



ZeroCarbonBritain
Centre for Alternative Technology

By Paul Allen

**INFORSE-Europe European Sustainable Energy NGO
Seminar
Artefact, Germany, November 10-14, 2009**

<http://www.inforse.org/europe/seminar09> Artefact.htm



introduction

globalcontext

framework▶

powerdown

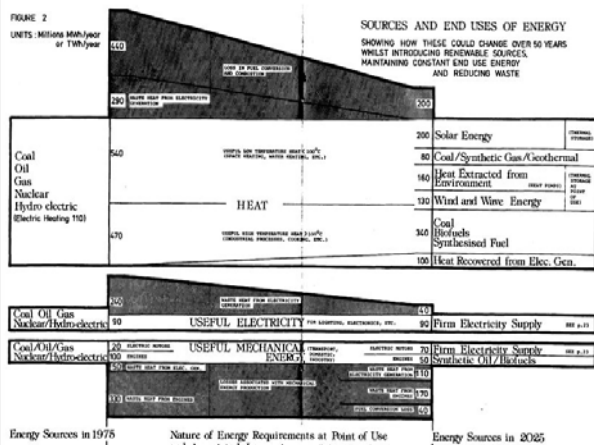
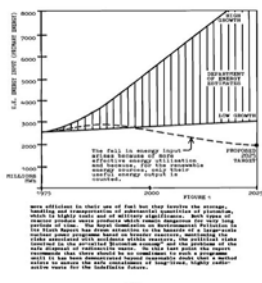
powerup

introduction

- Founded in 1973 & open to public in 1975
- 1977 Alternative Energy Strategy for the UK
- Against prevailing beliefs of the time



An
Alternative Energy
Strategy
for the
United Kingdom



Why we need a new vision

- The public is now aware of **many** green challenges
- Lots of people are doing **lots of great work**
- But what is our **target**?
- How much **time** do we have to reach it?
- How does everything **fit together**??

Charting a new terrain

- **Evidence-based** solutions scenarios
- **Back-casting** from where science tells us we must be
- Identifying '**what we don't yet know**' for urgent research
- Creating a common, coherent **vision** - linking things up
- **Connecting** actions - home, city, county, nation

Our wellbeing depends on:

- Climate Security
- Energy Security
- International Security
- Economic Security



Climate Security

- The long-industrialized west need to move to **zero emissions** as quickly as is 'humanely' possible
- To allow the majority world nations 'headroom' to develop their basic human infrastructure

Energy Security

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

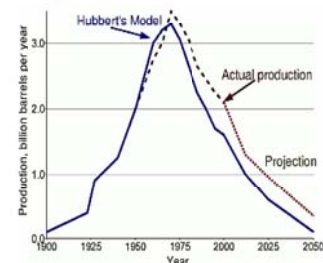
(Heinberg 2007)



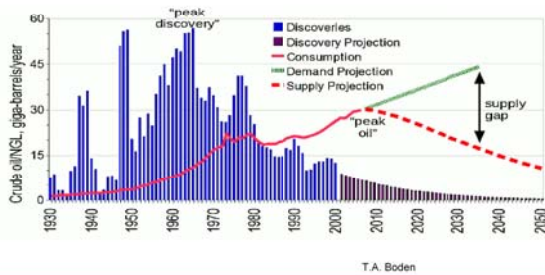
Energy Security

M. King Hubbert worked for Shell in the 1940s, studying production from US "lower 48" states oil fields to assess future production.

In a paper presented to the American Petroleum Institute conference in 1956, depending on the level of consumption, he predicted a **peak and then an unstoppable decline** in US oil production from the early 1970s.



Energy Security



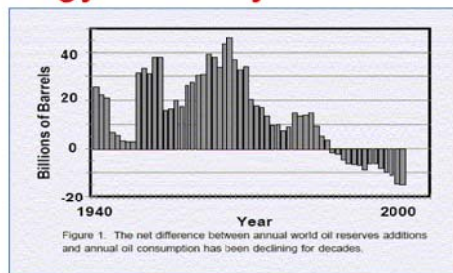
Energy Security

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



US Hirsch Report

Energy Security

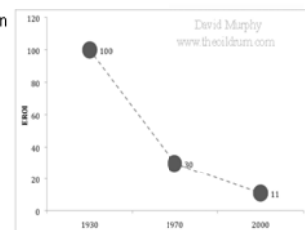
The EROI of oil and gas extraction in the U.S. has decreased :

100:1 in the 1930's

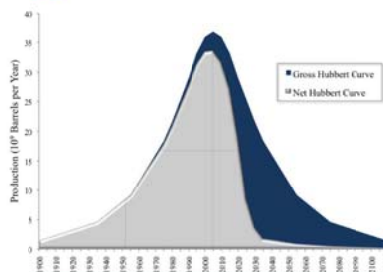
30:1 in the 1970's

11:1 as of 2000

(Cutler Cleveland, Boston University)



Energy Security



Energy Security

For the **first time in our history**, just as demand is exploding across the globe, humanity will no longer be able to increase energy production year on year!!!

Force on Pea

- 

Economic Security

Chart 1: UK balance of trade in oil, monthly outturns, £m



Economic Security



International security



An integrated solution



National & International policy frameworks

- Descending Cap = effect
- Equity = buy-in
- Consensus = delivery

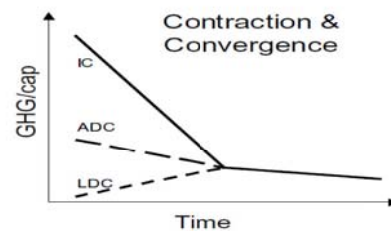
National & International policy frameworks

- Enforceable
- Include 'embodied emissions'
- Stable / predictable
- Low administrative burden
- Responsive & capable of evolution
- Capable of reaching zero
- Reform markets
- But don't expect it to do everything!!

National & International policy frameworks

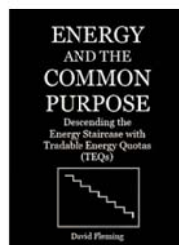
- 'Command and Control' interventions
- Taxation
 - net equal
 - additional
- Quotas
 - Tradable Energy Quotas
 - Cap and Trade
 - Cap and Share

Contraction & Convergence



Tradable Energy Quotas (TEQs)

- Motivation 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

TEQs for ***Business***

- Initially a year's worth put up for tender
- Weekly tender follows
- Bought through banks
- Budget looks ahead, provides certainty
- Other taxation reduced
- Stimulates zero-carbon business practices...

'Dead' Carbon



Market reform

- Market rules were set before we understood climate change, and the industrial world was awash with fossil fuels
- It works to the lowest (externalised) cost option – it is essentially carbon-blind
- So it uses far more energy than is actually necessary to deliver our well being

Carbon conscious market reform

- Make carbon visible to the market
- Harness the power of the market
- Lowest carbon = most economic
- A 'market-driven' race out of carbon
- Driving technology innovation

"Technology Scenario"

National, regional, community & domestic scale

powerdown powerup

powerdown

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

- 50% overall reduction achievable



Household

- Large-scale retrofit of existing stock
- All new-build to be zero-carbon
- Replace worst performing dwellings, with exceptions
- Behaviour change
- Intelligent appliances

Transport

- Switch to electric vehicles – huge savings
- Freight to rail
- Modal switches - “earthports”
- V2G
- Cycling & walking
- Liquid biofuels grown on-farm for farm use

Agriculture & land use

- Switch from fossil fuel fertilisers etc.
- Re-localisation of production
- Significant land-use changes
- More biomass production e.g. wood fuel
- Reduction in stocking levels

- Meter the UK's daily spend on imported energy
- A new index: the amount of money sucked out of the UK economy



- Identify UK's 'Strategic renewable energy reserve'
- Wind, waves, tides, biomass, solar, geothermal.....
- Include only that energy harvestable with current technology deployed in non-sensitive locations

Another new index:

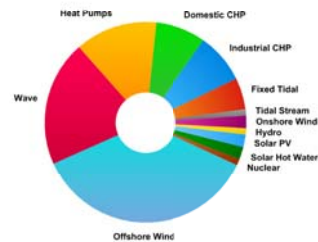
The amount of money this would inject into the UK economy!



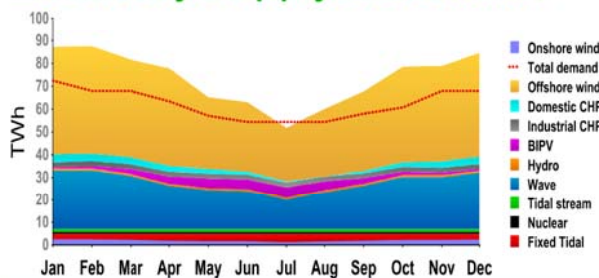
powerup

- Electricity becomes the main way we **move energy**
- Every roof, garden, hill top, island, coast, forest becomes an energy **and** an **income** generator
- As we get better at extracting energy through increasing economies of scale and advancements in technology, **the annual yield (and annual income) increases.**

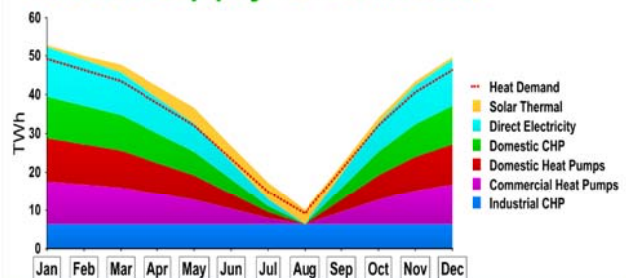
The technologies



Electricity supply & demand



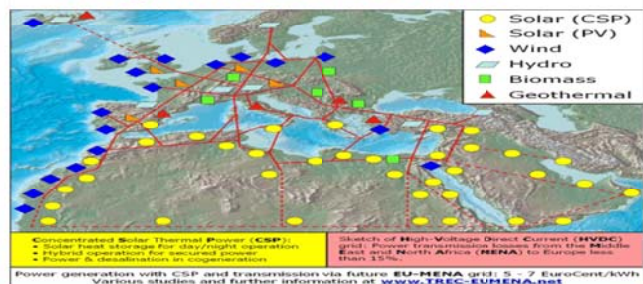
Heat supply & demand



Variability

- Dealing with demand
 - Reduced overall by 50%
 - Intelligent demand management
- Generation distributed to minimise variability
 - by region
 - by technology
- Storage - V2G, flow batteries, pumped storage
- **European Integrated scenario**

Integrated EU scenario



Conclusions

- Scientifically inescapable
- Economically unavoidable
- Technically achievable
- It must now become *socially & politically thinkable*

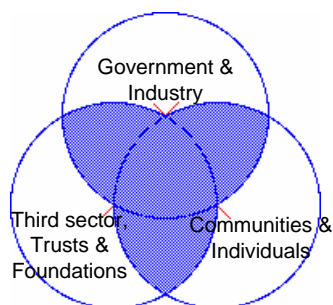
... sooner than expected

- 6 weeks after CAT presented ZCB in Westminster, the UK Liberal Democrats launched their policy called "Zero Carbon Britain – Taking a Global Lead"
- *"These proposals were largely inspired by the Welsh based Centre for Alternative Technology and I would like to thank them for the ground-breaking work."*

(Lembit Opik, Shadow Secretary of State for Business and Enterprise)

A Community of Practice

Between forward-thinking organisations and first movers!



ZCB:2 Economy & Employment

A large-scale **economic stimulus package** to power down demand & power-up renewables would:

- Create **employment** & stimulate the economy
- Dramatically improve future **balance of payments**
- **Inject revenue** into the economy every day
- **Repay the taxpayer** from the energy saved/generated
- Future-proof the economy against **energy price shocks & blockades**

ZCB:2 Funding the transition

- Many individuals, institutions & Governments are now seeking '**secure investments**'
- Future demand for electricity is **very secure**
- Future price paid for electricity is **very secure**
- Future costs for renewables are **predictable**
- Government backed '**eco-bonds**' as per WW2
- Releasing a wall of both **public & private capital**

It's transition time...

- Change is coming, ready or not
- Our choice is between a future where we have been proactive and acted ahead of events, and a future where we have let events overtake us.



Free download: zerocarbonbritain.com

