MOVE HEAT TECHNOLOGIES.,

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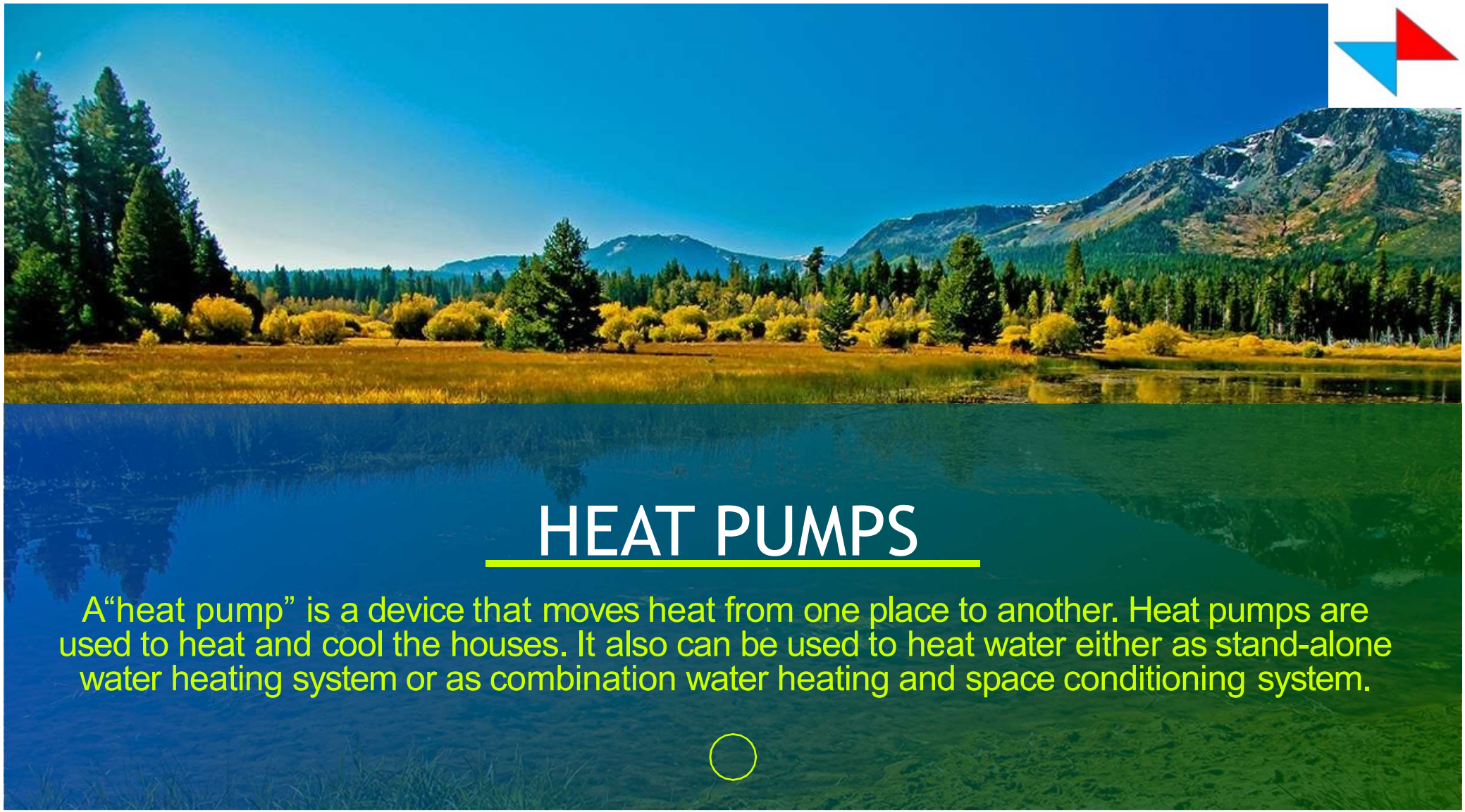
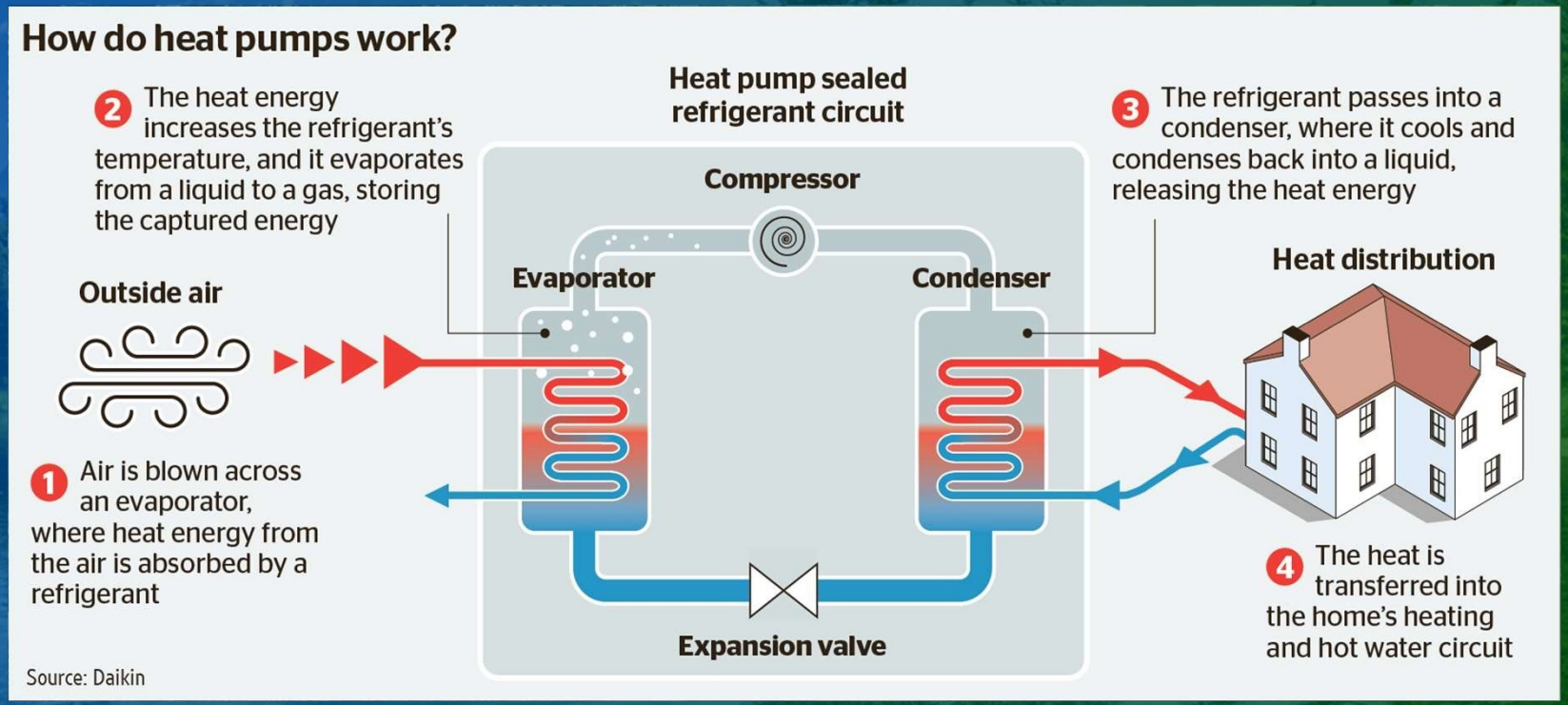


HEAT PUMPS

A“heat pump” is a device that moves heat from one place to another. Heat pumps are used to heat and cool the houses. It also can be used to heat water either as stand-alone water heating system or as combination water heating and space conditioning system.

Heat Pump Working Principle:



Heat Pump Working Principle:

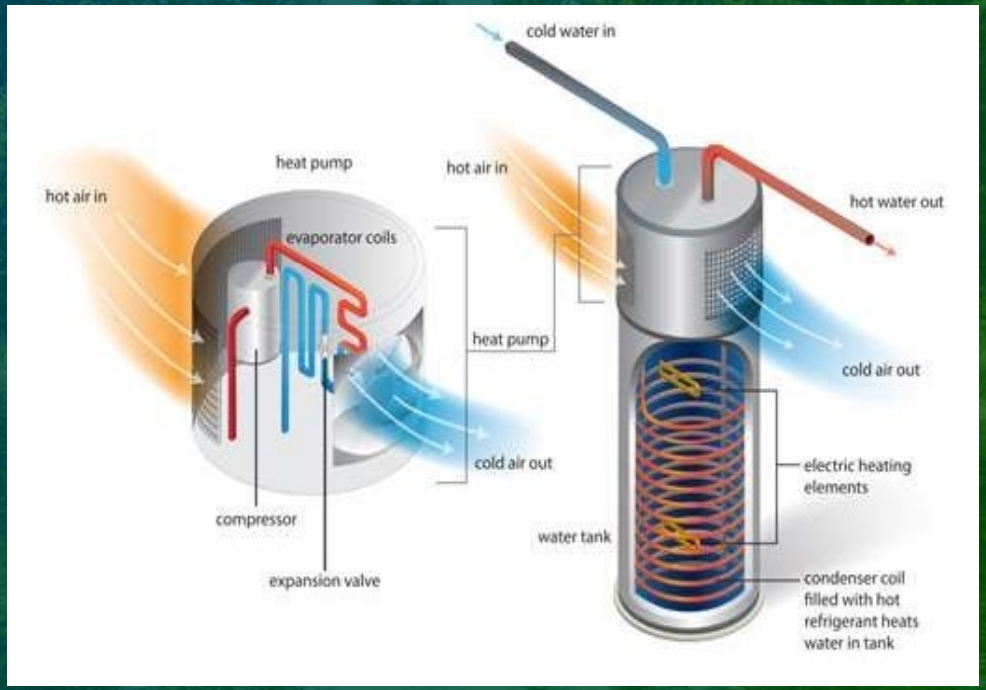
Its Principle Is Same As Refrigeration Cycle Which Operates On The Basic Of Boyle's Law Which States That Pressure And Volume Are Proportional To The Temperature. Here The Volume Is Defined And The Variable Are Pressure And Temperature. Hence The Temperature Of The Refrigerant Will In Increase If The Pressure Is Increased In The Circuit.

- **Evaporator:** Air Is Blown Across And Evaporator, Where Heat From The Air Is Absorbed By The Refrigerant Which Converts It To Gaseous State At A Low Temperature Storing The Captured Energy.
- **Compressor:** Here The Temperature Of The Gas Is Raised By Compressing The Gas To A Very High Pressure From A State Of Low Temperature And Pressure.
- **Condenser:** The Refrigerant Passes In To A Condenser Where It Cools And Condenses Back Into Liquid, Releasing Heat Energy. This Heat Is Transferred Into Water That Circulates Across Heat Exchanger In Case Of Water Heater Application And Transferred Into Air Inside The Room In Case Of Home Heating Application.
- **Expansion Valve:** Here The High-pressure Refrigerant Liquid From The Condenser Enters The Expansion Valve And Leaves It In A Liquid State At A Very Low Pressure As This Low Pressure Ensures That The Refrigerant Can Boil At A Very Low Temperature As It Enters The Evaporator.

Heat Pump Water Heater Working Principle:

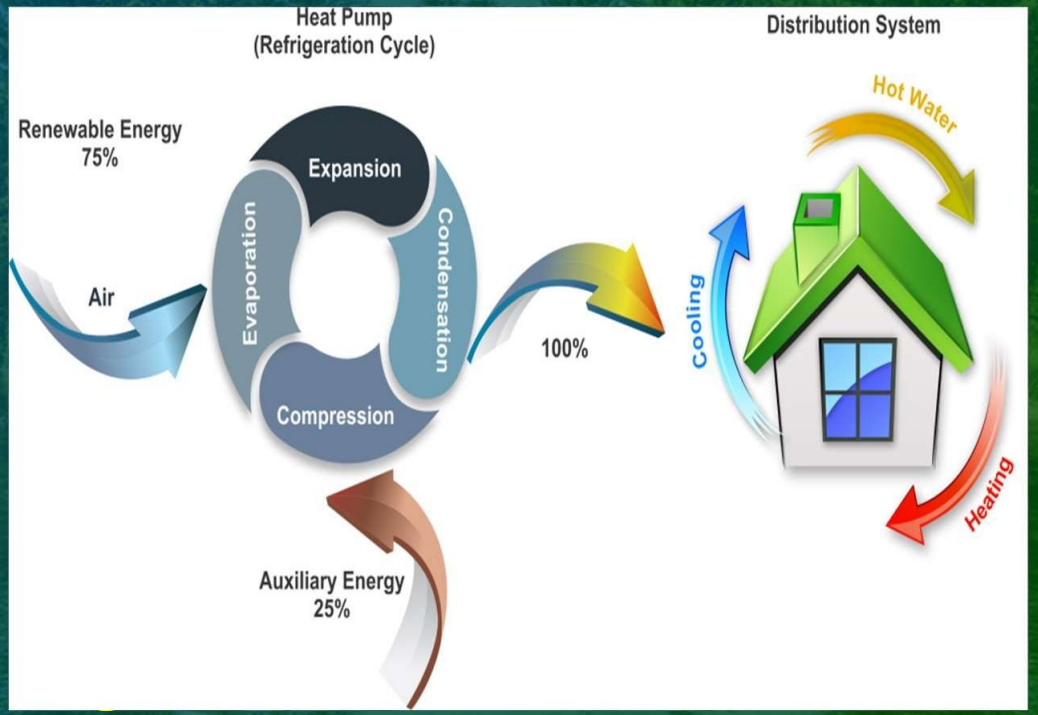
HPWH Takes The Heat From Surrounding Air And Transfers It To Water In An Enclosed Tank. Therefore, They Can Be Two To Three Times More Energy Efficient Than Conventional Electric Resistance Water Heaters And Wooden Boilers.

A Stand-alone *Air-source Heat Pump* Water Heater Pulls Heat From The Surrounding Air And Transfers It At A Higher Temperature - To Heat Water In A Storage Tank. Heat Pump Water Heaters Require Installation In Locations That Remain In The 4.4 ° C – 32.2 ºC Range Year.



Efficiency of Heat Pumps :

- The Efficiency Of Air Source Heat Pumps Is Measured By The Coefficient Of Performance (COP). A COP Of 3 Means The Heat Pump Produces 3 Units Of Heat Energy For Every 1 Unit Of Electricity It Consumes. Higher Cops Equate To Higher Efficiency, Lower Energy (Power) Consumption And Thus Lower Operating Costs.
- In Very Mild Weather, The Cop Of An Air Source Heat Pump Can Be Up To 4. However, On A Cold Winter Day, It Takes More Work To Move The Same Amount Of Heat Than On A Mild Day.
- Air Source Heat Pump Will Produce 4 KW Of Heat For Just 1 KW Of Energy Used, Whereas In Other Traditional System It Always Less Energy Produce Than The Energy Used. Here It Is Cost Savings As We Pay Only For The Energy Input.



Design Input Parameters are :

- ☐ Temperature of the Water Required
- ☐ Frequency and pattern of Usage of Hot Water
- ☐ Peak Demands and recovery time
- ☐ Volume of the Hot Water Required
- ☐ Heating Capacity and Storage Capacity
- ☐ Type of Building
- ☐ Facilities Offered at the Building
- ☐ Budget

PROS AND CONS OF HEAT PUMPS :

Pros of Heat Pumps are:

- Lower running costs : Heat pumps are cheaper to run than systems based on combustion & electrical Heaters
- Less maintenance : Heat pumps require less maintenance than combustion heating systems.
- Better Safety : Heat pumps are safer than combustion-based heating systems and electrical heaters.
- Reduces Carbon Emissions : it has an **efficient conversion rate** of energy to heat.
- Long life-span : the **average** life-span is somewhere between **14** to **15** years.

Cons of Heat Pumps are:

- High upfront cost: Heat pumps have a large upfront cost, but on the other hand, their operating costs translate to long-term savings on energy bills and lead to a path of reduced carbon emissions.

HPWH Applications are :

- ☐ Residences
- ☐ Hotels
- ☐ Hospitals
- ☐ Resorts
- ☐ Health Clubs
- ☐ Industrial
- ☐ Food Processing Units
- ☐ Restaurants
- ☐ Pharmaceutical Industries
- ☐ Swimming Pools
- ☐ Laundry
- ☐ Canteens
- ☐ Serviced Apartments.

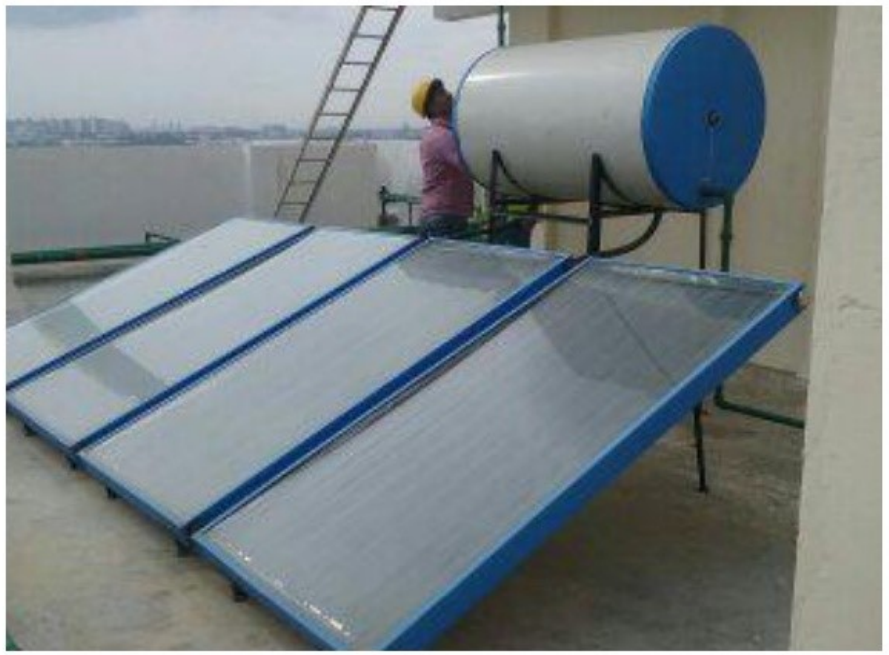
COMPARISON WITH OTHER FORMS OF HEATERS :

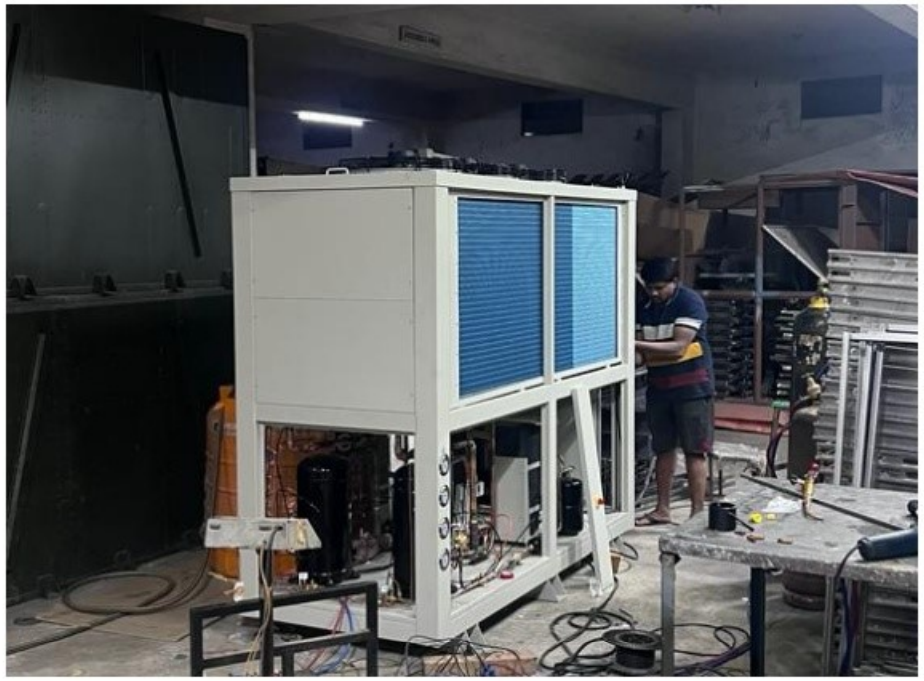
Heating Systems	Boilers	Diesel Boiler	LPG Heater	Electric Geyser	Solar Water Heater	Heat Pump Water Heater
Heat Source	Wood/Charcoal Briquettes	Diesel	LPG	Electricity	Solar	Atmospheric heatand Electricity
Efficiency	70%	80%	80%	90%	95%	400%
Safety	Low	Moderate	Low	Moderate	Moderate	High
Green Rating	Very Low	Low	Low	Moderate	Moderate	High
Maintenance	High	High	High	Moderate	Moderate	Low
Running Cost	High	High	High	High	Moderate	Low
Frequent maintenance Process	Briquette loadingand unloading, Ash Cleaning, Regular Man hours required	Diesel loadingand unloading, Stock Maintain, Regular Man hours required	Gas Cylinders stockto be maintained, Regular Man hours required	High Electricity Bills	Frequent Solar Panels Cleaning required	Zero maintenance, Once in a year routine Check
Hot water Availability	During Running Condition only	During Running Condition only	During Running Condition only	During Running Condition only	During Running Condition only	24 x 7
Average Water Heating Cost per litre (Rs./ Litre)	Rs.0.61	Rs.0. 45	Rs.0.40	Rs.0.32	NA	Rs.0.07

OUR HEAT PUMP MODELS ARE :

MODEL Description	MHHP - 250	MHHP - 500	MHHP -1000
Heating Capacity (LPH)	250	500	1000
Heating Capacity (KW)	9	13.5	27
Power Input (KW)	3	4.5	9
Power Supply	230V/1PH/50HZ & 400V/3PH	400V/3PH/50HZ	400V/3PH/50HZ
Rated Current (AMPS)	11	18	18
Recommended Usage (LPD)	1500	3000	6000
Recommended StorageTank Capacity (in Litres)	500 - 1000	1000 - 2000	2000 - 3000

OUR PROJECTS:



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SAVE EARTH