A submission by the Australian Sugar Milling Council

Introduction

The Australian Sugar Milling Council (the Milling Council) is the industry body that represents the 10 sugar milling companies operating Queensland's 23 sugar mills. In addition to producing between 4.5 and 5 million tonnes of raw sugar worth in excess of $1.5 billion per annum (85% of which is exported), sugar mills are also the largest generator of renewable electricity from biomass in Australia. Bagasse fired generation by Queensland sugar mills currently produces in excess of 1100 GWh of renewable electricity (600 GWh of which is exported from the sugar mill sites into Queensland's transmission or distribution networks). However, Queensland's bagasse resources are very significantly under-utilised in relation to the potential generation from these resources, which is estimated at 7,500 GWh per annum generated and 4,000 GWh available for export to the grid. This is sufficient power for more than half a million domestic consumers and offers a GHG abatement potential of over 6,000,0000 $tCO_{2\text{-}e}$ pa with renewable electricity projects that are largely invisible to local communities and provide embedded generation benefits.

The Milling Council welcomes this opportunity to comment on the *Garnaut Climate Change Review Emissions Trading Scheme Discussion paper.* The Milling Council has previously stated its support for the development of a workable global Emissions Trading System (ETS) in which Australia would be able to participate (ASMC Submission to the Prime Minister's Task Group on Emissions Trading – 7 March 2007).

Commencement of Emissions Trading Scheme

Support from the Milling Council for an Australian Emissions Trading Scheme prior to the establishment of an international agreement on greenhouse gas mitigation is less enthusiastic. Without further detail, it is difficult for the Milling Council to comment on the proposed treatment of trade exposed emission-intensive industries (TEEIIs). However, it should be noted that industries that manage their emissions (ie have undergone life cycle assessment and adjusted accordingly) will also be exposed to international trade competition by countries not required to manage their emissions, particularly primary and secondary industries. The Milling Council proposes the design of future algorithms to decide TEEIIs should provide an opportunity for reviewing industry status prior and post ETS operation.

As the discussion paper points out *"An ETS must be able to coexist and integrate with international emissions markets as well as other financial, commodity and product markets in the domestic and international economies".*

There is a risk that the design of a scheme for use in Australia commencing in 2010 could result in considerable disparities existing with other international schemes still to be developed and agreed on.

In the previous submission the Milling Council advanced the view that Australia could play an important role in not only stimulating a global approach to the development of emissions trading but also take the lead, through example, by developing and implementing a domestic scheme that is not only environmentally effective in delivering greenhouse gas abatement but also sufficiently robust to ensure an individual nation's economic and political imperatives are adequately and equitably addressed.

The achievement of this would provide a persuasive international position, one that should attract sufficient support internationally, and hopefully participation by developing countries. This requires that there be no barriers to the appropriate transmission of information within and between markets. If the ETS contains distortions that result in an emissions permit price that does not reflect its true scarcity value, this mis-priced market will adversely affect resource allocation decisions by investors in other markets. The converse is also true. Distortions in other markets may result in mis-priced outcomes in the ETS. However, the integrity of the ETS should not be compromised to compensate for distortions in other markets. Rather, policy-makers should use the opportunity and insights gained from establishing the ETS to identify and correct distortions in other markets.

As stated elsewhere, it is of concern to the Milling Council that the Garnaut Review ETS discussion paper proposals are underpinned on the flawed design of the European trading system based on a cap for emissions. The uncertainties surrounding climate change are referred to but then appear to be ignored in the basic design of the system.

The ETS discussion paper suggests that there is a known emission budget and builds from that base, yet science only gives estimates of what this budget might be. There is no doubt that a budget is better than an arbitrary emissions path but it still ignores climate change uncertainty.

The Milling Council agrees with the assertion of Professor Warwick McKibbin of the Australian National University that this assumption of a given carbon budget appears to drive an approach that would be sensible if the initial premise was correct. There is plenty of environmental economics opinion to support the fact that a price target rather than a quantity target is the best way to deal with the economic costs of climate change uncertainty - yet the draft report ignores the economics in preference to the ideological.

This leads to the report ruling out a short term price cap to reduce unnecessary short term price volatility as more information comes to light about the cost of abatement and climate change. What is needed is to create long term markets and property rights traded in those markets with clear long term price signals. This would encourage industries such as the sugar industry to make long term investments in greenhouse gas abatement projects.

Interaction with the mandatory renewable target (MRET)
Australia has higher greenhouse gas (GHG) emissions per capita than any other developed country. With energy a key component of economic growth in Australia, establishing an appropriate policy mix that delivers GHG emissions reductions at lowest cost to the economy is critical.

Most previous discussion has indicated the Mandatory Renewable Energy Target (MRET) would give way to an emissions trading scheme, either through progressive phase-out or immediate replacement.

As stated in our earlier submission, the Milling Council believes that an ETS introduced by the Federal Government must be enhanced by:

- Operating in parallel to MRET (20%) for a defined period to promote renewable projects that deliver immediate GHG abatement.
- Using a defined timetable to progressively gather up existing GHG abatement schemes, allowing scheme participants to trade in a mature ETS
- Recognising, as an absolute minimum, the financial commitments made under current schemes and ensure there are grand-fathering provisions in the new ETS.

MRET remains an important mechanism in assisting Australia meeting its 108% Kyoto target during the 2008-2012 compliance period, prior to commencement of an ETS. As such, it also facilitates a transition into increased electricity prices, provided the target is sufficient to continue to drive investment in renewable energy. This has not been the case over the last few years, with the MRET 2% target saturated. Hence reinvigorating MRET in the immediate future is essential if the scheme is to facilitate transition into a future ETS for the electricity sector.

The availability of an increased renewable generation energy target range for a defined period would assist in reducing electricity generation emissions at a modest cost to the electricity supply industry and without damage to Australia's relative international competitiveness.

Should MRET continue beyond the introduction of ETS, participants in MRET will be captured by expanding compliance requirements, costs and potential duplication as a result of mandatory participation in an ETS. As MRET is serviced by smaller generators, the impacts of scheme overlap are potentially significant. These impacts should be considered in the context of equitable participant interaction for all scheme participants when deciding the design of a final ETS. These issues will also apply to a varying extent to mandated energy

efficiency schemes. It is critical to ETS functionality that the participation in multiple mandatory and voluntary schemes not drive onerous compliance.

Biomass renewables offers a GHG reduction solution with a low cost increase to industrial and domestic electricity customers in Australia and warrants further policy consideration. International competitiveness is not likely to be impacted versus developed countries with minimal change in electricity cost merit order.

It is concerning that the discussion paper now raises the issue of some downside with regards to the carbon price in the proposed ETS through the interaction between the MRET scheme and an ETS. While there may be some potential for this to occur in the shorter term, any move to discontinue the MRET will come at the expense of encouraging significant near-term GHG abatement projects developed around renewable energy generation in the sugar industry.

A carbon price and emissions trading scheme does not provide a direct cash benefit to bagasse co-generation. It adds to the cost of fossil fuel generation which increases the wholesale market price of electricity and therefore indirectly benefits low emissions generation such as bagasse.

There is no doubt that the medium term energy challenge faced in Australia is complicated by the fact that the demand for electricity in this country is likely to double over the next forty years and the best available means of providing for this demand is to generate the electricity using coal as a fuel. However, without the development of new technology, the level of greenhouse gas emissions from coal fired boilers are unacceptable if Australia is to achieve its stated goal of keeping emissions from the generation of power at today's levels.

Alternative cleaner fuels to generate power are available, but all have a higher cost base than coal.

So the challenge for Government is to ensure that any scheme introduced:

- encourages continued research into clean coal technology;
- establishes an acceptance by power users (both large and small) that there is a cost to bear (or share) in reducing greenhouse gas emissions; and at the same time
- continues to provide sufficient electricity to satisfy the rapid demand increase.

The potential of the sugar industry as a large scale electricity generator should not be under estimated. Much of the discussion on how to satisfy Australia's burgeoning energy demand in the future has been centred on the large regional power station model. Community reaction to this is inevitably negative – particularly if the word nuclear is mentioned in the discussion.

The Queensland sugar industry presents a unique opportunity for Government to 'kick-start' a fresh approach at this country's greenhouse gas abatement task.

Much of the necessary infrastructure is in place; the transition of milling sites to incorporate co-generation facilities would be barely noticeable to their surrounding communities; and every MWh of electricity generated using bagasse as fuel would contribute to a massive potential reduction in emissions of **3,502,300 tCO_{2-e}** per annum when compared to current operations. (See Attachment 1 – Estimated Greenhouse Gas Abatement potential of the Queensland Sugar Industry)

It should be noted that the potential stated is only for electricity generated from bagasse and it allows for site based energy consumed for ethanol production from molasses. By also utilising sugar cane trash, the export potential rises to 9,500 GWh pa, equivalent to a reduction in Queensland GHG emissions of 9,150,000 tCO_{2-e} pa.

The 4,000 GWh of bagasse fired electricity that could be exported by the sugar industry is the equivalent of about 8% of Queensland's current annual demand for electricity.

The Milling Council thanks the Garnaut Climate Change Review for the opportunity to comment on its discussion paper on an emissions trading scheme and having the opportunity to highlight the potential of the Queensland Sugar Industry as a significant participant in Australia's greenhouse gas abatement effort.

Attachment 1

Estimated Greenhouse Gas Abatement potential of the Queensland Sugar Industry

Assumptions:

- Crop 34,900,000 tonnes
- Cane area 396,000 ha
- Electricity generated 1,100 GWh
- Electricity exported 650 GWh
- Coal burnt 60,000 tonne
- CCS 14.0%
- Fibre 14.0%

Activity	Total annual emissions (t CO_{2-e})	Emission intensity (kg CO_{2-e}/t cane)
Agriculture	933,890	26.8
Harvesting and transport	204,170	5.9
Processing	-277,180	-7.9
Products transport	41,720	1.2
Total	**902,600**	**25.9**

This represents about 0.17% of Australia's annual greenhouse emissions. The negative "processing" emissions result from a 750,700 tonne CO_{2-e} credit coming from the displacement of 650 GWh of coal-fired electricity with renewable electricity exported from sugar mills.

Operations with Cogeneration and Ethanol

To assess the change in greenhouse emissions if full scale cogeneration and ethanol were added to all sugar mill operations in Queensland, the following assumptions are made for modelling purposes:

Cogeneration

- All mills replace 17bar boilers with efficient 80bar boilers
- Condensing / extraction steam turbine generators consume all boiler steam and pass-out sufficient LP steam for sugar factory operations and co-located ethanol plant.
- 22 week season; 10% lost time; 40% LP steam% cane; all electric drives
- Sufficient bagasse is stored to operate the cogeneration and ethanol plant for 26 weeks during the non-crush
- No coal is burnt
- No trash is burnt (this would add significantly to the cogeneration output)

Ethanol

- All C molasses (@3.5% cane) is converted to ethanol → 318ML ethanol pa.
- All steam and electricity used in the ethanol plants originates from bagasse fuel.

- While each site energy balance assumes individual mill based ethanol plants, economics dictate that single regional based plants would be built. Therefore an emission allowance is made for the transport of C molasses and bagasse to a central regional mill.
- All ethanol is transported to an E10 blending plant in each region, ready for distribution for fuel transport.
- A "wells-to-wheel" approach has been taken, to calculate the total abatement of $CO_{2\text{-}e}$ in displacing ULP in an E10 blend.
- Because "upstream emissions" have been accounted for in the Base Case, these are not included in the ethanol production emission intensity as is normally the case for a life cycle analysis (LCA).

Cogeneration

The total Queensland sugar industry electricity export would rise from 650 GWh to 4,020 GWh. By displacing coal fired electricity generation with an emissions intensity of 1.058 $tCO_{2\text{-}e}$/MWh, the new emission saving figure would be 4,253,000 $tCO_{2\text{-}e}$ pa, a reduction of **3,502,300 $tCO_{2\text{-}e}$** per annum to current operations

This figure would more than double if cane trash was reclaimed for electricity generation. A further significant increase would be realised if bagasse gasification technology was developed. It should be noted that this technology is similar to one of the clean-coal technology solutions which is being promoted and financially supported by both state and federal governments.

Ethanol

Using results of a Mackay Sugar life cycle analysis for ethanol production using stored bagasse as the non-crush fuel, the following emission figures have been calculated for 318 ML anhydrous ethanol production in Queensland:

Activity	Emissions (t $CO_{\text{-}e}$)
Molasses transport	774
Bagasse transport	1,415
Production chemicals	7,653
Energy	0
Vinasse as fertiliser	-7,950
Vinasse transport	2,433
Ethanol transport	382
Total	4,707

The following can be calculated:

Ethanol emission intensity (EI) at terminal	0.015	$kgCO_{2\text{-}e}$/L
Ethanol EI in E10	0.0015	$kgCO_{2\text{-}e}$/L
ULP EI at terminal	2.80	$kgCO_{2\text{-}e}$/L
ULP EI in E10	2.52	$kgCO_{2\text{-}e}$/L
→ E10 EI	2.5215	$kgCO_{2\text{-}e}$/L

E10 fuel consumption (ERDC vehicle) 10.96 L/100km

→ E10 EI (in vehicle)	0.2764	$kgCO_{2-e}$/km
ULP EI (in vehicle)	0.3064	$kgCO_{2-e}$/km
Emission improvement (E10 vs ULP)	9.8%	
Abatement (E10 vs ULP)	0.0300	$kgCO_{2-e}$/km
Total abatement (318ML)	**870,440**	**tCO_{2-e} pa.**

If carbon credits were valued at $30/tCO2-e and applied to ethanol, this would be worth $26.2m pa to a Queensland sugar ethanol industry. This is equivalent to 8.2c/L, and would be a very significant support mechanism for the industry, partially offsetting the 12.5c/L excise that will be introduced.

Summary

Current emissions	902,600	tCO_{2-e} pa
Cogeneration emissions	-3,502,300	tCO_{2-e} pa
Ethanol emissions	- 870,400	tCO_{2-e} pa
Future emissions	**-3,470,100**	**tCO_{2-e} pa**

The industry has the potential to be a large greenhouse gas abater. This potential is increased significantly if trash is reclaimed for electricity generation, and if sugar production is sacrificed for increased ethanol production (as in Brazil).

Interaction with Biofuel

The Milling Council notes that the paper does not address biofuel requirements (state and national).