# Biomass Heating

## Market & Policy Development

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**CAT**

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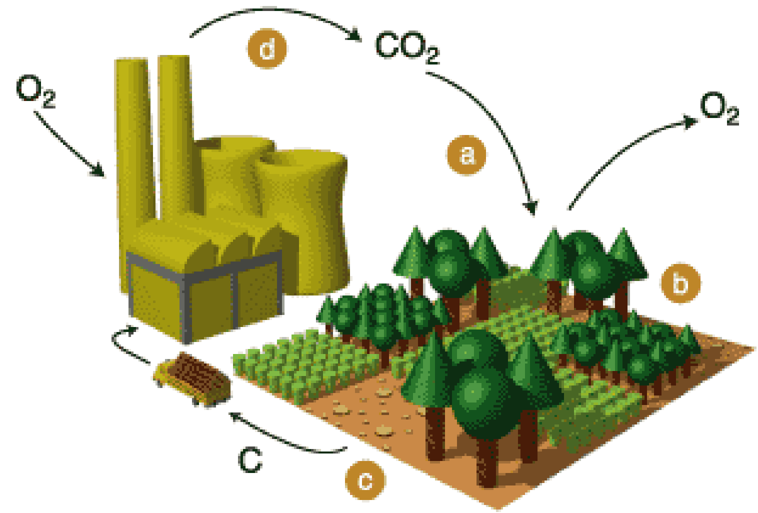
# Econergy Ltd: The Company

- A leading UK biomass heating supplier
  - Founded 1999
  - > 400 projects sold to date
  - Approx 80 schools, colleges etc.
  - 10KW to 2MW
  - 19% owned by British Gas
  - YPO/Pro5 Managed Biomass Service framework provider
- Econergy offering
  - biomass boilers
  - complete solution design & supply
  - district heating
  - biomass heat supply - sell heat
- Commercial market sectors:
  - schools, social housing, hospitals, universities, leisure centres, care homes, rural developments, offices, supermarkets, greenhouses etc.
- Domestic boilers
  - increasingly via installer network

**Hadley Learning Centre, Shropshire**
**320 KW wood chip boiler [PFI Project]**

# Biomass heat market

- Potential UK biomass heat market (RE Strategy, 2009):
  - Space/water heat in buildings
  - Process Heating
  - Up to 8% of heat (38Twh) by 2020 (3.2 million homes)
  - Renewable Heat Incentive (RHI)from April 2011
  - #2 RE potential after wind
- Market becoming mainstream
- Substantial fuel sources
  - UK forestry, waste wood
  - Energy crops from UK agriculture
  - Substantial pellet market
- Mature boiler technology
- UK wide installation




**Biomass Heating: Carbon Neutral Cycle**

- As trees grow they absorb CO2
- During photosynthesis the tree stores carbon in their woody tissues & O2 is released into the atmosphere
- At harvest wood fuel is transported to the heat or power generating plant
- As wood is burnt the carbon stored combines with O2 to form the same amount of CO2

# Important Market Sectors include:

**Government Departments**
Forestry Commission (14)
DEFRA
Foreign and Commonwealth Office
MOD

**Hospitals & Care Homes**
Royal Cornwall Hospital
Royal Victoria Hospital, Fife
Cyon Valley Hospital, Wales
Birtley House Care Home
Oxon Care Home

**Local Council Offices**
Worcestershire County Hall
Southwark Council, London
Maidstone Council
Bradford City Hall

**Leisure**
Doncaster Leisure Centre
Telford Leisure centre & theatre
Paignton Zoo Crocodile Farm
Bowood Golf Club & Spa
The Living Rainforest

**Social Housing District Heating**
Sheffield Homes (4)
Berneslai Homes, Barnsley (6)
Doncaster Homes
South Shropshire Housing Association
Bromford Corinthia Housing Association

**Education**
Bristol Council Schools (6)
Barnsley Council Schools (8)
Liverpool Schools (2)
University of Cambridge
South Lanarkshire Council schools (3)
Suffolk Council schools (4)
National Star College
Berkshire College of Agriculture
Royal College of Agriculture

**Rural Developments**
Duchy of Cornwall (4)
Aske Estate (4)
Kevin McCloud

**Charities**
National Trust (12)
RSPB

**Domestic**

**Commercial**
Marks & Spencer
Wessex Water
Skipton Building Society
The Co-operative Group

**Via Contractors**
NG Bailey
Balfour Beatty ESL
Crown House
Kier Group
Skanska
John Laing
Lorne Stewart
Mitie
Haydon Young
Crest Nicolson
Sir Robert McAlpine
Briggs & Forrestor
Dodd Group
Warings
T Clarke
Interserve
BAM

# Renewable Heating Sector: Why do we need an Incentive ?

- Heat Sector
  - 49% of all UK $CO_2$ emissions
  - 60% of domestic energy bills
    - 69% gas, 11% oil, 14% elec
- Gas source
  - 2008: 25% imported
  - >> 2020: 60% imported
- Strong measures in place/ planned for energy saving:
  - Domestic: CERT, CESP
  - Commercial: CRC
  - Planned 2010 energy bill
- On/off grants (now all off)
  - Do not build supply chain or attract investment
  - 1% of heat is renewable today
- 2020 UK RE Target of 15%
  - Will not get there without significant amount of heat

Data Sources: DECC (Feb 2010): RHI Consultation, RHI Impact Assessment, FIT Impact Assessment; OFGEM RO Annual report 2008/2009 & Grid Rolling Average of 0.54055 kg $CO_2$/kWh

An RHI will deliver:

- 12% (73 TWh) of heat by 2020
  - small & large (ie ROCs + FITs)
- 60 mt $CO_2$ saving by 2020 at £57 - 75/tonne compared to:
  - onshore wind: £101/tonne
  - biomass electricity: £150/tonne
  - offshore wind: £202/tonne
  - FIT cost at £460/t $CO_2$

  => lowest cost RE sector
- Fuel security
  - diversity & local production
- Green jobs
- Minimal short term impact on customer bills (3% by 2015)

# Biomass Heating
# Potential Market by 2020

**Chessington Community College wood pellet heating, Royal Borough of Kingston**

**National Trust Cottage, Oxfordshire Domestic pellet boiler**

- **Potential biomass heating market**
  - 29 TWhs* commercial & DH
    - c. 6,000 installations pa for 10 years
  - 7 TWhs* domestic
    - 45,000 installations* pa for 10 years
- **Target sectors**
  - Individual domestic
  - Social housing community heating
  - Rural dwellings
  - Fuel poverty
  - Public sector & LAs
  - Industrial & commercial
- **Target Rate of Return: 12%**
- **Provisional rates (from consultation):**
  - <45kW 9p/kWh deemed
  - 45 to 500kW 6.5p/kWh deemed
  - >501 kW 1.6 to 2.5 p/kWh metered
- **Rates & deeming structure will be reviewed by new Government**

** Source: NERA RH Supply Cost Study July 2009; No of Commercial installations estimated by Econergy from TWhs*

# What may the RHI be worth ?

Based on rates in Consultation

- Domestic 15 kW boiler
  - 4 bed house, 120m2 with cavity wall (BRE stds)
  - Deemed heat 20,686kWhs
  - RHI cash: £1,865 / yr
    - At 9p/kWh deemed

- Community heating retrofit (3 blocks & mains under road)
  - 75 x 1 bed flat
  - 75 x 2 bed flat
  - Insulation & indiv metering
  - Deem: 1.17m kWhs
  - Actual: 1.4 mkWhs pa
  - RHI= c. £80,000 pa
    - At 6/5p/kWh deemed + 2 p/kWh over deemed amount

# Wood Fuel
# Supply sources & Sustainability

- 2020 UK Government Biomass heat target: 38TWh
  - Requires 11 million tpa of wood fuel: c.£1 billion pa
- Wood fuel sources (1):
  - Forestry & sawmill residues, arboricultural arisings, under managed woodland, incl. domestic pellets: 3-4 m tpa possible by 2020
  - Energy crops: short rotation forestry, willow, poplar etc.
    - c.700,000 hectares by 2020 possible (>9m tpa)
  - Wood pellets
    - Very substantial - supply not believed to be a limited if imports included
    - eg. >£6 billion of wood products are currently imported into the UK
  - Recycled waste wood: > 4m tpa available now (mainly for industrial plant)
- Low carbon, sustainable sourcing is becoming essential
  - Criteria for legal and sustainable sourcing already defined for central Gov procurement
  - e.g. Sustainability assessed for YPO/Pro5 biomass managed service framework
- (1) Wood fuel sources: A supply scenario estimated by Econergy based on information from e4Tech reports to DECC 2009, Biomass Energy Strategy (DEFRA) 2007, Forestry Commission statistics (2009)

# Fuel sustainability & GHG saving

- Feb 2010: EU Report on Sustainability for solid biomass*
  - Deemed low risk for EU (& NA) forest residues for chip & pellet (when dried using biomass) & > 90% $CO_2$ reduction
  - EU propose deminis for reporting of >1MW
  - Non mandatory
  - New Calculation methodology
- Wood chip <u>and</u> pellet are very low carbon*
  - 1 $gCO_2/MJ$ emissions for wood chip from European forest residues
  - 2 $gCO_2/MJ$ for wood pellet from European forest residues
  - 87 $g/CO_2/MJ$ for oil
- RHI Consultation: Proposes similar reporting to ROCs for >45kW
  - This requires reporting of sources
- DECC Biomass Sustainability Stakeholder Group
  - Health warning: this is very much in flux & subject to change
  - Gov Depts. Trade associations, NGOs etc.
  - Likely to follow EU guidance (ie 1mW deminimis), but not yet discussed with new Ministers
  - Likely to require reporting from April 2011 onwards
- Need to be proactive from PR perspective

* REPORT FROM THE COMMISSION TO THE COUNCIL AND THE EUROPEAN PARLIAMENT on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling, Feb 2010
http://ec.europa.eu/energy/renewables/bioenergy/sustainability_criteria_en.htm

# Fuel Supply Development

- Wood chip
  - Regional companies receiving investments
    - Silvapower (Yorkshire)
    - Midland Wood Fuel
    - Forest Fuels (South West)
  - Rural estates
  - Councils considering self supply
  - Large national chip suppliers
- Pricing (cost of heat)
  - 2.4 to 4 p/kWh
  - Depends on region, delivery volume & delivery vehicle
- Wood pellet
  - A number of national or regional suppliers
    - Balcas
    - Lantmannen Renewable Fuels
    - Forever fuels
  - Lots of interest from new suppliers
- Pricing commercial
  - 4 to 5.5 p/kWh
  - 5 + tonne deliveries

See DECC RHI Consultation supporting document:
"Biomass Prices for Heat and he Electricity Sector in the UK"
for current and forecast price scenarios
Jan 2010 by E4Tech

# High Integrity Supply Now Required e.g. Biomass Heat Supply to 8 Schools

- Single 3 year heat supply contract for 8 schools
  - 10 million kWHs biomass / yr
  - > 3,000 tonnes / yr
  - Sold as heat (kWhs) out of the boiler
- Required to deliver 95% of heat from biomass over year
  - Defined dedicated wood fuel stock levels
  - 2 fuel supply sub-contractors providing mutual back-up
  - Fuel quality assurance
- Support
  - Local operation by FM provider
  - National service team
  - 3 call-out priorities
  - Local & national spares
  - Periodic preventative maintenance to maintain optimum performance

# Air Quality

<u>Current Regulation</u>

- Exempt appliances under the Clean Air Act (CAA) for smoke control zones or air quality management areas
- Part J Building regulations for flues
- Flue design according to CAA

- Local Authorities control emissions
  - Flues need to be assessed for all boilers > 45kg/hr (c. 150kW)
  - May need dispersion modelling
  - Advanced filters starting to be required (eg London, Sheffield)

<u>Emerging Regulation:</u>

- UK Wide
  - New limits proposed in RHI
    - 150 mg/MJ NOX
    - 30 mg/MJ (very tight)
- Urban areas
  - GLA proposals
    - to include in planning process
    - Likely to require advanced filters in all PM10 AQMAs
  - Other inner cities may follow

# Emissions: Gaining Approval & Optimising Performance

**Boiler selection**

**Fuel selection / quality control**

**Design Flue, Buffer, controls**

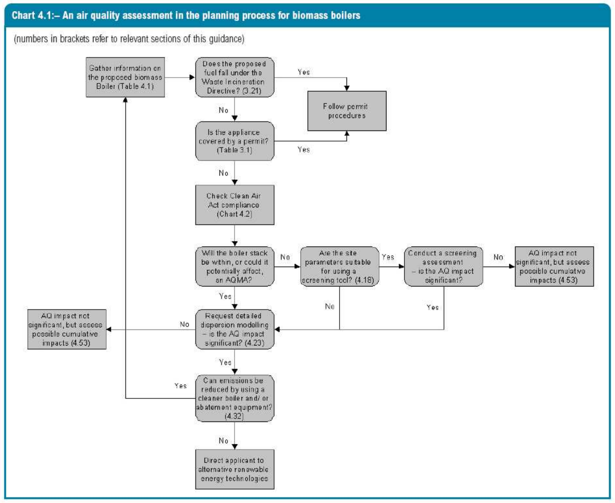
**Advanced Filters (if rqd)**

**Operation & Maintenance**

**Air Quality Assessment**

See **Environment Protection UK's "Biomass & Air Quality Guidance"(1)**

$4 & charts 4.1 & 4.2




1) Download Guidance document at: www.environmental-protection.org.uk/biomass/

# Econergy: Low Emissions Solution Sheffield Greenland District Heating

- Retrofit base load biomass community heating to 380 flats
- 2 x 500kW Froling 500kW wood chip boilers (50%mc)
  - Underground bunkers
- 2 Ceramic filters
  - PM10 / PM2.5s << 5 mg/MJ
- Part British Gas CERT funded


# Certification

CURRENT

- Domestic < 45kW
  - MCS Product & Installer certification
  - Clean Air Act Exemption
  - Energy Technology List
  - CE mark
- Commercial
  - Clean Air Act Exemption
    - Particulate emissions & documentation
  - Energy Technology List
    - Efficiency, documentation CE Mark
- Certification above or similar typically required for grants, CERT & CESP

FUTURE

- Domestic
  - Will most likely require MCS for RHI
  - Will most likely require tighter emissions limits for RHI
- Commercial
  - MCS possible to 300kW (but unlikely in short term)
  - Alternatively, likely to require CAA exemption, ETL & tighter emissions limits

# Building the Supply Chain

- Domestic
  - REAL code
  - MCS product & installer
  - Training
  - Capacity
- Commercial
  - Complete biomass solution providers
  - Boiler only suppliers
  - General Consultants & M&E contractors
  - Still needs design & commissioning certification, but will take some time

# RHI Administration

- Must be very simple and hassle free for customer to access
- Ofgem to administer scheme
- Simplified registration through MCS for domestic
- Ofgem's new eServe set-up to deliver administration

# Financing

<u>RHI Financing</u>

- Large upfront cost a barrier to many customers
- RHI provides income stream, potentially enhanced by deeming
- Market could provide finance
  - British Gas, B&Q & others trialling Pay as You Save (PAYS)
  - Substantial ESCo interest
  - Councils use RHI to secure low interest loans
- Permanent assignment of RHI payments required
  - Allows payment to go straight to financier
  - Cuts credit risk to allow lower cost of finance

<u>Other Financing</u>

- CERT & CESP available for biomass community heating
  - CERT to Mar 2011 & possible extension
  - CESP to Mar 2012
- CSEP Grant
- Some regional grants (eg RDPE, North East)
- SMEs: Carbon Trust zero interest loans
- National grants closed
  - Bioenergy capital grant
  - LCBP grants

# RHI Timetable

- Feasible RHI timetable:
  - Response to RHI Consultation (July)
  - Secondary Legislation (Oct)
  - Publish final RHI details (Dec)
  - Launch April 2011
- Need New Government to re-confirm RHI timetable

# Next Steps

- Securing the RHI in 2011
  - Energy Act 2008 had all Party support
  - Since election, Ministers have reaffirmed importance of RHI
  - DECC team are progressing with Consultation response
  - RHI details are subject to change following consultation
  - Cost is substantial (but less than all other renewables)
- Educating the media, customers & supply chain
  - Energy, Heat, Electricity
  - Renewable Energy is more than solar & wind
  - Energy saving
  - Renewable options
- Addressing concerns
  - Product & installer quality
  - Fuel security & sustainability
  - Air Quality

# Summary

- All political parties are committed to the RHI introduction
- Air Quality regulation will become tighter in pragmatic steps
- Fuel sustainability will be addressed
- Major players are positioning themselves for substantial investment in the supply chain
- The market is set for very substantial growth from 2011 onwards