Australian Forest Growers

Submission on the Garnaut Climate Change Review Issues Paper 1: Agriculture and Forestry

January 2008

Australian Forest Growers is the national association representing and promoting private forestry in Australia

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1. Executive Summary

The issue of climate change and its impact on the private forest growing sector is of critical importance to Australian Forest Growers. The impacts of climate change for this sector exist in a number of paradigms. On the positive side the opportunities for effective recognition of private forests as carbon sinks, private forests as a source for fibre for renewable energy and the inherent landscape amenity enhancement to the community from reforestation are many and varied.

Growing trees is easily the most efficient and cost effective carbon sequestration method available. The science of carbon sequestration by trees is well understood and recognised. Utilisation of wood waste and timber products has positive carbon benefits, especially when measured against the emissions created in producing the like of steel, petrol, concrete and electricity.

Forests growers are concerned that the negative impacts on their businesses from climate change might express themselves in a number of ways. Lower or less reliable rainfall would impact growth and enhance fire risk. Traditional species or varieties may have difficulty in a changing climate, a particular difficulty for forestry given the long term nature of the crop. Small growers in particular are likely to experience difficulty as their capacity to grow in emerging optimum regions is undermined by their regionalised ownership of land.

This submission outlines a range of areas that AFG anticipates will need close and ongoing attention as the climate change debate evolves. Trees are not just seen as a carbon sink. They have substantial capacity to provide alternate sources from fossil fuels for electricity generation; ethanol production; diesel production; and heating fuel.

The capacity to utilise woody biomass for a range of outcomes is discussed herein. AFG has also identified a capacity of sustainable management of existing natural forests on private land for these outcomes.

In recognition of likely difficulties for individual agricultural producers to sensibly participate in a complex emissions trading scheme AFG also offers some options as to how such individuals might balance the emissions of their enterprise so that it is not carbon negative.

Further research and resources should be provided by government to enhance the sensible utilisation of the range of opportunities that a sustainable private forest industry can provide.

AFG is aware of, and supports the content and context of the submission provided to the Garnaut Review by the Australian Plantation Products and Paper Industry Council (A3P). A3P deals with the issues relating to larger scale forest growing and its successor industries, AFG broadens the base of discussion as outlined above.

A summary of recommendations below forms the basis for the way forward from the perspective of AFG and its members.

Summary of Recommendations

1. Government commitment to provision of funding for longterm research and development programs on climate change, industry adaptability and new and emerging renewable energy industry possibilities such as those utilizing woody biomass. Programs supporting sector-specific research, such as Joint Venture Agroforestry Program (JVAP), Forests and Wood Products Australia (FWPA), and the Rural Industries Research and Development Corporation (RIRDC) are of critical importance.
2. Government endorsement of a carbon accounting methodology that accurately tracks the flux in carbon storage - crediting storage and creating liabilities for emissions, as and when they occur.
3. Inclusion of reforestation (new forests) since 1990 in an Australian Emissions Trading Scheme (ETS).
4. The ETS should recognise carbon stored in harvested wood products.
5. The New Zealand proposal for tenders/grants offering up-front payment to small landowners in return for carbon rights should be investigated in consultation with Australian growers.
6. Government funding for industry development and research into biomass-based renewable electricity production, heating, transport fuels should be enhanced.
7. AFG opposes an excise on biofuels. Should there be any excise on biofuels, it should be no greater than the excise on fossil fuels. To promote consumer adoption, a differential (lesser) excise should be applied.
8. Further research in consultation with industry to determine robust benchmark formulae for easy and cost effective calculation of on-farm carbon balance status and the number of trees required to offset on-farm emissions.
9. Federal government should compel states to remove legislative and policy impediments to sustainably managing private native forests for the improvement of carbon absorption rates.
10. The model for the oil mallee industry’s development should be drawn on to support development of other renewable bioenergy and biofuel facilities.

2. Background

Australian Forest Growers (AFG) is the national association representing the private forest growing industry. Its members include farm plantation growers, private native forest managers and non-government commercial plantation companies. This includes almost all of the companies operating forestry managed investment schemes, which have been responsible for the majority of Australia's plantation expansion over the last 10 years. This sector is represented on taxation and other compliance issues specifically by Treefarm Investment Managers Australia, a national special interest branch of AFG for the seven years.

Since 1969, AFG has been advocating responsible establishment and management of plantations on agricultural land, which provide the multiple outcomes that the community increasingly demands. The growing of commercial plantations on privately owned land by our members has been delivering improved landscape health outcomes for decades, as well as complementing existing productive agricultural land use practices. The active management of private native forests plays a role in not only creating commercial incentives to manage forests and diversifying rural industries but also as a conservation tool.

3. Adaptation & Research Needs

It is difficult to predict the effects of climate change that forest industries will experience, as consequences of climate change will be regionally specific. Without information on the likely regional changes to variables such as temperature and rainfall that are key to forestry, we are unable to speculate on this.

There is an urgent need for sound, repeatable science surrounding the likely impacts of climate change on forests – both planted and natural, in all forested regions of Australia. Two critical factors are necessary to apply and adapt this experience to the challenge of climate change:

1. Information relevant at a regional level on changes in climatic patterns, changes in climatic risk profiles and particularly changes in extreme events (e.g., low summer rainfall, extreme fire weather) over 30-50 year timeframes.

2. Research and development into: improved genetic material (e.g., tolerance of climatic extremes); adaptive management practices (e.g., site preparation, thinning); opportunities for new products (e.g., bioenergy); and production techniques (e.g., reduced energy consumption in paper production).

The role of research and development (R&D) programs such as that coordinated by the Joint Venture Agroforestry Program (JVAP), Forests and Wood Products Australia (FWPA), and the Rural Industries Research and Development Corporation (RIRDC) needs to be acknowledged. Longterm research into adaptability issues for forestry should be complemented by research into the development of new and emerging renewable energy industries such as those based on woody biomass. This research is dependent on secure funding and commitment from Government. Private forestry support is strong in this area, and AFG members have endorsed a policy for a levy on industry to support the work of FWPA (see AFG policy statement on research and development, AFG 2006) and

AFG senior management sitting on the committee advising JVAP. Future opportunities to support the work of R&D bodies will be actively sought by AFG.

Recommendation 1

Government commitment to provision of funding for longterm research and development programs on climate change, industry adaptability and new and emerging renewable energy industry possibilities such as those utilizing woody biomass. Programs supporting sector-specific research, such as Joint Venture Agroforestry Program (JVAP), Forests and Wood Products Australia (FWPA), and the Rural Industries Research and Development Corporation (RIRDC) are of critical importance.

4. Emissions Trading

Emissions trading must provide a simple, transparent and all encompassing market framework, which encapsulates both emissions and sequestration. There is substantial potential for the Australian forest industry to be a major on-going sink for atmospheric carbon, as wood products store high amounts of carbon over the life of the product, whilst also providing a source of energy that can be harnessed to offset the use of fossil fuels. Wood waste can be salvaged from harvesting and processing operations or specially grown for energy production of liquid biofuel and stationary energy production.

Any trading framework must mimic a fair, efficient market with low barriers to entry. This will be best achieved through a variety of mechanisms and services. It will require government-sanctioned, internationally consistent rules for verification, registration and market operation. If these are not carefully crafted, the risk for small-scale operators will be the costs of participating in the market outweighing the benefits. For example, adding the cost of accounting for credits in order to participate in the market could make the cost of establishing the forest sink unattractive. Facilitating the pooling of credits may be one way of resolving this issue. For more detailed discussion see AFG Policy Statements on Climate Change, Energy and Carbon Trading (AFG 2006a, AFG 2006b and AFG 2006c).

Permanence

Forests are different to most other forms of abatement in that action taken today does not automatically lead to a permanent reduction in atmospheric greenhouse gas concentration. While a decision to change fuel sources, for example, leads to a certain change in greenhouse gas concentrations, a decision to establish a forest may only cause a delay in emissions depending on the future management of the forest and products harvested from it.

This characteristic leads to consideration of the ‘permanence’ of the claimed abatement. This has been dealt with in some schemes by measures that require the carbon to be maintained in the forest for a minimum period (e.g., seventy or a hundred years). However it could also be dealt with through a carbon accounting methodology that accurately tracked the flux in carbon storage - crediting storage and creating liabilities for emissions, as and when they occur.

This would be achieved by the imposition of a liability for harvesting emissions on any forest where credits have been created. That is, a long term credit, without a commensurate liability, can only be created by the long-term or permanent storage of carbon in the forest.

It would be achieved in the case of wood products by the long-term use of the product and the ongoing storage of carbon after disposal as demonstrated from recent research. Wood products, especially structural lumber and furniture timber effectively stores carbon for the life of the products. Even paper has a positive carbon storage life. Wood production through forest harvesting is not only renewable, but replanting/regenerating is a sensible and readily attainable approach.

Recommendation 2:

Government endorsement of a carbon accounting methodology that accurately tracks the flux in carbon storage - crediting storage and creating liabilities for emissions, as and when they occur.

1990 Start Date

Australian Forest Growers strongly advocates that any benefits from carbon accumulation by trees are passed on to the forest grower. Any emissions trading system should ensure that the grower is able to trade in any carbon sequestered in trees since 1990 or in any sequestered carbon that the Australian Government includes in its calculations of Australia's emissions and carbon balance since 1990 for the purposes of meeting formal or informal international obligations.

Valuing the carbon stored in small growers' plantings and in private native forests may provide a crucial financial incentive to make small scale growers financially viable. Many of AFG's members are farm foresters and small scale forest managers who struggle to make their production systems financial, as tree plantings in the farm setting are often established with multiple benefits in mind. Aside from commercial products forests are also managed for services such as shelter and fodder for livestock, farm windbreaks, protection of water quality and biodiversity services. Irrespective of the purpose for which they were planted, these trees store carbon.

Additionality

If forests are not covered in an emissions trading scheme but participate through the provision of offsets, the issue of additionality becomes important. Offset credits should only be created by action that is additional to business-as-usual. Elements of additionality include financial, environmental and regulatory.

Whether plantations are 'additional' is a complex issue. Investment in commercial plantations by Government forest services or by processing companies through the 1990s and early 2000s has been negligible. The expansion in the resource base over this time has been the result of investments through managed investment schemes. Although these schemes have established varying amounts of plantations over the years, it is important to note that they are a 'vehicle' for investment and that the suite of investors in each year are different. They are a series of individual investment decisions that have been aggregated, not an ongoing investment program. Investment by any individual in any year does not require, imply, or even encourage, investment by that same investor in future years.

AFG supports the proposal by A3P to include reforested land (ie new forests on cleared land) in the Emissions Trading Scheme. Under the forest carbon accounting described in A3P's submission to the Garnaut Review, a long-term credit (without a commensurate liability) could only be created by the establishment of a new plantation, on previously cleared land, and then maintaining those carbon stocks beyond the initial rotation. These requirements are clearly additional to business-as-usual for any investor prior to the impact of a carbon price.

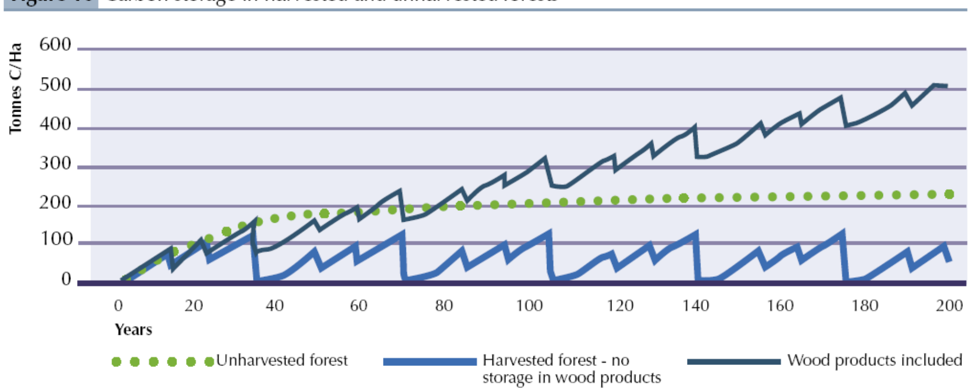
Recommendation 3

Inclusion of reforestation (new forests) since 1990 in an Australian Emissions Trading Scheme (ETS).

Harvested Wood Products

The assumption that a plantation sink becomes a carbon emitter at harvest is erroneous. Wood products actually store carbon for the life of the product. Meanwhile, new forests replace the harvested and net atmospheric carbon accumulations decline. An FWPRDC report (Ximenes, 2006) reveals that only 3.5% of carbon from wood products returns to the atmosphere, when discarded as landfill up to 46 years previously.

Figure 10 Carbon storage in harvested and unharvested forests



Source: FWPRDC 2006 p11

Figure 2 above illustrates that actively managed forests have more than twice the carbon storage potential than unharvested forests when the carbon that remains stored in harvested wood products is recognised and accounted for.

Recommendation 4

The ETS should recognise carbon stored in harvested wood products.

Small Landowners

The issue of small growers and a dispersed production base is not as significant for forestry as agriculture. However, it will still be to the benefit of an emissions trading scheme if it can be accessed by small landowners. The approach of carbon pooling has often been proposed though the administrative overhead seems crippling for many growers.

The New Zealand Government has proposed an elegant tender/grant system for small growers that warrants consideration in an Australian context. The approach offers an up-front payment to small landowners in return for the carbon rights to the forest. It is a simple, low-overhead system that enables participation by small landowners but still provides an incentive for direct participation if tree planting is on a larger scale.

New Zealand proposed Afforestation Grant Scheme

"Under the AGS, foresters can receive a government grant for the planting of new forests on previously unforested ('Kyoto compliant') land. Participants will own the new forests and earn income from the timber, while the Crown will retain the sink credits and take responsibility for meeting all harvesting and deforestation liabilities.

"It is proposed that AGS grants be available for the afforestation of Kyoto-compliant land under the following Category 1 – exotic forests and Category 2 – planted indigenous forests and assisted indigenous reversion.

"Successful applicants will enter into a contract with the Crown for 10 years. Under the terms of the contract:

- if the grant land is deforested during the term, or if encouraged natural reversion is unsuccessful for reasons beyond the grantee's control, the grant will be repayable with interest;
- if the grantee transfers the grant forest (by sale or other means), the grantee will be obliged to transfer the contract to the transferee;
- the scheme administrator, who will also administer the forestry components of the ETS, will have the right to access the land for measurement purposes."

Excerpts above are from page 44-45 of *Forestry in a New Zealand Emissions Trading Scheme: Engagement Document*. (New Zealand Government 2007).

Recommendation 5

The New Zealand proposal for tenders/grants offering up-front payment to small landowners in return for carbon rights should be investigated in consultation with Australian growers.

5. A Future for Biomass Energy Based on Wood Fibre

AFG supports the Rudd Government's announcement of a Mandatory Renewable Energy Target of 20%. Implementation of this policy will present a tremendous opportunity to better utilise Australia's forest production potential towards renewable energy goals. Forest industries have a key role in Australia's future if renewable energy is to underpin our needs. Using wood fibre for energy production would have the added benefit of replacing the use of fossil fuels domestically, reducing Australians' exposure to world oil prices and dependence on imported oil.

The benefits of developing industries around bioenergy and biofuels based on wood fibre plant material are significant and need to be supported by government funding. Funding in research and development is currently skewed towards developing 'clean coal' technologies. Research into bioenergy and biofuels is well advanced, and has established the potential for new industries (explored in detail below). Continued R&D as well as industry 'kick-start' funds in these areas should be a greater priority for the Government. Significant resources have been provided to developing technologies such a geo-sequestration, and similar investment is required from government for the refinement and commercialisation of renewable energy, particularly bioenergy.

A further issue is the impediment of excise of biofuels. Any excise contemplated by the Government must not exceed excise applied to other fuels. Further, in recognition of the desirability to move to less dependence on fossil fuels, any excise should be less than that applied to fossil fuels to stimulate consumer interest and adoption of biofuels.

The following two sections are derived, with permission, almost entirely from a conference paper by Cummine (2007).

Recommendations 6 & 7

Government funding for industry development and research into biomass-based renewable electricity production, heating, transport fuels should be enhanced.'

AFG opposes an excise on biofuels. Should there be any excise on biofuels, it should be no greater than the excise on fossil fuels. To promote consumer adoption, a differential (lesser) excise should be applied.

5.1 Wood-to-Energy Technologies

A summary of wood-to-energy technologies and wood feedstock options in Australia is presented below, prepared in collaboration with Treefarm Investment Managers Australia. The summary draws on Cummine (2007), Schuck (2006) and a recent RIRDC a report titled 'Biofuels in Australia – an overview of issues and prospects' (RIRDC 2007).

ELECTRICITY

Direct Combustion for Heat and Power

The simplest use of biomass is burning the material in a furnace to create heat energy. Typically the furnace's role is to produce steam, which in turn is used to produce heating, drying or electricity generation. Biomass materials used for combustion energy production require pre-processing such as chipping, cutting, drying or compacting.

Biofuel in the form of firewood for power generation is already heavily used in many parts of the world. 22% of Finland's power generation comes from combusting forestry wood residues. The last 20 years of technological development has seen dramatic improvements in energy harnessing and efficiency from wood, whilst delivering significant reductions in emissions. Modern wood and charcoal-fired power plants emit almost pure carbon dioxide throughout operation, whilst coal-fired power plants emit a combination of carbon dioxide, carbon monoxide, sulphur dioxide and nitrogen oxides.

There are a number of ways in which wood can be utilised for power generation, including burning the wood on its own, mixing it with other sources of biomass or co-firing the wood with coal in existing power plants. Co-firing wood with existing coal power plants is considered at this stage to be the most cost effective power generation option using wood.

There are already some operations in Australia that utilise wood waste for the production of electricity and heating within internal production systems. Macquarie Energy purchases wood waste from plantation sawmills for co-generation in existing coal-fired power plants in the Hunter Valley. They are currently paying about $40/green metric tonne delivered. Delta Electric is also working on biomass production using sugar mill waste in northern NSW. There are also Australian examples where wood waste is currently used for firing boilers and the like. These examples are all initiatives taken at the industry level, in the absence of Government incentives.

Gasification and Pyrolysis

Gasification is a thermo-chemical process in which biomass is heated in an oxygen deficient atmosphere to produce a low-energy gas containing hydrogen, carbon monoxide and methane. The gas can then be used as a fuel in a turbine, combustion engine or conventional steam boiler to generate electricity. Modern gas clean-up technology ensures that the resulting gas is suitable to be burnt in a variety of gas engines with a very favourable emissions profile. This technology is more suited to smaller scale electricity generation operations.

Pyrolysis shares many of the characteristics of gasification. With gasification partial oxidation of the waste occurs, whilst with pyrolysis the objective is to heat the waste in the complete absence of oxygen. Gas, olefin liquid and char are produced in various quantities. The gas and oil can be processed, stored and transported if necessary and combusted in an engine, gas turbine or boiler. Char can be recovered from the residue and used as a fuel, or the residue passed to a gasifier and the char gasified.

LIQUID TRANSPORT FUELS

Woody biomass can produce at least three renewable liquid transport fuels – synthetic diesel, methanol and ethanol. The technologies for the first two of these are well known and established. Ethanol-from-lignocellulosics (EXL) technology is yet to be demonstrated at a pre-commercial scale.

Synthetic Diesel

The technology to produce synthetic diesel was developed by German scientists in the 1920s (the Fischer-Tropsch (F-T) process) and used by the Germans and Japanese during World War II. The biomass must first be gasified (see above), and then two components of the synthetic gas (hydrogen and carbon monoxide) are condensed into liquid hydrocarbon through the F-T catalytic conversion reaction.

Use of the F-T process lapsed in the post-war presence of cheap crude oil, except in South Africa when that country was subject to economic sanctions during the apartheid era. But 2007 is expected to see the commissioning of the first biomass-to-liquids F-T plant, in Germany. The plant will apparently consume less than 100,000t of air-dried biomass per year to produce about 16ML of diesel – small by petroleum industry standards. A plant of that size, if profitable, could be ideally scaled to utilise surplus forest biomass in several regions in Australia, and warrants serious investigation by the forestry, energy and transport/regional services portfolios for future application in Australia.

Methanol

Also known as wood alcohol, methanol can be produced from wood, but is mostly produced from natural gas and sometimes from coal. While having similar physical and chemical characteristics to ethanol as a transport fuel, methanol is produced very differently. Methanol is predominantly produced by steam reforming of natural gas to create a synthesis gas, which is then fed into a reactor vessel where carbon monoxide and hydrogen are combined in the presence of a catalyst to produce methanol and water vapour.

Ethanol

Traditionally, ethanol has been produced by the fermentation of sugars derived either directly or as a by-product from sugar and grain food crops, and then by steam distillation to recover the ethanol from the fermentation broth. Those feedstocks and technologies remain the foundation of all commercial ethanol production facilities worldwide.

Extremely rapid growth over the past three years in ethanol production using these so-called ‘first generation’ technologies and feedstocks has attracted much public commentary (mostly poorly informed) for and against ethanol’s long-term prospects as a viable transport fuel.

‘First generation’ ethanol production continues to be criticised for quite valid reasons. These are:

- diversion of arable land away from producing food and agricultural feed to producing transport fuel (the ‘food-versus-fuel’ debate);
- poor energy input-output balance – (a) fossil fuel is used in producing and transporting the feedstock crop (sugar cane, maize, wheat, etc), and (b) fossil fuel is used in steam distillation to recover the ethanol from the fermentation broth, and in treating the effluent;
- large volumes of noxious liquid effluent from the distillation process, requiring treatment and disposal; and
- the high cost of ethanol production relative to the price of oil.

The development and commercialisation of technologies that use ‘second generation’ ethanol feedstock and that address all these current problems hold great promise for ethanol to become a long-term feature of the transport fuel market.

‘Second generation’ feedstocks are derived from lignocellulosic (woody) plant material – forest thinnings, harvest and sawmill residues, sugar cane bagasse, surplus crop stubbles, cotton gin trash, dedicated tree crops, high cellulose grasses, metropolitan wood waste, and more.

Ethanol-from-lignocellulosics (EXL) holds great promise because the feedstock is widely abundant and mostly surplus, being inevitably yielded in the growth and/or manufacture of the primary target food or fibre product.

Development and commercialisation of efficient and viable lignocellulosic breakdown technologies has, in the past three years, become the focus of very large-scale and high-profile public and private R&D funding on all continents. Hydrolysis using enzymes remains the most popular method being trialled, but increasing attention is being paid to concentrated acid hydrolysis.

Australia is at the forefront of the drive to commercialise ‘second generation’ ethanol, and especially to solve the other problems common to all ethanol production.

Concentrated acid hydrolysis is being used in the Australian-designed pilot plant at the Harwood sugar mill in northern NSW, which commenced its first trials in January 2008. That pilot plant is being run by Ethanol Technologies Ltd, a company owned by Willmott Forests Ltd (51%) and many individual sugar cane growers.

The plant will also demonstrate the new ‘induced phase separation’ technology developed by Australian research institute, Apace Research Ltd, recovering the ethanol without using conventional steam distillation or producing large volumes of noxious effluent to be treated and disposed of. This integrated combination of technologies is expected to produce ethanol from widely available forest and crop residues at a competitive cost without the need for any subsidy.

In clear recognition of the potential of these surplus and ‘waste’ materials for renewable fuel production, the newly elected Commonwealth Government has committed $15 million in grant assistance of up to $5 million each for pilot plants to demonstrate ‘second generation’ ethanol technologies.

5.2 Forest and Timber Resources for Bioenergy

Lignocellulosic feedstock in Australia would come from a vast and diverse resource base, including from the forest and timber industry (RIRDC 2007). A broad classification could put the wood resources in four categories: (i) dedicated ‘energy tree crops’; (ii) silvicultural surplus; (iii) timber processing residues; and (iv) other sources.

Dedicated ‘energy tree crops’

Tree crops grown predominantly for harvest as bioenergy feedstock offer a vast potential resource. The primary reason is that such tree crops are likely to be grown well outside the high rainfall range of conventional commercial timber plantations. It is in the much larger lower rainfall regions, where agriculture is or has become marginal, that land repair with very large-scale revegetation has been identified as imperative, but almost impossibly expensive for public and private investment alike.

Management of this planted and regenerated woody vegetation as a biofuel feedstock would provide a commercial return to at least partially fund the revegetation projects. The range of possible native species for this purpose is substantial. Slow-growing, ‘poor form’ natural forests and woodlands in low rainfall zones could also become commercially viable (and more biologically vibrant) forests if managed long-term for a biomass-to-energy market. AFG and TIMA discussions with rangeland pastoralists suggest that bioenergy solutions to the tragic ‘woody weeds’ invasion of once productive pastoral country.

Regional biofuel production based on these forests and tree crops could reinvigorate rural economies as well as deliver the diverse intended environmental benefits. (See the AFG Energy Policy statement, attached.) The RIRDC report considers these new energy tree crops, such as oil mallee, as having massive potential to supply Australia’s liquid transport fuel demand. But the report also considers such crops as a ‘second generation’ future resource, rather than immediately available resources such as surpluses and residues from existing operations.

Silvicultural surplus

There is already in Australia a vast volume of what is loosely referred to as wood waste. This is comprised of woody material that usually finds its way into urban landfill, and especially the silvicultural surplus and harvesting and sawmill residues that are inevitably and unavoidably yielded in growing, harvesting and processing the target fibre-quality material (eg, sawlogs, veneer logs and chiplogs).

Using otherwise unmerchantable silvicultural surplus (thinnings, culls and logging residues) as a renewable fuel has the added benefits of enhancing forest health and productivity and improving the economics of forestry to the growers.

In any managed forest, thinning and culling (that is, removing surplus young trees or defective trees) promotes the growth of the trees selected for retention and final harvest. It is an essential silvicultural operation to accelerate the growth of sawlogs and create or restore a quality forest. Notable exceptions where thinning is uncommon are wide-spaced high-pruned agroforestry and dedicated short-rotation pulpwood plantations.

A mature stand itself still includes a proportion of the standing volume that is not suitable for the target product – much lower in plantations than native forests.

These unavoidable silvicultural surpluses are greater in volume than fibre-quality logs at final harvest. Clearly, small young trees contain much less fibre than large mature trees, so there is no direct correlation between number and volume. Nevertheless, knowing that a conventional plantation initially stocked at 1,100 stems per hectare (spaced at 3 metres x 3 metres) will be progressively thinned down to a stocking rate of around 200 mature trees per hectare before final harvest offers some indication of the vast recurrent volume of surplus woody biomass that would benefit from having a commercial application.

A few regions with integrated forest processing industries can effectively utilise these thinnings and logging residues for export woodchips, small diameter poles and posts, engineered wood, and domestic pulp for paper and cardboard. But in other regions, this surplus material has no such use. In any case it is often unsuitable for existing wood products markets, or the distance to these markets may be uneconomic for low-value surplus.

The lack of access to a commercial use for thinnings (and other silvicultural surplus) is a recurring theme in forestry. It confronts forest growers with a choice between not thinning on time or at all (thereby losing forest quality and productivity) and ‘thinning to waste' (thereby incurring an unrecoverable operational expense). Together with little or no return for logging residues as well, this can seriously compromise the commercial viability of the forestry enterprise – as well as creating work and fire hazards from felled timber left in the forest.

Between 40% (in a well managed plantation) and 70% (in a native forest) of all forest produce is looking for a 'non-sawlog' market, and much of it is of the lower quality most suitable for solid and liquid fuel applications. Creating such demand would be a major breakthrough in improving the economics of private forestry in Australia, and lead to a greater uptake of private farm forestry.

Timber processing residues

Timber processing residue, such as log-yard waste, edgings, dockings, and sawdust, is also an under-utilised resource, highly suitable for supply to a bioenergy production industry. As a general rule, processing residues amount to about 60% by weight of incoming logs.

The NSW Bioenergy Handbook states that "about 40% of [sawmill] wastes are already used for pulp, paper or wood panel manufacturing. The remaining 60% of residues are used for energy generation, as horticultural mulches, or are disposed of as waste. These 'surplus' wastes may be burned on site, often in old boilers with inefficient energy recovery, and possible poor emission control."

There is much regional variation in the availability of sawmill waste. In southern NSW, where an integrated forest products industry is well-established, nearly all sawmill residues are currently used in pulp, paper and panel production. But in northern NSW, more than 60 per cent of sawmill residues would be available as bioenergy feedstock. Similar variations could probably be found in other states.

Urban wood waste

Urban trees that die and are replaced, and manufacturing, construction and demolition debris are, in most cases, disposed of in land-fill or chipped for garden supplies, thus revealing another potential woody feedstock for commercial electricity and biofuel production.

6. Support for Carbon Neutral Land Management

It will be important to promote initiatives of the agriculture and forestry sectors outside of their potential roles in an Emissions Trading Scheme. An opportunity exists for rural landholders to improve their 'carbon footprint' by changes to land management of their own initiative. In an agricultural setting, this could take the form of establishing trees to account for on-farm emissions, and in a native forestry setting this could involve active management of private native forest to increase carbon absorption rates.

The section below presents proposals for a) how agriculture and forestry can work together to see carbon neutral farming and b) how private native forest managers can improve the carbon absorption capacity of their forests. It also provides a summary of the developing oil mallee – one promising emerging industry that will contribute to renewable energy production.

<u>Carbon-Neutral Farms</u>

The concept of emissions-neutrality is gaining increasing attention through various airlines' carbon offset programs. These programs allow customers to purchase offset credits that are intended to account for a portion of the flight's emissions. This concept could apply to agriculture and forestry through the establishment of trees to absorb the carbon emitted through farming. Farmers could potentially reclaim under-utilised country by planting trees, whilst at the same time establishing net carbon emission neutrality.

A method for determining the number of trees that would absorb a farm's emissions would assist the development of this concept into a system for establishing carbon neutrality. Such a system needs to be based on robust carbon accounting methods and should lead to a cheap and simple framework for accrediting the emissions-neutrality of approved farms.

Recommendation 8

Further research in consultation with industry to determine robust benchmark formulae for easy and cost effective calculation of on-farm carbon balance status and the number of trees required to offset on-farm emissions.

<u>Private Native Forestry</u>

Gains in atmospheric carbon sequestration can be expected from actively growing forests. In contrast the vast areas of un-managed reserves and native forests in Australia are more or less carbon neutral.

The active management of private native forests to maximise carbon storage potential of the forest while extracting sustainable forest products should be encouraged and allowable.

It is also important to note that the private native forest estate in some areas has expanded since 1990 as a result of restrictions on clearing of native vegetation. Aside from the cessation of clearing, restrictions have resulted in the spread of woody weeds and natural regeneration on cleared land. Many farmers and native forest owners would support the revision of clearing frameworks to enable management of this problem. There is significant potential for bioenergy and biofuel production to provide an incentive for this management (discussed further below) – but legislative and policy restrictions would need to be modified to enable this.

Recommendation 9

Federal government should compel states to remove legislative and policy impediments to sustainably managing private native forests for the improvement of carbon absorption rates.

Innovative New Tree Growing – Oil Mallees

There is an urgent need to develop strong new industries in tree growing that can contribute to renewable energy production and the replacement of fossil fuels. One such example is the developing oil mallee industry. The below discussion draws on Oil Mallee Association (2008).

The oil mallee production system focuses on belts of trees, dispersed across the farming landscape, fully integrated with cropping and livestock production enabling the continuation of traditional farming between the mallee belts. Mallee plantations total around 12,000 hectares nationally, with the majority located in Western Australia.

Mallee eucalypts are multi-stemmed trees that grow in a bush-like, branching habit and are harvested on a short-rotation basis. Harvests remove the stems but roots, including the lignotuber (the woody root mass at the base of the tree) remain. Following the harvest, mallees coppice (re-sprout) to grow new stems. The root system stores a significant proportion of the carbon held by the tree, but is not removed from the site for several rotations.

The main driver of mallee planting in WA has been to supply a integrated processing plant planned for Narrogin that produces activated carbon, electricity from biomass, and eucalyptus oil. A pilot plant has been successfully established and investment is being sought for its expansion into a commercial-scale operation.

Plantings of mallee purely for offsetting carbon emissions have also occurred in Western Australia, New South Wales and other states since the 1990s.

The Oil Mallee Association, as well as the efforts of state and federal research agencies, has been integral to the development of this exciting new emerging industry that will see enhanced uptake of renewable energy production within the farming landscape. Support for associations that take the lead in initiating new industries, in addition to ongoing research and development funding (e.g. through the Joint Venture Agroforestry Program) is of critical importance.

Recommendation 10

The model for the oil mallee industry's development should be drawn on to support development of other renewable bioenergy and biofuel facilities.

7. Conclusion

AFG appreciates the opportunity to provide input into this important review. The impacts of climate change on private forest growing in Australia will be significant, and the best way to prepare for them is still uncertain. However, as growers of the most efficient and cost effective carbon sequestration method available, forestry clearly has a role in the response to climate change.

Perhaps the most exciting element of forestry's role is through renewable energy industries utilising biomass (including electricity and fuel production) that are already emerging. It is important to note that the role of trees in reducing Australia's greenhouse emissions is not limited to their value as a carbon sink, but includes their substantial capacity to provide alternate sources from fossil fuels for electricity generation; ethanol production; diesel production; and heating fuel. Discussions on emissions trading are important but are not the limit of AFG's interest in this issue.

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