

**2015 UNESCO Worldwide  
Youth Contest  
The Year of Light  
PRESENTATION**

on

**UNDER WATER TURBINE**





# INTRODUCTION

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## **What is NON CONVENTIONAL ENERGY?**

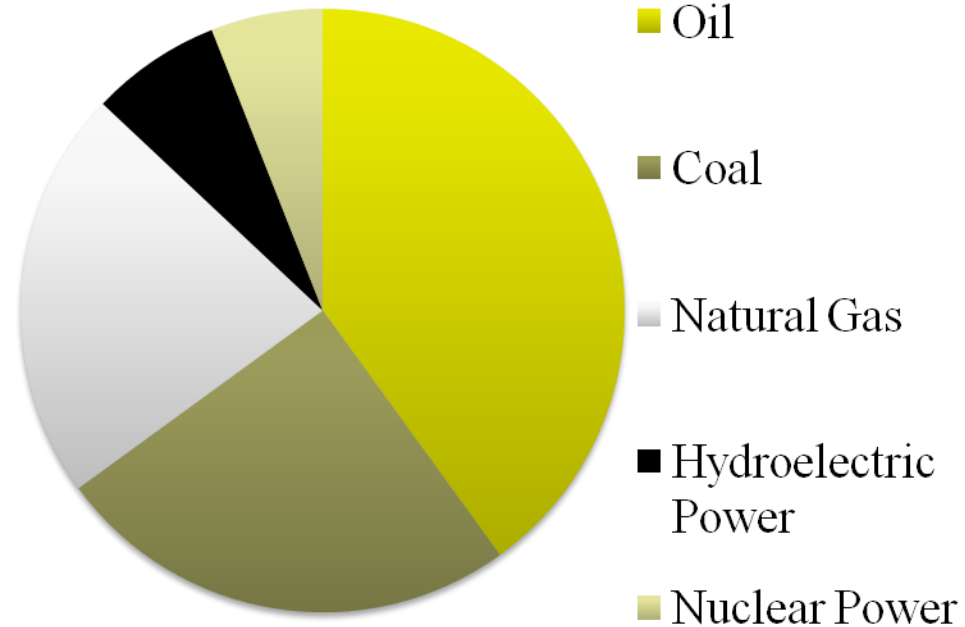
- Energy that is produced without permanently using up the Earth's limited resource is called **NON CONVENTIONAL ENERGY**.
- It is non exhaustible, sustaining and clean ( pollution free) form of energy.

# PRESENT ENERGY SCENARIO OF WORLD

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- **Around 90% of all the energy used comes from fossil fuels.**
- **The remaining is in the form of hydro power, nuclear power and non conventional sources like solar, wind, biomass etc.**
- **Hydroelectric power is the only form of non conventional energy that is used in any significant amount.**

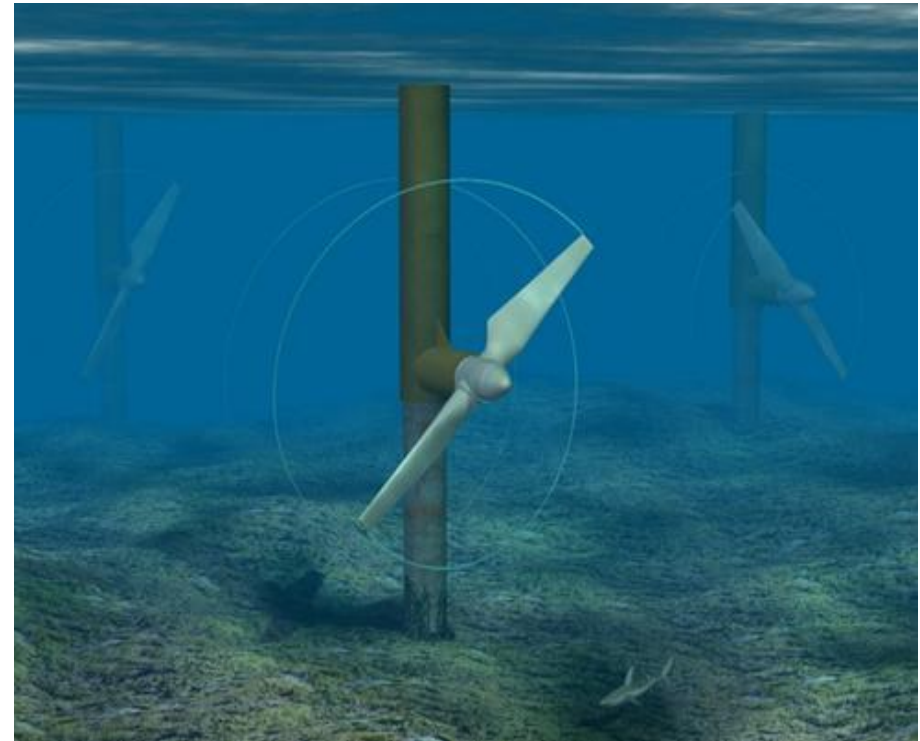
## WORLD ENERGY SCENARIO



# WHAT IS UNDERWATER TURBINE

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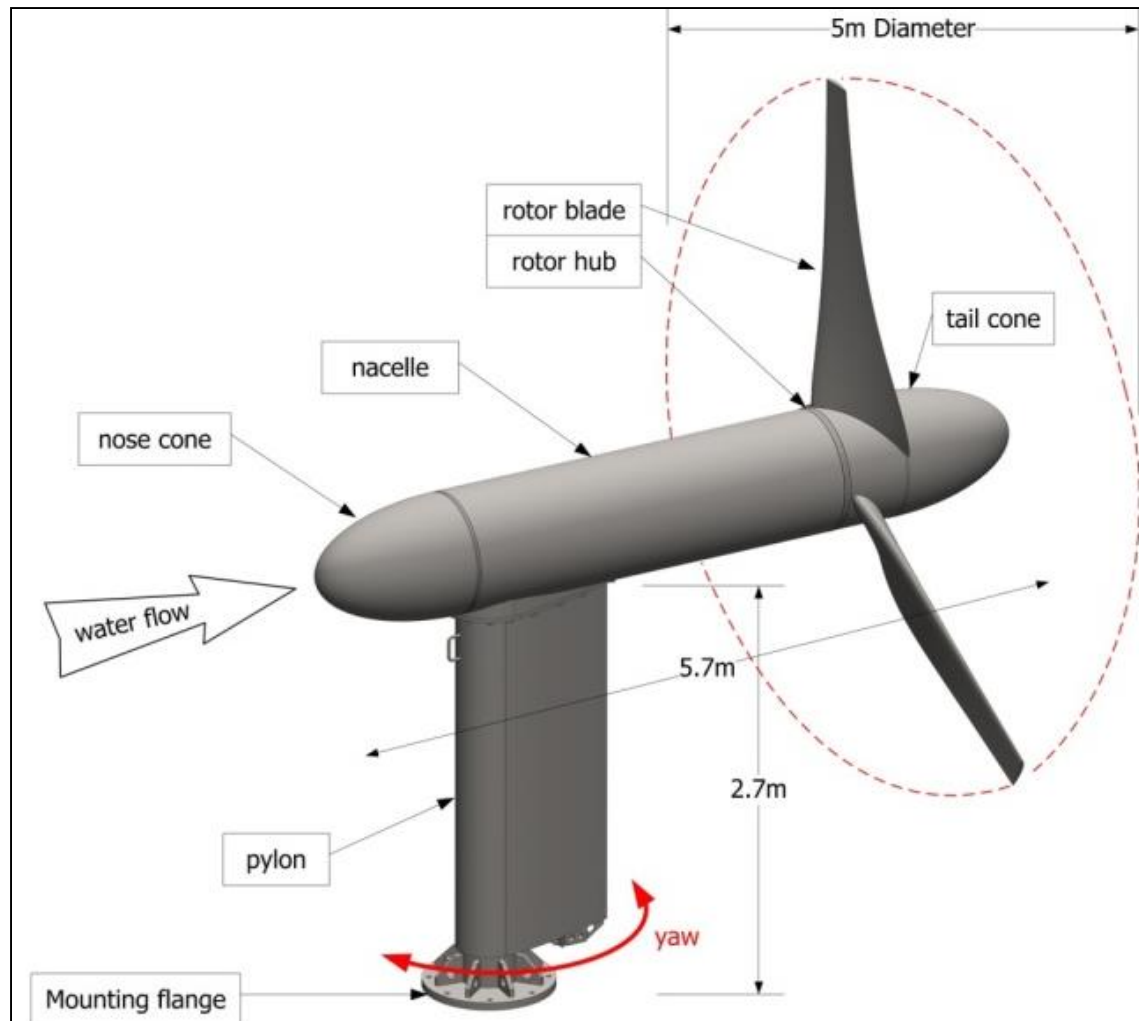
- As the name says these are basically under water propellers.
- It is a NEW alternative way of electricity generation using tidal energy.
- Underwater turbines work in much the same way as their above ground cousins i.e. WIND MILLS.



# DESIGN OF UNDER WATER TURBINE

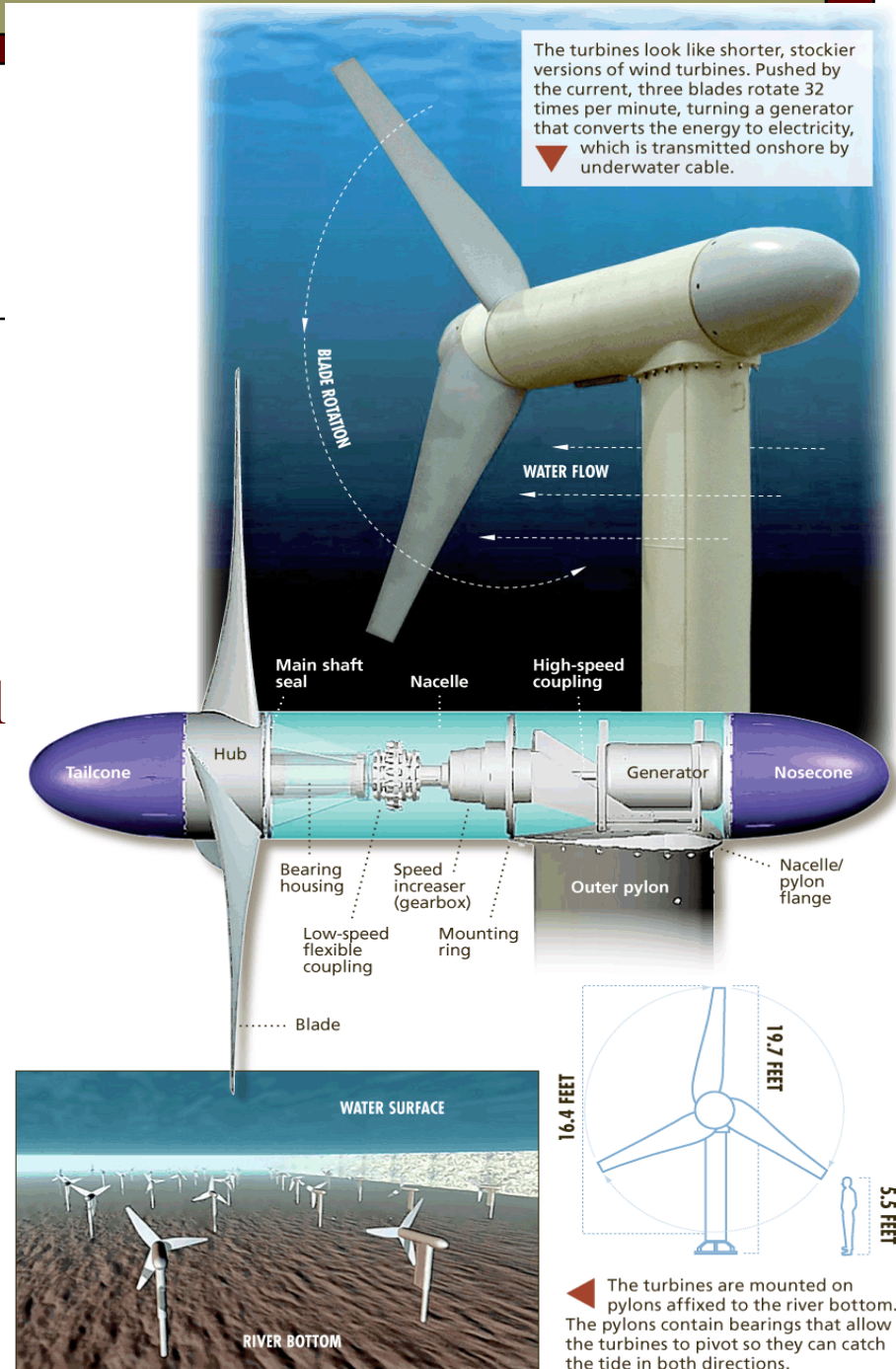
## COMPONENTS OF TURBINE

- ROTOR
- BLADES  
(Composite FRP)
- GEAR BOX
- GENERATOR
- COUPLING
- MOUNTING RINGS
- YAW



# WORKING OF UWT

- Three bladed rotors are placed on a vertical stack and are moved by the motion of the water from the back side.
- The rotor turns a magnetic coil generator in the shaft housing which creates an electrical current.
- The higher the flow rate of the water, the more electricity is generated.

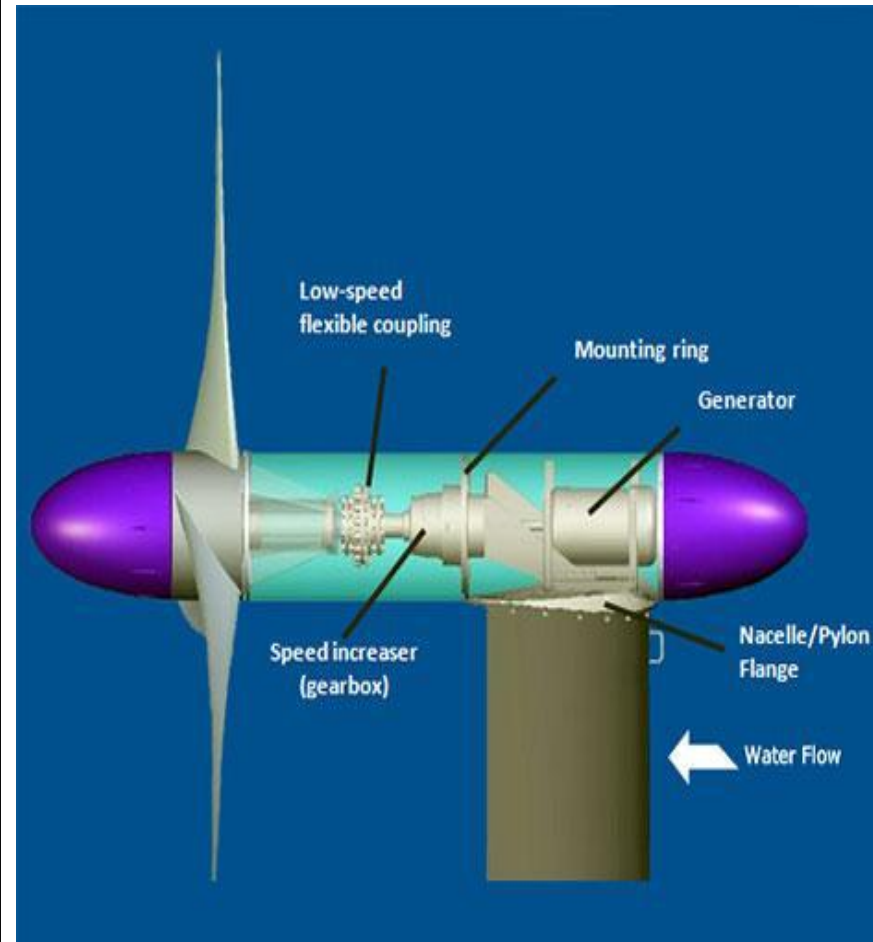


# ENERGY GENERATION CAPACITY

Deeper Water = Larger Rotor Diameter(m)  
Faster Water (m/s) = Larger Generator (kW)

Rotor Size & Current Speed

Rotor	2 m/s	3m/s	4m/s
5-m Class (5 to 7-m)	28 kW	95	224
7-m	55	190	450
10-m Class (9 to 11-m)	115	385	920
11-m	138	470	1,110 kW



# ADVANTAGES OF UNDERWATER TURBINE

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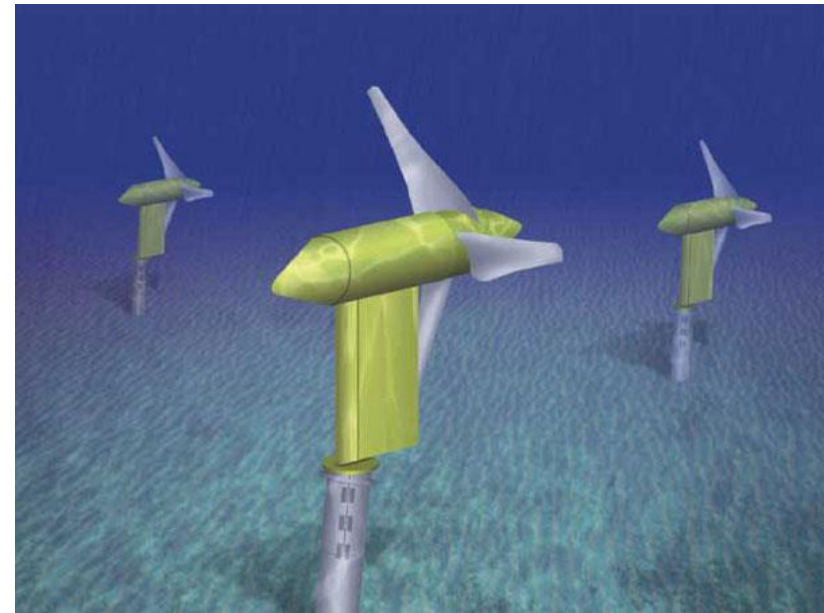
- Underwater turbines are designed to work with water flow, either the front or the back.
- • **Energy is clean and non-polluting:** Like the surface wind turbines, underwater turbines are also very clean and non-polluting.
- • **Economic:** Underwater tidal power is more cheaper than it's relative tidal power. This is because it's expensive to build dams.
- • **Safe:** underwater turbines are safe for marine life, as the rotors are slow turning.

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- Rotor spins at 40 revolutions per minute; when the current is at its peak, a single turbine can generate enough power for 20 to 30 homes.
- Water is much more denser than air. For example, water moving at 5 miles an hour can propel a larger turbine than one of the same size could be propelled by air.
- The Yaw bearings makes the turbine adjustments self employed to the river flow.



# Visit to India's Largest reservoir with a capacity of 12.22 billion cu m - INDIRA SAGAR DAM

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# DISADVANTAGES OF DAM STRUCTURE

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- ❑ Expensive to build and must be built to a very high standard.
- ❑ They must operate for many decades to become profitable.
- ❑ People living in villages and towns must move out.
- ❑ Sometimes increases the risk of deaths and flooding.
- ❑ Blocks the progress of a river which effect aquatic life.



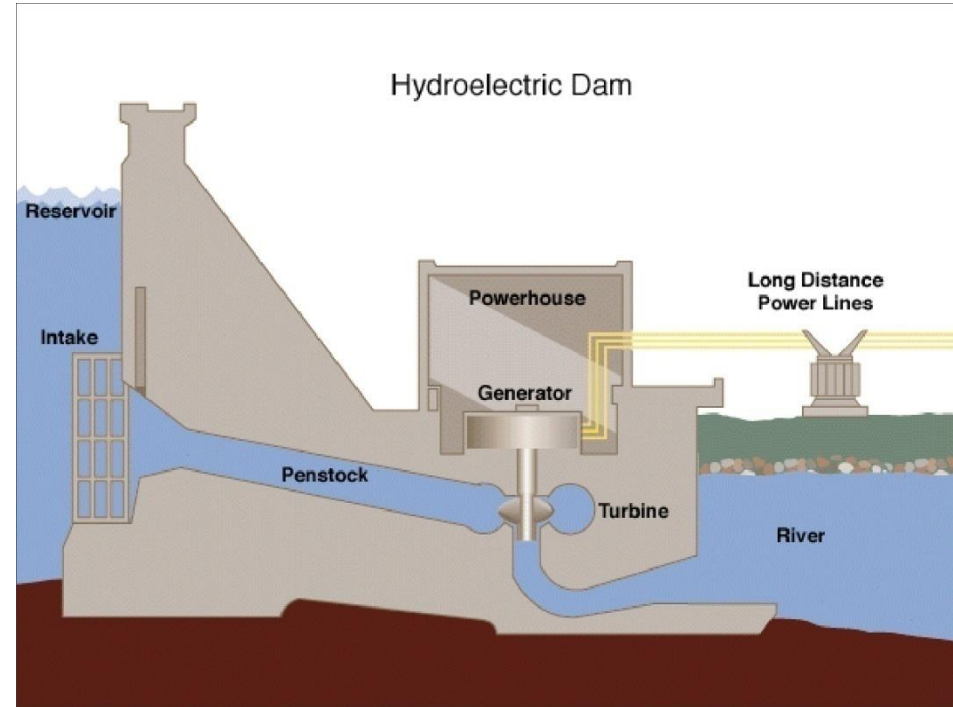
# ONLY EXISTING PLAN MANHATTAN CITY



# IN THE EXISITING WORLD

## ❑ UWT CAN BE PLACED AT

- River beds
- Near ocean shores
- Canals Beds
- Tail flows after the Dam structures
- Tidal estuaries



# FUTURE IN WORLD..??

- Number of canals system can be established in which these **Underwater turbines** will easily be deployed in constant and controlled flow rate of water in a number of arrays which will boom out the tremendous amount of electricity generation.





# CONCLUSION

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- As society moves towards a greener future, new technology to harness renewable energy sources continues to develop.
- As such, research shows that even as little as 0.2% of the ocean could generate enough power for the entire world.
- This may be the solution overall in the search for renewable and clean energy resources.
- Hopefully research and investment in this energy source will continue so that one day we will be a planet sustained by green energy.



**POWER OF NATURE  
WILL DRIVE THE FUTURE**

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*Thank  
You*