BIOMASS FOR BIOENERGY

Demonstration of potential for bioenergy to contribute to energy system transformation in NSW

Biomass is a renewable storable feedstock that can be utilised in many applications including electricity generation, where it can provide dispatchable power and create stability that allows the expansion of intermittent renewables (solar and wind) without the need for expensive storage solutions. Bioenergy could therefore play an important role in supporting transition to a low-carbon energy system, required to meet net zero emissions.

There are significant opportunities for displacing fossil fuels currently used for electricity generation in NSW with the use of biomass. However, this needs to be supported by robust science and realistic techno-economic assessments of the technologies considered for specific regions, at varying scales of generation. This work will assist in reducing the uncertainty for potential investments in the sector.

Hybrid solar-biomass plant in Spain © COMSA

Pellet mill at Altus Renewables, Maryborough, Qld

Key Goals

- Identifying and testing the suitability of native woody crops to supply biomass for bioenergy;
- Determining the feasibility of electricity generation from biomass in co-generation with coal and solar options, and as stand-alone biomass power stations;
- Determining the potential contribution of bioenergy to emissions reduction in NSW, including an understanding of community perceptions around bioenergy.

Key Benefits

- Demonstration of diversification opportunities for landholders across NSW, with biomass production from energy crops, and associated co-benefits (carbon sequestration, soil improvement, greater biodiversity);
- Identification of hot spots for grid-scale electricity generation from biomass in NSW;
- Provision of robust information to inform policy development in NSW, assisting with climate, energy and socio-economic goals.

Bioenergy crop trial seedlings © DPI

Key Deliverables

- Field-based estimates of productivity and carbon sequestration of native woody crops managed on short-rotation for bioenergy use for various regions of NSW;
- Demonstration of the feasibility of the use of biomass for grid-scale electricity generation;
- Development of a tool to estimate bioenergy generation potential and climate impacts of various bioenergy technologies across selected regions of NSW, considering existing and potential biomass sources.

The work program involves a combination of field work, techno-economic assessments, scenario modelling and tool development. A key feature of the project is the establishment of partnerships with relevant research institutions, allowing the development of a comprehensive, robust work program. The following are key activities that underpin the work program:

- Industry/stakeholder engagement to inform energy crop trials and energy generation options;
- Establishment of bioenergy crop trials across a range of sites in NSW;
- Techno-economic assessments of biomass co-generation with coal and solar options and as stand-alone biomass power stations;
- Scenario modelling, including the role of biomass in a 100% renewable grid; and life cycle assessment of the impact of biomass co-firing in coal-fired power stations;
- Engagement with regional communities through socio-spatial case studies for selected regions;
- Development of a spatial tool to allow for a rapid understanding of the potential for biomass use for bioenergy in different regions of NSW, including costs and climate implications.

Bioenergy crop trials across NSW © DPI

Site preparation | *Planting seedlings* | *6 month measurements*

For further information, please contact
NSW Forest Science
Senior Research Scientist Fabiano Ximenes
T: 0458 760 812
Fabiano.Ximenes@dpi.nsw.gov.au
Research Officer Catherine Carney
T: 0439 915 269
Cath.Carney@dpi.nsw.gov.au

Adoption of biomass as a dispatchable energy option for electricity generation in NSW, resulting in lower emissions, greater energy security and promoting socio-economic growth in regional areas.

Bioenergy crop trial seedlings © DPI