Solar, what else?!

Water heating in Israel means heating water with solar. Nine out of ten Israeli households take showers using solar energy. A 28-year-old building obligation for solar systems has made this possible. In this country special, *Sun & Wind Energy* reports on how a mass market works and why, despite this, there are hardly any solar systems at work in factories.

Israel can point to a long and successful solar history. The beginnings are associated with one name in particular: Harry Tabor. The physicist had emigrated from Great Britain just a few months after the state was set up in 1948. In the newly set up Research Council of Israel he was responsible among other things for bringing order to the system of measurements in the new country. Suggestions from the population kept landing on his desk on how the young country could advance technologically, including some on how the power of the sun could be harnessed.

Because he didn't know much about solar technology he began to read whatever literature he could find on the subject. Although there were already a few solar systems in Israel at the time, they delivered only poor results. Tabor looked into why their efficiency was so low. Then he had an idea and access to competent colleagues, who were able to turn it into an industrial process: a selective absorber layer of nickel-chrome. He and his team finished their development in time for the first World Congress on Applied Solar Energy in Arizona, USA, and were able to exhibit there. And the year... 1955!

Solar locations in Israel: The map shows the four major collector manufacturers, two PV system suppliers and the most important solar research institutes.

Figure: Eilers-Media

The solar systems on these pretty houses in Shimshit near Nazareth are different from many others in Israel: The collectors are mounted directly on the roof.

Photos (4): Joachim Berner

The El Ad project by Chromagen includes seven buildings. On each of them collectors supply 21 individual spiral storage tanks with hot water. *Photo: Chromagen*

Solar collectors also heat the shower water in high-rises. Architects like to hide them behind a skirting wall.

Photo: Amcor

View on Haifa: In Israel solar systems dominate the townscape.

Israel is one of solar's top duo

Today the sale of solar systems in Israel is a bulk market in which the replacement of old, clapped-out solar water heaters by far exceeds the annual new installation rate. Last year approx. 18,000 solar systems were installed on new buildings and 130,000 existing systems were replaced. At 498 W_{th} cumulative installed collector power per 1,000 inhabitants, the country was ranked second in the collector statistics of the International Energy Agency (IEA) in 2005, behind Cyprus on 657 W_{th}. In third, fourth and fifth places come Austria with 205 W_{th}, Barbados with 200 W_{th} and Greece with 192 W_{th}. Solar heating makes up 3 % of primary energy consumption in Israel. According to government figures this saves Israel 8 % of its electricity consumption.

But back to the history: In the years following Tabor's development a small solar market developed in Israel, for the country provides the best of conditions. In the south of the country the sun shines for 360 days a year, and in the north for 300. A building obligation for solar systems brought the breakthrough in 1980. Since then the hot water in all new private dwellings, hotels, old people's homes and boarding schools with fewer than nine storeys must be generated using solar energy. Even though new building activity has slowed down considerably in the last few years, and in comparison with the height of the wave of immigration from Russia in the nineties by more than two-thirds, the replacement market alone guarantees the Israeli solar suppliers with a stable sales volume of approx. 245 MW_{th} (350,000 m^2 of collector area).

Solar systems in Jaffa, the ancient port city located south of Tel Aviv on the Mediterranean. Today Jaffa is a neighbourhood of the city.

Solar Obligation in Israel

The obligation applies to all new buildings, except those used for industrial or trade purposes or as a hospital, and those higher than 27 metres. The required daily heat output of the solar system differs according to the use of the building and on the kind of solar system installed.

- The storage tank capacity must be according to the regulation:
- For residential units of one room at least 60 litres
- For residential units with two or three rooms at least 120 litres
- For residential units with four or more rooms at least 150 litres
- The system must provide 172 kJ/day for each litre of storage tank volume for open loop systems and 192 KJ for closed loop systems.
- For hotels, guest houses, elderly homes, boarding schools and similar, the obligation is defined in terms of daily solar output per litre of hot water consumption: 126 kJ for open and 142 kJ for closed loop systems.

Source: ESTIF

Solar systems are a mass-market product

For Israelis it goes without saying that their hot water comes from solar energy. It is so natural that nobody thinks much about it. If the system doesn't work any more, which given the sometimes very cheap and poor quality thermosiphon systems available can happen after just a few years, they just promptly buy a new one. They pick a trader or installer from the Yellow Pages, and these can usually supply and install products from various Israeli manufacturers. Larger businesses stock two or three suppliers, smaller businesses often stock even more than this. Brand loyalty, as can be found in some parts of Europe, is virtually unheard of in Israel. The largest collector manufacturer in Israel, Chromagen of Sha'ar Ha'amakim in the north of Israel, has confirmed this in a survey of end customers: »Since we are a solar country and a purchase mostly takes place when a crises arises – 'no hot water in the shower' – only 37 % of the clients recall a name without help,« explains Chromagen marketing expert Rakefet Shimon, talking of the results from the unaided recall test.

What counts in the purchasing decision is the price. The system must be cheap. Families can buy a typical thermosiphon system with 2.5 m^2 of collector area and a 150 litre tank for 2,000 Israeli New Shekel ILS (360 €). For this price they get the very simplest of systems: a metal absorber with metal tubes squeezed into place, coated with solar paint and covered with plain glass. Systems with ultrasonic-welded copper absorbers, tempered glass and a selective coating, usually of black chrome, cost around 3,500 ILS (625 €). Because solar hot water generation is cheap, most consumers don't change the type of energy carrier when they replace their old solar system. »The solar market in Israel behaves like every other market. Some clients want the cheapest system, some a well-known one and some the best quality,« says Shimon Geva, export manager at Amcor Solar Energies of Ashdod.

In a mass market the price is decisive

In order to protect the consumer from bad quality, the state introduced norms for collectors and storage tanks, as well as a compulsory guarantee period of five years. Systems which do not meet these standards may not be manufactured or sold in Israel, nor imported into it. 93 solar collectors from twelve Israeli manufacturers currently meet the requirements. However, systems which haven't been checked are still available on the market.

The low-cost suppliers are a thorn in the side to Eli Shilton. »Our problem: There is no control in the replacement market. We are competing in an unfair competition. There are so many small companies without certification,« says the solar expert, who has been head of the solar system manufacturer Rand Solar Water Heating Systems in Petach-Tiqva for 15 years. He estimates that a third of all collectors in the replacement market come from such companies. For this reason, Rand used to only do business with building contractors. Because the new-build sector collapsed in the mid-nineties,

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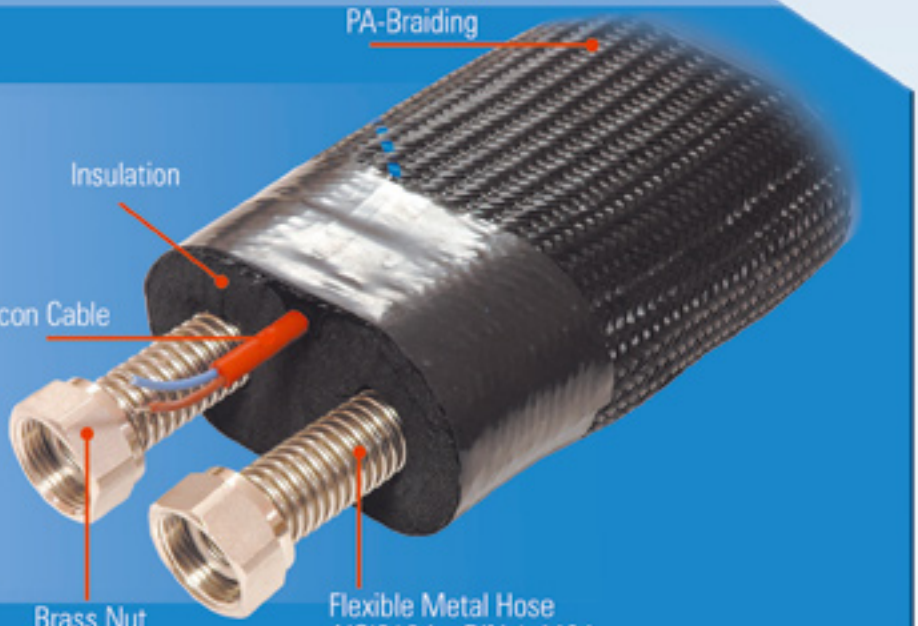

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To prevent the thermosiphon system from spoiling the visual characteristics of the building, it is hidden behind a three-sided wall.

Photo: Chromagen

Even though it doesn't look like it, this system in Jerusalem is still working.

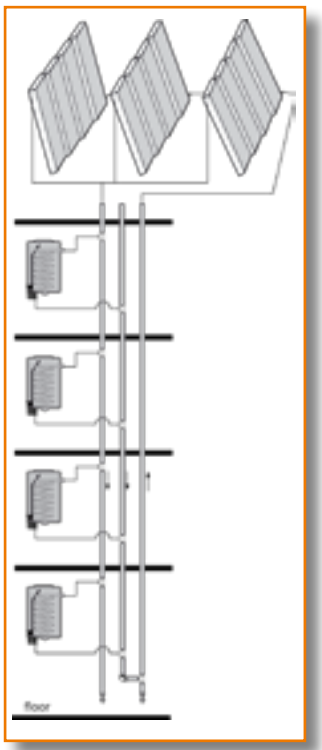
Rand also entered the private market. »Now you can't live without it.«

Chromagen has reacted to the intensified price by increasing its marketing activities. The company wishes to establish its products as a brand name and thus improve product recognition. It has come up with a catchphrase (»Catch the sun power«), has its advertising on buses and has taken up advertising on a popular television sports channel. »Once you have decided to have a brand, you need marketing actions,« explains Rakefet Shimon. »We are looking for high quality and are working on high and severe standards. Maybe we are the most expensive, but we deliver best quality.« In order to underline this quality claim Chromagen provides an eight-year guarantee on its products. Additionally the company has brought a new premium system onto the market with the distinctive name »High-tech«. The system is the Porsche among solar systems and comes at a price: 7.200 ILS (1,285 €).

Special system concept for apartment blocks

In apartment blocks with fewer than four storeys each family usually has its own open-loop thermosiphon system. Accordingly, things can look pretty chaotic on Israeli roofs. In the system tanks there is always an electric heating element for colder, cloudy days. Normally the collectors provide 80 % of the annual hot water requirement. In higher buildings, forced close-loop collector systems provide the energy for heating water in the apartments. Each family has its own polyurethane-insulated storage tank with an in-built heat exchanger.

So that the solar system delivers the same amount of energy to each apartment, whether it be on the tenth or the first floor, the pipes are laid in a particular way. The hot water from the collectors flows through a first set of pipes to every floor and through the heat exchangers in the tanks. The cooled water from the heat exchangers flows into a second set of pipes, not straight back to the collectors, however, but first down to the lowest floor. It is from there that a third set of pipes takes the water back to the solar collectors. The water from every heat exchanger must thus travel the same distance. This concept is called a reverse return system and delivers the heat evenly to the individual tanks. It prevents the first tank in the system on the top floor from getting more hot water than the others.



Schema of a solar hot water heating system in an apartment block: This so called reverse return system which three pipes delivers the heat evenly to the individual tanks.

Figure: Nimrod

Companies such as Amcor, Chromagen and Rand have employees who have specialised in the planning of such systems. »This is an added value of our company. As a small company we can't compete in prices but in engineering. This is our service,« explains Shilton from Rand, for example. There is also not much competition in this sector because only the good companies are active in it. Amcor automatically does business in the new-build sector directly as a result of its company allegiance. For some years now the company has belonged to the Ashtrom Group Ltd., one of Israel's largest construction companies.

Energy experts call for an expansion of the solar ordinance

Despite its success, the solar ordinance has had its disadvantages: It has limited the solar market mainly to private dwellings. »There is no reference in the law to the industrial sector, which consumes process heat for producing hot water or steam,« explains Gershon Grossman, head of the Energy Engineering Research Centre at the Israel Institute of Technology (Technion) in Haifa. At the end of January 2007 experts at an energy forum at Technion thus formulated some recommendations for the government. Among others they call for the enforcement of the construction and planning regulation by the local or national planning committees as in the domestic sector. The catalogue of recommendations also says: »It is clear now that it is possible to use this technology at buildings taller than nine floors. Therefore, the government has to consider the application of the regulation to such buildings as well.« They also initiated a national study in order to identify the potential of applying solar heat systems in the business and industrial sectors.

But still: The building obligation has provided Israel with a successful home market and thus the base for a strong home industry, one which is now starting to present its products abroad at exhibitions and fairs, like Tabor for instance. ✹

Joachim Berner

Joachim Berner is a long term *S&WE* author based in Munich, southern Germany. He is a specialist in solar thermal and biomass.

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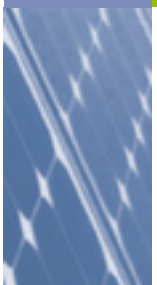

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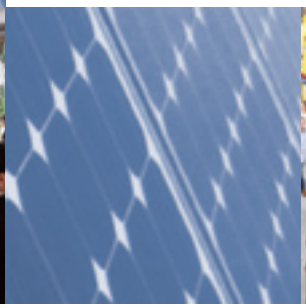

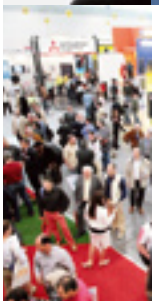

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The big four

Amcor Solar Energies, Chromagen, Nimrod Industries and Rand Solar Water Heating Systems are among the best-established collector manufacturers in Israel. Following on behind the market leader Chromagen, the other suppliers are now also increasing their export activities.

One way in which solar collectors can be architecturally integrated into apartment blocks. *Photos (3): Amcor*

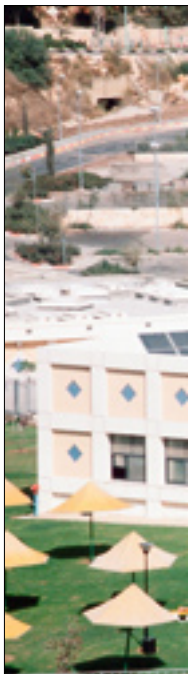
Amcor: backed by a construction company

Amcor Solar Energies shows that the Israeli manufacturer has long since started doing business in exports. Already in 2003 the company supplied 77 collectors for a Spanish swimming bath. To this end it provides a wide range of products. For example, Amcor manufactures solar collectors with ultrasonic-welded copper absorbers, coated either with solar paint or black chrome. The collector size ranges between 1.4 and 3.8 m^2. Amcor makes its collectors with either aluminium or painted galvanised steel section housings. Polyurethane foam provides the necessary insulation, and toughened glass sufficient transmission. The solar tank volume ranges between 80 and 300 litres and the electrical tank volume ranges between 15 and 200 litres. All products are certified to European standards.

The company has many years of experience with solar technology. It began doing business with solar energy 45 years ago and seven years ago it was taken over by Ashtrom Group Ltd., one of Israel's largest corporations. Amcor exports mainly to Italy, Greece, Spain, the U.S. and Eastern Europe. »Usually we sell under our name but OEM is also possible,« says export manager Shimon Geva on their export strategy. *www.amcor-solar.co.il*

Yossi Solomin (left) is responsible for quality and makes sure production standards are high in the new Chromagen collector factory in Ziporit near Nazareth (photo on the left). Micky Carmel is a development engineer responsible for product design. Both live in Kibbutz Sha'ar Ha'amakim. *Photos (8): Joachim Berner*

Solar heating for bathers (photos on the right): Chromagen employee Reuben Noga (second from left) and Eraz Bar (second from right) talking about solar system technology with Haim Azulai (right), owner of the swimming baths in Nazareth-Illit, and its caretaker Slomo David.



Like other large Israeli solar thermal manufacturers, Amcor also manufactures solar storage alongside solar collectors.

Absorber manufacturing: An Amcor employee solders an absorber tube.

Chromagen: from local to international player

Chromagen is now not only one of Israel's but also one of the world's largest companies in the solar thermal sector and exports to more than 35 countries, according to its own figures. The company was founded in 1962 by Kibbutz Sha'ar Ha'amakim and already has several spectacular reference systems abroad. In 2002 it supplied collectors for a hotel on the Greek island of Crete. At 1.75 MW_{th} (2,500 m^2 collector area) it is one of the largest solar systems in Europe. 30 collectors from northern Israel also adorn Greece's first energy-self-sufficient building in Athens.

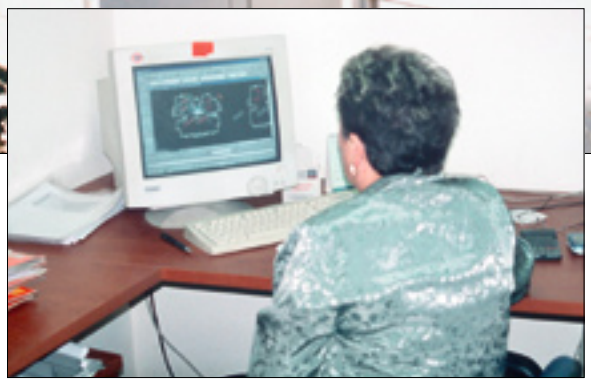
Chromagen has just recently presented a thermosiphon system specially developed for the south of Europe. The closed loop system »Chromagen 300« has a much more attractive design than is normal in Israel and the transversally mounted storage tank contains a double-jacket heat exchanger. »Our strategy is to develop from commodity products perspective to designed systems and next year to solutions«, explains Chromagen's CEO Haggai Shefer on the Israeli market leader's future company strategy. By this he means that Chromagen is to provide systems designed for domestic use as well as more complex central systems for commercial applications. Chromagen is thus aligning its systems technology with European system concepts. An Israeli investment fund has supplied the necessary capital for this expansion strategy, and has taken up a 26 % share in the company. *www.chromagen.biz*

Rand: success with planning know-how

»We are maybe the fourth largest manufacturer in Israel, but in exports we are the number two,« says Eli Shilton on the importance of Rand Solar Water Heating Systems, a subsidiary of Israel's leading gas provider Amisragas. Shilton ran the solar manufacturing business for 15 years. He recently handed the running of the company over to the younger Efi Luzon and founded his own company Elsol Solar Energy Systems, an engineering and marketing company specialised in solar technology. But he still visits the Rand building in Petach-Tiqva on a weekly basis. He is responsible for exports at the company, which was founded in 1947 as a manufacturer of household goods.

Apart from the products, Shilton also praises the engineering know-how of the company. As at home, in exports his eye is on projects. »We don't go to installers when we export, because there is competition without benefit.« The solar specialist prefers to supply to projects, such as this year to the solar system with 224 kW (320 m^2), installed at the Aparthotel El Duque near Tenerife. *www.rand.co.il*

At the Netanya boarding school Rand has installed 120 thermosiphon systems on various buildings. They deliver their energy to several large tanks.



Large solar thermal manufacturers such as Rand employ their own staff to plan large solar systems for construction companies.

Expansion plans: Export manager Mario Waisman wants to make Nimrod solar systems known internationally.

Nimrod: a traditional family-run business

Nimrod Industries has also been active abroad recently, mostly in Europe, Australia and Central America. »We decided to build up our international business two years ago,« says export manager Mario Waisman. In the coming year he wants to present his products at a foreign fair for the first time, »when we are done with certification«. The family-run business was founded in 1967 and mainly does business in Israel with private customers. Waisman self-confidently announces the expansion thus: »We can do it at the same level of quality, but we can do it cheaper.« Nimrod has made significant investments for improving the production procedures and technologies for manufacturing its products. An advanced process for cleaning the tanks and applying an internal enamel coating is one of them.

As is the case with other international Israeli manufacturers, the tanks are also equipped with an electric heating element, surrounded by a fast-heating sleeve. When hot water is required on days without sufficient hours of sunshine, the heating element is normally switched on. The heat accelerator, fitted as a sleeve around the electric heating element, quickly heats up a small amount of water for immediate use.

www.nimrod-solar.com

One tank per apartment: Eli Shilton from Rand explains the system technology of solar systems in high-rises.

Finishing work: Rand employees sticking signets onto solar tanks

Tel Aviv: Collectors don't have to get in the way even on artistically decorated buildings.
Photo: Joachim Berner

»We have had a break«

The success of solar heating technology in Israel can overshadow the fact that the country hardly uses other forms of renewable energy. This is not due to a lack of research efforts by the universities, explains Abraham Kribus, professor at the Faculty of Engineering at Tel Aviv University and president of the Israeli section of the ISES, during a discussion with *Sun & Wind Energy*.

S&WE: *How would you describe the situation of renewable energy research in Israel?*
Kribus: For almost 20 years the level of research activity was very strong, except for the solar water heaters, which are already an established technology. For all the other aspects like electricity production by photovoltaics or solar thermal power plants there was some research in academic institutions, but there was very little funding from the government and there was almost no industrial activity. In the last two years we have had research, people are becoming interested again.

S&WE: *Why?*
Kribus: The reason is that the interest is worldwide. So people are noticing that this is the new area where you can make money. It started with entrepreneurs and academic researchers who are trying always to break the glass ceilings and start something. But in the last two years there has also been a lot of interest from the people with money and from the government. This is the real difference.

S&WE: *So now the state gives money?*
Kribus: The government does not yet give a lot of money. But there are starting to talk about it. This is the change. This is a situation like in the United States two or three years ago when they just started to notice and then maybe one year later big investments began. Even the federal government, which was opposed to renewable energy, is now giving some incentives. So it takes time for the government to really do something. But if they are talking about it, that's already a big change.

S&WE: *You talk of a new start. In which fields of renewable energy?*
Kribus: The leading field in Israel is research in solar energy. And maybe a second one is on biomass. In solar energy usually most people work on concentrating solar power technologies and on photovoltaic concentrator systems. In both areas there are very strong research groups. We have a big solar tower at the Weizmann institute, the international center of scientific research in Rehovot. There are also several concentrating technologies that are using a very large dish at the Ben Gurion National Solar Energy Centre.

»In terms of solar energy technology we have been leaders in the world since the 1950's«

S&WE: *Israel is today famous for high-tech applications. Are you confident that in the future it will also be famous for clean-tech?*

Kribus: In terms of solar energy technology we have been leaders in the world since the 1950's. The revolution of the water heaters started in Israel because the selective coating was developed here by Harry Tabor. He was one of the founders of ISES. He worked in the National Institute of Physics in Jerusalem. The first company to build large solar power plants in California was also an Israeli company, Luz. The technology was developed here, actually it started at the same laboratory in Jerusalem. So far these are the biggest solar power plants in the world. So this is also an Israeli technology.

S&WE: *So, Israel has just been taking a break?*

Kribus: Yes, we've had a break, because of let's say loss of interest from the government and from the industrial community. But we still have a good infrastructure of research and academic institutions. It will be very easy for the Israeli community to regain its position in the leadership. *It would be nice if we would have the same kind of i*nstitutional support like you have in Europe. We have to work on that.

S&WE: *Solar thermal technology is widespread in Israel. But it is focussed on solar hot water in private households. What is the situation for solar thermal use for process heat or solar cooling?*

Kribus: There are many industrial consumers that consume a lot of heat and they burn some kind of fuel, heavy fuel oil or whatever. They could have the same kind of heat from solar collectors. In Israel this is a topic of debate that we always raise and there is never a solution, because it's not a technological problem, it's a tax problem, an administrative problem. It turns out that if an industrialist buys oil and burns it to get the heat he will get a tax credit as an expense for this cost of the fuel. But if he installs a solar collector he gets nothing. So actually this is more expensive for him.

S&WE: *What about solar air conditioning?*

Kribus: There have been many studies, in Europe and in other places that show that if you have solar thermal collectors that are feeding an absorption machine the cost of a kWh of cooling is not competitive against conventional cooling. So at the moment there are no applications. There is some hope at least from my perspective because of some work that we have done. It is at the moment still theoretical but I think it offers a great opportunity. The idea is to collect the heat which is generated by concentrating photovoltaic systems and to use it as a by-product for desalination or absorption cooling.

The cost of the heat is nothing or almost nothing, because you build the system in order to make electricity. We made a complete analysis of how much energy can be produced and what the costs would be. It seems that it is much more competitive than the conventional approach to solar air conditioning or solar desalination. But this is on paper. When you start building something it's a different story.

Abraham Kribus, professor at the Faculty of Engineering at Tel Aviv University and president of the Israeli section of the ISES

Photo: Joachim Berner

Research of PV concentrator systems in Tel Aviv

Professor Abraham Kribus at the University in Tel Aviv is developing photovoltaic concentrator systems using advanced cells with very high efficiency (multiple junction cells). His special approach: The system has one single large concentrator, like a dish, and in its focus there are many cells side by side. Alternatively concentrator systems can consist of many units of a reflector and a single cell in front of it. The advantage of Kribus' approach: There is only one compact place with cells where all the questions of electricity and heat removal need to be dealt with. So this makes the realisation of an active cooling system for the cells easier, and the heat collected from the active cooling system can be used for additional energy products such as air conditioning. On the other hand, the advantage of the individual cell approach is that you have a small module that is repeated in large quantities, meaning you can have mass production and reduce the costs. But both systems are being developed and the market will say who the winner will be.

Three years ago the professor established a start-up company, Distributed Solar Power, to develop this technology. Kribus expects that in about one year a few of these systems will be manufactured, installed and tested. The company plans to have a demonstration system in Israel. In the European sixth framework programme two demonstration systems, one in Italy and one in Spain, should be installed within the next two years.

Further information: *www.disp.co.il*

S&WE: *What about the use of other renewable energies in Israel?*

Kribus: Israel is a dry country. There is one hydropower facility on the Jordan river that has 300 kW. This is all the hydro potential of Israel. There is some potential for wind, not so much, but there are some sites that have reasonable wind in the north. Another source is biomass. We have a lot of agriculture in different areas. You know in the area of biomass there is a big controversy that is saying if we use biomass for fuel this raises the cost of food and creates a lot of problems. One of the approaches that started in Israel is to have plants that grow in areas that cannot be used for food. If you grow some plant in the desert, one that does not require good water, maybe brackish water, this is a reasonable application. So there are some research groups that are developing plants of this kind. ✹

This Interview was conducted by Joachim Berner.

More sunshine for electricity

Israel has so far hardly used the power of the sun in order to generate electricity. New feed-in regulations and an international tendering for solar power stations in the Negev Desert will improve this situation in the future. Politicians are also beginning to recognise the potential and opportunities from solar-generated electricity.

Historic places like the Temple Mount in Jerusalem are spoiled with sunshine but this energy is not yet used to produce electricity.
Photo: Joachim Berner

In the field of hot water generation the solar age began in Israel decades ago, but for electricity generation it is still being planned. While the country plays a leading role internationally in solar heating, in solar electricity generation it is lagging behind. Despite the enormous potential, photovoltaic systems with a total power of just 1.3 MW_p have so far been installed, of which a mere 25 kW_p are grid-tied. The largest array is in the Negev Desert and has only 6 kW_p. And yet the sun could help to reduce the country's energy dependence. Israel has to import 93 % of its primary energy demand in the form of oil, write the authors Amit Mor and Shimon Seroussi from the Israeli consultancy Eco Energy Ltd. in a current report on the state of renewable energies in Israel. »Since its pioneering efforts to develop rooftop solar water heating, Israel has done little to develop a renewable energy industry that can substantially reduce that energy dependency,« they conclude.

Photovoltaic companies thus find things tough in Israel. With its seven employees, Solarpower Ltd. from Netanya counts as the biggest PV company in the country. It shares the market mainly with Interdan Ltd. from Haifa. Both companies plan and install PV systems (see map on page 97). There are no manufacturers of photovoltaic components in Israel. The country does have a lot of scientific know-how, however. »But many promising renewable energy developments have remained at the research stage because of the lack of resources and policy coordination necessary simply to make the initial assessment of their commercial viability,« complain the Eco Energy employees in their report.

Lots of research, little application

The analysts give further reasons for the so far cautious use of renewable energies other than low-temperature solar heating. For one, the Ministry of National Infrastructures, which has primary responsibility for energy policy, has not developed comprehensive implementation plans for renewable energies. Additionally, the research centres have had to deal with extremely low levels of public investment in research and development. The Ministry of National Infrastructures provided 300,000 Israeli New Shekels ILS (53,000 €) for PV related research during 2006. Much of the research and training is funded by universities such as Ben-Gurion University in Beersheba and the Weizmann Institute in Rechovot. Furthermore, the Israel Electric Corporation (IEC) has stymied PV growth by creating formidable procedural roadblocks for photovoltaics to obtain the required authorisations to interconnect with IEC's grid. The International Energy Agency (IEA) completes the description of the thus-far bleak situation: »There were no key PV policy initiatives, promotional activities (commercial and non-commercial) or any other market drivers of significance in 2006 which affected the market.«

But the frameworks for the generation of solar electricity are improving. The Israel Public Utility Authority (PUA) issued guidelines and regulations in August 2006 providing premium payments to private electricity producers using renewable technologies. Tariffs of 0.70 and 0.876 ILS/kWh (0.12 and 0.16 €/kWh) were established for installations according to two size ranges: from 100 kW_p to 20 MW_p and above 20 MW_p. Smaller systems (under 100 kW_p) have since then also been taken into consideration. »In June 2007, the minister of national infrastructures announced a policy change regarding small installations for own-use, with transfer of surplus to the grid. This change was a result of lobbying in favour of facilitating private users' connection to the grid, and is expected therefore to have a great effect on the future of this market,« reports the IEA. The minister declared that he wishes to promote installation of about 50 MW_p over a period of five years. The PUA has therefore been instructed to establish the mechanism and tariffs, and it has set a target to complete this by the end of 2007. The PUA has already prepared a draft proposal, and made it available to the public for review and response. »The expected feed-in tariff for systems smaller than 50 kW_p is 2 ILS/kWh (0.36 €/kWh) for 20 years,« says Solarpower's general manager Alon Tamari.

The state provides financial help for start-ups

At the end of October, the director general of the Ministry of National Infrastructures announced during the environmental fair WATEC that Israel aims to be generating 5 % of its electricity from renewable sources within the next seven years. By 2020 this is to reach 10 %. It is an ambitious target, as energy experts such as company and government consultant Amnon Samid from AGS Technologies Ltd. assume that the country will have to double its electricity generating capacity to 20,000 MW in the coming years in order to be able to meet the growing demand. Solar thermal power stations are also to play a part here. In September the Israeli government approved the Ministry of National Infrastructures' plan to build two or three solar power stations with a total capacity of 250 MWp in the northern Negev Desert. A tender, expected in the first half of 2008, will invite local and international solar power technology companies as well as integrators to submit proposals. »In spite of the early intention to open the tender only for trough technology, which is the only mature and proven technology for commercial applications, it has now been decided to also invite all other technologies, including power towers, parabolic trough, parabolic dish and concentrating photovoltaics,« explains Samid. He hopes that the winners can be announced at the end of 2008 and that the power stations will be providing electricity as of 2012.

One of the market leaders in the parabolic trough technology, Solel, actually comes from the country, too. Solel is providing the key technology for new solar power plants currently under construction in the U.S. and in Spain. It now owns most of the assets of Luz Industries that built three of the world's largest solar power plants in the Mojave Desert in South California at the end of 1980s. »We have the capability to become a world leader as a renewable energy technologies provider,« says Samid confidently. The state wants to help the industrial base by providing financial help to start-ups. In April 2007, the Israel Ministry of National Infrastructures announced its new preseed funds »Startergy« for support of start-ups in the field of clean energy. It is part of a new policy approach announced by the minister regarding all renewable energies, photovoltaics included. Three of the seven companies which are benefiting from the bridge funding scheme are involved with photovoltaics or solar thermal power plants. ✷

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Further information:
AGS Technologies Ltd.: *www.cleanenergy.co.il*
Ben-Gurion National Solar Energy Center: *cmsprod.bgu.ac.il*
Eco Energy Ltd.: *www.ecoenergy.co.il*
Interdan Ltd.: *www.interdan.com/english.asp*
International Solar Energy Society – Israeli Section: *www2.technion.ac.il/~ises*
Israel Electric Corporation (IEC): *www.israel-electric.co.il*
Israel Public Utility Authority (PUA): *www.pua.gov.il*
Ministry of National Infrastructures: *www.mni.gov.il/mni/en-US*
Solarpower Ltd.: *www.solarpower.co.il*
Weizmann Institute: *www.weizmann.ac.il*