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## OCEANIC ENERGY FORMATION OF FOSSIL FUEL FROM MEDICAL WASTE

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**Abstract:** *The necessity of managing health care waste in a scientific manner has been receiving and increasing attention in India. Over the past few years due to the serious threat to public health, pollution of air, water and land resources arising out of its improper management. Medical waste is part of a larger solid waste problem. Healthcare facilities often spend more than is necessary to treat medical waste that is not defined as regulated. This increases the cost of healthcare and wastes resources. Strategies exist to help minimize the amount of wastes and money that healthcare facilities spend on medical waste treatment. This is possible by providing canals from hospitals to nearby oceans. And put the medical waste in middle of ocean. After a period of years this results the formation of fossils. Fossils are the key resources for fuels. For this reason oil companies are turning their attention to the oil and gas deposits deep in the oceans. Already, more than a period of the oil and gas extracted worldwide comes from offshore sources.*

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## **INTRODUCTION**

**Medical waste**, also known as **clinical waste**, normally refers to waste products that cannot be considered general waste, produced from healthcare premises, such as hospitals, clinics, doctor's offices, veterinary hospitals and labs. A main point of this presentation is medical waste. Medical waste is part of a larger solid waste problem. Most waste generated in a healthcare facility can be classified as medical waste. The state has a very narrow definition for what is considered to be regulated medical waste. Healthcare facilities often spend more than is necessary to treat medical waste that is not defined as regulated. This increases the cost of healthcare and wastes resources. Strategies exist to help minimize the amount of wastes and money that healthcare facilities spend on medical waste treatment.

## **NATIONAL LEGISLATION**

Generators, operators and transporters of pathogenic waste must comply with the legal provisions set out in the Hazardous Waste Act 24,051. The act, implemented by Decree 831/93, regulates the generation, handling, transportation, treatment and final disposal of pathogenic waste. Section 19 of the act defines the following as 'pathogenic waste':

- Residues from laboratory cultures;

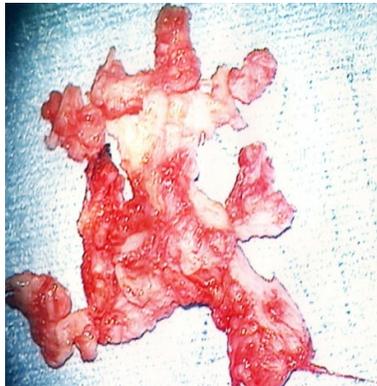




- Blood remains;



- Organic waste from operating rooms;



- Flesh from experiments on animals;





- Remains of medical research;
- Cotton wool;
- Gauze;
- Syringes;
- Elements soaked in blood;
- Chemotherapy agents; and
- Waste generated in the bacterial control of generated products.

## **METHODOLOGY**

- Formation of fossil fuel from medical waste is reviewed in the some documents.
- In all documents belonging to 3 broad categories have been reviewed.
- The categories are,
  1. What are all the Medical Waste?,
  2. Formation of Fossils (Gas & Oil forms in sea) and
  3. Process of Fossil Fuel.

## **MEDICAL WASTE**

- Medical waste is waste from a generator or a health care related facility which, if improperly treated or handled of may serve to transmit an infectious disease and which includes the following:
- Pathological waste All human unfixed tissues, organs and anatomical parts, other than intact skin, which emanate from surgeries, obstetrical procedures, dental procedures, autopsies and laboratories.
- Such waste shall be exclusive of bulk formaldehyde and other preservative agents.
- Liquid or semi-liquid blood such as human blood, (e.g., serum)and other potentially infectious materials, to include regulated human body fluids such as semen, vaginal secretions, cerebrospinal fluid, pleural fluid, pericardial fluid, synovial fluid, peritoneal fluid, saliva in dental procedures, amniotic fluid, any body fluid and all body fluids where it is difficult to differentiate between body fluids, not to include urine or feces, which cannot be discharged into the collection system of a publicly owned treatment works (POTW).



## **HOW FOSSILS FORM**

- After a long time, the chemicals in the buried animals' bodies underwent a series of changes.
- As the bone slowly decayed, water infused with minerals seeped into the bone and replaced the chemicals in the bone with rock-like minerals.
- The process of fossilization involves the dissolving and replacement of the original minerals in the object with other minerals (and/or per mineralization, the filling up of spaces in fossils with minerals, and/or recrystallization in which a mineral crystal changes its form).
- This process results in a heavy, rock-like copy of the original object - a fossil.  
The fossil has the same shape as the original object, but is chemically more like a rock! Some of the original hydroxy-apatite (a major bone constituent) remains, although it is saturated with silica (rock).
- Shallow seas covered the swamps and slowly deposited layers of sand and mud over the peat.
- These sediments exerted pressure on the peat over thousands of years.
- Slowly chemical changes took place transforming it to lignite or brown coal, which is about 40% carbon.  
Millions of years later, increasing pressure and heat changed the lignite into bituminous or soft coal (about 66% carbon).
- And finally into anthracite or hard coal (over 90% carbon).
- And also Coal was formed from the remains of ferns, trees, and grasses that grew in great swamps 345 million years ago. These remains formed layers as they sank under the water of the swamps.

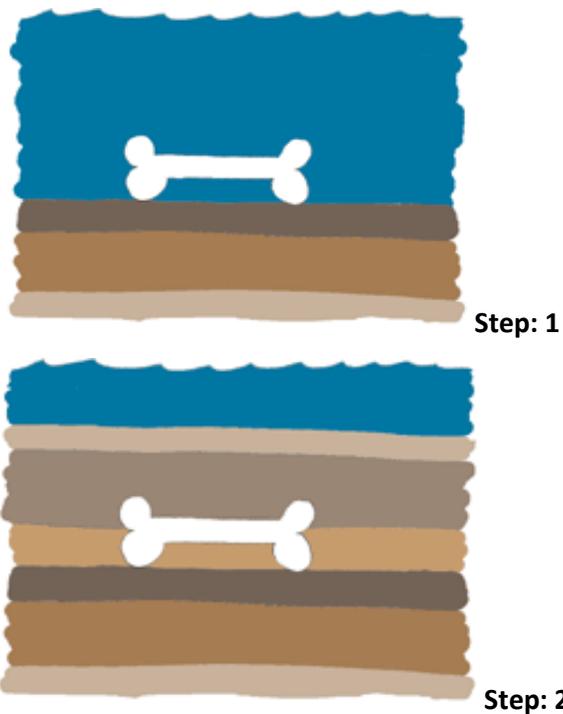


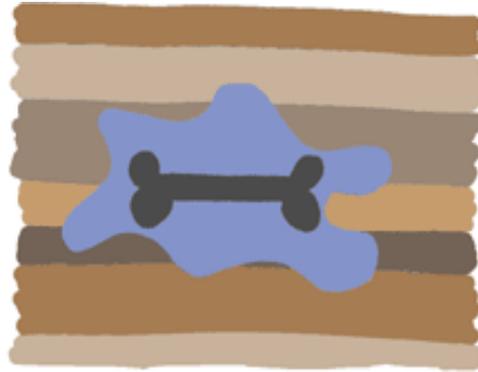
- The plant material partially decayed as these layers formed beds of peat, a soft brown substance that is up to 30% carbon.
- Peat is the earliest stage of coal formation. Shallow seas later covered the swamps and slowly deposited layers of sand and mud over the peat.
- These sediments exerted pressure on the peat over thousands of years. Slowly chemical changes took place transforming it to lignite or brown coal, which is about 40% carbon.
- Millions of years later, increasing pressure and heat changed the lignite into bituminous or soft coal (about 66% carbon) and finally into anthracite or hard coal (over 90% carbon).
- Fossil fuels were formed millions of years ago.
- Other sources of energy are replaced continuously. They are said to be renewable.
- Fossil fuel resources are finite.



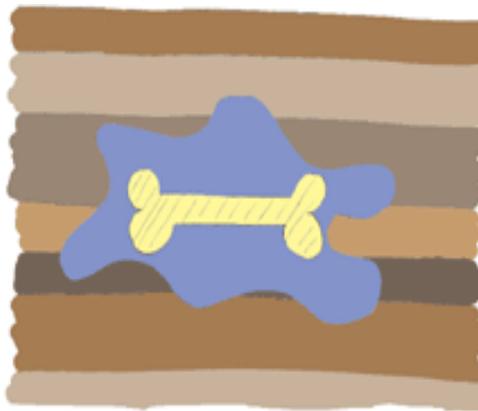
- Fossil fuels may be used up at some future time. Because they are not replaced during the time span of human history.
- The number of years (Worksheet E) that each fuel will last, based on constant use, is:
  - Coal - 1,051.4 years
  - Oil - 8.5 years
  - Natural gas - 11.5 years
- When fossil fuels are burned, they release energy.
- Most of the energy released is heat.
- Power plants and machines use that heat to produce electrical energy.
- Electrical energy is used to power lights.

### STEPS FOR ORGANISMS TURN INTO FOSSIL

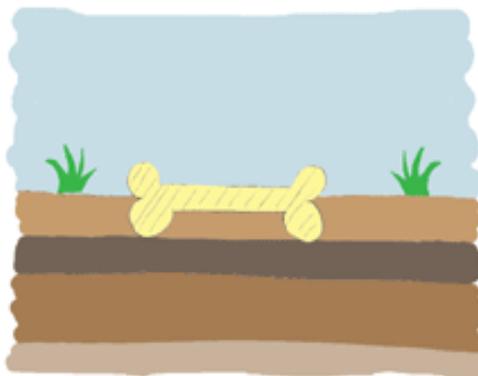




Step: 3



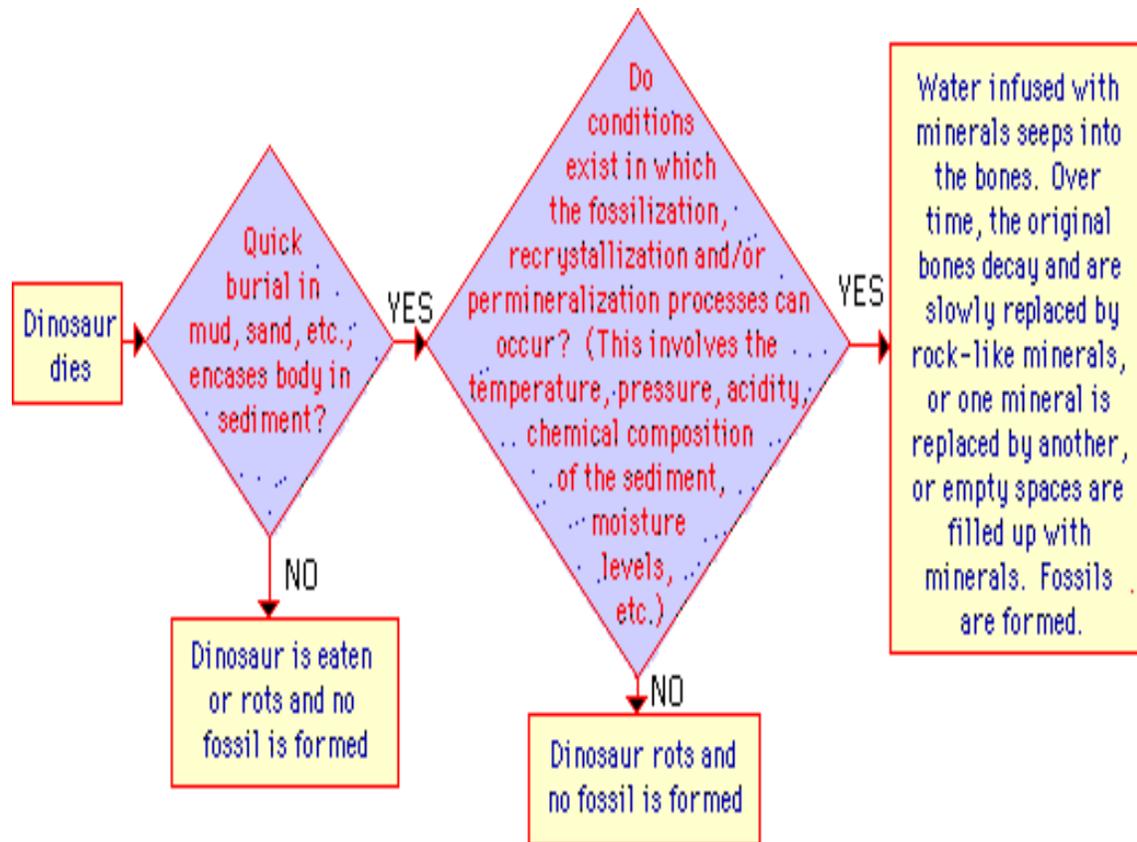
Step: 4



Step: 5



## Here's a flow chart of fossil formation



- Unaltered preservation (like insects or plant parts trapped in amber, a hardened form of tree sap).
  - Per mineralization=Petrifaction (in which rock-like minerals seep in slowly and replace the original organic tissues with minerals, forming a rock- like fossil-can preserve hard and soft parts -most bone and wood fossils are per mineralized)
  - Replacement (an organism's hard parts dissolve and are replaced by other minerals, like calcite, silica, pyrite, or iron)
  - Carbonization=Coalification (in which only the carbon remains in the specimen - other elements, like hydrogen, oxygen, and nitrogen are removed)
  - Recrystallization (hard parts either revert to more stable minerals turn into larger crystals)
- Antigenic preservation (molds and casts of organisms that have been destroyed or dissolved).



## PROCESS OF FOSSIL FUEL

Not many plants and animals are lucky enough to be turned into fossils. When an animal or plant dies its remains usually rot away to nothing.

Sometimes though, when the conditions are just right and its remains can be buried quickly, it may be fossilized. There are several ways fossils are formed. Here we go through the five steps of fossilization to make a typical 'mould and cast' fossil.

## OVERVIEW



- Medical waste means *any solid waste* which is generated in the diagnosis, treatment, or immunization of human beings or animals (does not mention care and feeding).
- Biohazardous waste generated outside this definition is not considered to be medical waste.
- For example - trauma scenes the exception is animals that died from a zoonotic disease (*e.g.-rabies, BSE*).



## REGULATED MEDICAL WASTE



- Regulated medical waste means blood and body fluids in individual containers in volumes greater than 20 ml (about the size of a test tube), microbiological waste, and pathological waste.
- Roughly 9 percent to 15 percent of the waste stream at hospitals is regulated medical waste.
- Regulated medical waste must be treated prior to disposal.
- The remains or impression of a prehistoric organism preserved in petrified form or as a mold or cast in rock: "sites rich in fossils"

## MICROBIOLOGICAL WASTE

- Microbiological waste means cultures and stocks of *infectious agents*, including, but not limited to, specimens from medical, pathological, pharmaceutical, research, commercial and industrial laboratories.
- Can be autoclaved, incinerated, or treated with disinfectant chemicals (bleach 1:5).



## BLOOD AND BODY FLUIDS



- Blood and body fluids means liquid blood, serum, plasma, other blood products, emulsified human tissue, spinal fluids and pleural and peritoneal fluids.
- Dialysis, urine, and feces are *not* blood or body fluids under this definition.
- Preferred methods of treatment- dispose of in a commode.

## PATHOLOGICAL WASTE

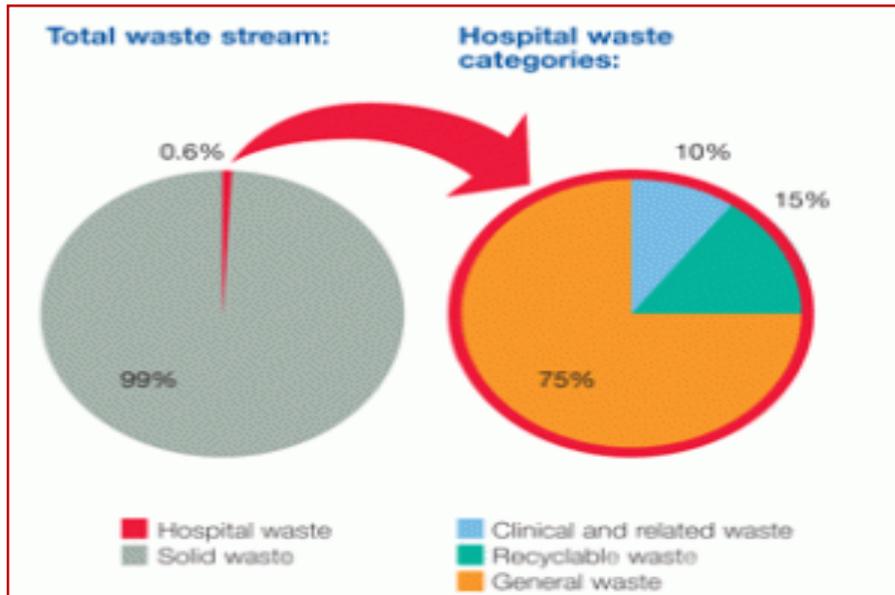


- Pathological waste means human tissues, organs and body parts; and the carcasses of animals that were known to have been exposed to pathogens or that died of a known or suspected disease transmissible to humans.
- Only method of treatment- incineration (and other approved methods).



## BRIEF DESCRIPTION

- Medical waste is waste from a generator or a health care related facility which, if improperly treated, handled, or disposed of may serve to transmit an infectious disease.



- Any wastes that contain medical waste mixed with general solid waste shall be managed as medical waste if the solid waste has been contaminated by pathological waste, blood or body fluids, contaminated items and/or microbiological waste.
- After a period of years this results the formation of fossils. Fossils are the key resources for fuels. For this reason oil companies are turning their attention to the **oil and gas deposits deep in the oceans.**
- Already, more than a period of the oil and gas extracted worldwide comes from offshore sources.

## CONVERSION OF MEDICAL WASTE INTO FOSSIL



Fossil fuels differ from "renewable fuels", in that renewable fuels derive from plants that recently lived, and recently removed the CO<sub>2</sub> their combustion releases from the atmosphere. Encouraging the growth of renewable fuel sources, food plants, even forests is one of Nature's methods of accomplishing "carbon sequestration".

#### LIQUID FOSSIL FUELS: PETROLEUM

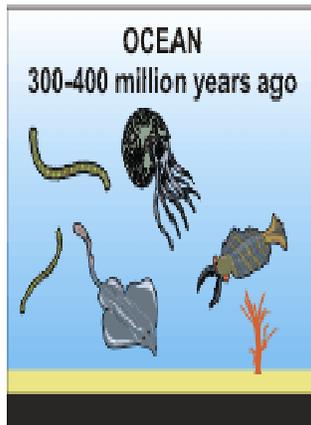
- We can get energy from materials that contain stored energy. We call these materials "fuels." One of our most important sources of energy today is fossil fuels.
- Fossil fuels take a long time to form. If we go back in geological history, we find that it took millions of years for our fossil fuels to come to be.
- Because of the time needed to form these fuels, and because the conditions for formation must be just right, most geologists feel that little or no new fossil fuel is being produced. For this reason, we call fossil fuels "non-renewable." The procedures to calculate leakage of CO<sub>2</sub> emissions from the combustion of fossil fuels. It can be used in cases where CO<sub>2</sub> emissions from fossil fuel combustion are calculated based on the quantity of fuel combusted and its properties.

#### [Methodological tool "Tool to calculate project or leakage CO<sub>2</sub> emissions from fossil fuel combustion" (Version 02)]

- A liquid mixture of complex hydrocarbon compounds is called petroleum. Petroleum is commonly known as *crude oil*.
- *Petroleum is separated into several kinds of products in refineries.*
- *Examples of products separated from petroleum are gasoline, jet fuel, oil, natural gas kerosene, diesel fuel, and fuel oil. Petroleum is also used to make plastics.*

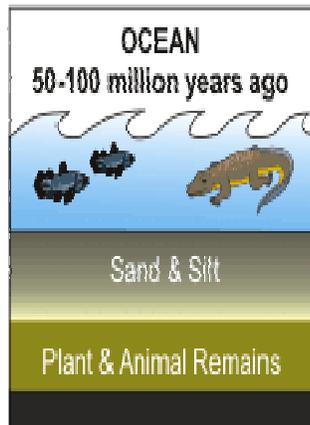


## PETROLEUM & NATURAL GAS FORMATION



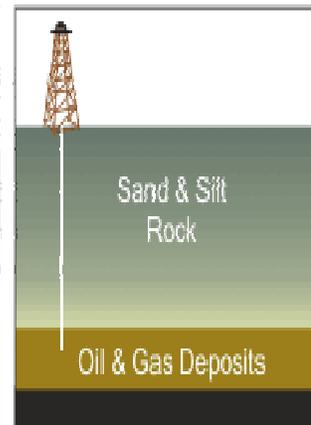
**OCEAN**  
300-400 million years ago

Tiny sea plants and animals died and were buried on the ocean floor. Over time, they were covered by layers of silt and sand.



**OCEAN**  
50-100 million years ago

Over millions of years, the remains were buried deeper and deeper. The enormous heat and pressure turned them into oil and gas.



Today, we drill down through layers of sand, silt, and rock to reach the rock formations that contain oil and gas deposits.

## Population Projections

World's Largest Countries in 2003

World's Largest Countries in 2050

Rank	Country	Population (millions)
1	China	1,289
2	India	1,069
3	United States	292
4	Indonesia	220
5	Brazil	176
6	Pakistan	149
7	Bangladesh	147
8	Russia	146
9	Nigeria	134
10	Japan	128
11	Mexico	105
12	Germany	83
13	Philippines	82
14	Vietnam	81
15	Egypt	72
16	Turkey	71
17	Ethiopia	71

Rank	Country	Population (millions)
1	India	1,628
2	China	1,394
3	United States	422
4	Pakistan	349
5	Indonesia	316
6	Nigeria	307
7	Bangladesh	255
8	Brazil	221
9	Congo, Dem. Rep. of	181
10	Ethiopia	173
11	Mexico	153
12	Philippines	133
13	Egypt	127
14	Russia	119
15	Vietnam	117
16	Japan	101



## WHAT ARE GAS HYDRATES?



[www.gashydate.de/images/hand.jpg](http://www.gashydate.de/images/hand.jpg)

The heat from the flame melts the hydrate thus releasing more methane to fuel the flame.

Notice the water dripping from the person's hands.

What Are Gas Hydrates?

- Crystalline Solids
- Clathrate Structure  
(gas molecules within water cages)

$\text{CH}_4$

$\text{CH}_4 \cdot 6\text{H}_2\text{O}$

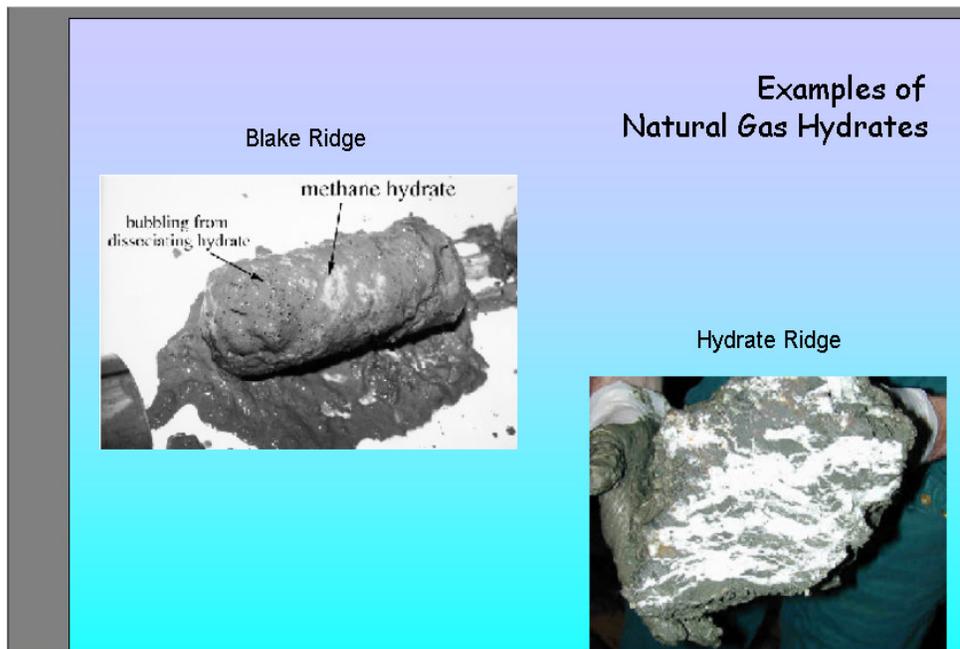
$\text{H}_2\text{O}$

Photo source: <http://woodshole.er.usgs.gov/project-pages/hydrates/>

## PIPELINE PLUGGING

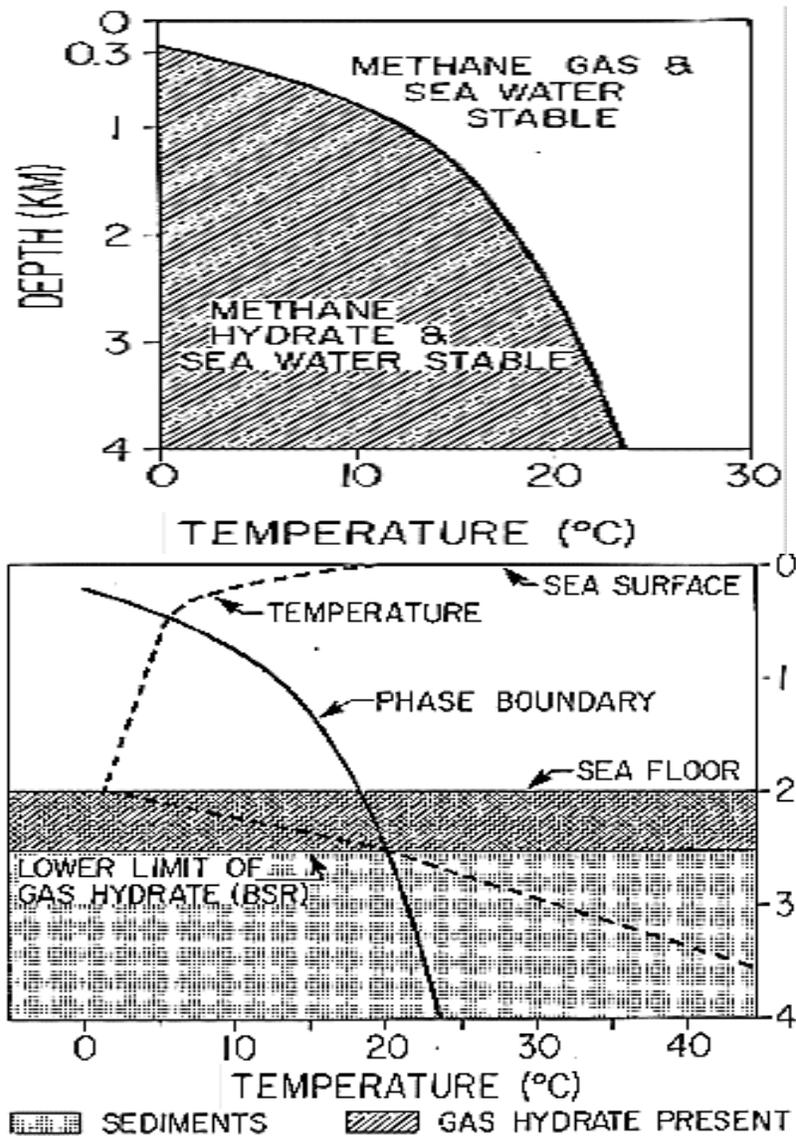
Preventing Gas Hydrate formation accounts for

- 10-15% of the production costs
- \$1 Million per day for Methanol alone

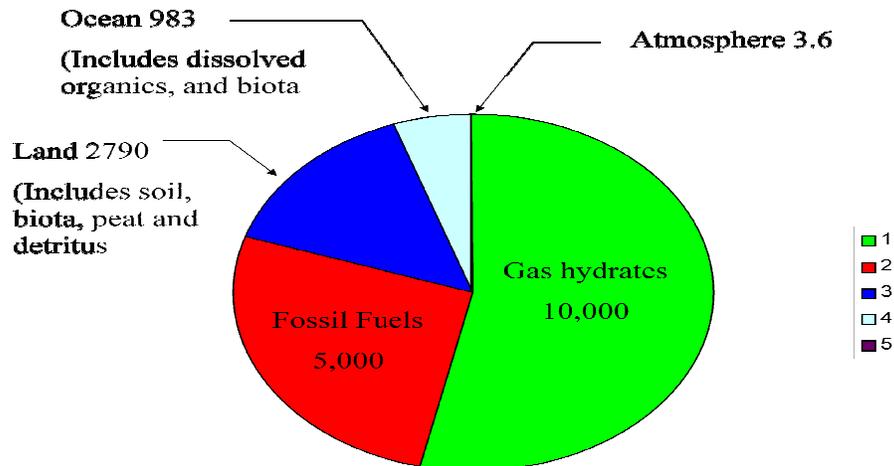


### WHERE DO HYDRATES FORM?

- In sediments below the ocean floor

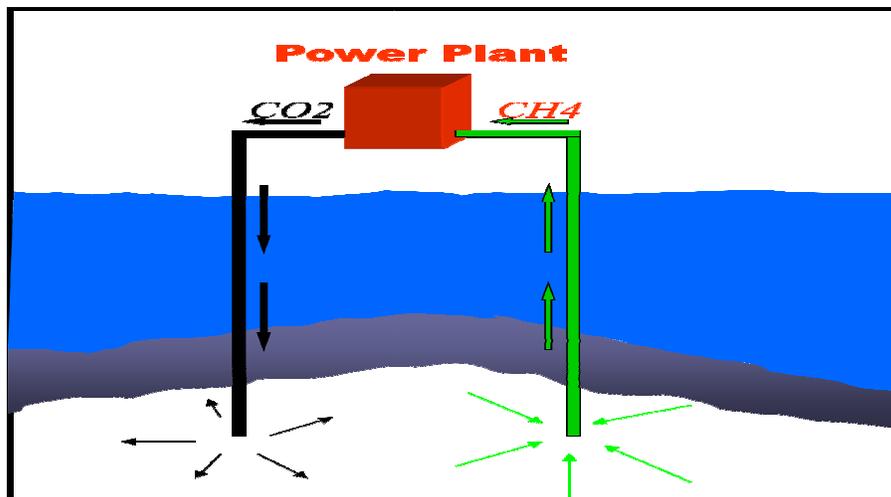


<http://marine.usgs.gov/fact-sheets/gas-hydrates/title.html>



Distribution of organic carbon in Earth reservoirs (excluding dispersed carbon in rocks and sediments). Numbers in gigatons ( $10^{15}$  tons) of carbon

### CO<sub>2</sub> DISPLACES METHANE



Sketch of a Proposed Method to Sequester CO<sub>2</sub> while Producing Methane and Possibly Electricity.

### BENEFITS

- Hospitals save money on waste that does not need to be treated and taken to the landfill.
- Valuable landfill space is preserved.

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### **ACKNOWLEDGEMENT**

Developing a strategy for primary level health-care waste management involving health-care waste (hospital waste and immunisation waste) generated from widespread network of hundreds of Block Primary Health Centres (BPHCs) and Primary Health Centres (PHCs) and thousands of Sub Centres (SCs) and Outreach Centres (ORCs) is a very complex and important component of health-care waste management in the state. It throws up new challenges and possibilities.

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