



Working together for the UK's hedgerows

Hedges for fuel: The South West experience

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April 2015

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What's a hedge (or hedgerow)?

Line of shrubs and trees that forms a boundary (<5m wide)

May be short or tall!



Two basic types of hedge in UK:



Species-rich hedges on banks



Hawthorn hedges with no banks

The state of hedges in England: Countryside Survey 2007 results

- Overall 1.4% loss between 1998 & 2007
- 6.1% loss of managed hedges
- 50% of hedges in poor structural condition



The policy context

Hedges increasingly valued
for biodiversity and
ecosystem services

But grant aid available to
farmers continues to fall
and to be increasingly
targeted

We cannot rely on public
funding!



We must find new economic drivers for sustainable hedge management

What are the options:

- Wood fuel
- Umm, err.....



“Many farms have no other woodland, nor supply of fuel, than what their hedges furnish; yet are amply supplied with this....

Hedge-wood is looked up to as a crop.”

Marshall (1796)



Normandy: Saving the bocage?



Hedge removal frequent



SCIC Bois Bocage Energie

Hedge wood fuel community co-operative based at Athis de l'Orme in Normandy.

www.boisbocageenergie.fr.

Objective is to promote hedge conservation through economic return

70 producers with 130 individuals and 10 councils buying the chips (2010)



Hedges coppiced

- Either by chainsaw and mechanical grab
- Or by feller-buncher



Excavator-mounted feller-buncher used to coppice hedges



Coppiced material chipped



Chip drying – simple!

- ✓ No leaves
- ✓ Heap under cover
- ✓ Self-dry in 3-4 months through fermentation





Wood chip pile at Athis –
last winter's harvest
drying (wet 50% moisture
– 400 tonnes)



Self-dried pile being
taken for burning (dry
20% moisture)

Shared
woodchip
drying and
storage
shed, Saint
Samson-de
Bonfosse,
Normandy



Commune hedge woodchip boiler, Athis



Woodchip feed bin for boiler



The local government office at Athis, heated by hedge fuel



Farmhouse at Raids, Normandy



Farmhouse at Athis heated from hedge woodchips



Woodchip boiler Saves €1600 pa



Costs of woodchips from bocage (within 20km)

2.6 cents per KWh

Compare to:

- Natural gas 7.0
- Electricity 14.3



A very green source of energy

For every 1 unit of energy used to extract, transport and process wood chips, 44 units are generated through combustion (1:44)

Biodiesel 1:3

Miscanthus 1:27

Short-rotation coppice 1:33

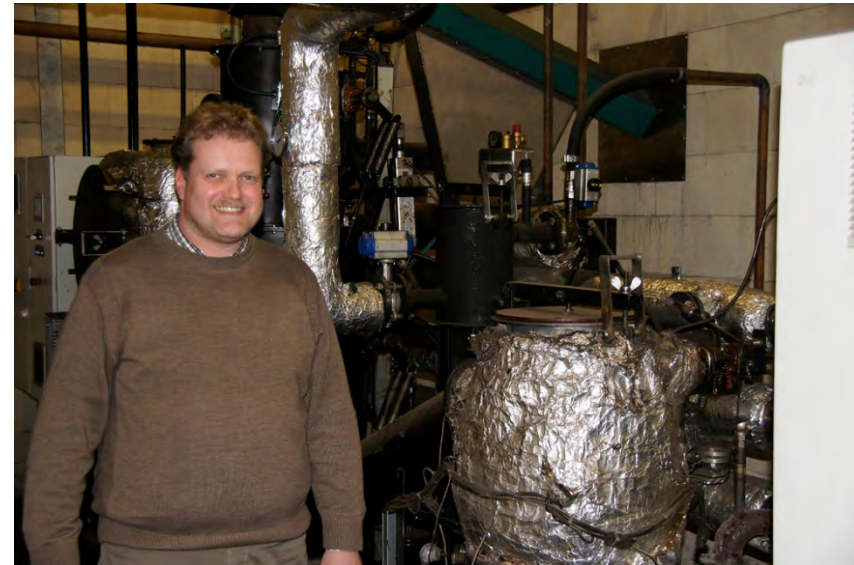


Not just NW France: e.g. most hedges in NW Germany are **sustainably** coppiced for fuel, as here at Schleswig Holstein



Chips used to generate electricity following gassification, by inventor and entrepreneur Markus Nyenhuis

135KW max output (8,000 houses). 25% efficiency. Remaining 75% thermal energy used to heat surrounding farms (1MW pa)



But will it work in the UK?

In 2012, the yield,
and harvesting and
processing costs, of
12 hedges
representative of
SW England,
assessed



CORDIALE

Managing Landscape Change

Brittany | South West England | Normandy

TamarValley

Area of Outstanding Natural Beauty



**Blackdown
Hills AONB**

The results

Good data for log production, limited for chips.

Results suggest yields from Devon/Cornwall hedges similar to those in Normandy.

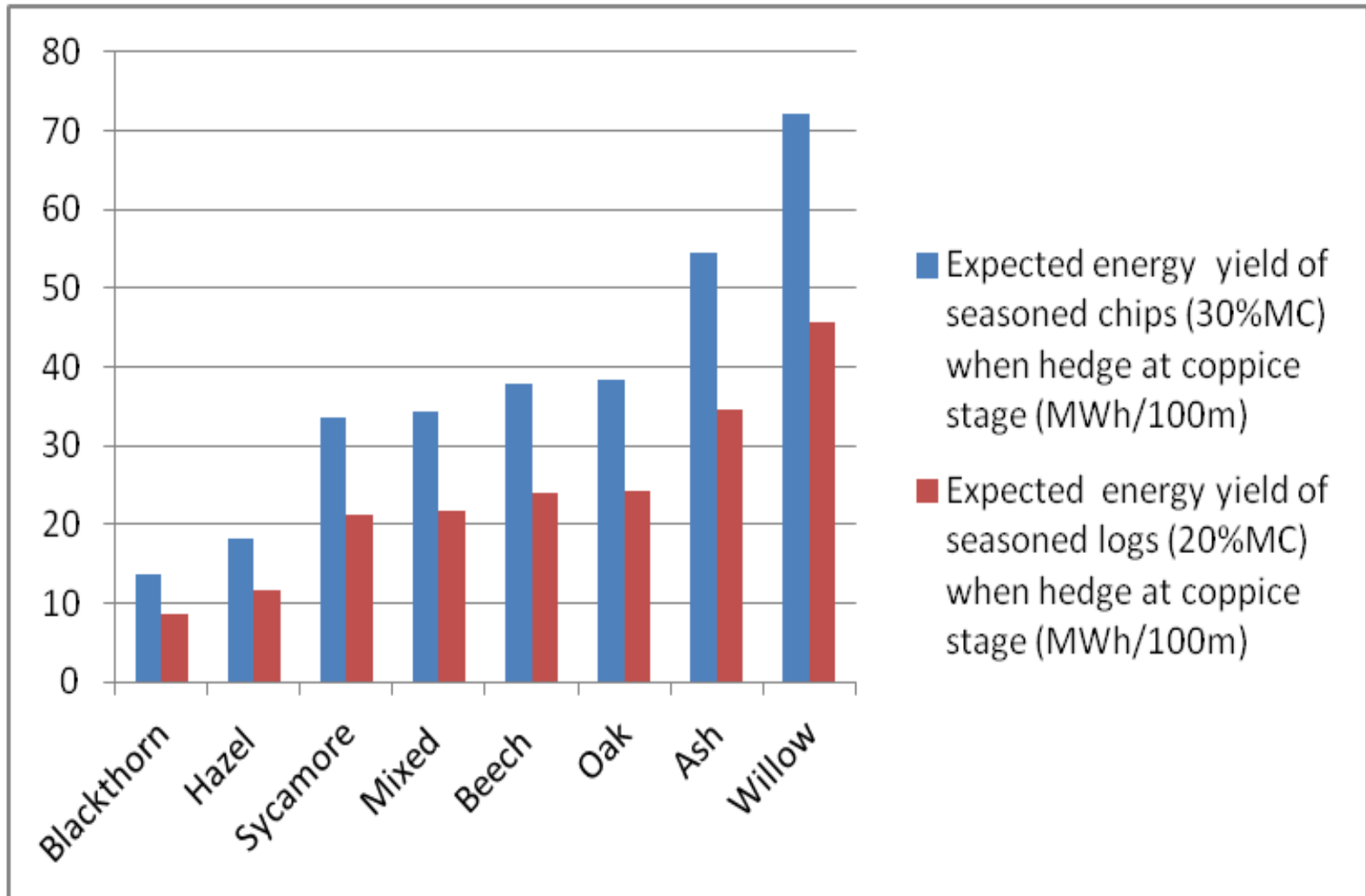


What SW hedges types are suitable for fuel production?

- Most hedges! But need different management from now.
- Mixed hedges and beech, ash and willow ones all good.
- Blackthorn hedges, and those in exposed sites or growing on infertile soils, likely to produce mediocre crops.
- Pure hazel hedges marginal, data lacking on hawthorn hedges.
- The more tree species, the greater the potential.

What woods burn best?

- All wood has same energy content by weight, at the same moisture content.
- Only in open fires are the different burning properties of species likely to be of any importance.
- Far more important to ensure wood is properly seasoned.



Farm woods or hedges for fuel?

- Devon's hedges have same biomass as county's small farm woodlands (<50 ha)
- Hedges generally more accessible
- Study of 4 parishes in Tamar Valley found that 59% of available energy was in hedges, 41% in small woodlands



Managing hedges for fuel

- ❖ Avoid top cutting - side trimming OK
- ❖ Harvest at coppice stage (6-7m high, larger stems 15-20cm diameter)
- ❖ Don't let them to develop into lines of trees (although these can be harvested)



Coppicing may require Felling Licence

What to do about flailed hedges

- Hedges flailed short for many years will have lost vigour
- Rejuvenate by coppicing (and discard cut stems)



Planting new hedges for fuel

- ✓ Use species that accumulate biomass rapidly - willow, poplar, alder
- ✓ Ensure fertile soils and good access
- ✓ Consider alley-cropping systems, managing hedge as short-rotation coppice
- ✓ Hedges may also provide useful supplementary fodder



Logs or chips from hedges?

Logs

- Flexible - open fires, stove, log boilers or ranges
- Waste a lot of biomass
- Take much muscle and 8x the man hours to produce - but keep you fit!

Chips

- Used in woodchip boilers which are highly automated but expensive
- Can use 100% biomass
- Much more cost effective

Lay + Log system

70% of
extracted
biomass
typically
wasted in
bonfires



Comparison of methods (NB there's plenty of scope for both)

Activity (per 100 m)	Lay + Log	Coppice + Chip
Coppice/lay	7 days	1 hour to 1 day
Cropping efficiency	20%	100%
Wood processing	3 - 4 days	1 - 2 hours
Boiler management	20 mins per day	2 mins per day
Fuel cost pence per KWh	15 - 30	2-3

Comparison of fuel costs (Dec 2013)	Pence per KWh	Comments
Hedge wood chips <i>Coppice + Chip system</i>	2-3	Coppicing with a chainsaw is as cost effective as using a feller-buncher, but more time consuming.
Hedge logs <i>Lay + Log system</i>	15-30	If hedge laid at coppice stage, then cost may fall under optimal conditions to as low as 4 pence per KWh.
Bought in wood chips (30% MC)	3.1	Based on bulk order of 10 tonnes. If chips have to be blown into store will be more expensive.
Wood pellets	4.4	Based on bulk order of 5 tonnes. If pellets purchased in bags, likely to be significantly more expensive.
Natural gas	4.9	
Heating oil	5.8	
LPG	6.5	
Electricity	15.0	

Savings and support payments

On-farm hedge woodchip and log costs shown in previous slide do not take account of:

1. Savings from not cutting hedges every year - these may be substantial (£1 per m pa).
2. Any funding through agri-environment schemes (for hedge laying or coppicing).
3. Any funding received through Renewable Heat Incentive - these allow capital costs of boiler installations to be recovered in 6-7 years.

How much hedge does a farm need?

- 100 - 200m of hedge each year to heat a typical 4 bedroom leaky farmhouse (35MWh), using Coppice + Chip system
- 5x this amount necessary under Lay + Log system
- On 17-18 year coppice cycle, c.3km of hedge need to be managed for fuel to heat the farmhouse
- For environmental reasons, usually a farm will need to have at least 6km of hedge in total
- Most commercial Devon farms have more than 10km

South-West examples

My neighbour, Flint McCulloch, heats his new farmhouse with chips from seasoned wood taken from his hedges and woods.

35KW chip boiler



My stepson, Olly Field, by his brand new 45 KW log boiler which will heat his farmhouse using wood from our farm hedges and woods



Our farm, Locks Park Farm (Devon)



Ross & Euan Dickinson, Racedown Farm, run log business, selling 250t pa, of which 75t come from coppicing hedges.



Charles Lacey, Whitemoor Farm - whole young trees, air seasoned, chipped for 200KW boiler providing heat for 9 houses.



Not Devon, but Leics.
Game and Wildlife Conservation Trust chip
hedge material to fuel 35 KW boiler.



Hedge Fuel for All. Communities working with farmers.

Local people get firewood,
exercise, social event

Farmer gets their hedge
managed

Addresses rural fuel
poverty



Much local interest in branch loggers - transitional between logs and chips



Barriers to uptake?

1. Cultural resistance - normal practice is to cut hedges frequently and very occasionally to lay them. Uncut hedges seen as untidy.
2. Few local case studies - for others to learn from and adapt.
3. Costs of machinery (purchase or hire) - more farmer collaboration and contractors needed.
4. Business start-up costs - need grant-aid and facilitation.
5. Concerns over chip drying and quality.
6. Environmental worries.

Chips concerns

Chips self-dry, or material can be chipped air-seasoned.

Chip quality needs to be matched to boiler specifications.

Many boilers very tolerant - crude hedge chip fine!



Environmental concerns: biodiversity

- X Untrimmed hedges provide poor cover
- X Coppicing reduces habitat continuity
- ✓ More flowers on shrubs
- ✓ Greater herb, invert, bird and mammal diversity over full cycle



Impact on some indicator species:

- ✓ Pollinators - more flowers
- = Bullfinch and Dormouse - less cover for nesting, but more food
- X Hedgehog - increased risk of predation



Impact on landscape

- Lines of trees already common
- Greater structural diversity



Proposed environmental safeguards

- Max 50% hedges on farm managed by coppicing
- Max 25 year coppice rotation, normally 10 - 20 years
- Max 5% of hedges on farm coppiced in any one year



Does Chalara ash dieback provide an opportunity to kick-start hedge fuel?



Resources

- *Wood fuel from hedges* - Handbook published by Devon Hedge Group & Cordiale (2014)
- Tool to assess yield at individual hedges and farm scale
<http://www.devon.gov.uk/hedges>
- Wood fuel from hedges toolkit for community groups, Dartmoor Circle. <http://www.dartmoorcircle.org.uk>
- Five reports on woodfuel from SW hedges
www.hedgelinek.org.uk/wood-fuel

Conclusions

1. Hedges can be sustainably managed to produce woodfuel, as chips, efficiently and cost effectively.
2. Half the price of buying heating oil.
3. Cropping for logs better for small scale and local community initiatives.
4. Need more advocacy, more UK facts and figures, more case studies, more promotion and more facilitation.

Managing hedges for fuel will help to save them. Thank you.

