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SUSTAINABLE DEVELOPMENT BIOMASS RENEWABLE ENERGY

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A Local Authority Biomass Supply Chain; experiences in North Lanarkshire and Stockport

November 2013

Councils operating or planning wood fuel depots

- Stockport
- North Lanarkshire Council
- Oldham Council
- Bristol City Council
- North Aryshire Council
- Barnsley
- ??

Wood energy and biomass - definitions

Biomass constitutes the largest source of renewable energies in the EU (66%), and

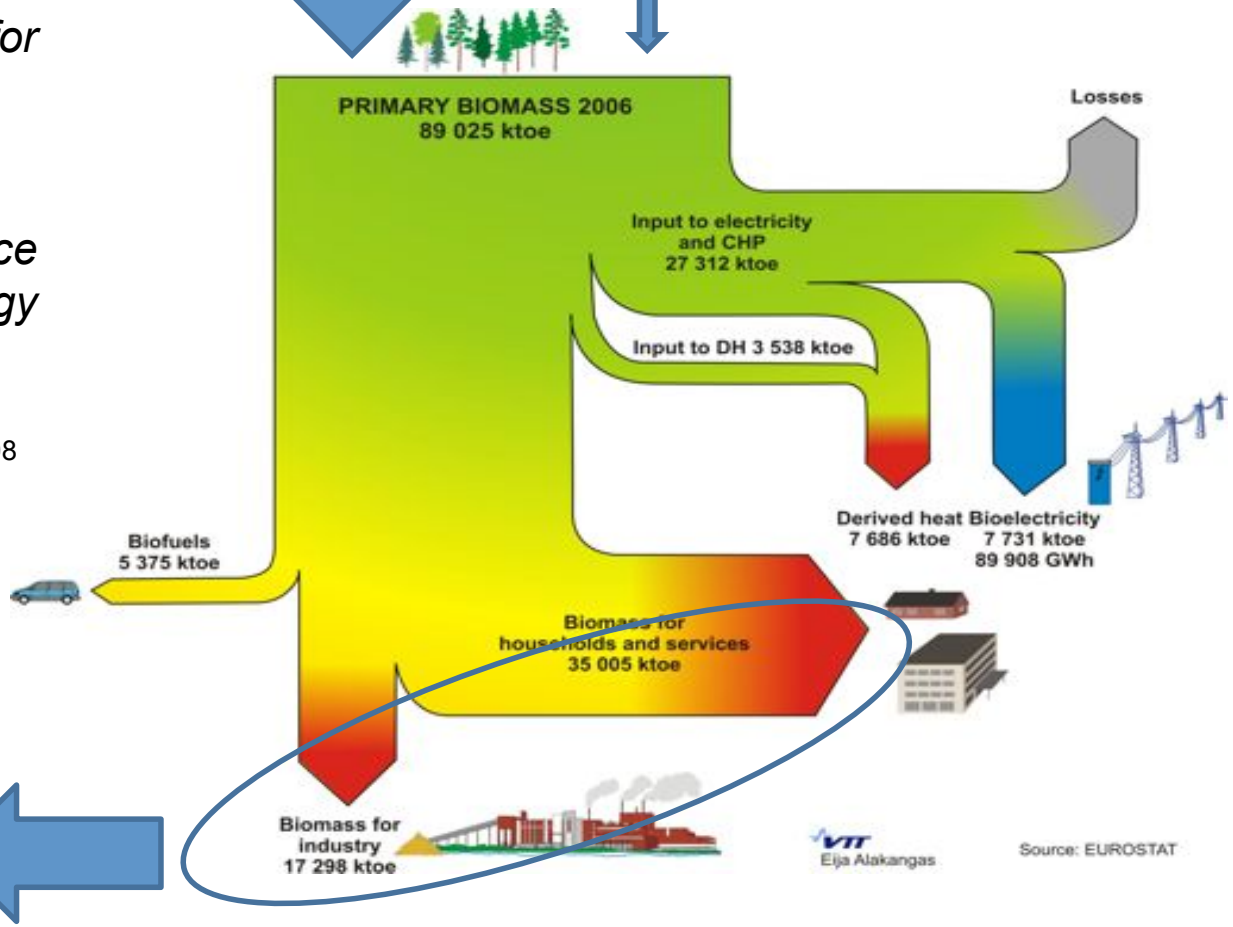
Wood is the major source for biomass (89%).

Thus, wood is the major source for all renewable energy generation in the EU = 59%

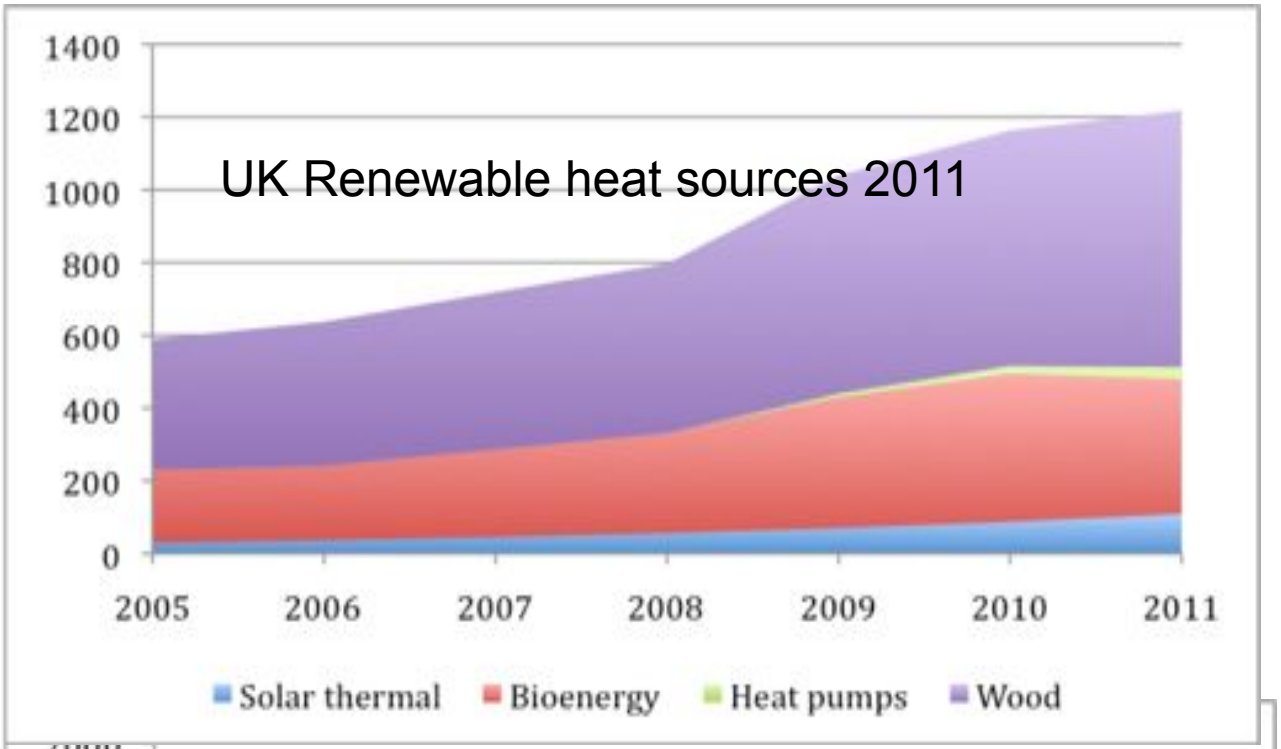
Source: UN Economic Commission for Europe 2008

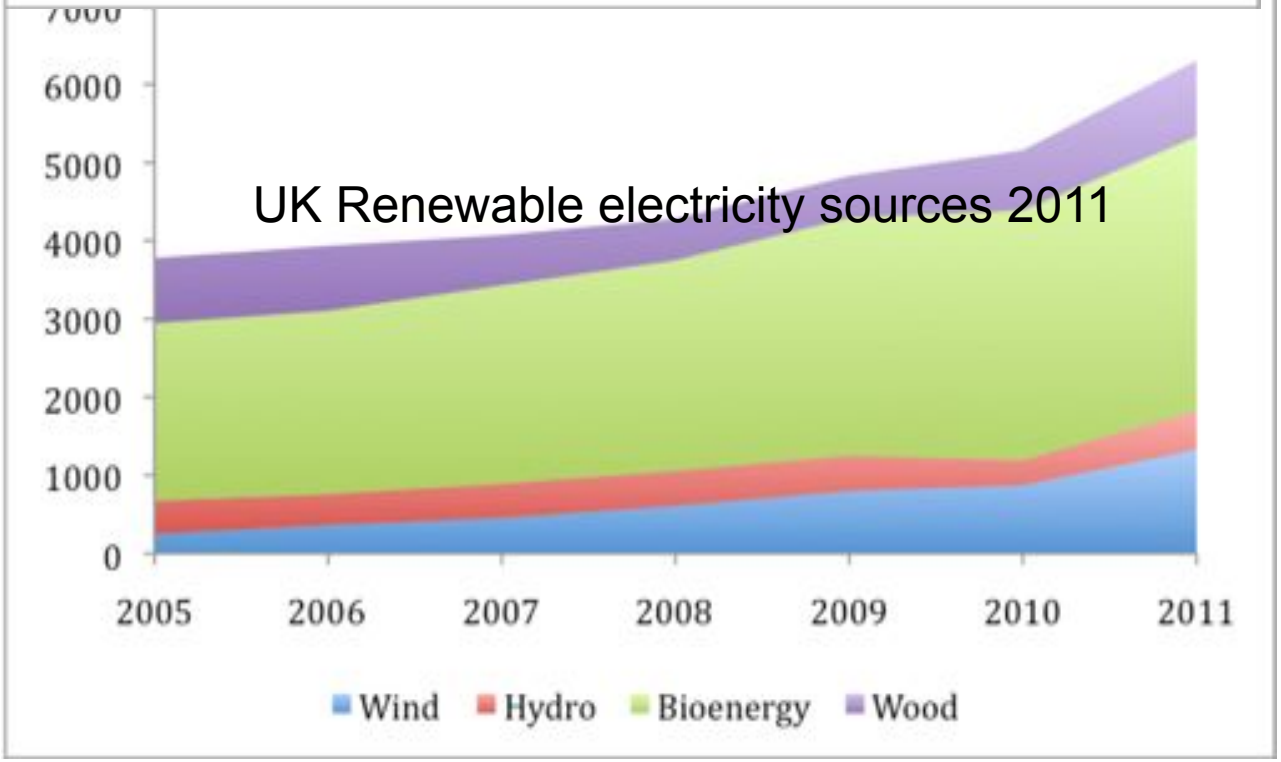
In mostly 89% wood

11% plant and animal biomass, Waste, landfill gas etc



Out mostly heat





Wood Renewable heating:

59%

2 million tonnes wood pa

Wood renewable electricity:

5.7%

1.5 million tonnes of wood pa

Overall

Provides about 20% of RES

Policy targets for renewable energy (presently at 3%)

EU

20% renewable energy by 2020

UK

•15% of energy demand from renewables by 2020

Scottish

•100% electricity demand equivalent from renewables by 2020

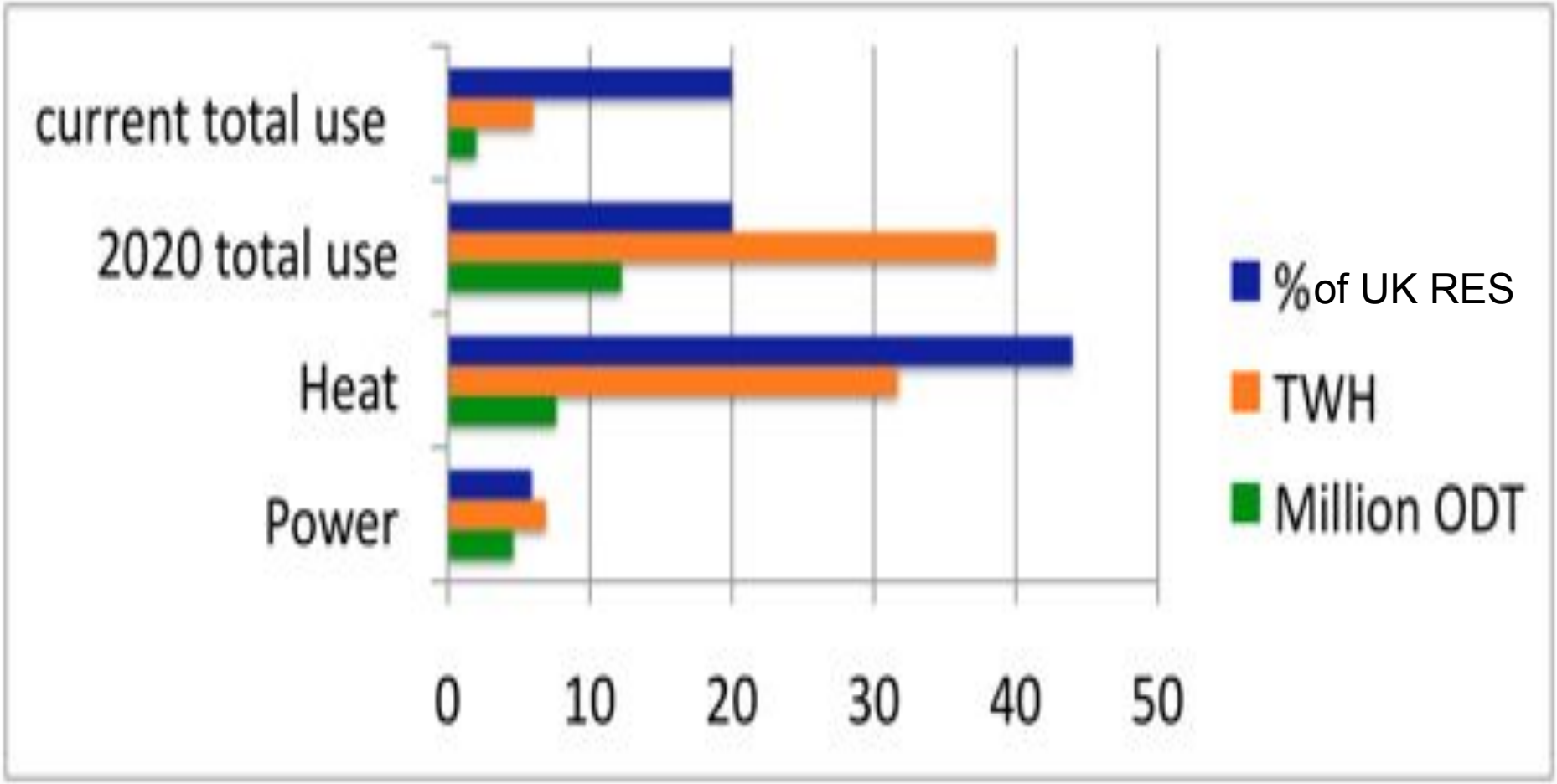
•11% heat demand from renewables by 2020

•At least 30% overall energy demand from renewables by 2020

•500 MW community and locally-owned renewable energy by 2020

•The Climate Change (Scotland) Act setting a 42% reduction target for 2020 (the UK has a 26% target)

A summary forecast to 2020 of wood energy



Key points:

- wood energy is/will be one of the most important RES

- wood will provide much of our renewable heat

Biomass in Scottish Councils in 2009

Around 12MW installed

47 systems in total

Average size 256KW

In 2013?

Guess we can double these figures

Installed System	Council	Capacity (KW)
Inverlochy Primary School	Highland Council	150
North Coast Leisure Pool (Bettyhill)	Highland Council	150
Avoch Primary School	Highland Council	110
Hilton of Cadboll Primary	Highland Council	150
Abernethy Primary	Highland Council	150
Lochyside Primary	Highland Council	150
Averon Leisure Centre	Highland Council\Leisure Centre	150
Dingwall Primary School	Highland Council	150
Lochbroom House	Highland Council	100
Russell Road Vehicle Depot	City of Edinburgh Council	360
Care Home (non operational)	City of Edinburgh Council	300
Vogrie Country Park (Dalkeith)	Midlothian Council	330
Palacerigg Country Park (Cumbernauld)	North Lanarkshire Council	50
Drumpellier Plant Nursery (Coatbridge)	North Lanarkshire Council	220
Calderhead High School (Shotts)	North Lanarkshire Council	500
Braodwood Staduim	North Lanarkshire Council\NNL	200(e)
Taylor High School (Motherwell)	North Lanarkshire Council	500
Aqualibrium Leisure Centre (Campbeltown)	Argyll & Bute Council	360
Berwickshire High School	Scottish Borders Council	300
Eyemouth High School	Scottish Borders Council	300
Earlston High School	Scottish Borders Council	300
Airlie Primary School	Angus Council	120
Tannadice School	Angus Council	300
Ladyloan Primary School	Angus Council	200
Seaview Primary School	Angus Council	250
Aboyne Acadamy	Aberdeenshire Council	1,000
Pitlochry High School	Perth & Kinross Council	220
Alyth Primary School	Perth & Kinross Council	300

Aberfeldy Community Campus	Perth & Kinross Council	Installed capacity
Blairgowrie Community Campus	Perth & Kinross Council	
Crieff Community Campus	Perth & Kinross Council	
Rural Cluster Primary School, Peel Farm	Angus Council	45
Forfar Academy	Angus Council	850
Monifieth High School	Angus Council	850
Websters High School	Angus Council	850
Telford Centre	Highland Council	200
Mallaig Hostel	Highland Council	300
Lochaber High	Highland Council	500
Wick High	Highland Council	500
Lairg Primary	Highland Council	150
Halkirk Primary	Highland Council	300
Acha an aus (home)	Highland Council	200

What is the size of the possible Council market?

- 8,500 buildings
- £65-£75 million pa on gas

Fuel costs

- £29/MWh wood fuel
- £30/MWh gas

- RHI £20 to £80/MWh

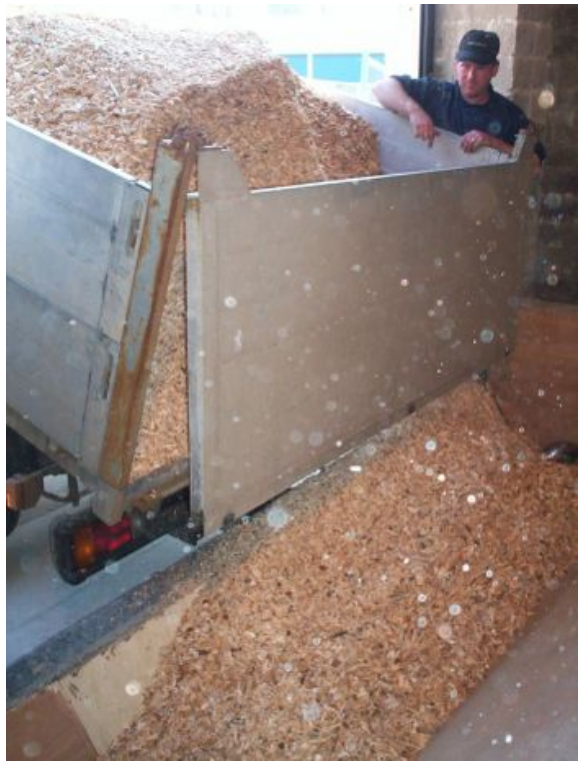
Typical current investment case in public buildings

Biomass heating system
Capital cost: £450-700,000
Return: £37-60,000 per annum
20yrs CO_2: 6,000 tonnes
IRR 7.4 to 10.7%

Solar PV power array
Capital cost: £375-450,000
Return: £34-35,500 per annum
20yrs CO_2: 1,840 tonnes
IRR 7.1 to 10.6%

Note the IRR is better than wind

What it is: heating a primary school



What it is: 100KW boiler heating sheltered housing

What it is: Sports Centre 400KW boiler Fort William

What it is – 500KW boiler for School

What it is: wood fuel production

What it is: wood fuel delivery

Why should a Council develop a wood fuel depot?

- **To secure long term sustainability of supply**
- **To secure stable biomass prices**
- To secure lower cost biomass (marginally)
- To use its own underused woods and wood
- To help manage/extend its woodlands
- To grow energy crops (in the future?) on underused land assets

North Lanarkshire depot – operated under an open book lease by a contractor

Site	Actual tonnes 2011/12	Possible long term tonnes
Broadwood	83.95/t	100/t
Coltness	192/t	429/t
Drumpellier	143.34/t	94/t
Palacerigg	65.42/t	27/t
Taylor HS	203/t	278/t
Calderhead	nil	400/t
Chryston	nil	400/t
Totals	688/t	1728/t

Wood fuel depot -process

Large agricultural shed (20m x 30m x 4.5m)to store chips, perhaps with a mechanical under-floor drier

Mobile chipper rented perhaps 25 days a year

Contract and in house haulage options

1.6h to 2h of level dry land and ideally surfaced land to store and dry logs

Possible sources of wood fuel feedstock

- Urban woodlands
- Recycled wood
- Arbor, parks and gardens etc
- Commercial forestry
- Energy crops
- Sawmills co-products

Stockport Homes/Council x 5 highrise

Demand = 6,875 tonnes

Source (all figures in tonnes pa at 35% MC)	Theoretical availability of wood fuel	Likely actual availability for a depot
Urban Woodlands	28,000 t	7,000 t
Aboricultural arisings	3,500 t	700 t
Recycled wood	200,000 t	10,000 t
Commercial Forestry	160,000 t	80,000 t
Energy Crops	2,323 t	370 t
Sawmills co-products	37,800 t	3,780 t
Totals	**431,623 t**	**101,850 t**

Urban Woodlands
Woodlands Satellite Mapping data

Council	LA area (HA)	Woodlands area (HA)	Sustainable theoretical annual tonnes at 35%
Bolton	13,980	1,286	3,215t
Bury	9,948	591	1,477t
Manchester	11,565	725	1,813t
Oldham	14,278	321	802t
Rochdale	15,808	595	1,488t
Salford	9,719	872	2,180t
Stockport	12,606	1,180	2,950t
Tameside	10,313	1,211	3,027t
Trafford	10,604	522	1,305t
Wigan	18,819	1,304	3,260t
Totals	**127,640**	**8,607**	**21,517t**

Data sourced from Redrose Forest and via 2009 and 2011 aerial photography – Greater Manchester Tree Audit (GMTA Consortium/Bluesky)

Tonnes at 35% calculated as if 100% of the woodlands are managed and 100% of the yield is used for wood fuel feedstock

Excludes Warrington, Cheshire East and Cheshire West and Cheshire Councils (adds 6,453 tonnes?)

Depot development issues

- Own and operate (in house)
- Own and lease
- Facilitate and long term purchase arrangement
- Pay the right price (all wood has a market)
- Secure supplies in different means
  - Gate fees
  - Disposal
  - Spot contracts
  - Long term contracts

And finally….sources of UK RES in 2010 (i.e. an established sector)

Of which c60% is heat and c40% is power