Wood pellet potential from Green Triangle plantations

Presentation to Bioenergy Roadmap Stage 2 Forum 26th May 2016

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Any successful bioenergy project needs …

- Sustainable long term fibre supply
- Fibre meets processor quality requirements
- Affordable fibre price
- Favourable political climate
- Favourable energy cost environment

Taupo, New Zealand

Albany, WA

Maryborough, QLD

What are wood pellets?

- Alternative fuel for power stations and for home heating
- Feedstock is initially chipped to a uniform size
- Dried to uniform moisture content (<12%)
- Hammer milled
- Conditioned with super heated steam
- Forced through holes to form 8 mm pellets
- Lignin released that binds pellet as it cools
- Pellets leave press at about 90-95°C
- Initially soft and fragile, but harden as they cool
- Then ready for bulk storage and transport to market

Pellet conversion factors

- Fibre to pellet tonnes (Pt) depends on biofuel type
- The higher the bark & leaves, the lower the conversion
- Typically one GMT of WTC converts to about 0.55 Pt
- Logs (without leaves & branches) convert to about 0.65 Pt

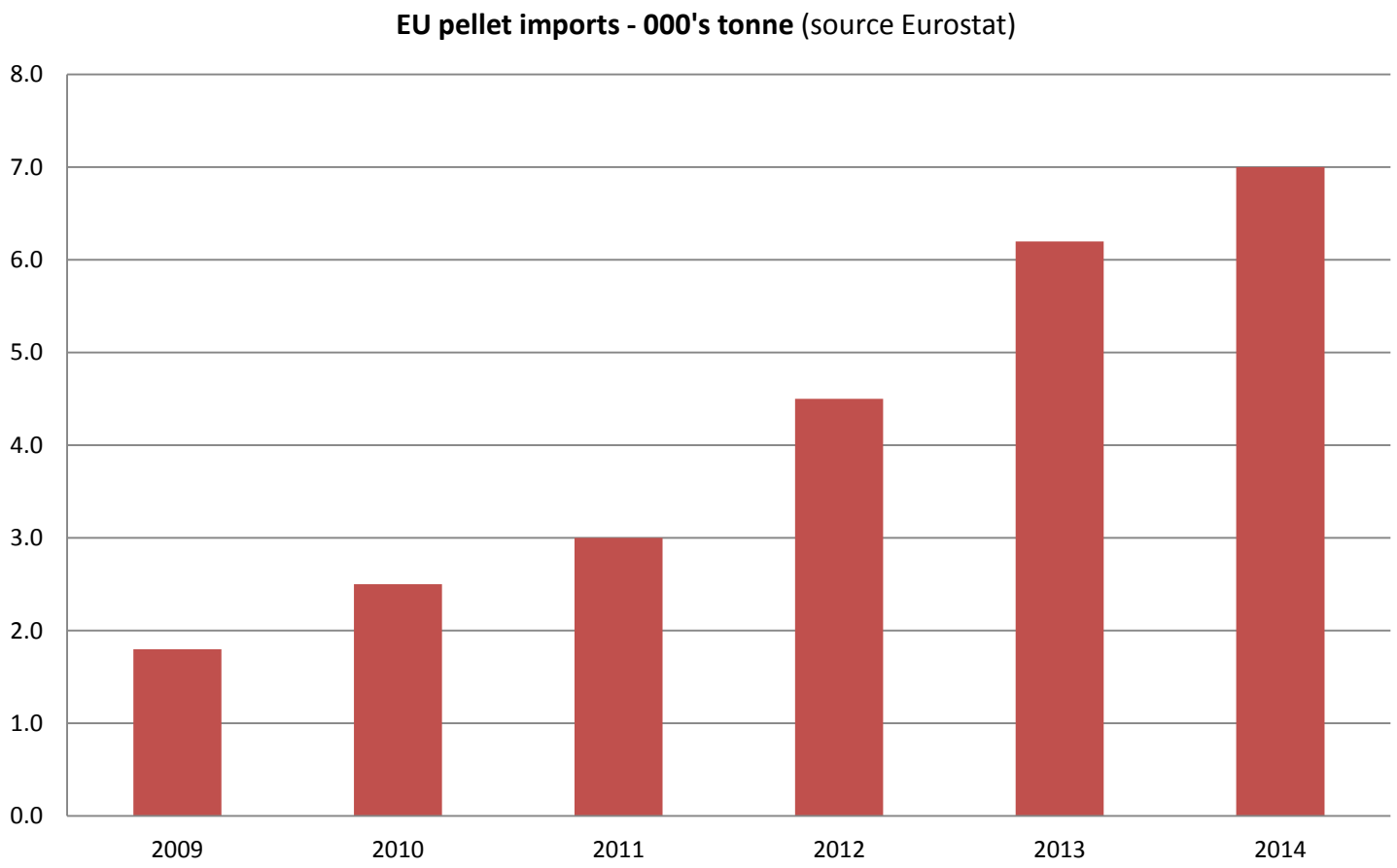
Where are the markets?

- Mainly UK, Italy & US
- Then Sweden, Denmark & Germany
- UK, Italy, Denmark & South Korea are key importers
- Intra-EU trade satisfies 75% of European domestic demand

Political demand drivers

- Europe is the key wood pellet demand driver
- Coal being displaced with biomass to reduce GHG's
- UK, Denmark, Belgium & the Netherlands previously dependent on coal – they lack biomass alternatives
- EU 2020 requires doubling of energy produced from renewable resources by 2020 (from a base in 2005)
- EU countries have different targets, based on socioeconomic factors and current energy mix
- Each country is required to develop individual National Renewable Energy Action Plan

Growth in EU pellet imports



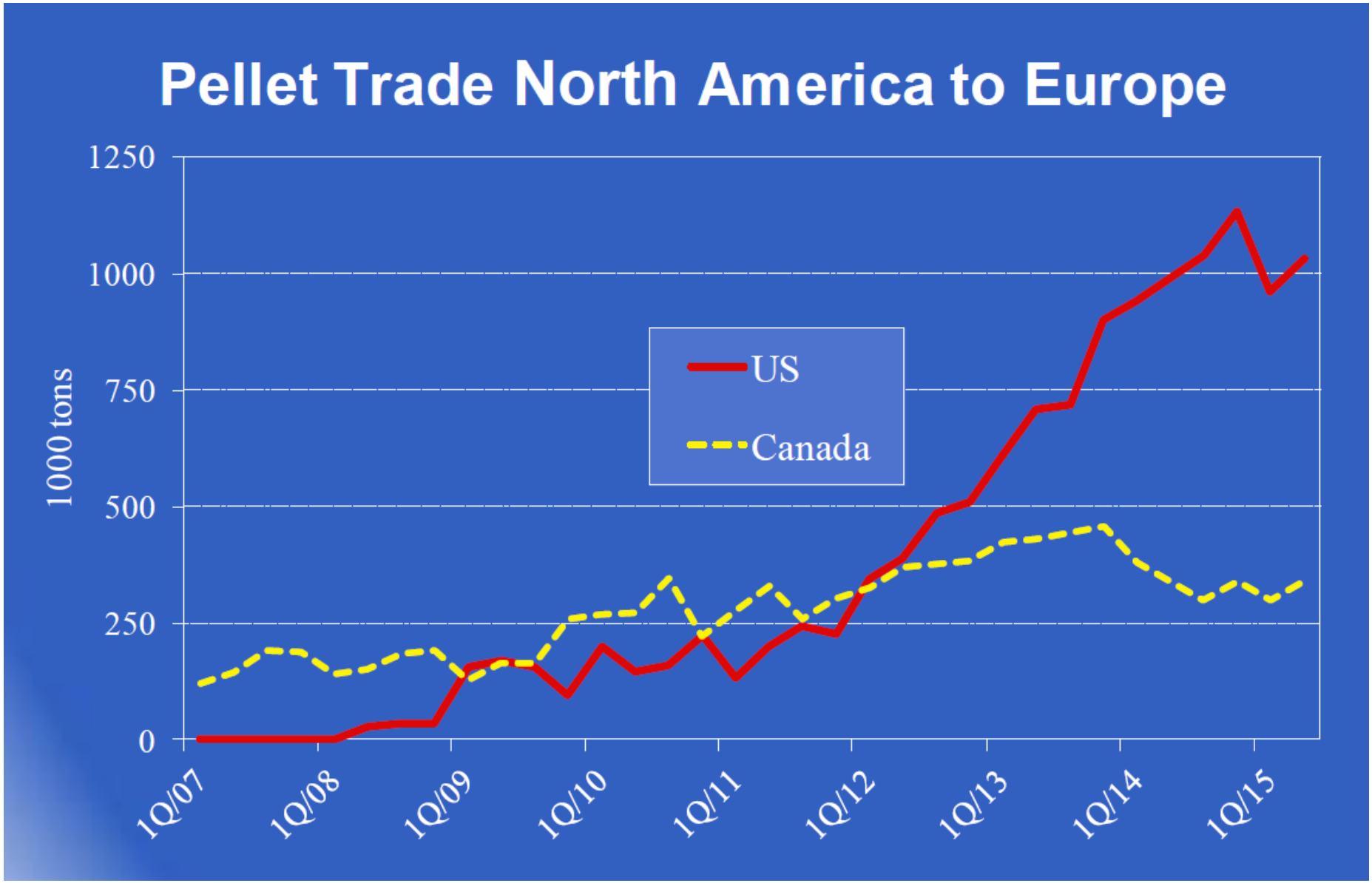
Future global wood pellet demand

- Global wood pellet production is continuing to expand to meet demand
- Demand growth due to government policies aimed at reducing GHG emissions through substitution with renewable fuel sources
- Wood and woody biomass for energy generation and heating is one of the fastest-growing segments of both the forest products and energy sectors
- Estimates have annual global pellet consumption growing from 28 mill tonnes (in 2015) to 49 mill tonnes (by 2020)

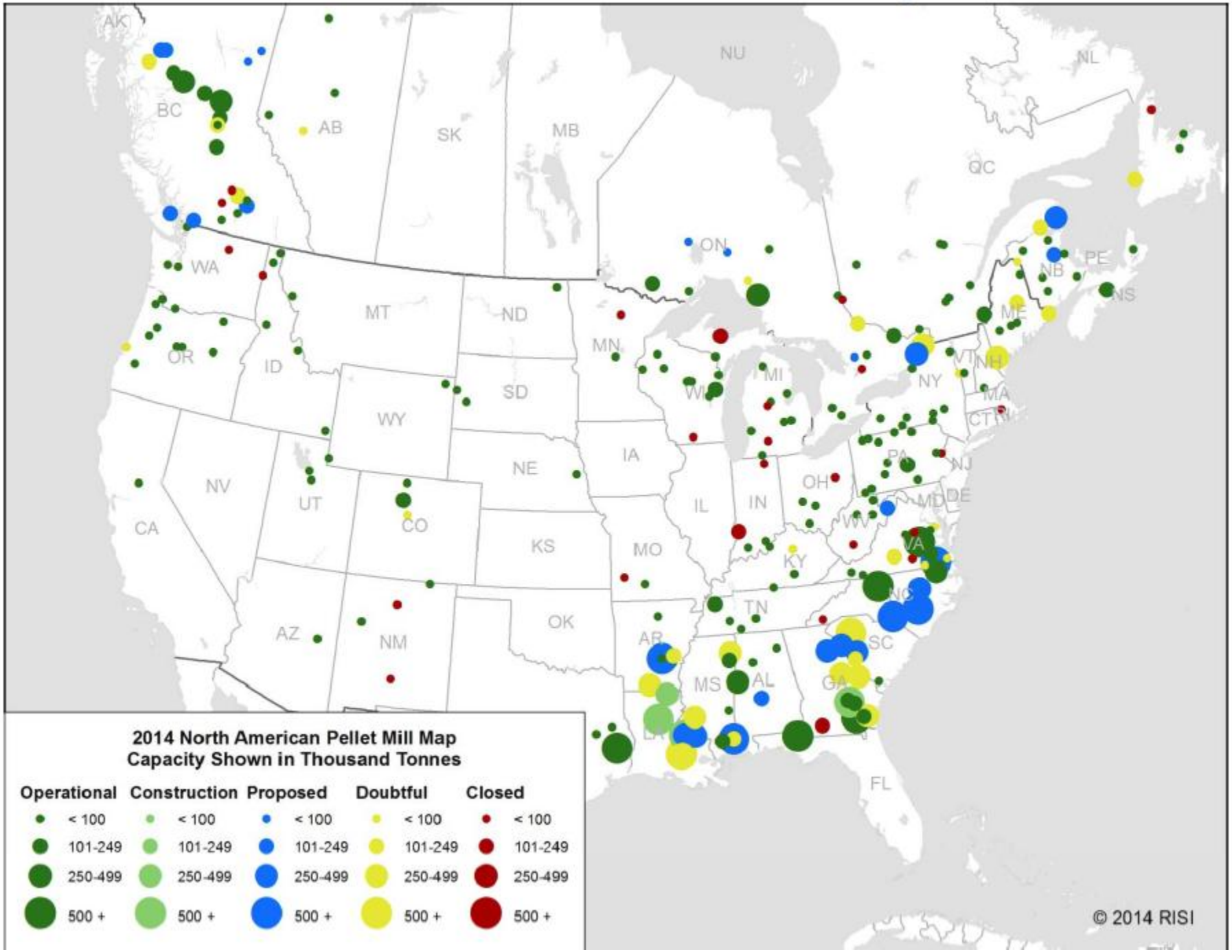
Source: International WOOD MARKETS Group, www.woodmarkets.com May 2016

Where are the main suppliers?

- The EU region is the largest producer of wood pellets globally
- Global supply (in 2014) was:
  - 48% from Germany, Sweden, Latvia, France and Portugal
  - 30% from North America
  - 22% from the rest of Europe, Russia & CIS countries, China and the rest of Asia



Source: Wood Resources International LLC (Nov 2015)


2014 North American Pellet Mill Map
Capacity Shown in Thousand Tonnes
Operational
Construction
Proposed
Doubtful
Closed
< 100
101-249
250-499
500 +
AK
BC
AB
SK
MB
NU
QC
NL
PE
NB
NS
ON
WA
OR
CA
ID
NV
MT
WY
UT
AZ
CO
NM
ND
SD
NE
KS
OK
TX
MN
IA
MO
AR
LA
WI
IL
MS
MI
IN
KY
TN
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MD
DE
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What does the Green Triangle offer?

- Largest plantation area in Australia (18% of national estate)
- 355,200 ha – about half pine and half blue gum
- Sustainable production – internationally certified forests
- Flat terrain for ease of harvesting and transport
- Surplus small diam roundwood (since KCA pulpmill closure)
- Current regional exports:
  - Hardwood chips - 3.0 mill GMT/year
  - Softwood chips – 0.6 mill GMT/year
  - Softwood logs – 1.3 mill GMT/year
- Some of these exports could be directed to pellet production
- Access to a port for exporting the pellet product

Fibre supply options

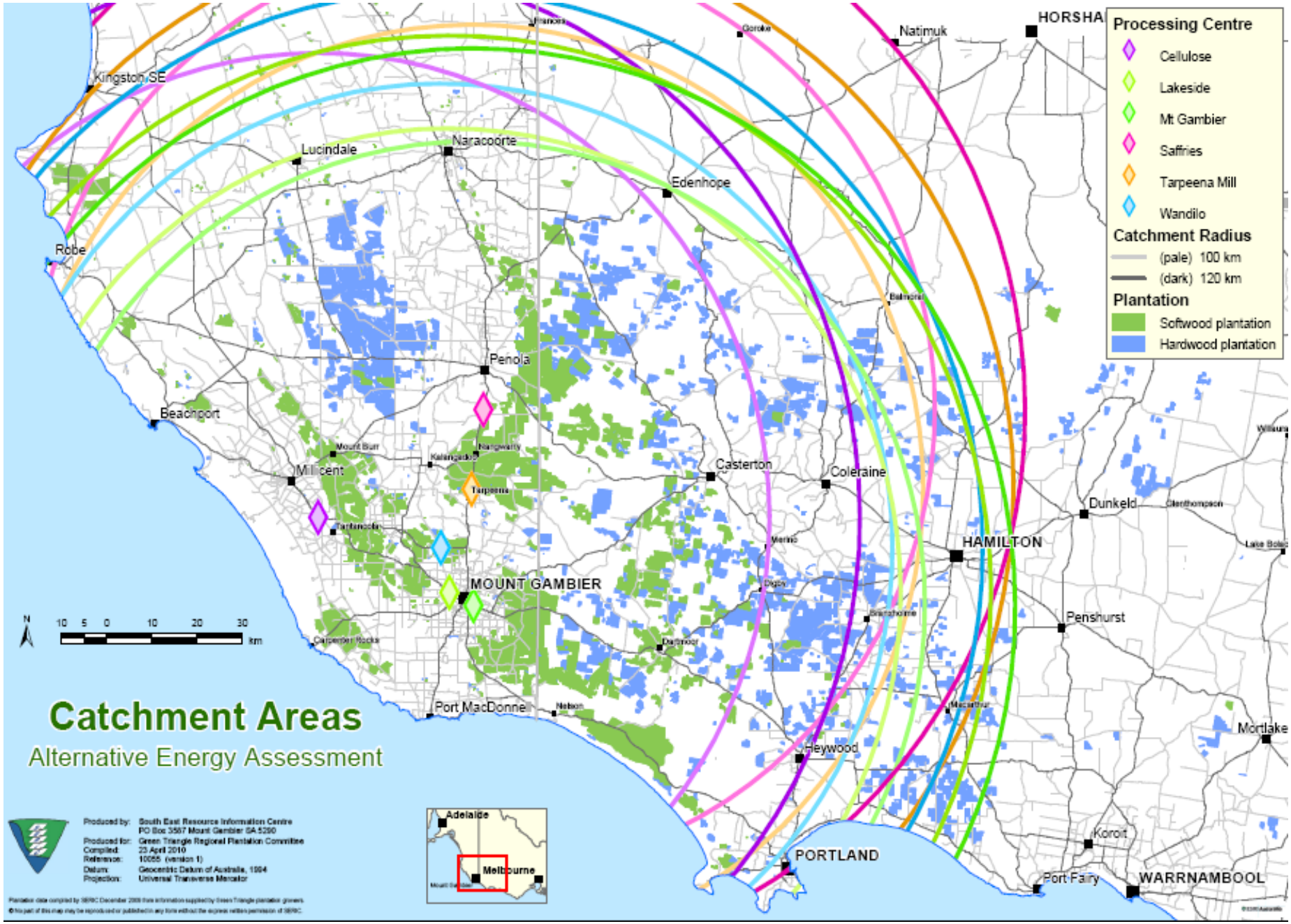
- Sawmill residues
- Pine T1 WTC
- Pine CF broken logs
- Fire damaged plantations
- BG CF WTC
- Dead & koala BG trees
- Logging residue
- Stumps

Supply realities

- Harvest debris expensive to collect unless dumped on forest edge
- Stumps difficult to extract, and high sand content contamination
- BG area reduction likely in 2R – less annual supply after 2023
- Fire salvage debris only available when there is a fire – therefore can't be relied on each year
- Global shortage of both softwood and hardwood fibre – therefore export woodchip price pressures on any local pellet supply

BUT …

- There is a large potential biofuel volume available
- Pine thinnings provide a reliable long term fibre supply


Processing Centre
Cellulose
Lakeside
Mt Gambier
Saffries
Tarpeena Mill
Wandilo
Catchment Radius
(pale) 100 km
(dark) 120 km
Plantation
Softwood plantation
Hardwood plantation
Kingston SE
Robe
Lucindale
Naracoorte
Edenhope
Natimuk
HORSHA
Penola
Beachport
Mount Burr
Nangwarry
Kalangadoo
Millicent
Tarpeena
Tantanoola
Casterton
Coleraine
Dunkeld
Glenthompson
HAMILTON
MOUNT GAMBIER
Penshurst
Carpenter Rocks
Port MacDonnell
Nelson
Heywood
Mortlake
Adelaide
Melbourne
PORTLAND
Port Fairy
WARRNAMBOOL
Koroit
10 5 0 10 20 30
km
Catchment Areas
Alternative Energy Assessment
Produced by: South East Resource Information Centre
PO Box 3587 Mount Gambier SA 5290
Produced for: Green Triangle Regional Plantation Committee
Compiled: 23 April 2010
Reference: 10055 (version 1)
Datum: Geocentric Datum of Australia, 1994
Projection: Universal Transverse Mercator


PORT OF PORTLAND
Canal Court
SL Patterson Berth 10.8m
LEE BREAKWATER
No. 6 Berth 12.0m
Woodchip berths
NORTH
No. 5 Berth 12.3m
Smelter Berth 11.8m
KSA 2 Berth 10.6m
KSA 1 Berth 12.5m
MAIN BREAKWATER
LADY BAY BREAKWATER

Wood pellet storage

- Pellets can deteriorate if exposed to moisture
- Unlike softwood and hardwood woodchip stockpiles at Portland, pellets require undercover storage

Summary

- GT the largest plantation forestry region in Australia
- Certified sustainable fibre production
- Wood pellet manufacturing opportunities for growers & investors
- Reliable long term supplies from softwood plantations
- In the longer term, likely to be a reduction in BG plantation area
- Large volumes available to a wood pellet producer if a competitive price is paid