

Introduction to wood fuel and the RHI



Heartwoods
West Midlands Wood Fuel
Project

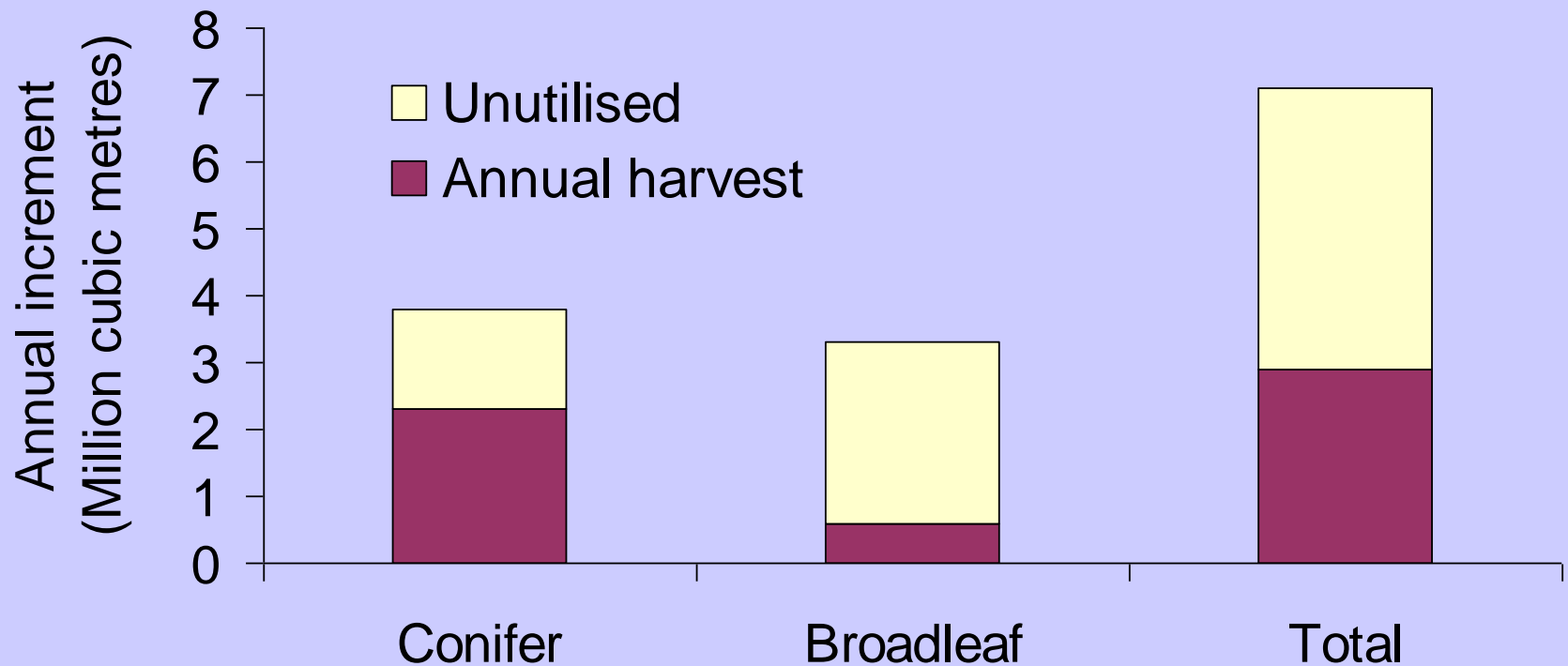
Overview

- Why woodfuel?
- How woodfuel is currently used
- Renewable Heat Incentive

Why Woodfuel?

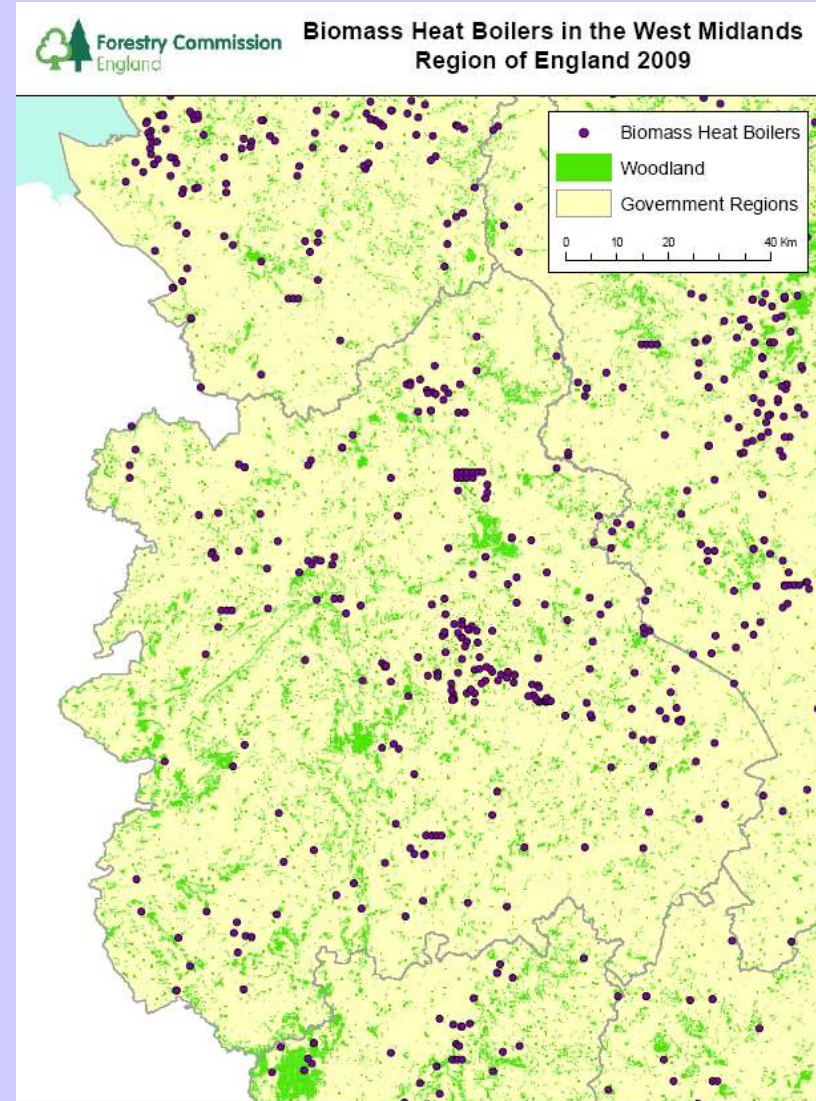
- Carbon lean, 95% CO₂ saving over oil
- Secure, renewable, and already there and under-utilised ! No fuel/food/land use debate
- Well distributed, therefore lends itself to decentralised generation
- Creates rural employment
- Landscape & biodiversity benefits

The Resource: 2 million tonnes pa



West Midlands

- 350+ installations
- 13% of English installations
- 54 MWth+
- 10% of English installed capacity



Produced by Policy & Programmes Group, Forestry Commission England, 9 December 2009. Contact: david.kcross@forestry.gsi.gov.uk.
 Source: Renewable Energy Association Ltd Heat Data Survey 2009. Locational accuracy of boilers varies from within about 200m for many, to others where only the county is known; the latter are plotted at a nominal location near the centre of the respective county. Woodland data from National Inventory of Woodlands & Trees (NINW11). Forestry Commission.
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How is Woodfuel Used?

- Around 3000+boilers in England
- Most common application is heat production using woodchips, logs or pellets
- Growing interest and application of ‘district heating’ systems
- Scattered distribution of woodlands suits many small markets using 10’s or 100’s of tonnes each year
- Large scale power generation market potentially huge, around 16 biomass plants in operation and around 30 planned. Wood is just one fuel amongst many including straw, poultry litter, residue from palm oil, paper sludge etc.

Don't Forget Firewood?

The other end of the spectrum

- Logs - c£120 per tonne
- Stove Industries Alliance reported c160,000 stove sales in 2008/09, If each burns just 1 tonne of wood p.a. = 160,000t wood + £19.3m annually
- The sales figures for this year are reported to be significantly higher

Renewable Heat Incentive

Main Points To Cover

- The Importance of Renewable Heat
- The RHI – Introduction
- Tariffs
- Income Stream
- Worked Example
- Key Check List
- Next Steps

Renewable Heat Market...

...the Sleeping Giant

RHI is designed to put the UK on a path to achieving Renewable Energy Targets

- 15% of UK's energy to come from renewable sources by 2020 - EU Directive
- 11-12% of heating from renewable sources by 2020 including:
 - 110,000 commercial and public sector installations by 2020 (25 % of demand in these sectors)
 - 13,000 industrial installations
 - **< 1% of heat today from renewable sources**
- Heating accounts for 47% of UK's CO2 emissions
 - 69% gas, 10% oil, 14% electricity
 - 2 million homes on oil - a key target segment for renewable heat
- Modern wood heating likely to be at least 40% of renewable heat target & could be a lot more

New RE Heat policy

- Feed-In Tariffs for Renewable Heat
- Value for money is key
- Two phase approach – second phase of the scheme from 2012
- July 2011 – commercial/industrial, public sector, not for profit, domestic district heating
- Domestic included from 2012–initial support through Renewable Heat Premium Payments – c.£950
- Fewer technologies supported in phase 1 to allow further evidence gathering
- Two-tier tariff for biomass <1MW
- Funded from Government spending

RHI Phasing for Modern Wood Heating

- Long term support (adjusted for inflation) to compensate for:
 - Capex of renewable heating compared to a gas fossil fuel alternative
 - Additional barriers and financial cost
- Parliamentary approval in July 2011 and EU State aid approval recently
- Phase 1: Applications taken from 28 Nov 2011
- Phase 2: Oct. 2012
 - domestic RHI launched alongside the Green Deal
 - certain levels of insulation/efficiency will be required

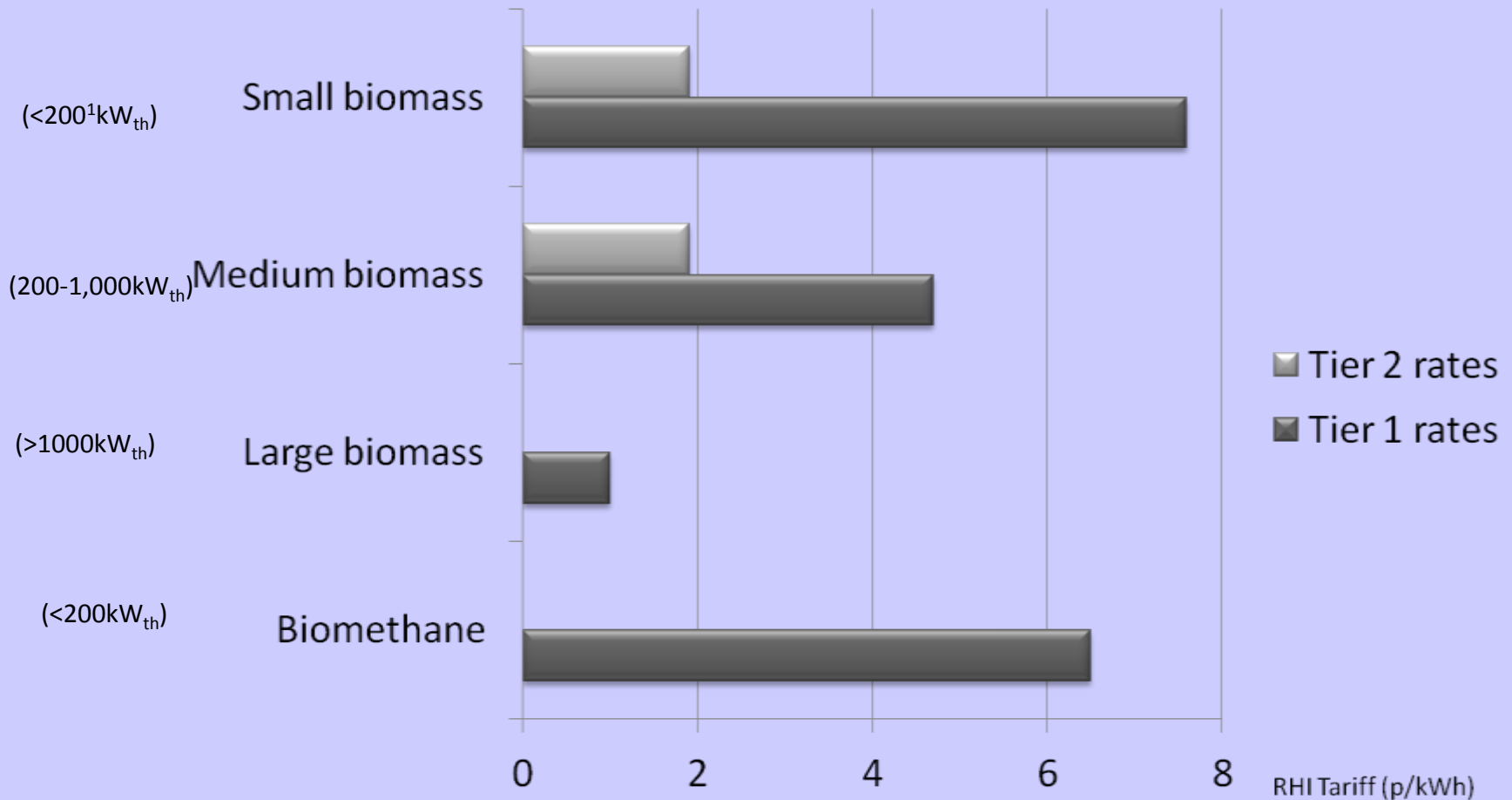
RHI Scheme key eligibility facts for phase 1

- Non-domestic RHI
 - public sector
 - community & not for profit
 - Industrial
 - domestic community heating – more than one building heated
- Includes
 - forest residue, pellets, logs (in boilers not stoves), waste wood even if contaminated
- RHI paid to **owner** of boiler system for 20 years
- For eligible installations commissioned after 15/7/2009 – public grants must be paid back
- Paid based on **metered** heat output
- Installations >1MW change from 2.6 p / kw to 1p / kwh to comply with EU

Non-Domestic Tariffs for Biomass Heating

| Tariff Name | Eligible Technology | Eligible Size kW nominal output thermal | Tariff rate * (pence/kWh) | Tariff Duration (years) | Support Calculation |
|----------------|--|---|----------------------------|-------------------------|---|
| Small Biomass | | Up to 199 kW | Tier 1: 7.6 Tier 2: 1.9 | | Metered Tier 1 applies annually up to tier break – Tier 2 above the tier break. The tier break is 1,314hr x installed capacity (kW) |
| Medium Biomass | Solid Biomass (includes wood chip, wood pellet, wood logs) | 200 kW to 999 kW | Tier 1: 4.7 Tier 2: 1.9 | 20 | |
| Large Biomass | | 1000 kW and above | 1 | | |

Tariffs for biomass vary from up to 7.6p/kWh down to 1p/kWh



Tiers provide higher incomes for smaller systems for initial period of operation each year (1,314 "peak load hours" X system size)

“Tier” system only applies to small and medium scales in recognition of their higher unit costs but to also prevent “gaming”

How it works:

- Allow for first 1,314 “**peak load hours**” (equivalent at full load of the boiler’s Maximum Combustion Rate) in **each 12 month period** to be claimed at the “Tier 1” level;
- Any additional output will be claimed at the lower, “Tier 2” level.
- **For a hypothetical 500W_{th} boiler which delivers 1,750,000kWh of heat in a year (CF~0.4):**
- 500kW X 1314 = **657,000 kWh** eligible at 4.7p/kWh (Tier 1 Tariff rate for Medium biomass systems)
- 500kW X 2186 = **1,093,000 kWh** eligible at 1.9p/kWh (Tier 2 Tariff rate for Medium biomass systems)
- Thus annual receipts could be:
- £30,879 (Tier 1 Tariff receipts) + £20,767 (Tier 2 Tariff receipts) **Total: £51,646 per annum**
- The figure of 1,314 hours is designed to represent a Load Factor of 15%

Case Study

Small Off-Gas Grid: Income / payback ?

- 150kw wood pellet boiler to heat a retail store (£100,000 installation)
 - Current: old oil boiler
 - 37,000 l /yr at 50 p/l (5.7 p /kwh)
 - £23,200 oil cost pa
 - Site survey 208,997 kwh annual heat load
RHI Tiered Payments
150 X **1314** = 197,100kwh
197,100kwh X **7.6p** = £14,979.60
11,897kwh X **1.9p** = £226.04
RHI Annual payment = £15,205.64
 - 85 tonne/yr at £200/tonne (4.1 p/kw)
 - £17,000 pellet cost (4.1 p /kwh)
- RHI over 20 years (no indexation) **£304,112.80**
- **Net benefit (fuel + RHI)**
 - **£20,405= < 5 yr payback**



Where to look for wood heating opportunities?

Initial information required:

- Customer, building type(s), competing fuel, & location
- Economic driver(s)
 - **Fuel price and availability**, RHI, CRC, Planning, Building Regs?
 - ROI required (yrs, %)?
- Boiler sizing
 - Peak heat demand & heat profile – **KEY ISSUE**
 - Current boilers – sizing, usage, retain or scrap?
 - Building(s) floor area – efficiency upgrade?
 - Gas / oil usage now and in future
- Layout & distances (drawing)
- Space and access – **KEY ISSUE**
 - Plant room
 - Fuel store
 - Delivery lorry access (tip (chip), blown (pellet) etc.)

Conclusions

Key Check List

- Good financial payback with the RHI?
- Fossil Fuel boilers more than 10 -15 years old?
- **Space & access essential for fuel – key aspect of consultancy support**
- Experienced consultancy or wood heating company design support available?
- Boilers and suppliers / installers accredited (MCS)?
- Ability to fund high capital cost? OR.....
- ESCO or boiler finance
- **Wood fuel supply (if chip), national or imported supply if pellet?**
- Self-supply (Farm / Estate) offers even better ROI with fuel costs between £50-£100 for woodchip
- Security of fuel supply
- Education or PR opportunities

Next Steps

More information

- www.decc.gov.uk/rhi to see:
 - Policy document, Draft regulations, Impact assessment and supporting documentation, Frequently asked questions
- For queries e-mail rhi@decc.gsi.gov.uk
- For technical queries on biomass fuel see www.biomassenergycentre.org.uk
- Carbon Trust Biomass Heating Design Guide – www.carbontrust.co.uk
- Environmental Protection UK: Biomass and Air Quality - <http://www.environmental-protection.org.uk/biomass/>
- **Get good advice!**

Thank you

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Wood fuel sources and sustainability

Are there enough trees?

- 2020 UK Government Biomass Heat Target: 38TWh
 - **Requires 11 million tonnes per annum of wood fuel: > £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 limited if imports included
 - eg. >£6 billion of wood products are currently imported into the UK
 - Recycled waste wood: > 4m tpa available now (industrial plant only)
- Low carbon, sustainable sourcing is essential