Forestry - Data Capture and Collection Methodology

This document describes the methodology for processing, analysing and delivering the South Australian spatial data component of the Australian Biomass for Bioenergy Assessment (ABBA) for upload onto the Australian Renewable Energy Mapping Infrastructure (AREMI) web mapping platform.

What is the Australian Biomass for Bioenergy Assessment?

The purpose of ABBA is to catalyse investment in the renewable energy sector by providing detailed information about biomass resources across Australia. This information will assist project developers make decisions for new bioenergy projects, and provide linkages between potential biomass feedstocks - through the supply chain - to end users. To achieve this, ABBA collects datasets, on a state-by-state basis, about the location, volumes and availability of biomass, and publishes them on the AREMI platform.

https://nationalmap.gov.au/renewables/

ABBA is managed by the AgriFutures (formerly Rural Industries Research and Development Corporation), with funding support from the Australian Renewable Energy Agency (ARENA).

SA Forestry Data

Forest industries generate a substantial amount of residues from activities such as harvesting and processing. The residues represented in this data set are:

- Field residues - includes foliage, branches etc. These are the residues which are left behind in the forest and are often referred to as harvest residues.
- Pulpwood - inferior trees and components are harvested for pulpwood production.
- Processing residues - includes solid wood, shavings, sawdust etc. These are the residues which are a by-product of the milling process.

What data about Forestry is uploaded to AREMI?

This dataset represents forestry residues and was derived from production volumes contained in the National Plantation Inventory, 2015 – 2059.

This includes information on:

- Forestry residues (for softwood and hardwood plantations) including:

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- Field residues: includes foliage, branches etc. These are the residues which are left behind in the forest and are sometimes referred to as harvesting residues.

- Pulp log residues: These are the residues which are a by-product of harvesting pulp logs.

- Sawmill residues: includes solid wood, shavings, sawdust etc. These are the residues which are a by-product of the saw milling process.

Data has been presented in several layers. One has the information for the period 2015 – 2019 and following 5 year increments to 2059.

Please Note:

Issues around the availability of the data represented here may include:

1. Sustainability - field residues such as small branches, cones and bark are normally left in the field for retaining soil nutrients. The economics of collecting these field residues may also effect availability. Some residues from clear fell sites are suitable for collection.

2. The exchange rate of the $A may influence what growers are prepared to sell into the Australian market compared to export markets.

3. Many growers are aware of the benefits of a local bioenergy industry and the stability of a local market compared to the more volatile export market.

The forestry footprint is derived from ABARES forestry spatial data clipped to the National Plantation Industry Boundaries for Mt Lofty Ranges & Kangaroo Island and the Green Triangle which comprises forestry in the South East of South Australia and the South West of Victoria.

Method

Forestry – Harvest residues

**All residues are calculated as a dry weight. Green residues can be assumed to have a moisture content in the range of 40% to 60% whilst dry material will have a moisture content in the range of 12% to 14%.

This dataset represents forestry residues and was derived from production volumes contained in the Australian Plantation Log Supply 2015 – 2059.

This includes information on:

Pulp log residues (for hardwood plantations). These are the residues which are a by-product of harvesting pulp logs.

Forestry residues (for softwood plantations) including:

Field residues: includes foliage, branches etc. These are the residues which are left behind in the forest and are sometimes referred to as harvesting residues.

Sawmill residues: includes solid wood, shavings, sawdust etc. These are the residues which are a by-product of the saw milling process.

This includes information on: Pulp log residues (for softwood plantations) : These are the residues which are a by-product of harvesting pulp logs.

Forestry – Harvest residues

The following provides a basic worked example for harvest residues by category:

1) Calculate harvest residues (field residues) by category

To generate figures for the various types of field residues the following equation was used:

Field residues (dry tonnes) = total log volume (sawlogs m3)

X Basic density[1]

X (1 – field product recovery)

X Breakdown by residue type

Basic densities were obtained from published sources (principally Bootle 1986).

Forestry – Processing residues

The following provides a basic worked example for processing residues by category (dry weight):

2) Calculate wood processing (sawmill) residues by category (dry weight)

To generate figures for the various types of wood processing residues the following equation was used:

Wood processing residues (dry tonnes) = total log volume [sawlogs only] (m3)

X Basic density

X (1-sawn product recovery)

X Breakdown by residue type

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[1] Basic density is a measure of the mass of actual fibrous material, lignin and extractives present in a wood sample. It is calculated as the oven-dry mass of a specimen divided by its green volume (Bootle 1986).

Same basic density used as for field residues.

Forestry – Mapping considerations for the AREMI

The data that has been analysed and uploaded to AREMI is based upon sources, experimentation and methodology which at the time of preparing this document were believed to be reasonably reliable and the accuracy of this information subsequent to this date may not necessarily be valid.

It is important to recognise that this is the first version of this type of State-wide biomass data set that has been prepared for South Australia. The data set relies on readily available public data and reports so that others are then able to access this information to reproduce this data set if necessary. However, this publicly available data is relatively limited. There are potentially other more detailed data sets that could be used to improve the scope and resolution of the SA Biomass data set.

Over time it is expected that the feedback gained from the initial baseline data that is currently being uploaded to AREMI will help to inform subsequent versions of the information contained in the various data sets.

Methods and assumptions were also developed on how to convert source data into biomass resource estimates. These were based on methods used by the ABBA team in Queensland and inputs adjusted to reflect the tree species grown and harvested in South Australian forestry activities. These methods and assumptions, too, could be expanded, refined, and improved in future versions of the SA Biomass data set.

Consequently, this inaugural State biomass data set should be considered an important starting point for future development of improved knowledge about biomass resources potentially available in South Australia for bioenergy opportunities. It can reasonably be expected that over time this initial SA Biomass data set will continue to evolve and expand in scope and detail, which should improve its utility for potential bioenergy investors.

As this data is presented at the NPI Region level, Landuse information has been overlaid to give users and indication of where the forestry activity is in the landscape. This landuse information is indicative only.

The landuse spatial data has been sourced from ABARES (http://www.agriculture.gov.au/abares/aclump/land-use/data-download) and contains the combined datasets of the South Australian areas land use mapped to May 2008 (and 2014 South East and SA River Murray corridor). The data presented is a subset of the original data comprising only landuse classified as Cropping.

The ABBA mapping team has consulted widely to provide a consistent representation of the biomass data in terms of aggregation, content and units of measurement. Whilst this has been developed for use across all regions there may be some differences in the way that

each state represents various feedstocks depending on source data, data analysis, expert advice and other considerations. Every effort has been made to provide a consistent and consultative approach to data presentation providing the best outcome for users.

Level of Current Use

In Australia, residual biomass from forest industries is already extensively in beneficial use. These uses range from energy feedstock for domestic and industrial heating or industrial processes (including powering sawmills) to landscape amenity, soil improvements and fertilisers or animal bedding. However there are many opportunities to increase the utilisation of forest industry residues (Greaves and May 2012) including:

- production of wood pellets for export to meet expected increasing global demand
- co-firing with coal in existing power stations to generate electricity
- combined heat and power production in wood processing plants to supply electricity and process heating needs
- production of synthetic diesel through gasification and the Fischer-Tropsch process
- production of bioethanol using hydrolysis followed by fermentation and distillation, or
- production of biochar for use in agriculture

Outputs

The final data outputs are:

- *SA NPI Region Boundaries*
- *Forestry Residues - 2015 – 2059*
- *FORESTRY RESIDUES - 2015 – 2059 in 5 year increments – nine datasets*
  2015-19, 2020-24, 2025-29, 2030-34, 2035-39, 2040-44, 2045-49, 2050-54, 2055-59

- *Green Triangle Biomass Potential*

Assumptions

For this initial version, readily available public data and reports were used, which others can access to reproduce this data set if necessary. In some areas, original methods have been developed and assumptions made on how to convert source data into biomass resource estimates. These methods and assumptions were informed by the knowledge and expertise

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of experts engaging with biomass generating activities in South Australia. These experts have also been involved with reviewing and preparing similar data sets for other State Government agencies.

The scope and quality of this initial data set is necessarily limited by the scope and quality of the information in the data sources used, types of methods, and assumptions used when converting source data into biomass resource estimates. These assumptions should be kept in mind when interpreting the SA Biomass Data Set.

This inaugural data set should be an important starting point for future development and improved knowledge about biomass resources potentially available in South Australia for bioenergy opportunities. It is expected that over time this initial SA Biomass Data Set will continue to evolve to expand its scope, detail, and perceived accuracy or reliability, which may overcome some of these limitations.

Data Sets and Data Sources

For the Forestry Biomass Residues the following data sets have been produced using the listed data sources and the limitations of this data have been described.

Data Set:

Forestry Biomass Residues

Plantation Hardwood Pulplog; Plantation Softwood Pulplog; Plantation Softwood Harvest; Plantation Softwood Processing

Source Data:

Australia's plantation log supply 2015-2059, ABARES

"This report has been prepared by ABARES under the auspices of the National Plantation Inventory--a program that has collected data and reported on plantations established primarily for wood production in Australia since 1993. Comprehensive plantation log availability forecast reports are published every five years and Australia's plantation log supply 2015-2059 is the fifth log supply report."

https://www.agriculture.gov.au/abares/research-topics/forests/forest-economics/plantation-and-log-supply#australias-plantation-log-supply-20152059

Limitations/Clarifications:

Geographical areas are ABARES NPI Regions.

References

Bootle KR (1986) Wood in Australia: types, properties, uses. McGraw-Hill, Sydney.

ABARES 2016, Australia's plantation log supply, 2015 - 2059, Australian Bureau of Agricultural and Resource Economics and Sciences, Canberra, 2016.

For more information

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