



# KUREDU ISLAND RESORT & SPA

Lhaviyani Atoll, Republic of Maldives

Tel: (960) 6620337, Fax: (960) 6620332

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## Sustainability

Kuredu Island Resort & Spa is committed to sustainability and its obligation to the environment and the community. Kuredu aims to enhance the guest experience by showing respect to nature. Through careful consideration of the effects that operating systems, materials and purchasing policies have on the environment, Kuredu Management is continually developing new initiatives and procedures to minimize our ecological impact following international guidelines in sustainable tourism best practices. These include environmental performance tracking and measurement, support for the preservation of natural and cultural heritage and enhancing social and economic benefits to local communities. Our commitment to sustainability addresses the carbon emissions resulting from guest travel and hotel operations and invites guests to share the responsibility to offset that footprint. There are programs in place to conserve energy, re-use water for secondary applications and to recycle waste materials produced by the resort. Responsible purchasing means that only eco-friendly chemicals are procured for use in the operations, while food and beverage products are produced locally, and wherever possible, packaging is kept to an absolute minimum, or re-usable. Being located in a place of great beauty and close to nature, the resort has biodiversity opportunities to preserve, protect and rebuild environments that range from coral reefs to pristine jungle. There is also an unswerving commitment to protect endangered species on land and in water.

Kuredu Island Resort & Spa is committed to reducing the ecological and carbon footprint from activities associated with the resort and the spa, which are the result of providing accommodations, dining, excursions, spa treatments, sports and aquatic activities.

### ENERGY CONSERVATION

Producing energy usually creates pollution and is the biggest cause of global warming. At Kuredu Island Resort & Spa we have taken several steps to reduce our energy usage and to use renewable energy.

Until more renewable energy options become practical, the electricity used at Kuredu will continue to be produced with diesel generators. Reducing the power demand, however, is something we are continuously working on. Therefore alternative power with Solar System Panels have been installed in 2015.

The average power consumption per guest in-house has been steadily decreased in the past 2 years: 44.91 kWh (2016) to 44.63 kWh (2017)



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## SOLAR POWER

The solar power project at Kuredu Resort & Spa, Maldives is generating an average power of 600KW per day.

The highest power demand in the resort is recorded at 1,900KW, requiring up to seven diesel generators. The solar power creates a significant reduction in our diesel consumption and therefore have a positive impact on the environment, as currently, up to 8,000 liters of diesel are burnt daily for producing electricity.

Carbon dioxide emission and sound pollution will also be reduced by a considerable amount.

The existing small solar panels that you see around the island contribute only enough energy for heating up fresh water for guest bathrooms, however the new solar project will generate electricity requirements for all electrical appliances of the resort as it is connected to the main grid.

Most of the existing roof tops in the Team Village areas have been used for installing these 4,160 solar panels. Each panel generates 240 watts of maximum power during a sunny day using the photovoltaic system, converting sun light into an electric current.

Kuredu is proud to be implementing one of the first such projects in the hospitality industry in the Maldives. Conserving energy on this scale, using solar power, is a big undertaking and we are sure our beautiful island is thankful for it.

## DESALINATION PLANT

With more than 99% of the Maldives consisting of seawater it is ironic that fresh water, on the other hand, is not a natural resource that can be taken for granted.

Back in the old days, and to some extent still today, the Maldivians would gather rainwater from the roof tops of their houses and store it for drinking. Regardless of the big amounts of salt water that the islands are surrounded by, most communities didn't have the means of turning it into drinkable water – until roughly 30 years ago.

Kuredu has been keeping in step with tech and is proud to have its own desalination plant. Using reverse osmosis, a water purification technology, we can produce fresh water from seawater. The equipment is top of the line, producing an impressive 600,000 liters of fresh water every day.

The average water consumption per guest in-house has been steadily decreased in the past two years: 552 ltr (2016) to 521 ltr (2017).

## WATER BOTTLING PLANT



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With the opening of the water bottling plant in 2013, Kuredu has made a big attempt to eventually kick the plastic bottle habit completely, and thereby reduce the negative effects that plastic pollution has on the oceans – and consequently on the whole planet.

Until the setting up of the plant, we used on average 1200 plastic water bottles per day, roughly 420,000 per year. With the in-house production of drinking water and bottling thereof, we can produce up to 60,000 liters each month, which is the equivalent of 440,000 plastic bottles per year.

We use a process called reverse osmosis, which uses high pressure to force water through a membrane, separating it from unwanted substances. Before being bottled, water is mineralized and chilled. The plant operates under strict hygiene standards and is tested for quality and pH levels every 100 liters.

## ECO FRIENDLY ENVIRONMENT PRACTICES

### AT THE LAUNDRY

With 387 rooms, Kuredu is the second biggest hotel operation in the Maldives, washing roughly 2500 kilograms of linen per day. The laundry is one of the main power consumption areas in the resort operation, as big commercial washing machines and electrical dryers need to be used to meet the huge demand.

That said, to reduce the negative impact on the environment, we try to use line-drying as often as possible.

The linen is hung up under a roof, which block the UV radiation and reduces fiber damage and bleaching. By doing this, we are able to dry 35% of the linen by letting nature's clothes dryer, the sun, do the work for us.

Although we can't completely skip the dryer, every time we do, we're glad we're doing something good for the environment – without compromising your comfort.

### AT THE KITCHEN

By far the most lucrative, in terms of sustainable commercial stocks and accessible by local fishermen, is the Tuna. Here on Kuredu, our average daily consumption is 500kg of fish per day. This is predominately made up of the smaller Skipjack Tuna. We also land reef fish, as well as the wonderful sashimi grade Yellow Fin that weigh in at an average of 45kg, sometimes as big as 90kg.

The traditional method of fishing is still strictly controlled by the Ministry of Fisheries and all fish is hand/line caught in the Maldives. The benefits of this are twofold. It is sustainable, and secondly offers very little by-catch. Therefore, the impact on other marine life is minimal. Importantly, as an



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industry, we would much prefer to support the local economy of our neighboring islands Hinnavaru and Naifaru, the fishermen and instead educate our guests as to the reasons why there are not mountains of imported prawns on offer or lobsters crawling up the beach onto the grill. What we lack in available variety we certainly make up for in quality and the creative and delicious cooking styles that the fish is served.

## SEA GRASS CONSERVATION

Kuredu recognizes the ecological importance of sea grass habitats and pledges to play a more active role in the conservation of sea grass beds around the resort island.

Lhaviyani Atoll has one of the highest densities of sea grass in the Maldives which supports a huge diversity and abundance of marine animals. Just 2.4 acres (9,715 square meters) of sea grass can support 80,000 fish and 100 million invertebrates. It is also an important source of food for Green turtles and an important peripheral habitat for Hawksbill turtles, classified as “Endangered” and “Critically Endangered” respectively, on the IUCN Red List. To date the resort has recorded 91 Green turtles in the surrounding waters which is 1/3 of their entire population within The Maldives waters. Therefore, maintaining a healthy sea grass habitat is critical for the turtle populations in Kuredu.

Like all other plants, sea grass provides a continuous supply of oxygen and acts as a sink for carbon dioxide. Just 2.4 acres of sea grass can produce 26,000 gallons of oxygen per day. The ocean absorbs 25 percent of the global carbon dioxide emissions, of which 12 percent is stored as carbon in the sediment below sea grass meadows. Sea grass beds also act as nutrient sinks, filtering chemical inputs into the marine environment and keeping waters clear. Recent studies have also shown that maintaining sea grass beds adjacent to a reef, increases the resilience of the corals to natural and human threats.

The resort believes that protecting this habitat is critical to stabilizing sediments which will in turn reduce the amount of island erosion.

## WASTE REDUCTION

Waste, garbage, trash, rubbish is a huge source and cause of environmental degradation – either through litter illegally dumped, which washes up on beaches all over the world and which we see lying around, or that which is legally disposed of in landfill sites, often in pristine areas, destroying them forever. Waste disposal, litter and debris on beaches and adequate recycling facilities are major concerns in the Maldives. The country currently lacks the facilities to separate, collect and recycle or



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reuse materials generated by households and businesses. Most resources and items that could be recycled or composted are at present treated as waste and transported from resorts and local islands to landfill. As the country develops it seems inevitable that more consumer goods will become available, consumption will increase and so will the amount of material that will need to be recycled, reused or disposed.

Kuredu is actively looking for ways to reduce the waste generated and dispose of it properly:

We talk with our suppliers to reduce packaging when delivering supplies.

Our printing paper is eco-labelled or recycled and we re-use the reverse side of printed paper for notes, reducing numbers of trees needed to be cut down.

We try to reduce use of plastic bags as much as possible to reduce waste, instead using bins that can be washed or linen bags.

Both guests and hosts are provided with re-usable glass water bottles rather than disposable plastic bottles.

Guests are encouraged to take disposable and hazardous waste items back to their own countries, where recycling facilities are more sophisticated.

Rechargeable batteries, energy-saving light bulbs with a long lifespan, purchases in bulk to avoid unnecessary packaging, the re-use of office paper, kitchen oil, waste wood and other materials are some of the many measures, through which the amount of waste on the island is reduced.

We have created our own recycling corner where waste is separated into paper, plastic, metal, glass, organic waste and toxic waste. Our compactor reduces the space required to store the waste before it is sent for recycling and proper handling. It is also easier for the recyclers to collect the waste and they do not have to come as many times. Furthermore, our own shredding machine is used for shredding garden waste, which is re-used in the garden, pathways and for composting.

A composting site has been built in which our food waste from the kitchen and restaurants is composted together with garden waste. The composting soil generated from this activity is reused in our landscape and gardening.

To make our composting as effective and odorless as possible we have implemented waste separation in the kitchen where all the food, except meat and seafood, is collected for composting. The reason meat and seafood is excluded is that these items decompose slower as well as to avoid attracting rodents. The garden waste is shredded using our chipping machine, in which some garden waste is used for composting and some for footpaths and around plants reducing unwanted weeds. The composting is taking place in a specially built area away from guest areas.



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## NATURE, ISLAND & REEF PROTECTION

At Kuredu we believe in living in harmony with nature and not manipulating it. Because the island flora and fauna and the biologically diverse reef communities have survived for millions of years without human assistance and they are poorly understood, we suspect that non-interference is the best approach. Accordingly, we have adopted several good practices for the health of the island and reef.

During Kuredu's construction, buildings were designed to minimize the damage to the island and lagoon.

Branches were cut in a controlled way, old plant matter is left to decompose, and only fallen flowers are used for decoration.

Snorkelers and Divers are informed before any tour about the coral reef ecosystem and about responsible behavior in the reef environment..

We endeavor to keep our reefs healthy by:

Informing all visitors about responsible snorkeling and diving behavior;

Installing mooring buoys for boats to avoid anchor damage;

Not carrying out any destructive night-fishing activities for guest amusement;

Not engaging in coral transplantation or propagation projects of dubious value;

Discouraging both guests and hosts from feeding wildlife and fish;

Encouraging guests to leave all debris, shells, and coral pieces and sand on the beach or in the reef

Not selling any shells, coral or other animal products in our gift shop

We are committed to comply, and wherever possible improving upon, Maldivian and international legislative environmental requirements, such as environmental, public and occupational health and safety, hygiene and employment legislation. We do, wherever possible and feasible, give preference to the employment of persons living in the Lhaviyani Atoll or nearby areas, local products and services which do not adversely affect the resort's operational activities, viability and environmental and social impacts.

## SUPPORT LOCAL ISLANDS

Kuredu Island Resort & Spa employs many Maldivians, many of which are from the vicinity of the resort. It also obtains goods (local fish, fruits and vegetables) and services (e.g. for construction or



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repair work) from the surrounding area, thereby benefiting local island communities directly and indirectly. In addition, various contributions are made to social projects each year. These activities utilize Kuredu's human and financial resources.

## POWER/WATER/SEWAGE TREATMENT PLANT FACT SHEET

### 1. ELECTRICAL POWER PLANT:

Kuredu produces its own electricity using 7 Stamford AC Generators driven by Cummins diesel engines and Solar Power, producing a theoretical maximum of 5760 KW.

Generators are synchronized, work together and are managed from the Control Room.

Power is distributed as 400 Volts, 3 phase. Electricity flows through distribution panels and is routed to meet the demand of the guest and staff rooms and public areas. Electrical outlets are 230 Volts 50 Hz.

The maximum daily demand of about 1,850 KW occurs at 1900 - 2100.

The minimum daily demand of about 900 KW occurs at 0300 - 0400.

The average diesel fuel consumption is about 7,800 liters/day at 98% occupancy, based on 387 guest rooms and about 780 staff.

Diesel storage tanks of 200,000 and 177,500 liters total 377,500 liters.

Tanks are filled by an underground pipeline along the jetty where the tanker anchors.

Generator specifications are:

Cummins I, II, III	Cummins IV	Cummins V	Cummins VI, VII
1000 KVA x 3	250 KVA x 1	500 KVA x 1	1250 KVA x 2
1000 KVA	250 KVA	500 KVA	1250 KVA
800 KW	160 KW	400 KW	1000 KW
50 Hz	50 Hz	50 Hz	50 Hz
RPM 1500	RPM 1500	RPM 1500	RPM 1500



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Basic generator and engine maintenance service is performed after 250, 1,500 and 5,000 hours operation. A “top” overhaul and a “major” overhaul are performed at 5,000 and 10,000 hours, respectively.

## **2. REVERSE OSMOSIS FRESH WATER PLANT:**

Fresh water is produced using high pressure pumps to force seawater through membrane filters. End products are fresh water and concentrated seawater (brine) which is returned to the sea.

Fresh water production is 900,000 liters/day (900 tons) from 3 reverse osmosis plants.

Storage is in 2 tanks, a total of 940,000 liters (940 tons), a 2 day supply.

Fresh water consumption is 410,000 liters/day (410 tons), about 550 liters/person/day, which includes about 768 guests @ 98% occupancy and 780 staff.

The reverse osmosis plant specifications are:

	Plant I, II & III	Plant IV & V	Plant VI
<b>Product flow</b>	7.9 m <sup>3</sup> /hr	7.9 m <sup>3</sup> /hr	20.4 m <sup>3</sup> /hr
<b>Working pressure</b>	60 bar	60 bar	60 bar
<b>Power</b>	49 KW	49 KW	102 KW
<b>Production capacity</b>	200 m <sup>3</sup> /day	200 m <sup>3</sup> /day	500 m <sup>3</sup> /day

Seawater undergoes a filtration process before being “fed” to the membrane filters:

1. Pumped to a holding tank with 5 compartments to allow natural filtration
2. Metabisulphite is added to kill any bacteria on the filters and membranes
3. Flocculate is added to improve filtration
4. Pumped through a sand filter
5. Pumped through a 3 micron “security” filter then an anti-scaling product is added
6. Pumped through a high pressure pump at 60 bar pressure into the pressure vessels, each containing 12 membranes and the big one, 30 membranes.



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### **3. WATER BOTTLING PLANT:**

Fresh water produced by the reverse osmosis plant is bottled as drinking water for guests and for staff, dispensed at water taps in staff areas.

The water bottling plant process requires specialized equipment including a doser which improves taste by adding minerals; a flow meter; ultra violet and 3 stage filters; a carbonator and an ice bank cooler. The equipment dispenses pure, chilled, still and sparkling water through two stainless steel water taps.

Daily tests ensure that international water quality standards are maintained which include checking pH and free chlorine levels.

### **4. WASTEWATER TREATMENT PLANT:**

A fully automated sewage (wastewater) treatment plant "STP" is operated which conforms to European Union standards. The STP removes contaminants through a biological and chemical process and produces an end product (effluent) which is safe to reuse in the environment. Solids are dried and used as fertilizer.

Wastewater is collected in a network of 12 underground tanks and 3 Kitchen grease trap tanks, then pumped to a holding tank at the STP, then pumped to a grid and lifting tank, then pumped to the Sequencing Batch Reactor Tanks A, B and C in which the biological oxidation process is initiated with the help of bacteria.

A chemical flocculent (a nutrient) is added to the wastewater to assist the process of keeping the bacteria alive and to avoid bad odors. The bacteria break down the contaminants into biological degradable components.

The wastewater then flows to a filtration tank, then through a sand filter, after which can be used as "gray" water to irrigate the gardens. Remaining solids are dehydrated in sludge bags and are used as a biological fertilizer in the gardens. The STP capacity is 600000 liters/day (600 tons) and consumes about 40 KW.

### **5. INCINERATOR:**

An incinerator burns 3 tons of rubbish, garbage and paper in 2 - 4 hours at a temperature of 1,200 degrees C. The burning process is monitored by 4 staff.



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## 6. WASTE COMPACTOR:

An Orwak model 5070 HDC machine produces 10 tons of pressure in 20 seconds, compresses then straps waste material into mini bales measuring 700 mm long x 500 mm wide deep x 700 mm high. The bales weigh:

Tin/paint cans / aluminum cans: 45 kg per day

Compact plastic bottles: 25 kg per day

Compacted waste is transported by boat to Thilafushi, the landfill reclamation island, where bales are sold for export and non-saleable items are incinerated.

## 7. MACERATOR:

A fully automated food grinding (macerator) system, which conforms to European Union standards is operated. The macerator breaks up solid food into smaller particles without turning it into a paste. The grinded food is then sent to the STP.

## 8. SOLAR PANELS:

There are installed 4,500 sqm of highly efficient solar panels and the most modern and sophisticated system to produce electricity. The solar panels production is more than 800 KW on sunny days. The solar panels produces 20 - 25% of Kuredu's total electricity which results in reduction of carbon emission of about 43,000 Kg per year.

4,160 solar panels are installed on the existing rooftops in the Team Village area.

Each panel generates 240 watts maximum power during a sunny day using the photovoltaic system (converting sunlight into an electric current).

1. Total number of panels in - 4,160
2. Single panel size - 58 cm x 80 cm generating 240 watts/48 volts DC
3. Total number of inverters - 4
4. Maximum solar power production recorded - 900 KW
5. Batteries power - 250 KVA
6. Batteries discharging period - 15 minutes
7. Total number of batteries installed - 11
8. Daily saving diesel approximately -1,200 liter
9. Emission avoided per day - 2,400 Kg