

## A greener solution to air conditioning?

Who hasn't wished for a nice, soothing air conditioner on a hot summer's day in the office? Unfortunately, though, traditional air coolers have a nasty<sup>1</sup> side-effect – they use so much energy that they perpetuate, in their own, not-insignificant way, global warming.

But what if one could harness<sup>2</sup> the sun's rays to cool a home or office without gobbling up<sup>3</sup> huge quantities of energy – and without releasing too much CO<sub>2</sub> in the process? The revolutionary technology, though still in its infancy, already exists. But it remains prohibitively expensive. A Hamburg-based company, Thermodyna, has set out to solve the problem. It wants to build a household unit that can produce power, heat, and cold air whenever the consumer needs it. A classic energy guzzling<sup>4</sup> air-conditioning system would no longer be required.

The core of the system is the so-called Schuke motor which transforms the sun's rays into cool air for comfortable buildings. It produces one kilowatt hour of coolness for five cents. By way of contrast, conventional air conditioners burn through 12 to 14 cents per kilowatt hour. "There are no electronics and hardly any components," says Thermodyna boss Volker Bergholter, describing the machine's "sensational simplicity". It just requires two motors to produce the cool air. The booster converts steam, which is produced by a solar panel, into mechanical energy. This then powers the actual cooling machine, which sucks up the damp<sup>5</sup> warm air in a room, compresses it, then expands it and cools it to 20 degrees Celsius.

Thermodyna plans to sell the first of these machines as early as 2010. Its biggest advantage is that cooling is required exactly when the sun is shining the most – meaning the solar cooling machine can better match<sup>6</sup> consumers' requirements. For years, researchers and engineers have been striving<sup>7</sup> to develop machines that can use the sun's heat to bring down room temperature. But they were never able to compete with classic, plug-in air-conditioning units. Solid, a solar power information service based in the city of Fürth, estimates that each year, air-conditioning units with a combined output of 250,000 megawatts are installed. Only a

### GLOSSARY

- 1 bad
- 2 control and use
- 3 quickly using large amounts of something
- 4 using a lot of something
- 5 humid
- 6 satisfy
- 7 making a great effort





tiny<sup>8</sup> percentage of those units, however, are environmentally friendly. "The technology has not been economically viable<sup>9</sup> until now", says Oskar Wolf,

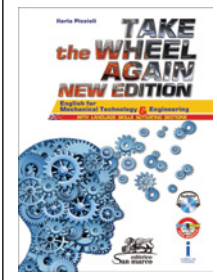
an expert on solar cooling at Solid. Regenerative cooling systems have tended to cost between 24 and 30 cent per kilowatt hour – double the cost of conventional systems.

These exorbitant costs have largely been due to the extraordinarily complex technology such green cooling systems have used until now. The current method involves using solar energy to heat a mixture of water and coolants in a so-called absorption cooling machine. The coolant evaporates, is condensed and sprayed into a heat exchanger, where it is evaporated again. The heat used

to evaporate then extracts the water from the air, which then flows into the heat exchanger. It is cooled here and can then be used to cool the room. The problem, says Wolf, is that even small machines with an output of just 15 kilowatts require a huge amount of electricity and temperatures of up to 100 degrees Celsius. It is also difficult to calibrate solar and cooling systems to each other. "It took a long time to get a grip on<sup>10</sup> the technology", Wolf says. The market for clean air-conditioning, by contrast, is enormous. The *International Energy Agency* (IEA) expects the demand for air-conditioning units in Europe to grow by more than 10 per cent by 2020 as a result of climate change. Solar-powered units could cover the need without increasing CO<sub>2</sub> emissions and could help to reduce the effect on the climate. At the same time it could reduce the midday spikes<sup>11</sup> in electricity use and stabilize the grid.

(Adapted from *BusinessWeek*)

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Take  
the Wheel  
Again  
New Edition



## GLOSSARY

- 8** very small
- 9** able to work successfully
- 10** to control
- 11** sudden large increase

## ACTIVITIES

**1** Answer the following questions.

- 1 To what extent are conventional air conditioners environmentally friendly?
- 2 What is Thermodyna?
- 3 What is Thermodyna going to manufacture?
- 4 What is the main function of the Schukey motor?
- 5 How does this 'green' air conditioner work?
- 6 Why does the *International Energy Agency* expect the demand for air-conditioning units in Europe to grow?

**2** Match a term in the first column with a term in the second column.

- |             |               |
|-------------|---------------|
| 1 Global    | A Panel       |
| 2 Household | B Air         |
| 3 Cool      | C Warming     |
| 4 Solar     | D Exchanger   |
| 5 Room      | E Unit        |
| 6 Heat      | F Temperature |