

# HOW WILL I CHARGE MY SMARTPHONE IN THE FUTURE

## Alternative Energy Sources



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# HOW MUCH COAL, OIL AND NATURAL GAS ARE LEFT ON EARTH?

## HOW MUCH COAL, OIL AND NATURAL GAS IS LEFT ON EARTH?

SEVERAL MEASURES ARE USED TO DETERMINE HOW MUCH COAL IS LEFT IN THE UNITED STATES, WHICH ARE BASED ON VARIOUS DEGREES OF GEOLOGIC CERTAINTY AND ON THE ECONOMIC FEASIBILITY OF MINING THE COAL.

THE AMOUNT OF MUCH COAL THAT EXISTS IN THE UNITED STATES IS DIFFICULT TO ESTIMATE BECAUSE IT IS BURIED UNDERGROUND.

TOTAL RESOURCES ARE ESTIMATED TO BE ABOUT 3.9 TRILLION SHORT TONS .

# HOW MUCH COAL, OIL AND NATURAL GAS ARE LEFT ON EARTH?

- In October 2014, according to the Institute of Mechanical Engineers, there are 1.3 trillion barrels of proven oil reserve left in the world's major fields, which at present rates of consumption should last 40 years.
- In May 2012, it has been estimated that there are over 847 billion tonnes of proven coal reserves worldwide. This means that there is enough coal to last us around 118 years at current rates of production.
- The actual number of years will depend on the amount of natural gas consumed each year, natural gas imports and exports, and additions to natural gas reserves.
- At the rate of U.S. dry natural gas consumption in 2013 of about 27 Tcf per year, the United States has enough natural gas to last about 84 years.
- As of January 1, 2015, there were an estimated 6,950 trillion cubic feet (Tcf) of total world proved reserves of gross natural gas.

# SOLAR ENERGY IN UNITED ARAB EMIRATES

It is an oil producing country but it has also developed the energy production using renewables like solar energy. To prevent and reduce the emission of carbon dioxide by burning fossil fuels and it is a country which is warm or hot most of the year, solar energy is much efficient and will help reduce the problems of non-renewables by 25%. By 2020, Abu Dhabi has committed to produce 7% of its energy using renewables.

The most suitable situation for the solar panels is on the equator where UAE lies making it most efficient for rooftops to have solar panels.

# WIND ENERGY IN UNITED ARAB EMIRATES

Wind power is the kinetic energy of wind, harnessed and redirected to perform a task mechanically or to generate electrical power. UAE does not produce energy from wind since the conditions are not suitable for it but they are more focused on solar energy. It may be located but not very efficient.



# BIOMASS

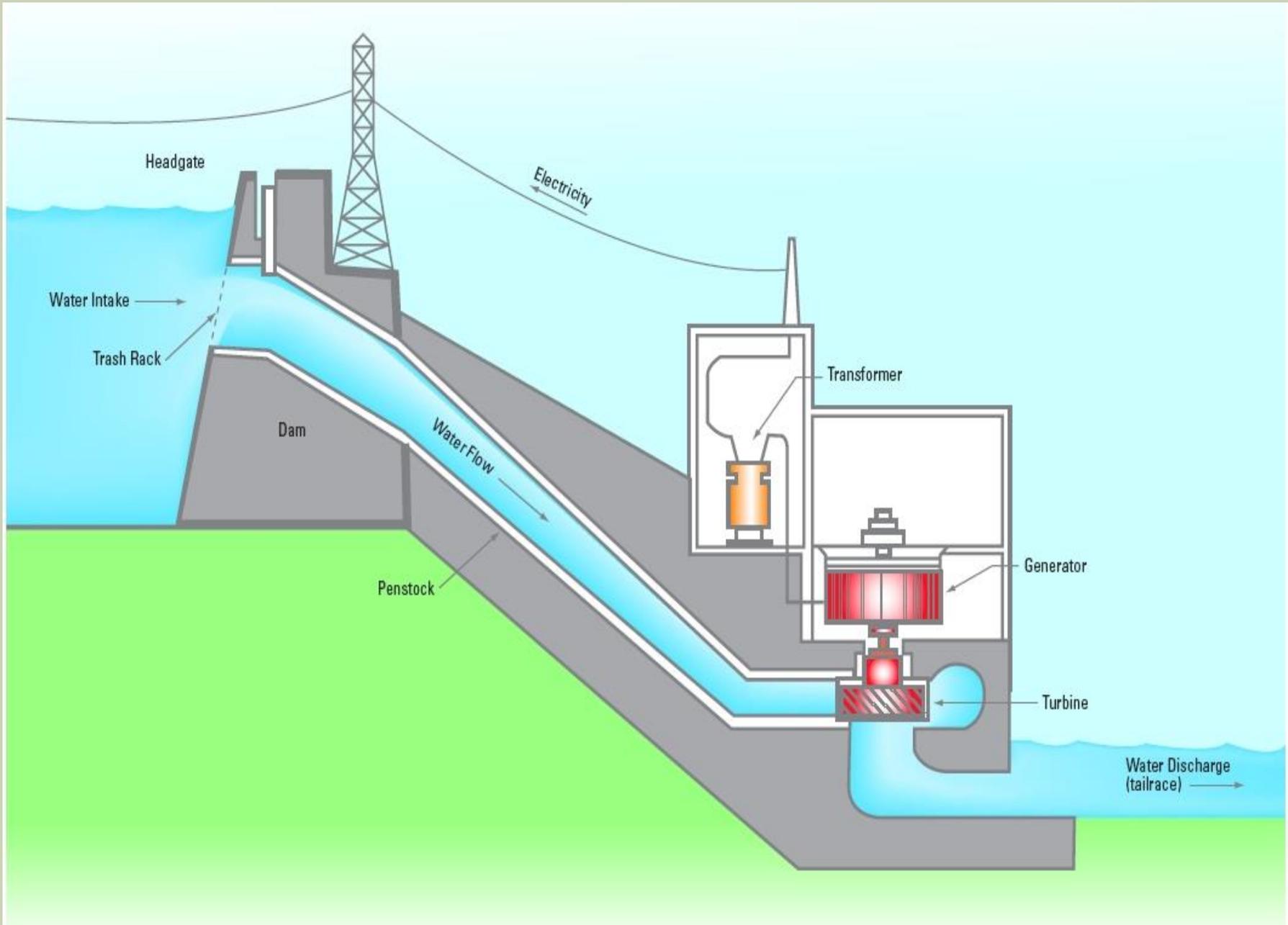
There are no productions of biofuel in the United Arab Emirates yet. In the UAE, researchers from Masdar Institute who teamed with waste recycling company Tadweer on a biodiesel chemical reactor are testing the prototype that can process 50 liters per hour in 10-hour batches. It has been in progress but not in a very efficient way yet in the UAE.

The reactor uses waste fats and oils as feedstock and is hoped to produce biodiesel faster and cheaper than currently available technology. The new method mixes sound wave agitation, flow mixing by a static mixer, and separation, recovery, and purification, producing much less glycerol and more biodiesel than standard methods.

# HYDROELECTRICITY IN UAE

Hydroelectricity is the generation of electricity using hydropower and the use of gravitational force of falling or flowing water at high speeds.

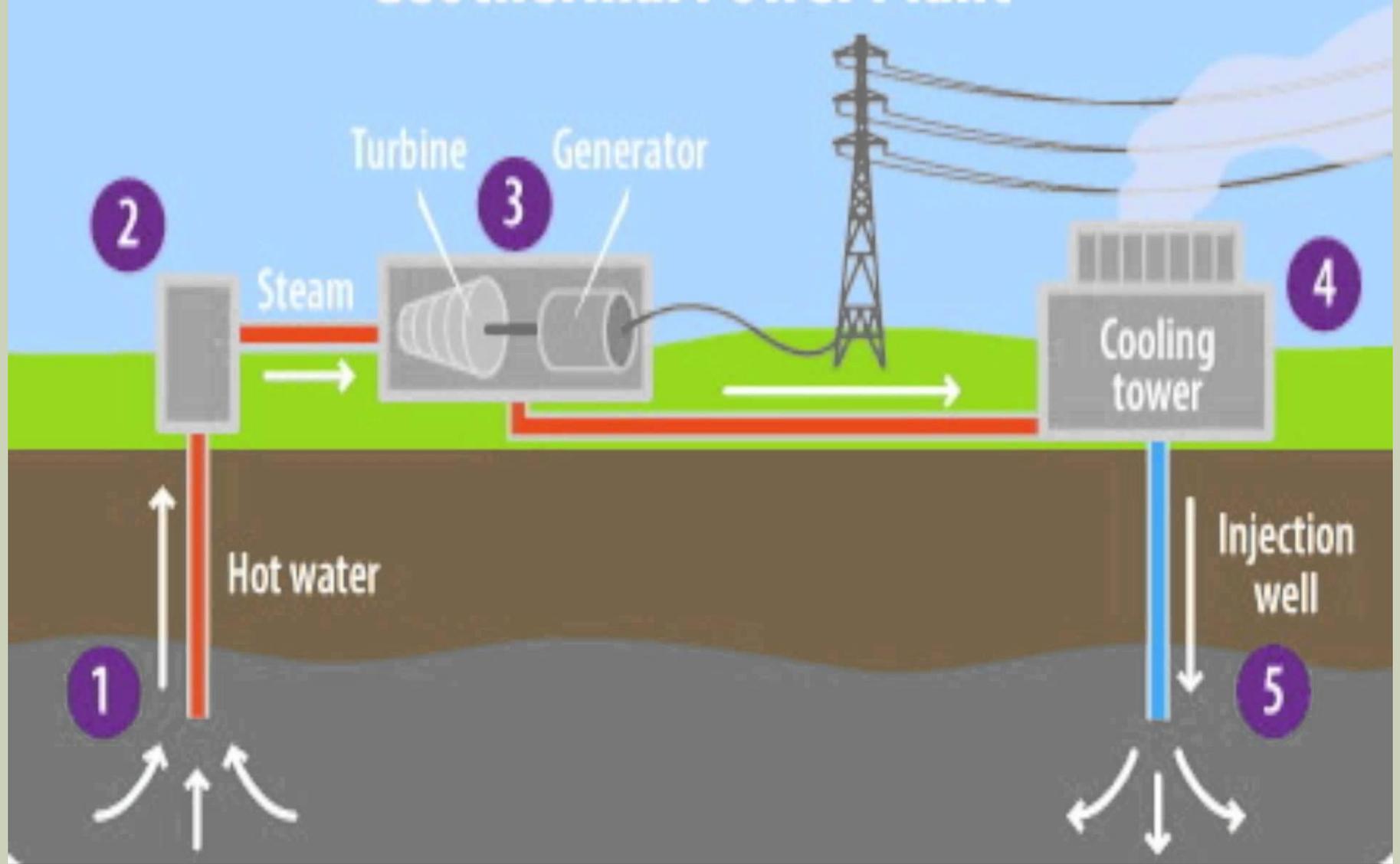
The dams in the UAE do not have the potential to be used as alternative energy resource due to lack of fast flowing water and also, there are no waterfalls or fast flowing rivers so UAE does not have hydro electricity production.



# GEOTHERMAL ENERGY

Geothermal energy from beneath the Earth's surface, the heat that creates hot springs, needs to be at temperatures of more than 200 °C to be a prime candidate for power generation. The UAE's temperatures are much lower than this, making geothermal more suitable for applications such as desalination rather than power generation, according to experts. Dubai Electricity and Water Authority (Dewa) is requesting proposals for an early-stage feasibility study on producing electricity from geothermal energy and its use in desalination – removing salt from water to make it potable.

# Geothermal Power Plant



# IMPORTANCE OF EACH TYPE OF ENERGY PRODUCTION. WHY SHOULD WE BE PRODUCING THESE ALTERNATIVE ENERGY SOURCES?

## ■ SOLAR ENERGY

Energy can be generated from the sun's energy during the day but the energy could also be stored for the times when the Sun isn't bright or at night.

## ■ WIND ENERGY

Favourable conditions like strong wind force are not very common in the World but for the areas with those conditions, it is very efficient.

## ■ HYDROELECTRICITY

It is also one of the most efficient ways of producing electricity if there are fast flowing water sources because the water never stops flowing.

## ■ BIOMASS

One common example is wood. Biomass contains stored energy. That's because plants absorb energy from the sun through the process of photosynthesis. When biomass is burned, this stored energy is released as heat and water and release the energy they captured from the sun.

**Energy from trees-** People can get energy by burning the scrap wood that's left over after trees have been trimmed. It's an efficient way to use a resource that might otherwise get thrown away.

**Turning trash into electricity-** Waste-to-energy power plants burn trash to produce electricity. They generate enough electricity to supply 1.3 million U.S. homes.

## ■ GEOTHERMAL ENERGY

A geothermal system is three to four times more efficient than the most efficient ordinary system because geothermal systems do not burn fossil fuels to make heat, they provide three to four units of energy for every one unit used to power the system. They simply transfer heat to and from the earth to provide a more efficient, affordable and environmentally friendly method of heating and cooling.

# PROBLEMS ASSOCIATED WITH BUILDING THEIR SITES

Hydro generators need rain to fill dams to supply flowing water. Wind turbines need wind to turn the blades, and solar collectors need clear skies and sunshine to collect heat and make electricity. When these resources are unavailable so is the capacity to make energy from them. This can be unpredictable and inconsistent. The current cost of renewable energy technology is also far in excess of traditional fossil fuel generation. This is because it is a new technology and as such has extremely large capital cost. It is difficult to generate the quantities of electricity that are as large as those produced by traditional fossil fuel generators. This may mean that we need to reduce the amount of energy we use or simply build more energy facilities. Reliability of supply may not be as predicted because they are affected by environment and climate. People may also be forced to evacuate and leave somewhere else or at the same time, it can be noisy or spoil the beauty of a place in other's point of view.

# BEST LOCATIONS FOR EACH ALTERNATIVE IN UAE

## ■ SOLAR ENERGY

The Western Region of Abu Dhabi where the largest solar power plant is operating where the Sun is strongest.

## ■ WIND ENERGY

Locations such as power-hungry Northern Emirates and islands such as Sir Bani Yas while at the same time technology to produce power from lower wind speeds improves.

## ■ HYDROPOWER

There are no plans for hydropower but the government is focusing on other renewables for the time being. Best location would be a place with fast flowing water.

## ■ BIOMASS

MENA region has abundant biomass energy resources which have been unexplored but now they are starting to make progress in it.

## ■ GEOTHERMAL POWER

The best known geothermal energy sources in the UAE are located in Western States and Hawaii, some exist in the Dakotas. There is a possibility of finding the area underground where the temperature is suitable, they will start building plants for it.

# WHY DO WE NEED TO EXPAND OUR PRODUCTION OF ALTERNATIVE ENERGY?

- It is renewable it is therefore sustainable and so will never run out.
- Facilities generally require less maintenance than traditional generators.
- Renewable energy produces little or no waste products such as carbon dioxide or other chemical pollutants, so has minimal impact on the environment.
- Renewable energy projects can also bring economic benefits to many regional areas, as most projects are located away from large urban centres and suburbs of the capital cities. These economic benefits may be from the increased use of local services as well as tourism.
- Their fuel being derived from natural and available resources reduces the costs of operation.

Biomass

Solar

Wind

Geothermal

Water

# WHAT FORMS OF ALTERNATIVE ENERGY SHOULD WE BE PRODUCING IN LARGER AMOUNTS?

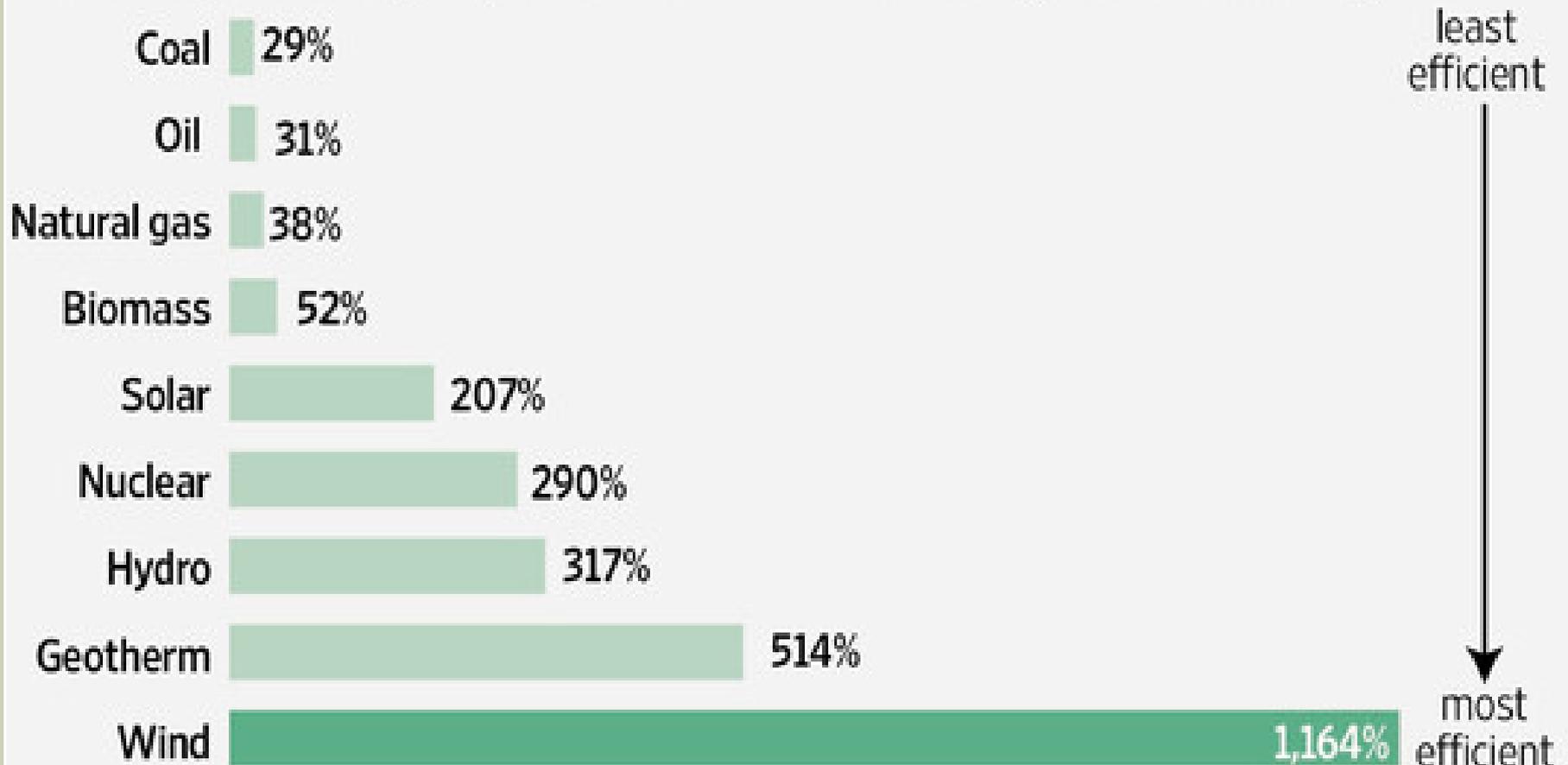
It differs from country to country and from region to another since there are different conditions in each one and could be or could not be suitable for a certain type of alternative energy source. As for UAE, solar energy should be producing in larger amounts since it has been efficient for years, the government is able to set up the solar panels and the conditions are most suitable for it. It is also one of the most trusted ways of producing energy by the World.



## 2014 AVERAGE RESULTS

# Energy Efficiency

Percentage of energy input retained when converting fuel to electricity



Source: Energy Points

The Wall Street Journal

# WHAT PERCENTAGES OF EACH SHOULD WE USE?

According to different countries, the percentage of each to be used is different, too. As for the World's percentage of efficiency, wind, geothermal, hydropower and solar are the most efficient. As for the majority of the World's agreement, wind energy should be used at 90%, geothermal at 90%, hydropower at 50%, solar power at 70% and biomass at 70%. For total percentage, it might go like:

- Wind - 10%
- Geothermal - 30%
- Hydropower - 10%
- Solar power - 30%
- Biomass - 20%





## WHY?



Geothermal power and solar power are becoming the most used and useful alternatives years by years because it is not possible to prevent the Sun from shining and it is available for all areas unlike fast flowing wind and water. It can simply be set up on the rooftops. Geothermal may not be used by many areas because of the low temperatures but the Earth underground is also common for all parts of the World.

Biomass and biofuel are less costly and are suitable for a country with high agriculture rate to easily get the animal and plant waste that could be burnt.

Wind and hydropower are useful for many areas too but other alternatives are taking their positions since they mainly depends on environmental conditions.

# TYPES OF ALTERNATIVE ENERGY WOULD BE APPROPRIATE FOR THE DIFFERENT TYPES OF POWER NEEDS

## ■ Transportation (cars, planes, trains, busses)

Biomass or solar power could be used. More importance goes for biomass since it does not depend on environmental and climatic conditions.



## ■ Electricity

It depends on the region but solar power might be the most suitable for all parts since solar panels can be set up just on rooftops.



## ■ Domestic uses (cooking, heating and cooling)

Geothermal energy is associated with heating and cooling so it can be one alternative. Other could be solar or biomass for the same purposes stated above.



# TIMELINE OF EXPANSION?

- In 10 years time, it is estimated that at least 40% of electricity production will come from solar energy because many countries are going on with that since the climate becomes hotter year by year.
- In 20 years time, it is estimated that at least 50% of electricity production will come from biomass because it was discovered long time ago but it wasn't utilised properly so with the upcoming technology, governments will realise the importance of biomass and using it rather than other alternatives because it is less costly and efficient enough.
- In the next few years, there could be a major change in percentages since every country will try to depend on alternatives so equal or close percentages will be made.

**NO ONE CAN DENY THE FACT THAT COAL,  
OIL AND NATURAL GAS ARE NON-  
RENEWABLE ENERGY SOURCES THAT  
WILL RUN OUT AND WE HAVE TO SWITCH  
TO USING ALTERNATIVES IF WE WANT A  
BRIGHT FUTURE**

**THANK YOU!**