



ARISTON
The home of sustainable comfort



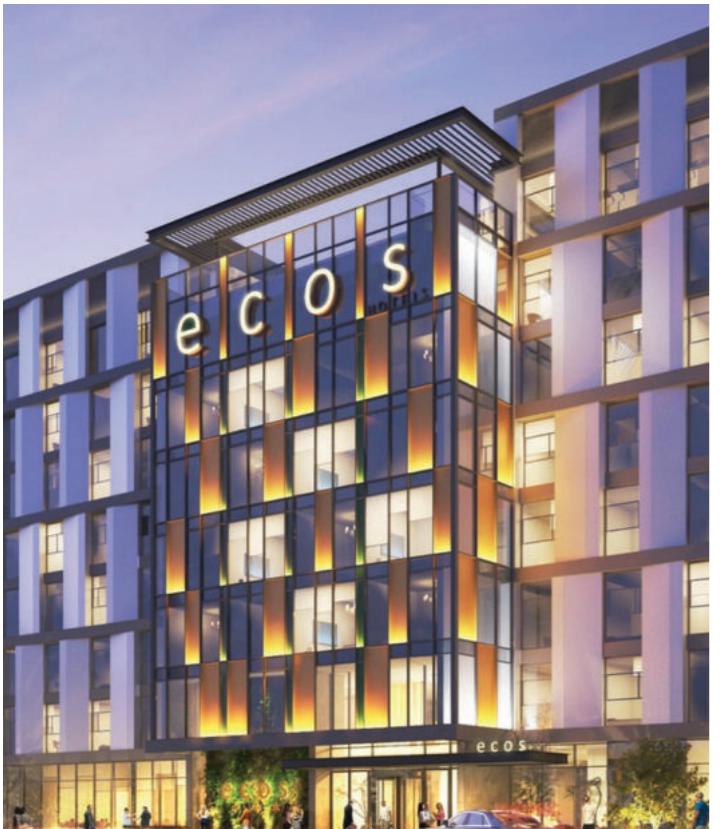
A more **sustainable**
world starts at **home**

PROJECT REFERENCE BOOK



Introduction to case studies featured.

Ariston Middle East delivers social and economic benefits to the contracting industry in the Middle East through sustainable solutions for water heating. The following case studies demonstrate how Ariston Middle East leverage its research and innovation to offer excellent social and economic benefit to clients across the spectrum.



ECOS Hotel, Dubai.

/ The opportunity

ECOS Dubai was conceived as the first of a hotel chain by property developers Faisal Holding, a conglomerate of numerous businesses including property and hospitality, operating in UAE for the past 48 years. The objective is to provide modern-day upwardly mobile and young travellers unparalleled hospitality services at affordable rates. Sustainability as a feature had to be prioritised since it has a high appeal to the selected target audience. The need was to install an efficient sustainable solution for hot water as well as cooling for 304 rooms, a restaurant, and a central kitchen.

/ The challenge

The hotel design and architectural plans had limited room available for water heating equipment. Despite this, Ariston's skilled service engineers overcame the challenge by leveraging their technical expertise.

/ Approach

Four water to water heat pumps were installed: two **AR-120WTP** and two **AR-160WTP**. The combination of the heat pumps installed has a capacity to heat 24,000 litres of water by generating 550 kW of heating *power with a consumption of 136 kW of energy at full capacity. The calorifier tanks have a capacity of 4,000 L each. The target water temperature is set at 60 °C with inlet water temperature of 29 °C and outlet water temperature of 59.2°C. The heat pumps have an intelligent controller and are not affected by the weather. The installation at ECOS

BUILDING DATA

Type of application: Hotel chain

Number of buildings: 1

Hot water demand: 24,000 l/day at 60°C

Total annual energy requirements: 67,906 kWh

PLANT TECHNICAL DATA

Feeding category: water

Heat production technology:
water-water heat pump

Heat pump output power: 160 kW

Number of heat pumps: 4

Heat pump COP: 4,7



set the minimum ambient temperature at 20 °C that works well in Dubai. While the heating operation takes place through the condenser of the water to water heat pumps, the evaporator generates cooling that is utilized to cool down the GRP tank, for use to aid the chiller operation.

/ Outcome

The heat pumps installed in ECOS save **the property energy consumption amounting to a cost reduction of more than AED 450,000 over a year**. The installation was fitted into the space available. The heat pumps meet Faisal Holdings requirement for water heating as well as cooling the water in the GRP tank. **The solution implemented was able to raise the temperature of 24,000L from 20 °C to 60 °C in just 2 hours while consuming 136 kW of power only**. The total cooling capacity of the proposed heat pumps is around 384 kW. **The payback period for the installation is around 2.5 years only**.



AR-120 WTP

Heat pump floor standing water heater water-water for the production of hot water:

- / Heating capacity: 120 kW
- / Heating water capacity: 1720 l/h
- / COP at source water temperature 20°C, water inlet 29°C and outlet 59.2°C: 4.71
- / Refrigerant: R134 A
- / Max. water temperature: 80 °C



AR-160 WTP

Heat pump floor standing water heater water-water for the production of hot water:

- / Heating capacity: 160 kW
- / Heating water capacity: 1720 l/h
- / COP at source water temperature 15°C, water inlet 15°C and outlet 55°C: 4,7
- / Refrigerant: R134 A
- / Max. water temperature: 80 °C



Industrial City Labour Camp, Dubai

/ The opportunity

The Tecom Authority had an issue with high electricity bills due to use of electric water heaters in a labor camp with many tenants. Ariston provided detailed study of the full system, including the system savings, full design, and made a commitment to reduce energy consumption by at least 25%. The solution involved replacement with heat pump water heaters that translate into a reduced carbon footprint and a more environmentally responsible choice.

/ The challenge

The Labour Camp buildings were constructed many years back so the installations in place were aged and had to be replaced by new systems requiring a different framework.

/ Approach

Ariston installed 168 **NUOS PRIMO 240 HC** heat pumps with 240L and 3575W capacity in the water heater rooms of the LV1 buildings. 224 numbers of 100L **NUOS PRIMO** units were installed in other areas. In the eight buildings of the LV1A model, 192 **NUOS PRIMO** replaced the electric units inside the toilets. With GRFN, experts in indigenous build overseeing the project and ENOVA, JV between MAF and Veolia as EPC Contractors the project was successfully completed on time.

BUILDING DATA

Type of application: Big residential complex

Number of buildings: Multiple

Hot water demand: 24,000 l/day at 60°C

Total annual energy requirements: 270.109 kWh

PLANT TECHNICAL DATA

Feeding category: water

Heat production technology:
water-water heat pump

Heat pump output power: 160 kW

Number of heat pumps: 168

Heat pump COP: 4,7



/ Outcome

Operating the heat pumps has a significant impact on energy savings, while maintaining the heating for a reasonable period. The Dubai Industrial City Labour Camp saves approximately AED 350,000 over a year. It will recoup its investment in approximately 3.5 years.



/ Installed products



NUOS PRIMO

Heat pump wall hang water heater air-water for the production of domestic hot water:

- / Energy class ErP A tapping profile M
- / Average thermal power: 1,200 W
- / Average electrical power consumption in heat pump mode: 250 W
- / COP: 2,17
- / Refrigerant type R-134a
- / Max. water temperature heat pump only mode: 55°C



Double Tree Hotel by Hilton, Fujairah.

/ The opportunity

Double Tree Hotel by Hilton, a modern and luxurious hotel located in Fujairah City is a symbol of comfort for business and leisure travellers around the world. The upscale guests appreciate high standards and imbibing modern trends such as ecology concern. The hotel requires hot water and cooling for 228 rooms, a restaurant, and a central kitchen.

/ The challenge

The hotel required cost saving solutions that work for both water heating and cooling.

/ Approach

Taking into consideration the specific profiles of the building, space available and the hotel's budget, 3 **AR-160WTP** that are not affected by the air temperature were installed along with one new generation **AR-80WTP** that works on the reverse Carnot Cycle and one

AR-40WTP known for its properties of reducing carbon emissions These water-to-water heat pumps provide hot water as well as cool the water to the acceptable degree by DM. The heat pumps are sustainable and renewable solution with efficiency up to 400% (COP = 4). **The heat**

BUILDING DATA

Type of application : Hotel

Number of buildings: Multiple

Hot water demand: 26,000 l/day at 60°C

Total annual energy requirements:60.109 KWh

PLANT TECHNICAL DATA

Feeding category: water

Heat production technology:
water-water heat pump

Heat pump output power: 80 kW and 160W

Number of heat pumps: 4

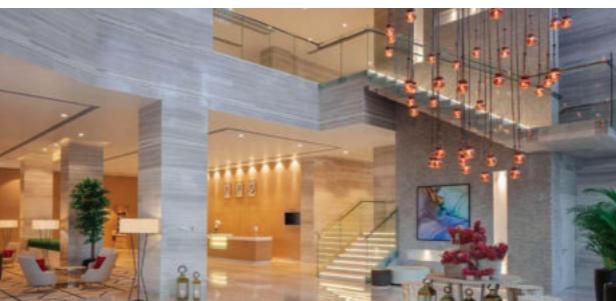
Heat pump COP: 4



pumps have the capacity of heating 25,000 litres of water utilising 600kW energy. While the heating operation takes place through the condenser of the water-to-water heat pumps, the evaporator generates cooling that is utilized to cool down the GRP tank, for use to aid the chiller operation.

/ Outcome

The Ariston heat pumps installation meet the hotel's requirement for water heating as well as cooling the water in the GRP tank. **The installations saved the hotel app. AED 380,000 per year resulting in full payback of investment in three years.**



/ Installed products



AR-160 WTP

Heat pump floor standing water heater water-water for the production of hot water:

- / Heating capacity: 120 kW
- / Heating water capacity: 1720 l/h
- / COP at source water temperature 20°C, water inlet 29°C and outlet 59.2°C: 4.71
- / Refrigerant: R134 A
- / Max. water temperature: 80 °C



AR-80 WTP

Heat pump floor standing water heater water-water for the production of hot water:

- / Heating capacity: 80 kW
- / Heating water capacity: 1720 l/h
- / COP at source water temperature 15°C, water inlet 15°C and outlet 55°C: 4.7
- / Refrigerant: R410 A
- / Max. water temperature: 60 °C



BUILDING DATA

Type of application : Residential complex

Number of buildings: Multiple

Hot water demand: 20,000 l/day at 60°C

Total annual energy requirements: 60.109 KWh

PLANT TECHNICAL DATA

Feeding category: water

Heat production technology:
water-water heat pump

Heat pump output power: 160 kW

Number of heat pumps: 4

Heat pump COP: 4

Damac Hills 2 – Navitas, Dubai.

/ The opportunity

Home to the Tiger Woods designed international golf course, The Dubai Rainforest and the high-end retail and entertainment district, Vista Lux, Navitas will showcase 'Sustainability' around which the 55 million square foot Damac Hills 2 community has been developed. The concept of green sustainable living is an integral part of the community. Among other unique green features is a Hydroponic café and restaurant where visitors can select their own produce.

/ The challenge

The hotel is built on a property that claims to be a forerunner of sustainable living. The solution had to fit the image as well as the budget and requirement.

/ Approach

Navitas Hotel & Residences are fitted with Ariston Heat pumps to deliver 20,000 L of hot and cold water across the property. 4 x **AR-160WTP** water-to-water heat pumps are installed to provide hot water as well as cool the water to the acceptable degree by DM. The heat pumps offer a sustainable and renewable solution with efficiency up to 400% (COP = 4). They have a high efficiency as they use compressor and thermal expansion valve and the air energy to heat water.



/ Outcome

The investment in heat pumps installed by Ariston was covered by savings generated in approximately 2.5 years. The property saves **AED 450,000 per year through reduced energy consumption.**



/ Installed products



AR-160 WTP

Heat pump floor standing water heater water-water for the production of hot water:

- / Heating capacity: 120 kW
- / Heating water capacity: 1720 l/h
- / COP at source water temperature 20°C, water inlet 29°C and outlet 59.2°C: 4.71
- / Refrigerant: R134 A
- / Max. water temperature: 80 °C



Courtyard by Marriott, Dubai.

/ The opportunity

Placed behind Mall of the Emirates, Courtyard by Marriott Al Barsha is a 4-star hotel in Dubai. The structure consists of a building with 200 guest rooms, a swimming pool and a fitness center.

The request was to satisfy the sanitary hot water demand for all the users of the building by using renewable energy to obtain a leading, economic and green solution.

/ The challenge

An **hybrid system consisting of a heat pump and solar collectors** was proposed to cover the hot water demand requirements by **utilizing the free solar energy** generated by the collectors to pre-heat the water needed by the users of the building and then reaching the required water temperature with the heat pump. Such hybrid system assures the optimum savings in energy since heat pump as a backup source utilizes the ambient air temperature to heat up water while keeping **electric consumption as low as 25%** when compared to traditional electric heating.

/ Approach

To cope with the large quantity of water required by all the users of the hotel, it was necessary to select a high-power commercial heat pump, the **AR-35 PTP** with a nominal **output power of 45 kW**. The heat pump brings to the desired temperature the water previously preheated by the solar system consisting of a battery of 12 collectors type **KAIROS CF 2.0-1**. The hot water thus produced is stored at a temperature of 60 ° C in a cylinder **MAXIS CD1 2500**, a single coil storage tank with a nominal capacity of 2500l. From here the water can be relaunched towards the various users of the hotel. This synergy between the heat pump and the solar system has led to **reduce the overall energy consumption**, making the best use of renewable energy sources, air and solar.

BUILDING DATA

Type of application: hotel
Number of buildings: 1
Number of rooms: 200
Hot water storage temperature: 60 °C

PLANT TECHNICAL DATA

Feeding category: solar - air
Heat production technology:
solar collectors - heat pump
Heat Pump output power: 45 kW
Number of heat pumps: 4
Number of solar collectors: 12
Number of storage tank: 4
Storage tank capacity: 2.500l



/ Installed products



AR-35 PTP

Heat pump floor standing water heater air-water for the production of hot water:

- / Heating capacity: 45,30 kW
- / Heating water capacity: 970 l/h
- / COP at ambient temp. 30°C/60°C, inlet 25°C and outlet 55°C: 4,02
- / Refrigerant: R417 A
- / Max. water temperature: 60 °C



CYLINDER MAXIS CD1

Floor-standing vertical single-coil cylinder for the production of domestic hot water. Integrable with forced circulation solar system or high power heating system.

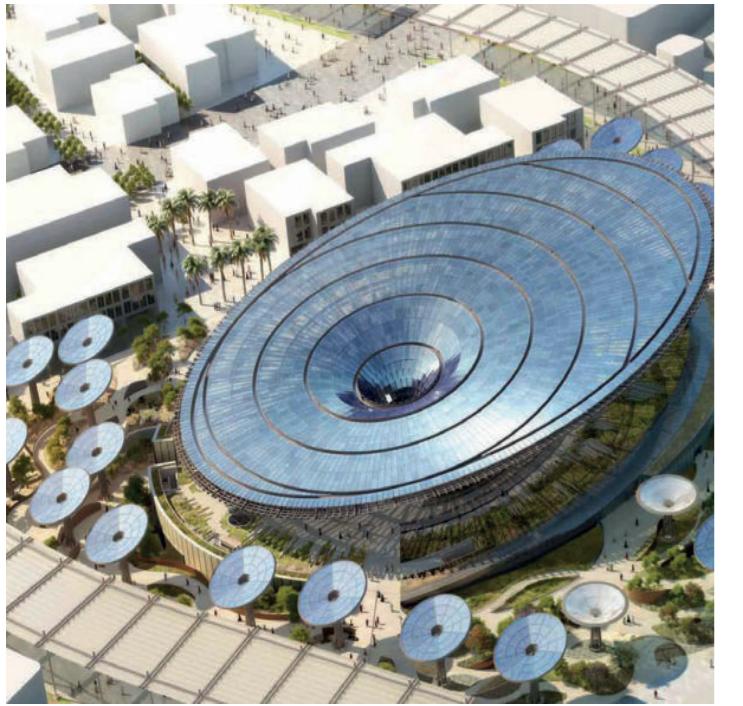
- / Titanium enameled steel boiler
- / Maximum operating pressure: 8 bar
- / maximum temperature: 95°C
- / Capacity: 2500 l



KAIROS CF 2.0-1 V

Solar collector for forced circulation.

- / Gross surface: 2,02 m²
- / Aperture surface: 1,83 m²
- / Absorbent surface: 1,74 m²
- / Optical efficiency: 74 %
- / Temp. stagnation: 190 °C



Expo, Dubai.

/ The opportunity

The sustainability pavilion is one of three thematic pavilions at the Expo Dubai. It will produce **4GWh** of electricity per year through solar panels targeting a net zero energy status. It will also produce up to **22.000 l** of water per day, extracted from atmospheric humidity and recycling grey water as a **plan to achieve net zero water status**.

/ The challenge

An indirect forced solar system was offered to cover the hot water demand requirements, by utilizing the free solar energy generated by the collectors to pre-heat the water and the backup and main heating through the heat pump supplied by others. Such hybrid system assures the optimum savings in energy since heat pump as a backup source utilizes the ambient air temperature to heat up water while keeping **electric consumption as low as 25% when compared to traditional electric heating**.

BUILDING DATA

Type of application: pavilion

Hot water demand: 8.000l/day @60°C

Total annual energy requirements: 10.572,91 kWh

PLANT TECHNICAL DATA

Feeding category: Solar

Heat production technology: solar collectors

Cylinder nominal capacity: 4.000 l

Cylinder quantity: 2

Solar collector quantities: 30

Solar fraction: 56,3%

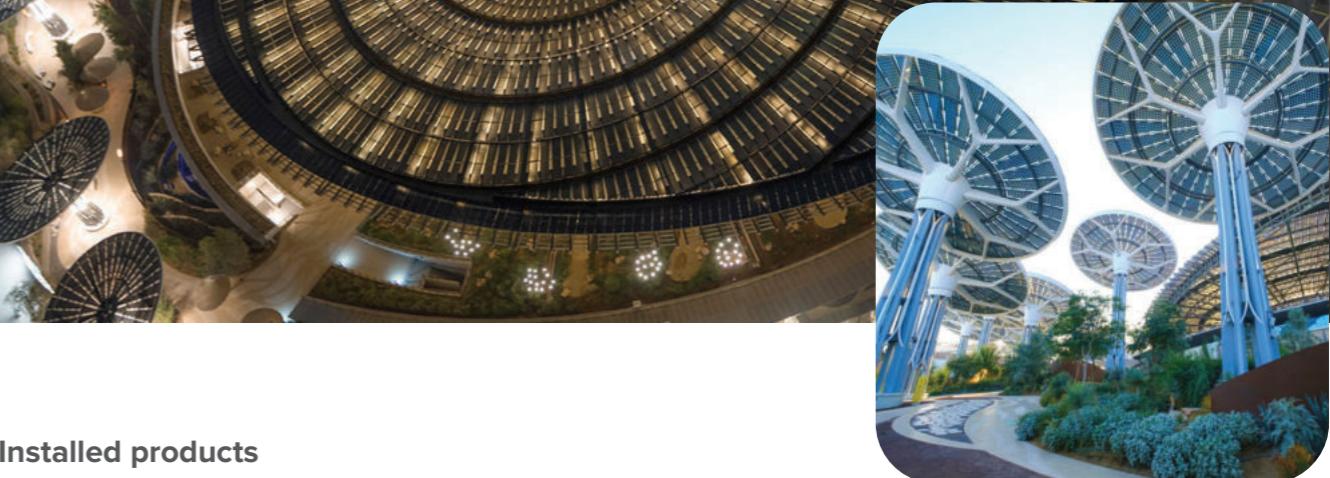
CO2 Emissions avoided: 16.009,89 kg

Solar system annual energy contribution:

61.533,47 kWh

/ Approach

The solar system was created through the installation of KAIROS CF 2.0-1 solar panels. With regard to the storage tank, the choice fell on the range of commercial epoxy cylinders which include tanks with very high capacities (from 3.000 to 7.000l). In this case 2 CYLINDERS EP1 4000 were selected, nominal storage tank capacity 4.000 liters single coil, to meet the demand of 8.000 l per day. The solar collectors provided were able to reduce the overall energy consumption and the CO2 emissions.



/ Installed products



EXPOXY COMMERCIAL CYLINDER EP1 4000

Single coil floor standing epoxy painted cylinder for domestic hot water

- / Epoxy inner coating
- / Maximum operating pressure: 8 bar
- / Maximum temperature: 85°C
- / Capacity: 3877 l
- / Coil surface: 5,4 m²
- / Type of coil: removable



KAIROS CF 2.0-1 V

Solar collector for forced circulation.

- / Gross surface: 2,02 m²
- / Aperture surface: 1,83 m²
- / Absorbent surface: 1,74 m²
- / Optical efficiency: 74%
- / Temp. stagnation: 190°C



The Ministry of Interior office, Jeddah.

/ The opportunity

The Ministry of Interior office of Saudi Arabia is placed in Jeddah. The request was to satisfy the hot water demand of the main building consisting of many offices and bathrooms. In particular, the requirement was a solar system able to supply 3.257 l/day at 60°C at solar contribution of minimum 60%. 4 - Solar manager .

/ The challenge

The project idea was the supply of a solar forced system installed to minister of interior HRH Building along with all other specified related equipment to generate required temperature for the proper operation of hot water supply for the equipment.

The system was designed as a fully integrated, packaged domestic hot water heating system incorporating the high performance solar collectors, drain back thermal storage tanks, circulating pumps, and all other necessary controls for safe and efficient operation.

/ Approach

The solar system was created through the installation of N°24 solar collectors type KAIROS CF 2.0-1 connected to N°2 storage tank MAXIS CD1 2000, single coil cylinders

BUILDING DATA

Type of application: public building

Number of buildings: 1

Hot water demand: 3257 l/day @60°C

Total annual energy requirements: 59354 kWh

PLANT TECHNICAL DATA

Feeding category: Solar

Heat production technology: solar collectors

Solar system power: 33,77 kW

Solar collectors quantity: 24

Storage tanks capacity: 2000 l

Storage tanks quantity: 2

Electric element power: 24 kW

Energy coverage of the solar system: 82.7%

Solar system annual energy contribution:
51.290 kWh

CO2 Emissions avoided: 13.344 kg

Natural gas savings: 6.310 m³



/ Installed products



CYLINDER MAXIS CD1

Floor-standing vertical single-coil cylinder for the production of domestic hot water. Integrable with forced circulation solar system or high power heating system.

/ Titanium enameled steel boiler

/ Maximum operating pressure: 8 bar

/ maximum temperature: 95°C

/ Capacity: 2500 l



KAIROS CF 2.0-1 V

Solar collector for forced circulation.

/ Gross surface: 2,02 m²

/ Aperture surface: 1,83 m²

/ Absorbent surface: 1,74 m²

/ Optical efficiency: 74%

/ Temp. stagnation: 190°C



Kitchen and Amenities building, Dubai.

/ The opportunity

The project is a kitchen and amenities building serving 12 staff accommodation buildings in the area of Dubai south. It requires a total of 4.000 l per day of hot water, stored at 60°C with a total energy requirement of 67906 kWh.

/ The challenge

Water to water heat pump system was proposed to cover the hot water demand requirements, backed up with electric heating elements immersed in the hot water tank. The water-water heat pump was the best selection for the project, as it allowed for the heat pump unit to be placed indoors in accordance with project requirements, while at the same time it assisted in generating the cold/chilled water that was used in cooling down the raw water tanks.

/ Approach

The proposed solution consisted of N°2 AR-80 WTP water to water heat pump with nominal output of 80 kW with N°1 hot water Storage tank EPZ 4000 PVC. The tank is equipped with a 12 kW backup heating element. Such system assures the optimum savings in energy since the heat pump proposed operates at a COP of 4.7, while keeping electric consumption as low as 25% when compared to traditional electric heating.

BUILDING DATA

Type of application: accomodation building

Number of buildings: 12

Hot water demand: 4.000 l/day at 60°C

Total annual energy requirements: 67.906 kWh

PLANT TECHNICAL DATA

Feeding category: water

Heat production technology:
water-water heat pump

Heat pump output power: 80 kW

Number of heat pumps: 2

Heat pump COP: 4,7

Number of storage tank: 1

Storage tank capacity: 4.000 l

Power of heating element: 12 kW



/ Installed products



EXPOXY COMMERCIAL CYLINDER EPZ 4000

Floor standing epoxy painted cylinder for domestic hot water

- / Nominal heat input Hi max/min: 140/35 kW
- / Epoxy inner coating
- / Maximum operating pressure: 8 bar
- / Maximum temperature: 85°C
- / Capacity: 3910 l



AR-80 WTP

Heat pump floor standing water heater water-water for the production of hot water:

- / Heating capacity: 80 kW
- / Heating water capacity: 1720 l/h
- / COP at source water temperature 15°C, water inlet 15°C and outlet 55°C: 4,7
- / Refrigerant: R410 A
- / Max. water temperature: 60 °C



Residential complex, Milano, Italy.

/ The opportunity

In Trezzano Rosa, in the province of Milan, it was built a residential complex consisting of 18 apartments divided into 2 buildings. The buildings were prepared for a centralized heating system: the design studio had therefore to devise a new solution adaptable to the existing system.

/ The challenge

The design idea included a hybrid system consisting of a solar system and a heating heat pump with one condensing boiler as backup.

/ Approach

The most suitable system choice proved to be **NIMBUS PLUS 110 M-T NET** and **GENUS PREMIUM EVO 100 HP**.

In relation to outdoor temperature, electronic logic of this plant allows optimization of the operation of the generators. Heating in the apartments the environment is radiant and on the floor, while for the production of domestic hot water, a 2000 liter cylinder **Maxis CD2** was installed and connected to a battery of 8 solar panels, installed on the roof. The cylinder is dual coil, one connected with the solar system and one connected to the boiler which contributes to the production of domestic hot water in case of needed.

BUILDING DATA

Type of application: residential building

Number of buildings: 2

Number of apartments: 18

Building total surface: 2.000 m²

Apartments average height: 75 Watt/m²

Building energy classification: A2

Climatic Zone: E

PLANT TECHNICAL DATA

Feeding category: solar - electric

Heat production technology: solar collectors - wall hung boiler condensing - heat pump

Heating type: heating floor system

photovoltaic system power: 18 kWp

/ Installed products



**NIMBUS PLUS
110 M-T NET**



Heat pump air-water for heating
and air conditioning:

- / Space heating energy class 35°C ErP A+++
- / Space heating energy class 55°C ErP A++
- / Max heat output: Space heating (A7/W35): 16,70 kW, COP 3,57
- / Rated heat output: Space heating (A7/W35): 10,40 kW, COP 5,00



KAIROS XP 2.5 V

High efficiency flat solar collector
for forced circulation, solar
Keymark certified.

- / Gross surface: 2,53 m²
- / Aperture surface: 2,26 m²
- / Absorbent surface: 2,24 m²
- / Optical efficiency: 81%
- / Temp. stagnation: 198°C



**GENUS PREMIUM
EVO 100 HP**

High power condensing boiler

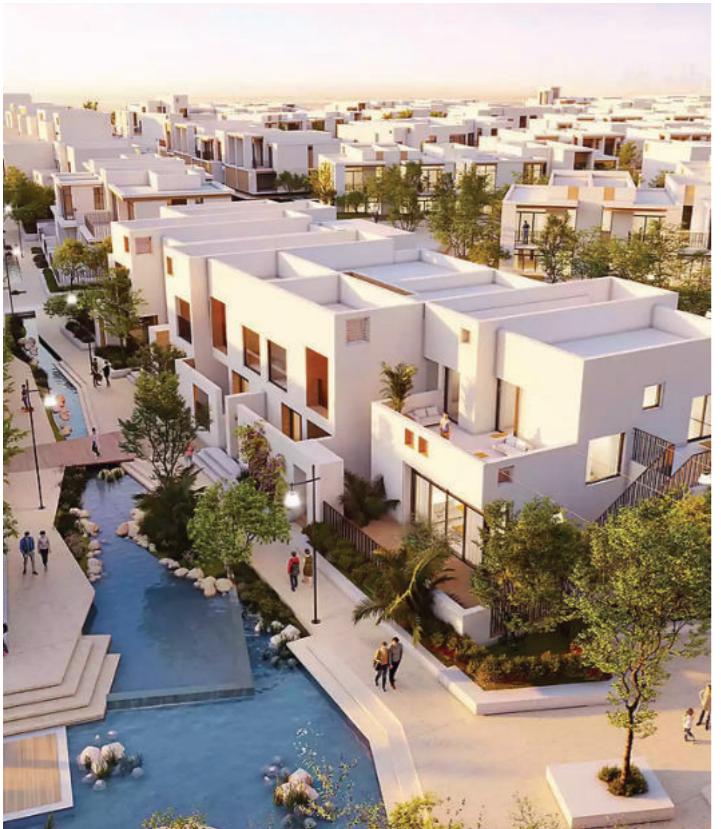
- / Nominal heat input Hi max/min: 88,3/22,1 kW
- / Nominal heat output at 80-60°C max/min: 86,1/21,9 kW
- / Nominal heat output at 50-30°C max/min: 94,0/24,1 kW
- / Efficiency at 80-60°C full/min load: 97,5/98,4 %
- / Efficiency at 50-30°C full/min load: 106,5/108,1 %
- / Efficiency at 30%load 30°C: 108,1 %



**CYLINDER
MAXIS CD2 F**

Double coil enameled boiler for
domestic hot water

- / Capacity: 1884 l
- / Max. operating pressure: 8 bar
- / Max. operating temperature: 95 °C
- / Solar coil surface: 4,5 m²
- / Upper coil surface: 3,0 m²



Arabian Ranches III Town House, Dubai.

/ The opportunity

Arabian Ranches, one of Dubai's first suburbs, with over 4,000 stunning homes is a combination of Mediterranean and Arabian designs. This posh property required an equally efficient water-heating solution for its residents.

/ The challenge

The challenge was to install green and efficient Water Heating systems at Arabian III townhouse residences.

/ Approach

Ariston came up with the solution of installing residential Air-to-water heat pumps.

NUOS PRIMO 240L was the best solution for the water heating requirement at the residences. NUOS is a heat pump that uses a natural and inexhaustible source of energy: the heat of the air. Thanks to its technology, NUOS extracts heat from the air to heat water, expending a minimum amount of energy. This way, **75% of the heat generated is free**, without giving up the usual comfort. Ideal for new homes, as a complement to a solar thermal installation, it improves the energy rating of the building. The product is very much intended for **indoor installation** and **works at high performance** promoting sustainability.

BUILDING DATA

Type of application: Residential complex

Number of buildings: Multiple

Heating Capacity required: 250KW/240L

Capacity requirements: 240L- 55C

PLANT TECHNICAL DATA

Feeding category: water

Heat production technology:

Gas Boiler

Nominal heat input: 650KW

COP: 2.17



/ Installed products



NUOS PRIMO

Heat pump wall hang water heater air-water for the production of domestic hot water:

- / Energy class ErP A tapping profile M
- / Average thermal power: 1,200 W
- / Average electrical power consumption in heat pump mode: 250 W
- / COP: 2,17
- / Refrigerant type R-134a
- / Max. water temperature heat pump only mode: 55°C





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