

# HOW ELECTRICITY GETS TO YOUR HOME

1 ELECTRICITY IS GENERATED AT A POWER PLANT

3 ELECTRICITY TRAVELS ACROSS THE PROVINCE ON TRANSMISSION LINES

5 ELECTRICITY IS CARRIED TO YOUR NEIGHBOURHOOD TRANSFORMERS ON DISTRIBUTION LINES

6 THE TRANSFORMER ON THE POLE DECREASES VOLTAGE BEFORE ENTERING YOUR HOUSE

2 VOLTAGE IS INCREASED AT THE TRANSFORMER STATION

4 THE NEIGHBOURHOOD TRANSFORMER STATION DECREASES VOLTAGE



But what's the best Way to make it ???

## Thermal fuels

Use the fuel to turn WATER to STEAM which drives a TURBINE which GENERATES electricity

Coal

Oil

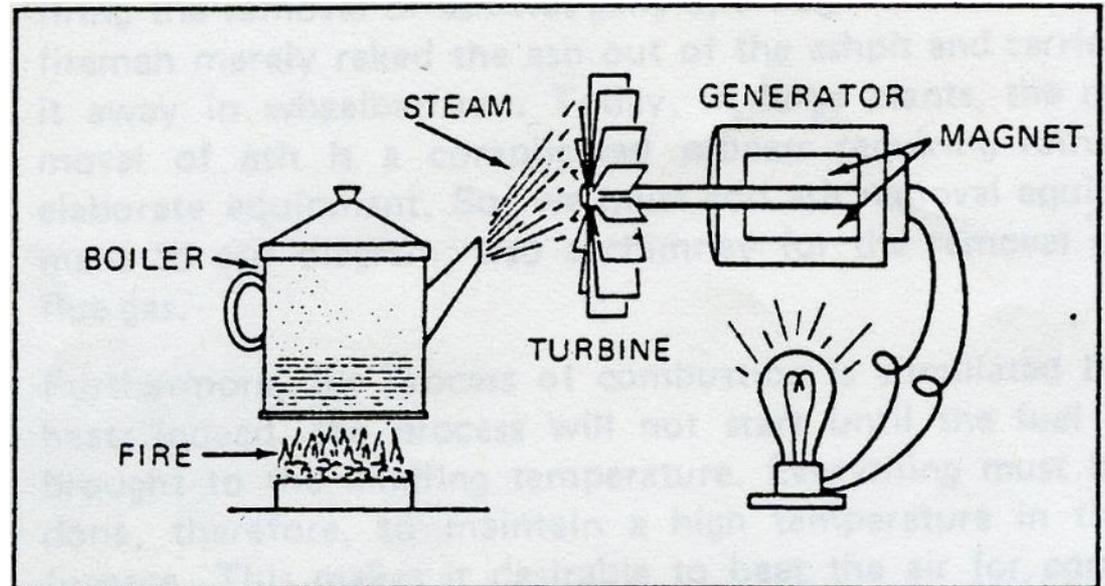
Gas

Nuclear

Wood

Biomass (some)

Solar (some)

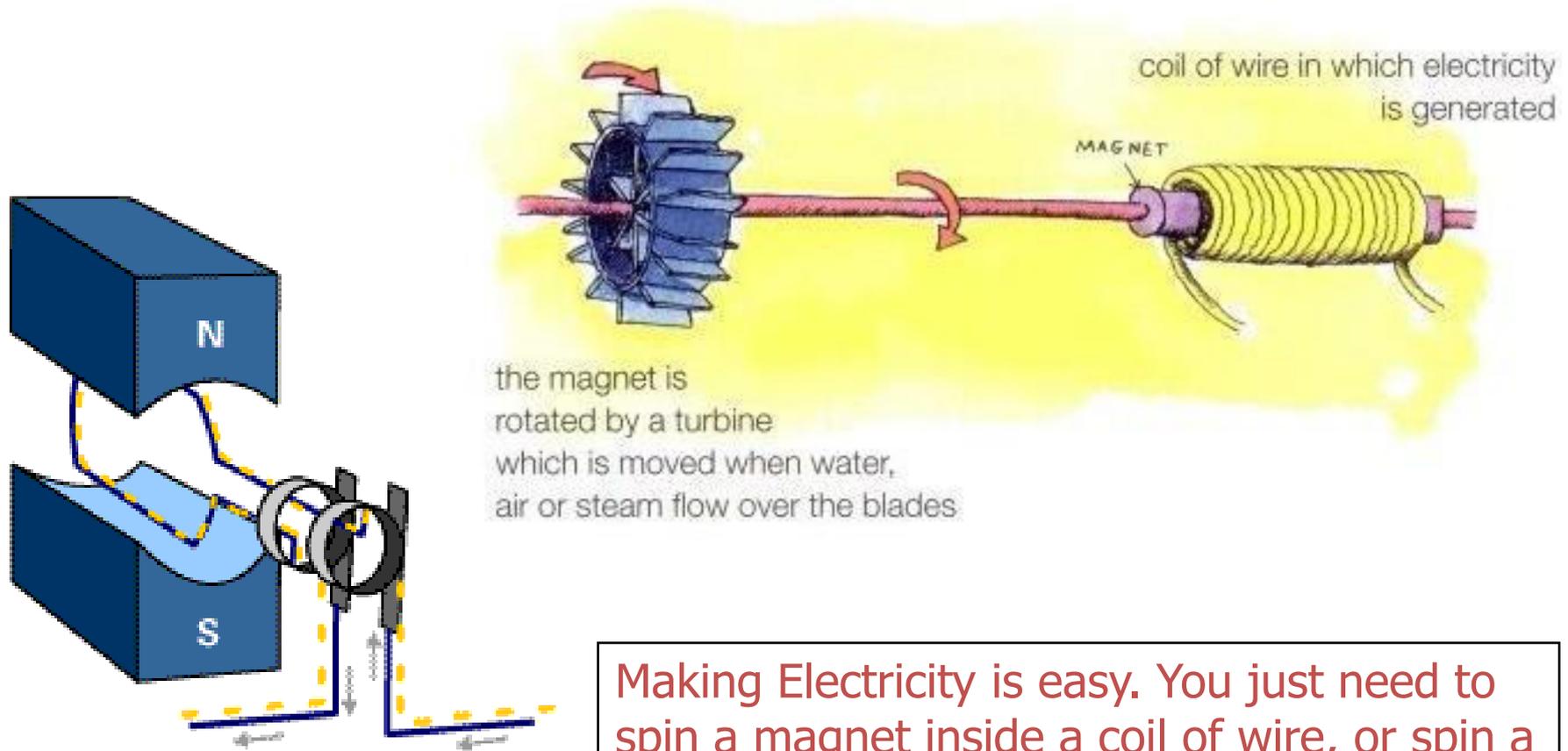


**Primary Energy** : When energy is extracted from a fuel source directly e.g burning oil, coal, gas, wood...and using the heat directly, or getting energy from the sun, or using wind to turn a grinding wheel in a traditional windmill.

**Secondary Energy**: Sometimes primary fuels are converted into a different form of energy – which is more versatile, the best known being ELECTRICITY. It's a type of energy that is made from transforming a 'primary' energy fuel into a different energy.

## *Generating Electricity*

Electricity is made in a generator. A generator is a magnet fixed to a rod inside a coil of wires. When the rod is turned, an electric current is generated in the wires.

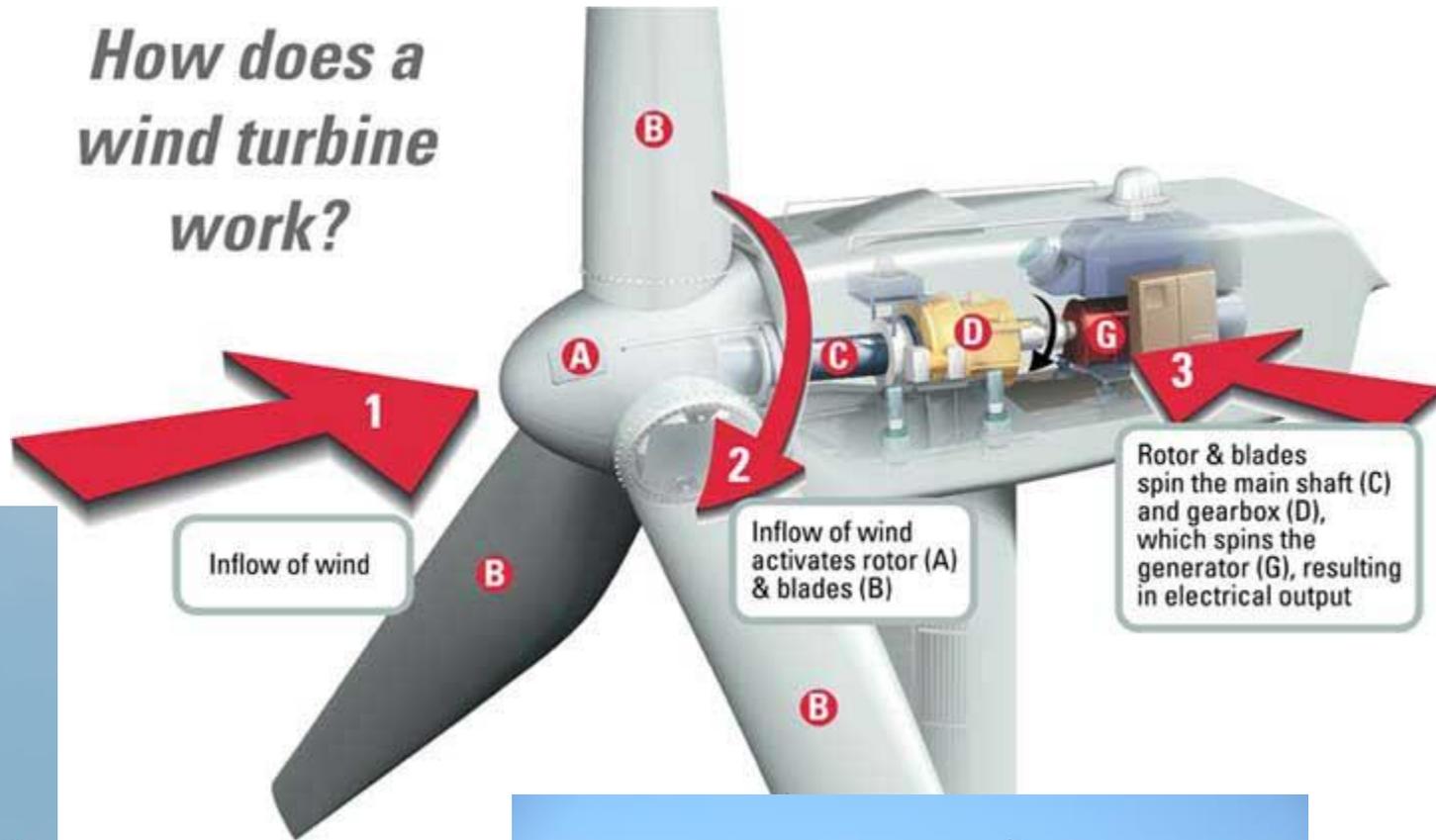


Making Electricity is easy. You just need to spin a magnet inside a coil of wire, or spin a coil of wire between a N and S magnet.

# Wind Power:

An easy way to spin the magnet inside the coil

*How does a wind turbine work?*





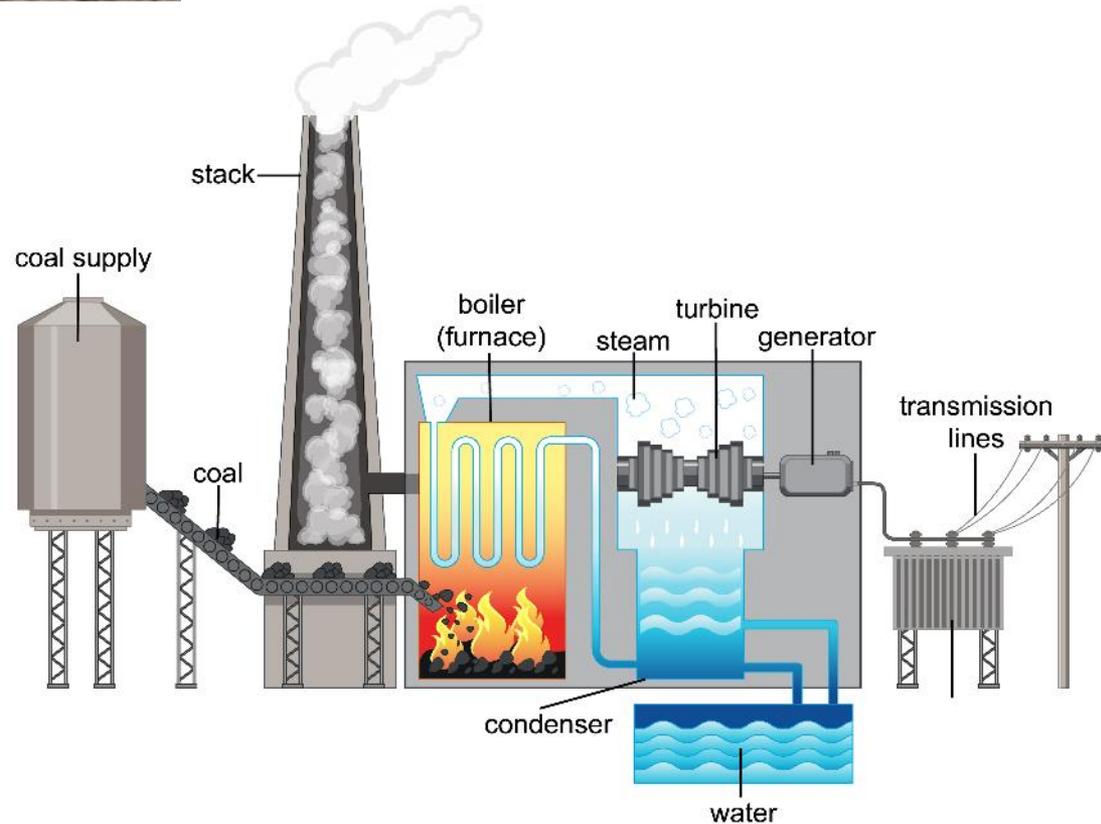
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In a coal or biomass -fired power station:  
Fuel is burned – to turn water to steam.....steam expands and is directed onto blades of a turbine (giant fan)  
.....Which spins a magnet inside a coil of wire

In other power stations the fuel is gas instead of coal or biomass.



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# From Coal to biomass – fired Power Station : Drax, Yorkshire.



Image Source :<https://www.drax.com/power-generation/drax-rail-history/>



# Gas – fired Power Station



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# Oil – fired Power Station : Isle of Grain, Rochester



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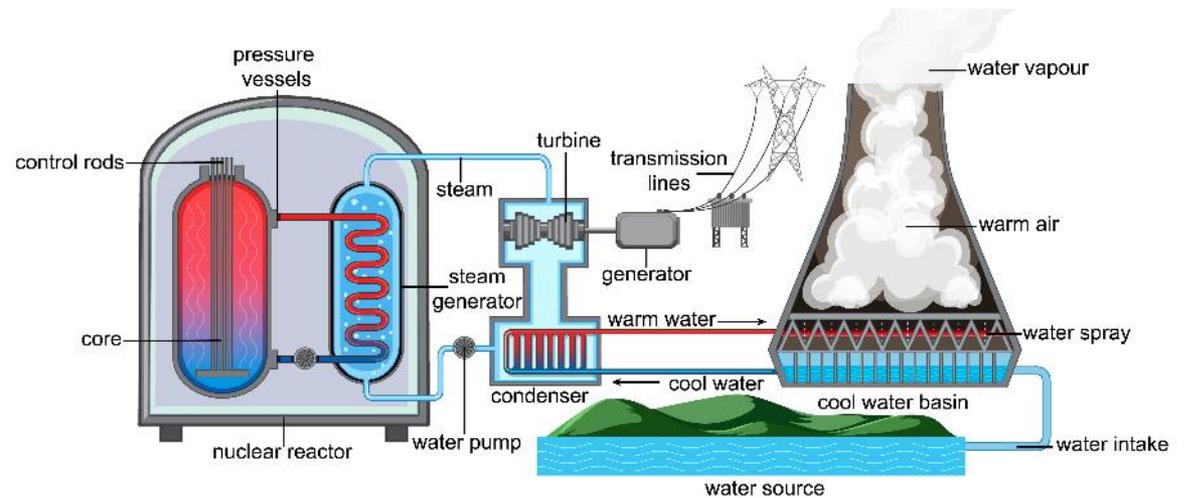


Image source: Clynt Garnham Energy / Alamy Stock Photo

# Nuclear Power Station



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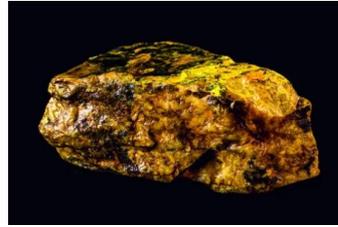


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A Uranium mine...



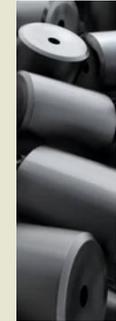
...gives uranium ore....



.....Which is processed into uranium 'cake'...



to a pellet...



to make a

## Energy Equivalents



1 Uranium Fuel Pellet has much energy available as...



120 gallons of oil



1 ton of coal



17,000 cubic feet of natural gas



# Solar Power



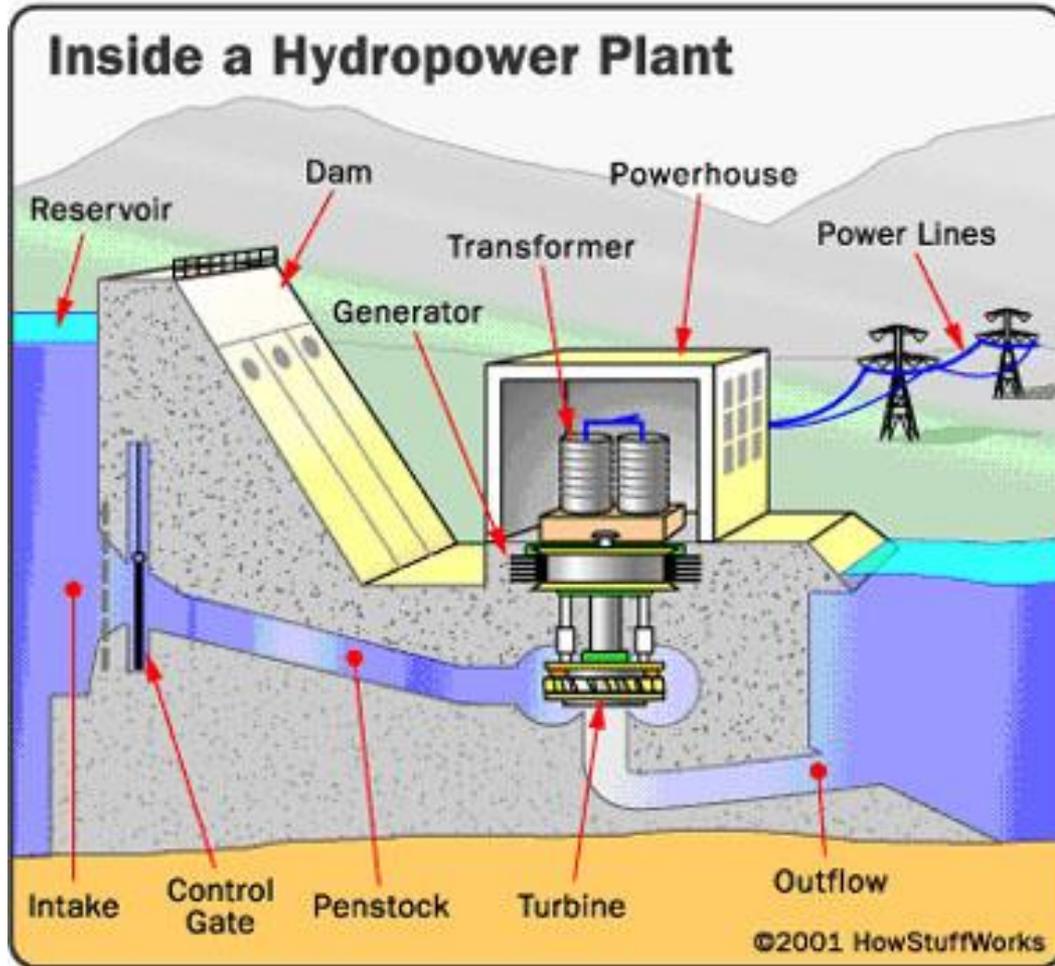
Reflective thermal



Massive solar array at Seville in S. Spain – Europe's first commercial solar power plant of its type

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# Hydro Electric Power (HEP)



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# Wind Power



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**Produce direct Energy**

Solar : Photovoltaic Cells



## Biogas Plant

Plants or animal waste is 'fermented' to produce Methane. Methane can be burned – to turn water to steam.....



Animal Slurry from the Dairy farm and nearby pig farms is 'mashed up', water is added and it 'ferments'.



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The methane is collected and piped off to power plant. The remains of the slurry are sprayed onto fields as a fertiliser.





Which energy sources are  
RENEWABLE and which  
are NON-RENEWABLE ?



Which do you think  
Britain uses most at  
present?



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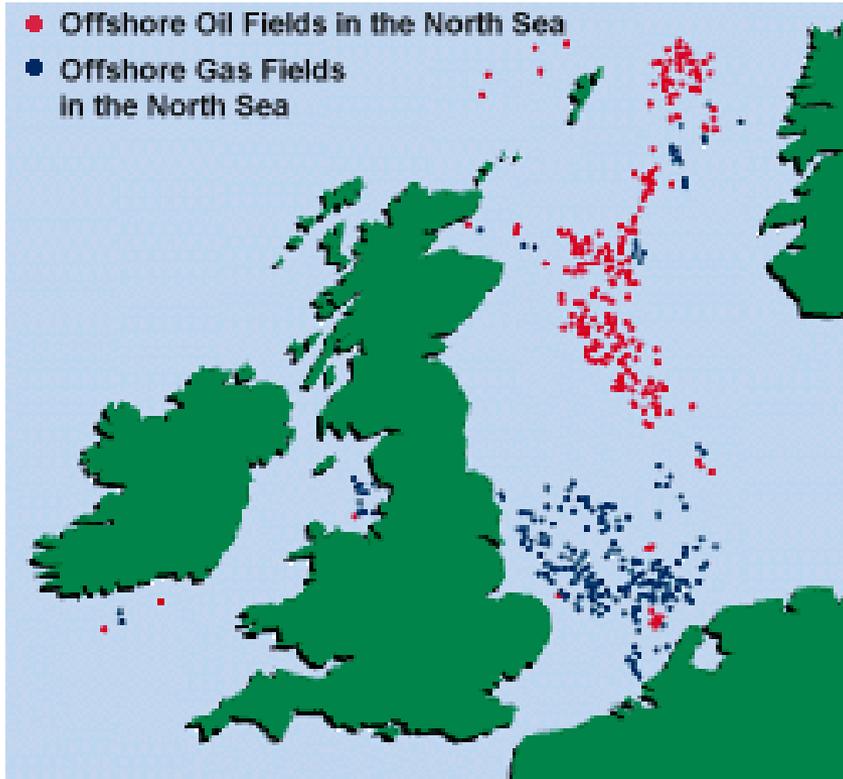


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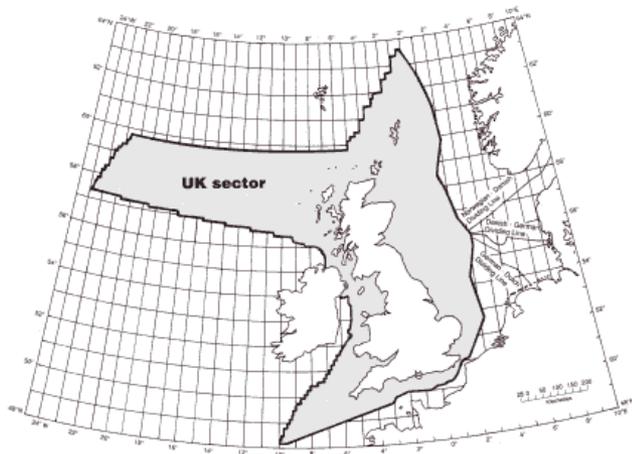
# The Energy Problem

## Oil and Gas

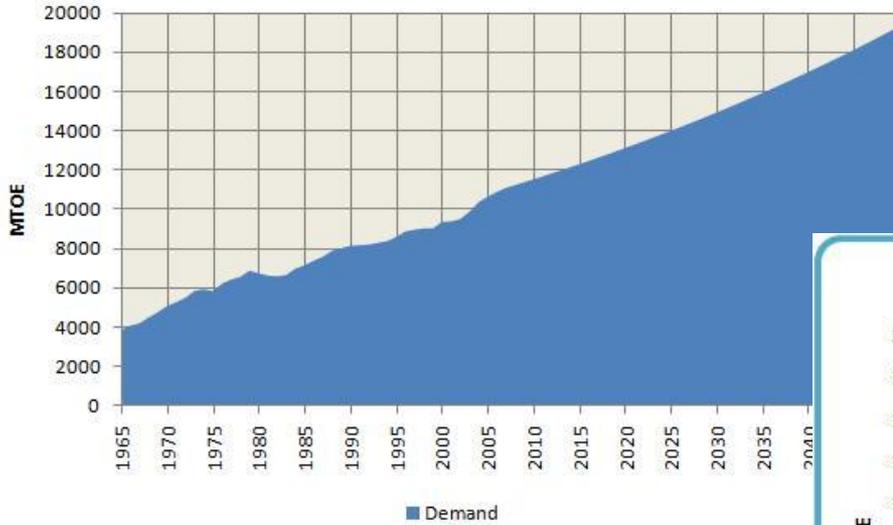
Since the 1970s Britain has supplied itself with Oil and Gas from the North Sea. But these reserves are now running out and will probably be used up in the next 15 years



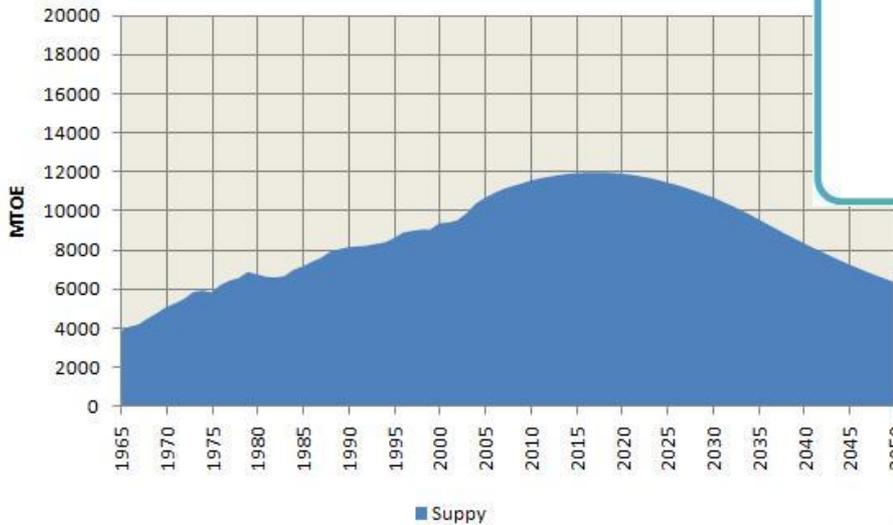
**North Sea sectors**



### Energy Demand



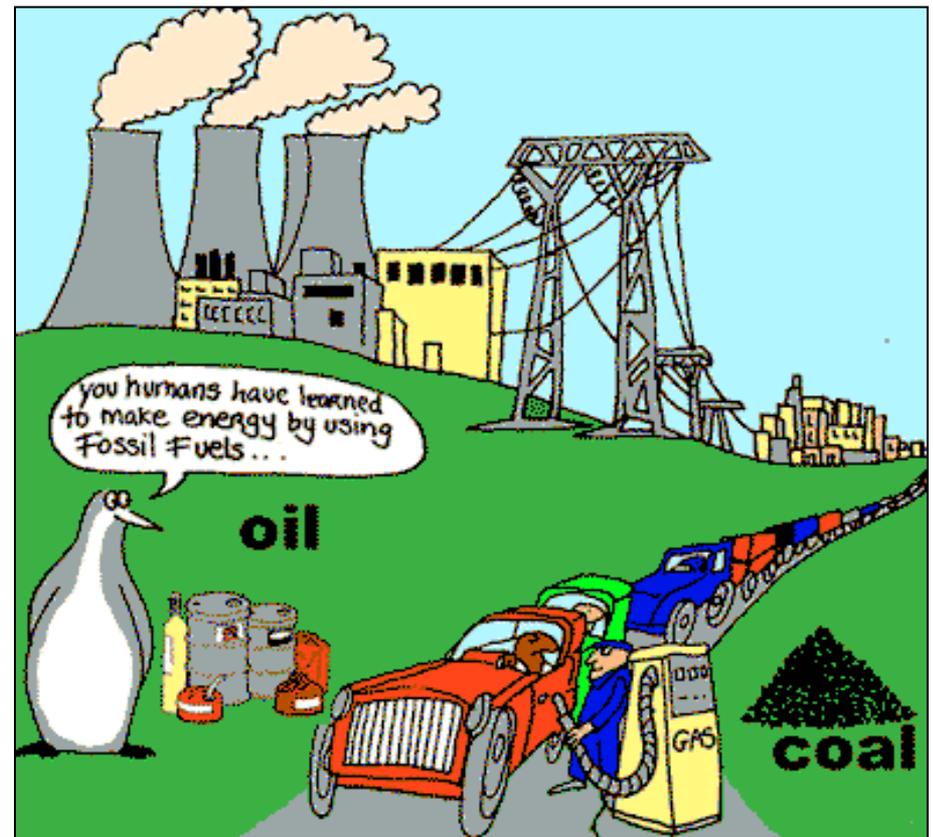
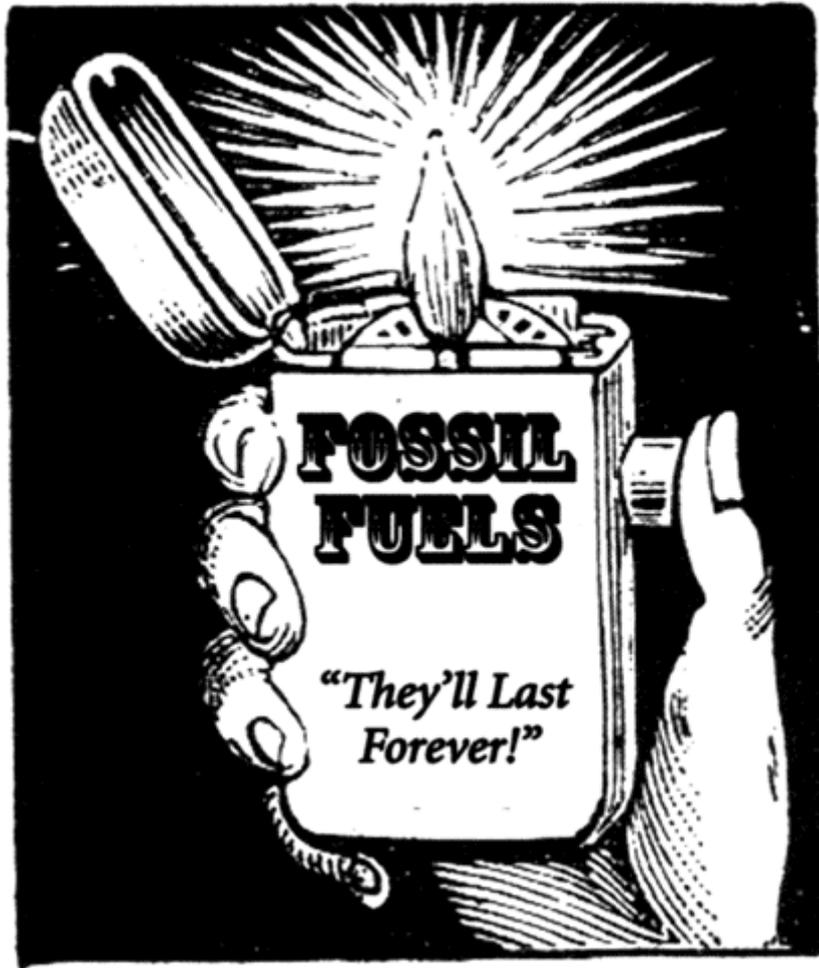
### Energy Supply



### Post-Peak Energy Gap



The Main Energy Producers in Britain are facing a problem



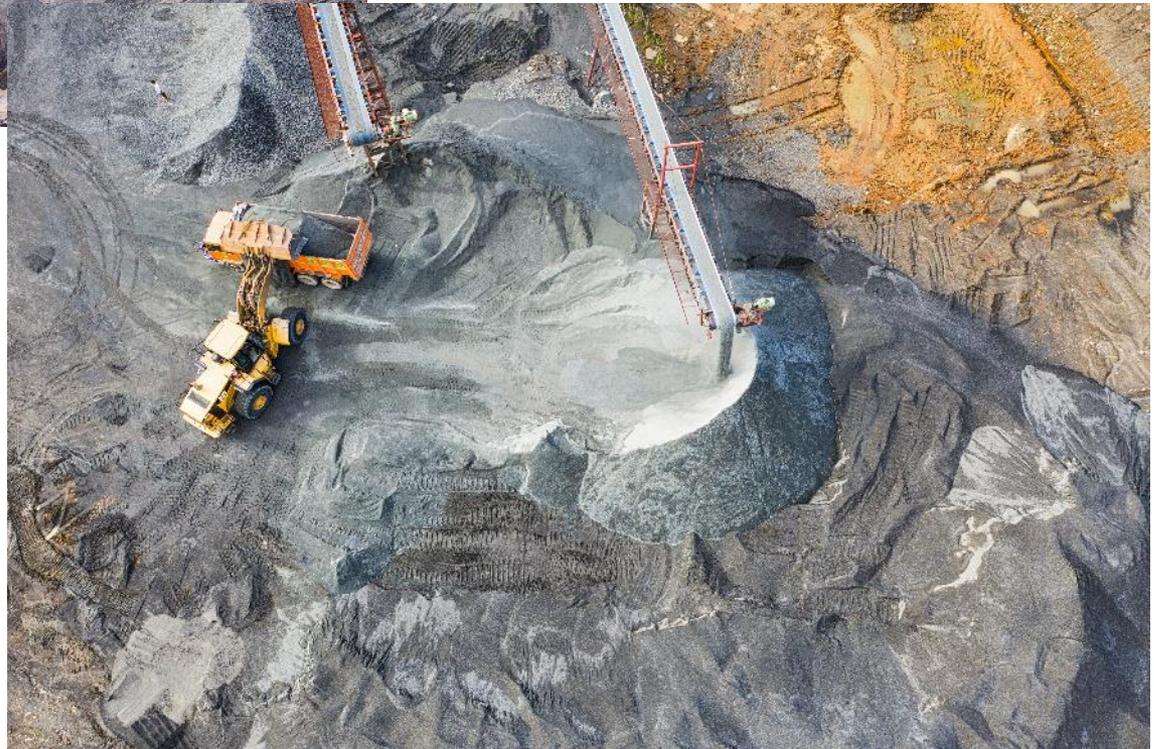
## Life without Electricity : Power Cut !!



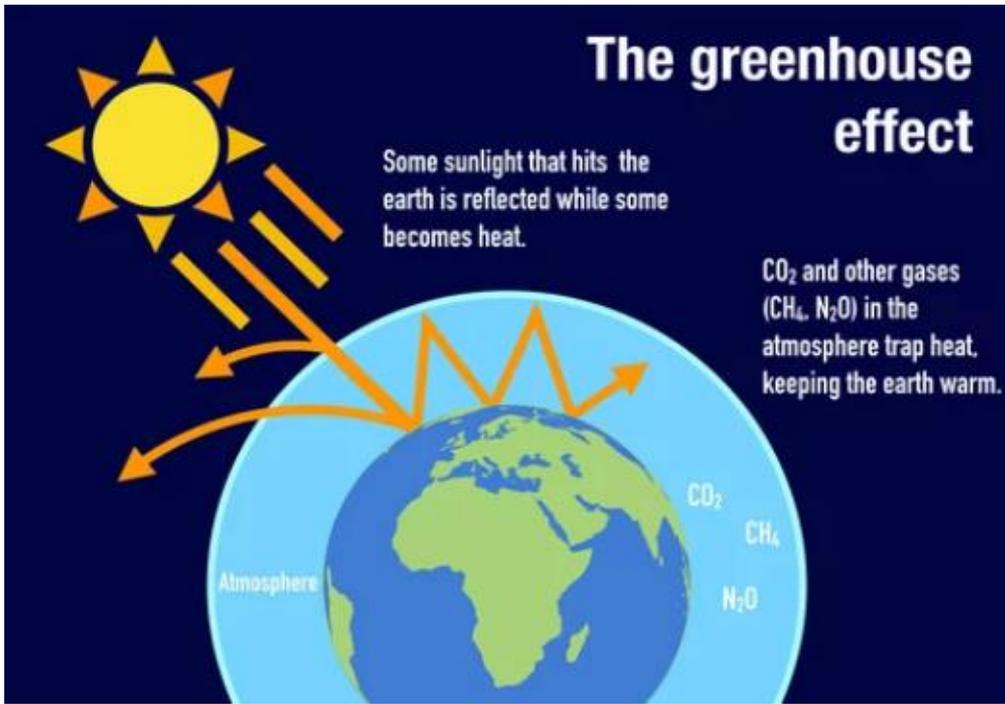


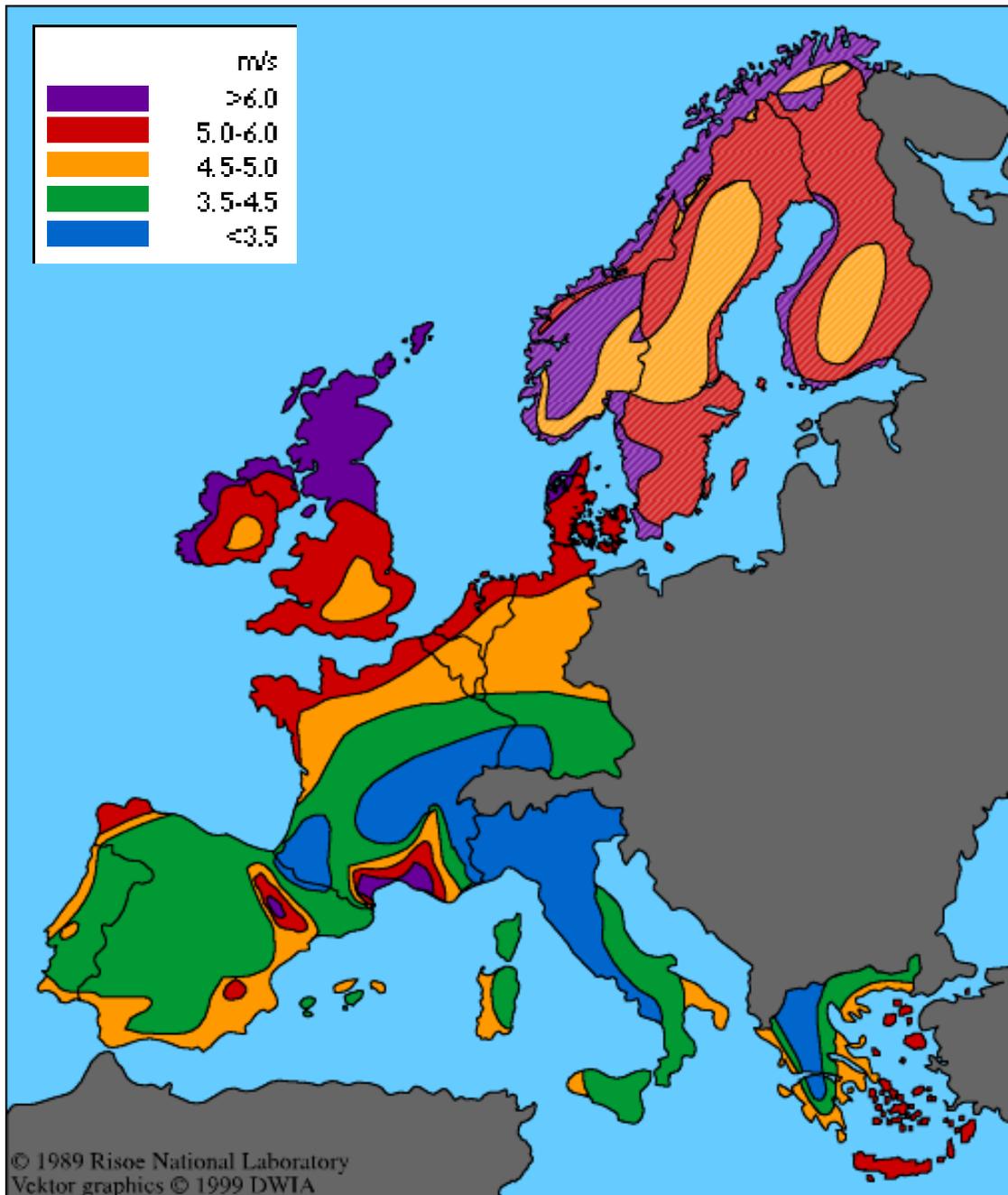
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Britain has huge amounts of coal – enough for 300 years. So should we use this for our energy supplies in the future?



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**Is there another  
solution to  
Britain's energy  
problem?**

**Britain is one of  
the windiest  
places in Europe**

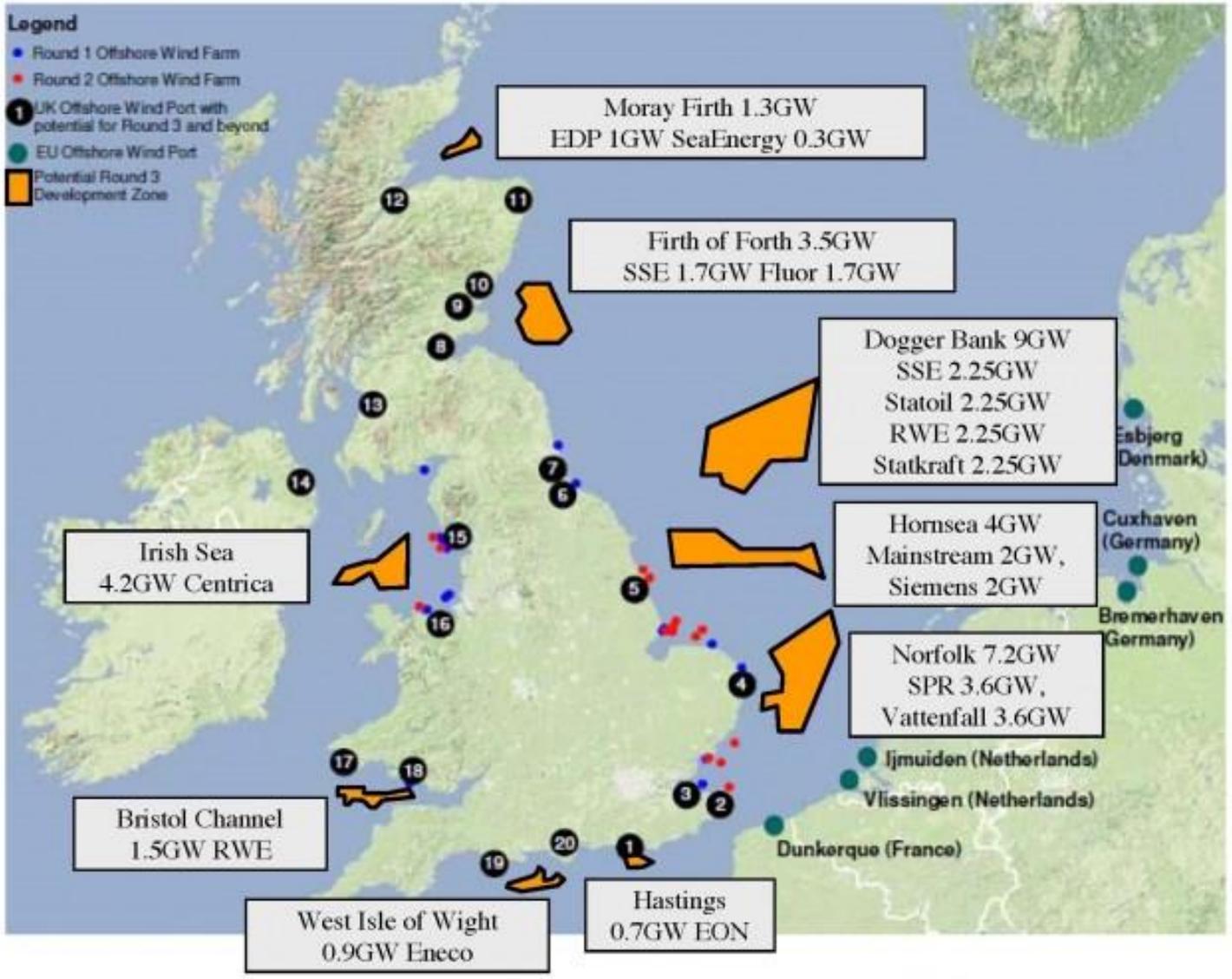
## Offshore UK wind farm zones



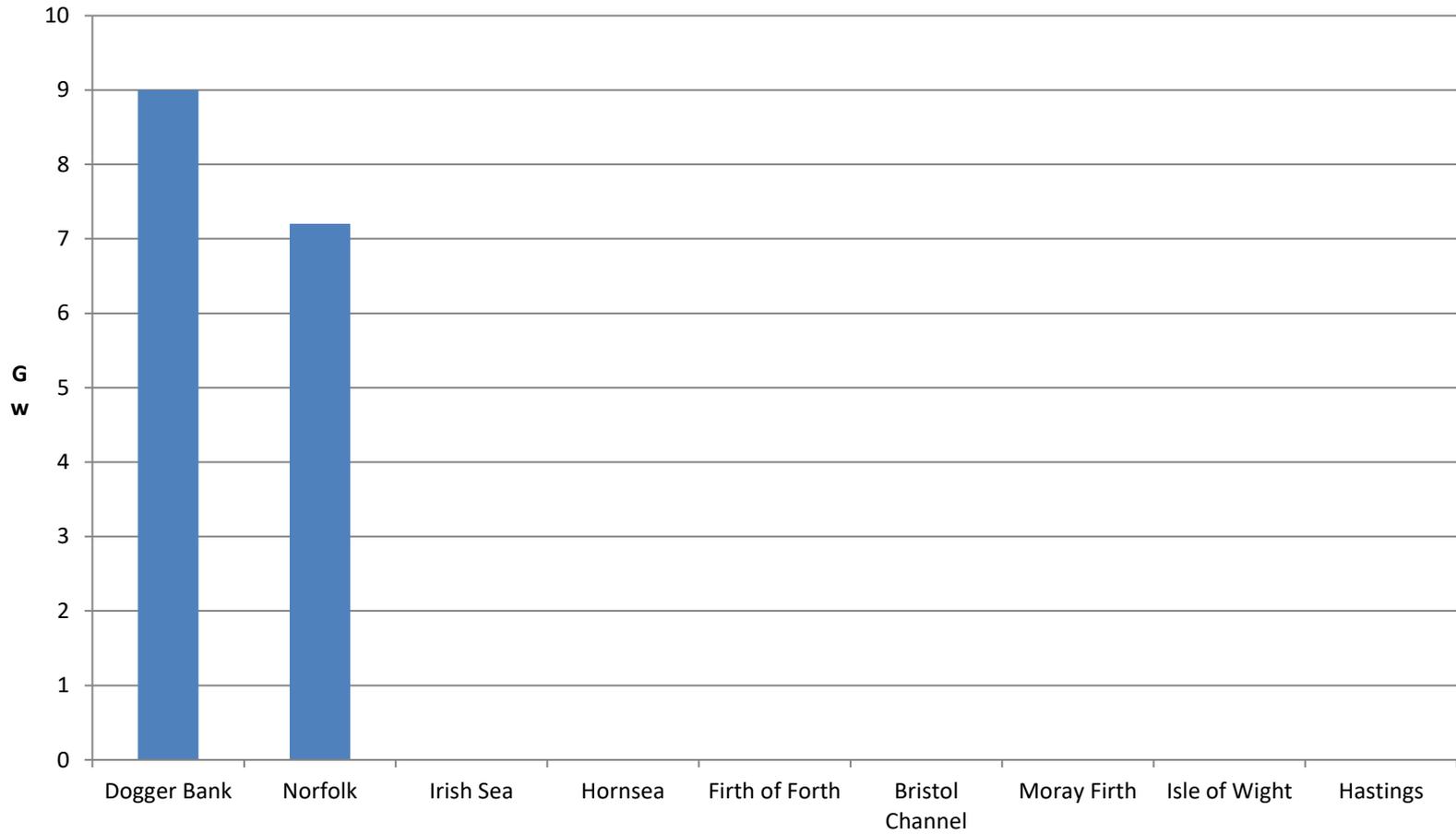
More reliable wind than on-shore wind farms, far more turbines, with far less public outcry

The current UK government plan is to have 20% of Britain's electricity generated by renewable energy by 2020. Most of this will come from 9 huge offshore wind farms that are being developed around Britain's coast. The 3 most massive off the east coast of England.

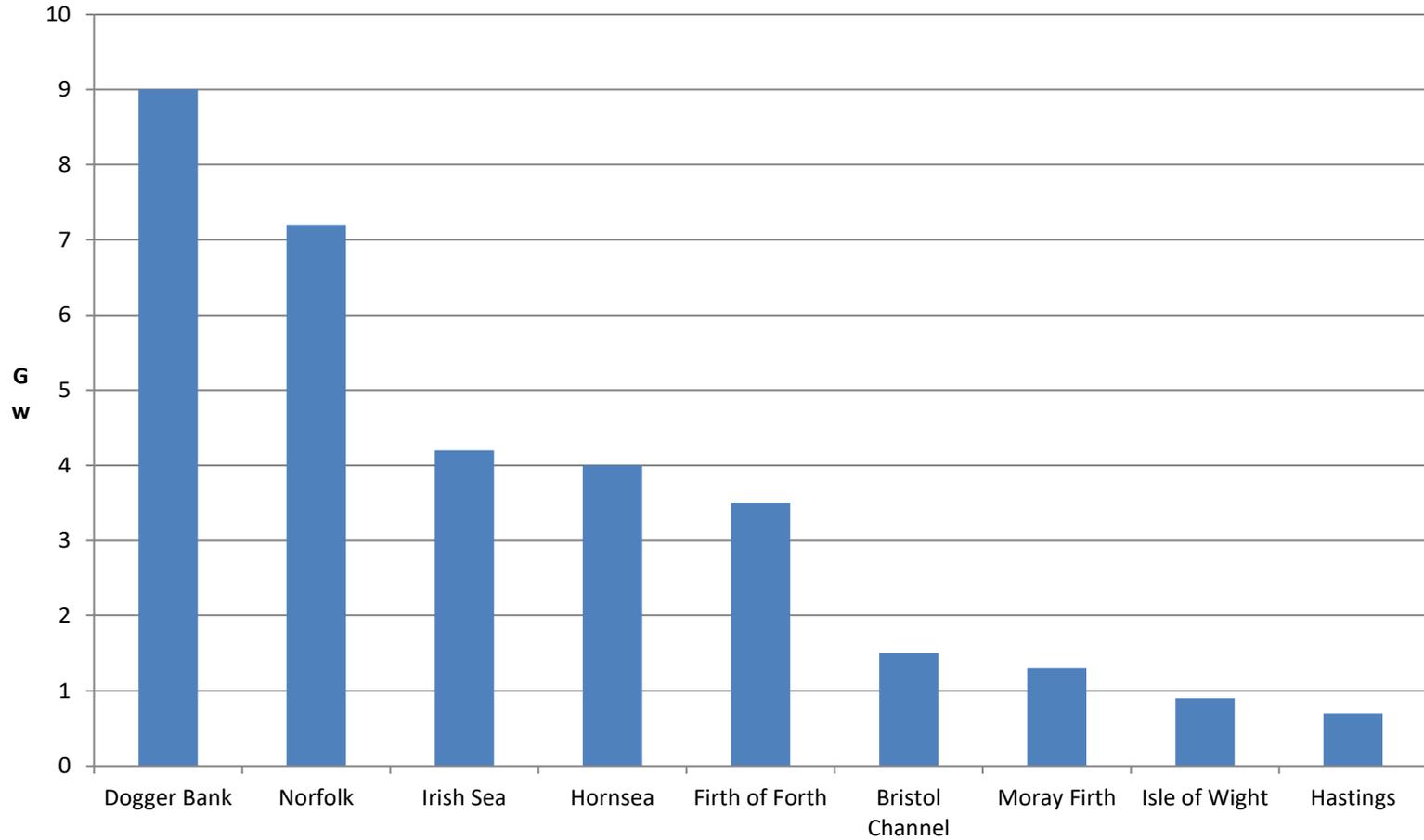




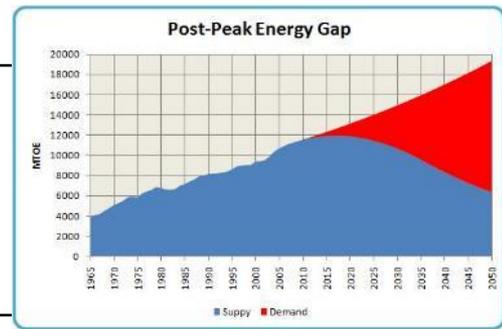
# UK Offshore Wind Farms



# UK Offshore Wind Farms



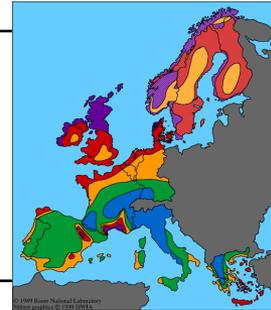
What's the big energy problem facing Britain?



Why don't we use our coal supplies to fix the problem?



What's the energy solution the government is going for – and why this one?



Why will this be so important for people living in North East England?



UPDATED  
EDITION

# GLOBAL WARMING

Causes, Effects, and the Future

Mark Maslin

WORLDLIFE  
LIBRARY



