

Appendix 3

Study on Retention and Use or Sale of Biomass (woodchip and/or timber) Arising from the Ash Dieback Project

Summary

This is a report on the practicability of retaining biomass in the form of timber and woodchip arising from tree works undertaken by CCC as part of the ash dieback project for the purpose of recovering funds through the sale of these materials or the offsetting of costs by using woodchip to fuel CCCs existing biomass boilers.

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2. Introduction

- 2.1. The felling/removal of ash trees owned by Ceredigion County Council which become affected by ash dieback disease is necessary due the resulting safety risks.
- 2.2. Removing these trees will produce a quantity of timber and woodchip and members of the scrutiny committee have asked that the potential of gaining value from these arisings be investigated to possibly offset the costs of the cutting work.
- 2.3. There are several options for how these arisings could be dealt with which this study will investigate the practicability of.

3. Quantity of biomass arising

- 3.1. Having had the Ash Dieback Action Plan (ADAP) in place for almost 10 months it is becoming apparent that the initial estimates of the number of trees owned by the council is far fewer than initially estimated within the ADAP, as it is becoming clear that most trees at roadsides are privately owned.
- 3.2. Where private landowners fail to remove trees when issued with notices by the council requiring them to do so, and the council uses powers to remove privately owned trees, the arisings from these trees would remain the property of the landowner and therefore would not be available for retention or sale by the council.

3.3. It is difficult at this stage to accurately estimate the number of trees which be solely the responsibility of the council, however as the project progresses the number of trees will become more apparent as more surveys and inspections are conducted annually.

4. Options for potentially gaining value from cut ash trees

4.1. Retention of arisings by tree cutting contractors who carry out work for the council.

- The contractor framework for tree cutting operations which is currently in procurement has built into it a facility if the council wishes, for the contractor to credit back part of the costs of the work to the council in exchange for retaining the arisings to process, use or sale by them. The nature of the mini competitions within the framework creates competition for the work which should ensure the amount offered to the Council for the arisings should be competitive.
- This will rely on the contractor honestly & accurately estimating and/or declaring the quantity of arising they are retaining when undertaking works. While this may appear to have potential for abuse - as more contracts are fulfilled a pattern of average quantities of arisings should emerge and can be monitored by the Ash Dieback Officer who will be commissioning the works & on-site spot checks of contractors' work will also be conducted where quantities of arisings can also be monitored.

4.2. Retention of arisings by Ceredigion for sale to biomass processors and users.

This option would require some or all the following:

- Paying the contractors (£ per m³ per mile) to transport arisings to either a biomass purchaser or to a Council depot.
- Facilities/plant for the storage and handling of arisings when arisings need to be stored at a council depot.
- The establishment and management of a supply contract between the Council and a biomass purchaser.
- If purchasers only require chip and not timber, it would be necessary to process timber into chip at a Council depot with all the infrastructure procurement and management that would entail (see section 5.1 for details).

4.3. Retention of arisings by Ceredigion for processing and drying and use as fuel in Council owned biomass boilers

- These biomass heating systems are located at and used to heat the following:

- Penmorfa Aberaeron
Heats the Penmorfa offices, Min Y Mor care home and Ysgol Gynradd Aberaeron primary school.
- Plascrug Aberystwyth
Heats Plascrug leisure centre & swimming pool, and Canolfan Rheidol offices.
- Use as fuel in Council owned biomass boilers would require the following:
 - Paying the contractors to transport arisings to a council depot.
 - Storing woodchip as delivered.
 - Processing timber into woodchip (chipping smaller timber & splitting larger timber into smaller sizes then chipping).
 - Drying woodchip.
 - Storing dried woodchip.
 - Delivering woodchip as required to biomass heating plants.
 - The purchase and installation of extra woodchip storage hoppers and erection of buildings to house them at biomass heating plant locations.
 - See section 5.2 for details/costings
 - Note: The use of retained woodchip to fuel council heating is complicated by the current woodchip fuel procurement arrangements which would need to be retained to ensure continuity of supply.
 - The biomass heating plants can only safely and successfully burn woodchip of very specific specification – size of chip and ratio of leaf & bark matter to clean timber matter (too high of a ratio of bark and leaf will result in damage to heating plant).
 - The current suppliers of chip are paid per kilowatt of heat produced when burnt as opposed to the quantity of chip supplied, council retained chip can't simply be measured and added into the existing storage facilities at the heating plants.
 - The retained supply would need storing in extra purpose-built storage facilities at the heating plants and would need to be burned separately and alternately from the bought in supply and the heat produced from each supply measured separately.

5. Costings for biomass retention and drying

5.1. Process and Costings for processing arisings for sale as in option 4.2

- Requirements
 - Outdoor storage area for whole timber/logs
 - Indoor storage for fresh undried woodchip as delivered from worksites and produced from onsite chipping of large timber.
 - Excavator for mounting tree handling and splitting equipment

- Mechanical grab for handling timber
 - Mechanical timber splitting cone
 - Large diameter woodchipper
 - Loading shovel/telehandler for moving/loading woodchip
 - Lorry for the delivery of woodchip to boiler sites
 - Operatives to run and manage woodchip drying machinery and process
- Costings:

Initial setup costings of woodchip processing for sale(undried)	
Raw timber handling/splitting	
Excavator 360° 5tonne	£44,500.00
Rotating grab	£3,960.00
Splitting cone	£4,190.40
Chipping	
Large diameter woodchipper	£200,000.00
Loading and delivery	
Telehandler (potentially already be available on site)	TBC
Lorry for delivery of woodchip	£90,000.00
Buildings (many variables TBC - estimated cost only)	
Storage building for undried(green) woodchip	TBC
Total Initial Plant & Buildings expenditure (minus items TBC)	£342,650.40

Annual running costs	
Operatives grade 7 (equivalent of two thirds of a full-time operator)	£21,022.00
Plant running costs	
Excavator 360° 5tonne	£4,605.00
Rotating grab	£2,572.00
Splitting cone	£2,572.00
Lorry for delivery of woodchip and timber	£8,703.00
Vehicle/machinery fuel - DERV	TBC
Total annual running costs (minus items TBC)	£39,474.00

Annual cost of reselling undried chip where cost is spread over 10-year life of ADBP	
Initial set up costs excluding new buildings	£342,650.40
Annual running costs excluding fuel & utilities	£39,474.00
Annual cost where initial cost is spread over 10-year life of ADBP	£73,739.04

5.2. Processing and costings for processing arisings for fuelling biomass heating plants as in option 4.3

- Requirements
 - Outdoor storage area for whole timber/logs
 - Indoor storage for fresh undried woodchip as delivered from worksites and produced from onsite chipping of large timber.
 - Excavator for mounting tree handling and splitting equipment
 - Mechanical grab for handling timber
 - Mechanical timber splitting cone
 - Large diameter woodchipper
 - Loading shovel/telehandler for moving/loading woodchip
 - Woodchip drying plant
 - Biomass boiler to provide heat for woodchip drying plant
 - Indoor storage for dried woodchip
 - Lorry for the delivery of woodchip to boiler sites
 - Operatives to run and manage woodchip drying machinery and process
 - Extra biomass storage and feed in equipment at heating plants and additional buildings to house these.

- Costings:

Initial setup costings of woodchip processing for retention to fuel council heating plants(dried)	
Raw timber handling/splitting	
Excavator 360° 5tonne	£44,500.00
Rotating grab	£3,960.00
Splitting cone	£4,190.40
Chipping	
Large diameter woodchipper	£200,000.00
Woodchip drying	
Biomass boiler, installation & operator training	£90,000.00
Woodchip drying plant	£39,500.00
Container housing boiler and drying plant	£26,000.00
Loading and delivery	
Telehandler (potentially already be available on site)	TBC
Lorry for delivery of woodchip to boiler sites	£90,000.00
Buildings (many variables TBC - estimated cost only)	
Storage building for undried(green) & dried woodchip	TBC
Total Initial Plant & Buildings expenditure (excluding items TBC)	£498,150.40

Annual running costs	
Operatives grade 7 (equivalent of one full time operator)	£31,564.00

Plant running costs	
Excavator 360° 5tonne	£4,605.00
Rotating grab	£2,572.00
Splitting cone	£2,572.00
Large diameter woodchipper	£2,781.00
Woodchip drying plant	TBC
Lorry for delivery of woodchip to boiler sites	£8,703.00
Vehicle/machinery fuel - DERV	TBC
Electricity(drying plant)	TBC
Total annual running costs(minus items TBC)	£52,797.00

Annual cost of retaining dried chip where cost is spread over 10-year life of ADBP	
Initial set up costs excluding new buildings	£498,150.40
Annual running costs excluding fuel & utilities	£52,797.00
Total annual cost	£102,612.04

The cost of purchase and installation of biomass storage and feed in equipment at heating plants and the design and erection of the extra buildings at both council biomass heating plants has not yet been investigated so is to be confirmed but is likely to be considerable.

Whether sufficient space is available for this infrastructure has also not yet been investigated.

6. Evaluation of options

While recovery of costs from and or processing and use of woodchip by Ceredigion County Council is theoretically possible, at one or more sites in the county, it does present numerous challenges which may or may not be justified by potential savings or rewards available through it.

6.1. Option 4.1 will require no initial expenditure on infrastructure and the least input in terms of ongoing management whilst providing a saving on tree cutting costs by crediting back a value for the woodchip against the costs of the tree cutting work. This would also be the most efficient means of gaining value from whilst disposing of arisings from smaller works with smaller quantities of arisings.

6.2. Options 4.2 and 4.3 both require significant initial capital expenditure/investment (some of which isn't possible to cost at this stage), and continual ongoing primary revenue costs in undertaking the processes previously described.

6.3. Options 4.2 and 4.3 will also incur a significant secondary ongoing revenue cost burden for direct management of the process, procurement issues,

finance issues and admin, and heating plant management which are difficult to quantify at this stage.

7. Potential value available from arisings

7.1. Current wholesale market values of biomass are as follows:

- Undried woodchip = £45 per tonne, approximately equal to £16.66/m³.
(One tonne of woodchip would be approximately 2.7m³ which gives an approximate wholesale cost of £16.66/m³)

7.2. Option 4.1 while likely to produce the least (revenue equivalence) through savings on tree cutting costs, due mostly to the burden of transport costs and work required to recover value from the arisings being placed wholly on the contractor this may still represent the best overall value and financial risk outcomes to the Council as it requires the least input.

7.3. To generate enough income through option 4.2 or offset enough costs through option 4.3 would require the throughput of a very large quantity of biomass to recover these costs and due to most trees affected by ADB in Ceredigion being privately owned the available council owned trees affected by ADB is likely to be insufficient to recover costs thus posing a high financial risk.

8. Carbon benefits

8.1. Whilst no biomass fuel is truly carbon neutral due to fossil fuel use in its production and transport, the use of biomass arising from the ADBAP can only be viewed as a net carbon benefit due to it displacing fossil fuels in generating energy.

8.2. Whilst the retention of biomass by contractors would not allow the Council to produce its own non fossil fuel, provided the arisings produced find their way into sustainable energy (heat or electric) generation locally the net carbon benefits regarding climate change would likely be the same.

8.3. Transport issues around low carbon fuel can be the difference between it being low carbon or not, and transport issues when considering the geography of Ceredigion can become very complex. Given that if the Council were to process the arisings they would need to be transported from all over Ceredigion in most cases in special trips by our contractors as opposed to being returned to their bases of operation could dramatically dilute the carbon benefits of retaining them, especially if we assume (as is likely) that work in the north or south of the county is likely to be conducted by more northerly or southerly based contractors respectively. This can be assumed as travel costs incurred by contractors are likely to affect tenders for work in different locations.

9. Conclusion

9.1. Where initial capita set up costs are spread over the anticipated 10-year lifespan of the ash dieback project and combined with the annual running costs we arrive at an annual cost of:

£73,739 per annum for selling on undried chip on (Option 4.2)

And

£102,612 Per annum for retaining dried chip for our own use (option 4.3)

Note: These figures are conservative in that they do not include additional building, boiler site storage/infeed plant, fuel costs and utility costs.

To offset these costs with the sale of woodchip or the retention of woodchip to offset heating costs based on a current wholesale chip price of £45/tonne (£16.66/m³) we would need to have quantities more than the following amounts available from council owned trees:

Processing and sale of undried chip (option 4.2); 1,639 tonnes (4,426m³)

Processing and retention of dried chip (option 4.3); 2,280 tonnes (6,159m³)

9.2. Accurate m³ tables for volumes of biomass available from deciduous trees of various sizes only exist for plantation forestry grown trees and not for trees growing in the open, on hedges or in unmanaged mixed woodland which are the typical of ash trees owned by the Council. Biomass quantities available can therefore only be estimated based on experience and measurement of individual trees.

9.3. While there are large trees owned by the council which will yield many m³ of biomass these are the minority of trees, more trees will lie be in medium size ranges and far more still in the smaller size ranges, the biomass yield ranges of which will be from a few m³ down to a fraction of a m³. Meaning that obtaining the forecast quantities of biomass required to make the processing and sale or retention of biomass economically viable is far beyond what is available from Council owned trees.

9.4. If we wish to recover some costs of the work which the council will be undertaking the only potentially cost-effective means of doing so would be through gaining credit back for the biomass when retained by our contractors, where this is practicable.