SOLAR WATER HEATING IN INDUSTRIES

Akansha*1, Pranjal Meena*2, Dr. JP Kesari*3

*1UG Students, Dept. of BioTechnology, DTU Solaris, Delhi Technological University, Bawana Road. Delhi - 110042, India.

*2UG Students, Dept. of Information Technology, DTU Solaris, Delhi Technological University, Bawana Road. Delhi -110042, India.

*3Associate Professor, Faculty Head, DTU Solaris Department of Mechanical Engineering, DTU Solaris, Delhi Technological University, Bawana Road. Delhi -110042, India.

ABSTRACT

Our search for the best industrial solar water heater manufacturer in India will end up on Inter Solar. Because customers out there are falling for quality and not for the price, in which InterSolar is doing great. They have access to solar products for personal as well as for commercial purposes. Therefore, if you are wondering which industrial solar water heater should you buy as an Indian, you can surely consider Inter Solar as an option .Undoubtedly all this growing industrialization is resulting in developing the nation more. But on the other note it is also deteriorating the environment adversely. Because hazardous chemicals and gases are being released either in a direct way or by refining them into the environment, Consequently. Problems like global warming and greenhouse effect are influencing the environment and health a lot.

So why not consider eco-friendly options? Why can't we focus towards environmental protection just by contributing our bare minimum? Solar energy use can be the best option in some of its alternative solutions.

I.INTRODUCTION

Solar water heaters - also known as solar domestic hot water systems - can be a cost-effective way to generate hot water for your personal use. They can be used in any climate, and the fuel that it uses, which is sunshine itself, is free.

The Solar water heating systems include storage tanks and solar collectors. There are two types of solar water heating systems: active, which have circulating pumps and controls, and passive,

Records of solar collectors in the United States date to before 1900,involving a black-painted tank mounted on a roof. In 1896 Clarence Kemp of Baltimore enclosed a tank in a wooden box, thus creating the first 'batch water heater' as they are known today. Frank Shuman built the world's first solar thermal power station in Maadi, Egypt, using parabolic troughs to power a 45 to 52 kilowatts (60 to 70 horsepower) engine that pumped 23,000 litres (6,000 US gal) of water per minute from the Nile River to adjacent cotton fields.

Source: https://ensia.com/features/solar-water-heaters-israel-renewable-energy-thermal-photovoltaic

Flat-plate collectors for solar water heating were used in Florida and Southern California in the 1920s. Interest grew in North America after 1960, but especially after the 1973 oil crisis.

Solar power is in use in Australia, Canada, China, Germany, India, Israel, Japan, Portugal, Romania, Spain, the United Kingdom and the United States.

II.How Solar Water Heater are used in Industries

The solar water heater is growing as one of the best and most considerable options in the industry and Many of the popular industries are also working in collaboration with the government to increase productivity and to reduce costs. Government is promoting the use of solar products as undoubtedly there are numerous benefits of it and if we talk about the highlighted advantage of opting solar energy instead of any other form of energy the key point is that it converts solar energy into heat energy or electrical energy without even releasing any sort of residue in the air.

And when we specifically talk about the commercial uses of solar water heaters, undoubtedly there are many and to be more specific Industries can use solar water heaters for washing, drying, heating, steaming, sterilizing, chemical treatment, dyeing, air drying, power generation, pasteurization, boiling and there are many more uses of an industrial solar water heater. Solar water heaters for industrial use can help to a greater extent of pollution reduction. It can be considered as an eco friendly option Therefore, industrial solar water heaters in India are gaining popularity and importance progressively.

III.Demand in Indian Market

The segment-wise statistics on Indian market are not available. Based on our work, we have pieced together the following picture.

Table 1. Estimated Breakup:

Sector	million m^2
Residential (80%)	2.108
Hotels (6%)	0.158
Hospitals (3%)	0.079
Industry (6%)	0.158
Other (Railway + Defence + Hostel + Religious places, other) (5%)	0.132
Total	**2.635**

source:http://www.greentechsolution.co.in/

The sale during 2009 is estimated at 0.55 million m2 . The CAGR of cumulative installation during 1995-2000 was 8.23%. It spurted to 20.6% during 2000-04 and further to 24.6% during 2004-08, denoting overall CAGR of 16.8% over 1995-2008. The following explains demand upsurge in recent years

. • Growth in new urban housing; rising disposable income; increased propensity for consumer durables
• Arrival of ETC & improvements in supply chain
• Energy price hike
• Policy initiatives

IV. Manufacturing And Dealing Of Solar Water Heaters

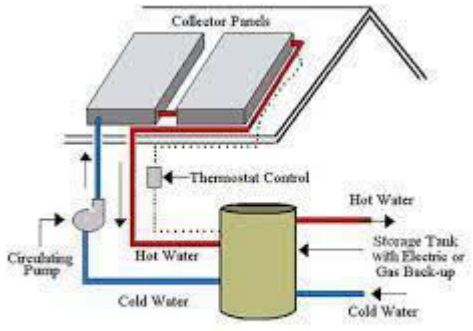
As the industrialization began to boom, the demand for different industrial products and equipment also began to blow and nowadays A number of people are becoming entrepreneurs and starting their own business. There they will need high-quality products which can better save their pockets. Solar products usage is the best option for commercial use as well . As it's gonna benefit the surrounding as well as the business holder . Therefore, people are demanding more and more of such products.
The demand for the industrial usage of solar water heaters is automatically resulting in the manufacturing and dealing of such solar products in India. You can get the list of top solar water heater manufacturer companies in India by searching online. Inter Solar is one of the best you can get for commercial purposes. Obviously, customers will be looking out for the quality in solar water heaters for durability which you can get from Inter Solar products.

V. Best Industrial Solar Water Heater : Inter Solar

As the electricity expenses are increasing day by day, people are finding solar energy products more reliable and shifting more towards these types of products. So Why not go for the best out of thousands of alternatives?
Inter Solar is the topmost industrial solar water heater dealing company in India. Their industrial solar water heaters price is the most reasonable one from a quality perspective. In addition, you can easily order an industrial solar water heater online from Inter Solar. Other quality features include the on-time delivery and there will be 24/7 customer support for you. So if you are willing to buy one you should definitely give a chance to the inter solar water heater as they have excellent durability features.

VI.ENERGY PRODUCED

In the tropics insolation can be relatively high, e.g. 7 kWh/m² per day, versus e.g. 3.2 kWh/m² per day in temperate areas. Even at the same latitude average insolation can vary a great deal from location to location due to differences in local weather patterns and the amount of overcast.The amount of heat delivered by a solar water heating system depends primarily on the amount of heat delivered by the sun at a particular place. Calculators are available for estimating insolation at a site.



Active Solar Water Heating System

source:https://www.google.com

With most solar water heating systems, the energy output scales linearly with the collector surface area.

VII. APPLICATIONS OF SOLAR WATER HEATER

1) Commercial : Hotels, Hospitals, Hostels and Dormitories.

2) Domestic : Flats, Bungalows and Apartments

3) Industrial : Process Industries, Preheating boiler feed water. In the domestic sector, hot water is used for bathing, washing of clothes & utensils etc. The requirement may, however, vary with the season of the year & number of family members. Our experience says that on an average 30 to 35 litres of water at 50 to 55º C. is consumed by an individual. Thus for a family of 4 members, 125 LPD Solar Water Heating System is quite sufficient.

Evacuated tube
ETSCs can be more useful than other solar collectors during the winter season. ETCs can be used for heating and cooling purposes in industries like pharmaceuticals and drugs, paper, leather and textile and also for residential houses, hospitals, nursing homes, hotels, swimming pools etc.
An ETC can operate at a range of temperatures from medium to high for solar hot water, swimming pool, air conditioning and solar cooker.
Swimming pools
Floating pool covering systems and separate STCs are used for pool heating.
Pool covering systems, whether solid sheets or floating disks, act as insulation and reduce heat loss. Much heat loss occurs through evaporation, and using a cover slows evaporation.
STCs for non potable pool water use are often made of plastic. Pool water is mildly corrosive due to chlorine. Water is circulated through the panels using the existing pool filter or supplemental pump. In mild environments, unglazed plastic collectors are more efficient as a direct system. In cold or windy environments evacuated tubes or flat plates in an indirect configuration are used in conjunction with a heat exchanger. This reduces corrosion. A fairly simple differential temperature controller is used to direct the water to the panels or heat exchanger either by turning a valve or operating the pump. Once the pool water has reached the required temperature, a diverter valve is used to return water directly to the pool without heating. Many systems are configured as drainback systems where the water drains into the pool when the water pump is switched off.
The collector panels are usually mounted on a nearby roof, or ground-mounted on a tilted rack. Due to the low temperature difference between the air and the water, the panels are often formed collectors or unglazed flat plate collectors. An active solar energy system analysis program may be used to optimize the solar pool heating system before it is built.

VIII.CONCLUSION

SWHs can be a cost-effective way to generate hot water for your personal use. They can be used in any climate, and the fuel that it uses, which is sunshine itself, is free.
A variety of configurations is available at varying cost to provide solutions in different climates and latitudes. SWHs are widely used for residential and some industrial applications SWH are active (pumped) and passive (convection-driven).They are heated directly or via light-concentrating mirrors. They operate independently or as hybrids with electric or gas heaters. Solar products usage is the best option for commercial use as well . Most SWH installations require backup heating ETCs can be used for heating and cooling purposes in industries like pharmaceuticals and drugs, paper, leather and textile and also for residential houses, hospitals, nursing homes,

hotels, swimming pools etc.InterSolar is the topmost industrial solar water heater dealing company in India. Their industrial solar water heaters price is the most reasonable one from a quality perspective.

IX.ACKNOWLEDGMENT

We would like to express our sincere gratitude to Delhi Technological University (DTU) and Dr. J.P Kesari who assisted us and provided the data compilation for this publications

X.REFERENCES

[1]U.S. Energy Information Administration (EIA). (2021). Retrieved 19 july 2021, from https://www.eia.gov/outlooks/aeo/, Energy, U.S., 2017.
[2] M. A. Green, S. P. Bremner, Nat. Mater. 2016, 16, 23.
[3] National Renewable Energy Laboratory - National Center for Photovoltaics. https://energy.gov/eere/sunshot/downloads/research-cell-efficiency-records.
[4] B. Saparov, D. B. Mitzi, Chem. Rev. 2021, 116, 4558.
[5] W. Zhang, G. E. Eperon, H. J. Snaith, Nat. Energy 2016, 1, 16048.
[6] A. Kojima, K. Teshima, Y. Shirai, T. Miyasaka, J. Am. Chem. Soc. 2005, 131, 6050.
[7] W. S. Yang, B. Park, E. H. Jung, N. Jeon, Science 2017, 356, 1376.
[8] J. S. Manser, J. A. Christians, P. V. Kamat, Chem. Rev. 2016, 116, 12956.
[9] G. Grancini, C. Roldán-Carmona, I. Zimmermann, E. Mosconi, X. Lee, D. Martineau, S. Narbey, F. Oswald, F. De Angelis, M. Graetzel, M. K. Nazeeruddin, Nat. Commun. 2017, 8, 15684