Action for Sustainable Buildings – A NZ/UK Comparison



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- Split talk into existing stock and new build, focussing on the UK
- Talk about policy drivers and sector response, illustrate with examples from my UK work for Uttlesford District Council
- Contrast with NZ situation and my thoughts on lessons that can be transferred









Before we go further



Friday afternoon...



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...big lunch...



...a PowerPoint...



concentration impairment



High-level policy drivers



• UK

- EU Emissions Trading Scheme and the Carbon Reduction Commitment
- EU 20% renewable energy target by 2020 15% for the UK
- UK Climate Change Act 34% reduction in UK emissions by 2020
- EU Energy Performance of Buildings Directive



NZ

- Kyoto liabilities/Emissions Trading Scheme
- Err, that's it



High level policy drivers (UK)

 Have Department of Energy and Climate Change, with a cabinet minister



Ed Miliband

Chris Huhne

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Existing buildings

Characteristics of housing energy use NZ to UK (absolu		(absolute)
	UK	NZ
Dwellings (millions)	26.6	1.6
Domestic CO2 emissions (kTCO2/year)	145,725	3,690
Domestic energy use (GWh/year)	515,209	17,640



Existing buildings

Per dwelling characteristics of housing energy use NZ and UK			
	UK	NZ	% diff NZ to UK
Space heating (kWh)	10,887	3,177	-71%
Water heating (kWh)	4,941	3,325	-33%
Cooking (kWh)	568	723	27%
Lights and appliances (kWh)	2,973	3,664	23%
Total energy (kWh)	19,369	10,889	-44%
Total CO2 (TCO ₂)	5.5	2.3	-58%
Average floor area (m ²)	80	140	75%
Space heating intensity (kWh/m ²)	136	23	-83%
Total energy intensity (kWh/m ²)	242	78	-68%
Total CO2 intensity (kCO ₂ /m ²)	68.5	16.3	-76%



- Long running energy supplier commitment funding for domestic energy efficiency improvement 'CERT'
 - Market based scheme paid for by energy suppliers (ultimately consumers)
 - Loft and cavity wall insulation, plus lots and lots of light bulbs!
 - No uniform branding
 - CERT 2008 2012 value: £3.7 billion
- Government fuel poverty abatement scheme 'Warm Front'
 - Insulation and central heating installation/upgrade
 - £ 3,500 /household, £6,000 if off the gas network
 - Total spend over 10 years = £2.5 billion









- Renewable energy grants
 - solar HW, PV, wind, heat pumps, micro-hydro, wood boilers and wood pellet burners
- Now partly replaced by new feed-intariff for renewable electricity
 - payment for every unit generated
 - additional per unit payment for metered exports
 - For electricity: not very costeffective, but not perverse
 - For heat: bonkers
 - No word if new Government will press on with RHI







- EU Energy Performance of Buildings
 Directive
- Mandatory building labelling
 - All buildings when built, sold or let out must have and Energy Performance Certifcate (EPC)
 - All public buildings over 1000 sqm must have a Display Energy Certificate (DEC) shown in their reception area
- All action arising from EPCs/DECs voluntary, but 'name and shame' effect appears to be increasing improvements









Energy Performance Certificate

17 Any Street,	
Any Town,	
County,	
YY3 5XX	

 Dwelling type:
 Detached house

 Date of assessment:
 02 February 2007

 Date of certificate:
 [dd mmmm yyyy]

 Reference number:
 0000-0000-0000-0000

 Total floor area:
 166 m²

This home's performance is rated in terms of the energy use per square metre of floor area, energy efficiency based on fuel costs and environmental impact based on carbon dioxide (CO₂) emissions.





The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills will be. The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

Estimated energy use, carbon dioxide (CO2) emissions and fuel costs of this home

	Current	Potential
Energy Use	453 kWh/m² per year	178 kWh/mª per year
Carbon dioxide emissions	13 tonnes per year	4.9 tonnes per year
Lighting	£81 per year	£85 per year
Heating	£1173 per year	£457 per year
Hot water	£219 per year	£104 per year

Based on standardised assumptions about occupancy, heating patterns and geographical location, the above table provides an indication of how much it will cost to provide lighting, heating and hot water to this home. The fuel costs only take into account the cost of fuel and not any associated service, maintenance or safety inspection. This certificate has been provided for comparative purposes only and enables one home to be compared with another. Always check the date the certificate was issued, because fuel prices can increase over time and energy saving recommendations will evolve.

To see how this home can achieve its potential rating please see the recommended measures.



Remember to look for the energy saving recommended logo when buying energy-efficient products. It's a quick and easy way to identify the most energy-efficient products on the market.

For advice on how to take action and to find out about offers available to help make your home more energy efficient, call 0800 512 012 or visit www.energysavingtrust.org.uk/myhome

EPC

Based on theoretical performance

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Display Energy Certificate How efficiently is this building being used?

Uttlesford District Council Uttlesford District Council Council Offices, London Road Saffron Walden CB11 4ER

Certificate Reference Number: 0979-1081-0217-0900-4491

HMGovernment

DEC

This certificate indicates how much energy is being used to operate this building. The operational rating is besed on meter readings of all the energy actually used in the building. It is compared to a benchmark that represents performance indicative of all buildings of this type. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.



Based on real performance

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- New strategy: whole house approach to existing stock
 - Plan is to finish all lofts and cavity walls by 2015
 - Deliver 7 million 'major' upgrade interventions by 2020
 - Pay as you save approach use savings to repay cost of measures
 - New government has said they will continue with this plan







Images credit: Energy Saving Trust





Meanwhile in Sleepy Saffron Walden...





Uttlesford examples

- Herts Essex Energy Partnership
 - 15 local authorities in Hertfordshire and Essex
 - Grants and zero-interest loans for householders
 - 13,500 interventions in 2 years
 - Joins up all existing funding sources, and adds £6.6 M extra
 - Full range of measures whatever it takes
 - Takes a whole-house approach, objective to make low income households 'fuel poverty proof', reduce in emissions in other households











Uttlesford examples

- Sustainable Homes Network
 - Community network promoting greener homes – 360 members
 - Sustainable Homes Shows (4) showcasing technologies and giving advice
 - Case studies and information via quarterly meetings and regular newsletters
 - Bulk deals for members electricity monitors, low energy lights, thermal imaging



Sustainable Homes Network







Uttlesford examples

- Energy efficiency requirement for existing homes when they are extended, condition of planning permission
 - Mimics policy that was going to be in 2006 Building Regulations
 - Adopted via local planning policy
 - Straightforward measures required, where present and cost effective
 - Successfully implemented, no appeals, since 2006
 - Held up as good practice by practically everyone
 - Lobbied to get in 2010 Building Regs
 - Blocked by (former) Minister of Housing, John Healey, on a whim
 - Better luck in 2013?





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Lessons for NZ, part 1

- Low hanging fruit is not enough we need to strip the whole tree
- Doing all measures at once allows crosssubsidy
- Paying for improvements from savings:
 - might work for water heating measures
 - need another model for space heating and insulation in NZ
- Clear EECA/Govt branding for HeatSmart Scheme is the <u>right</u> way to do it
- Building labelling will have very limited impact unless it is made mandatory







Break





New buildings

Building Code	R-values (m².K/	W)		
Element	NZ H1 Zone 3	NZ H1 Zone 2	UK Part L1A 2010 backstop	UK Part L1A 2010 compliant
Wall	2.0	1.9	3.3	4.0
Roof	3.3	2.9	5.0	7.7
Floor	1.3	1.3	4.0	5.0
Windows	0.26	0.26	0.50	0.67
Air tightness	Unspecified	Unspecified	10 m3/m2 @ 50pa	3.0 m3/m2 @ 50pa

- Part L is fully performance based, flexible compliance method
- In addition to above, would also need:
 - 90%+ efficient natural gas boiler plus advanced controls
 - Minimal of thermal bridging
 - Whole-house mechanical ventilation with heat recovery OR solar panels OR wood burner





loor space (m2)	Dunt nomes
	USA – 214
	Australia – 206
	Denmark – 137
	France – 113
	Spain – 97
	Ireland – 88
	UK – 76



- All new homes 'zero-carbon' by 2016 zero carbon agenda
- Inspired by ministerial visits to Sweden
- Announced 2006:
 - 25% reduction in 2010
 - 45% reduction in 2013
 - 'zero-carbon' by 2016
- New government has reaffirmed commitment for 2016...
- ...but the silence is deafening for all new non-domestic buildings being zero-carbon from 2019



Image credit: BBC News





- Zero carbon definition still not defined!
- 'True' zero-carbon not practical
- Offsite solutions will plug the gap a form of offsetting
- But all emissions (not just regulated emissions) will be addressed



• Water

- Average domestic use UK 150 l/person/day
- Part G of the UK Building Regulations, 125 l/person/day
- Theoretical usage worked out from assumptions and rated performance of systems, not metered use



- Code for Sustainable Homes
 - Government backed system, has overtaken all others
 - 6 levels of attainment, for new homes only
 - Covers energy, water, materials, waste, health, biodiversity, drainage, security, adaptability
 - Combination of tradable and mandatory standards
 - Mandatory, but not really (nil rating)







Image credit: OFWAT



Industry response

Revolutionary change

- Need to completely change approach
- Large house building companies can spare money for research
- Social housing as a test-bed: good, but...
- BRE
 - Innovation Park
 - Research, seminars and free guides in partnership with Energy Saving Trust
 - Certification of new technologies SAP Appendix Q
- Zero Carbon Hub (Public/private partnership, created by Govt. mandate) oversees and smoothes transition









Meanwhile in sleepy Saffron Walden...







Uttlesford Examples

- Planning framework allows local planning policies to set standards higher than building regulations e.g.
 - Percentage of on-site renewable energy ('Merton rules')
 - A Code for Sustainable Homes level

- Uttlesford has implemented both from 2008
 - 10% on-site renewable energy
 - Code for Sustainable
 Homes Level 3
 - Pushed consideration of requirements to the very start of the design process
 - No appeals!





Uttlesford Examples

- 1 4 Birdbush Avenue, Saffron Walden
- Required to achieve Code Level 3 under local planning rules, but not 10% renewable energy (has 9.8% anyway!)





Uttlesford Examples – Code level 3



 Solar panels, plus associated drainback vessel and thermal store



Uttlesford Examples – Code level 3







Uttlesford Examples – Code level 3

6,5

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A-rated washing machine, low flow taps, low volume bath



And on the Kāpiti Coast...





Kāpiti Coast examples

- Plan Change 75
 - 10,000 litre rainwater tank required for new homes (OR 4000 litre rainwater tank plus grey water system)
 - Condition of resource consent
 - Justified on basis of mitigating new house impact on water supply infrastructure
 - One developer challenging in the Environment Court
- RMA not allowed to address topics covered by Building Code
- Building Code talks only about ensuring 'an adequate level of energy efficiency'
- Could you justify requiring enhancements via RMA on basis of carbon abatement and/or energy security?







Lessons for NZ, part 2

- NZ standards of energy efficiency for new housing are well behind the UK
- Government intervention can transform markets for the better and drive innovation
- House building is not subject to 'carbon leakage' and therefore...
- When minimum standards are increased the playing field is kept more or less level, protecting profitability and competitiveness for house builders





Thanks!

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Further info at www.uttlesford.gov.uk/climate+change

Special thanks to Paul Kempkaram Thompson of PBBC Ltd for pictures and info on Birdbush Ave

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