

SHARP

BYE-BYE CO₂

The Sharp Climate Protection Guide



Look no further for plenty of climate protection

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Sharp: Products in harmony with nature

With the consistent implementation of its multiple prize-winning environmental management programme (e.g. EU Eco Label and Energy Star) as well as ISO certificates, Sharp embraces its responsibility toward humanity and nature. Reducing the consumption of energy and resources is a particularly high priority in this endeavour. The company contributes to the global reduction of carbon dioxide emissions with new energy-saving products and its dedication to photo-

voltaics for clean power from the sun. In keeping with Sharp's environmental strategy, new production facilities are developed and built compatible with nature. In years past, close to 250 Sharp products have won awards for their environmental friendliness.

Please join us on our journey into a future marked by environmental protection and sustainability. Get environmentally active. Nature, the environment and future generations will thank you.



How we can all protect the climate

Global warming – what can you do?

In your hands you are holding one answer to what must be the most important question of our times: The latest Sharp Climate Protection Guide. A whole issue dedicated to active climate protection, full to the brim with tips and tricks on how to avoid greenhouse gases, most importantly damaging carbon dioxide (CO₂). In this Sharp Climate Protection Guide, we have paid particular attention to presenting measures that are very practice-orientated. As you will see, small changes

in day-to-day life are often enough to save tonnes of CO₂. We have touched on all climate-relevant areas of daily life. These include your mobility, your consumerism and, of course, your heat and energy consumption. Now you may be wondering: "Do I have to forego comfort to protect the environment?" Your Sharp Climate Protection Guide has a clear answer to this question as well: No, quite the contrary. By saving energy and CO₂, you can save money, increase your quality of life and protect the environment at the same time.



Voices of our times

"We face a true planetary emergency. The climate crisis is not a political issue, it is a moral and spiritual challenge to all of humanity."

(Al Gore, winner of the Nobel Peace Prize 2007)

"The time has come to face this challenge."

(Klaus Töpfer, former director of the UN environmental programme)

"You may, of course, roll a six a few times, but if the dice always comes up six, then something is wrong – that's how it is with the weather, too."

(Mojib Latif, meteorologist and climate researcher)

"The transition to renewable energies is a race against time – for ecological, economical and social reasons."

(Hermann Scheer, chairman of the World Council for Renewable Energy)

"Turn to face the sun, and shadows will fall behind you."

(Chinese proverb)

Why climate protection is so crucial

Our Earth is running a fever

According to the UN climate report of the Intergovernmental Panel on Climate Change (IPCC), global warming caused by mankind is steadily increasing: The average measured temperature of the past 50 years is almost twice as high as the average of the past 100 years. Eleven of the last twelve years have been among the warmest since experts started recording weather statistics. According to the IPCC, the temperature of the Earth will rise by 2 to 4.5 degrees Celsius by the year 2100.

Time is getting away

Since the Industrial Revolution from the mid-19th century on, humanity has been adding to the natural greenhouse phenomenon with the emission of greenhouse gases, predominantly CO₂*. Scientific measurements taken from ice cores indicate that the concentration of CO₂ never rose above 290 ppmv (parts per million by volume) in the last 650,000 years. The concentration of CO₂ has now increased to more than 385 ppmv, mainly as a result of the burning of fossil fuels

as well as the large-scale clear-cutting of forests since the beginning of industrialisation. This may well be the highest value in 20 million years. In 2006 alone, mankind produced 36.3 gigatonnes of CO₂**.

Just to make things clear: One gigatonne is 1,000 billion tonnes.

Change is here

Climate change will have grave consequences world-wide in this century. Extreme weather situations such as heavy precipitation, heatwaves and droughts are already occurring more frequently, and will continue to do so in the upcoming decades. In addition to the impact and damage to agriculture, industry and infrastructure, this results in imminent danger to people.

Everyone can do something

Technological and organisational measures as well as different behaviour can tangibly reduce the causes of climate change. If we were to start implementing the technological measures we already have world-wide, it would be possible to reduce global greenhouse emissions to below 2000

* Geophysical Research Letters, Vol. 31

** Nature, Vol. 410

levels in the time period from 2010 to 2020. A global problem like climate change has local causes, for which we all share responsibility. Therefore, it is necessary for each of us to make a contribution toward protecting the climate and thus to ensuring the basis of life. Most importantly, if we lower our energy consumption and generate our energy from renewable sources, we will be on the right path toward a future worth living in.

The sun to the climate's rescue

Climate-friendly power from the natural energy of the sun is growing in popularity in Europe. At the end of 2007, more than 500,000 solar power systems were installed in Europe – many of these in single-family dwellings. They generate a total of approx. 4.5 gigawatts of solar power annually, which corresponds to the capacity of about three climate-damaging coal-based power stations. You now have the opportunity to generate environmentally-friendly solar power yourself with ease and convenience – with a Sharp PV system. We would be pleased to help you:
www.sharp.eu

Advantages

- Active climate protection
- High-impact image factor
- Feed-in rates specified by the state
- Top quality
- High level of efficiency
- Renowned manufacturers
- Excellent price/performance ratio
- Attractive design



Examples of the impact of global climate change

Extreme climate phenomena and the likelihood of their occurrence during the 21st century. Examples of possible impact (probability of occurrence is between 67% and 95%)

Simple extremes	
<p>Higher maximum temperatures, more hot days and heatwaves across almost all regions</p> <p>Very probable</p>	<ul style="list-style-type: none">• Increasing frequency of death and various illnesses among older people and poorer urban populations• Increasing levels of stress as a result of heat among domestic and wild animals• Shift in tourist destinations• Increasing risk of damage for a great number of crops• Increasing need for electrical cooling and reduced reliability of energy supply systems
<p>Higher (increasing) minimum temperatures, fewer days with frost, cold days and periods of cold temperatures across almost all regions</p> <p>Very probable</p>	<ul style="list-style-type: none">• Declining frequency of illness and death as a result of cold temperatures• Declining risk of damage for some crops and increasing risk for other crops• Growing areas of contagion and activity of some pests and germs• Reduced energy requirements for heating
<p>More heavy precipitation across many regions</p> <p>Very probable</p>	<ul style="list-style-type: none">• Increasing damages as a result of flooding, earth and mud slides and avalanches• More ground erosion• More drainage as a result of flooding could result in increased filling of water reservoirs• Increasing pressure on governments and private insurance schemes (flooding) and disaster assistance

Complex extremes

Increasing dry periods in summer across most regions at mid-latitudes and the risk of drought these entail

Probable

- Declining harvests
- More damages to building foundations as a result of the destabilised ground
- Declining quantity and quality of water resources
- Increasing risk of forest fires
- Problems with traffic in internal waterways and the operation of power stations

Increase in the wind speeds of tropical cyclones¹⁾, and of medium and maximum precipitation in some regions

Probable

¹⁾Changes in the regional distribution of tropical cyclones are possible, but not proven to date

- Increasing risk to human life, greater risk of epidemics as a result of infectious diseases and many other risks
- Higher levels of coastal erosion and damage to buildings and infrastructure in coastal regions
- Increasing damage to coastal ecosystems – such as coral reefs and mango grove forests

In conjunction with El Niño occurrences, growing droughts and flooding in many regions

Probable

(see also occurrences of drought and heavy precipitation)

- Declining productivity of agriculturally used land in regions hit by drought and flooding
- Declining potential of hydro power plants in regions hit by drought

Increasing variability of precipitation of the Asian summer monsoon

Probable

- Increasing impact of flooding and drought including their damage in moderate and tropical Asia

Increasing intensity of storms (wind speed) at mid-latitudes

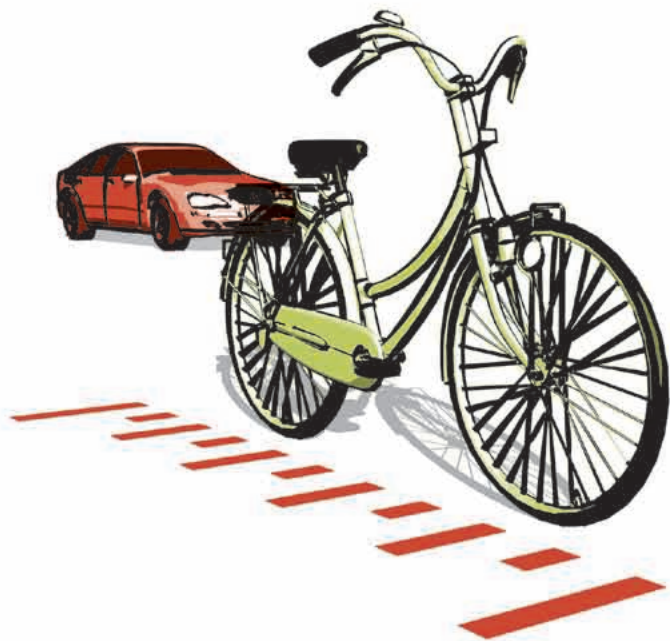
Uncertain

(less correspondence within the scope of present-day model results)

- Increasing risk to human life and health
- Increasing loss of property value and infrastructure
- Increasing damage to coastal ecosystems

Source: Deutsches Umweltbundesamt für Menschen und Umwelt

Use the bike pedals instead of the gas pedal



MOBILITY

1. Use the bike instead of the car for short distances

Example:

Every morning you drive 5 km to work. You go to the supermarket on your trip home, which is 2 km out of your way. This adds up to 12 km every day, and you have to warm up your engine twice.

Facts:

- A cold engine requires one litre of petrol/diesel for the first three kilometres
- 2,500 / 3,090 g of CO₂ are emitted per consumed litre of petrol/diesel
- A medium-class vehicle in city traffic emits an average of 250 g of CO₂ / km for petrol and 210 g of CO₂ / km for diesel

Source: Öko-Institut, ifeu

Advantages:

- Depending on the fuel, daily savings amount to about 6.5 kg of CO₂ for petrol or 7.4 kg of CO₂ for diesel
- Cycling is great for physical fitness and lets you avoid any traffic jams
- No emissions of hazardous substances, fine particulate, etc.
- No noise pollution
- Travel costs are cut drastically
- No fuel costs
- Less wear and tear on your vehicle

Show your climate awareness –
when purchasing a car as well



MOBILITY

2. Check the specific emissions when you purchase a new car

Facts: Average emissions (city, country, motorway) for various types of car.

Model	CO ₂ emissions / km	CO ₂ emissions per 25,000 km
Audi A4 1.9 TDI/Avant	154 g	3,850 kg
BMW 520d	158 g	3,950 kg
Mercedes E 200 CDI	167 g	4,175 kg
VW Sharan 2.0 TDI	181 g	4,525 kg
BMW 750iL	369 g	9,225 kg

Source: VCD, VCÖ

The following list of environmentally-compatible and affordable vehicles is presented by the VCD (a German drivers' club) as an aid for purchasing a new car.

Compact class	CO ₂ emissions / km	The best family cars	CO ₂ emissions / km
Smart fortwo cdi	88 g	Toyota Prius (Hybrid)	104 g
Honda Civic Hybrid	109 g	Seat Cordoba 1.4 TDI DPF	120 g
Peugeot 107 1.0	109 g	BMW 318d	123 g
Volkswagen Golf BlueMotion	119 g	BMW 318d/Touring	125 g
Hyundai I 30 1.6 CRDi	125 g	Ford Focus 1.6 TDCi/Turnier	127 g
Mazda3 1.6 CD Sport MZ-CD	128 g	BMW 320d/Touring	128 g
Mercedes A 160 CDI	128 g	Ford C-MAX 1.6 TDCi	129 g
Audi A3 1.9 TDI/Sportback	137 g	Honda Civic 5dr	139 g
Opel Astra 1.3 CDTI Ecotec/Caravan	137 g	BMW 318i	142 g
Volkswagen Golf 1.4 TSI DSG	139 g	Volvo S 1.6 D	142 g
Skoda Fabia II 1.2	140 g		
Toyota Auris 2.0 D-4 D	151 g		

Source: VCD, VCÖ

All clear for less CO₂ under Europe's skies



MOBILITY

3. Choose rail over air travel

It is possible to save the following in terms of CO₂ emissions per person for a return trip compared to air travel (expressed in kg of CO₂ per person):

Trip	Air	Rail	Savings
London – Brussels – London	131.8	18.4	113.4
Berlin – Brussels – Berlin	203.2	57.0	146.2
Paris – Brussels – Paris	116.8	10.4	106.4
Madrid – Brussels – Madrid	336.4	53.8	282.6

Source: UMC/IFEU

Check the impact of your personal trip: www.ecopassenger.com

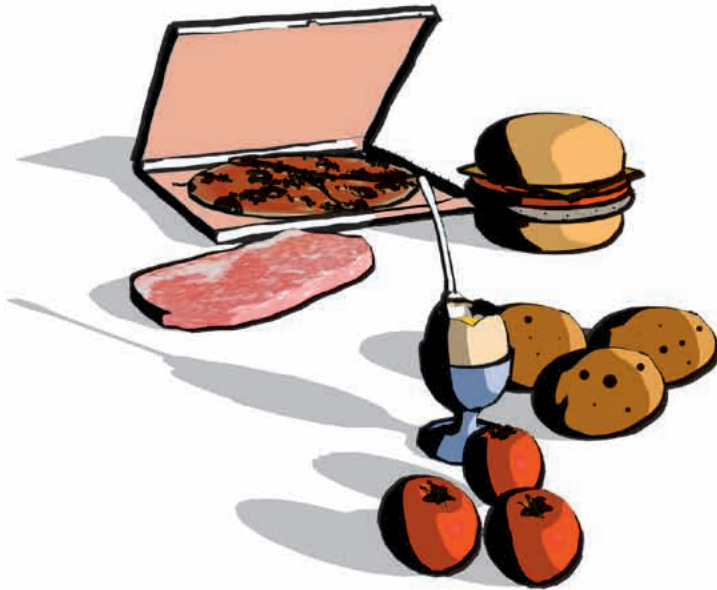
Note:

If you must fly, you can compensate by choosing an airline which offsets the damage caused by air travel by supporting climate protection projects: www.myclimate.org, www.ecotransit.org

Advantages:

- Reduction of environmental impact
- No considerable increases in travel time
- Relaxed, comfortable travel

One way to climate protection
is through the stomach



CONSUMPTION

4. Eat organic food instead of "normal" food

The following shows all major greenhouse gases generated up to the point that the goods arrive at the retailer's: From diesel for tractors, fertiliser (in the case of "normal" products) and packaging all the way to storage.

However, factors such as animal husbandry, the cultivation of rice and the clear-cutting of rain forests, and the greenhouse gases which are generated as a result (primarily methane and nitrous oxide), have a negative impact. The table indicates: Those who do not eat beef, for instance, live in a climate-friendly way! For this CO₂ Guide, the greenhouse gases have been converted into CO₂ equivalents in order to provide you with a better overview of possible savings.

Product	Normal (CO ₂ /kg)	Organic (CO ₂ /kg)	Difference (CO ₂ /kg)	Difference (percentage)
Beef	13,300	11,350	1,950	-6%
Eggs	1,950	1,550	400	-21%
Margarine	1,350	1,050	300	-22%
Pizza (frozen)	1,250	950	300	-24%
Tomatoes (season)	350	250	100	-29%
Potatoes (fresh)	200	150	50	-25%

Source: Öko-Institut

Advantages of organic:

- Reduction of environmental impact
- Healthier food (no pesticides or lower levels of hazardous substances)
- Animal feed free from antibiotics and artificial or hormonal additives
- Sustainable use of the soil
- No use of genetically enhanced products
- Appropriate living conditions for domestic animals
- Better taste

Climate protection is carved in solid wood



HEAT

5. Save heating energy as a homeowner

In the EU, heating rooms makes up about 70% of energy consumption in households, with hot water taking up 14%. Good heat insulation, though, makes it possible to reduce heating energy requirements and thus CO₂ emissions significantly.

CO₂ emissions vary greatly from one fuel to another.

	CO ₂ in kg per kWh	CO ₂ in kg in poorly insulated buildings (250 kWh/m ²)	CO ₂ in kg in well insulated buildings (150 kWh/m ²)
Natural gas	0.251	62.75	37.65
Heating oil	0.320	80.00	48.00
Black coal briquettes	0.374	93.50	56.10
Wood	0.014	3.50	0.14
Wood pellets	0.038	9.50	5.70
Wood chips	0.030	7.50	4.50
Electricity	0.647	161.75	97.05

Source: GRE; AG Energiebilanzen; VDEW; ifeu; Öko-Institut

Advantages:

- Great CO₂ savings
- Decrease in operating costs as a result of low consumption
- Some European countries offer state subsidies for insulation and investment in environmentally-friendly heating systems
- Increased real estate value

Open your own energy-saving household



HEAT

6. Save heating energy as a tenant

You can also save a lot of energy as a tenant.

Example: Rented flat with central gas boiler and average building insulation.

Annual CO₂ savings in kg per m²

- Install electronic thermostat valves 12.5
- Lower the room temperature by 1°C 3.0
- Brief periods of ventilation instead of extended periods with tilted windows 2.0
- Do not obstruct or cover radiators 10.0

Example calculation:

You can save 2,475 kg of CO₂ annually in an average sized flat of 90 m².

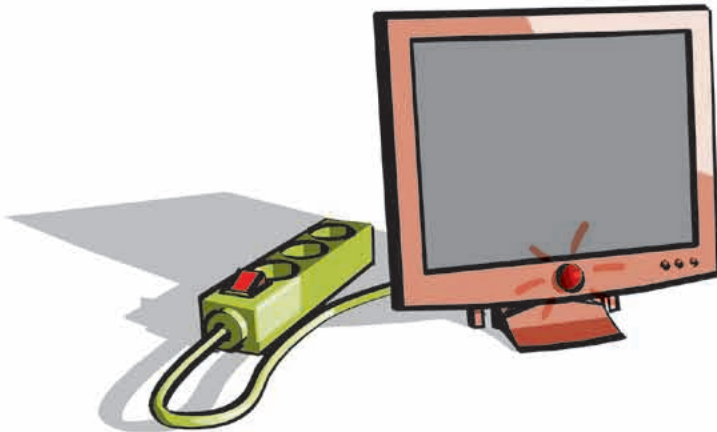
Source: GRE; dena; co2online; Bund der Energieverbraucher; Verbraucherzentrale NRW

Changing how you use hot water can also save a lot of CO₂.

Savings of CO ₂ in g	Hot water tanks, natural gas	Tankless water heater, electric
Shower instead of bath	920 g of CO ₂	1,890 g of CO ₂
Turn off water while brushing teeth	400 g of CO ₂	900 g of CO ₂
Wash hands with cold instead of hot water	30 g of CO ₂	70 g of CO ₂
Short instead of long hair washing	60 g of CO ₂	110 g of CO ₂

Source: co2online.com

Bye-bye stand-by. Bye-bye CO₂



ELECTRICITY

7. Turn off stand-by devices

Even if a device in stand-by mode uses only one watt, this energy adds up in the course of a year (8,760 hours) to total 8.76 kWh. Assuming 650 g of CO₂ per generated kilowatt hour of electricity, this results in annual emissions of 5.7 kg of CO₂.

According to a current report by the EU commission, the electricity wasted annually due to stand-by operation amounts to 44 billion kWh in EU countries. This corresponds to an unnecessary European "electricity bill" of about 4.4 billion euros – year in, year out!

Device	Annual CO ₂ stand-by emissions in kg
Microwave	32
Standard CRT TV	27 – 54
Average DVD player	33
Average CD player	33
Compact stereo system	62
PC with monitor	28
Notebook	0.9
Laser printer	68
Answerphone	14

Source: Bund der Energieverbraucher; Verbraucherzentrale NRW; dena

Advantages:

- If all of the above-mentioned devices are separated from the mains periodically, e.g. by means of a simple switch at the outlet, savings of about 250 kg of CO₂ can be achieved annually
- Cost savings (lower electricity bill)
- Easier on the device (longer service life)
- Safety: Less risk of fire, e.g. as a result of defective devices

The best laundry detergent for climate protection:
Turn down the temperature



ELECTRICITY

8. Lower the washing temperature to get clothes clean

A washing cycle at 95 degrees Celsius with pre-wash results in CO₂ emissions of 1.4 kg. The following reductions could be achieved in this area:

Washing temperature	Pre-wash	Emissions in kg	Reduction in kg
95°C	No	1.25	0.15
60°C	Yes	0.95	0.45
60°C	No	0.85	0.55
40°C	Yes	0.30	1.10

Source: Energieagentur NRW; Eco Top Ten

Tumble dryers

Only use a dryer when absolutely necessary – each dryer cycle produces more than 3 kg of CO₂ emissions. Drying laundry naturally is by far the best option: Your clothes will last longer, and the energy required for the drying process is free and environmentally friendly.

Advantages:

- CO₂ savings
- Cost savings (lower electricity bill)
- Easier on appliances and clothes
- Water savings

Brief cookery course on saving CO₂



ELECTRICITY

9. Boil water with an electric kettle

An electrically powered kettle emits 100 g of CO₂ to boil 1.5 litres of water. If a stove element is used, the CO₂ emissions increase as follows:

Device	Emissions	Increase compared to electric kettle
Electric stove element	170 g	70 g
Infrared glass ceramic element	140 g	40 g
Induction glass ceramic element	120 g	20 g

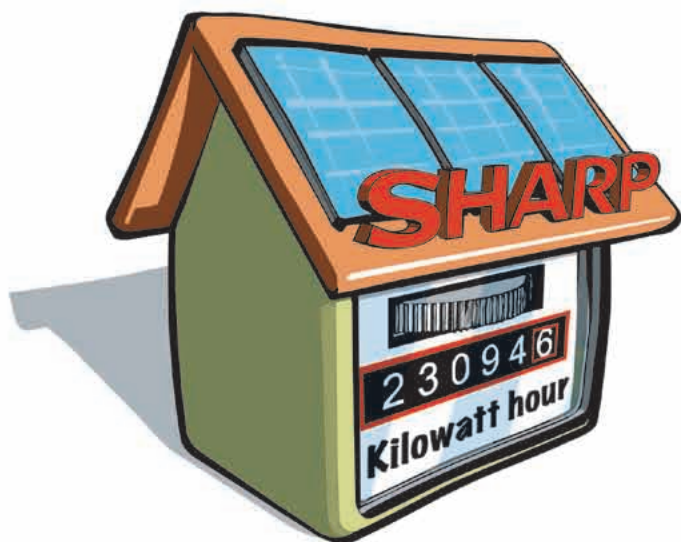
Source: Verbund Österreichische Elektrizitätswirtschaft

Advantages:

- CO₂ savings: Ideally 70 g to boil 1.5 litres of water
- Lower electricity costs

Say yes to solar power!

Because it can turn your roof into a climate saver!



**Complete:
Sharp solar
energy system**

Find out more!

For more information on how you and the climate can profit from a Sharp solar energy system, please visit

www.sharp.eu

ELECTRICITY

10. Install a Sharp photovoltaic system

Energy providers (public power and heat generation) and private households are by far the greatest producers of CO₂ in Europe:

Energy providers	Households / Minor consumers	Traffic	Industry
1,510	1,390	980	660

CO₂ values expressed in millions of tonnes

The proportion of photovoltaics among regenerative energies for the generation of power has greatly increased.

Type of energy	2000	2004	Annual growth	Projections 2010
Wind	13.2 GW	33.6 GW	263%	80.0 GW
Hydro	93.0 GW	107.5 GW	37%	113.0 GW
PV	0.18 GWp	0.86 GWp	478%	8.0 GWp
Biomass	9.5 GWe	13.1 GWe	86%	25 GWe
Geothermal	0.6 GW	0.66 GW	24%	1 GW

Meanwhile, the overall capacity of installed photovoltaic systems in Europe amounts to almost 4.5 GWp. With only 1 kWp of installed photovoltaic capacity, it is possible to save about 800 kg of CO₂ annually – a huge potential.

	Per kWp	In Europe
CO ₂ savings	800 kg	2.5 million tonnes of CO ₂

Source: BSW Solar

Advantages:

- CO₂-free power generation
- Possible yield of returns through the sale of power (feed-in remuneration)
- Government subsidies
- Increased real estate value
- Simple, clean installation

Additional CO₂-saving opportunities

- Switch to a provider of ecologically-friendly energy
- Check the energy label prior to purchasing new electrical devices; "A devices" consume between 20 and 50% less energy than "D devices"
- Establish car pools
- Use public transport
- Use recycled paper
- Replace plastic bags with ones made of fabric
- Do not position the refrigerator / freezer next to the stove or dishwasher
- Use low-energy lightbulbs
- Use modern building insulation
- Install sustainable hot water and heating systems, e. g. solar thermal systems and pellet heating systems
- Switch to an ecologically-orientated bank
- Choose portfolios that invest in ecological projects

You can work out your personal CO₂ balance sheet with the CO₂ calculator at the following address: **www.co2balance.uk.com**

Use your roof. Protect the climate.

Sharp, the pioneer in photovoltaics, has been using technologically groundbreaking solar energy systems to boost the environmentally-sound generation of power for almost 50 years. In 2007 alone, the Sharp group invested 1.2 billion euros in research and development in all product areas.

The most recent examples of the innovative strength of the company from the land of the rising sun are silicon-saving thin-film and solar concentration technologies. As a result of these technological innovations and the construction of a 1-gigawatt solar cell plant in Sakai, Japan, Sharp is not only leading photovoltaics into a new era, but also documenting yet again the company's ongoing efforts with regard to protecting the Earth and cultivating a society with minimum CO₂ emissions.

Experience state-of-the-art photovoltaics.

Welcome to Sharp: www.sharp.eu



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