North East NSW Forestry Hub

Towards a Circular Economy through Stewardship

A pathway for the north-east NSW forest industry

15 October 2023

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Regenerating Natural Systems is a Pillar of Circular Economy

"The circular economy is based on three principles, driven by design:

1. Eliminate waste and pollution
2. Circulate products and materials (at their highest value)
3. Regenerate nature

Regenerative production is an approach to managing agroecosystems that provide food and materials – be it through agriculture, aquaculture, or forestry – in ways that create positive outcomes for nature. These outcomes include, but are not limited to, healthy and stable soils, improved local biodiversity, improved air and water quality, and higher levels of carbon sequestration."

Source: Ellen Macarthur Foundation

Reframing the Role of Forestry in a Circular Economy

As practiced, forestry in the North-East Region is already delivering positive outcomes for nature. There are, however, three very important stewardship services that forestry could provide that would reposition it as a circular economy leader; they are:

1. **Protecting forests from high intensity wildfires**

2. **Capturing and storing carbon**

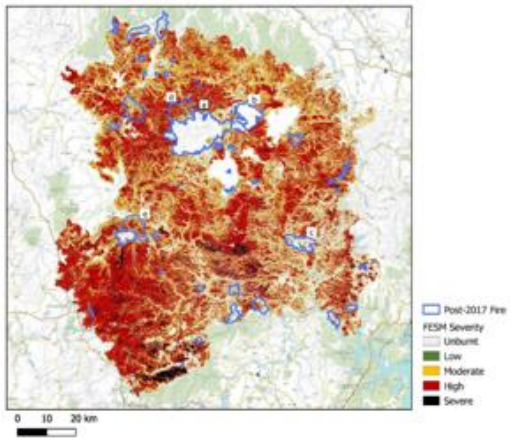
3. **Supporting the development of emerging markets**

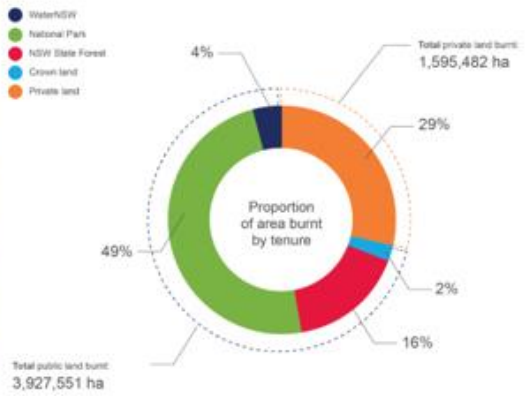
Protecting Forests from High Intensity Wildfires

The issue

- High intensity wildfires are highly detrimental to forest values. Every time there is a large intense wildfire - biodiversity, carbon stocks, water and air quality, soils, timber, cultural heritage, and infrastructure are all seriously impacted.
- The cost to the environment, society and the economy can be massive.
- In the 2019-20 bushfires 5.5 million hectares were burnt , 800,000 hectares burnt at high or severe intensity. Seven fires exceeded 200,000 hectares in size.
  - $4.6 billion reduction in GDP, 1.8% GDP decrease in affected areas (Clth Treasury)
  - 26 lives lost; 2,476 homes destroyed (NSW Bushfire Inquiry)
  - 830 million tonnes of carbon dioxide equivalent were emitted (DCCEEW)
  - 3 billion animals killed or displaced including 143 million mammals, 2.46 billion reptiles, 181 million birds, and 51 million frogs (WWF).
  - Record-setting air pollution in NSW (NSW DPE)
  - Ecological carrying capacity reduced by 39% within the NSW fire ground (NSW DPE)
  - High sediment loads within rivers that resulted in localised fish kills and large-scale water quality impacts (CSIRO).
  - 25% of NSW plantations burnt – Over 5 million tonnes of wood had to be salvaged (FCNSW)
  - 1 million m^3 of high-quality native sawlog destroyed/downgraded (FCNSW)
  - Major restrictions imposed on native timber harvesting from concerns about compounding environmental impacts (TNSW).

Protecting Forests from High Intensity Wildfires





The solution

- Limiting the spread of wildfires by creating a network of low forest fuel zones strategically located across the landscape

Forestry's role

- Development of markets for wood biomass to support the economics of forest protection
- Management of mechanical thinning operations that reduce forest canopy cover

The benefits

- The environment is protected, and billions of dollars are saved through avoided damage
- Forestry positioned as a leader in climate change adaptation

The challenge

- Convincing environmental policy makers that active management interventions are needed in native forests

Capturing and Storing Carbon

The issue

- Without more investment in natural regenerative systems, it will not be possible for Australia to achieve Net Zero
- Expensive and complex project-based accounting under the ERF is limiting uptake of carbon sequestration projects

The solution

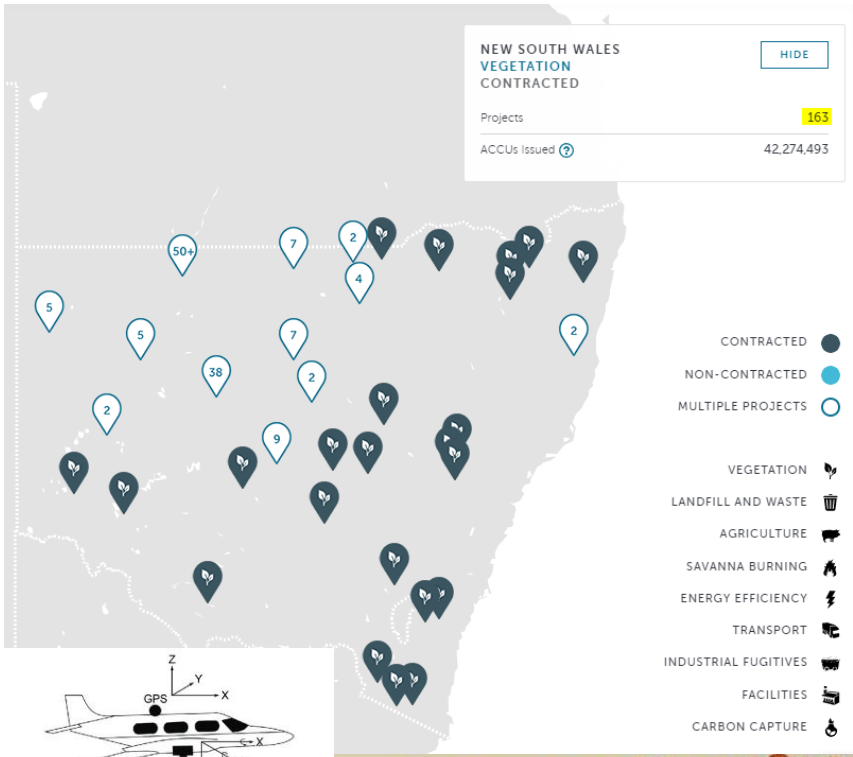
- A simplified national approach to monitoring carbon stock changes in vegetation is needed
- Investment and use of remote assessment technology (LiDAR) is the solution. This is logically a role for government as there are multiple public benefits

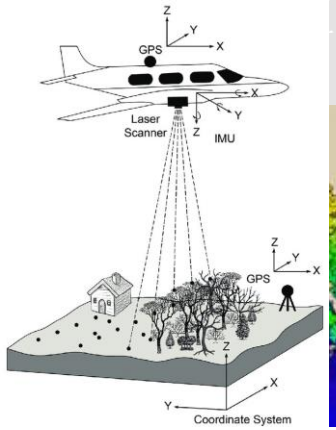
Forestry's role

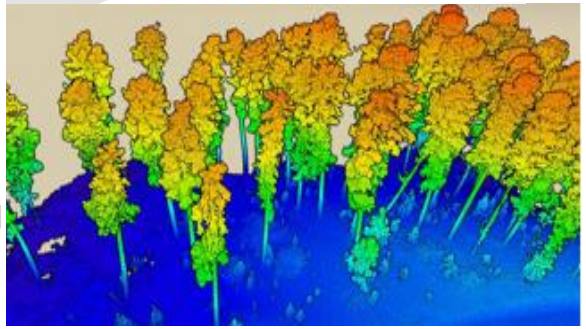
- Re-invigorate investment in new long rotation plantations for carbon and timber to meet Australia's growing needs

The benefits

- Publicly collected LiDAR data has multiple uses and benefits including for monitoring agriculture, bushfire hazards, state of the environment, forestry timber resources, development and infrastructure
- If accounting and auditing costs for carbon can be minimised, a compelling business case will emerge for landholders to invest in trees
- Forestry seen as part of the solution to climate change mitigation



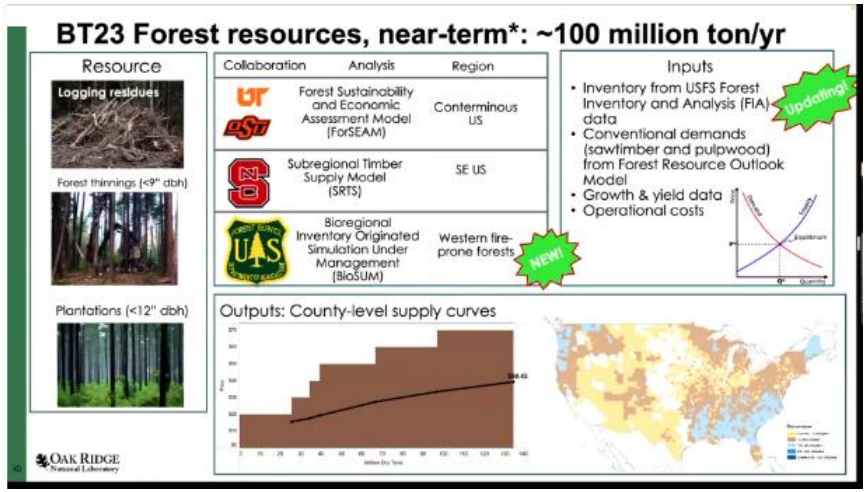




Supporting the Development of Emerging Markets

The issue

- For Australia to meet its GHG emission reduction targets, it needs to make better use of its woody biomass residues
- Carbon dioxide reduction (CDR) credits and negative emissions technologies (NETs), including pyrolysis and gasification, need forestry residues to deliver full benefits
- In North East NSW
  - Over 1 million tonnes of harvested pulpwood is being left to waste in the forest every year
  - Thousands of hectares of plantations and hundreds of thousands native regrowth forest remain unthinned
  - Markets for wood processing residues remain weak
  - Creating low fuel zones to protect forest values remains prohibitively expensive in the absence of woody biomass markets
- We're not alone! The United States has identified 100 million tons per year of useable woody biomass material.



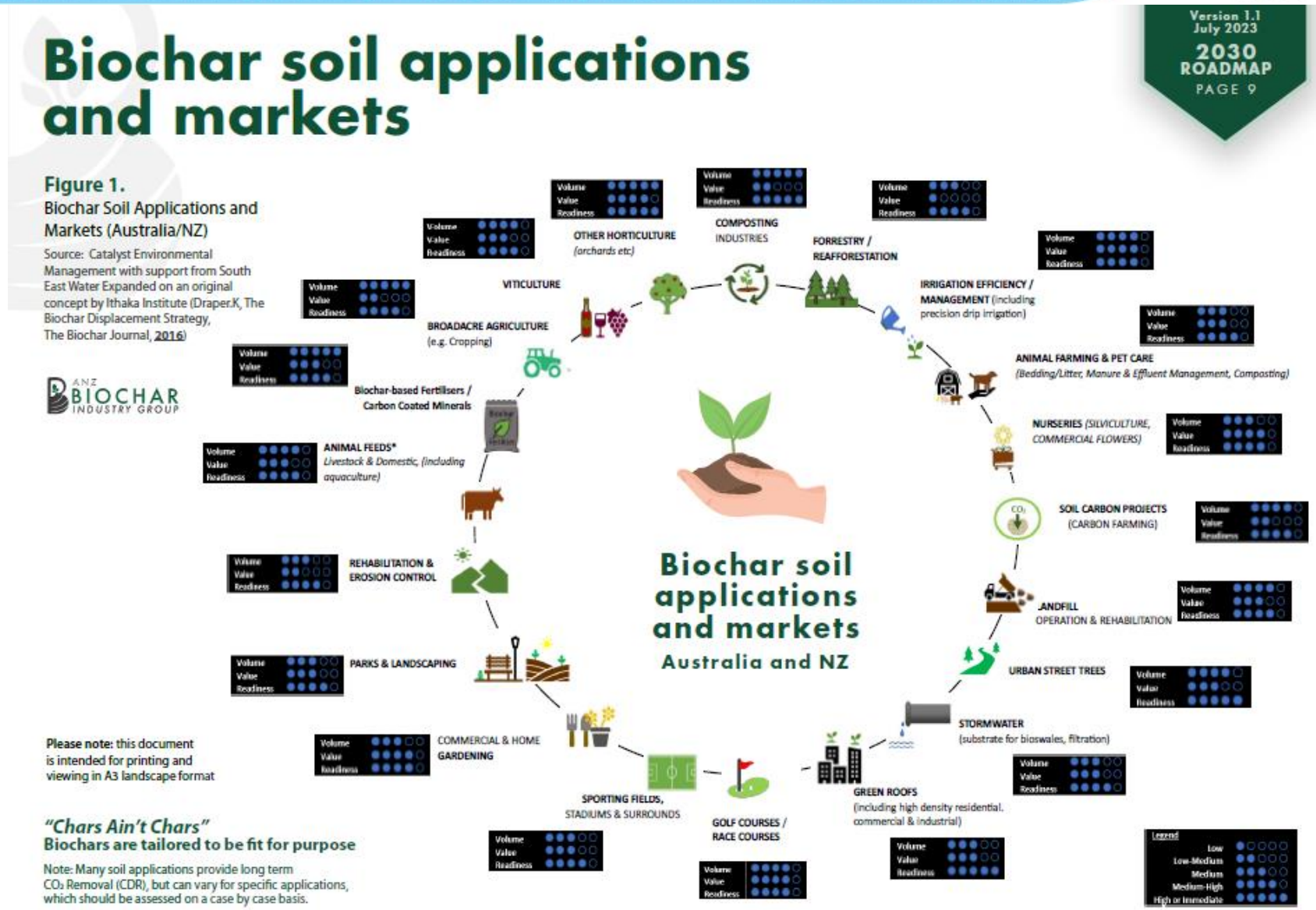
Supporting the Development of Emerging Markets

THE SOLUTION

- Development of diverse markets for woody biomass
- Creating higher values for residues to increase cost-effective transport distances and more commercially viable options
- Increased demand for sustainably-sourced biomass, including forestry residues:
  - Public and private Net Zero efforts
  - Australian Biochar Industry 2030 Roadmap - world-first biochar industry roadmap
  - NSW DPI consortium heading up NSW Decarbonisation Hub
    - Biochar from residues can help decarbonise industries including steel, concrete, built environment
- Resource mapping under Timber Circularity project for treated timber and engineered wood products / other efforts
- North East NSW Forestry Hub workshops
- Avoid industry isolation – collaborate with Biochar, Agriculture, Water and other sectors to develop and demonstrate integrated systems for mutual benefits, incl. regional development
- Increased emphasis on stewardship, circular economy and social license to operate
- Upcycle resources and their values – timber hubs, water treatment plants etc. become resource recovery hubs

Emerging Market Opportunities - Soil Applications for Biochar

- More than just Agriculture…
- Standard Grade / Feed Grade Biochars (ANZBIG Code of Practice)
- P recovery for higher order use



Emerging Market Opportunities - Non-soil Applications for Biochar

Industrial Grade Biochars (or higher) (ANZBIG Code of Practice)

Other Non-Soil Uses of Biochar and Biocarbons

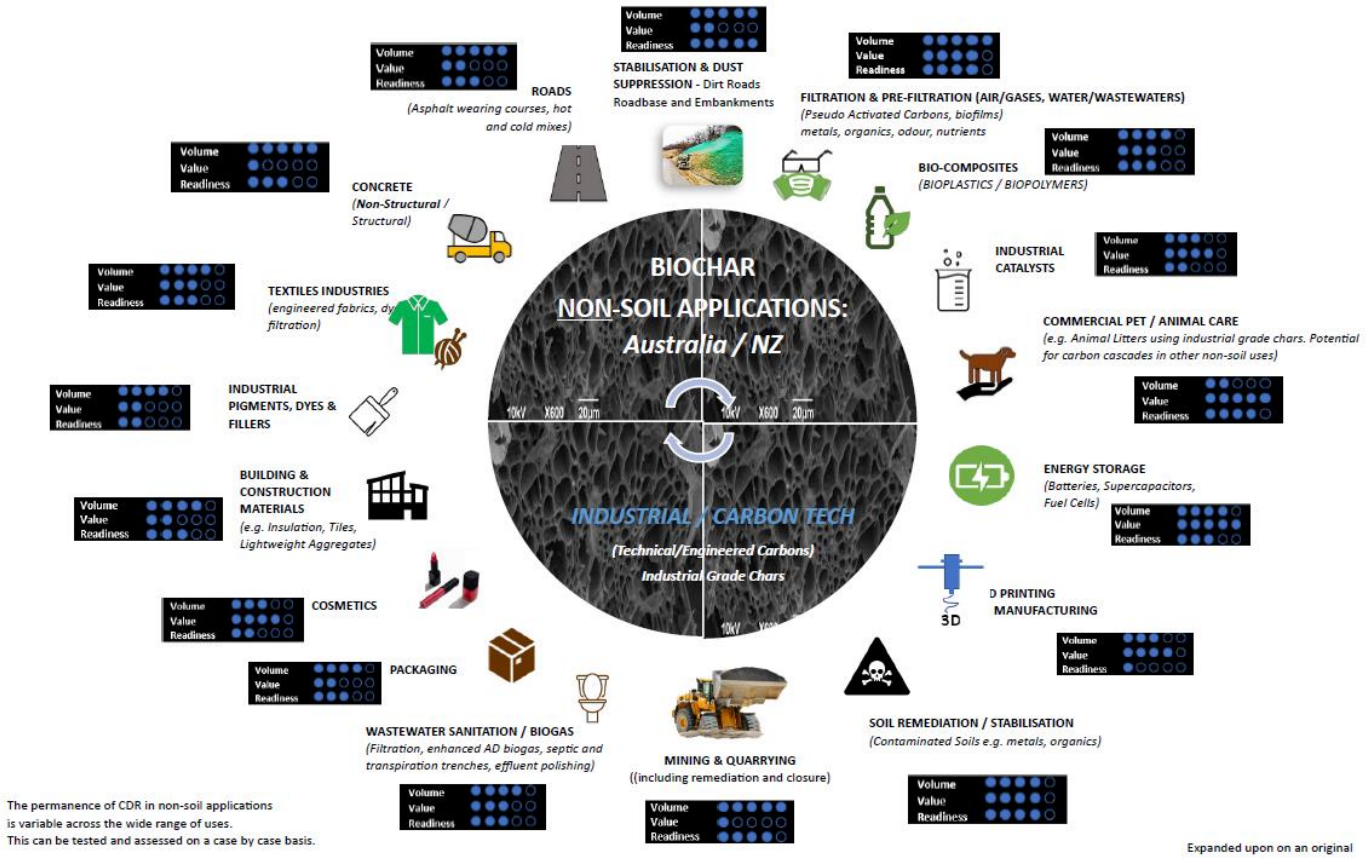


Figure 1. Biochar Non-Soil Applications and Markets (Australia/NZ) – Industrial / Carbon Tech

Source: Catalyst Environmental Management with support from South East Water Expanded on an original concept by Ithaka Institute (Draper.K, The Biochar Displacement Strategy, The Biochar Journal, 2016)

ANZ BIOCHAR INDUSTRY GROUP

The permanence of CDR in non-soil applications is variable across the wide range of uses. This can be tested and assessed on a case by case basis.

Expanded upon on an original concept by Ithaka Institute 2016 (Draper,K: The Biochar Displacement Strategy,

Legend: Low; Low-Medium; Medium; Medium-High; High or Immediate

"Chars Ain't Chars"....

Biochars for Non-Soil Applications are engineered to be *Fit for Purpose*. They should be sustainably sourced and consider optimal use of available biomass resources and optimal use of land (including biomass cropping).

Please note: this document is intended for printing and viewing in A3 landscape format

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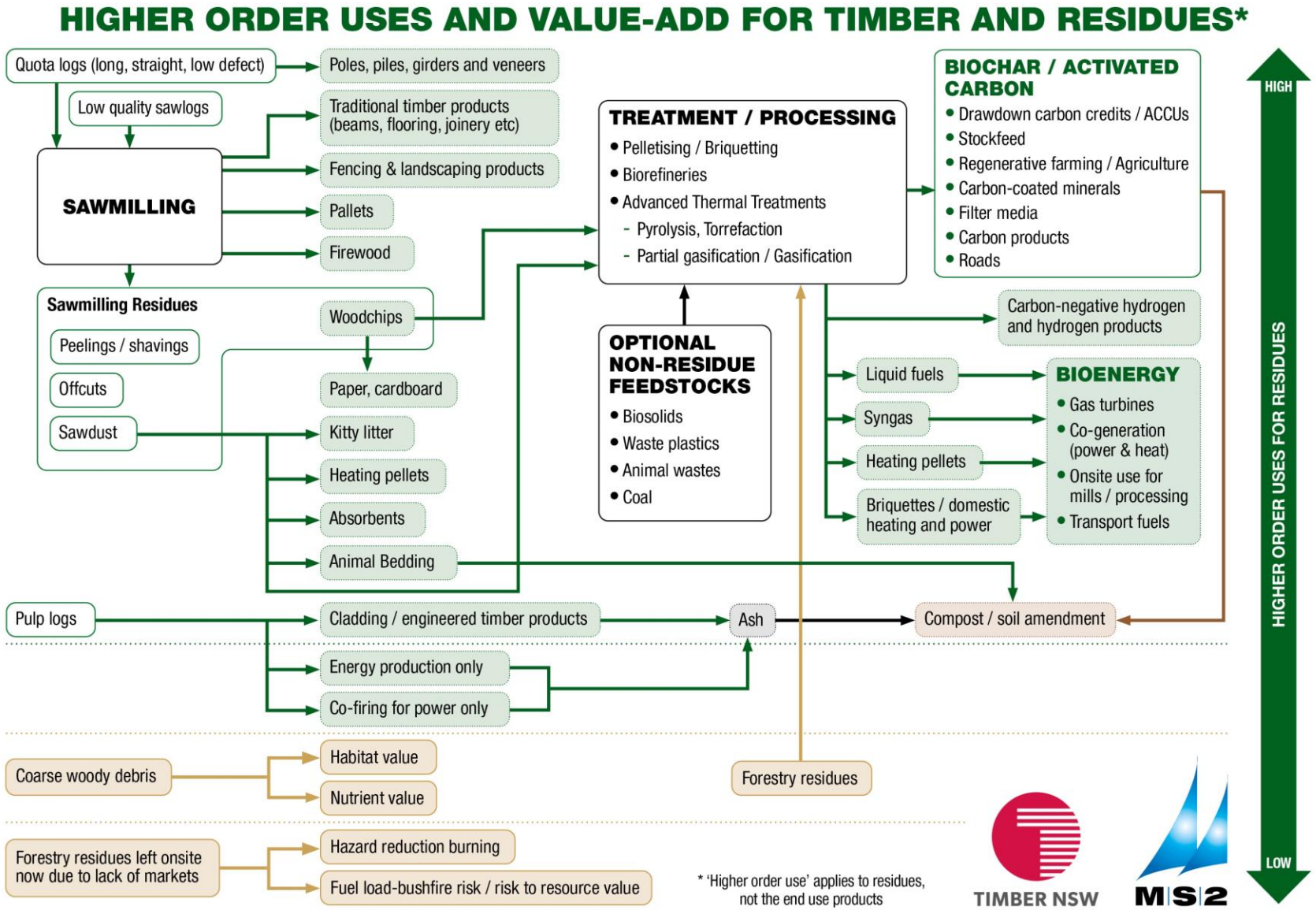
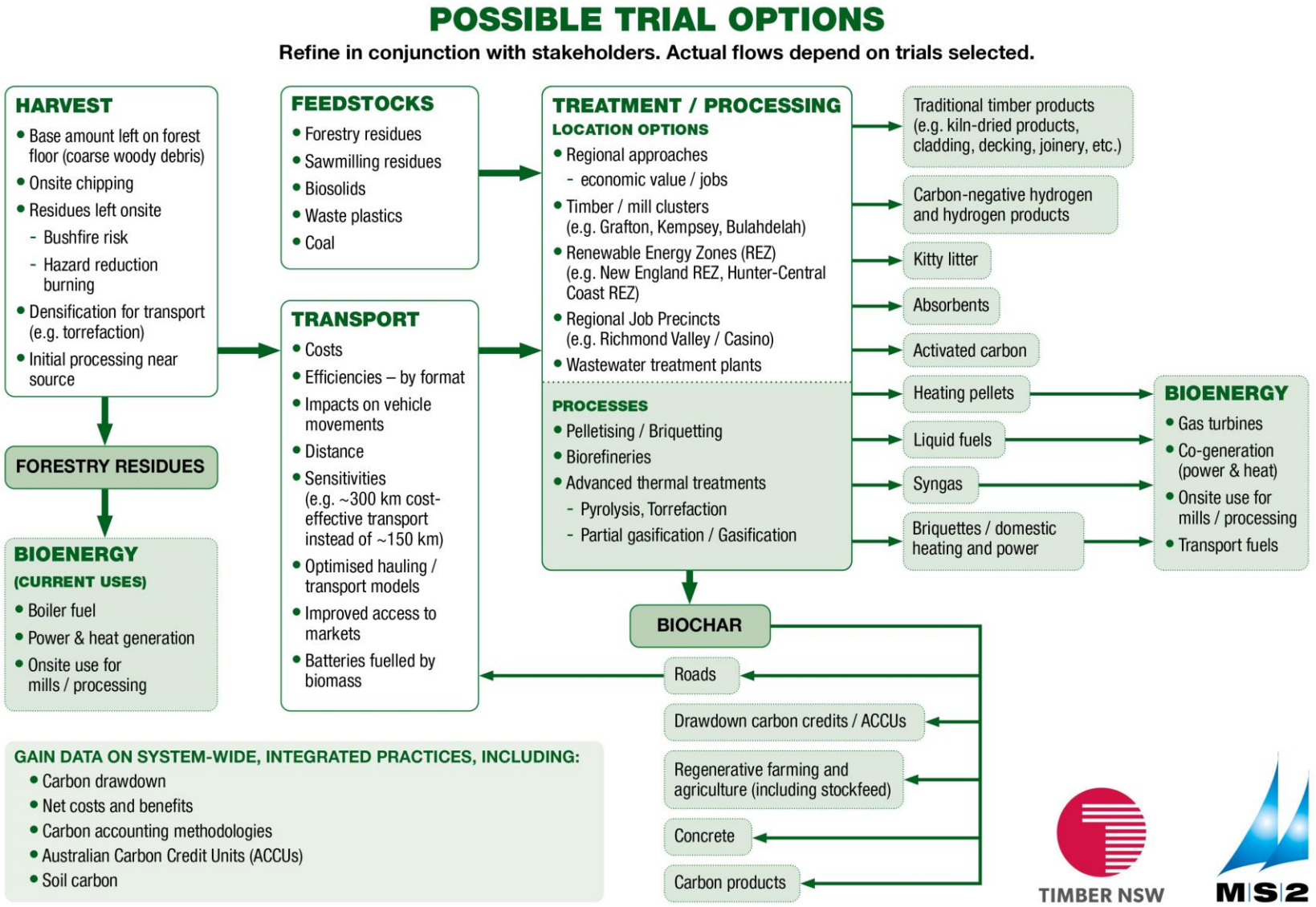
Pathway Forward for Emerging Markets

- Social licence to operate and limited resource supplies can have a significant effect on feedstock availability
- Smaller, varied projects can build local resilience and social licence to operate whilst helping prove various technologies to regulators
- Too many sectors are still operating in silos; need to collaborate better and look for synergies and circular approaches
- Need a fundamental rethink around technologies, feedstocks, risk management and regulatory approaches to address priorities including CDR, stewardship, circular economy, higher order uses, resource availability and systemic solutions
- Position industry to take advantage of emerging opportunities
- Seek to address regulatory barriers

Raise Awareness of Higher Order Uses and Integration

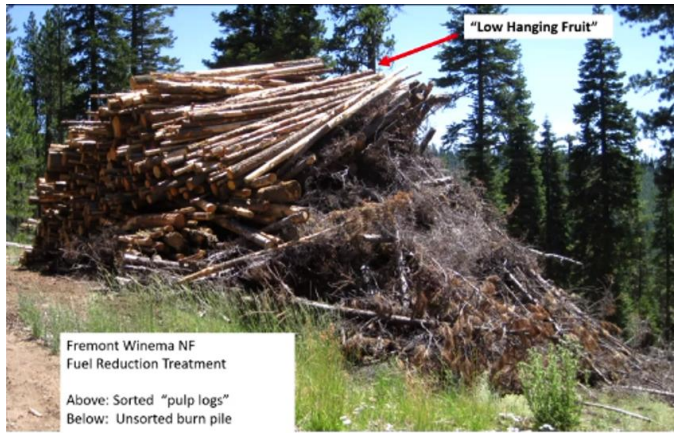


Investigate and trial approaches and technologies



Practical considerations for market development

- Feedstocks for treatment / processing
  - Many different types of feedstock – forestry, agricultural, municipal. Considerable potential for blending
  - Focused research is needed to determine availability. Availability is heavily influenced by cost:
    - Harvesting and transport costs are influenced by access quality, terrain, yield, and proximity to market
    - Feedstock specifications are also important - for woody biomass, logs are much cheaper to recover than slash, the lower the moisture content the lower the transport cost, sorting woody products in the bush is expensive
  - Keeping costs low is the best way to maximise availability.



Practical considerations for market development

- Feedstock processing and logistics – many options – horses for courses
  - Centralised vs decentralised - Economies of scale - Proximity to feedstock and proximity to market. NE NSW is fortunate to have abundant feedstock and prospective customers located relatively close to one another.
  - Independent versus co-located plants – need to weigh up the costs and benefits
- Regulatory approvals
  - Uncertainty around approval processes – clear pathways needed
- Certification and Traceability
  - Block chain technology is the solution
- System-wide economics, emissions, benefits
  - Benefits extend far beyond individual business models

Questions?

Contact Us

Russ Martin
Director, MS2

russ@ms2.com.au
0417 445 644
www.ms2.com.au

Nick Cameron
Manager, North East NSW Forestry Hub

manager@nenswforestryhub.com.au
0422 577 805
www.nenswforestryhub.com.au