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Natural resources

Energy Resources

- *Energy resources are all forms of fuels used in the modern world, either for heating, generation of electrical energy, or for other forms of energy conversion processes.*
- *Energy resources can be roughly classified in three categories: Renewable, fossil, and nuclear.*
- *This includes fossil fuels found in the ground in an area: coal, oil, wood, and gas.*
- *But, it also includes the potential an area has to exploit renewable resources, like wind (wind power), sunlight (solar power), waves (tidal power), underground heat (geothermal), etc.*

Fossil fuel

- *A fossil fuel is a fuel formed by natural processes, such as anaerobic decomposition of buried dead organisms containing energy originating in ancient photosynthesis.*
- *Such organisms and their resulting fossil fuels typically have an age of millions of years, and sometimes more than 650 million years.*
- *Fossil fuels contain high percentages of carbon and include petroleum, coal, and natural gas .*
- *Fossil fuels range from volatile materials with low carbon-to-hydrogen ratios (like methane), to liquids (like petroleum), to nonvolatile materials composed of almost pure carbon, like anthracite coal.*

Fossil fuel

- *As of 2018, the world's primary energy sources consisted of petroleum (34%), coal (27%), natural gas (24%), amounting to an 85% share for fossil fuels in primary energy consumption in the world.*
- *According to another source, world renewable energy consumption was 18% in 2018.*
- *When compared with the previous year, world energy consumption grew at a rate of 2.9%, almost double its 10-year average of 1.5% per year, and the fastest since 2010.*

Fossil fuel

- *Although natural processes continually form fossil fuels, such fuels are generally classified as non-renewable resources because they take millions of years to form and the known viable reserves are being depleted much faster than new ones are being made.*
- *Most air pollution deaths are due to fossil fuels, and fossil fuel phase-out would save 3.6 million lives each year.*
- *It is estimated that natural processes can only absorb about half of that amount, so there is a net increase of 10.65 billion tones of atmospheric carbon dioxide per year.*
- *Carbon dioxide is a greenhouse gas that increases radiative forcing and contributes to global warming along with ocean acidification.*

Fossil fuel

FOSSIL FUELS!!!!!!



Wind power

- *In 2018, worldwide installed capacity of wind power was 564 GW.*
- *Air flow can be used to run wind turbines.*
- *Modern utility-scale wind turbines range from around 600 kW to 9 MW of rated power.*
- *The power available from the wind is a function of the cube of the wind speed, so as wind speed increases, power output increases up to the maximum output for the particular turbine.*
- *Areas where winds are stronger and more constant, such as offshore and high-altitude sites, are preferred locations for wind farms.*

Wind power

- *This form of energy generation has become increasingly popular in recent years.*
- *Current wind energy installations power roughly twenty million homes in the United States per year and that number is growing.*
- *Most states in the nation now have some form of wind energy set-up and investment into the technology continues to grow.*
- *Unfortunately, this form of energy generation also presents challenges.*
- *Wind turbines restrict views and may be dangerous to some forms of wildlife.*

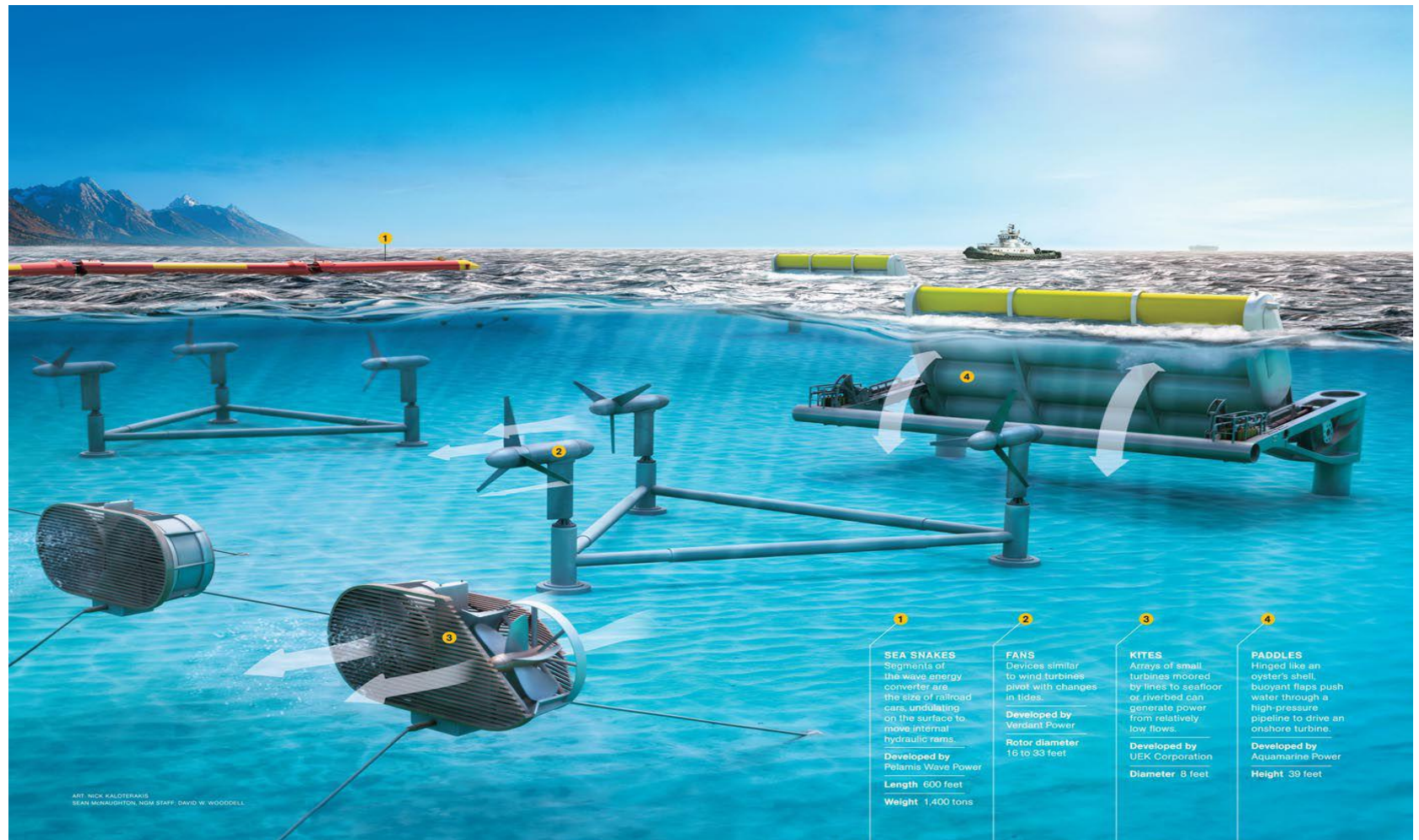
Wind power



Tidal energy

- *Tidal energy uses the power of water to generate energy, much like with hydroelectric methods, its application actually has more in common with wind turbines in many cases.*
- *Though it is a fairly new technology, its potential is enormous. A report produced in the United Kingdom estimated that tidal energy could meet as much as 20% of the UK's current electricity demands.*
- *The most common form of tidal energy generation is the use of Tidal Stream Generators. These use the kinetic energy of the ocean to power turbines, without producing the waste of fossil fuels or being as susceptible to the elements as other forms of alternative energy.*

Tidal energy



1

SEA SNAKES

Segments of the wave energy converter are the size of railroad cars, undulating on the surface to move internal hydraulic rams.

Developed by Pelamis Wave Power
Length 600 feet
Weight 1,400 tons

2

FANS

Devices similar to wind turbines pivot with changes in tides.

Developed by Verdant Power
Rotor diameter 16 to 33 feet

3

KITES

Arrays of small turbines moored by lines to seafloor or riverbed can generate power from relatively low flows.

Developed by UEK Corporation
Diameter 8 feet

4

PADDLES

Hinged like an oyster's shell, buoyant flaps push water through a high-pressure pipeline to drive an onshore turbine.

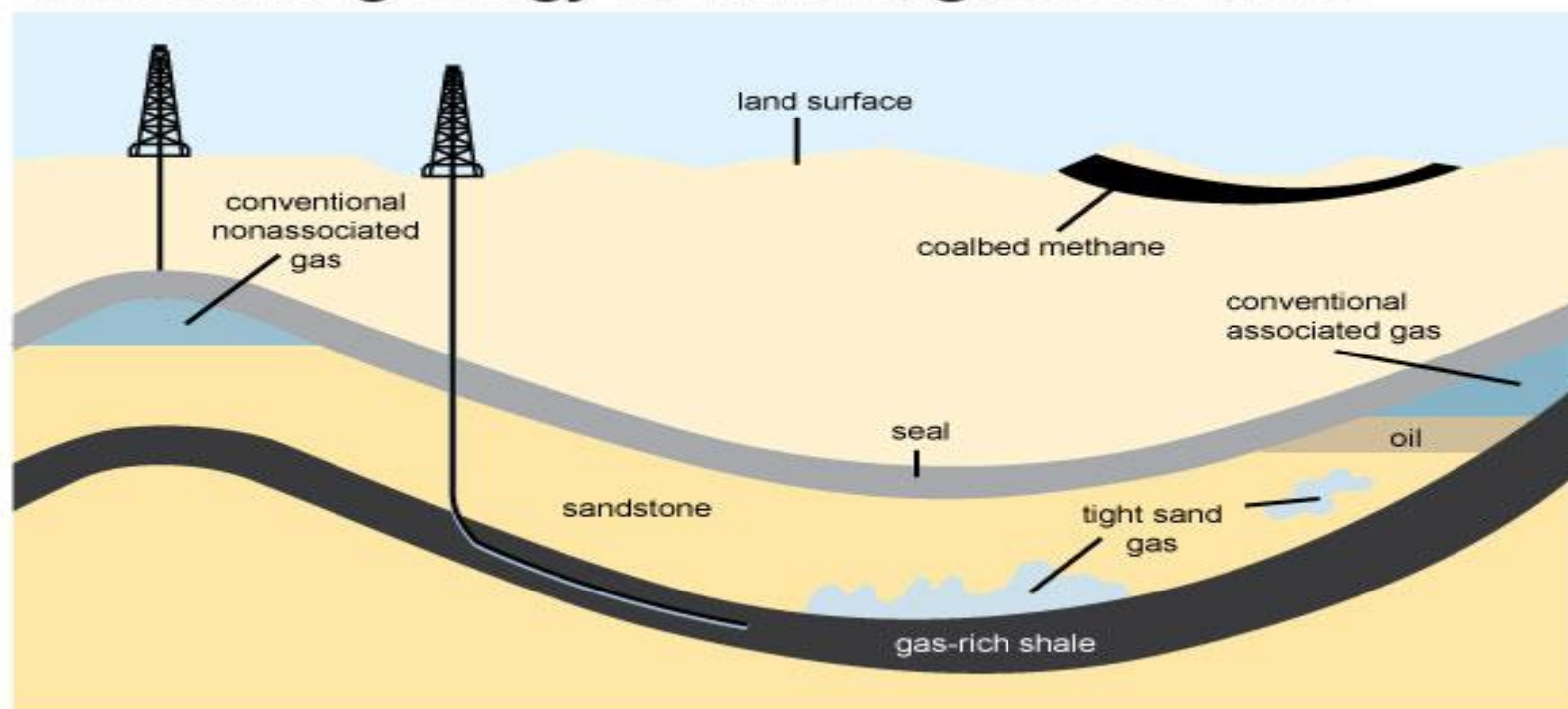
Developed by Aquamarine Power
Height 39 feet

Natural Gas

- *Natural gas sources have been in use for a number of decades, but it is through the progression of compression techniques that it is becoming a more viable alternative energy source.*
- *Demand for this energy source has been increasing.*
- *In 2016, the lower 48 states of the United States reached record levels of demand and consumption.*
- *Despite this, natural gas does come with some issues.*
- *The potential for contamination is larger than with other alternative fuel sources and natural gas still emits greenhouse gases, even if the amount is lower than with fossil fuels.*

Natural Gas

Schematic geology of natural gas resources



Source: Adapted from *United States Geological Survey factsheet 0113-01* (public domain)

Nuclear power

- *Nuclear power is amongst the most abundant forms of alternative energy.*
- *It creates a number of direct benefits in terms of emissions and efficiency, while also boosting the economy by creating jobs in plant creation and operation.*
- *Thirteen countries relied on nuclear power to produce at least a quarter of their electricity as of 2015 and there are currently 450 plants in operation throughout the world.*
- *The drawback is that when something goes wrong with a nuclear power plant the potential for catastrophe exists.*
- *The situations in Hiroshima and Nagasaki are examples of this.*

Nuclear power



Solar Power

- *When most people think of alternative energy sources they tend to use solar power as an example.*
- *The technology has evolved massively over the years and is now used for large-scale energy production and power generation for single homes.*
- *A number of countries have introduced initiatives to promote the growth of solar power.*
- *The United Kingdom's 'Feed-in Tariff' is one example, as is the United States' 'Solar Investment Tax Credit'.*
- *This energy source is completely renewable and the costs of installation are outweighed by the money saved in energy bills from traditional suppliers.*

Solar Power



Energy conservation

- *Energy conservation is the effort made to reduce the consumption of energy by using less of an energy service.*
- *This can be achieved either by using energy more efficiently (using less energy for a constant service) or by reducing the amount of service used .for example, by driving less).*
- *Energy conservation is a part of the concept of Eco-sufficiency.*
- *It is at the top of the sustainable energy hierarchy.*
- *It also lowers energy costs by preventing future resource depletion.*
- *On a global level energy use can also be reduced by the stabilization of population growth.*

Atmosphere

- *An atmosphere from Ancient Greek (atmos), meaning 'vapour', and (sphaira), meaning 'ball' or 'sphere' is a layer or a set of layers of gases surrounding a planet or other material body, that is held in place by the gravity of that body.*
- *The atmosphere of Earth is composed of nitrogen (about 78%), oxygen (about 21%), argon (about 0.9%), carbon dioxide (0.04%) and other gases in trace amounts.*
- *Oxygen is used by most organisms for respiration, nitrogen is fixed by bacteria and lightning to produce ammonia used in the construction of nucleotides and amino acids.*
- *Carbon dioxide is used by plants, algae and cyanobacteria for photosynthesis.*

Atmosphere conservation

- *Clean air is needed by all organisms on Earth.*
- *The atmosphere regulates the Earth's temperature and protects it from harmful radiation.*
- *Global warming and ozone depletion threaten all organisms, including humans.*
- *Wildlife conservation: preventing extinctions, maintaining biodiversity.*

Water Resources

- *Water resources are sources of water that are useful or potentially useful to humans.*
- *It is important because it is needed for life to exist.*
- *Many uses of water include agricultural, industrial, household, recreational and environmental activities.*
- *Virtually all of these human uses require fresh water.*
- *Water resources are sources of usually fresh water that are useful, or potentially useful, to society, for instance for agricultural, industrial or recreational use.*
- *Examples include groundwater, rivers, lakes and reservoirs*

Water Resources

- *The world's water exists naturally in different forms and locations: in the air, on the surface, below the ground, and in the oceans.*
- *Freshwater accounts for only 2.5% of the Earth's water, and most of it is frozen in glaciers and ice caps.*
- *The remaining unfrozen freshwater is mainly found as groundwater, with only a small fraction present above ground or in the air.*
- *Looking at how water moves through the Earth's water cycle helps us understand how it interacts with the environment and how much is available for human use.*

Water conservation

- *Water conservation day is celebrated on 22nd of March. Water conservation includes all the policies, strategies and activities to sustainably manage the natural resource of fresh water, to protect the hydrosphere, and to meet the current and future human demand.*
- *The goals of water conservation efforts include.*
- *Ensuring the availability of water for future generations where the withdrawal of freshwater from an ecosystem does not exceed its natural replacement rate.*
- *Energy conservation as water pumping, delivery and wastewater treatment facilities consume a significant amount of energy.*

Land resources

- *Land resource planning (also called land-use planning) is a tool for achieving sustainable and efficient resource use, taking into account biophysical and socio-economic dimensions.*
- *It is the systematic assessment of land potential and land-use alternatives for achieving optimal land uses and improved socio-economic conditions through a participatory multi-sectoral, multi-stakeholder and scale dependent process.*
- *The purpose of land resource planning is to support decision-makers and land users in selecting and putting into practice land uses that best meet the needs of people while safeguarding natural resources and ecosystem services for current and future generations.*

Types of Land Uses

- *Recreational - fun, non-essentials like parks.*
- *Transport - roads, railways, and airports.*
- *Agricultural - farmland.*
- *Residential - housing.*
- *Commercial - businesses and factories.*
- *The scientific study of soil is called pedology.*
- *It deals with the origin, formation and geographical distribution of the soil.*

Structure and formation of soil

- *Soil consists of five components:*
- *Minerals matter 45%*
- *Organic matter 5%*
- *Water 25%*
- *Air 25%*
- *Living organism*

Land conservation

- *Land conservation is the process of protecting natural land and returning developed land to its natural state.*
- *Due to the fact that some land has only had minor disturbances and other land has been completely destroyed, a variety of techniques are needed to carry out land conservation.*
- *Some of the most common techniques include preservation, restoration, remediation, and mitigation.*
- *Preservation of the environment means that lands and their natural resources should not be consumed by humans and should instead be maintained in their pristine form.*

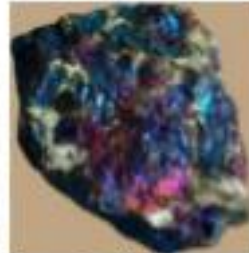
Mineral resources

- *A mineral is a pure inorganic substance that occurs naturally in the earth's crust.*
- *Mineral resources are non-renewable and include metals (e.g. iron, copper, and aluminum), and non-metals (e.g. salt, gypsum, clay, sand, phosphates).*
- *Minerals are valuable natural resources being finite and non-renewable.*
- *We require metals for making machines, sands and gravels for making roads and buildings, sand for making computer chips, limestone and gypsum for making concrete, clays for making ceramics, gold, silver, copper and aluminum for making electric circuits, and diamonds and corundum (sapphire, ruby, emerald) for abrasives and jewelry.*

Mineral resources

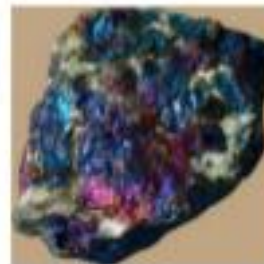
- *Energy minerals, metals, construction minerals and industrial minerals. Energy minerals are used to produce electricity, fuel for transportation, heating for homes and offices and in the manufacture of plastics.*
- *Energy minerals include coal, oil, natural gas and uranium.*
- *Construction minerals include sand and gravel, brick clay and crushed rock aggregates.*
- *They are used in the manufacture of concrete, bricks and pipes and in building houses and roads.*
- *Industrial minerals are non-metallic minerals used in a range of industrial applications including the manufacture of chemicals, glass, fertilizers and fillers in pharmaceuticals, plastics and paper.*

Mineral resources



ORES WITH

MINERALS



Uses of mineral resources

- *Used in construction of buildings, bridges and housing settlement.*
- *Development of industries and machinery.*
- *Used for generation of energy mainly Coal, petroleum and natural gas.*
- *Used for development of defence equipment*

Conservation of mineral resources

- *Use of minerals in a planned and sustainable manner.*
- *Recycling of metals.*
- *Use of alternative renewable substitutes.*
- *The preservation of natural mineral diversity is a fundamental problem, equal in significance to the preservation of biological diversity.*
- *From this point of view the role of mineralogical museums is of immense importance, as they preserve samples of the condemned to destruction non-living nature sufficient to satisfy in both quantity and quality the scientific and esthetic needs of future human generations.*

Biotic resources

- *Biotic resources are resources derived from the biosphere such as living things and from forest and the materials derived from them.*
- *This mainly include fossil fuels like petroleum, coal gas, etc. .*
- *Biotic resources also called as living resources.*
- *These resources are renewable resources .*
- *Examples of biotic resources are forests, animals, birds, fish, and marine organisms.*
- *Mineral fuels can be regarded as biotic resources since they are derived from or products formed from decayed organic matter*

FORESTS

- *A forest is a large area dominated by trees, incorporating factors such as tree density, tree height, land use, legal standing and ecological function .*
- *The living parts include trees, shrubs, vines, grasses and other herbaceous (non-woody) plants, mosses, algae, fungi, insects, mammals, birds, reptiles, amphibians, and microorganisms living on the plants and animals and in the soil.*
- *Forests provide clean water and air, timber for wood products, wildlife habitats, stable soil, and recreational opportunities, and they beautify the environment.*
- *For example, Under such a land use definition, cleared roads or infrastructure within an area used for forestry, or areas within the region that have been cleared by harvesting.*

Forest conservation

- *Forest conservation as the name suggests is the preservation and the protection of forests.*
- *Importance of Forests*
- *The most important function of forests is that it produces mass amounts of oxygen as a by-product of photosynthesis.*
- *Oxygen is the main respiratory gas for all animals, it ensures our survival.*
- *And while photosynthesis, trees also absorb carbon dioxide from the air. This is one of the main pollutants of air pollution. Hence forests also reduce air pollution.*
- *And finally, forests are the natural home and habitat for millions of species of animals, birds, and insects.*

Forest conservation

- *Ways to Conserve the Forest:*
- *Controlled Deforestation.*
- *While deforestation cannot be avoided completely, we must look to control it.*
- *Young and immature trees should not be felled as far as possible. We must look to avoid large-scale commercial deforestation as well.*
- *Forest fires are the most common and deadly cause of loss of forests.*
- *Precautions must be taken for such incidents. Making fire lanes, spreading chemicals to control fire, clearing out dry leaves and trees etc.*

Forest conservation

- *Afforestation*
- *This is the process by which we plant more trees in the area. We try to increase the forest cover by manual transplantation, or fresh plantation of trees. It is an attempt to balance our ecosystem to reduce the effects of deforestation and environmental pollutions of all types.*
- *Better Farming Practices*
- *Slash and burn farming, overgrazing by cattle, shifting agriculture are all farming practices that are harmful to the environment and particularly to forests. We must keep all these practices under control.*

References



- *Website: www.google.com.*
- *Wikipedia.*
- *Pradeep's A text book of zoology By P.S. Dhami and J.K. Dhami*

Thank you!

