Wine:

Winery Residues/National Crush/Wine Processing

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

The National ABBA Team have consulted widely to ensure a consistent and standardised representation of biomass feedstock data with regard to organisation of content, units of measurement and aggregation methods. This has led to the development of a baseline schema including minimum data requirements for data capture and upload. It is expected that this approach will lead to a robust and repeatable method for data capture and generation of datasets for use across all regions. There will be some variation however, in the way in which each state characterises various feedstocks depending on source data, data analysis techniques, expert advice and other considerations.

Every effort has been made to provide a consistent and consultative approach to data collection and presentation in order to provide the best outcome for users.

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 Rural Industries Research and Development Corporation (RIRDC), with funding support from the Australian Renewable Energy Agency (ARENA).

Why Winery Residues

The generation of bioenergy and production of biofuels from winery residues, such as processing (e.g. grape marc), vineyards (e.g. pruning's, stalks) and other organic material from excess production or insufficient market has the potential to provide positive outcomes.

Some of the advantages of using agricultural residues as a biomass feedstock include:

- Improvement of vineyard and winery waste management practices
- Diversification of revenue streams for growers
- Improvement of the economic viability of agricultural land
- Offset/reduce GHG emissions from agricultural practices
- Valuable by-product (e.g. biochar)
- Possibility of reduced energy costs
- Diversification of rural economies
- Environmental benefits

What data about Winery Residues is uploaded to AREMI?

ABBA has published the following data onto AREMI:

- Residues - from winery and vineyard practices
    - Winery Residues by Geographic Indications (GI) Regions
    - Percent of National Crush by GI Region
    - Wine processing facilities that crush greater than 20,000 tonnes per annum

Method

Winery Biomass residues (including winery residues, % national crush and processing facilities)

This dataset represents winery waste and was derived from crush volumes contained in the National Vintage Report, 2017, which is released jointly by Wine Australia, the Winemakers' Federation of Australia and Australian Vignerons. The information in this report was collected on behalf of the Australian wine sector in the winegrowing regions in Australia. Wine Australia wine grape levy payers (approximately 2,000 businesses) were surveyed in the Wine Sector Survey.

The Winery Residues dataset is represented spatially as Geographical Indications (GI) Regions of Australia. Only defined GI regions where the total collected tonnage exceeds 1,000 tonnes have been included.

This Winery Residues dataset contains the breakdown of crush (production) into solid winery processing waste and was undertaken in consultation with industry and academia as well as utilising existing studies. The method used to create this dataset was adapted from Bacic, T,

2003, "Recovery of valuable products from lees and integrated approach to minimise waste and add value to wine production" and verified by regionally specific research in South Australia. This report indicates that stalks and grape marc comprise the following percentages of the total crush: Stalks - 3.5% Grape marc - 13.6%

The quantity of stalks generated varies greatly and depends on whether the fruit is machine harvested (vineyard residues) or handpicked (winery residues).

Other research suggests that (Wet) Grape marc production is approximately 20-25% w/w of the fresh weight of grapes crushed.

The Wine Residues dataset uses the Bacic figures for stalks and grape marc while adding a 20% figure representing other research.

MINIMUM values exclude stalks from the Total whilst MAXIMUM and TOTAL RESIDUES include stalks and grape marc.

The following provides a basic worked example for National Winery – Residues by GI Region for the Riverland GI Region.

1. Total Crushed (2017) = 470,123 tonnes

Bacic research

2. Stalks 3.5% and Grape Marc 13.6% of crush = 17.1% = 80,391 tonnes
3. Potential residue types and % splits and tonnes resulting
    - Grape Marc – 13.6% = 63,937 tonnes
    - Stalks – 3.5% = 16,454 tonnes
    - Moisture Content = 50%

Other research

4. Wet Grape Marc (assumed) = 20% of weight of total crush = 94,025 tonnes

The following provides a basic worked example for National Winery – Percent of National Crush by GI Region for the Riverland GI Region.

1. Total Crushed (2017) = 470,123 tonnes
2. National Total Crushed = 1,958,846
3. Riverland has 24% of national crush

The following provides a basic worked example for National Winery – Processing Facilities

1. Crush Tonnes (2017) > 200,000
2. Tonnes = 220,000
3. Riverland has 15% of total crushed

Note: This method provides a singular estimate of biomass residues in that year. Grape production, biomass generation, and residue volumes will vary seasonally and in different regions depending on soils, climate and other agricultural conditions. Future winery biomass data sets could consider providing a range for biomass residue volumes, which may better reflect the uncertainties in annual volumes that may be generated. It is also important to recognise that much of some of the residues may already be resource recovered and reused (e.g. grape marc to distillery). Future data sets could quantify this resource recovery activity. Exploitation of some of these residues could require development of innovative technologies for collection and/or aggregation.

Winery – Mapping considerations for the AREMI

This data is presented at the Geographical Indications level

Level of Current Use

An attempt was made to estimate the proportions of each of the various categories that is currently disposed of (and hence could be considered most available for redirection into bio-industrial use). As mentioned previously, some of these residues may be resource recovered and reused and others may have a logistic or economic barrier to recovery.

This is an area where more information may become available as the project progresses.

Outputs

The final data outputs are:

- Residues by GI Region
- Percent of National Crush by GI Region
- Processing Facilities

Note: This method provides a singular estimate of biomass residues in that year. Wine production, biomass generation, and residue volumes will vary seasonally and in different regions depending on soils, climate and other agricultural conditions. Future winery biomass

data sets could consider providing a range for biomass residue volumes, which may better reflect the uncertainties in annual volumes that may be generated. It is also important to recognise that much of some of the residues may already be resource recovered and reused (e.g. as animal feed, to return carbon and nutrients into the soil). Future data sets could quantify this resource recovery activity. Exploitation of some of these residues could require development of innovative technologies for collection and/or aggregation (e.g. to recover pruning's left by harvesting).

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 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.

Note

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 a similar previous (biomass mapping) study undertaken for the Limestone Coast region of South Australia. 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.

Data Sets and Data Sources

For the Winery 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:

Residues by GI Region

Percent of National Crush by GI Region

Processing Facilities

Source Data:

Australian & New Zealand Wine Industry Directory, 2017. The largest wine processing facilities are represented in Table 24 on page 12 of this publication.

Limitations/Clarifications:

Geographical areas are Geographical Indications Regions.

The method used to create this dataset was adapted from Bacic, T, 2003, "Recovery of valuable products from lees and integrated approach to minimise waste and add value to wine production" and verified by regionally specific research in South Australia. This report indicates that stalks and grape marc comprise the following percentages of the total crush: Stalks - 3.5% Grape marc - 13.6%

References

Bacic, T, 2003, "Recovery of valuable products from lees and integrated approach to minimise waste and add value to wine production".

Australian & New Zealand Wine Industry Directory, 2017 - https://winetitles.com.au/

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