

APSE Scotland building and housing seminar

The Solutions –Biomass  
Planning ‘the right’ Investment in Wood  
Energy in Housing

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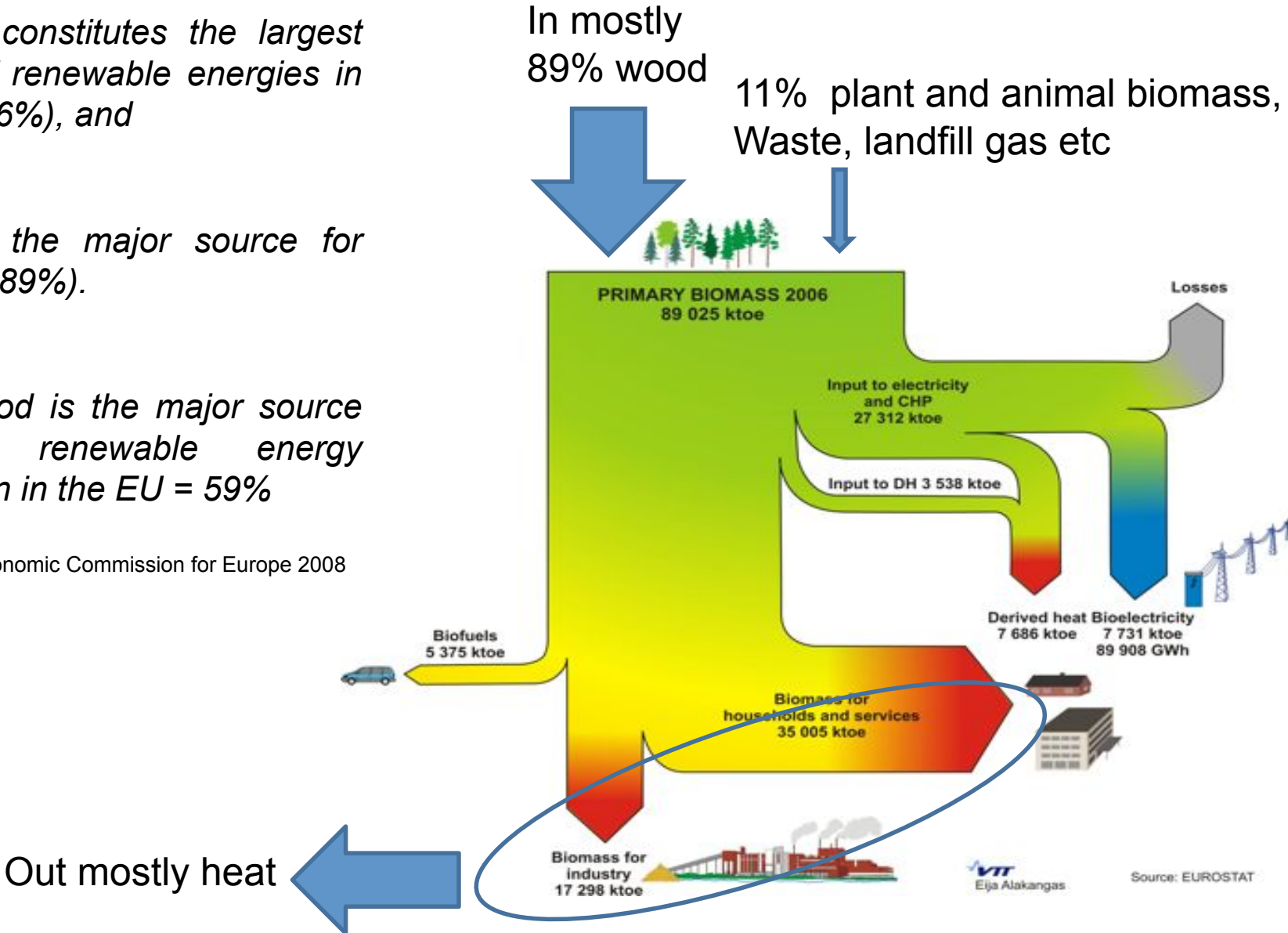
# Wood energy and biomass - definitions

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

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

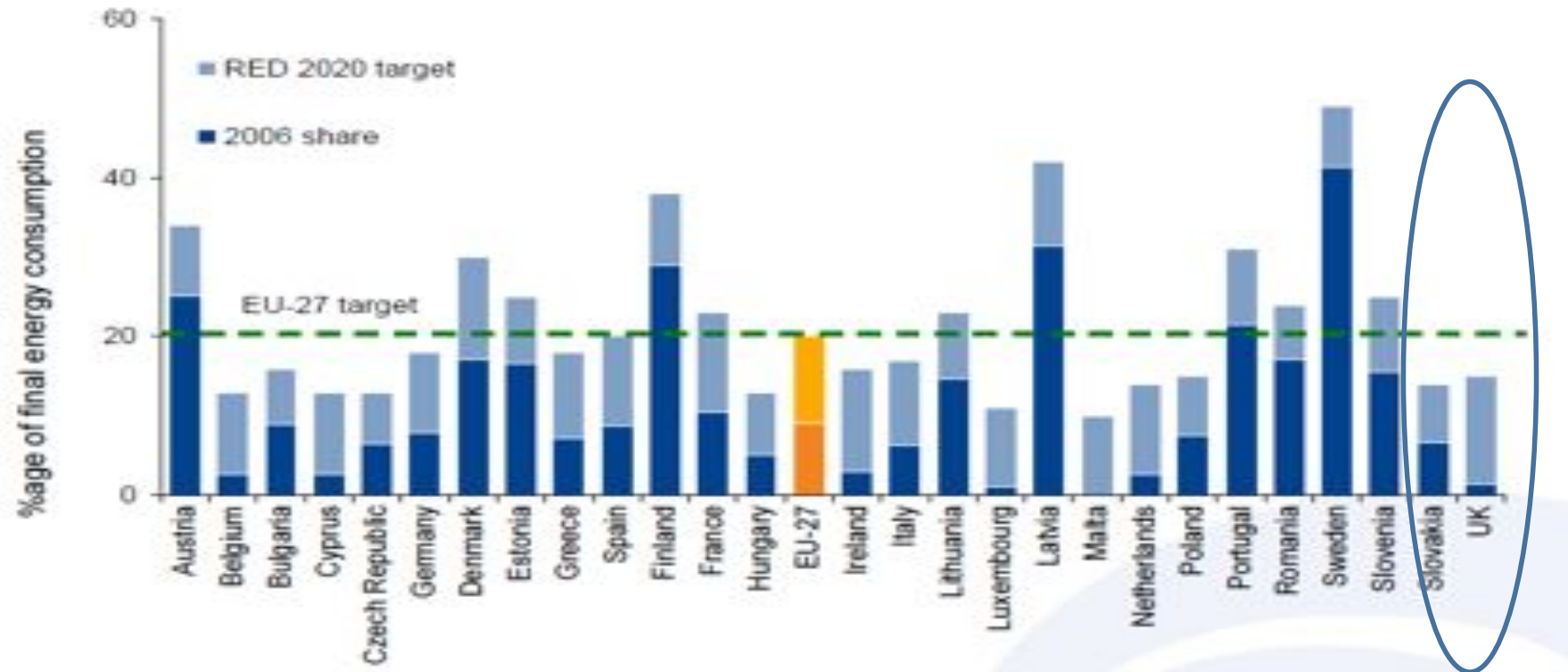
*Thus, wood is the major source for all renewable energy generation in the EU = 59%*

Source: UN Economic Commission for Europe 2008



UK – very low levels of RES – 3%.....to 15%

## EU Renewable Energy Directive 2009



UK requires the biggest absolute rise in RE

UK requires the biggest % rise in RE (other than Malta)

# Details and growth in UK RES

Chart 3: Trends in the use of renewable energy for heat, electricity, and transport

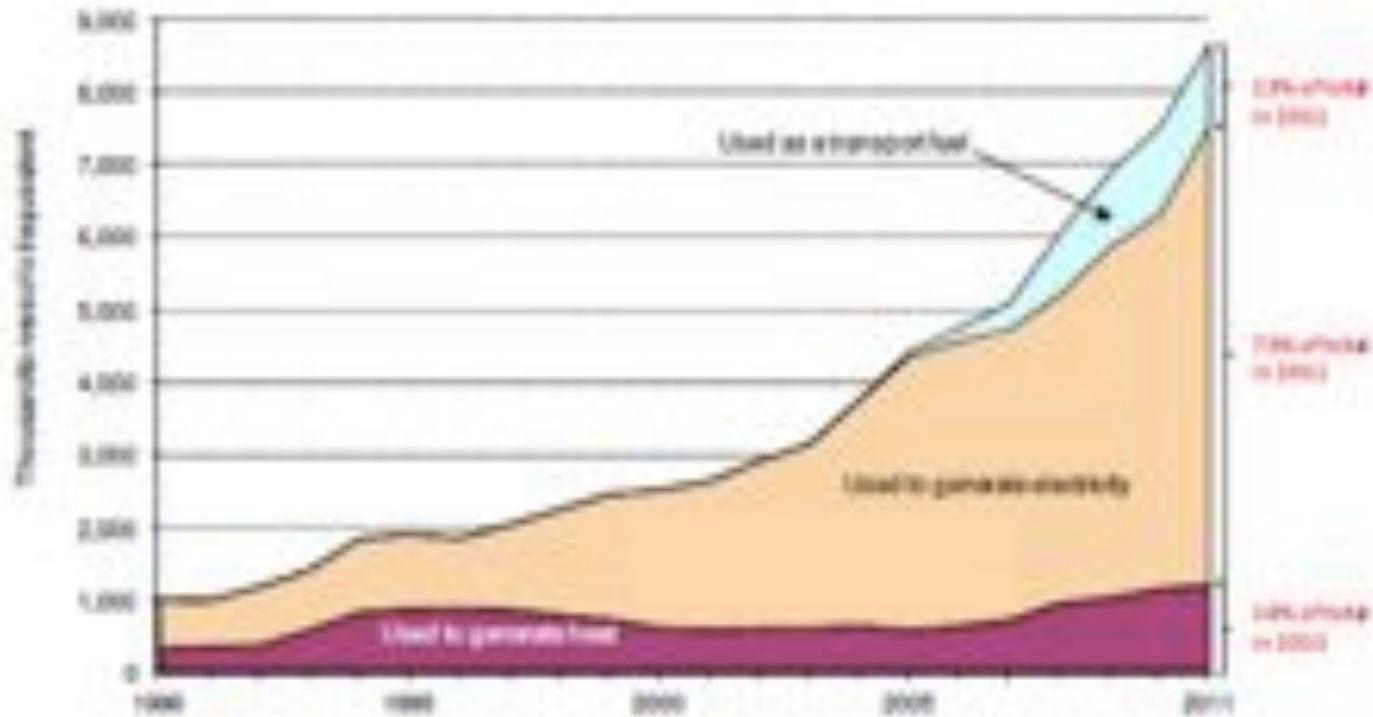


Figure 2: UK renewable energy growth

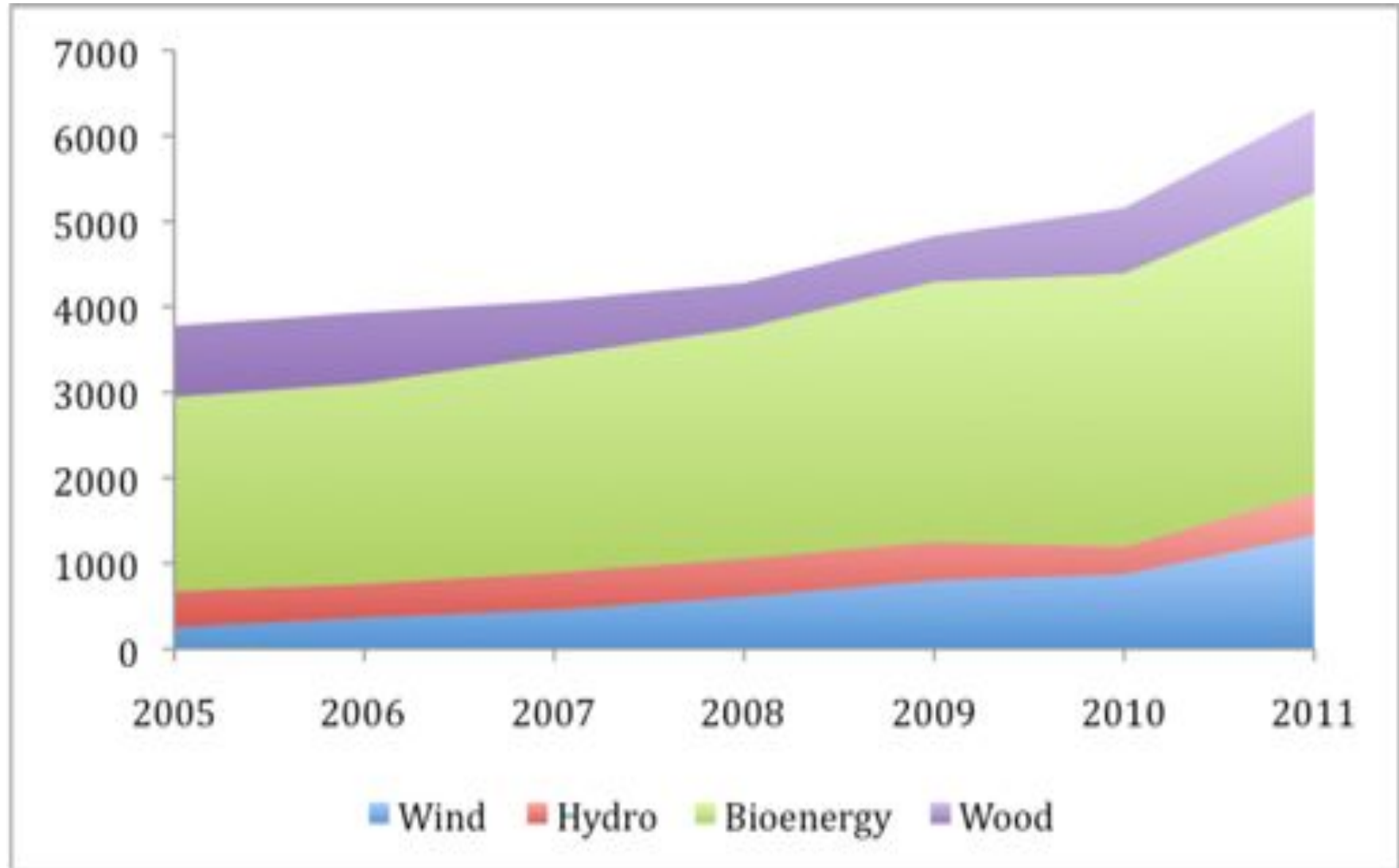
% share of total energy:

3%: in 2009

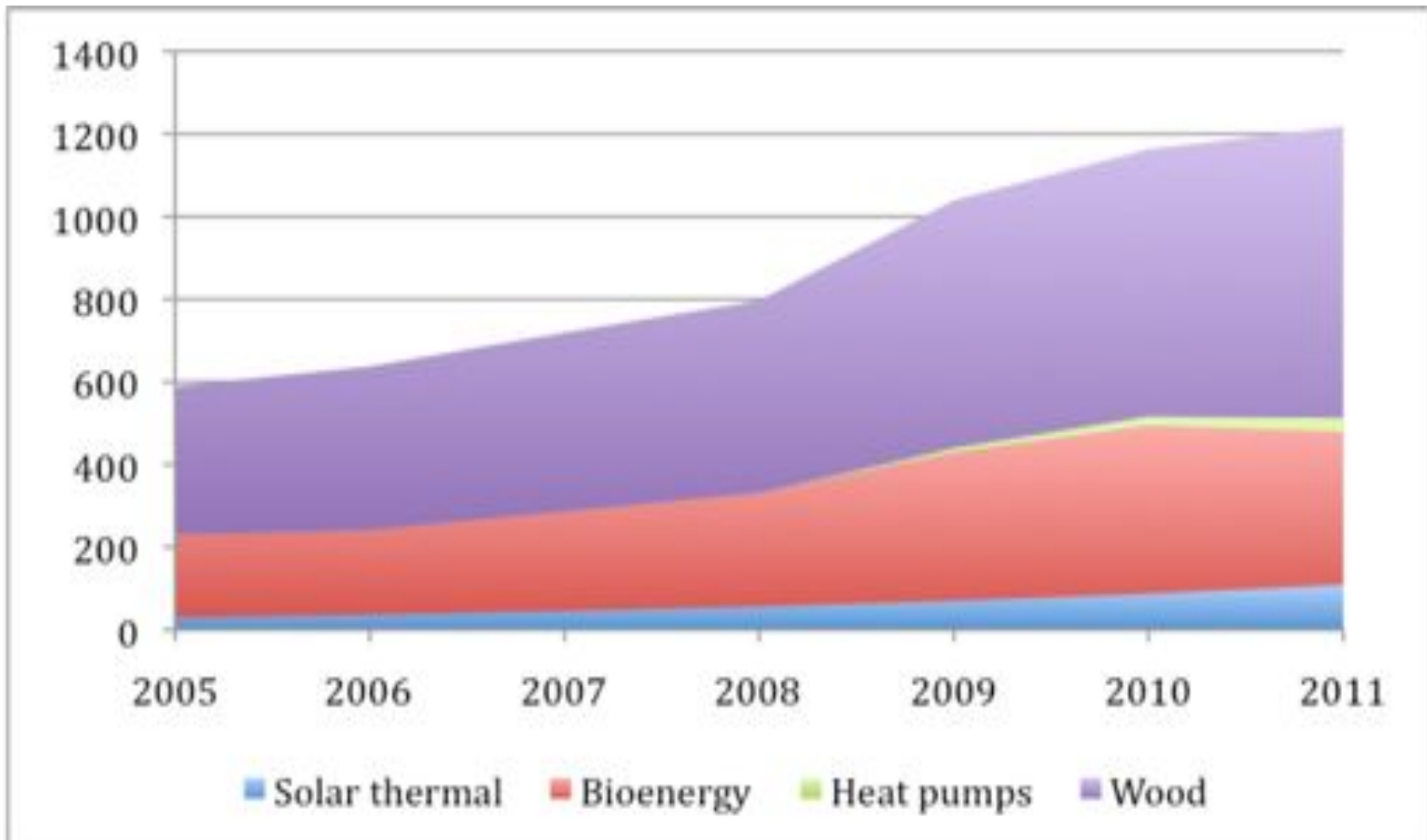
3.2%: in 2010

3.8%: in 2011

# Renewable electricity sources 2011



## Renewable heat sources 2011



# Wood use and overall supply in the UK

## **CURRENT Wood for renewable heating:**

Is 59% of the renewable heat sector

Now uses c 2 million tonnes wood per annum

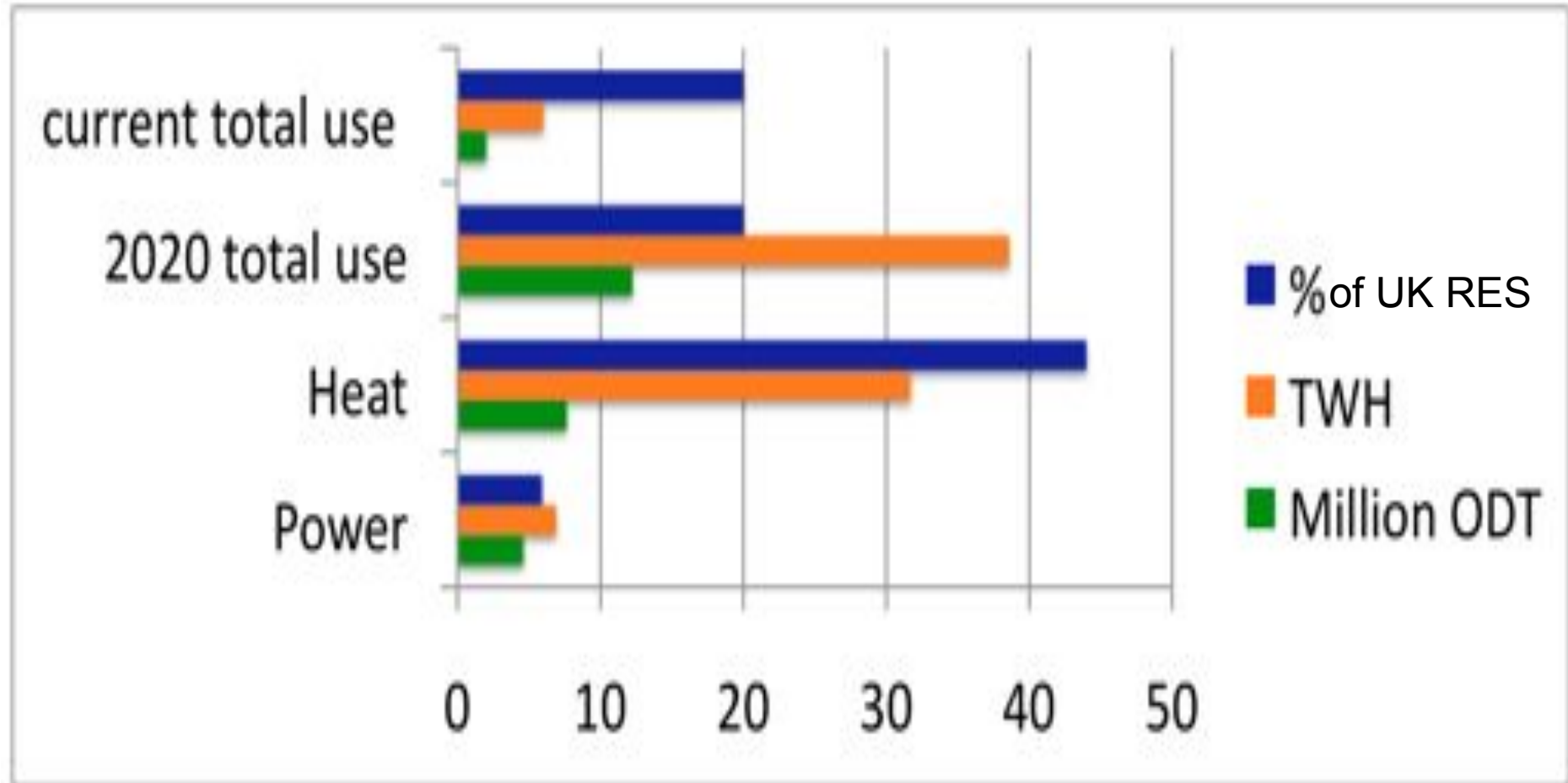
## **CURRENT Wood for renewable electricity:**

Is 5.7% of the renewable electricity sector

Now uses c 1.5 million tonnes of wood per annum

Overall this means wood provides about 20% of the UKs current renewable energy.

## 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



# What its not – domestic stoves, CHP and Power Stations



# What it is: commercial scale heating boilers

## Kingussie High School 500KW boiler



# What it is: heating a primary school



What it is: 60KW boiler in industrial estate



What it is: 100KW boiler heating sheltered housing



What it is: Sports Centre 400KW boiler Fort William



# What it is: 100KW boiler heating large estate



# What it is – 500KW boiler for School





# Austrian district heating for a village



# What it is: wood fuel production



# What it is: wood fuel delivery



# 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)
Inverloch 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
Lochside 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
Vogie 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 Stadium	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 Academy	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
Blairstown 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



## **November 2011- the Renewable Heat Incentive (RHI) was launched**

*“The RHI scheme is the **first of its kind** in the world. It will provide **long term support** for renewable heat technologies, from ground-source heat pumps to wood-chip boilers” (= end of grants)*

20 year indexed linked payments

To the owner for schemes installed after July 2009 (grants paid back)

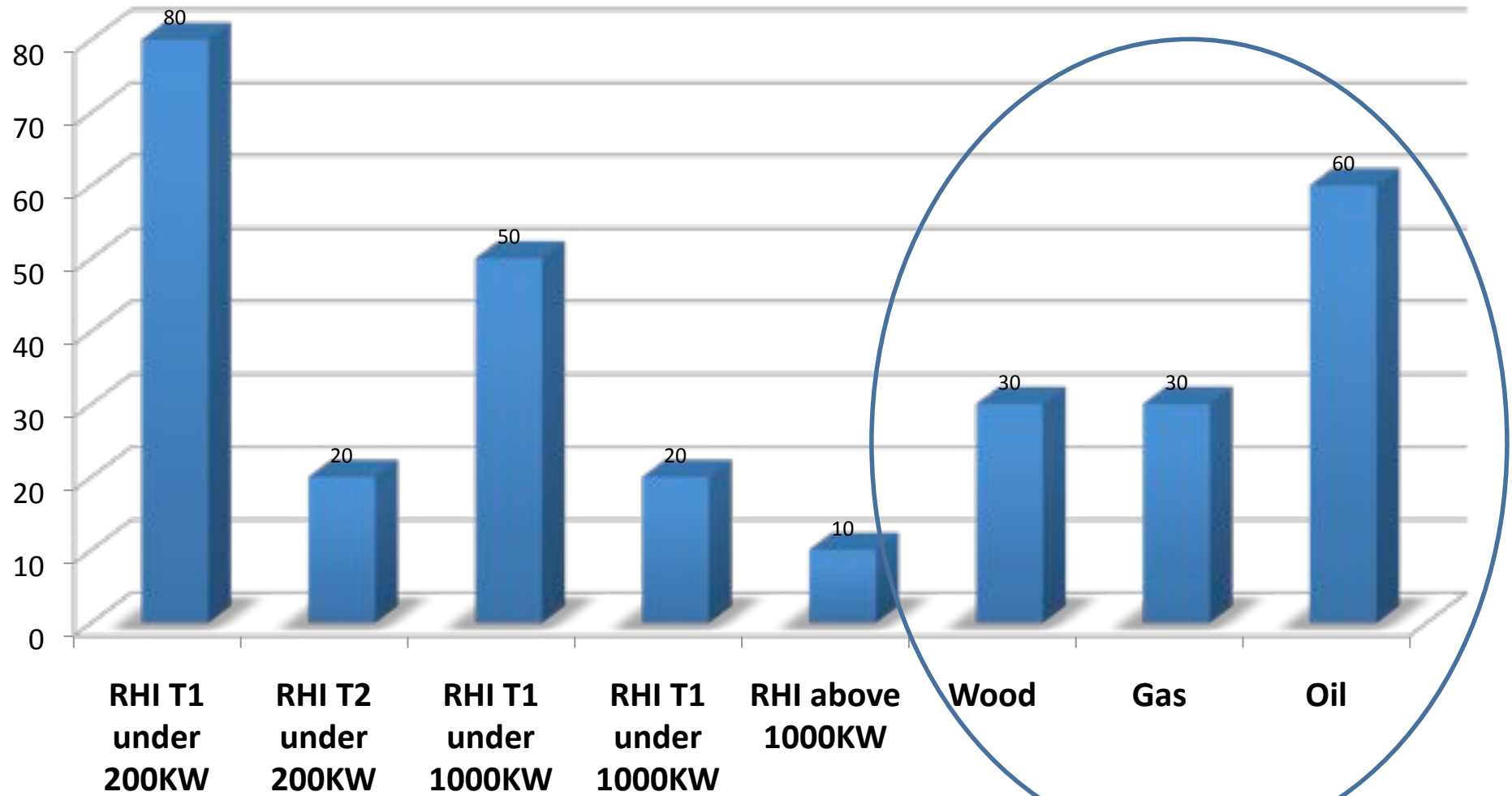
Paid quarterly by Ofgem

Payments based on metered heat outputs

Tariff related to boiler size (1314hrs x capacity) and run hours for rest

# RHI – changes the game

£/MWh

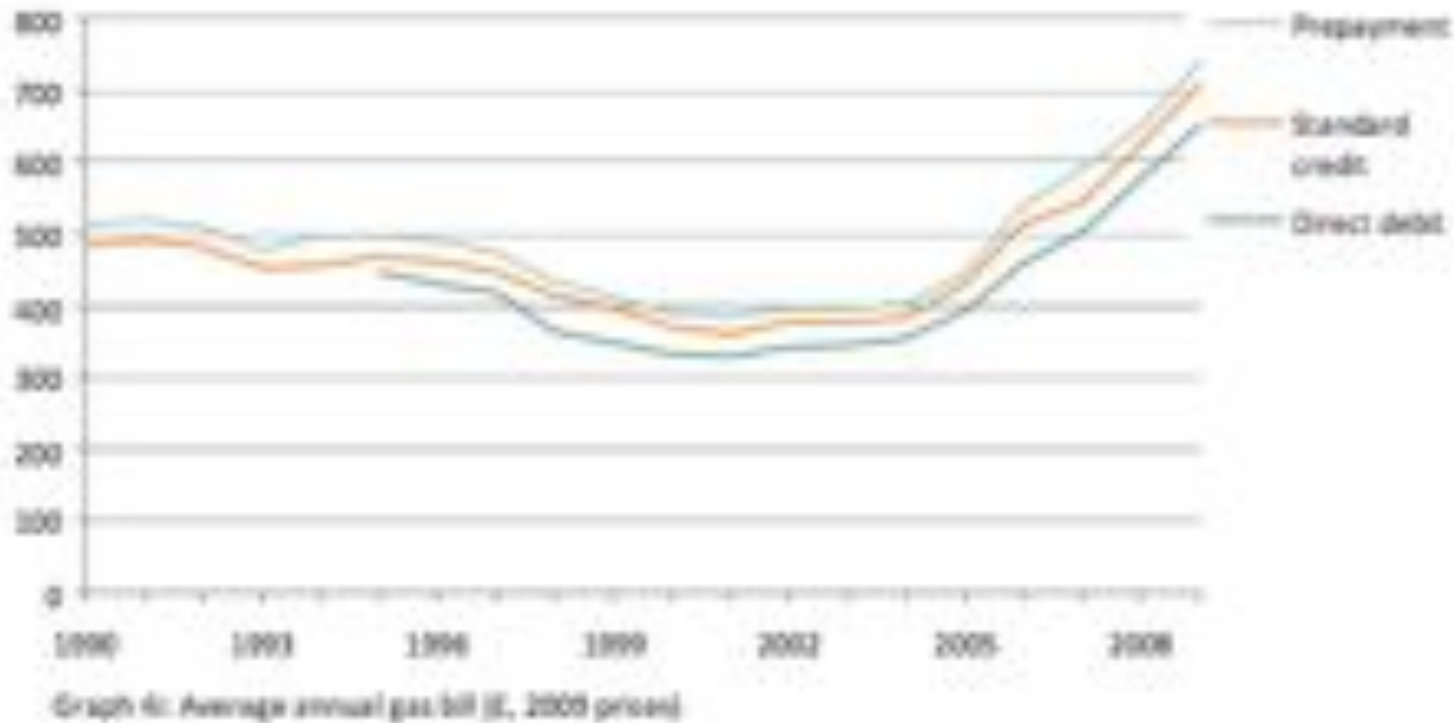


# The case for **retrofitting** wood heating in Council buildings

Site	Boiler size KWs	Turn key capital	Forecast do-nothing gas cost	Net running cost of biomass	Savings over do-nothing gas cost	CO2 savings
High School	500	£437,320	£62,400	£14,778	£47,622	458
Primary School	150	£205,320	£15,000	<b>-£3,535</b>	£18,535	110
Civic Headquarters	550	£494,740	£67,440	£15,525	£51,915	496
Mini district heating primary and high school	700	£600,880	£86,100	£19,889	£66,211	633

# The case for biomass district heating in front/back housing

Annual spend on heating per home = £600 - 700 pa



Is the high cost of pipes, boiler, silo etc worth the cost of saving some that bill?



## The case for biomass district heating in front/back housing –retrofitting gas

- 50 home scheme?
- Gas bill = £35,000
- Biomass bill = £35,000
- RHI income = £28,000
- Net saving = £28,000
- Capex = £200k on 200KW boiler, £200k on 500m DH pipes, heat exchangers etc = £400k
- ROI = 14 years
- Or pass on a £560/year savings and spend £400k
- New build much worse.....

# A better example: Stockport Homes high rise x 5



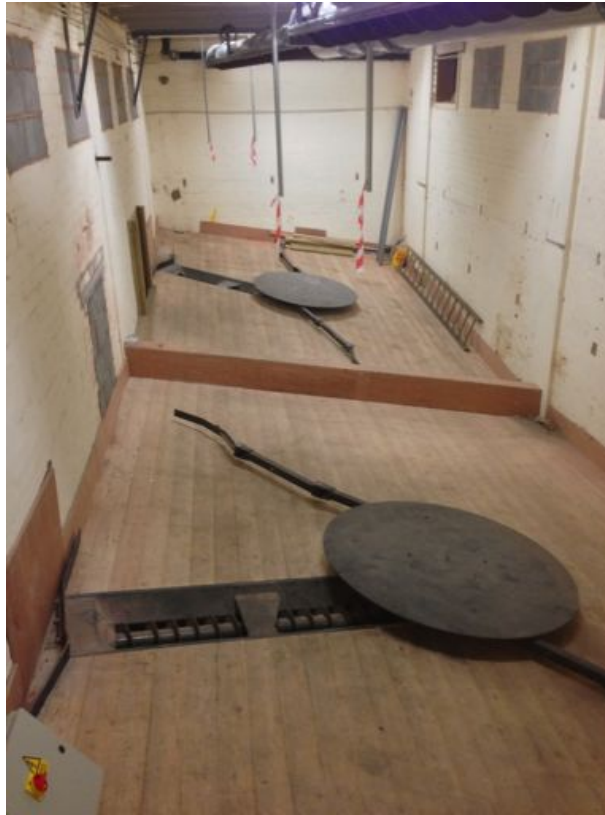
	1	2	4	3	5
	Lancashire Hill	York St Flats	Hollywood Towers	Mottram Street	Heaton and Norris
Postcode	SK5 7RZ	SK3 9EA	SK3 0HL	SK1 3PA	SK4 1ST
Number of flats	488	222	150	558	132
Total gas use	9200000	4423007	2852091	10391267	1881000
Percentage biomass	75%	77%	100%	67%	100%
Biomass demand kwh	6,900,000	3,405,715	2,852,091	6,982,149	1,881,000
Boiler type	1 X Froling LM 999	1 X FROLING TM 499	1 X FROLING TM 499	2 X FROLING TM 499	1 X FROLING TM 320
Total Boiler Load	999	499	499	998	320
Woodchip Tonnes Per Annum	2156	1064	891	2176	588

## A better example: Stockport Homes high rise x 5

Sites	Annual theoretical demand in tonnes at 35% MC (tonnes)	Annual theoretical demand of <u>roundwood</u> feedstock at 60% (tonnes)
Lancashire Hill	2156	4031
York St Flats	1064	1989
Hollywood Towers	891	1666
<u>Mottram Street</u>	2176	4068
Heaton Norris	588	1099
Total	6875	12,854

If all stacked up drying (4.5m high) it occupies 4 football pitches

# Stockport Homes high rise x 5



# Stockport Homes high rise x 5



# Biomass energy supply agreements



- Scottish Procurement and Commercial Directorate of the Scottish Government appointed 10 Framework Service Providers for the provision of biomass energy supply agreements in Jan 13.
- The process provides for a ‘design, build **and operate**’ solution,
- or a **finance** ‘DBO’ as well
- Via mini tenders and ITT and HSA’s
- Risk transfer, RHI income, dual fuel solution

# Framework suppliers

Alternative Heat Ltd - Co Down

William Y Watson t/a Angus Biofuels – Forfar

Barnhill Estates – Stirling

Buccleuch Bioenergy Ltd - Dalkeith

Econergy Ltd - Sandy

Heather Energy Limited - London

HWEnergy - Fort William

Linheat PLC - Louth

MITIE Asset Management - Farnham

RES On-site Ltd - Bristol

# What can go wrong?





# No integration of fuel supply with system design



# Poor planning and design



# No plan for operation and maintenance

Commissioning and handover

Training for the site staff

Cost effective maintenance and  
back up services

Local service engineers and rapid  
call outs



# The 'right' investment

Front/back door estates over 50 homes ✘

New build estates ✘

Retro fitting - High rise, sheltered homes and blocks of flats ✓✓

Under 200KW – about 50 homes (gets better ROIs) ✓

Dual fuel = no risk of heat outage

Biomass Framework offers financial risk management and secures RHI and delivers the design and operation solution