

# RAINFORESTS OF THE SEA

Ahmed Anwar Abdul Azeez



The reefs are built by living organisms, primarily corals. The corals contain green algae in their interiors that provide oxygen the corals need to live. The corals, in turn, provide protection for the algae - a mutually supportive relationship that is called a symbiosis. The algae produce the oxygen by photosynthesis, so they need sunlight. This requirement limits reef-building coral to the upper 65 feet or so of water where sufficient light exists for photosynthesis. Of course, the dead carbonate "skeletons" of the coral can continue to exist at much greater depths.

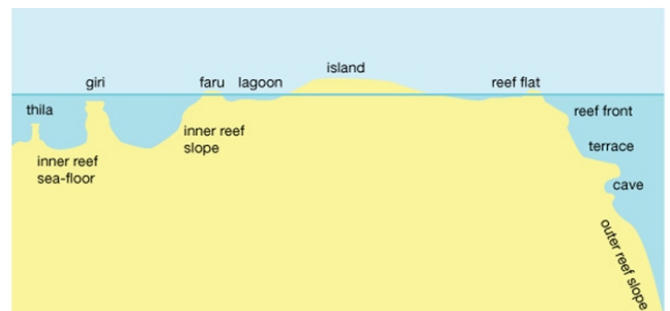
Often called “rainforests of the sea”, coral reefs form some of the most diverse ecosystems on earth. They occupy less than 1% of the world ocean surface, about half the area of France, yet they provide a home for 25% of all marine species, including fish, molluscs, echinoderms and sponges.



Coral reefs deliver ecosystem services to tourism, fisheries and shoreline protection. The annual global economic value of coral reefs has been estimated at \$30 billion. However, coral reefs are fragile ecosystems, partly because they are very sensitive to water temperature. They are under threat from climate change, ocean acidification, blast fishing, cyanide fishing for aquarium fish, overuse of reef resources, and harmful land-use practices.

## Coral Reef formation

The coral reef systems of the Republic of Maldives are the eighth largest in the World and cover an area of approximately 4513 km<sup>2</sup>. Due to the very low total area of land, coral reefs are the dominant ecosystem found in this chain of atoll islands. Present living reef system of the Maldives is 8,000 to 10,000 years old.

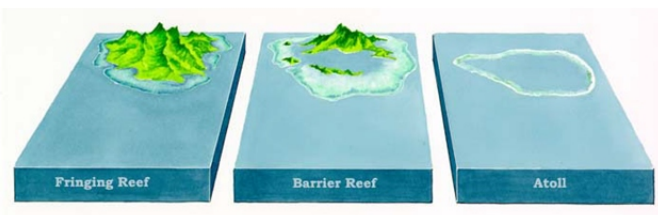


Cross section of a coral reef in the Maldives

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The most reasonable explanation for coral growth begins with a volcano. Volcanoes can build themselves thousands of feet upward from the ocean floor, and some of them will grow tall enough to break through the surface of the water. During periods of volcanic inactivity, corals and lime-secreting algae colonize the areas just below the shoreline around the volcano. The corals and algae cement themselves together with lime as they grow, thereby constructing a circular reef around the volcano. Eventually the volcanic peak erodes to sea level. Further, as a result of tectonic activity, the volcano slowly sinks into the ocean depths. If the rate of sinking is slow enough, the reef-building can keep pace and continue constructing the reef. In this way a reef can be built that is several thousand feet tall, even though living corals can only survive in the upper layers of the ocean. Deep sea drilling at several atolls in the Pacific has confirmed this theory of reef growth, revealing volcanic rock below the corals.

### Three main stages of the formation of an atoll reef



The Great Chagos Bank, in the Chagos Archipelago, about 500 km (310 mi) south of the Maldives, is the largest atoll structure in the world, with a total area of 12,642 km<sup>2</sup> (4,881 sq mi). With 26 natural atolls or groups of coral islands, the Maldives, is a part of an underwater mountain range that includes the Lakshadweep Islands and the Chagos Islands. The coral reefs and atolls that make up these islands have grown on and around the peaks of this underwater mountain range.

A fringing reef forms along the shoreline of most new tropical islands. This is because the reef building coral animal is one of the few marine organisms that can survive in the warm, nutrient-poor surface tropical waters.

In fact, the reef building coral (hermatypic) can only survive in warm, clear ocean waters (such as would be common around a new oceanic island). So a coral reef forms along the edge of this new island, right next to the island and is called a fringing reef - the first step in 'classical' coral reef formation.

A barrier reef forms as the oceanic island begins to sink into Earth's crust due to the absence of volcanic island building forces, the added weight of the coral reef, and erosion at the surface of the island. As the island sinks, the coral reef continues to grow upward. If conditions are good they can usually keep pace with the sinking island. Their living tissue remains in the upper part of the reef in the warm, clear, tropical water. The lower part of the reef is composed of the calcium carbonate skeletons left by the reef building coral. This upward growth creates a lagoon of water between the top of the reef (that started as a fringing reef) and the sinking crustal island.

An atoll forms when the oceanic island sinks below the surface of the ocean but the coral reef continues to grow upward. The atoll is usually circular in shape but a broken circle (due to the history of storms). Eroded reef material may pile up on parts of the reef, creating an area above sea level, an island called a 'cay.' Cays may become stabilized enough (often through plants) to provide a permanent island for buildings. Cays may also be unstable and move across the reef or disappear.

## THE FAMOUS R<sup>3</sup>

*Muhsina Abdul Rahman*



### Reduce, Reuse and Recycle

We here this three words being used together commonly. It's even rhyming to say and colorful when printed on billboards and T-shirts. But the important thing we should consider is, their meaning and how we can implement them in our daily life.

So here I want to give you few tips on how to follow this R3 in our daily life.

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## Reduce

Reducing means cutting down on the amount of garbage or trash that is made. To do this you can:

- Buy items which are important and to the amount that it is required. This is especially important to consider during this time of year as it is Ramadan month.
- Search for items that can be used to minimize the trash. You can do wonders with creative mind and make an amazing piece of art.
- Reduce pollution by walking. This can be good for both health and wealth.
- Switch off, switch off and switch off the lights, laptops, fans and taps to reduce electricity and water when you finish using them.

## Reuse

Reuse means using something again rather than throwing it out. That usually means finding a new use, such as making a jelly jar into a drinking glass.

- Did you know that 2.5 million plastic water bottles are reused every day? Make sure to recycle your water bottles or reuse them by filling them up with water from your home.
- Did you know plastic bags, coffee cans, and wrapping paper can be reused? Think about all the items in your home. Which ones can you reuse?
- Reuse plastic food containers such as margarine tubs. They're strong enough to be used several times, and they're great for leftovers!

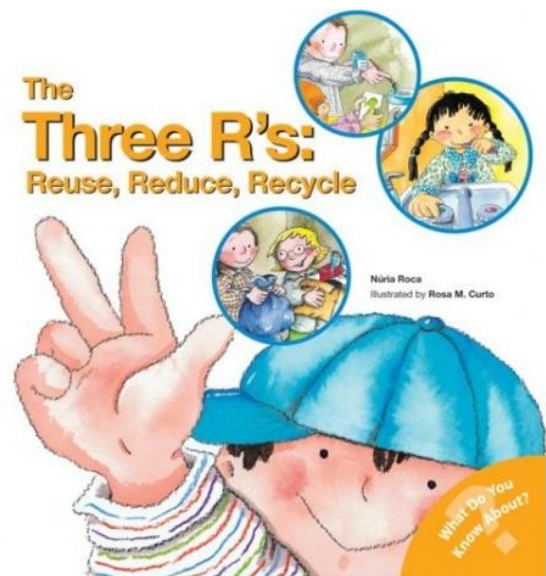
## Recycle

Recycling takes materials from items you have finished using and makes them into brand new products. For example, most aluminum cans are made with recycled aluminum. So if you drink juice from a can, recycle that can instead of throwing it in the trash. That can will then stay in the recycling loop.

·Did you know that you can recycle electronic items in your home? Take your old DVD Player, TV and computer to repair before throwing them.

Some even collect wires, tin cans and papers. Sell them and make some pocket money!

·You know you can recycle more of your things than you thought? Your computer, printer, and video games can all be recycled – same with the batteries that are inside your electronic toys.



# MALDIVES EXPERIENCING ANOTHER EPISODE OF CORAL BLEACHING

*Ahmed Hassaan Zuhair*

Tourism, the largest economic industry in the Maldives thrives due to its exotic and beautiful underwater life with stunning coral reefs. This tiny nation comprising of around 2000 fascinating coral reefs are a delight for scuba divers and people who love marine life in general.

The whitening of corals in the Maldives has once again become the hot topic among local and foreign researchers and marine biologists.

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Many such expertise believe that the Maldives is experiencing the worst case of coral bleaching since the 1998 El Nino event, in which 90 percent of the nation's corals were severely affected, with damage in some areas recorded to have extended to a dazzling 98 percent.



According to Hussein Zahir of Marine Research Centre the temperatures this year were following similar patterns to those of 1998, with a surface temperature in April of one degree above the long term average. As per his estimates 10-15 percent shallow water corals have now become completely white, while 50-70 percent is on the verge, having become pale. However the recent drop in temperature, brought on by rain and the onset of the southwest monsoon, has lowered the surface sea temperature and brought some relief, “and may give the coral time to recover.”



Coral bleaching happens when rising water temperatures force the coral polyps to shed the algae (zooxanthellae) that give them their color, and which are necessary for their survival. When the algae leave the coral polyp and enter the water column, it causes the coral to lose its color and it eventually dies.

The recovery of the reefs takes a very long time, although it is possible. Recent coral propagation techniques reveal that the process of coral recovery can be accelerated by introducing the coral to areas where new corals are needed. This means that we can take the damaged corals further down, let them recover and bring them up later.

Scientists are also looking for methods of growing heat-resistant corals that would be less vulnerable to climate change.

Surrounded by the vast expanse of sea and sprawling sandy beaches, the islands of the Maldives are a natural enchantment for many viewers. Coral reefs which surround each and every island of this tropical wonder furnish exquisite natural barriers which are fundamental in protecting the white sandy beaches and contribute enormously to sand formation. Coral reefs are also home to many sea animals and plants. Thus protecting these delicate ecosystems becomes a necessity for a sustainable and better future of the nation.

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## KEY RENEWABLE ENERGY SECTORS

*Hassan Azhar*

No-one can predict with any certainty what the energy mix will look like in 2030, let alone 2050. Fossil fuel generation will undoubtedly still be a substantial part of the equation. However, it is clear that any future low carbon energy infrastructure will have to include a significant proportion of energy generated from renewable sources – most scenarios showing the proportion of primary energy having to reach 40-50% by 2050. Some of the leading technology contenders are emerging and, in some cases have begun to build significant experience.

In this article eight renewable energy technologies which look particularly promising in terms of two factors: abatement potential and current state of competitiveness. This Article will look at some of the other technologies – principally around the digital/smart grid, energy efficiency, power storage and carbon capture and sequestration – which will be required if low carbon energy is to fulfill its full potential within the future energy mix.

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### **Onshore Wind**

The most mature of the renewable energy sectors, the onshore wind industry saw 21GW built in 2007, bringing installed capacity to over 100GW. In Germany, Spain and Denmark wind power now supplies 3%, 11% and 19% respectively of total electricity production during the course of the year, and in Denmark up to 43% of the country's electricity demand at times of peak wind supply. Electricity from onshore wind can be generated at prices of 9-13 c/kWh, making it only 32% more expensive than natural gas CCGT, even in the absence of a carbon price.

### **Offshore Wind**

When the best sites for onshore wind have been snapped up, the next place to look for large quantities of renewable energy is offshore.

Offshore wind offers enormous potential, with stronger more predictable winds and almost unlimited space for turbines. Planning permission can be easier to obtain than onshore, farms can be built at scales impossible on land, and the availability of space is almost unlimited if deep waters are mastered. At present, the cost of electricity from offshore wind is high – around 16-21 c/kWh.

### **Solar Photovoltaic Power**

Photovoltaic (PV) technology has made very rapid strides in the past four years, in terms of reducing the cost of crystalline silicon (its main component) and commercializing thin film technology, with investment volume growing to US\$ 50 billion in 2007-2008.

Although there has been a bottleneck in the production of solargrade silicon, new capacity is coming on line and costs are set to drop rapidly from US\$ 4/W to US\$ 2.60/W by the end of 2009, making unsubsidized solar PV generation costs comparable with daytime peak retail electricity prices in many sunny parts of the world.

### **Cellulosic and Next Generation Biofuels**

The argument over food vs fuel is an emotive one. In most regions, there is sufficient land to increase biofuels production from the current 1% of transport fuel to 3% or even 5% without impacting on food availability (as long as we can quickly return to increasing annual agricultural productivity). But after that the only way to increase production of biofuels will be to source feedstock that does not compete with food. Luckily, the cost of producing biofuels from agricultural waste through cellulosic conversion and algae is coming down rapidly, and the future fuel system is likely to include a proportion of fuels from these sources. Future technologies could include artificial photosynthesis and synthetic genomics.

### **Geothermal**

Geothermal power is particularly attractive as a renewable energy source because it can be used as predictable base-load power in a way that wind and solar power cannot be. Until now, geothermal power has been used only in limited regions, but a raft of new approaches has helped make it economically viable across a wider area. In addition, all countries can exploit geothermal resources for ground source heat pumps or district heating, if not for large-scale electricity generation. It is important to emphasize that these are by no means the only clean energy sectors of promise.

There are many other emerging technologies – a wide range of biomass based power generation approaches, wave and tidal power, ground source heat pumps, ocean thermal and osmotic power – each of which has substantial potential and its fervent admirers. Nuclear power is also set for a renaissance in many countries around the world. Nuclear energy's share of total electricity production has remained steady at around 16% since the 1980s, when 218 reactors were built around the world. However, nuclear power will clearly be part of any future energy system, although its contribution will be limited by issues of cost, storage, safety and public resistance.

# E - WASTES AND WHAT TO DO WITH THEM?

*Mohamed Simah*

We are living in a world where the technology is rapidly increasing. New gadgets and electronics are being announced every now and then. As the increasing number of gadgets that are being introduced one might wonder what to do with the old and unused mobile phones, television sets, computers systems and other electronics.

Electronic waste or e-waste contains lots of heavy metals and toxic chemicals. So obviously burning or incinerating them is not an option because of the damage it can cause to the environment. And just by throwing these is also not an option as these are not biodegradable and will most probably result in a landfill with emitting harmful heavy metals to the surrounding environment for a long time. Also when the people who work in landfills and other dump areas get exposed to these e-wastes there are a significant amount of health effects that could happen to them, because as mentioned above they contain a variety of toxic chemical such as lead, mercury, arsenics and many more. This makes the discard of these e-wastes quite difficult.

So after you buy a brand new superfast computer, what to do with the old one?? Even though our old computer is not powerful enough to run modern softwares and applications, instead of throwing it away we can re-use it.



The same computer can be used by another person for basic computer uses such as browsing the internet, reading or writing. Likewise after buying a new mobile phones with lots of exciting features, instead of throwing away the old and used mobile which most likely would end up in a landfill posing a threat to the environment and health, we can gift it to another person who would be more than grateful to accept it for doing the basic functions of a phone; call and text message. We can either gift these to a close relative or friend, or give it to a charity program which collects reused items. Doing this surely would minimize the amount of these toxic wastes that are being end up at landfills.

Another option to manage e-waste is to resell it. Why throw away perfectly working electronic equipment just because you got a new one with more features. By selling it we can get some money to cover for the new mobile phone or computer that we bought. Of course it depends on the condition of the item. Also if you are for providing some accessories such as earphones and covers for a mobile there is a better chance for it to be sold at a higher price. But don't expect to get a too high price for it. There are lots of people looking for used items. Maybe because they find that particular item very interesting or maybe they are just looking for a cheap one for an immediate use. Or maybe they have an affection for retro gadgets. The famous [www.ebay.com](http://www.ebay.com) sells reused items. You could register there and take some pictures of your items write some details includes some pictures of the item and try your luck selling it there. Also there are some local websites that support listing of reused items. For instance one of the much popular website [www.ibay.com.mv](http://www.ibay.com.mv) assists in listing reused items.

So next time you decide to throw away the electronic equipment just think and try to put it into another use. So by either selling it or giving it to another person to re-use it we can avoid these electronics waste items from being



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