

Transfer of Technology-some examples of how to promote Climate Change Mitigation

Presentation to the UNECE Committee on Sustainable Energy
Ad Hoc Group of Experts on Energy Efficiency
Investments for Climate Change Mitigation, 31 May 2006

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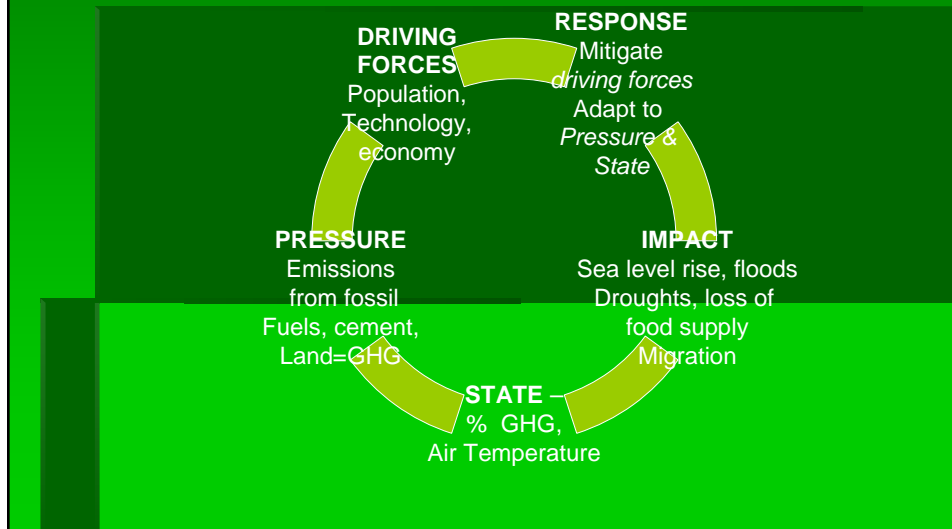
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Effects of Climate Change

The Intergovernmental Panel on Climate Change predicts a rise of 5.8°C by the end of this century



Driving Forces and climate change



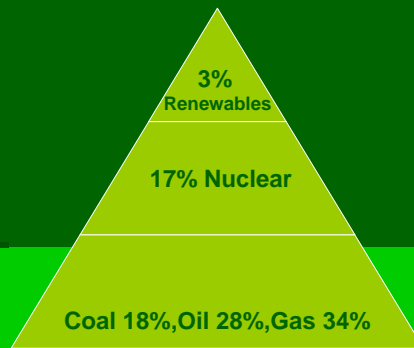
Drivers for Development of Innovative Renewable Energy and Transfer of Technologies

- Climate Change-global warming-GHG reduction requirements
- Environmental Pollution including Waste mountains
- Limited availability /rising cost of fossil fuels
- Growing Energy demand
- Need for Energy Efficiency

Energy Consumption continues to rise in many countries whilst Fuel Mix alters-for example Scotland,1990-2002

- Total energy consumption rose 10% from 1990-2002,
- Domestic sector consumption rose 15%,and transport 10%, BUT
- Industrial energy demand fell 30%
- Renewables use grew 13% from 1990-2002,but still only 3% of total
- Gas and electricity use grew, coal and oil use declined
- Scotland emitted 9% [44 million tonnes] of UK CO2 in 2002
- There was a 5% reduction in emissions from 1990-2002

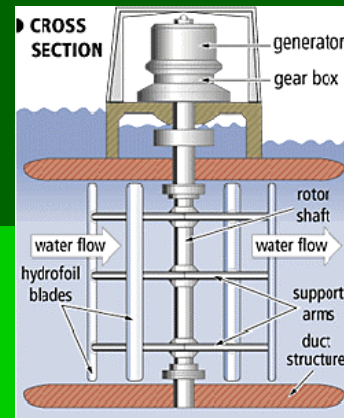
2002 Fuel Mix
Non Fossil fuel : 20% Fossil:80%



Marine tidal power could transform energy balance

- Scotland's Pentland Firth estimated could produce 30 gigawatts-half UK's electricity demand in a series of marine power stations
- EPRI of USA report [2006] estimates proven tidal turbine technology could produce electricity for 4.2 to 6 cents per kilowatt hour-competing with conventional thermal power stations
- Maine 7 county programme now beginning on US east coast
- Many other marine sites in Europe and internationally to be developed

Canadian Blue Energy Tidal Fence Technology

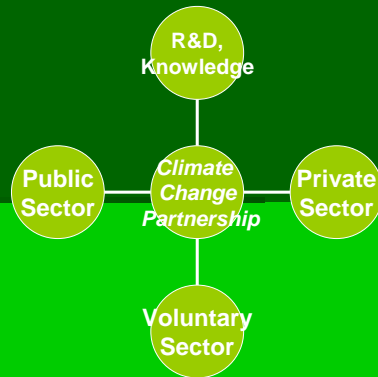


How to pay for Climate Change technologies

- Climate Change policies *can* mean increased energy bills, which hamper industrial and commercial sector profitability and directly affect domestic household budgets
- Energy bills *can* be reduced and sector profitability stabilised with policy-induced accelerated technical change and R&D but it takes time
- Energy bills can be reduced by investing NOW and sector profitability stabilised by accelerating use of education in managing change, integrating existing technologies and promoting partnership working

New Alliances leverage resources to accelerate appropriate Technology use, Trade & Development

- Leverage resources- create partnerships-for access to finance, physical resources [land, buildings], people [skills and knowledge]



Global Climate Change & Partnership Growth

- UN Framework on Climate Change [UNFCCC]
- Intergovernmental Panel on Climate Change [IPCC]
- Renewable Energy and Energy Efficiency Partnership [REEP] since Johannesburg, 2002
- Environmental Technologies Opportunities Portal [ETOP]

Involvement of number of UN agencies including UNIDO and UNEP, as well as bilateral co-operation between Australia, USA, China, New Zealand, EU and Japan.

- Some Private sector multinational company partnering through International Climate Change Partnership based in Arlington, Virginia-including multinational companies

Conventional Technological development from research to utilisation

- Basic Research, proof of concept
- Technological Development
- Demonstration projects, pilot/full scale
- Verification
- Commercialisation
- Utilisation of technology
- Time taken~ ? Seven years plus?

Investing in Utilising *Existing Technology* Now is Time Saving and Wealth Creating

- Inadequate policy emphasis given to
- utilising existing technology vs. new technology
 - integration of existing technology for optimising energy, water and waste utilisation by changing management systems
 - trading and mass production of proven cost effective technologies e.g. solar thermal-solar hot water; wood burners
 - Developing cost effective local solutions for distributed energy-think local-go global
 - Developing marine tidal power [most energy dense] as now happening in east coast of USA

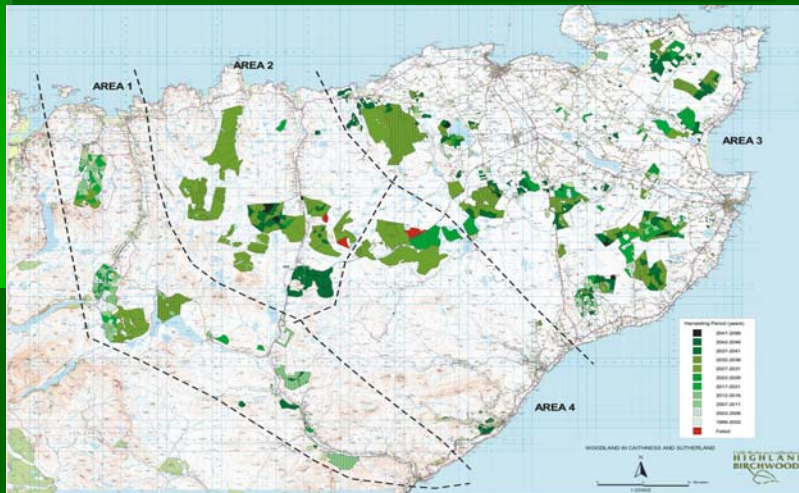
Prioritising Projects and appropriate technologies

- First priority is rapid reduction of fuel poverty in towns/urban environment/centres of population to achieve maximum economic benefit –UK towns can save 60 percent or more of energy used-Woking has achieved 77 percent, and is acting as model for London
- Efficient use of heat energy was one UK target, heat maps of towns have been made in much of UK to identify major sources of waste heat [e.g. from process plant] and their distance from fuel-poor consumers

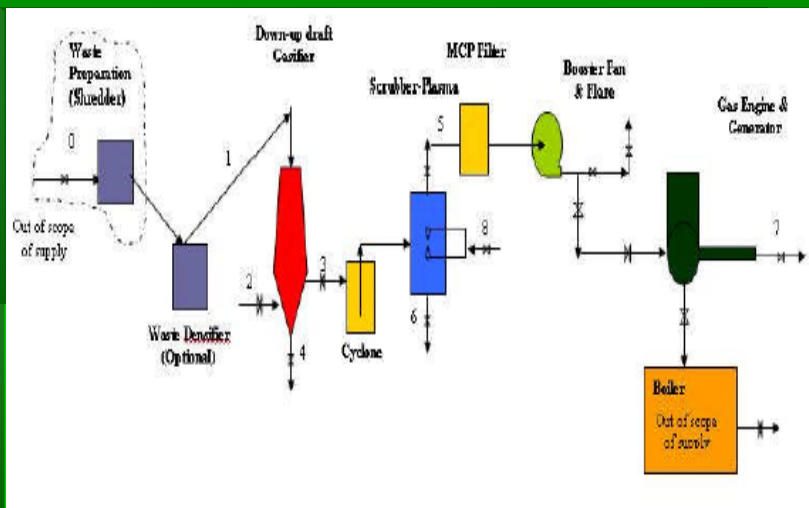
Aerial View of Wick Distillery and Surrounding Houses



Forestry within 50 miles of Wick



Model of Operational Phases for wood gasification



Grass Roots Solar Thermal

- Solar thermal [hot water and air heating] can provide up to 40 percent of annual hot water needs per household and is regarded as proven technology
- Even with 40% government grants, cost per UK household averages £1800 for commercial installers
- A DIY system was pioneered in a successful pathfinder Caithness workshop in late 2005 by the inventor Kerr 'Sunshine' MacGregor, reducing installed cost to £350.
- Further cost reductions may be achieved by importing mass produced panels from China. Use of grass roots technology approach needs to become universal-target 2 to 3 year maximum payback period.

Promotion through Centres for Alternative Technology, e.g. Wales-a model to be adapted for elsewhere?



SAMPLE OF COURSES TAUGHT

Working with Willow

Install and Test Domestic Photovoltaic Systems

Convert Your Engine to Vegetable Oil

Hemp as an industrial crop

The Urban Eco Home

Heating with Wood Fuels

Solar Domestic Water Heating :

Water Treatment, Conservation, Recycling

Alternative Sewage Systems

Lotte Glob's Zero Energy house- heated from body heat alone- designed by Gokay Devici



Model of localised Wind Turbine hydrogen production system electrolysing water



Hydrogen Transport – Cars, Bus



Hydrogen fuelled Heating systems & household applications



Summary-think local, go global

- Technology transfer is a multi-directional process, and should not be limited to new technologies.
- **Global investment programme is required for mass production** and trade development of existing technologies, including for micropower.
- Use of Knowledge Economy and green technologies to meet growing energy demand requires **policies to promote mass education** including training for lifestyle change and partnership working at grass roots level
- **Growth rate can dramatically accelerate** from 2002-14, especially if **localised Climate Change Partnerships** created to combine resources and use existing technologies more effectively for distributed heat and power
- **Partnership toolkit could be added to Financial Engineering Manuals;**
- **Specialised schools workbook, including fuel cell, solar energy and other models** needed for new practical learning programme