• 1977 Alternative Energy Strategy for the UK
• Predictions & evidence over 30 years
• Integrated solution to the 3 key challenges
• Launched June 2007 at APPCCG
NOW
POST 2012
2020
DE-CARBONISED WORLD

GLOBAL
CONVENTION ON PROTECTION OF NATURAL SINKS

EU
REFORM OF EU EMISSIONS AND AGRICULTURE POLICY

UK
CLIMATE BILL

REGIONAL
DE-VOLVED ASSEMBLY’S POLICY THIS TERM

LOCAL
LA21, MERTON RULE etc.

COMPREHENSIVE TREATY ON GLOBAL DECARBONISATION ("PLAN B")
INTRODUCTION OF TRADABLE QUOTAS

PLAN B
REFORM OF EU EMISSIONS AND AGRICULTURE POLICY
COMPREHENSIVE TREATY ON GLOBAL DECARBONISATION ("PLAN B")
Charting the new terrain

- Identifying areas for urgent research
- Create a common, coherent vision
- Endorsing, supporting and connecting actions from all sectors of European society
Reading of the science:

- Climate Security
- Energy Security
- Global Equity
Climate Security

- Record CO$_2$ levels
- Earth has enormous thermal mass
- 30-40 years until a new equilibrium is reached
- Locked into at least another 0.6°C temp rise
Climate Security

• IPCC 4th Assessment Report
• Conservative position
• Lessons to date
• Speed of decision making
Arctic ice melt

“Targets of 550ppm must become 350ppm if humanity wishes to preserve a planet similar to that on which civilisation developed”

James Hanson Nasa Goddard Institute for Space Studies
Failing Sinks

• University of East Anglia gauged CO$_2$ absorption through more than 90,000 measurements from merchant ships equipped with automatic instruments.

• Results of their 10-year study in the North Atlantic show CO$_2$ uptake halved between the mid-90s and 2000 to 2005.

20 October 2007, BBC News
Climate Security

- Methane hydrate release
- Emergency Situation
- Transition to Zero Carbon
Energy Security

• Fossil Fuels are incredible!
• Dense and transportable
• 1 Gallon = 6 weeks labour
• US daily use = 20,000,000 person years of labour

(Heinberg 2007)
Energy Security

There are currently 98 oil producing countries in the world, of which 64 are thought to have passed their geologically imposed production peak, and of those 60 are in terminal production decline.

(David Strahan www.energybulletin.net)
Energy Security

![Graph showing energy security trends](chart.png)

- **World Demand**
- **Existing Field Decline ~ 4–6%**
- **Required New Production**

**Millions of Barrels per Day of Oil Equivalent (MBDOE)**

- **Existing Production**
- **Base Investment Required**

**Timeline (1980-2015):**

- 1980: 80 MBDOE
- 2000: 120 MBDOE
- 2015: 180 MBDOE

**Key Points:**

- The graph illustrates the decline in existing oil fields and the increasing demand, highlighting the need for increased production.
- Base investment is required to meet the growing demand and avoid a significant decline in production.

**Conclusion:**

- Energy security remains a critical global concern, with investments necessary to sustain production levels and meet future demands.
Energy Security
Energy Security

- A permanent energy crisis
- Production rates become limited by the geology
- Preceded by political limitations?
Global Equity

- The world’s 360 wealthiest people have combined income of the poorest 45% of the world’s population (2.3 billion people).

- Britain’s GDP = £17,200
  Tanzania’s GDP = £420

- A Britain = 10 Tonnes CO₂
  An Afghani = 0.01 Tonnes CO₂

- Mounting international tension
Global Equity
A common solution
• **International**
  – Contraction & Convergence

• **National**
  – Tradable Energy Quotas (TEQs)
Carbon Budget: Global
This example shows regionally negotiated rates of C&C. This example is for a 450ppmv Contraction Budget, Converging by 2030.
Carbon Budget: Britain
Tradable Energy Quotas (TEQs)

- Motivator for change across all sectors
- 40/60 split
  - 40% given free to individuals
  - 60% to auctioned to industry
TEQs for **Individuals**

- Only for fuel
- Receive a year’s worth at the start
- Topped up weekly
- Tradable!
- Safety net
Market rules were set when the industrial world was awash with fossil fuels & before climate change was recognised

The market is driven by the lowest cost option – it is carbon-blind

So, in delivering our needs, it releases far more carbon than is actually necessary
Carbon Blind Markets

Common sense says that importing and exporting identical products is an inefficient and wasteful exercise!

IMPORT:
- 126 million litres of milk
- 23,000 tonnes of milk powder
- 115,000 tonnes of butter

EXPORT:
- 270 million litres of milk
- 153,000 tonnes of milk powder
- 67,000 tonnes of butter
De-carbonisation options:

• Widespread re-nationalisation?
• A command & control economy?
• To be directed by Government?
• Carbon-conscious market reform?
TEQs for Business

- Carbon-conscious market reform
- Initially a year’s worth put up for tender
- Weekly tender follows - 1 year in advance of use
- Budget looks ahead, provides certainty
- Purchased through banks
- Other taxation reduced
Carbon conscious markets

- Use the power of the market
- Make carbon visible
- Lowest carbon = most economic
- A ‘market-driven’ race out of carbon
- Driving technology innovation
‘Island Britain’ Scenario
powerdown

- Sector by Sector
  - Household
  - Industry
  - Transport
  - Agriculture & Services

- 50% overall reduction
Household

• Mass retro-fit of existing stock
• Zero-carbon standards for all new-build
• Replace worst performing dwellings
• Intelligent appliances
• Behaviour change
Transport

- Transition to electric vehicles will result in huge savings
- Freight to rail
- Modal switches - “Earthports”
- V2G systems
Agriculture

- Re-localisation
- Reduction in livestock
- Switch to “organic”
- On-farm biofuels for farm machinery only
- Significant land-use changes
• 100% Renewable!
• Electric Britain
• Diverse mix
The resources are out there
The Saudi Arabia of wind power
Electricity supply & demand

[Graph showing electricity supply and demand from January to December with various sources such as Onshore wind, Offshore wind, Domestic CHP, Industrial CHP, BIPV, Hydro, Wave, Tidal stream, Nuclear, and Fixed Tidal.]
Heat supply & demand
UK Potential Energy Flows 2027 (terawatt hours)
Variability

• Demand
  – Reduced overall by 50%
  – Intelligent demand management
• Generation distributed by region & by technology
• Storage - V2G, flow batteries, pumped storage
• European Integration in next scenario…
Integrated EU scenario

Concentrated Solar Thermal Power (CSP):
- Solar heat storage for day/night operation
- Hybrid operation for secured power
- Power & desalination in cogeneration

Sketch of High-Voltage Direct Current (HVDC) grid: Power transmission losses from the Middle East and North Africa (MENA) to Europe less than 15%.

Power generation with CSP and transmission via future EU-MENA grid: 5 - 7 EuroCent/kWh

Various studies and further information at www.TREC-EUMENA.net
Energy research 1974-2004

Source: Data reported to the IEA by IEA Member countries
Vital Catalysts

• Robust cross-party consensus
• Constantly up-dated climate research
• Pan EU awareness campaign
• Accelerated technology R&D
• Accredited training across EU
WISE: work on-site began July 2007
WISE: a unique learning environment
WISE: for CAT Graduate School of the Environment
WISE: Opens end of 2008!
Conclusions

• Scientifically inescapable
• Economically unavoidable
• Technically achievable
• It must now become socially & politically thinkable
• A new optimism!
Where next?

- Pan-EU 27 scenario
- Collaboration
- Annually up-dated report
- Presented at the COPs in Poznan (2008) & Copenhagen (2009)
Report available free from

www.zerocarbonbritain.com

www.cat.org.uk