

Why Nuclear Power needs to be part of the UK energy mix

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Criteria for an energy source

- Low Carbon
- Capable of a significant contribution
- Reliable and secure
- Technically feasible within time span
- Politically feasible
- Low risk

Sustainable Energy

– without the hot air

By David JC MacKay

UIT Cambridge 2009

Measuring energy

- GW used for **average** rate of energy use, not installed capacity or maximum demand.
- e.g. If installed electricity capacity 90 GW
Maximum demand may be 75 GW
Average consumption may be 50 GW
- MacKay uses kWh/day/person for this
(1kWh/d/p \approx 2.5 GW average)

How much energy do we need?

- 2008 primary energy consumption 312 GW
- 2050 predicted consumption 175 GW

A possible energy mix (GW)

Part 1

- | | | | |
|-----------------|------|----------------|------|
| • Hydro | 0.5 | • Biofuels | 5.0 |
| • Waste | 2.75 | • Tide | 9.25 |
| • Pumped Heat | 30.0 | • Wave | 5.0 |
| • Wood | 12.5 | • Photovoltaic | 7.5 |
| • Solar Thermal | 2.5 | | |

Sub total 75 GW

A possible energy mix (GW)

Part 2

• Solar in deserts	40.0	
• Wind	20.0	
• Coal and/or Nuclear	40.0	
Part 2 sub total	100.0	
Part 1 sub total	<u>75.0</u>	
Grand Total	175.0	GW

Nuclear

- All choices carry risks
- Nuclear essential if CCS not realised
- Many other technologies untested
- Land required for Biofuels and Wood
- Nuclear is tried and tested
- Rash to ditch Nuclear now

Land areas shown for:

- Wood 12.5 GW (darker green)
- Biofuels 5.0 GW (lighter green)

(MacKay Fig 28.2)

