NSW GOVERNMENT | Department of Primary Industries

Biomass in the Hunter: Prospects and Possibilities




Fabiano Ximenes; Senior Research Scientist, DPI Forestry, October 2018, BioValley Forum

Outline

* Why Biomass

* Growing the energy of the future

* Baseload BioPower

* Hybrid Solar:BioPower

Problem

- Energy security and reliance on fossil fuels for electricity generation major concerns for NSW
- Need for reliable electricity supply as coal-fired power stations phased out

Opportunity

- Biomass provides baseload power without need for expensive storage - gradual transition to wind / solar
- Contribute to GHG emission reductions; regional growth (job multiplier), opportunities to go off-grid
- Opportunity for mining land rehab and diversification for farmers: energy crops

Re-energising the Landscape

Energy crops

Partners: *CSIRO; DPI Research Stations*

- *Why?*

Existing biomass insufficient for large-scale power

- *Opportunity*

Large areas of mining lands; farms

- *Has it been done before?*

Well-established concept around the world

- *What is possible?*

Large-scale planting of native, woody crops; 3-4 year cycles; locally grown biomass for baseload power generation

Re-energising the Landscape

Energy crops –cont.

- *Added benefits*

Increased C sequestration, soil benefits and biodiversity; wind breaks; allowing other activities (e.g. grazing)

- *What crop?*

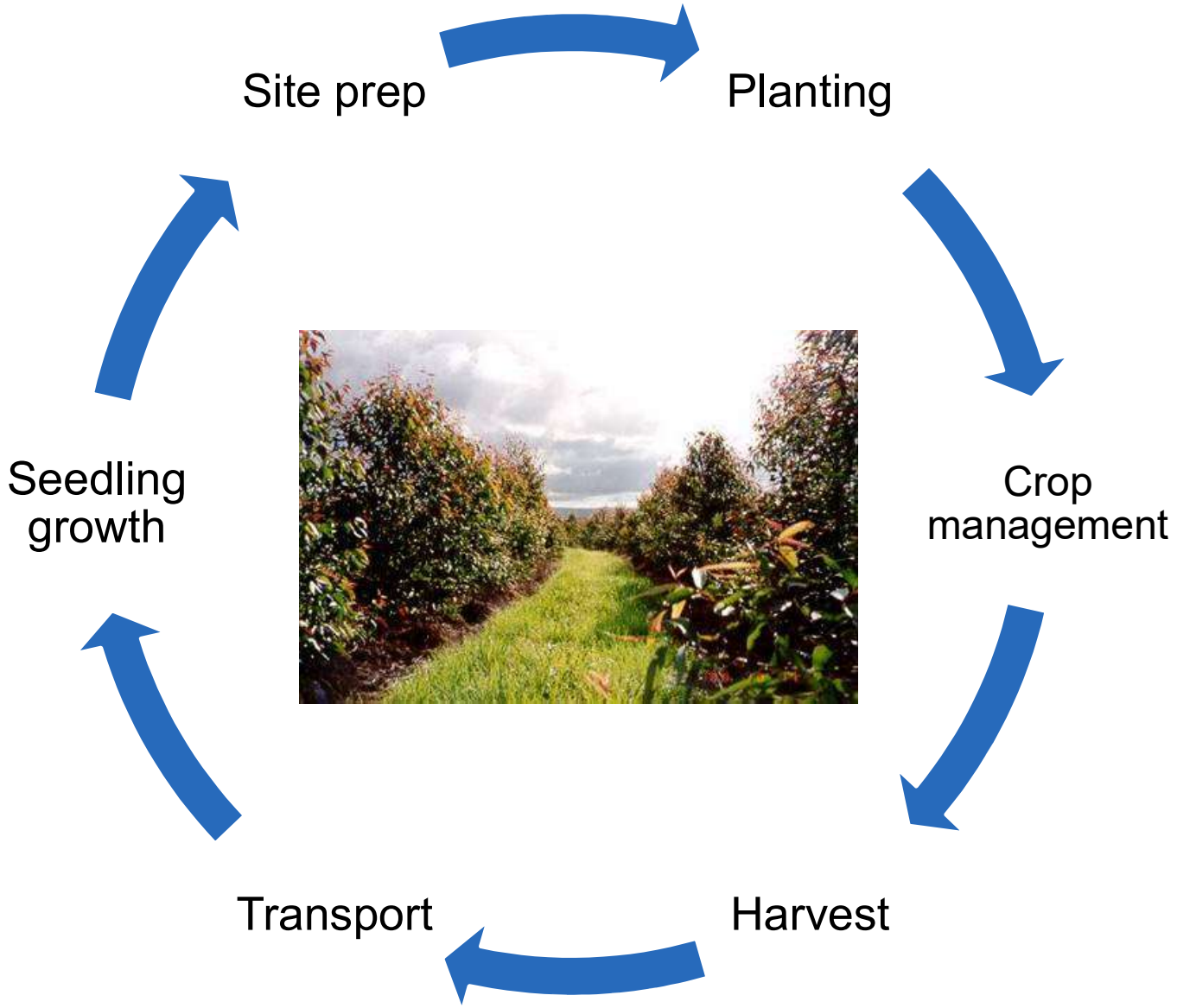
Native, coppicing, hardy, drought-resistant

- Crops may be used for a variety of applications: electricity, biofuels, etc…

NO competition with traditional crops

- *Impact on the region?*

Biomass job multiplication effect – continuous cycle


Site prep
Planting
Crop management
Harvest
Transport
Seedling growth

Bio-reliable Electricity
Biomass in power stations

***Partners**: Uni of Newcastle; UTS; FutureMetrics*

- *Why?*

Transition from coal, need for reliable, dispatchable sources

- *Opportunity*

Large areas of land near where power is generated.

Gradual transition from coal - ↑co-generation rate over time

- *Has it been done before?*

Co-generation is a very mature, reliable technology: North America, Europe, Asia, some experience here





Bio-reliable Electricity
Biomass in power stations





- *What is possible?*

Biomass processing facility near where power is generated - unique in the world.

Circular economy opportunities (use of heat for drying biomass / local industry); extraction of green chemicals.

- *Added benefits*

Use of existing infra-structure (no new capital investment); emission reductions

- *Impact on the region?*

Job creation in the establishment and running of biomass processing plant and related industries

Hybrid Power: Bio:Solar Electricity





- **Partners:** UTS; ERK Eckrohrkessel GmbH
- *Why?*

Plentiful biomass and solar; ideal for small / medium power needs; flexibility in feedstocks.

- *Benefits*

Provision of baseload power; biomass boiler/gasification adds stability to intermittent solar (CSP); increased outputs /efficiencies.
No need for battery storage. Reduced transmission losses.
Heat generated may be used.

- *Opportunity*

Local councils; supplying regional centres (ability to go off-grid); industry requiring heat / cooling. Ideal use of waste / local residues

Hybrid Power: Bio:Solar Electricity – cont.

- *What is possible?*

Network of facilities generating renewable baseload power where needed plus heat / cooling

- *Added benefits*

Surplus power may be supplied to low-income households; emission reductions

- *Impact on the region?*

Job creation in running of hybrid plants and related biomass industries (collection and transport of waste)

- *Has it been done before?*

Termosolar Borges (Spain); 22.5 MW (supplying 27,000 homes); feedstock is forest residues (66,000 t /year); investment of $153M Euros.

Long-term aim

"Adoption of biomass as a dispatchable energy option for electricity generation in the Hunter; resulting in greater energy security, lower emissions, and promoting socio-economic growth"