

OTEC
OMEGA TECHNOLOGY
EVAPORATIVE COOLING

BOOST YOUR ENERGY!



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Engineered to elevate Energy Conservation
..... to the next level!

Humidification
Based
Cooling System

OTEC

A Product of
OMEGA
Environmental
Technologies LLC.

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What is OTEC?

OTEC is an economic and ecological humidification (Adiabatic - Evaporative) cooling system is designed for increased energy production by providing higher energy efficiency.

Application areas:

Electricity Production:

- Gas & steam turbine plants
- Geothermal power plants
- Cogeneration - trigeneration systems

Industrial Application:

- Air-cooled, water-cooled equipment (chiller)
- Dry type coolers
- Large Roof-Top air conditioning systems

Application areas are displayed in Figure 1.



Figure 1. OTEC Applications

OTEC as a Humidification System

- In systems where **OTEC** will be applied, production interruption is not experienced, and losses such as production loss, production decrease, and productivity losses are eliminated in the application.
- **OTEC** has a lightweight and flexible structure to be installed with its specially designed frame, diffuser and filter-function mesh structure for the systems
- With its lightweight construction platform and walkways, **OTEC** does not interfere with the existing system during application, service and maintenance. It is a system that can be monitored and intervened remotely without interfering with the original structure and control system of the system.
- **OTEC** utilizes the water to bring the inlet air from the dry bulb temperature to the wet bulb temperature with its software based on calculation with a specific algorithm according to the psychrometric diagram.
- **OTEC** ensures that the maximum energy is saved by bringing the intake air to the design conditions based on the psychrometric diagram and calculation under the current geographical location and climate conditions in the Power Plants.
- **OTEC**, water, energy and maintenance expenses do not exceed 10% of savings.
- **OTEC** is an energy efficiency boosting system that provides a capacity increase and energy saving equivalent to air source efficiency, ground source efficiency in comfort or in process cooling systems.
- With **OTEC**, the pressure losses are not experienced in the inlet air, because the water is sprayed as pulverized, a high amount of water is not consumed, and there is no need for a treatment plant because there is no wastewater.
- **OTEC** extends the turbine filter life in power plants and maintenance life in cooling systems by reducing dust pollution.
- In addition to its patent filed by TPE, **OTEC** is the TRIADIC PATENT Humidification Based (Adiabatic - Evaporative) Cooling System with the documents obtained from Europe, America and Japan, the top 3 patent offices of the world that OECD accepts as an innovation indicator.
- Brand Patented **OTEC**, developed by EVS, has a patent with the patent number TR 2010 07003 B with the Turkish Patent Institute, it has European patent with the number EP2609374, the US patent with the number US2013205816 and the Japan patent with the number JP2013536398. In addition to the Triadic Patent valid in OEDC member

countries, it is a Humidification Based (Adiabatic-Evaporative) Cooling System with a Priority Patent.

- Patents and properties of **OTEC** are displayed in Figures 2 and 3



Figure 2. Patents of OTEC

Modular System which is the continuation of first triadic patented system, is explained in Part 1.3. Origin Turkey, new version of the system through the PCT is filed with the subject title “A MODULAR PRE-COOLING SYSTEM” under the number WO2019194767A2.



Figure 3. Features of OTEC

Your reliable Solution Partner:

OTEC offers effective solutions for energy efficiency studies, which are becoming more and more important in the world. In addition to energy efficiency, it also provides capacity increases in projects where it applies humidification-based (Adiabatic - Evaporative) cooling system.

Scope of Application:

In geothermal power plants with air-cooled condensers, outdoor air temperature directly affects power plant performance. The power plant is designed according to the average temperature of the place where the power plants will be built. **OTEC** contributes up to 30% increase in energy production by bringing the condenser air inlet temperature to the design conditions.

With the help of air absorbed through the condenser in air-cooled chiller groups, the refrigerant gas converts into liquid phase. The lower the temperature of the intake outside air, the better the cooling performance. At an outdoor ambient temperature of 42 ° C, if the device that makes 500 kW of cooling is consuming 200 kW of energy; At outdoor temperature at 30° C, the cooling capacity of the device will be increased to 575 kW while the energy consumption decreases to 185 kW. It is shown schematically in Figure 4.

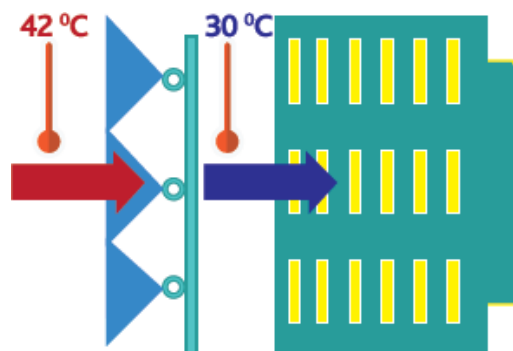


Figure 4. Schematic Representation of the System

The need for electrical energy is increasing in all developing countries. The increasing energy demand brings the need for new power plant construction to the agenda,

while necessary to improve the performance and increase the capacity of the existing power plants. It should not be forgotten that increasing the performance of existing power plants is less costly and more environmentally friendly solution. With this consideration, Enervis increase in efficiency by decreasing power plant operating costs increasing the performance and capacity of existing power plants with **OTEC** is a logical application.

The most important factors affecting the performance of existing power plants are the temperature and humidity of the environmental air. Environmental conditions are critical to gas turbine performance. The high ambient temperature decreases the air flow circulating in the gas turbine and increases the compressor load. As a result, the power generation will be reduced while the efficiency is decreased. Especially in regions with hot climate, a significant decrease in the performance of gas turbines is observed. However, when the air entering the gas turbine is cooled with **OTEC**, a significant reduction in lost energy is achieved and the cost of production is reduced.

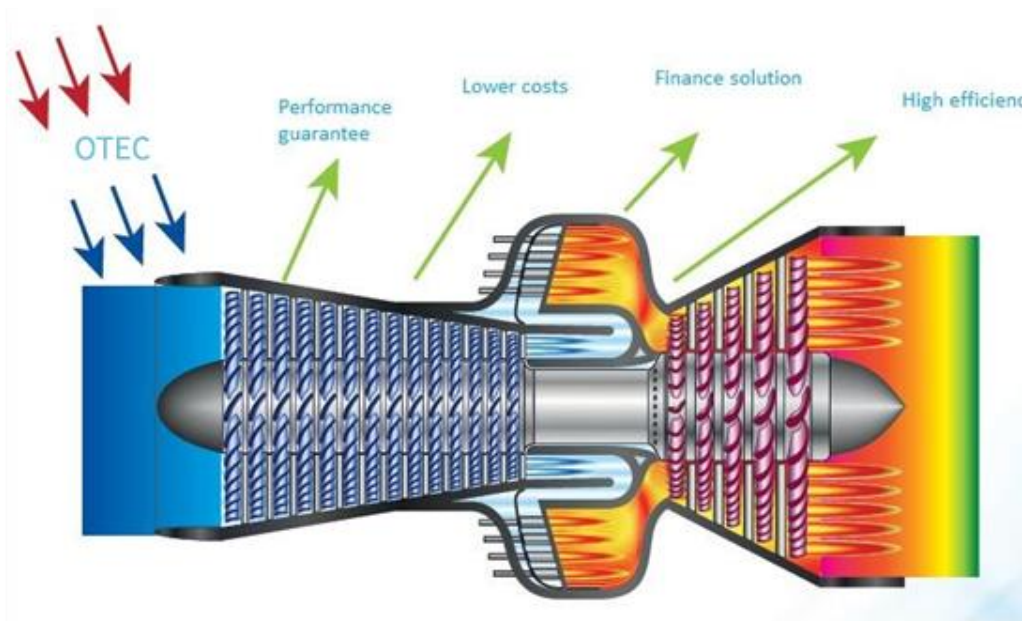


Figure 5. Demonstration of OTEC

OTEC provides maximum cooling by supplying sufficient amount of water required for air saturation in a precise balance, after thermodynamic control and psychometric analysis, with a unique algorithm.

How it Works

OTEC works according to the climatic conditions of the system it will be installed in and provides the water that needs to be saturated in the air according to the instant weather conditions and reduces the dry bulb temperature to the wet bulb temperature. Thus, it provides an increase in efficiency by reducing energy losses. The data before and after the improvement can be seen on the psychrometric chart in Figure 6.

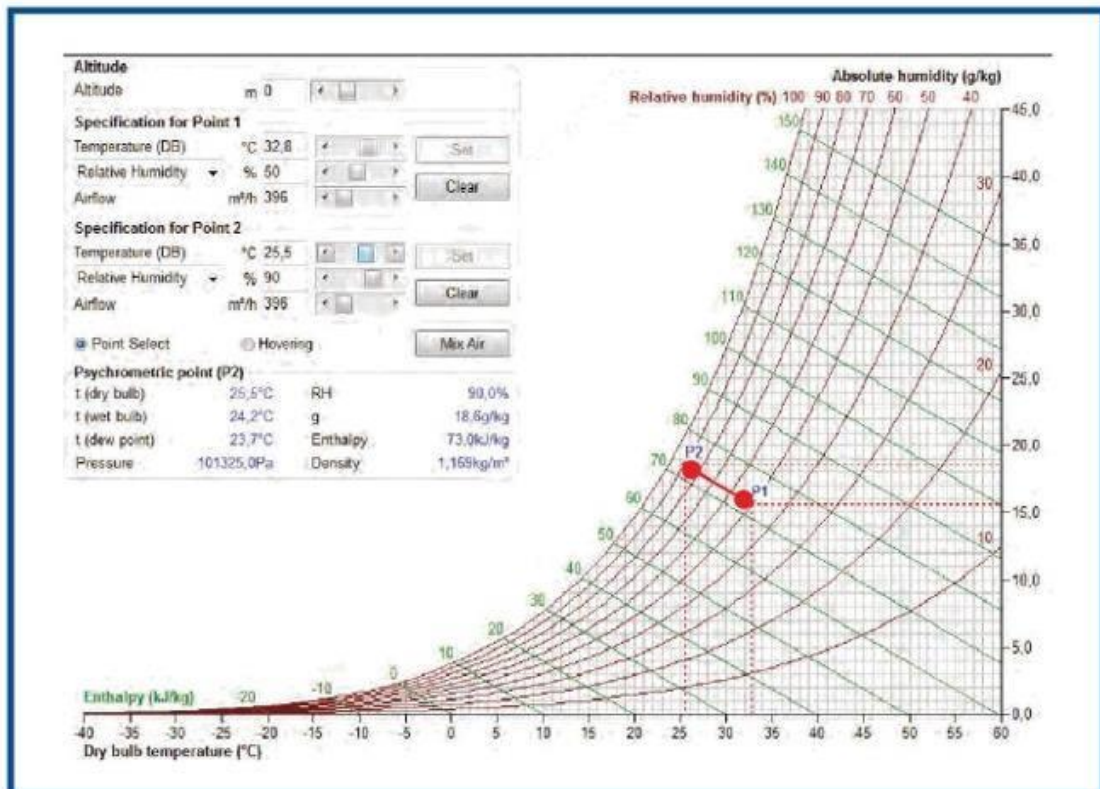


Figure 6. Psychrometric chart.

Before the Application

External Temperature 32.8 °C
Cooling Capacity (kW) 659
Energy Consumption (kW) 223
COP 2.95

After the Application

External Temperature 25.5 °C
Cooling Capacity (kW) 698
Energy Consumption (kW) 208
COP 3.35

Temperature difference providing efficiency increase 7.3 °C
COP increase 13.6%

Ews Ltd., Headquartered in Izmir, focuses on three areas:

- Survey and consultancy services,
- Energy efficiency applications (EPC),
- Solar power plant installation and operation (EPC)

Brand Patented **OTEC**, developed by EVS, has a patent with the patent number TR 2010 07003 B at the Turkish Patent Institute, it has European patent with the number EP2609374, and the US patented with the number US2013205816 and the Japan with the number JP2013536398. In addition to the Triadic Patent valid in OEDC member countries, it is a Humidification Based (Adiabatic-Evaporative) Cooling System with a Priority Patent. There is no need to stop the system for the initial installation, maintenance and repair of **OTEC**. The modular system is described below.

Single and Multiple Modular structures of **OTEC**, Humidification-Based (Adiabatic-Evaporative) Cooling System, consists of the basic components described below.

Single or Multiple Modular Structure and System Components,

OTEC Single Modular structure and system components consist of main carcass, external air louvre, the amount of water to be given to the air per module with the help of calculation, and a variable, adiabatic cooling (collector-manifold-nozzle) set for homogeneous dispersion of fogging.

Nozzle: AISI 304 solid chrome and ceramic-backed or special plastic material sprinklers have a water fogging capacity of 5-20 μ .

Collector and Manifold: AISI 304 steel drawn or special plastic pipes are resistant to minimum 10-250 bar pressure. The collectors have the feature of connecting without welding with specially developed fasteners. It has the opportunity to serve easily.

High Pressure Pumps: In the **OTEC** Cooling System, high pressure direct coupled electric motors produced with high technology are used. Ceramic piston 80-100 bar pressure pumps (domestic or imported) are inverter-controlled to ensure maximum efficiency according to their position in the system.

Depending on the system and ambient conditions, it also has a model that does not need high pressure pumps with 3-10 bar water pressure, has special plastic pipes and nozzles, and can be installed with an additional fan.

It is a system consisting of double-row movable or fixed curtain (net), drop holder separator, drain pan, pump and cabin at appropriate flow and pressure, electrical and automation panel, and humidity, temperature and differential pressure sensors etc.

OTEC Cooling Systems is a system that can be installed in systems where it will be applied without interruption and without interfering with the original mechanical structure and automation of the systems. It is a system designed and protected under the international validity of Triadic Patent, to ensure that a coarse-grained water particle does not go directly to the system (turbine, dry cooler, serpentine blades) when installed.

OTEC Modular Structure; Single or Multiple Modular Systems,

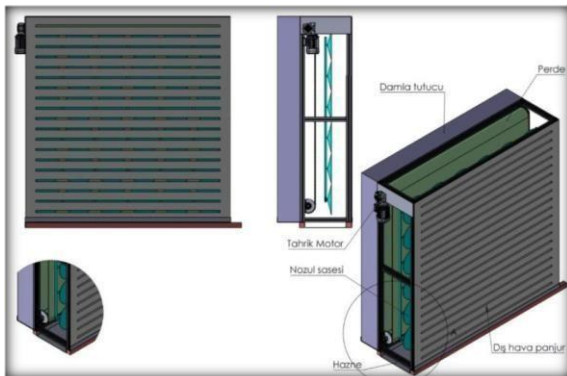


Figure 7. Single Modular System

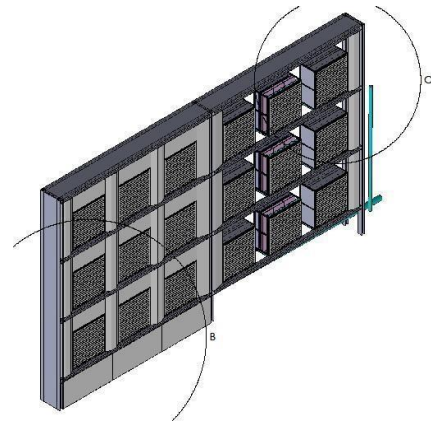


Figure 8. Multiple Modular System

The **OTEC** system prevents production losses due to environmental pollution (dust, sheets, paper, etc.) due to its structure. It reduces filter and maintenance costs by virtually none. Due to its structure that will minimize pressure loss, it is designed in such a way that it automatically washes itself when it detects contamination in the networks by means of differential pressure sensors.

The **OTEC** system removes potential coarse particles during the Automatic Washing and Fogging system, based on the ecological and economic importance of the water in the world. Consequently, the water saturated with water and the drop holder removes excess water from the system that may arise due to impact or condensation when passing through the separator. It is designed in such a way that it can be returned to the raw water tank with pprc piping to be connected to the drain pans of all existing modules.

OTEC System with Multiple Modular Structure (Wide Suction Area Like JES Dry Cooler, High Air Flow and Suction Speed Systems),

For these multiple modular systems, the temperature and humidity data of the past years and months belonging to the geographical location of the system where the system is located and the climate conditions of the region in accordance with the structure of the system where the suction air is desired to be cooled are taken. In line with this information, an adiabatic cooling based on psychrometric calculation is aimed. Accordingly, under the maximum temperature and lowest humidity conditions, the maximum water flow required by the enterprise is determined.

The outdoor temperature at which the systems to be applied **OTEC** will work or will depend on the ISO design requirement that all air-cooled systems must be based on in the first production. In order not to mislead the consumer, the maximum loss and the minimum gain that can be achieved with **OTEC** are calculated. An **OTEC** system is designed with a single or multiple modular structure whose initial return on investment can be as soon as possible. With the preliminary project, technical and commercial offers are presented to the Company. The proposal is approved by the technical and commercial management of the enterprise, and if the contract is signed, detailed implementation projects are issued.

Isometric images of **OTEC** are given in Figure 9 respectively.

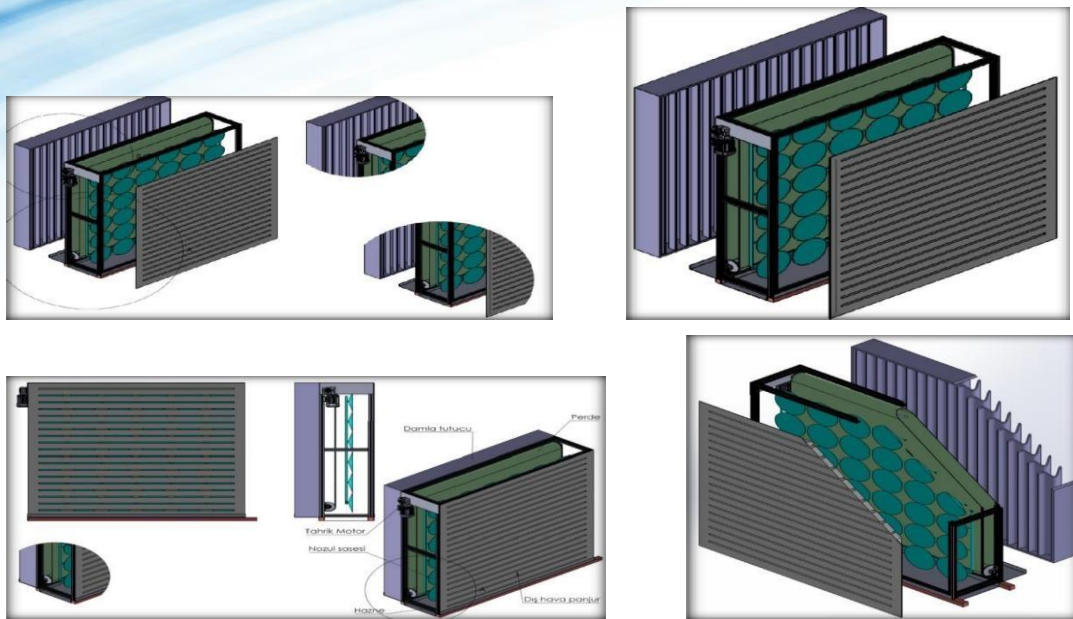


Figure 9. Isometric images of **OTEC**

Examples of Application

OTEC; Installation and Testing Stages of The Components with Rotary or Fixed Mesh
 Figure 10 shows the testing and assembly phase.



Figure 10.

Installation and Testing Stages

ENERVIS Bursa central building, Application of modular OTEC and ducts for 2 chiller suction air cooling

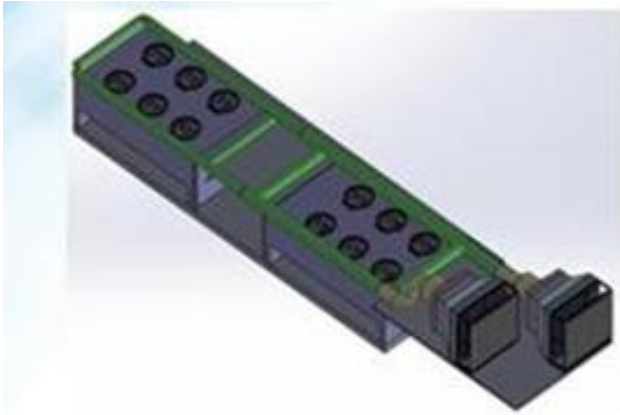


Figure 11. Application of OTEC

Representative Application For Existing Dry Cooler In Geothermal Power Plants

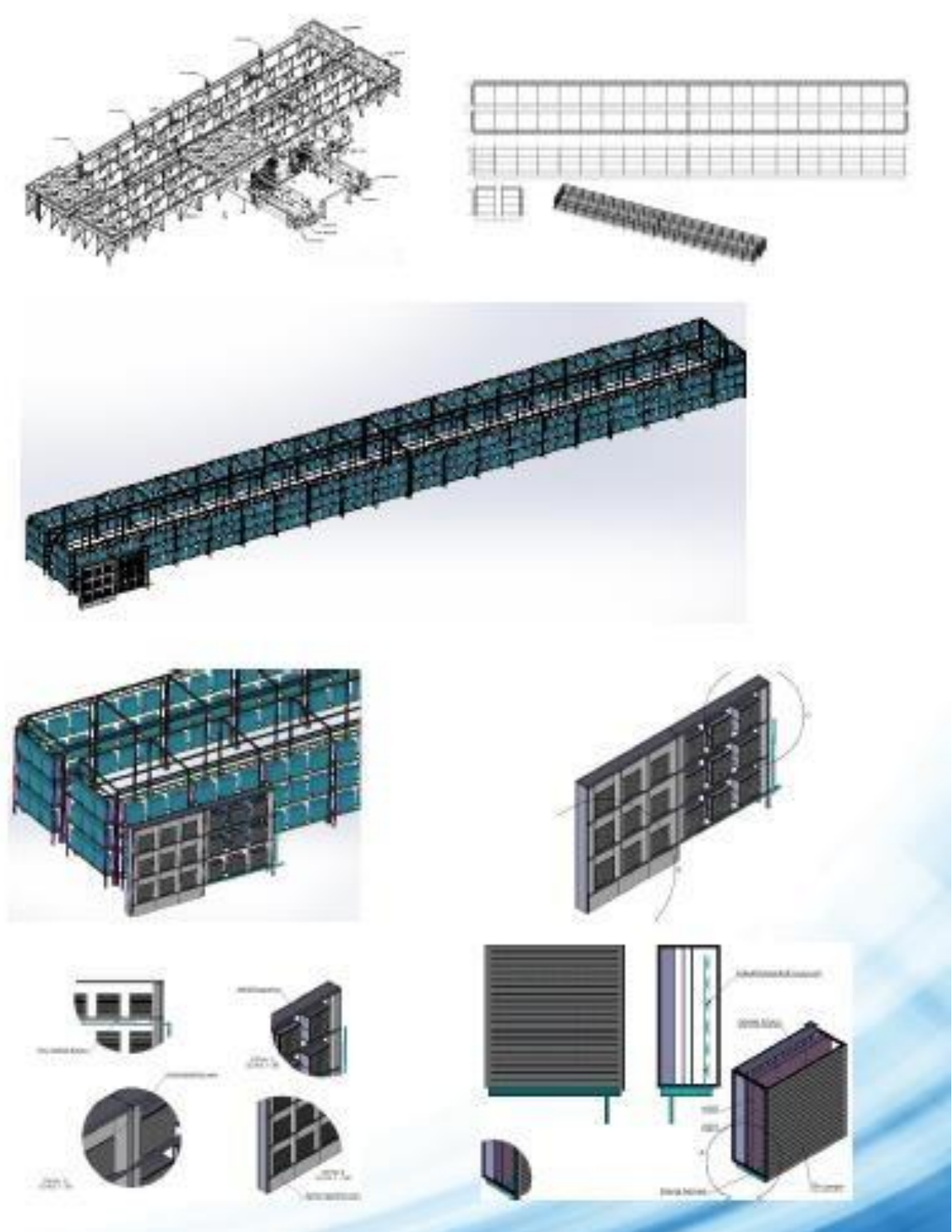


Figure 12. Representative Application of **OTEC**

Representative Application for Dry Cooler (Gas Engine Etc.)

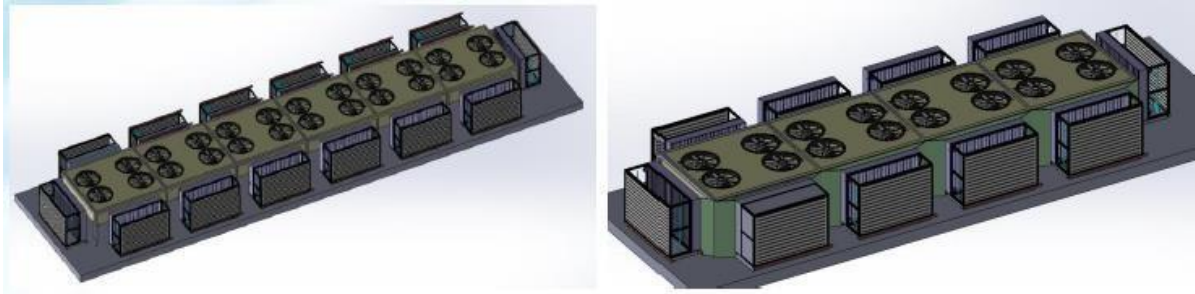


Figure 13. ACC Application

OTEC Modular at a Business in Izmir/Aliğa, Cooling System Application at the Chimney Suction of the Existing Compressor

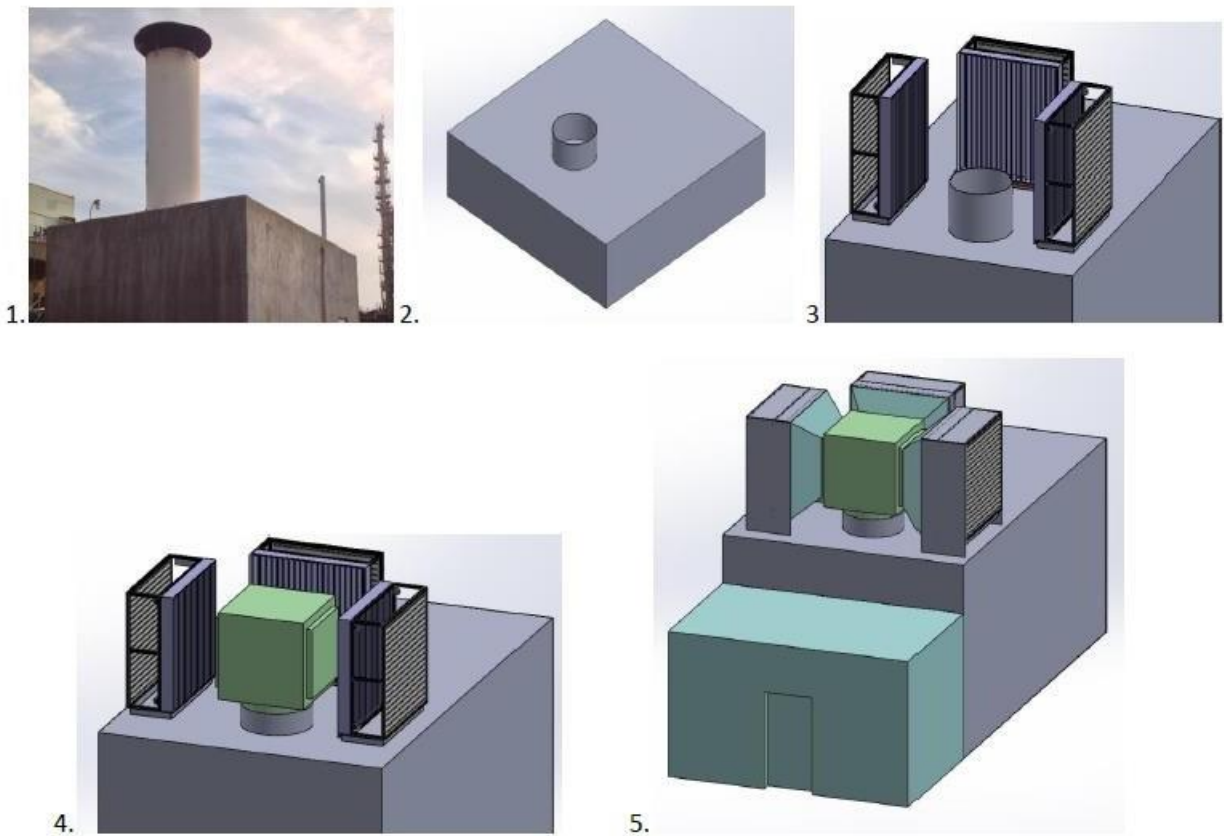


Figure 14. Cooling System Application

OTEC, based on multiple modular design,

If we give an example from geothermal power plants from a real technical study;

The system to be applied depends on the size, height, air flow and speed of the extract air area. A homogeneous adiabatic cooling is aimed in the whole area, which will cover the entire suction area homogeneously and based on a homogeneous thermodynamic control in the whole area. By dividing the whole area into zones, a system is designed to work synchronously in the total area cooling of these zones, and automation is designed according to the zones and number of pumps. Pumps, cabinets and places that will house the panels are determined.

If the enterprise requests entry under the coil, a design is made according to the number of **OTEC** Modules that will fit in the remaining space to be determined by the number of entries. Variable adiabatic cooling (collector-manifold-nozzle) set is designed for water to be given to the head of the module and the homogeneous dispersion of fogging.

According to the number of modules, the appropriate number of modules are placed side by side and one on top of the other. Static calculation is made depending on weight and wind resistance. Steel construction design is made in accordance with the appropriate material selection and the entrance to the bottom of the serpentine. This steel construction has insulated sectional doors.

OTEC, Cooling System,

OTEC consists of the module head, the amount of water to be released into the air, the collector-manifold nozzle set and high-pressure pumps. The collector-manifold-nozzle set is necessary for the homogeneous dispersion of fogging.

OTEC has instant thermodynamic control with temperature, humidity, differential pressure combined sensors. It has a software that performs psychrometric calculation with an instant and unique algorithm based on this control.

It also has a model that can operate with water pressure between 3-14 bars, does not require high pressure pumps for energy saving, has plastic pipes and special nozzles, and can be installed with additional fan (Ews ltd./Bursa application).

OTEC, Software and Automation,

The software brings the air conditions in front of the serpentine inlet (suction) to maximum adiabatic air conditions with the help of a microprocessor. The external climate conditions and the rate given by the psychrometric diagram are taken into consideration. The system is based on psychrometric calculation.

Thanks to the software, information such as the outside air inlet temperature, humidity, pressure, outlet temperature after the cooler, humidity and differential pressure and pollution, the amount of cooling, the number of pumps used and the amount of water operated by drainage can be monitored.

While the cooling capacity is increased, water consumption is kept to a minimum.

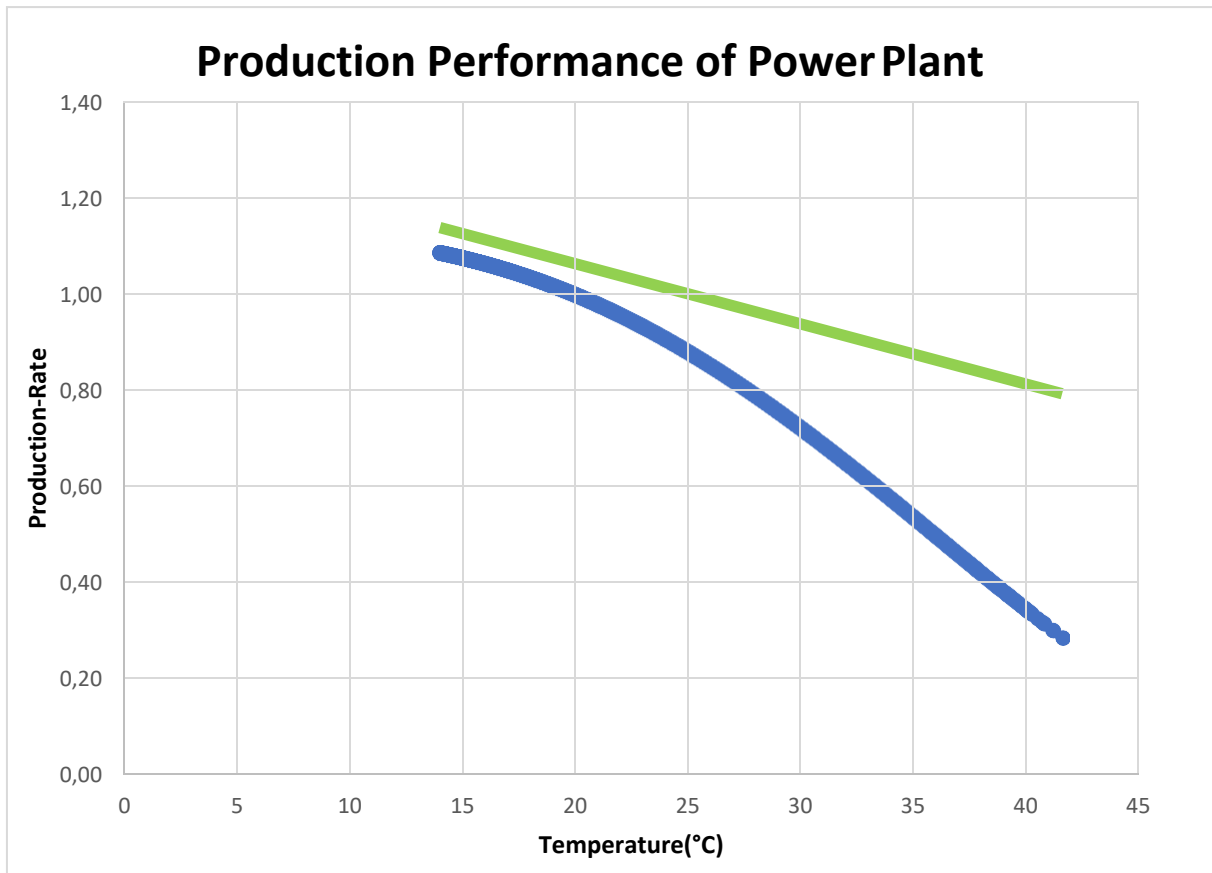
It does not cause environmental pollution due to wastewater.

System Performance

Outside temperature directly affects the power generation performance of Geothermal Power Plants. As the outdoor temperature increases, power generation performance decreases. Electricity generation decreased by 60% (Blue Curve) when the outside temperature reached 40C in a power plant under study.

In case **OTEC** Modular System works above 14 ° C and brings the system to 90% relative humidity, the performance increase (Green Curve) is shown in the chart below. The graphic belongs to a geothermal power plant application in the province of Aydın.

When **OTEC** Modular System is coupled to an 18MW power plant, approximately 2MW installed power will be added.



Graph 1. Production Curve

- The average amount of water required to achieve this performance is 102.5 m³ / h.
- If the enterprise supplies with the declaration that a fixed amount of 50m³ / h of water, the performance will vary depending on the current weather conditions.
- The loss of system performance can be roughly assessed by the approximate amount of water supply inversely proportional to the average amount of water.

The field equipment are listed below,

Table 1. PLC Field and Switchgear Material - 4 sets

| Brand | Reference | Material Description | Number |
|-------------------|---------------|---|--------|
| SchneiderElectric | BMXP342020 | CPU340-20 Modbus Ethernet CPU | 1 |
| SchneiderElectric | BMXXBP1200 | The spine of the 12s | 1 |
| SchneiderElectric | BMXCPS2010 | 24 VDC Isolated PS | 1 |
| SchneiderElectric | BMXDDI6402K | 64 Input Sink 24VDC | 1 |
| SchneiderElectric | BMXDDO6402K | 64 output (Transistor) | 1 |
| SchneiderElectric | BMXAMI0810 | 8 logins | 7 |
| SchneiderElectric | BMXFCW303 | FCN 2 x 20 vessel 3m kablo (one end opening other end 40 way connector) | 4 |
| SchneiderElectric | BMXFTB2820 | Connection blocks of 28 for spring PTO | 7 |
| SchneiderElectric | TCSESU043F1N0 | 4 x 10/100TX port + 1 x Fiber optik MultiMode | 1 |
| SchneiderElectric | HMIGTO5310 | 10,4" TFT LCD 65K color VGA 2 x Com, 2 x USB, 1 x Ethernet 96 Mb | 1 |
| SchneiderElectric | XBTZ9980 | M340--> XBTG communication cable | 1 |
| SchneiderElectric | ABL8RPS24100 | UNIVERSAL P.S. 100-500/24V 10 A | 1 |
| SchneiderElectric | RSL1PVBUB | 24V Slim Relay | 64 |
| SchneiderElectric | LV431630 | NSX250F TM250D 36kA | 1 |
| SchneiderElectric | METSEPM2130 | PM2130 LED 31st Ext, Data logging | 1 |
| ALCE | SMR-AKT1-0010 | 250-5 current transformer class 1 2,5VA | 3 |
| SchneiderElectric | A9F74110 | iC60N 1P 10A C | 3 |
| SchneiderElectric | A9F74116 | iC60N 1P 16A C | 1 |
| DANFOSS | SMR-SRF-0008 | 5,5kw 380V speed controller | 20 |
| SchneiderElectric | GV2ME16 | Engine protection switch GV2ME 9-14A | 20 |
| SchneiderElectric | GVAE11 | PLUG IN AUX. INO OR NC | 20 |
| SchneiderElectric | GV2AF3 | TERMINAL BLOCK | 20 |

Table 2. OTEC, 2000*2000*900 - ~ Approximate material to be used for 396 modules are listed below;

| Material Description | Number |
|--|--------|
| 40*40 anodized winged aluminum profile | 8.000 |
| 40*25 anodized aluminum intermediate section profile | 4.000 |
| 40*40*40 corner aluminum wedge | 3.168 |
| Drip holder | 63.500 |
| Drop holder wing nail (25 cm 25mm range) | 38.000 |
| For M8 clip covers | 6.350 |
| Sag left top 900x2000 double cidar insulated 1 face painted cover | 1.188 |
| Plastic cover grips | 3.186 |
| 20*30 box profile with 6th transmission shaft, divisional framework AG | 2.376 |
| 2000*2000 exterior air shutter aluminum painted | 396 |
| CR collector, manifold, nozzle slot set | 396 |
| Draining pan 2000X900X20 polyester coated | 396 |
| Site installation consumable material + transport + crane + external laboring % 10 | 396 |

Table 3. Required Materials

| Brand | Reference | Material Definition | Number |
|---------|--------------|--------------------------|--------|
| SEVAL | SMR-SRF-0001 | 3*1,5mm ttr cable | 20000 |
| SEVAL | SMR-SRF-0002 | 3*0,75 mm blendajl cable | 60000 |
| ENERPAN | SMR-SRF-0003 | Sheet pan | 20000 |

OTEC Multiple Modular System, also when it is divided into regions;

Other approximately required equipment:

- The set-in terms of 4-6 number of panels and pumps
- 4-6 suitable sizes and quality containers
- Scada and system software provides using a Combined set containing 50 Testo Temperature, Humidity and Differential Pressure Sensors.
- For **OTEC** Adiabatic Cooling System ~ 165 tons of steel construction suitable material will be used.

- The pump, nozzle spare equipment and chrome pipe list are listed in Table 4 below.

Table 4. Pump, nozzle spare equipment list

| Brand | Reference | Material Description | Number |
|--------------|------------------|--|---------------|
| SUTEM PUMP | MP 4808 HT | MP 4808 HT , 48 lpm 80 bar 7,5 kW ceramic piston | 66 |
| SUTEM NOZZLE | CR NOZZLE 0.5 | 0,194 lpm/nozzle => 0,5 mm Cr. Nozzle (70 bar) | 15444 |
| SUTEM PUMP | MP 4808 HT | Same legending – spare pump | 10 |
| SUTEM NOZZLE | | 0,194 lpm/nozzle => 0,5 mm Cr. nozzle (70 bar) spare NOZZLE | 5000 |
| NOT | CR.BORU | Group and regional cr. Piping included top material | 0 |

OTEC Multiple Modular System, PLC is controlled, Based on the previously mentioned information, reading inlet temperature, humidity and differential pressure values and comparing them with outlet temperature, humidity and differential pressure values and makes a psychrometric analysis to capture the entered humidity, a system has been designed to bring the complete system to the desired values.

- In addition, the amount of water used, the amount of recycled water, the inlet-outlet temperatures, humidity values and differential pressure values at the time of operation of the system are recorded either instantaneously or at certain intervals.
- The faults and alarms present in the system are kept both instantaneously and permanently in the memory.
- System communication can be selected as MODBUS or ETHERNET.
- If desired, data can be adapted to existing operating systems via MODBUS-ETHERNET.
- The system algorithm is built with Master CPU and Slave CPU.

OTEC Multiple Modular System, it is designed as to give as geothermal fluid, as condensate water and as aggregate water from drain pans

- All the water to be obtained will mix so as to be mixture in the outdoor pool, let to be to rest, and after lowering to around 35-40 ° C, it will feed the reverse osmosis system.z
- Outlet water values are given in the Table 5 below.

Table 5. Water values

| Parameters | Values |
|--|------------------------|
| System feed water flow | 50.0 m ³ /h |
| Product water flow rate | 40,0 m ³ /h |
| System approximate efficiency | 80% |
| Design water temperature | 35°C |
| Daily production capacity | 900 m ³ |
| The pressing pressure | 9 bar |
| Product water tds value | <15 mg/l |
| Product water conductivity value | 40 μS/cm |
| Product water pH value | 4,20 |
| Total Membrane Number | 42 |
| System average flux rate (l/m ² -h) | 28,1 |

- The Modulus designated at Purification system can make a decision after that if it is obvious that 50m³ / h - 102,5 m³ / h provided water flow. The **OTEC** system is designed to operate either at full capacity or according to the amount of water that can be given. In this respect. In the system where **OTEC** system will be applied, it will not affect the filter advantage, but the loss that can be provided depending on the amount of cooling will negatively affect the return gains.
- System operational expenses are designed not to exceed 10-15% of the earnings.
- The 66 pieces of 7.5 kw ceramic piston pump motors will be used in the system.
- According to the decision to be made after the meeting, for a new and partner p&pd - (product & process development)of system , if there is more advantageous in water treatment values compared to chrome nozzles; Instead of 40-100 Bar high pressure ceramic piston pumps , special plastic nozzles working at 3-14 Bar, if it is approved to operate with pumps of suitable flow and power, It might be provided a significant reductions of cost at the initial investment and at operational expenses.

OTEC for Multiple Modular System, to talk about a real example of project and of details. In this case a technical work can be viewed for those, an existing compressor in İzmir / Aliğa, a Chimney installed for the outdoor Extraction Air, **OTEC** Cooling System application.

OTEC for power supply, By placing an external panel in the switch room, the system will be fed by laying 4 * 6 mm² NYRY cable through 1 " galvanized pipe. Monitoring and control of **OTEC** will be done by PLC panel. Modbus RS485 communication system will be installed to transfer the signals on the PLC panel to the existing DCS. Its essential grounding will be connected to the main ring of the enterprise from two different points. Grounding cables will be provided according to the conditions specified in the Technical Specifications. From a point that determined by the business. There will be an isolation valve at the point where the demineralized water is taken from. Supply and installation of materials for the support of pipes are within the scope of the offer and the support types are determined according to the business standards.

As in the schematic drawing below, Independent **OTEC** modules are placed around the chimney that the compressor sucks, suction air will be cooled. In the sample project, the existing Chimney is shortened first, the reason for installing modules that work independently around each other is due to the increased specific gravity of the cooling air with suction power and speed, hitting the top of the flue body and preventing condensation.

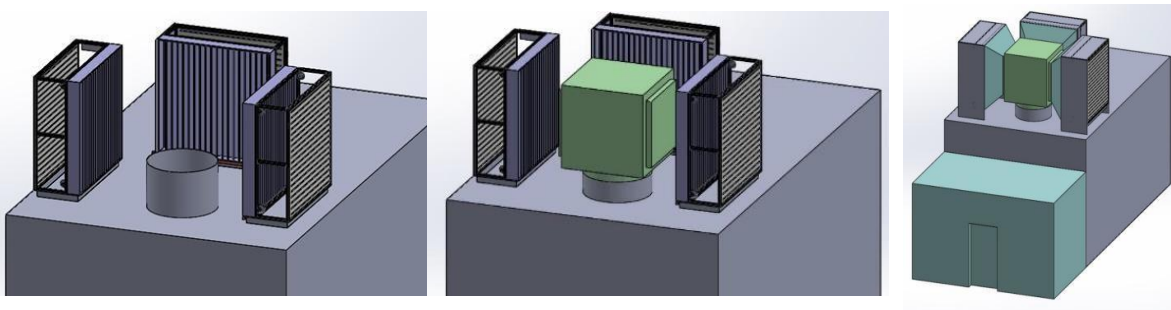


Figure 15. Schematic drawing

The software, which automatically determines the amount of water supplied to the extract air according to the outside temperature and humidity, is explained above. Thanks to the module structure, the entire amount of water supplied to the intake air will evaporate. Adjustable by the operator,

In the air saturated with intermittent humidity, possible water particles due to climate conditions and air velocity are not desired. Therefore, liquid phase water from the chimney to the compressor will be prevented at the end of the system by using a droplet separator in the appropriate range and measure.

With the evaporative cooling system, the outside air temperature, humidity, pressure and the temperature, humidity, differential pressure and the amount of water consumed after cooling will be traceable.

A connection (box) will be established that will connect **OTEC** modules to the chimney. Although the system has been designed so as not to cause any malfunction, necessary measures have been taken in such a way that there will be no adverse effect on the extract air and suction flow in case of any malfunction. **OTEC** continues to act as a coarse and fine filter when it is not cooling.

In the modules to be used in compressor intake air cooling work, the pollution of the system is controlled by differential pressure. When the total pressure loss in the air intake of the system exceeds 90 Pascal, automatic filter cleaning is performed by giving excess water while the system is running. In this case, excess water will either be returned to the demineralized line, depending on the request of the enterprise, or this excess water that may occur due to washing with a drainage line will be transmitted to the rainwater line. Since the system is designed to bring the suction air to 90% relative humidity, water in liquid phase will be prevented from entering, and the drop holder described above has been added to the system as an additional measure for additional prevention due to the sensitivity of the system. Also, if the system detects contamination despite automatic washing, the warning system will be activated. For this reason, the curtain structure (double mesh) is designed as sliding for easy removal, cleaning or replacement with a new one.

Sample Project Earnings and Consumption Values

The data for cooling the suction air of an existing compressor in an enterprise in İzmir / Aliğa was taken from the Aliğa station of the Izmir Meteorology 2nd Regional Directorate. In order to increase the sensitivity of the study, the average temperature and relative humidity of 2017 were requested from İzmir Meteorology 2nd Regional Directorate in the form of daily data. The data were examined on a daily basis and for the days with temperatures above 15 °C, wet thermometer temperature was determined in the software logic of the **OTEC** modular system, with the relative humidity of 90%. By determining the amount of water required to bring 90% relative humidity, the amount of water required for the suction air flow of this Compressor was determined.

If **OTEC** was established in 2017 in line with the data received from İzmir Meteorology 2nd Regional Directorate, it would be expected to cool the suction air by working within the days specified in the table 6 below. Since it is thought that the data received will work 24 hours a day due to the daily average data, approximately 5,232 hours the system will work according to 2017 data.

Table 6. **OTEC**'s Operating Days & Schedule.

| Month | Number of Days | Operation Time (hours) |
|--------------|----------------|------------------------|
| February | 1 | 24 |
| March | 6 | 144 |
| April | 15 | 360 |
| May | 31 | 744 |
| June | 30 | 720 |
| July | 31 | 744 |
| August | 31 | 744 |
| September | 30 | 720 |
| October | 29 | 696 |
| November | 7 | 168 |
| December | 7 | 168 |
| Total | 218 | 5232 |

In addition, in accordance with the test conditions specified in the technical specifications, a temperature drop occurs in the suction air above 7 °C in weather conditions above 25 °C and 50% relative humidity. In accordance with the daily average data obtained from İzmir Meteorology 2nd Regional Directorate, the average water consumption was

calculated as 0.35 m³ / h and the average temperature drop was 7.77 °C, based on the days with values above 25 °C and 50% relative humidity.

As known; The global climate change experienced in our world is the increasing carbon emission rate.

Reducing or controlling the carbon emission rate is only possible by providing Energy Efficiency!



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