Project Title:

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Subject Name: Renewable Energy Sources for Power converters

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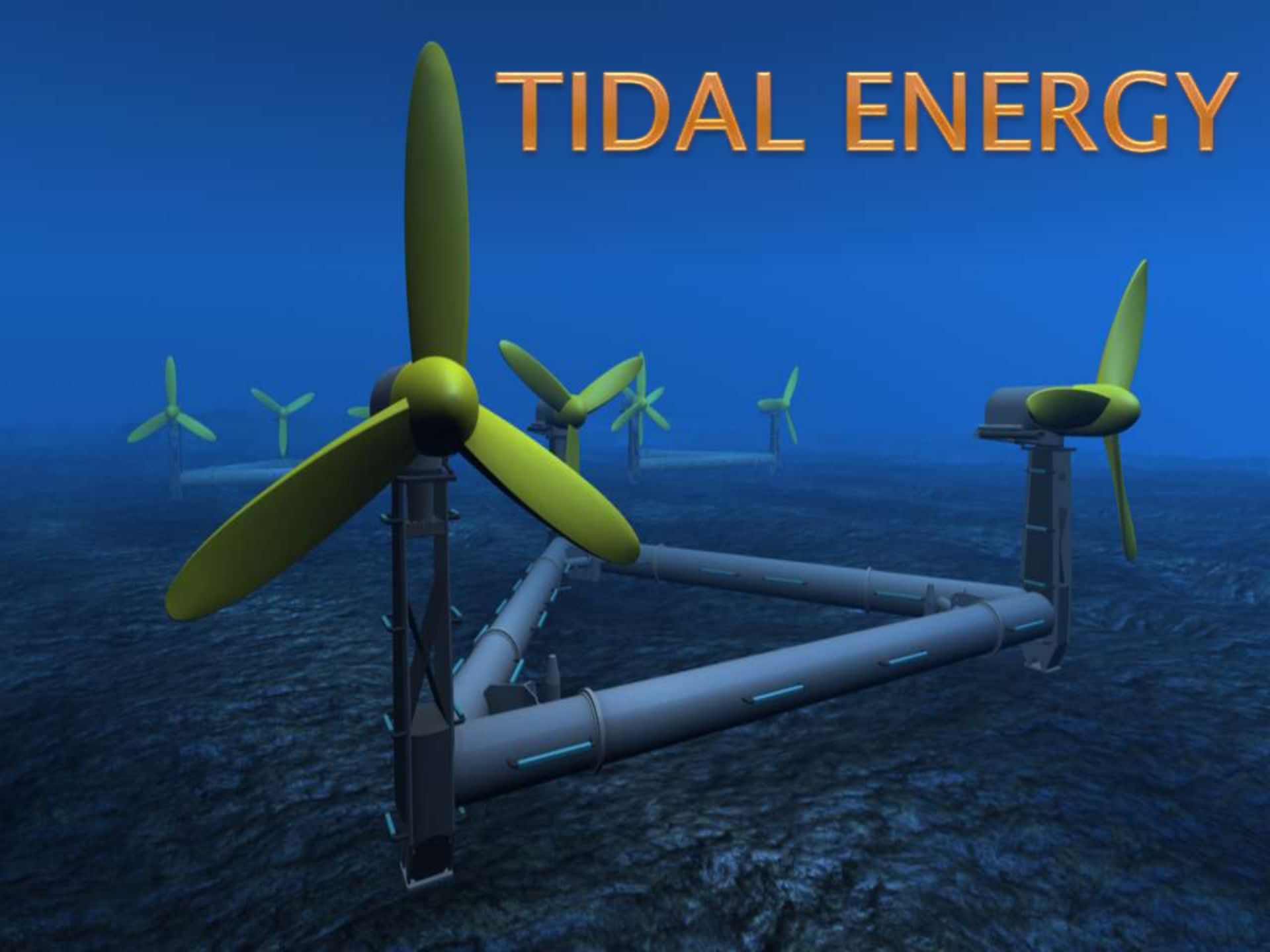

TIDAL ENERGY

TIDAL ENERGY

TIDAL ENERGY IS A FORM OF HYDROPOWER THAT CONVERTS THE ENERGY OF TIDES INTO USEFUL FORMS OF POWER.

INTRODUCTION TO TIDAL ENERGY

- Demand of electricity is increasing and global warming also threaten human life. It's time to move away from fossil fuel and other source.

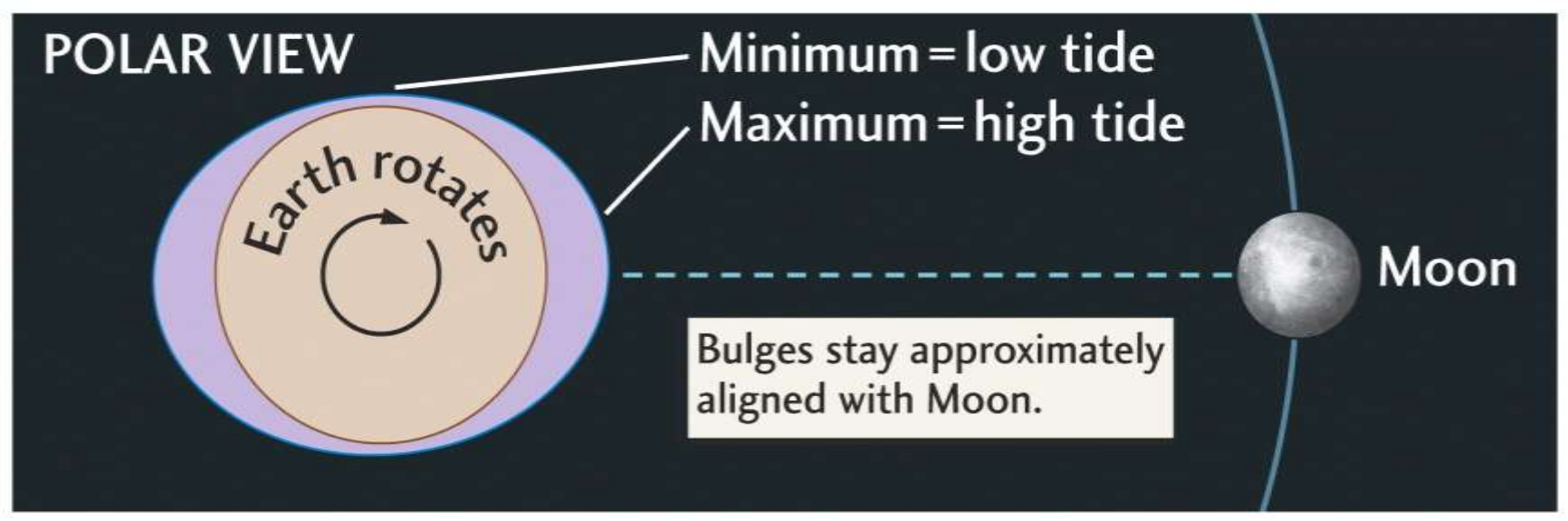
- The tides contain energy that can be harnessed to produce electricity. Two types of tidal energy can be extracted. Kinetic energy can be harnessed from the ebbing and surging tides. Potential energy can be harnessed from differences in the high and low tides. Using tidal currents remains the primary method of generating electricity.

- Tidal power has huge potential due to the size of the oceans and predictability of the tides.

BASIC PHYSICS OF TIDES

- Gravitational pull of the sun and moon.
- The pull of the centrifugal force of rotation of the earth-moon system.
- There are two high tides and low tides during each period of rotation of the earth.

HOW THE TIDES COME AND GO ?

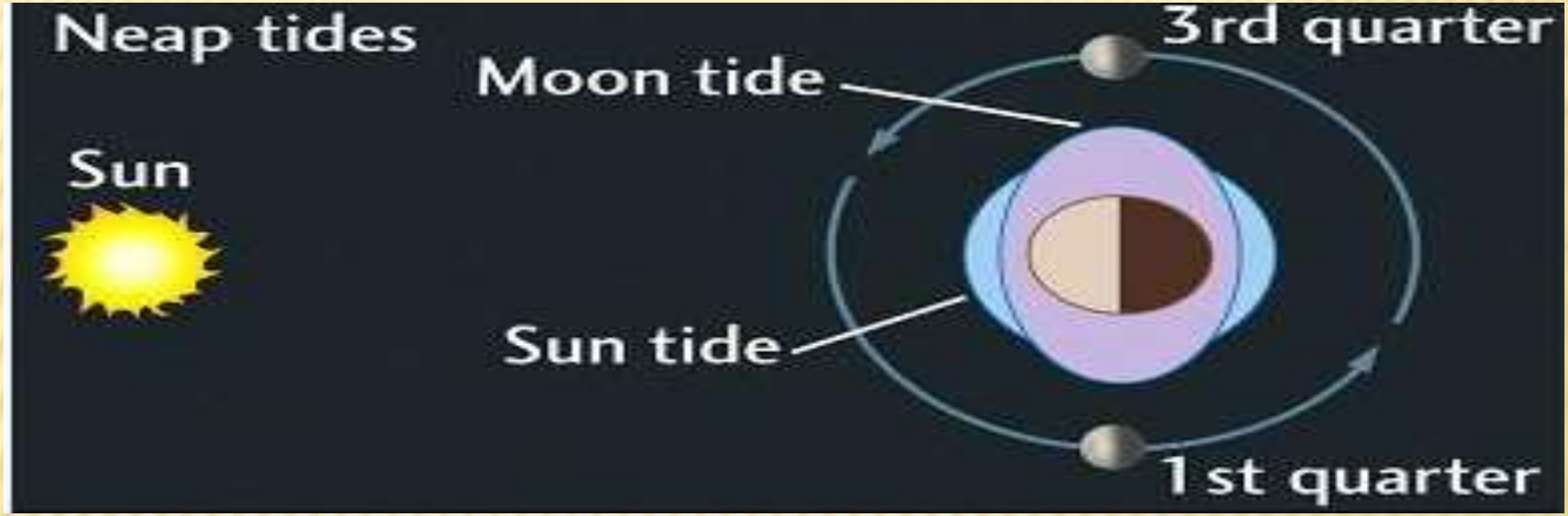


- The gravitational force of the moon causes the oceans to bulge along an axis pointing directly at the moon. The magnitude of this attraction depends on the mass of the object and its distance away .

SPRING TIDES

- When the sun and moon are in a line their gravitational attraction on the earth combine and cause a “spring” tides.

NEAP TIDES



- When they are as positioned in 90° from each other, their gravitational attraction each pulls water in different directions, causing a “neap” tides.

ENERGY FROM THE MOON

- Tides generated by the combination of the moon and sun's gravitational forces.
- Greatest affect in spring when moon and sun combine forces.
- for energy production, the height difference needs to be at least 5 meters.
- Overall potential of 3000 GW from movement of tides.

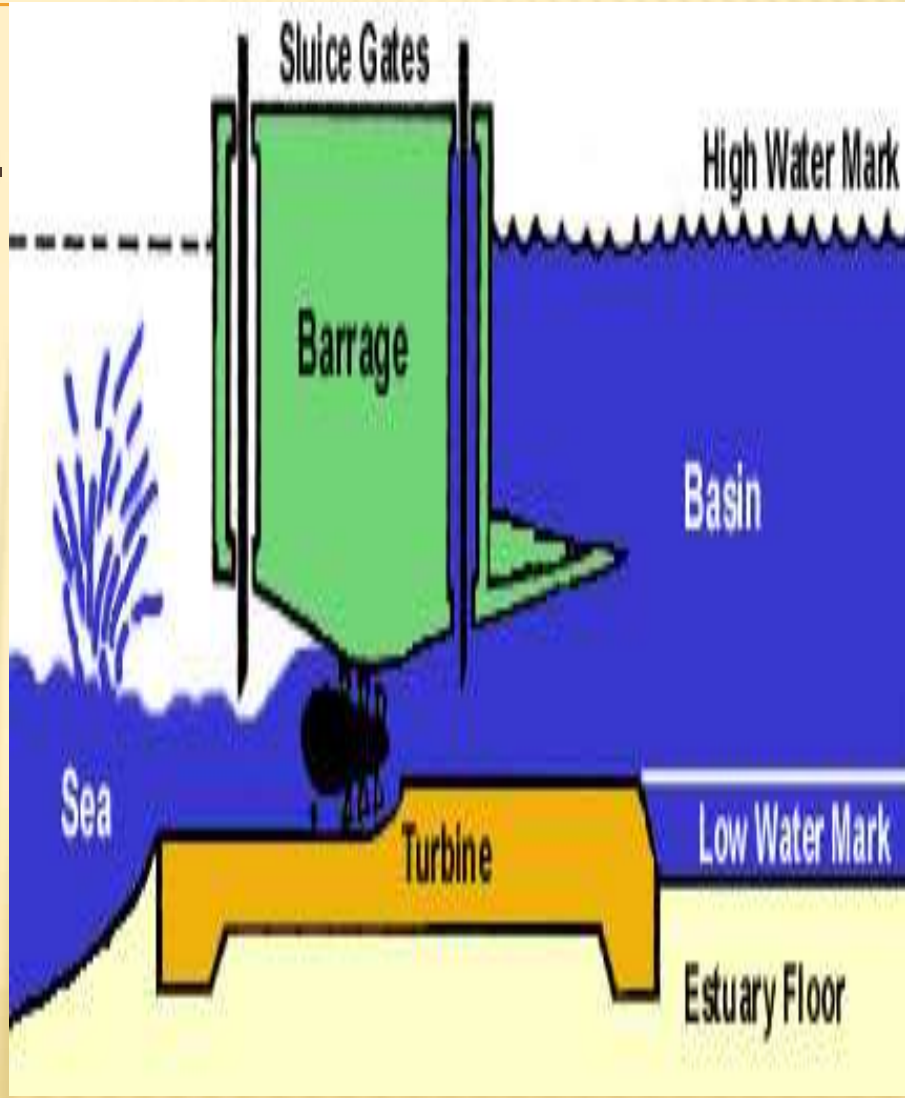
ELECTRICITY GENERATION THROUGH TIDAL ENERGY

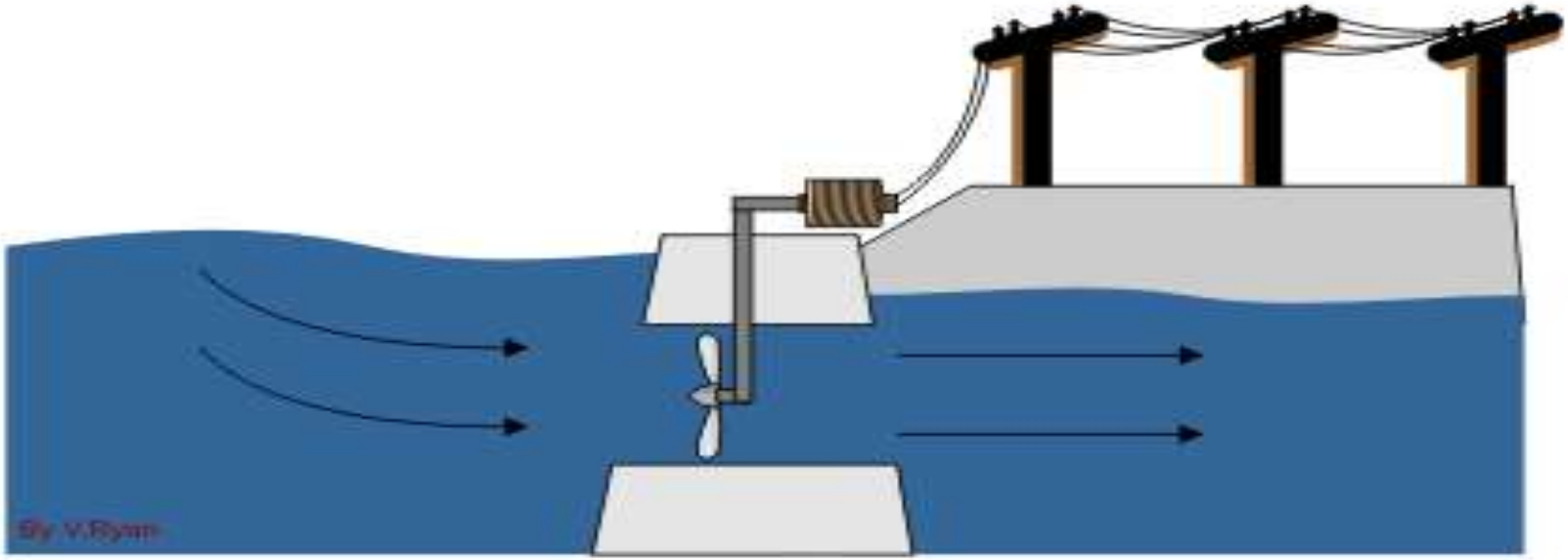
Two types of tidal plant facilities.

- Tidal barrages
- Tidal currents turbine

TIDAL BARRAGES

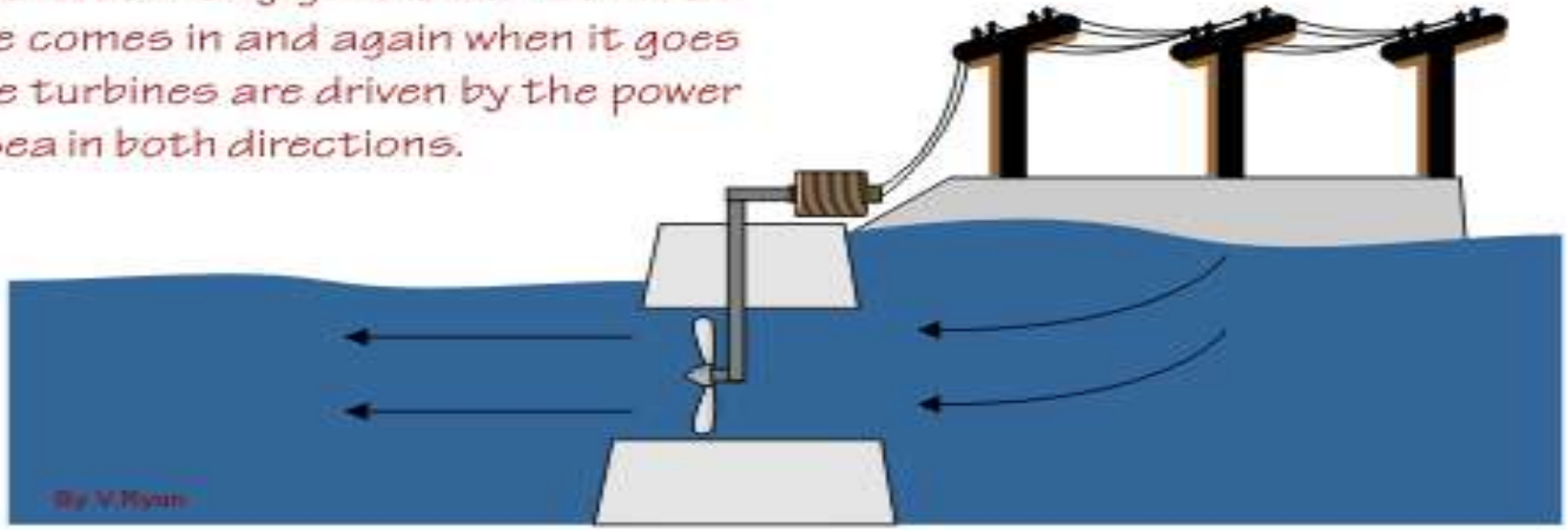
- Utilize potential energy.
- Tidal barrages are typically dams built across an bay.
- Consist of turbines, sluicegates, and Ship locks.





TIDE COMING IN

This tidal electricity generation works as the tide comes in and again when it goes out. The turbines are driven by the power of the sea in both directions.



TIDE GOING OUT

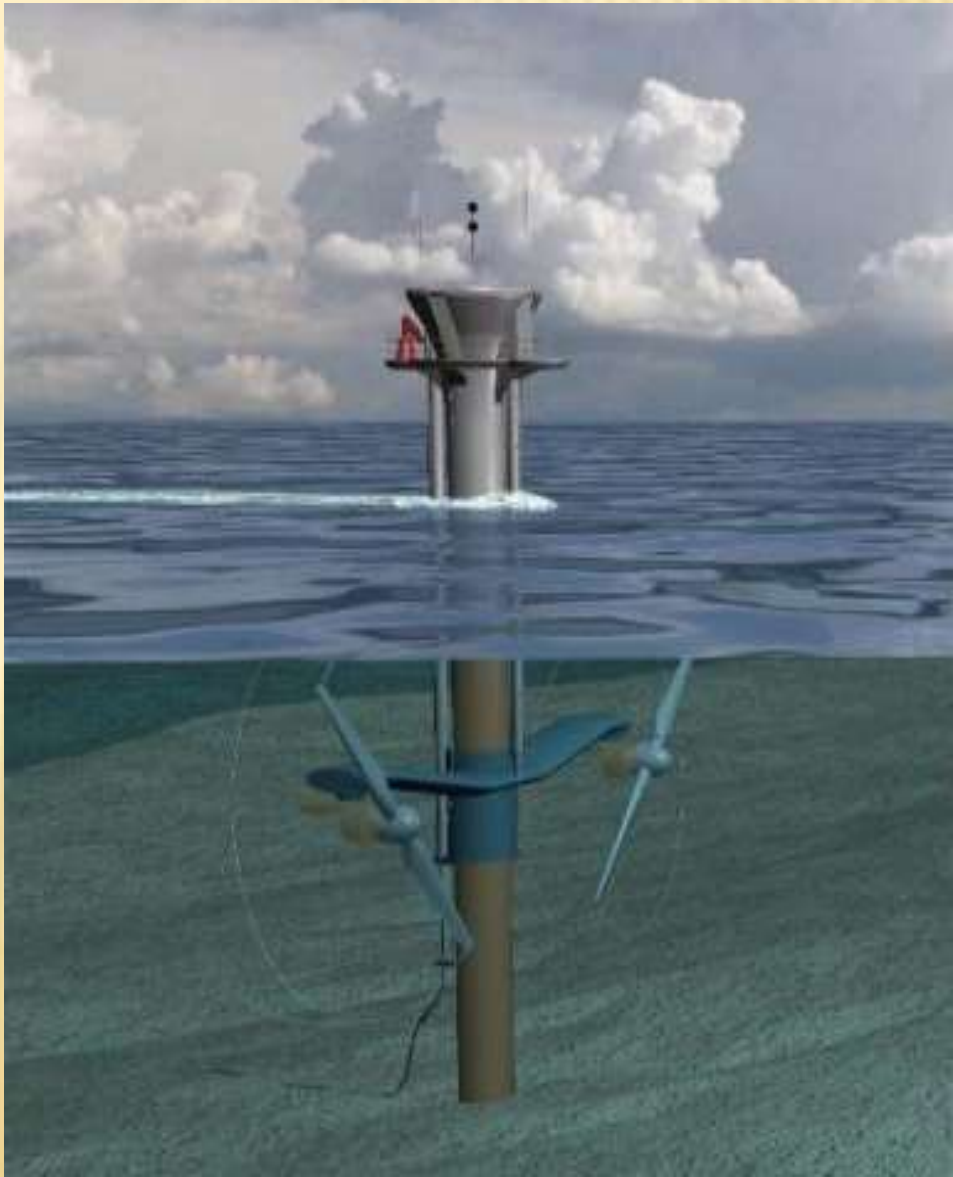

Crazy World

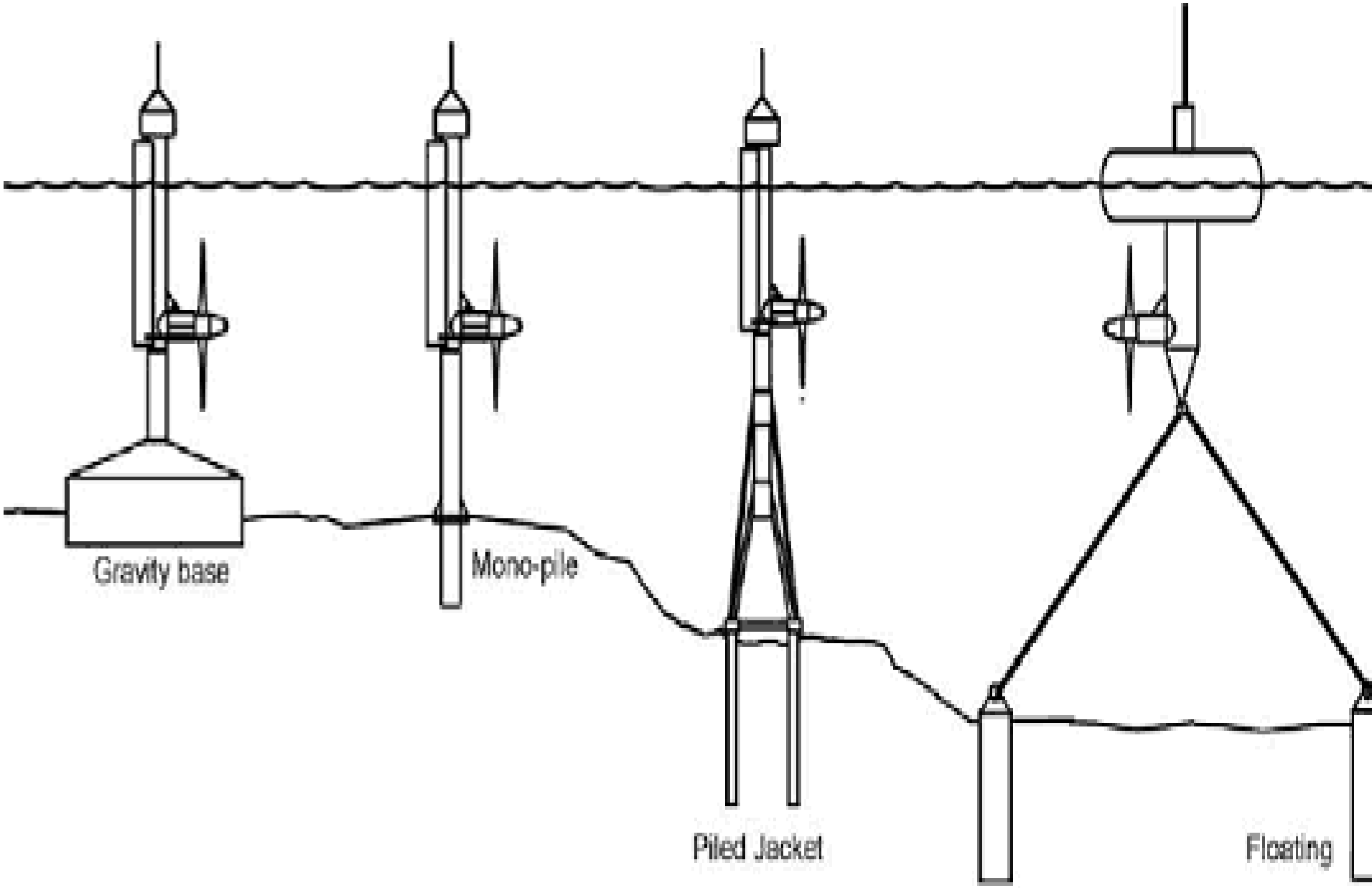
TIDAL CURRENT TURBINES

- Make use of kinetic energy of moving water to power turbines, in a similar way to wind turbines that use wind to power turbines.
- Operate during Flood and Ebb tides.
- Consists of a rotor, gearbox, and a generator. These three parts are mounted onto a support structure.

There are three main types structure:

- Gravity structure
- Piled Structure
- Floating structure





Support structure concepts


VOITH

PROS AND CONS OF BOTH TIDAL POWER FACILITIES

Tidal Barrages

- Mature technology that has been around for nearly 50years.
- Reliable energy source.

BUT

- High costs of construction
- Environmental on marine life
- Low power output in. comparison to other energy source like coal and nuclear power plants.

Tidal Current Turbine

- Able to utilize both Ebb and Flood tides.
- Tidal current turbines are not large massive dam structure.

BUT

- Tidal current turbine technology is young in its development.
- Installation and maintenance challenges.

MAJOR TIDAL PLANTS IN THE WORLD

Station	Capacity (MW)	Country	Location	Comm	Ref
Annapolis Royal Generating Station	20	Canada	44°45′07″N 65°30′40″W	1984	[1]
Jiangxia Tidal Power Station	3.2	China	28°20′34″N 121°14′25″E	1980	[2][3]
Kislaya Guba Tidal Power Station	1.7	Russia	69°22′37″N 33°04′33″E	1968	
Rance Tidal Power Station	240	France	48°37′05″N 02°01′24″W	1966	
Sihwa Lake Tidal Power Station	254	South Korea	37°18′47″N 126°36′46″E	2011	[4][5]
Strangford Lough SeaGen	1.2	United Kingdom	54°22′04″N 05°32′40″W	2008	
Uldolmok Tidal Power Station	1.5	South Korea	34°32′07″N 126°14′06″E	2009	[6]

ADVANTAGES OF TIDAL ENERGY

- Once you've built it, tidal power is free.
- It produces no green-house gases or other waste.
- It needs no fuel.
- Not expensive to maintain.
- Permits the simultaneous use of the dam for a road or rail road.
- Provides a non-polluting and inexhaustible supply of energy.

DISADVANTAGES OF TIDAL ENERGY

- Building of barrage is expensive
- Needs a wide area
- Few suitable sites available

CONCLUSION

- Tidal power is a proven technology and has the potential to generate significant amounts of electricity at certain sites around the world.
- Although, our entire electricity needs could never be met by tidal power alone, it can be invaluable source of renewable energy.


Thank You