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Engineering for the 21<sup>st</sup> century  
Renewables expansion and innovation

# Renewables Expansion & innovation

Philip Wolfe

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**RPA**  
RENEWABLE  
POWER  
ASSOCIATION



# Topics

- Renewables within Energy Policy
- Expansion
  - Government & White Paper targets
  - Actual growth to date
  - Barriers to expansion
- Innovation
  - Renewables sub-sectors
  - Barriers to innovation



# Renewable Power Association

- Represent most UK renewable power
- Generators and developers in:
  - Biogas
  - Hydro
  - EFW
  - Tidal
  - Biomass
  - CMM
  - Solar
  - Wind
  - Wave
- Other renewables specialists
- Independents to multinationals



# Progress on White Paper Low carbon priorities

*Done/Due/Total*

**4/6** Energy Efficiency

*/15*

10MtC/year by 2010

**7/8** Renewables

*/12*

10% by 2010 (10GW new capacity)

20% by 2020

**3/7** Combined heat & power

*/8*

10GW by 2010 (from 5GW today)

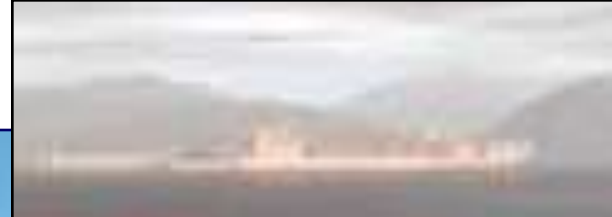


# The potential of renewables

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Electricity  
consumption





# Expansion – the issues

- Climate change a key driver
  - 60% reduction in GHG emissions by 2050
  - Implies ~50% from renewables
- Where we are now
  - Less than 4% from renewables
  - Way behind most other OECD countries
- How to achieve a quantum change
  - Raising awareness
  - 'Coming clean' on price

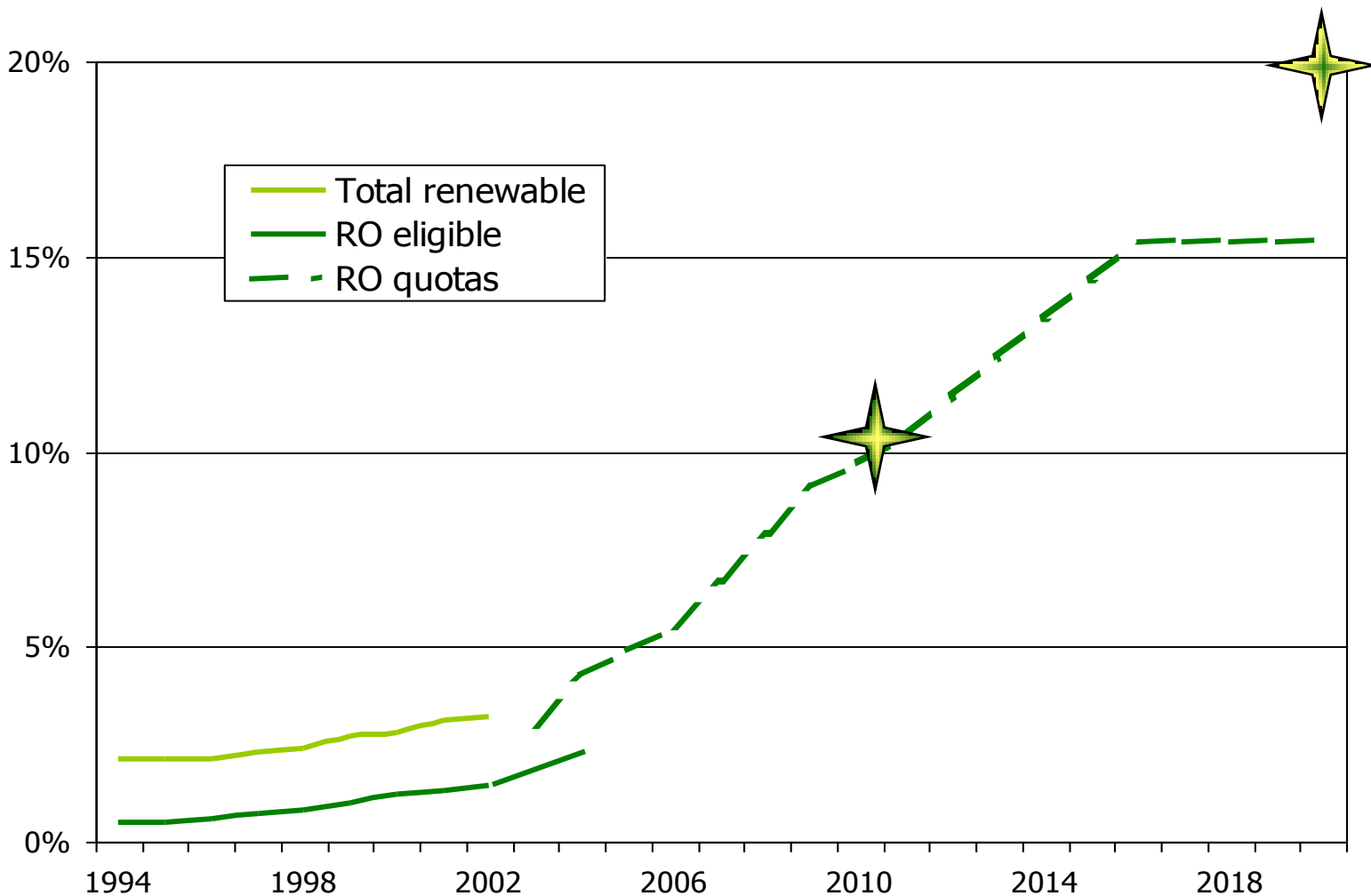


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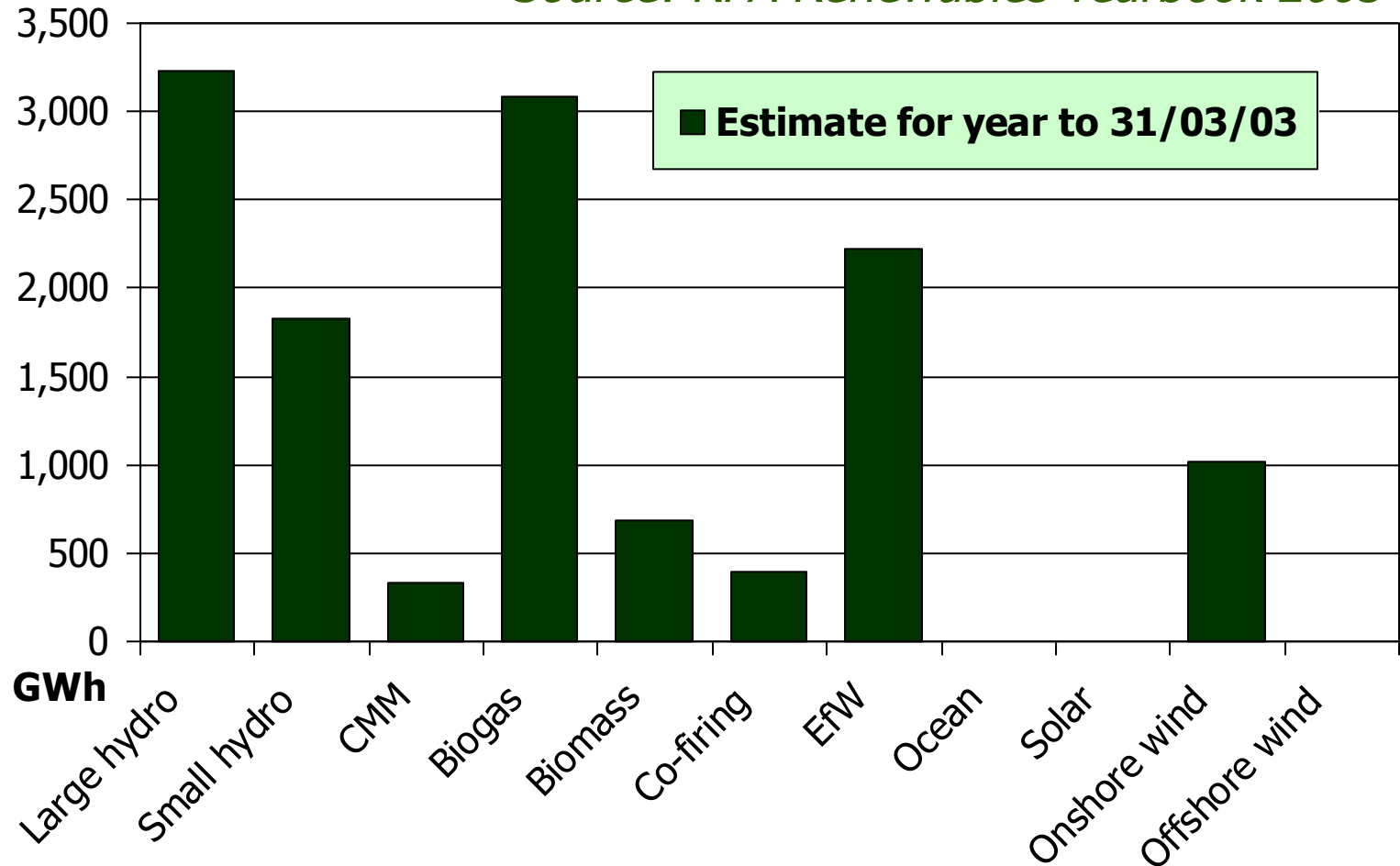
# Aiming for a Quantum Leap





# UK Renewable generation

*Source: RPA Renewables Yearbook 2003*

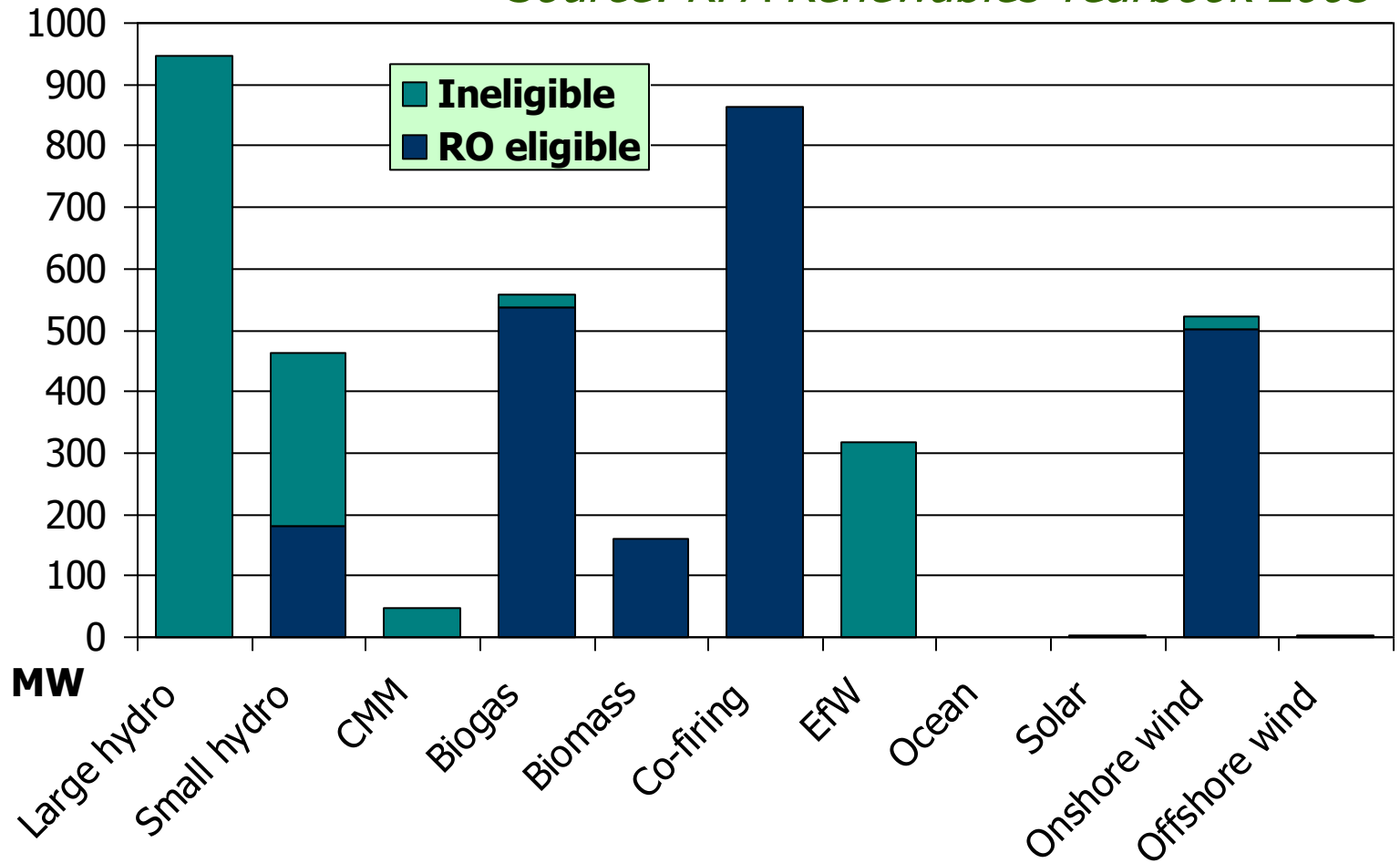






# UK Renewable capacity

*Source: RPA Renewables Yearbook 2003*





# Barriers to expansion

- Planning
  - MOD
  - Nimbys and Bananas
- Grid connection
  - Accessibility
  - Distributed generation
  - Cost
- Entrenched attitudes
- Diversity



# The White Paper on Infrastructure

Structural barriers to renewables & CHP

- ? NETA evolving to eliminate problems  
*... into BETTA – the same but more so!*
- ? Planning needs to be streamlined  
*PPS22 published at last, not yet adopted*
- ✓ People make the difference  
*Upcoming 'Hearts & Minds' campaign*
- ✗ Accommodating national security  
*MOD still oppose nearly half RE projects*
- ? Learning to handle intermittency  
*Not yet an issue. Diversity would solve*



# Innovation – the issues

- Drivers for innovation
  - Expansion of the market
  - Energy security
  - Diversity in renewables
- Research and development
  - Identifying the best opportunities
  - The Renewables Innovation Review
- Transition to commercialisation
  - The 'British disease'



# Support for renewables

- Renewables Obligation

For currently competitive sources:

Biogas, hydro, onshore wind

- Capital grants

For near term resources:

Offshore wind, biomass

- R & D and market building

For emerging technologies:

Tidal, solar, wave



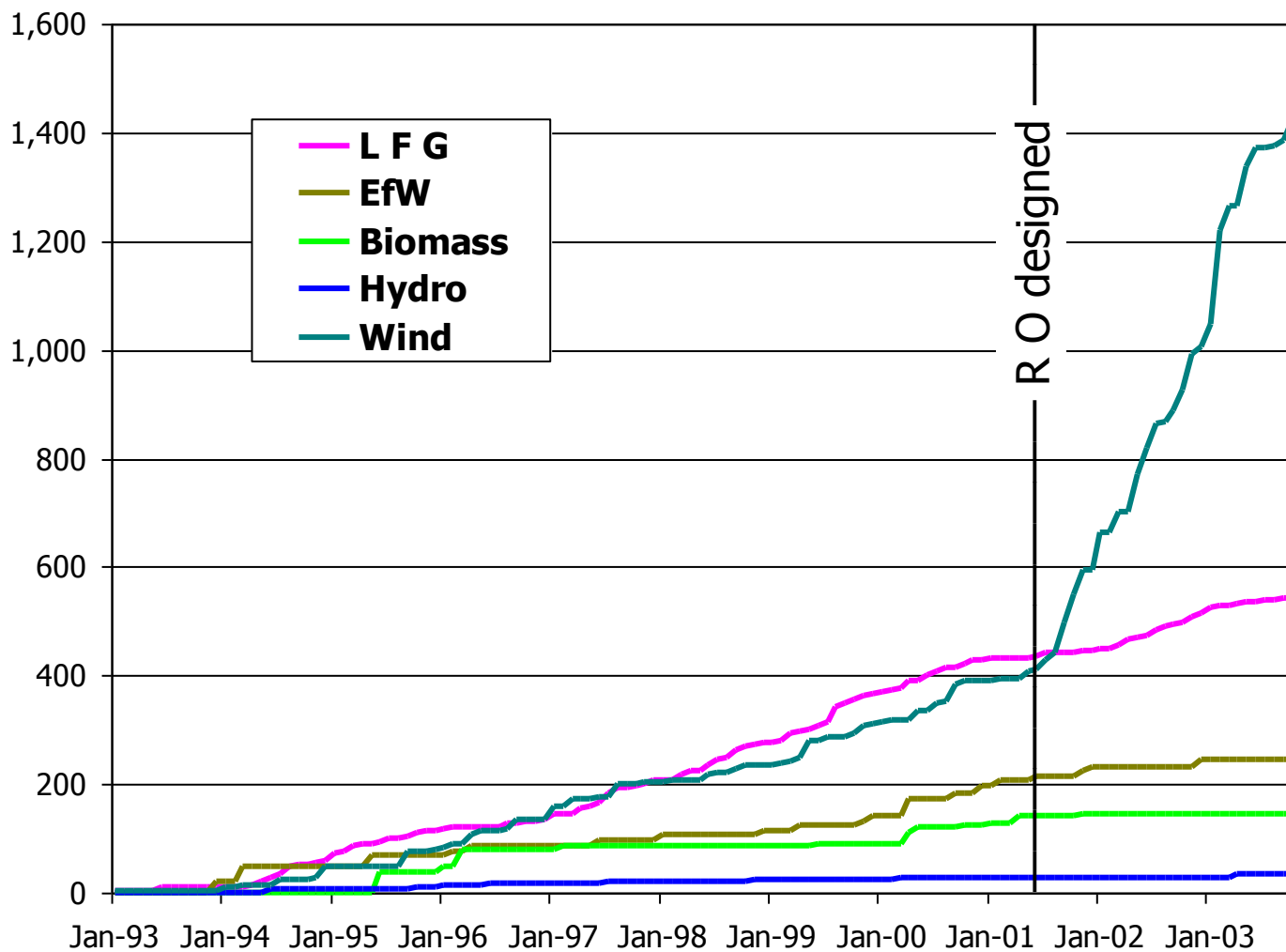
# The White Paper on Diversity

Technologies are at different stages

- Offshore wind – about to take off  
*Two projects in progress. Who funds Phase 2?*
- Biomass & waste – need momentum  
*No effective new policy measures*
- Wave & tidal – potentially important  
*Need for effective transitional support*
- Solar PV – potentially very large  
*Need for effective transitional support*
- Fuel cells – a long term advantage  
*No effective new policy measures*



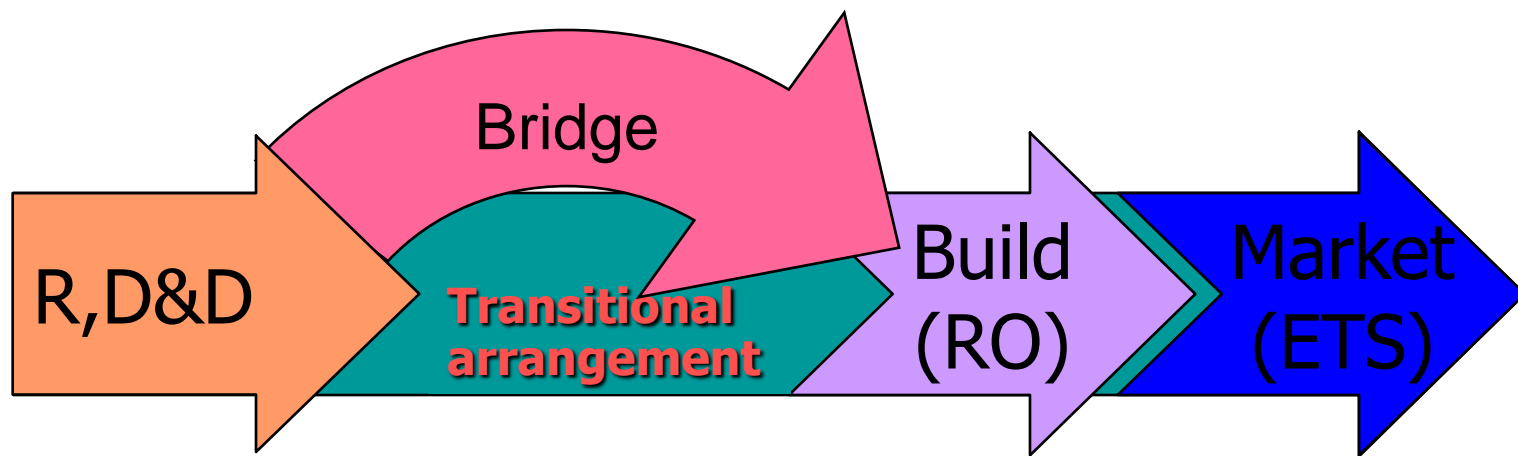
# Diversity – the issue





# Diversity – the solution

Tidal  
Wave  
Solar  
Biomass  
Wind  
Biogas  
Hydro



Developing

Proving

Maturing

Free-market





# The White Paper on Innovation and business

We still need to do more

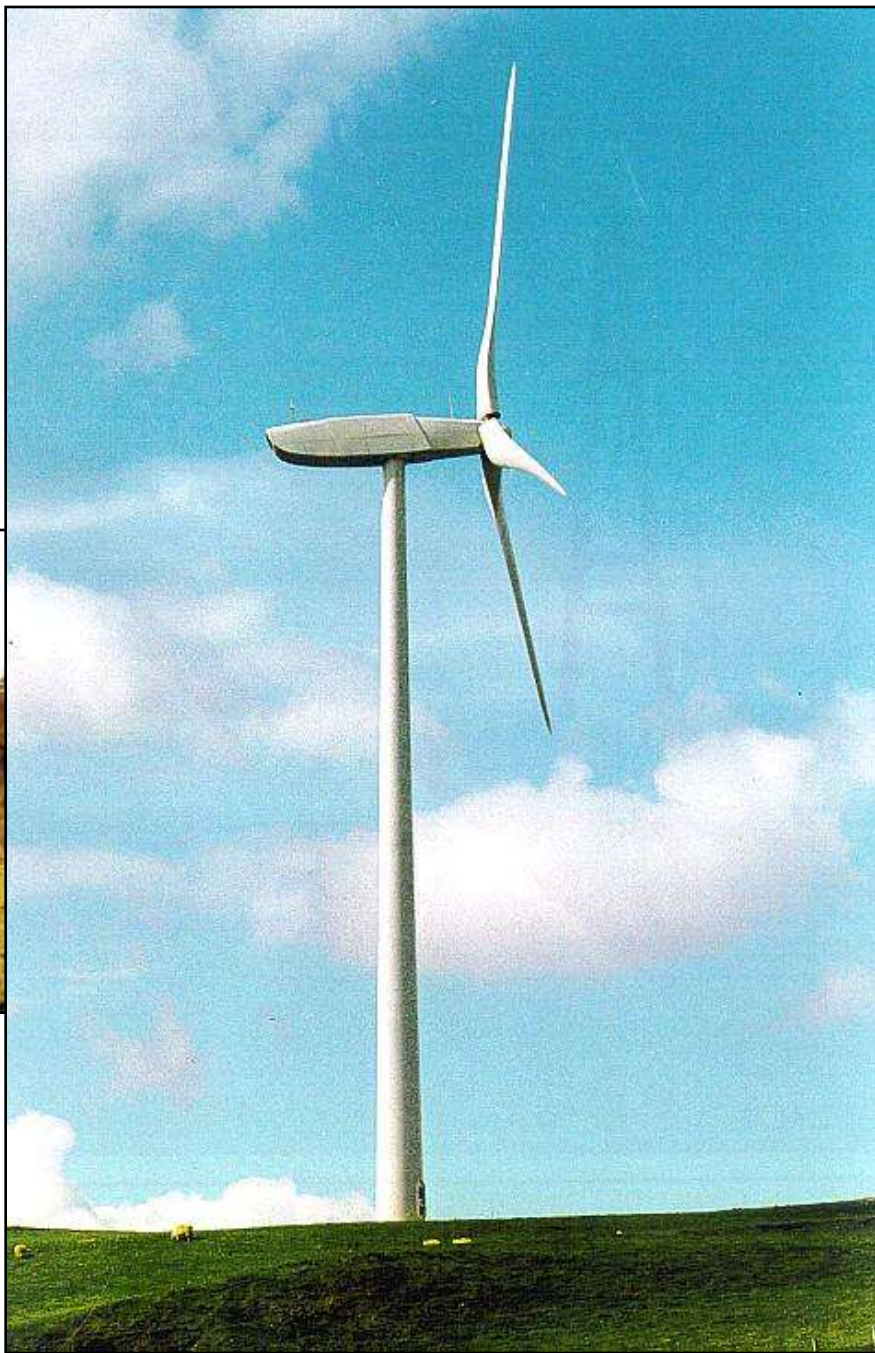
- Innovation, R & D are crucial  
*Innovation Review inconclusive*
- Research is needed  
*Spending Review may help*
- Big opportunities for UK business  
*Need for effective transitional support*
- Widening the ROC market  
*Extended to 2015. Needs market governance*
- No new nuclear build  
*But still 10x more Government funds than RE*



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# Once upon a time





# Full-scale wave devices



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# Full-scale tidal devices



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