KCC Renewable Energy Select Committee

An Overview of Renewables and Kent

Neil Hilkene – 22nd February 2010

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Scope of today's presentation

- Guiding principles for low carbon energy
- A definition of renewable energy
- The drivers behind renewable energy
- A look at renewable energy targets
- Baseline energy information for Kent
- Renewable energy sources and technologies
- Planning and development
- KCC and renewable energy

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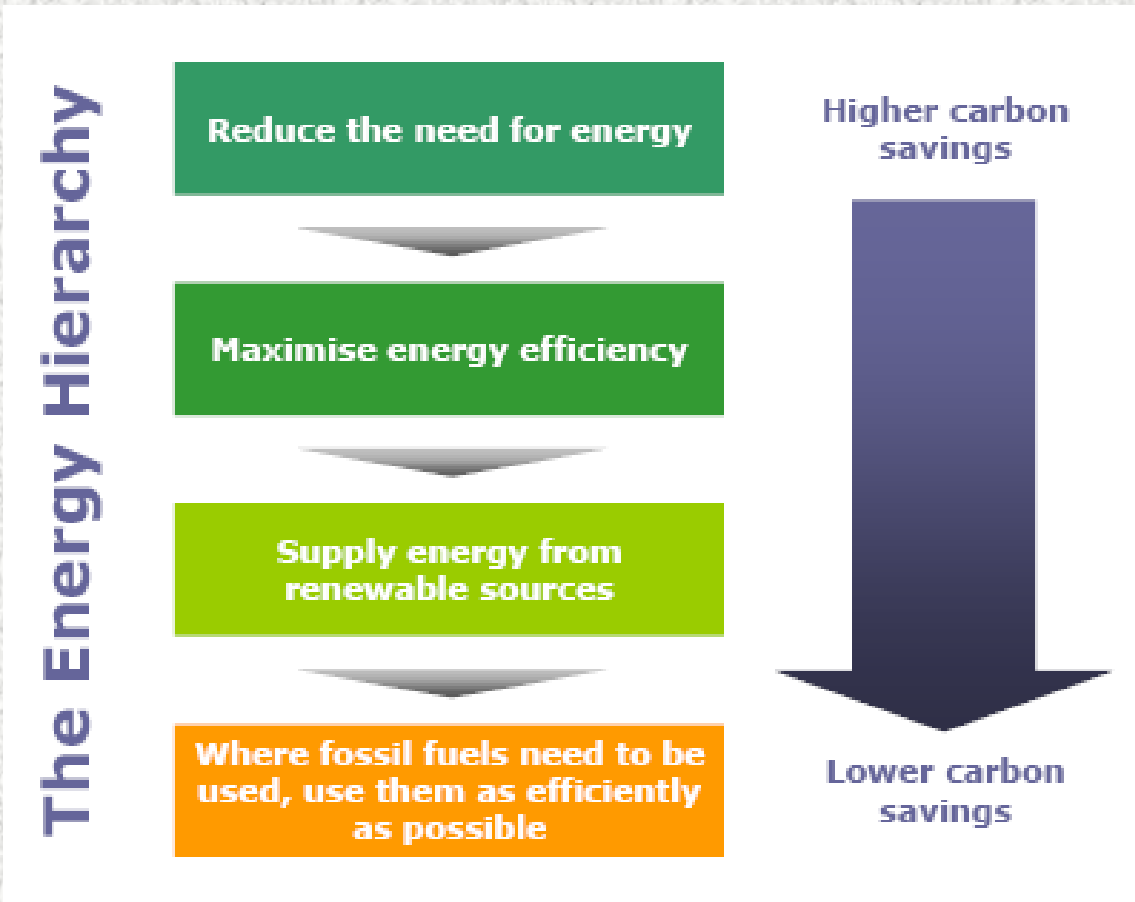
Guiding principles for delivering low carbon energy

Action based around four key areas



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A definition of renewable energy

Renewable energy is the term used to describe energy flows that occur naturally and continuously in the environment such as energy from the sun, wind, waves or tides

Includes biomass and geothermal heat in the ground

Excludes nuclear power and energy from non-biodegradable waste

Not always zero carbon

In some cases it is free energy!

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The drivers behind renewable energy

- The need to maintain a secure and affordable supply of energy which is not dependant on imported sources
- The diminishing availability of fossil fuels for energy generation
- CO2 from energy generation and use is one of the key greenhouse gases contributing to climate change
- Power stations reaching the end of their working life
- Continuing growth in the demand for energy
- Compliance with International, European and National regulations and targets

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Policy, Regulatory & Fiscal Measures

Driving Down Carbon Emissions

Energy Act
Climate Change Act
EU Renewable Energy Directive
UK Renewable Energy Strategy
UK Low Carbon Transition Plan
Renewables Obligation
EU Emissions Trading Scheme
Carbon Emissions Reduction Target
Carbon Reduction Commitment
Climate Change Levy
Climate Change Agreements
Zero Carbon Buildings
Planning Policy & Design Codes
Building Regulations
New Product Standards

New Economic Opportunities

National, Regional & Local Impacts

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Renewable energy targets

European/National

EU target of 20% of total energy consumption from renewables by 2020

Apportioned to member states with UK target set at 15%

Will require:

- 35% electricity to be generated from renewables
- 12% heat generated from renewables
- 10% of transport energy from renewables

Regional/Sub-regional

Included within the South East Plan

Regional target of 1130MW of installed electricity capacity by 2020 respectively

Kent contribution to this target is 154MW of installed renewable energy capacity by 2016

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Baseline energy information for Kent – consumption

Kent total energy consumption 2007 (GWh)

	All Fuels			
	Industry & Commercial	Domestic	Transport	**Total**
Ashford	877.8	911.5	1,346.3	**3,135.6**
Canterbury	879.5	1,275.5	972.4	**3,127.4**
Dartford	902.5	812.2	1,297.4	**3,012.2**
Dover	1,069.9	947.4	706.3	**2,723.6**
Gravesham	2,704.6	829.3	696.4	**4,230.2**
Maidstone	983.7	1,294.2	1,598.3	**3,876.2**
Medway	1,091.2	2,100.6	1,283.2	**4,474.9**
Sevenoaks	667.1	1,121.5	2,187.8	**3,976.5**
Shepway	736.3	887.0	916.8	**2,540.1**
Swale	2,333.8	1,123.7	1,264.7	**4,722.2**
Thanet	578.9	1,190.4	534.6	**2,303.8**
Tonbridge and Malling	945.4	1,053.7	1,716.3	**3,715.4**
Tunbridge Wells	621.0	990.8	717.9	**2,329.7**
TOTAL KENT	**14,391.7**	**14,537.7**	**15,238.3**	**44,167.8**

Source DECC December 2009

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Baseline energy information for Kent – renewable generation

UK renewables target = 15% of total energy consumption

Equivalent to 6625GWh of total energy consumption in Kent

Current installed renewable energy generation capacity in Kent:

- 201MWe (electricity) = Approx. 493GWh
- 1.18MWth (heat) = Approx. 0.85GWh

Renewable energy generation currently supplies approx. 1.1% of total Kent energy consumption

<u>Additional factors:</u>

Growth in demand for energy as the economy recovers

143,000 new homes in Kent

120,000 new jobs in Kent

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Wind

UK has very large potential

Coastal areas and higher ground in Kent

Currently most economically viable of renewable energy sources

Many scales of deployment:

- Offshore wind farms
- Onshore wind farms and clusters
- Stand alone turbines
- Roof mounted turbines
- Blade and vertical axis formats

Many development issues and as a general rule the larger the proposed turbine the more significant these issues become!

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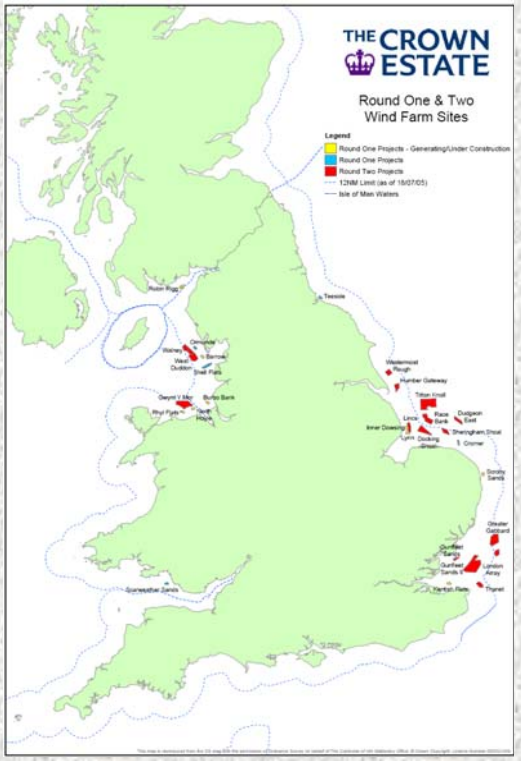
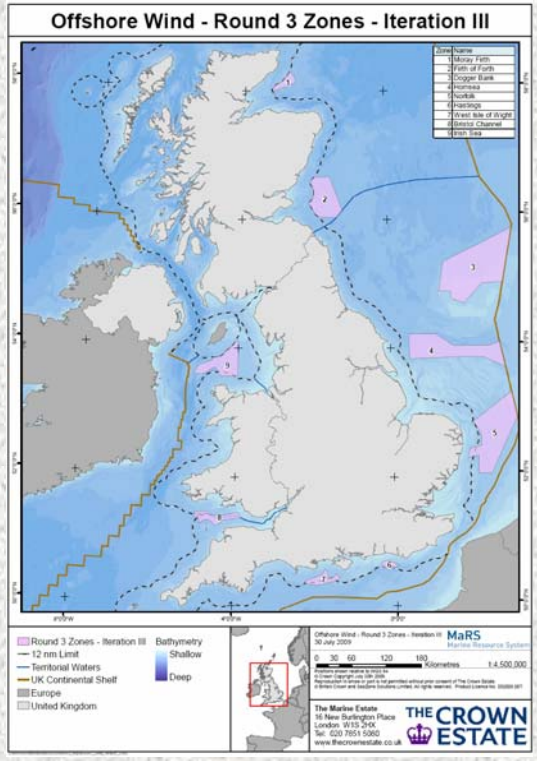
Offshore wind





Key Kent Projects:

- Kentish Flats = 90MW/30 turbines
- Thanet Offshore = 300MW/100 turbines
- London Array = 1000MW/271 turbines

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Onshore wind

Planning and design issues:

- An open site free from obstructions
- Minimum wind speed of 5-6 m/s at hub height
- Visual impact especially where landscape designations, conservation areas and green belt
- Impact on special wildlife areas and bird migration corridors
- Proximity to radar and airports - larger projects
- Amenity - inhabited buildings, noise and flicker
- Associated infrastructure
- Access - construction and servicing

Projects:

Little Cheyne Court Wind Farm

Sheerness Docks and Isle of Grain

Small to medium scale turbines

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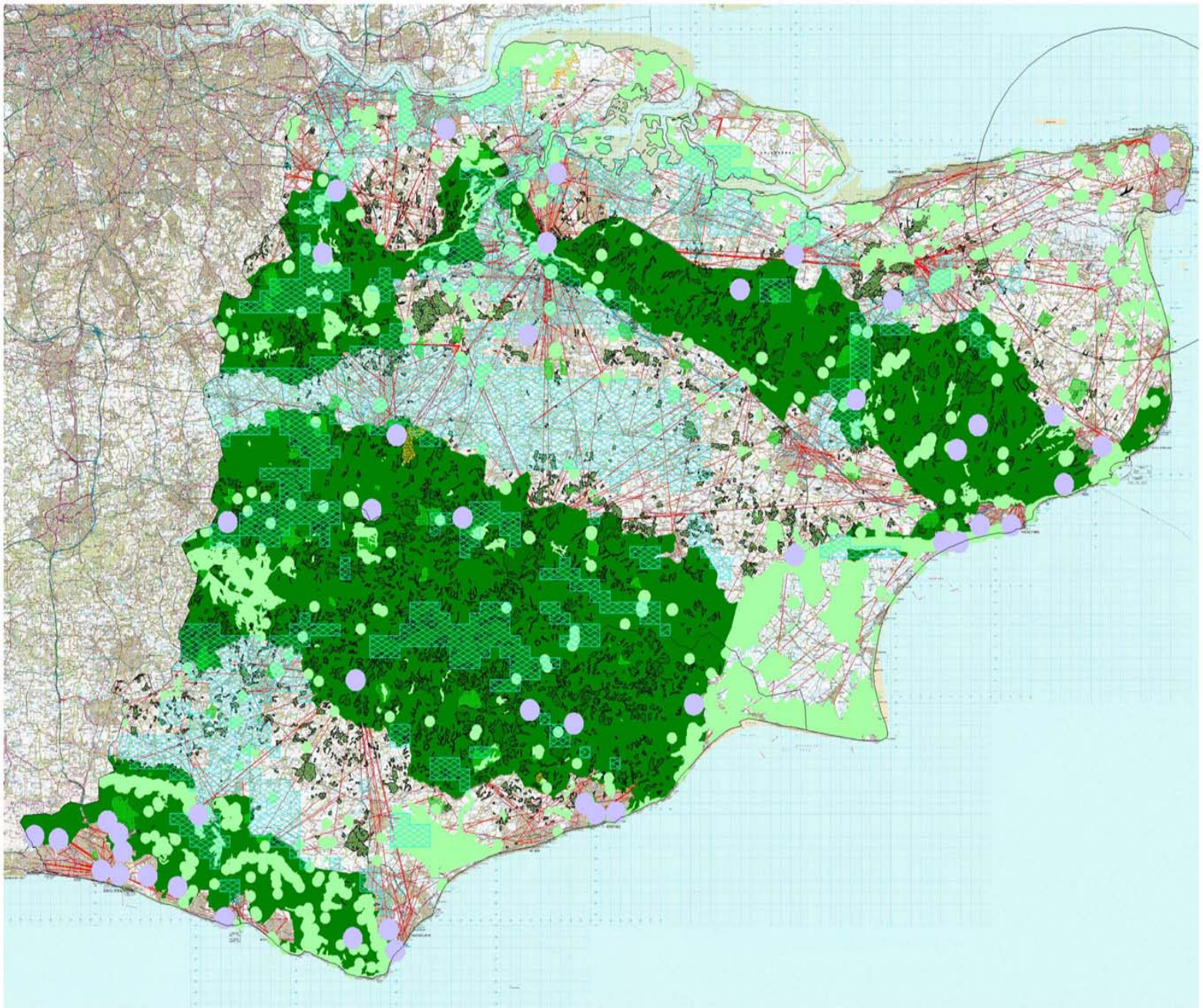
Technical and environmental constraints to windfarm development



N

0 5 10 Miles

- County boundaries
- 15km buffer around London Manston Airport
- London Manston Airport
- Technical constraints
- Windspeeds below 6m/s
- Environmental constraints
- Microwave links
- RSPB sites
- Parks and gardens
- Areas of Outstanding Natural Beauty
- Ancient Woodland

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Babtie

Maps produced by the Babtie Group
95 Bothwell Street
Glasgow, G2 7HX
This map should NOT be rescaled.

Wind turbine examples

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Biomass

Biofuels among the fastest growing energy sector

Good potential in Kent - woodlands and agriculture

Fuel sources:

Forestry wood, waste wood, energy crops, agricultural residues, biodegradable food and organic wastes

Fuel Types:

Wood chip/wood pellet/logs

Bio-diesel/Bio-ethanol/Biogas

Fuel uses:

Heating stoves, boilers/heat networks, CHP, co-firing at existing power stations, transportation, agricultural machinery

Fuel versus food and spectre of cheap imports rather than home grown

Issues around economics, carbon linked to processing and transportation – Local solutions work best!

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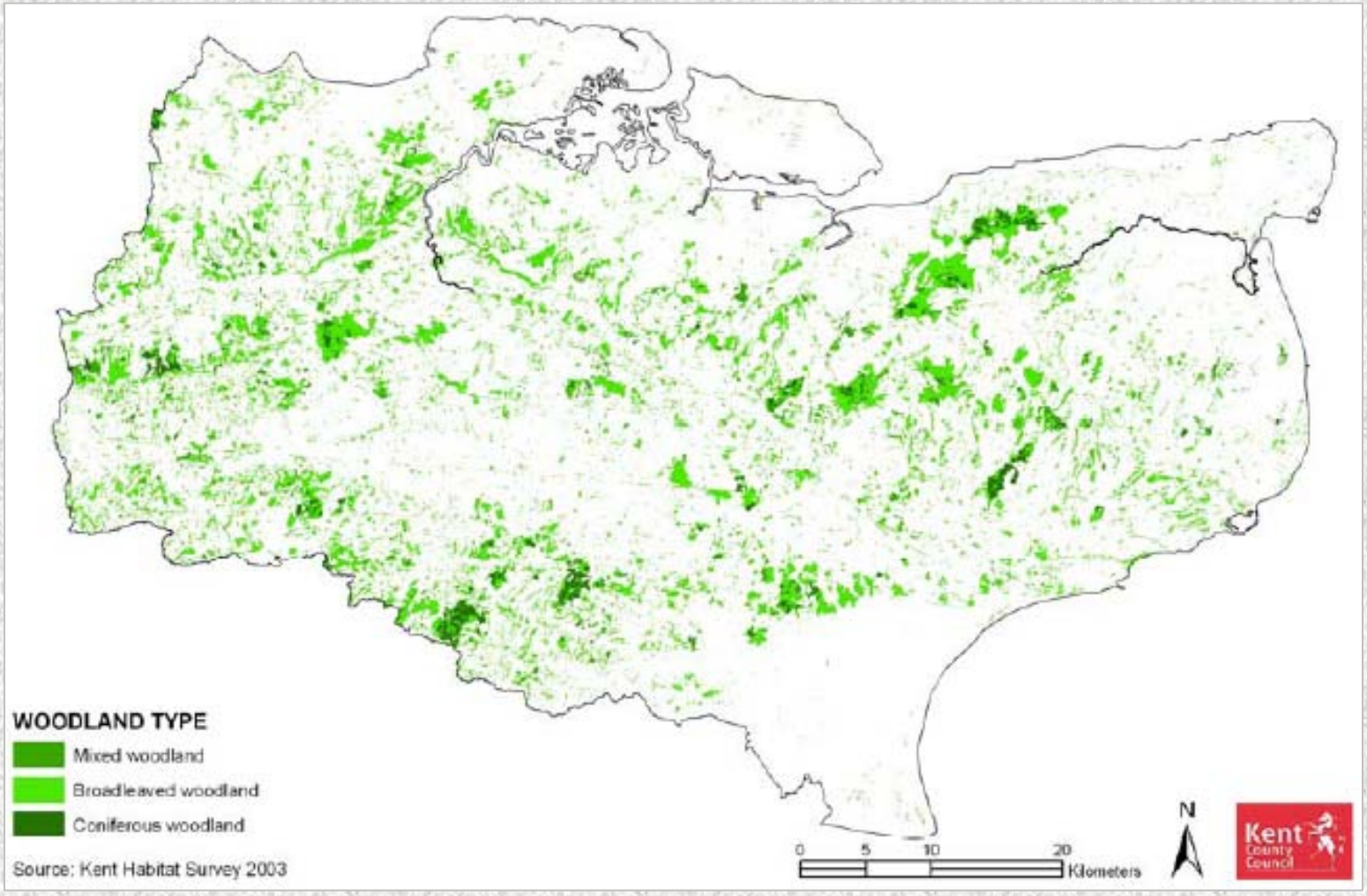
Kent woodlands



	Existing woodland	New Coppice / SRC
Wood renewable energy potential in Kent	**6–19MWe**	**3–31MWe**

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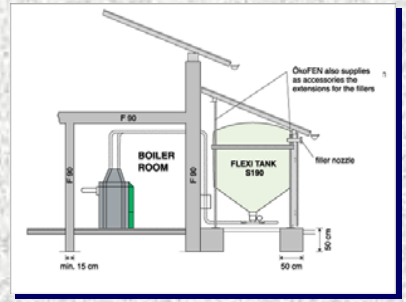
Biomass examples



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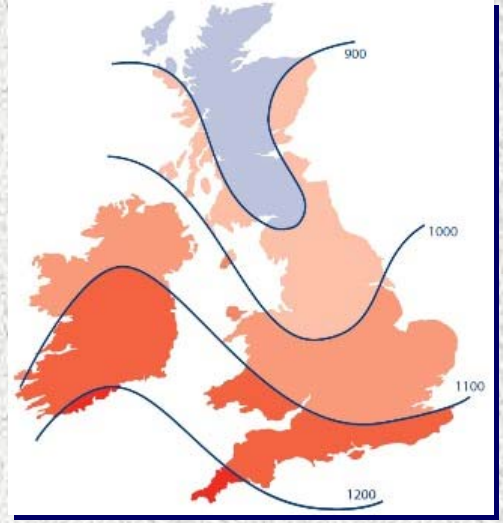
Solar



Good potential in Kent buildings

Works in sunny and cloudy conditions

Two main applications:

- Solar thermal (heat for water)
- Solar photovoltaics (electricity)

Needs unobstructed location orientated between SW & SE

Optimum inclination of between 30-45 degrees

PV is more flexible in its applications than solar thermal and can be used on roofs, vertical and curved surfaces

PV can be integrated into the buildings design and materials

Solar raises few planning issues

Downside – PV technology is expensive and not yet mature

Upside – a new 'Feed in Tariff' with guaranteed price for electricity generated and which supports investment case

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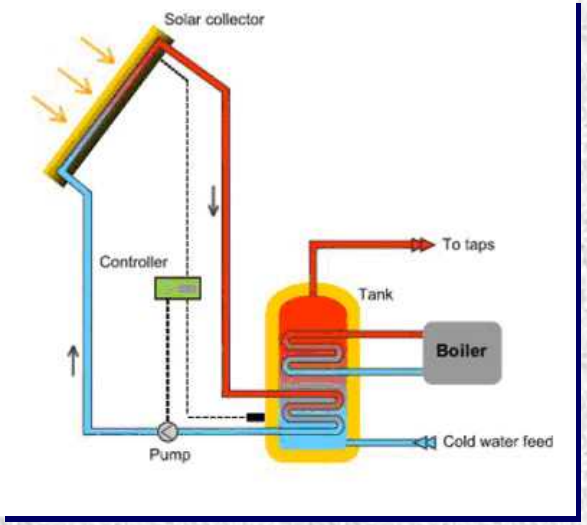
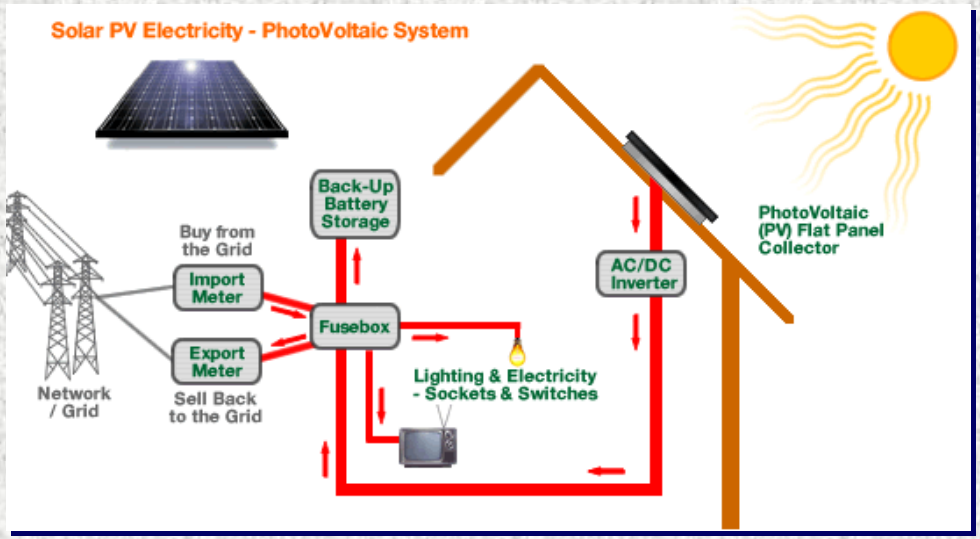
Solar examples





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Ground and air source

Ground source

Harnesses energy by utilising stable ground temperatures, generally 9 to 14 degrees centigrade in the UK

Horizontal, trench and borehole systems

Geology and ground conditions must be surveyed to establish suitability for use

Air source

Air source heat pumps absorb heat from the outside air

Less efficient due to fluctuations in air temperature

Both

Heating and cooling options

Best used where high energy efficiency and often in connection with under floor heating systems

Electricity needed to operate compressor and pump

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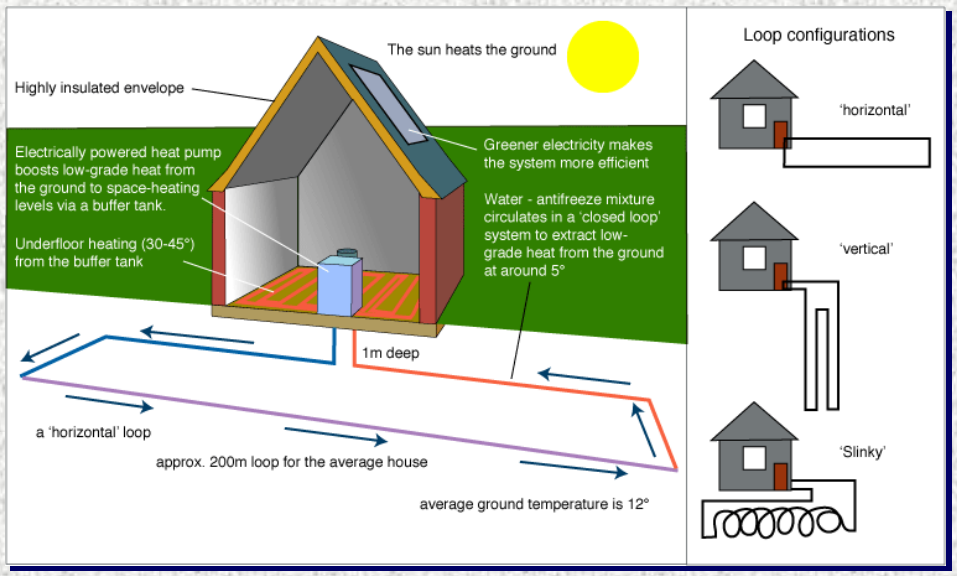
Ground and air source examples



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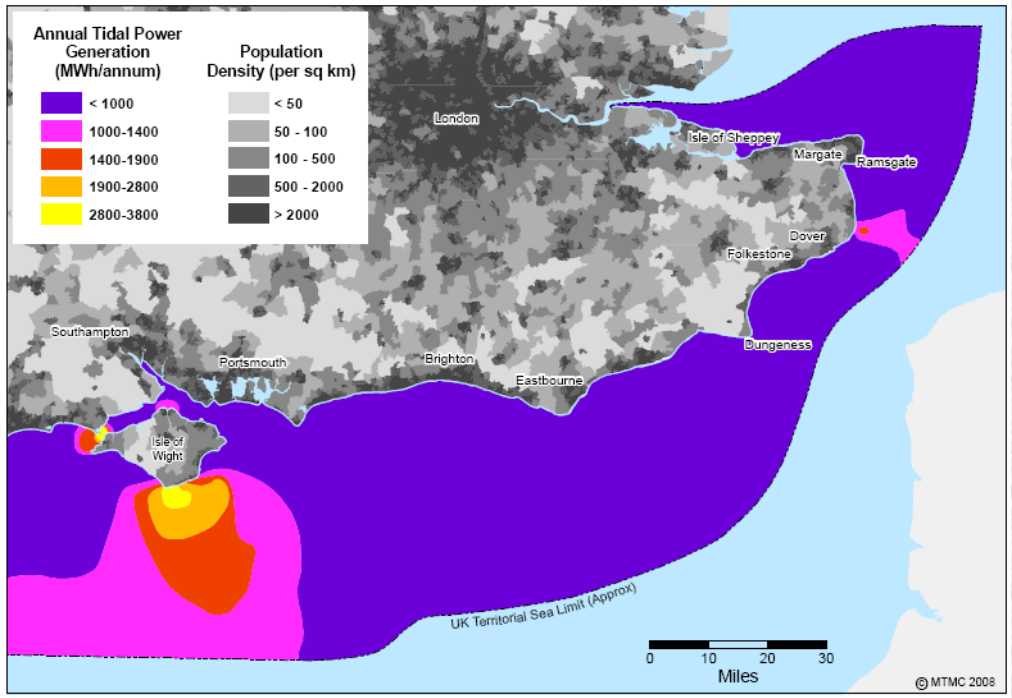
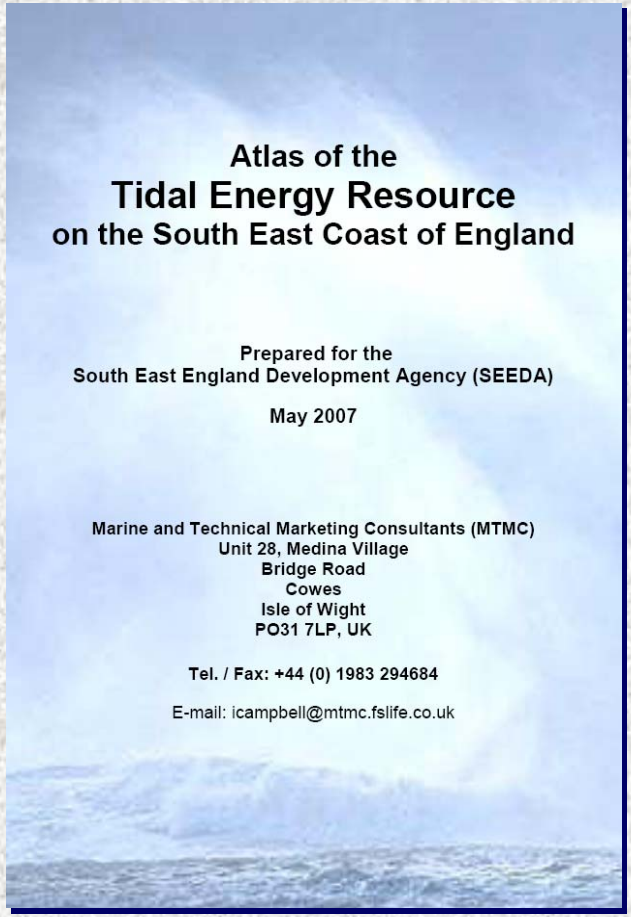
Wave, tidal and hydro

UK focus on west coast and Scotland
Some potential around Kent but:

- Congested shipping routes
- Subsea power cables
- Protected historic wrecks
- Environmental constraints





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Renewable energy costs and savings

Measure	Cost	Annual Savings	Payback	CO2 Reduction	*Notes*
Condensing boiler and heating controls upgrade	£2,500-£3,000	£235	9-12 years	1,300 kg	*Based on existing boiler being G rated.*
Biomass wood boiler and flue	£9,000	£410	22 years	9.6 tonnes	*Savings based on replacing a coal fired system.*
Ground source heat pump	£7,000-£13,000	£160-£840	8-81 years	0 kg-6 tonnes	*Savings depend on fuels source replaced.*
Air source heat pump	£5,000-£9,000	£20-£700	7-180 years	0 kg-5 tonnes	*Savings depend on fuels source replaced.*
Solar thermal water heating	£3,000-£5,000	£185	15-30 years	260-580 kg	*Savings depend on fuels source replaced and are based on a 3.5 sq. m panel.*
Solar PV electricity generation	£8,000-£14,000	£500-£600	13-28 years	1 tonne	*Savings based on a 2kWp system and income received under new Feed in Tariffs.*
Wind turbine	£11,000-£19,000	£1000	11-19 years	2.6 tonnes	*Savings based on a well sited 2.5kW turbine and income received under new Feed in Tariffs.*

- Based on information sourced from the Energy Savings Trust
- In the case of heat systems does not take into account the availability of grant support
- Heat savings depend on fuel displaced and on site demand

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Planning and development

National

- Draft National Planning Statements on energy
- Planning Policy Statements – PPS1 & PPS22

Regional

- South East Plan

Local

- Local Development Frameworks
- Supplementary Planning Documents
- Kent Design
- Masterplans and energy studies

Other

- Code for Sustainable Homes/BREEAM
- Building Regulations
- Energy Performance Certificates

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KCC and renewable energy

Strategic direction and influencing policy

Baseline evidence and research

Kent Design – Guide to Sustainable Energy Solutions

Regeneration, new jobs and economic growth

Pilot projects, corporate and community initiatives

Responding to the demand for new skills and training

Working with like minded partners in the public and private sectors

Backing business and inward investment through sector support

European initiatives and funding

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Thank you

Questions and discussion…

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