

Ecological Cleaning System Ltd

Impianto Concentrazione Solare

HELIOSTATIC OPTICAL CO-GENERATOR

H.O.C. – 16 optixs head/24 sq.m./10kWatt nominal/5kWatt electricity with 16 optical concentrating heads mounted on a common heliostat stand to monitor the direct solar radiation according to Azimuth and declination.

Type of optical solar receiver of the optical concentrating head:

– refracting - reflecting, focone – focline with a diffracting screen and Fresnel optics located on each floor, irradiating / with solar radiation, concentrated up to 8 000 times / thermal complex energy-transformer with oil heat transfer, by means of flow oil diathermy heat fluid with high potential heat up to 340 °C .

H.O.C. - 16/24 sq.m./10 kW has a cogeneration operation at initial density of the solar radiation within the visible range with a wave length between 390 - 780 nanometers, varying between minimum 90 W - maximum 850 W per sq. meter normally irradiated area.

OPTICAL CONCENTRATING HEAD – OCH-HOC.-1.5



- Solar average concentrating aperture /average solar area/ per one optical concentrating head - 1.25 sq.m.;
- Total irradiated optical focone-focline area of optical concentrating head – 1.564 sq.m.;
- Maximum solar optical capacity per one optical concentrating head - 1010 – 1020 W;
- Nominal solar optical capacity – 875 - 890 W;

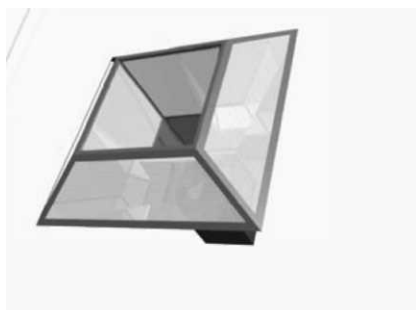
Ecological Cleaning System Ltd

- Average solar optical capacity – 750 – 770 W;
 - Minimum solar optical capacity – 150 - 170 W;
 - Maximum energy in the energy-receiver, registered as a thermal capacity with a high -potential heat up to 340 °C of the cooling oil diathermia heat fluid – 810 – 860 W;
 - Nominal capacity – in the oil diathermia heat fluid – 640 - 690 W at 320 °C;
 - Average capacity of the concentrating optical head in the oil diathermia heat fluid – 540 – 580 W at 310 °C;
 - Minimum capacity in the oil diathermia heat fluid in the optical concentrating head - 90 – 110 W at 230 °C;
 - Dimensions – 4 x 1170 mm;
 - Depth – 1170 mm including the thermal receiver;
 - Encapsulated in a glass capsule radiation energy thermal receiver of rays directly from solar radiation concentrated up to 8 000 «Suns»;
 - The high-temperature oil pipeline with siphon flexible joints and hollander connecting thread-free joints – nuts;
 - Area of the optical concentrating head – up to 40 kg without auxiliary body components;
 - Initial data on solar radiation within the visible optical range varying between 320 nanometers and 800 nanometers wave length with a peak of 40% in the range of the green – yellow colors for the territory of R. Bulgaria;
 - Peak values for the territory of R. Bulgaria – 690 - 740 – 920 W per sq.m. area usually irradiated directly from the Sun;• Mean values – between 380 – 440 W per sq.m. normally irradiated area usually irradiated directly from the Sun /for R. Bulgaria/;
 - Annual working time of the Sun for the territory of R. Bulgaria – between 2200 – 2700 working hours per one calendar year /according to average data for the direct sun shine from the last fifty years / from solar radiation;
 - Maximum energy annual output /as a high-potential heat with average temperature of the oil heat fluid- 320 - 340 °C/ per one optical head – 1750 – 1900 kWh /1.75 – 1.9 MWh/;*
 - Nominal energy annual output /as a high-potential heat with average temperature 310 – 320 °C/ per one optical head – 1040 – 1120 kWh /1,04 – 1,12 MWh/;*
 - Minimum energy annual output /as a high-potential heat with average temperature 300 – 310 °C/ per one optical head – 700 – 800 kWh/ 0,7 – 0,8 MWh/;*
- * For the territory of R. Bulgaria

GENERAL PARAMETERS

Ecological Cleaning System Ltd

**OF THE HELIOSTATIC OPTICAL CO-GENERATOR H.O.C.
6/8sq.m./4 kW**



Average solar optical aperture concentrating area – 8 sq.m.;

Number of optical concentrating heads – 6 pcs.;

Nominal capacity conveyed to the consumers, by means of oil heat carrier /heat fluid-diathermanous /with a high-potential heat of 310 – 340 °C – 4 kW;

Maximum capacity – 4.86 – 5.16 kW.;

Minimum capacity – 0.54 – 0.66 KW /15% diffuse solar radiation – cloudy weather /;

Working time with nominal capacity for the territory of R. Bulgaria – 2200 - 2700 working hours;

Maximum energy-output by H.O.C. – 6/8sq.m./4kW. /as a high-potential heat with an average temperature of the oil diathermia heat fluid – 310 – 340 °C/ per year on the territory of R. Bulgaria – 10.6 -11.4 MWh;

Average annual energy-output for the territory of R. Bulgaria from H.O.C.-6/8sq.m.4kW- 6.24 – 6.72 MWh;

Minimum annual energy-output on the territory of R. Bulgaria from H.O.C. -6/8sq.m./4kW. – 4.2-4.8 MWh;

The assembling area /leveled concrete site with servitude minimum distance of 1 meter against overshadowing from adjacent H.O.C. - 6/8 sq.m./4 kW. – 9 sq.m.

HELIOSTATIC PARAMETERS of H.O.C. 6/8sq.m./4kW

REGULATION by means of a rotating cart, central stop device and lifting device on the POSITION OF THE SOLAR OPTICAL CONCENTRATING APERTURE STEPWISE, ALONG THE AZIMUTH and DECLINATION COMPARED TO THE DIRECT SOLAR RADIATION;

Ecological Cleaning System Ltd

Along the Declination, considered as angle declination of the direct radiation of the Sun in the sunny half day compared to the Equator plain – the slope of the rotation axis of the Earth to the eclipse in the Solar system;

Along the Azimuth, described as Azimuth angle of the Sun characterizing the angular shifting to the North of the projection of direct sun rays on the horizontal plain;

The heliostatic variations in the slope /height angle/ of the optical solar aperture section of H.O.C. 6/8 sq.m./4kW compared to the direct solar radiation:

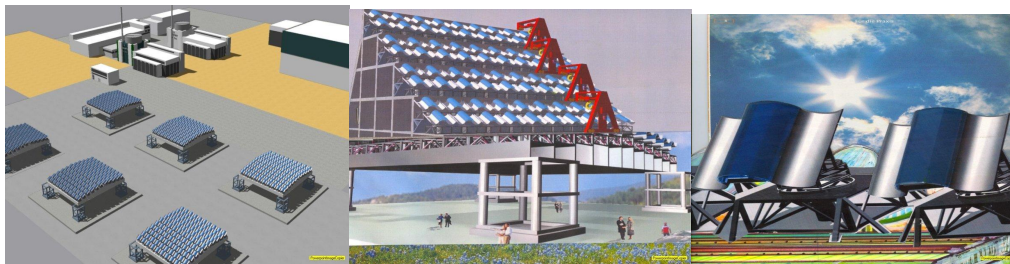
- winter position of 60 – 73 angular degrees – «standing H.O.C.»;

Slope of the optical solar aperture section of H.O.C. compared to direct Solar radiation – spring - autumn position – of 35 – 50 angular degrees;

Slope of the optical solar aperture concentrating section of H.O.C. compared to direct Solar radiation – summer position of 23 – 32 angular degrees - «prone H.O.C.»;

Hourly positioning of the heliostat – STEPWISE /every 15 angular degrees / in 1 hour /hourly degree/ specifying the angular hourly shifting of the direct solar radiation in relation to the local meridian with 15 angular degrees per hour with a variation of – 13 – 18 angular degrees of H.O.C.-6/8 sq.m./4kW.

SOLAR THERMAL ELECTRICAL /CO-GENERATIVE/ STATION WITH CONCENTRATING OPTICAL HELIOSTATIC CO- GENERATORII TYPE H.O.C. – 6/8sq.m./4kW



NOMINAL CAPACITY - 100 KW;

PEAK CAPACITY - max. 160 kW /read as high-potential heat with temperature 310 – 340 °C of the diathermanous oil heat fluid with operating time of solar radiation of 2200-2700 working hours for the territory of R. Bulgaria/;

Energy accumulation in the diathermanous boiling oil with a volume of 7 cu. meters and 19 cu. meters boiling water with temperature 95 - 110 °C in heat-insulated boilers;

Ecological Cleaning System Ltd

Auxiliary fittings, valves, control measurement devices, automation, gear high-temperature oil pumps, injection pumps and a group of expansive oil-steam engines – 2 pcs. with nominal mechanical capacity of 2×16 kW each and a synchronic generator, transformer – accumulator with electrical capacity of 2×12 kW each with network parameters:

- total 32 kW mechanical capacity;

- total $2 \times 12 = 24$ kW electrical capacity with night energy-accumulation, together and with emergency energy-accumulation for regime 5 000 and 8 000 working hours per year supplied to consumers;

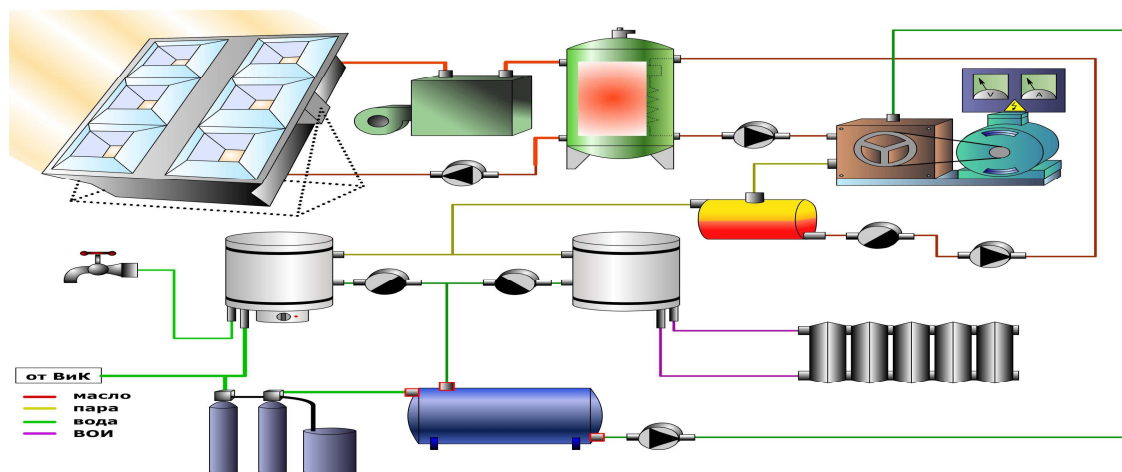
- emitted heat capacity for heat supply, air-conditioning and domestic hot water for buildings 14 – 30 kW at 5000 – 8000 working hours per year;

Number of solar modules type H.O.C. - 6/8sq.m./ 4kW- 32 – 36 pcs.;

Installation area 350 – 400 sq.m. of H.O.C. facing south – without shadow;

Unfold built-up area of the auxiliary building with machine and energy accumulation room – 30 sq.m.;

Unfold built-up area of all the buildings belonging to the SOLAR POWER PLANT for air-conditioning and electricity supply 550 – 800 sq.m.



"INNOVATION COMPANY" A.D.

The objective and the motivation of the company is to implement in practice a PROJECT for a national strategy "Large-scale industrial implementation of solar-hydrogen technologies in the economy of the Republic of Bulgaria", aligned with "Strategy on encouragement of investments in the Republic of Bulgaria for the period 2005 – 2010 year", harmonized with the clauses of the "Innovation strategy" of Bulgaria and the measures for implementation thereof. It is aligned with the clauses of the Lisbon EU Strategy, aiming by 2010 the entire economy of the European

Ecological Cleaning System Ltd

Union to become competitive and dynamic, based on knowledge and latest technologies, to dominate world wide, with opportunities for sustainable economic development, in line with intensive social cohesion, with more and better jobs, with energy sector based mainly on abundant recoverable solar energy sources, high energy efficiency and hybrid energy innovations covering the entire economic sector.

TOPICS

TOPIC: "RECOVERABLE SOLAR ENERGY SECTOR"

- 1 HYBRID SCHEMES TYPE „SUN-WIND-WATER“ combined with conventional energy;
- 2 HYBRID SOLAR-ENERGY THERMAL POWER PLANT“
 - one component
 - two component, including high-positioned aerostatic photo-solar concentrators of solar radiation, allowing independence from the climatic parameters of a region and increasing the „working time of the SUN“ from the natural 2200 – 2700 to about 3900 – 4200 working hours;

TOPIC: "SOLAR-ENERGY CO-GENERATIVE URBAN DEVELOPMENT and public transport systems and vertical automated parking-lift installations";

TOPIC "GENIPONIC GREEN-HOUSE AND ANIMAL-BREEDING FACILITIES"

- with established high-quality and optimum conditions, where flora and fauna reach
- their genetic maximum in terms of fruits and quality of output;

TOPIC: Terrestrial concentration of solar energy in directed modules with special optical equipment and redirection of light ducts to solar furnaces;

- 1 For burning of a mix of limestone and coal, biomass – compost, hay, organic waste etc., in corresponding stoichiometric relation and obtaining of calcium carbide and carbon oxide;
- 2 Furnaces with cyclic or continuous operation for thermal photo electrolysis of water with UV rays, high-frequency barrier rate and resonance electrolysis of para-gas phase for generation of hydrogen, purified through net palladium cathodes and is absorbed in a titanium-iron sponge in containers by means of blowing with a compressor;
- 3 solar concentrating reactors with catalyst where carbon oxide and hydrogen are connected chemically with methanol – methyl alcohol;

Ecological Cleaning System Ltd

The reason for formulation, designing and adapting of a new generation of RES, helio-technical equipment and systems, with a high degree of economic efficiency is due to the fact, that the lifestyle of the people in the 21 century will be governed by «SOLAR-HYDROCARBON RENEWABLE SOURCES » and the utilization of solid domestic and organic waste, waste biomass, waste plastics – as a component of RES and the solar energy in the strategy for «zero waste», due to the rapid depletion fossil fuels, global climatic changes and the ensuing disasters for humanity, for environment protection and conservation of biodiversity and biosphere on the Earth. The project ideas deal with cogeneration – utilizing direct solar radiation in concentrated kind, by means of simultaneous obtaining of high potential heat and electricity at reasonable low prices.

Ecological Cleaning System Ltd

