fresh air, resulting in lower energy consumption.
- Improves the operation of both new and existing ventilation and dehumidifying systems.



Mounting examples

Economy:

The SolarVenti Professional ® Solar Air System significantly reduces running costs for heating and dehumidification of larger commercial and industrial buildings.

Installing a SolarVenti Professional ® Solar Air System in conjunction with an existing ventilation system (HVAC) saves costs for both heating and dehumidification.

Payback time is usually less than 5 years.

Using the internationally recognized Canadian software RETScreen, based on climate data from NASA, significant savings can be shown.

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