

# SOLARCAP -A FRONT RUNNER FOR RENEWABLE ENERGY HEATING



[www.solarcap.dk](http://www.solarcap.dk)

SolarCAP is a front runner in delivering solar systems of all scales and sizes – ranging from residential systems to large-scale systems catering to industrial needs, district heating/CHP systems, housing construction, swimming baths, hotels, etc.

Since 2002 it has been SolarCAP's vision to become the leading provider of sustainable energy solutions focusing on thermal solar energy – while at the same time making thermal solar energy the most environmentally sound and cost-effective source of energy.

SolarCAP is among the market leaders in Europe, with subsidiaries in sales and production in a number of countries inside and outside Europe. The SolarCAP Group employs about 1,000 staff.

With a motivated and qualified team we are servicing our customers as a Full-Service Solar System Supplier, and we are today the largest international supplier of thermal solar systems and components on all important markets.

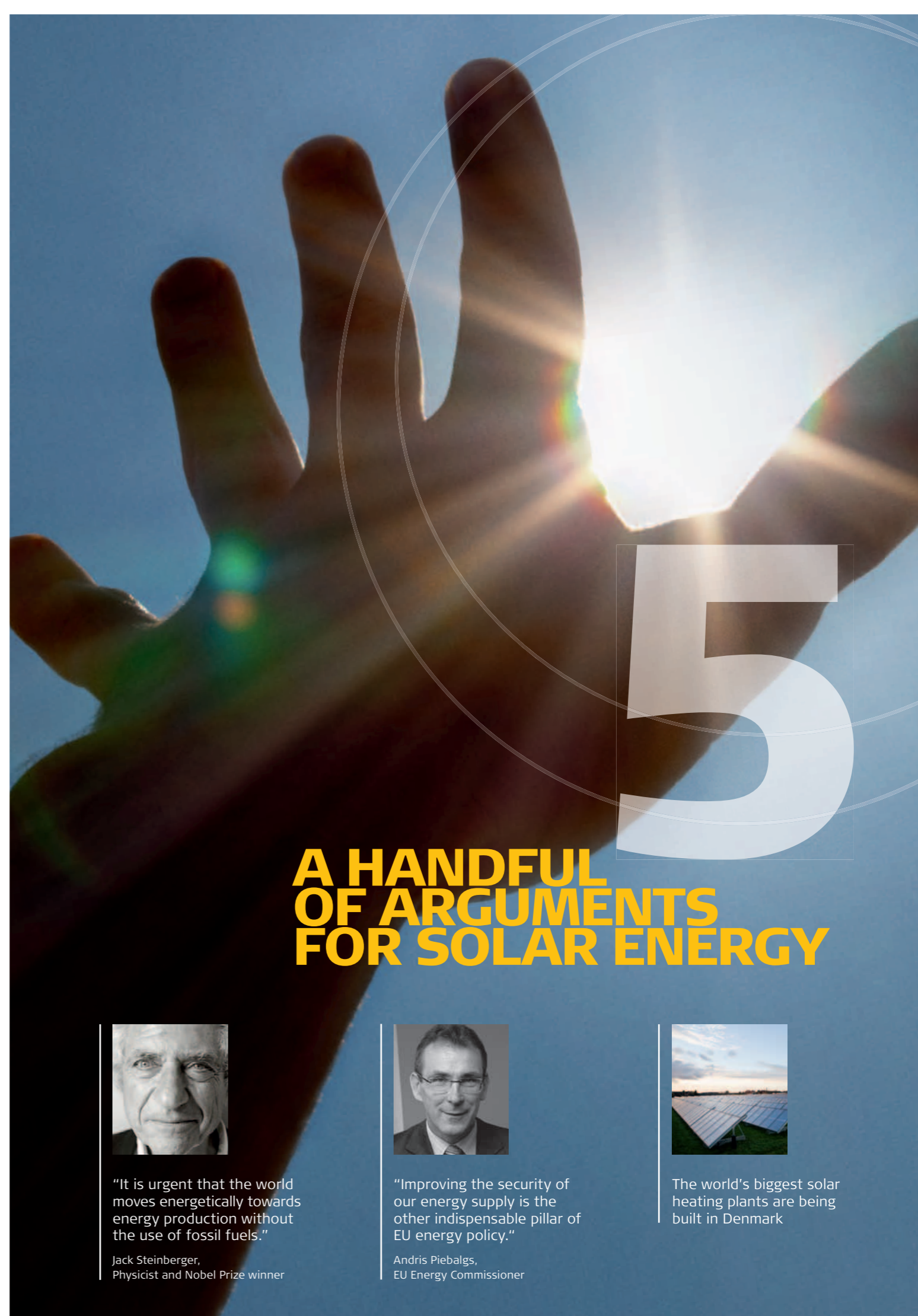
SolarCAP has a number of independent brands, the best known of which in Europe are SONNENKRAFT, ARCON, pro solar and isisun.

Read more about solar technology on [www.solarcap.dk](http://www.solarcap.dk)

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SolarCAP is the operative holding company of the VKR Group's business area 'thermal solar energy' which consists of the following companies: General Solar Systems (of which SONNENKRAFT, pro solar and Isisun are the most important brands), GREENoneTEC Solarindustrie, EMMVEE Solar Systems, ARCON Solvarme and Heliodyne Corporation. These companies develop, manufacture and market thermal solar energy systems.



## A HANDFUL OF ARGUMENTS FOR SOLAR ENERGY



"It is urgent that the world moves energetically towards energy production without the use of fossil fuels."

Jack Steinberger,  
Physicist and Nobel Prize winner



"Improving the security of our energy supply is the other indispensable pillar of EU energy policy."

Andris Piebalgs,  
EU Energy Commissioner



The world's biggest solar heating plants are being built in Denmark

# WHY

## SOLAR ENERGY?

### Five good reasons to seize the potential

Solar energy has grown into one of the 21<sup>st</sup> century's most promising and accessible technologies. Pioneered by strongminded inventors and engineers in the 70s and 80s, such as Italian professor Giovanni Francia and German scientist Adolf Goetzberger, solar energy has become a serious contender, creating increasingly competitive solutions for usable thermal energy and photovoltaic power generation.

Focusing on thermal solar energy production, figures from the REN21 Renewables Global Status Report 2009 show that from 2006 to 2008 global hot water capacity grew from 105 to 145 GWth. In Germany alone, solar hot water set record for growth in 2008, with over 200,000 systems installed. REN21 chairman, Mohamed El-Ashry, stated during the presentation, "There is much in the report for optimism."

**20% reduction is achievable today**  
The reason for this positive trend derives from the fact that solar energy has five easily conceivable advantages: Sunlight is a pure source of energy and there is more than enough to cover our needs. The technology is simple and strong. The potential is immense and – perhaps most importantly – the resource is free to anyone, leaving market trends and national interests behind.

Furthermore, leaders in the solar energy industry emphasise that merely using existing technology could solve our immediate energy challenges. In other words, applying today's solar technology for EU's heating and hot water production in the private households would make the 2020 goal of 20% renewable energy production reachable – a crucial point, when discussing the investment strategy for renewable energy technologies of the future.

## 1 FREE, UNLIMITED RESOURCES

Just 0.01% of the sun's radiation will cover the entire world's energy consumption needs.

## 2 A PURE, NATURAL ENERGY SOURCE

A solar application works without a sound or a smell - and is virtually unnoticeable on a horizontal field or integrated in a house roof.

## 3 FIXED, PREDICTABLE ENERGY PRICES

The energy price is affected only by system installation and maintenance costs - and the payback time is considerably shorter than the lifetime of the system.

## 4 SIMPLE, FLEXIBLE, WELL-PROVEN TECHNOLOGY

The use of strong and clear-cut technology makes today's thermal solar applications a safe and durable energy solution for single homes as well as entire communities.

## 5 INEVITABLE FOR THE FUTURE

Today less than 1% of the world's energy consumption comes from solar energy. The huge potential makes solar energy a central part of meeting EU's reduction target of 20% by the year 2020 and further ahead.

# HERE COMES THE SUN

## THE WORLD'S BIGGEST ENERGY RESOURCE HAS MORE THAN ENOUGH

In the public mind, solar energy has for many years been associated with niche applications and people with a strong environmental agenda. The truth is, for centuries the sun has been the focal point for scientists in search of energy, as it undeniably represents the ultimate supplier.

Each moment the sun transmits energy equivalent to 1,370 watts per square meter towards the Earth. Although only about 40% of this reaches the Earth's surface, it is still the biggest power socket you'll find this side of Alpha Centauri. Of course the energy mass is relative to the geographic location, season and the sun's current distance to Earth, but as the Research Professor Richard Perez from the University of

Albany in New York (US) once noted, even a modest sized, northern, and sometimes cloudy country such as Denmark receives a total of nearly 5 terawatts of solar energy every year.<sup>1</sup> And that is one third of the entire planet's energy consumption.

**A democratic technology**  
There are several ways to exploit sunlight. Solar energy can be utilised for electric power production via a photovoltaic (PV) process or through concentrated solar power (CSP) that uses hot water to drive a turbine. While PV is still a fairly expensive way to generate energy because of the need for silicon, CSP plants are showing promising results. Last but not least, thermal solar energy (direct water

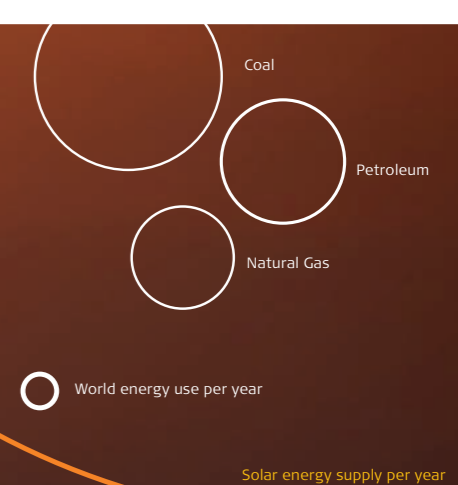
heating by means of a heat absorber) is the most widespread and proven technology. In 2008, thermal solar energy was the leading global renewable energy contributor for the third year in a row.<sup>2</sup> The low-tech approach to squeezing precious calories out of sunlight gives thermal solar energy a significant advantage. Basically, the combination of windowed panels, insulation, a heat absorber and heat-resistant fluid connected to a water tank for storage guarantees everyone a chance to hop on the bandwagon. This democratic quality has awoken a number of commentators, such as German-American physicist and Nobel Prize winner Jack Steinberger, to state an allegiance to the sun as the energy resource of the future.<sup>3</sup>

<sup>1</sup> Richard Perez, Making the Case for Solar Energy, Daylight & Architecture #9, 2008.

<sup>2</sup> Excl. hydro-electric power, REN21 Renewables Global Status Report 2009

<sup>3</sup> Solar power should replace wind energy, says Jack Steinberger, The Times (UK) May 8, 2009.

Illustration showing the world's total remaining reserves of fossil energy resources, compared to the annual world energy consumption<sup>1</sup>



In just three hours, the surface of the Earth receives an amount of solar energy equivalent to the annual world energy consumption



Jack Steinberger, Physicist and Nobel Prize winner

### Some like it hot

Jack Steinberger doesn't like to beat around the bush. When asked: - Is solar energy really the final answer to our energy problems? He answers: "I see no alternative." The former Nobel Prize winner in physics is quite clear about the cost of failing to reduce our dependency of fossil energy.

- Atmospheric CO<sub>2</sub> will (in 2030) have increased to 700 ppm from the preindustrial era's 280 ppm and the global temperature by perhaps 6° C. It will take many decades to change the world's energy production methods. It is urgent that the world moves energetically towards energy production without the use of fossil fuels, he says.

Earlier this year, Steinberger introduced his own vision for the future in a London talk, involving gigantic thermal solar farms in Sahara that, for a start, would distribute three to five gigawatts to two million households in Europe. The difficulties in keeping the desert energy flowing over long distances to the European continent don't make him waver.

- The long distance is clearly disagreeable, but the much better insulation in the desert, and the availability of land there, outweighs the disadvantages by more than a factor of ten, he says.

### 100% renewables

Jack Steinberger is purely a thermal solar believer, disregarding other technologies for being too ineffective. However, he does see some hurdles on the road ahead.

- Adequate technologies for solar energy concentration, thermal fluids, thermal stor-

age and long distance transmission are known, but it is also clear that the most economically advantageous methods have not yet crystallised. In my opinion, this could be accomplished in a few years, if the research were driven with appropriate vigour.

Regarding the goal of 20% renewable energy production in 2020, Jack Steinberger isn't too excited, because as he says "before long it will be 100%." He only finds the long range future interesting. A fair perspective, if you take into account that the remaining fossil resources are set to run out within the next 60 years.

### The desert sun is not necessary

Giant solar plants in North Africa could sound a bit far off, but the German-American physicist is backed up by his younger colleague, research professor in atmospheric science at the University at Albany, Richard Perez.



Research Professor Richard Perez Atmospheric Science Research Center University of Albany

- Not a bad idea because very little of the Sahara's surface would be required to produce all the energy needed by Europe - in all forms. However, few people realise that the solar energy directly collectable in Europe or any of the OECD countries is not that much less than that collectable in the Sahara per square metre, Perez says.

### A shift in technology and mindset

Also Richard Perez isn't too keen on the necessary electric transmission super highways that would have to be built between Europe and Sahara. He is much more for a decentralised energy network, where the energy is produced and consumed locally. He and Jack Steinberger however do agree that the sun is the future renewable energy source.

- All renewables are second and third order by-products of incoming solar energy. These by-products are generally easier and cheaper to exploit, at least initially. But if one looks at the available resources to tap into, one realises that solar energy is the only one big enough (by far) to carry the planet through the long haul, Perez says.

For the sun to be exploited in a future safe way, the New York professor says there must be improvements in technology as well as in the public mindset. On the technological side, Richard Perez calls for fully-developed electricity storage and load management technologies and, furthermore, a switch from fossil fuels to electricity for the majority of energy demand sectors, transportation in particular.

Also the public has to realise that the conventional energy costs incurred today are not reflective of their actual cost as they don't include fossil fuel depletion allowances and environmental footprint impact, particularly in terms of global warming.

### The only scalable long-term option

To Richard Perez, the most logical energy solution points to thermal solar technology, because, as he points out, "it is the only scalable long-term option we have, so we better get on it full speed, while the conventional energy situation is still more or less manageable." And when it comes to comparing thermal generation with that of photovoltaic, Richard Perez has his mind set.

- Thermal solar generation for hot water production will be preferable to PV because it is a direct conversion from solar to end-use with inherently higher efficiency. The current downsides - intermittency, seasonality and apparent cost - will likely be overcome by smart technological and socio-economic thinking. Otherwise when I look at solar, I see a quasi-unlimited application potential that will last us a long time, Perez says.

"We are the first generation that has had the power to destroy the planet. Ignoring that risk can only be described as reckless" Lord Nicholas Stern

# REDUCTION

## IS EUROPE READY FOR ACTION?

20% of the EU's energy consumption must come from renewable sources by 2020

In 2007 the European Council endorsed a mandatory target of a 20% share of energy from renewable sources in the EU's overall energy consumption by 2020. Due to the difference in starting points, renewable energy potential and the various energy mix of each member state, the endorsement was followed by mandatory national targets for each European country.

Thus the targets differ a great deal within the EU – from Sweden's 49% to Malta's rather modest 10%. However, while some question the rationality behind these disparities, the debate is ultimately overshadowed by the significance of laying down mandatory targets – a decision that will give the industry a clear future market scenario. In the words of the Directive: "The main purpose (...) is to provide certainty for investors and to encourage continuous development of technologies which generate energy from all types of renewable sources."<sup>1</sup>

Experts agree that such a market will have a massive economic effect. According to a joint report by Greenpeace and the European Renewable Energy Council (EREC), investing in a green energy scenario would in theory release an annual saving of fossil fuel costs by the year 2030 of up to USD 202 billion.<sup>2</sup>



Andris Piebalgs, EU Energy Commissioner, shares his thoughts on solar energy

**What is the EU's position regarding the use of thermal solar energy as a contributor to the 2020 goals of renewable energy sources?**

The new Directive on renewable energy gives Europe the challenging target of 20% of our energy coming from renewable energy sources by 2020. For the first time, renewable heating counts towards the targets. For this reason, I believe we will see a significant increase in the growth and deployment of solar thermal technologies; now that such energy counts towards the targets, Member States have more incentive to encourage these technologies.

**Solar industry leaders claim that by simply implementing existing thermal solar technology in buildings and private households, the goal of 20% renewables is reachable. What is your response to this claim?**

Obviously, we encourage the use of solar thermal technologies in buildings wherever appropriate, and when it's cost effective to do so. The technology has improved significantly over the years and it is already contributing to the share of renewable energy. We have a number of EU programmes assisting the deployment of solar thermal technologies, significant research and development, and studies monitoring the policy measures taken in Member States to support the technology. Analyses carried out on behalf of the Commission suggest that the prospects for solar thermal technologies are promising, with output expected to rise ten-fold by 2020.

**Households and buildings are the largest energy consumers within the EU and consume more than the transport and industry sector. Does this pattern call for extra focus in this area in terms of developing the sector's share of renewables?**

I believe the household and building sectors are certainly important, and Member States should explore these areas thoroughly to find the best ways to deploy renewables. (...) The Commission has undertaken a great deal of analyses to assist Member States in implementing the Directive. All stakeholders can refer to our reports, communications, studies and research projects on our website. (...)

I am also pleased to see that building codes are increasingly requiring the use of renewable energy in buildings. As solar thermal power can be one of the most cost effective renewable energy technologies around, this requirement offers a very strong incentive for the growth in the sector. In fact, under the new Directive Member States are required to take measures to increase the use of renewable energy in this sector, and to modify their building regulations and codes where appropriate. What started in Barcelona in 1999 is close to becoming common practice in countries, regions and municipalities around Europe.

**Is the commission considering improving market conditions for thermal solar applications within the EU in terms of liberalisation, uniform legislation and favourable taxation?**

Broadly speaking, the answer is yes. We know that the non-cost barriers to developing renewable energy, including solar thermal applications, are high; that improving the market conditions will help. This is why the commission proposed, and Member States and Parliament accepted, a range of reforms in the new Directive, such as standardising and ensuring mutual recognition of product certification regimes and guarding against discriminatory practices. The Directive also covers installer qualification regimes and the provision of information to consumers – all important aspects of the market conditions for renewable energy applications. The taxation of solar thermal products is another area where more could be done, but this is more easily achieved at national, rather than European, level.

**Existing fossil energy reserves are concentrated in a very few countries outside the EU. In what way does the EU consider renewables a strategic tool towards securing an energy supply for European consumers and industries?**

During my mandate as Commissioner in charge of the Energy portfolio, I have had the responsibility to represent the EU in some extremely critical moments, including the two main Russia-Ukraine gas crises and the disruption of energy supplies to the EU Member States. I am thus completely convinced of the strategic value in having security of our energy supply at the centre of European energy policy. We certainly support renewable energy development because it reduces our emissions and helps generate jobs and economic growth; but improving the security of our energy supply is the other indispensable pillar of the EU's energy policy. Diversification – in terms of energy sources, technologies, trading partners and locations – helps to reduce the risk of supply shocks to our energy systems and excessive market volatility. Renewables are therefore very much a strategic tool of European energy policy.

## The solution remains inside our homes and office buildings

When talking about emissions and overcoming the global climate change, much focus has been on heavy industry and the transport sector.

The truth is, energy consumption in private households and office buildings is a growing factor that exceeds the energy needs of cars, airplanes and factories. According to the EU statistical pocket book (2009) on energy and transport, households and services took up 38.7% of 2006's final energy consumption, whereas transportation only accounted for 27.5% and industry 31.4%.

**Cutting consumption relies on liberalisation**

The room for reduction in the EU thus points to a large potential in the building sector. If all current and future households, housing communities or office buildings are properly insulated and supported by a thermal solar energy application, energy consumption will have dropped 37% by the year 2050. In terms of emissions, this reduction would lower CO<sub>2</sub> production in the sector by 540 million tonnes per year.<sup>3</sup>

Unfortunately, none of this is going to happen without a big incentive. A simple calculation shows that in most cases it only takes six to eight years before an ordinary thermal solar energy application becomes an unconditional financial asset.

Still, solar industry leaders don't expect to see many households shift to thermal technology in the near future, mainly because of present legislation. Most countries today only regulate the use of thermal solar energy in the construction of new homes. But the new buildings segment only comprises a small %age of the building development market, and thus totally neglects the huge potential within the area of bringing old buildings up to modern energy standards. If incentives to refurbish the existing old houses and buildings were instituted, energy consumers would, according to industry experts, be encouraged to exploit the technology more efficiently and thus bring the target of 20% renewables in 2020 easily within reach.

<sup>1</sup> DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009

<sup>2</sup> Future Investment - A sustainable investment plan for the power sector to save the climate, Greenpeace, European Renewable Energy Council (EREC), 2007

<sup>3</sup> According to analyses made by the Institute for Sustainable Energies at AEE Intec. Results include an estimated 31% drop in demand compared to the reference year, 2006, because of increased building efficiencies.

# SAFE ENERGY

## THE SUN DOESN'T GET ROYALTIES

In a globalised market economy, energy is produced, sold and transported over great distances and between different nations just like any other commodity. Unfortunately, we are not dealing with shoes or toothpaste. The interdependency that follows has an inherent vulnerability that sometimes leaves everyday people in the dark while politicians try to renegotiate the terms.

The oil crisis of the 1970s made it clear that building a world economy and public wealth on territory-specific resources such as oil or gas is risky business. Of course the resource owners will always seek to maximise their assets.

Fortunately a renewable resource like solar energy isn't limited by nations wanting to make a profit – in fact it isn't limited by anything.

**The sun shines on everybody**  
It is often said that solar energy only has a clear potential in places like southern Europe or even the Sahara desert. The sun simply doesn't have the power to make a difference in Helsinki or Glasgow. However, Simon Furbo, an expert on renewable energy solutions for buildings at the Technological University of Denmark, says that "is the result of a limited mindset".

Simon Furbo admits that the radiation intensity of the sun is 2.5 times larger over the equator than in northern Europe, "but only if you measure it on a horizontal plane like most

critics tend to do. If you raise the panels and even make them follow the sun's movement, the radiation intensity rises dramatically", says Simon Furbo.

This small but significant addition to the equation leaves us a renewable energy resource with a wide and strong geographic usability range that also covers heavily populated areas of Scandinavia or North America, for example. As a safe energy supply, thermal energy represents a strong weapon for the private energy consumer in the struggle against national interests and energy market trends.

According to the IEA, only 10% of the world's known oil reserves are located in Europe and North America while 60% are located in the Middle East. Following the estimated growth in energy demand by 1.6% per year, the frailty of the future energy supply seems obvious.

Source: IEA and the Danish Energy Agency

The first SolarActive Houses will be opened in the Klagenfurt area (Austria) and in Regensburg (Germany) in the autumn of 2009.  
[www.solar-aktivhaus.com](http://www.solar-aktivhaus.com)



"It's like jumping between canyons."

Kai Hockerts, Associate Professor at Copenhagen Business School explains the challenges facing the renewable energy market

The link between technological evolution and the chances of that same technology becoming a favourite commodity often rely on complicated economic changes and confusing market logic. Kai Hockerts, an expert in investment trends within the renewable technology market, makes several interesting predictions.

- In the short term we remain dependent on fossil fuels, but the interesting thing is, which scenario are we talking about? In the end, oil, gas and coal will lose to renewables. But, at least the countries in Europe, will rely on gas for a longer period of time, simply because a backup system is necessary when the sun isn't strong or the wind slows, Kai Hockerts says.

#### Large plants have the advantage

Kai Hockerts refers to a colleague who once compared the giant shifts in technology with the way a canyon is carved out. In the beginning, technology runs like water in several directions, but after a period of time it will dig a canyon and become

fixed to one path. What we are about to witness is a technological shift – a jump from one canyon to another. And the new one is only just being carved out.

- When we look at the present system, it is set up for larger plants. That is why CSP, or solar heating plants, looks promising. On the other hand, you have the possibility of distributed energy production, where people produce energy locally and consume as well as distribute energy to a larger network in accordance to a feed-in tariff. Different technologies unlock different opportunities. Success relies on what can be gained in terms of efficiency, Kai Hockert says.

#### The mass market

In terms of success, the winning technology will most likely take the lead with the help of venture capitalists, looking to make a profit from green technology. Kai Hockerts has seen an interesting trend in the market, which could help boost the whole sector.

- It is quite amazing. Venture capitalists are really beginning to finance young start-ups, trying to get them ready to be listed on the stock market. Of course many of them will go bust, but others will succeed. Venture capitalists want to make money and they call for a very clear economic discipline that will make technology companies move towards marketing aspects. The environmental agenda will still be there, but not in a predominant way.

To Kai Hockerts this new trend is a positive sign, because it will set in motion the mechanisms of the mass market and allow the industry to develop more and better solutions at a lower cost. A trend that developing countries such as China and India will have a good chance of leading due to their large work force and low production cost.

Green technology is therefore slowly coming of age, perhaps losing some of its idealistic youthfulness, but gaining a more pragmatic approach and, above all, the characteristics of a solid investment.



IT'S TIME TO

# HARVEST

The 5.000 m<sup>2</sup> solar plant at Ulsted (Denmark) was built in 2005/6

## SOLAR HEATING PLANTS ALREADY SAVE ENERGY BY THE MILLIONS

If you know about renewable energy solutions using solar radiation, you've probably heard of more than a dozen high profile solar plants such as those situated in California's Mojave desert or in the south of Spain. These Concentrated Solar Power (CSP) plants are impressive and produce enough electricity for thousands of homes.

Projects like the thermal solar plant in Hillerød north of Copenhagen, or the somewhat bigger one in Strandby in northern Jutland, are smaller in both size and fame, but their production of hot water for heating, for example, gives evidence to the fact that thermal solar energy can be scaled to fit the exact requirements of a community and still be a highly cost-efficient enterprise.

### How to save money and reduce CO<sub>2</sub>

Hillerød's solar heating plant is an integrated part of the municipality's district heating system. The plant consists of over 3000 m<sup>2</sup> of solar collectors that have been installed on a 37° slope to catch the sunlight at an optimal angle. In one hour the plant can produce the equivalent of 24 hours' heat consumption in 50 new low energy houses during the coldest part of winter. In lifetime (a minimum of 25 years) the plant will produce no less than 37,000 MWh, reduce CO<sub>2</sub> emissions by 300 tonnes and save the municipality 2.5 million Euros.

In Strandby the collectors cover an area of 8000 m<sup>2</sup> and supply 830 households with heated water. Like the plant in Hillerød, the collectors are turned towards the sun for maximum

effect – even during the winter. A 2000 m<sup>3</sup> storage tank ensures that the collected heat can be saved for later use. The plant was ready for service in late 2008 and is expected to produce almost 94,000 MWh over the next 25 years, cutting CO<sub>2</sub> emissions by 750 tonnes each year of operation.

The owners of the two plants are obviously delighted to give a helping hand to the environment, however when asked directly, they will point to an equally important fact, namely their release from fossil fuel dependency and an erratic energy market. In other words, unless the sun refuses to deliver, the communities in Hillerød and Strandby are guaranteed fair and stable heating prices for at least the next 25 years.

For further reference visit: [www.strandbyvarmevaerk.dk](http://www.strandbyvarmevaerk.dk)



"The potential is immense" says industry leader Anders Otte Jørgensen

The solar heating plant industry is set to take off. No, not in southern Europe or another sunny place, but somewhere far to the north. In fact, last year the world's three largest plants were built in Denmark. A coincidence? Well not entirely – this year Denmark is building another three that are even bigger!

Spearheading this development is a company called ARCON Solvarme A/S, and CEO Anders Otte Jørgensen thinks there's more than just a soft spot for the environment behind this success.

- Solar heating is an inexpensive way to secure our heating supply – not only for domestic communities, but also for public facilities, office buildings and even the process industry. Once established, the cost of operating a plant accounts for just 1% of its energy production. At present, the solar heating plants in countries like Denmark pay for themselves in about seven to eight years. With a total lifetime of up to 30 years, the investment is quite sound, says Anders Otte Jørgensen.

With today's technology, a plant will typically provide 15-30% of the heating required. In other words, you still need

a primary system like a boiler to secure supply, but the technology is still evolving. Mr. Jørgensen reveals that a plant with a 50% solar heating supply is planned for next year.

**The sun equals flexibility**  
Solar heating will never be a 100% solution, simply because the sun doesn't deliver during the night. The importance, however, isn't just about how much, but also why and when.

- In any given energy system, the volume of energy tends to shift during the day due to the changing capabilities of the different energy sources. In such a system, solar heating can help level the imbalances of the system, delivering energy consumers a steady flow of heat and energy. Especially in a system like Denmark's, where wind turbines play an important role in the way heating plants administer and produce heat and power, says Anders Otte Jørgensen.

**Overcoming the barriers**  
According to Mr. Jørgensen, we are now witnessing a snowball effect. This year solar heating plants with a total area of 27,000 m<sup>2</sup> will be installed in Denmark. Next year this number might reach

100,000 m<sup>2</sup>. And still solar heating will only cover less than 0.5% of the market.

- You have to acknowledge the potential. It is immense, not only in countries like Denmark and Germany where central heating is common. If you look at countries further to the south, where the sun is more generous, the payback time of a plant drops to only two to three years. This crosses a vital barrier, says Anders Otte Jørgensen.

Financing is perhaps the single most important obstacle right now, when it comes to speeding up the development of new plants. The process industry is especially reluctant to invest in anything with a payback time of more than three years.

- Even though the market is evolving in northern Europe, there is considerable potential right now in the south. But we need to develop the technology further. If we succeed, solar heating will play a key role in the future, says Anders Otte Jørgensen.

