

**Submission in response to
Issue Paper 1
Climate Change: Land Use – Agriculture and Forestry**

This submission has been supplied by

Claire Penniceard
Director
The Pig Pen Pty Ltd
P O Box 324
Euroa
VIC 3666

Ph: 03 57 951 298 Mob: 0427 951 298
e-mail: claire.2@bigpond.net.au

Context:

The Issues Paper observes that agriculture and forestry will experience significant change as a result of climate change exposure.

However, agriculture has already been exposed to a significant degree of structural change in response to trade, production and certification requirements, as well as the variability already experienced by the climate change impacts already observed.

This change is largely unplanned and almost entirely unmanaged at a system level across the country. And it is all in one direction: in almost every agricultural industry, enterprises are becoming larger and their production strategies are becoming intensified.

This significant change is not often recognized or analysed in public discussion. In 2007, I prepared an overview document on challenges for farming innovation for the Department of Primary Industries, Irrigation Futures Project. (Final Report 10, Business Futures. 2007)

Arising from this work and my other positions of responsibility (See CV at end) I offer the following observations:

Current trends in agriculture

The Australian domestic market is, for most cases, too small to provide a profitable, robust, stand-alone market in agricultural produce. Increasingly, businesses need to be able to trade in the global market as well as the Australian market, to obtain the economies of production which buffer them against market movements. Globalized businesses will also need to deal with the problem of production variability created by seasonal and climatic variation.

This is producing significant changes in Australian agriculture. Enterprises are becoming larger, mainly by consolidation. Even traditional broadacre grazing enterprises, namely beef and sheep, have been undergoing significant aggregations. Volume of production is steady or rising while the number of enterprises is declining.

Industries are also moving to intensification as a production strategy. For some years, beef enterprises have not been rearing calves on site, but sending them to feedlots. In the lamb industry, larger farms are feedlotting lambs on their own properties, and large feedlots are being established to smooth out production and to provide market consistency. This trend has produced some serious issues for infrastructure provision, animal welfare, and environmental management. For example, an assessment of the environmental impact of livestock has indicated that major changes are required if production strategies in this sector are to be sustainable (*Livestock's Long Shadow*, FAO 2006).

While agricultural industries are aggregating, climate change is driving a reduction in the area of land on which agriculture can be practised. In parallel, population increases are removing land from production to provide for housing. This means that the growing world food needs will be produced on progressively less land. And new uses for food products, such as the use of grains for biofuel production, add further to the production constraints in meeting the global food demand.

Locally, climate change will place horticultural production at risk due to temperature and rainfall changes that may induce unseasonable frosts or reduce the available chilling. This may lead horticulture to trial new plant varieties, or move to another region, or construct some form of controlled environment for their plants. Cropping systems will potentially be faced with increased rainfall during traditional harvest seasons. Livestock may require additional shelter. The increased incidence of fires will place all agricultural activity at risk. Note that most of the adaptation strategies outlined have implications for infrastructure and land-use planning.

Many businesses are also taking control over a larger proportion of the value chain by taking responsibility for marketing their product to the consumer. This enables them to have more control over the prices they receive for their produce and therefore moderate the decline in their terms of trade.

Market demands

Market requirements have traditionally influenced issues such as consistency of supply, product quality and accountability. These requirements are enforced through matrix payment systems that impose significant penalties on variations from prescribed standards. However, increasingly these requirements have been extended to cover the production systems as well as the products themselves.

Market requirements are generally prescribed in terms of audit and certification requirements. The certification of production systems is costly to establish. It also requires ongoing monitoring and record maintenance, as well as annual licence and audit fees. For example, if a producer wishes to sell any of their product in any part of the UK supermarket system, the business must hold a current, unblemished ISO 14001

certification. This can take more than a year to obtain and the annual audit and licence fees are such as to preclude any but very significant enterprises from being able to support these costs.

The certification of some components of production systems by an individual enterprise is nearly impossible. Singapore, for example, mandates the ability to support by certification, that no genetically modified material of any kind has been used in the production of food products imported into the country. At this stage, mechanisms to prevent cross-contamination of materials in storage and transportation are not well established, and industry wide approaches are required.

A number of new areas of production certification are becoming important in the global market. These go beyond customer concerns about food safety, and focus on production techniques. One relates to animal welfare. In the UK, some market sectors now require labelling of products on a “traffic light” rating system of the quality of animal welfare calibre of the enterprise producing the food. Green represents approved standards, yellow represents marginal approval, and red asserts that the product was created with unsatisfactory welfare standards. The quandary is that there is no national development or international ratification of animal welfare standards.

The second area pertains to the international market interest in the emissions footprint of the enterprise. This has had more consistent research applied to it than the welfare standards. In Australia, we now have the Australian and International Standard ISO 14064. The methodology to support this Standard comes from the Australian Greenhouse Office and is based on the AS ISO 14040 series of Standards.

There is a significant drive among producers to support their market access with the ability to claim a low or neutral Carbon Footprint. This includes both emissions from the enterprise itself, and any offset capacity it has to offer in the carbon trading markets. It will not be long before customers begin requiring these as another aspect of market access. In turn, Australian agricultural producers will need to factor this into their certification systems and their production practices.

There is also an increasing interest in the market certification of water and energy use efficiencies. As we move to more stringent management of scarce resources, we will see more emphasis on these environmental certifications.

The trends in market requirements for energy and water efficiency, adaptation to climate and moves toward intensification of agriculture have implications for agencies who deliver infrastructure, zoning and other production needs.

It is clear that the issues of emissions mitigation and certification which are the focus of this Review also coincide with significant global market drivers already operating in the agricultural sector.

It is therefore opportune that these drivers are both analysed and employed together to maximize the benefits from this Climate Change Review.

3.The Issues

3.1 Adaptation in the agriculture and forestry sectors.

Adaptation challenges

“Lack of uptake and adoption of measures on farm” may be the natural personal response of some members of a conservative production sector, but as I have outlined earlier, there are significant market drivers which are compelling rapid structural change in agriculture and forestry.

The list of factors affecting uptake of adaptation opportunities is useful, but could include specific mention of the key role of Zoning and Planning regulatory structures to facilitate or impede the management of structural change.

Dot point 5 does not specify the nature of the investment concerned, but a significant aspect of this is the need to supply appropriate infrastructure for the new forms of agriculture. This is not only an issue of cost, but also of location.

And the quality and character of this infrastructure is also being affected by climate change issues. Internationally, underwriters of insurance companies servicing infrastructure entities are increasingly warning that repeated insurance claims by utilities providers for events “which could reasonably have been foreseen” will not be continued. These events include an increase in “extreme weather events” which are associated with climate change. The frequency and severity of these events are now increasingly taken by the underwriters as being “reasonably foreseen.” This in turn will drive the need for more reliable infrastructure provision, such as undergrounding, which in turn will mean cost increases. The supply of energy infrastructure to agriculture is classically prone to regular interruption by floods, fire and storms, the intensity of which is now a recognized feature of climate change expectations.

Traditionally, Victorian agricultural enterprises have been provided with energy, in general electricity, with similar levels of service and supply as residences. In rural areas, this has been through a single wire earth return electricity distribution system. These supplies are inadequate for modern intensive production systems that commonly require three-phase power supplies.

Individual businesses have the opportunity to upgrade their power supplies. However, this can place significant costs on the business as it may necessitate the upgrading of infrastructure for a considerable distance. The current strategy for locating intensive enterprises on the landscape is to scatter them, often in an effort to distance them from other producers, and then to resource each enterprise as it is created. The characteristic result is expensive delays, controversy at the permit stage, then slow and expensive infrastructure provision. Discussions with various intensive enterprises across the State have identified an average cost of \$500,000 to \$700,000 to the enterprise for these outcomes.

In January 2007, the Australian energy market transferred from a State to a National market. While the Victorian Energy and Water Ombudsman will still have carriage of complaints in Victoria relating to energy matters, the distributors and retailers will be working in the national market. This creates some concern. As an entrepreneur, my experience is that the single user focus has been hard enough to manage at a State level. Will the introduction of a national market make this better or worse?

An alternative approach is to group users of particular types of infrastructure within the landscape, just as we have done with irrigation districts, and then to service those users with appropriate infrastructure. The aggregation of users will make the capital investment by the distributors more commercially appropriate. This will also make it simpler for the electricity retailers to provide service contracts which are appropriate for the intensive agriculture category of users.

The same argument applies to gas supply. The cost and technical constraints of gas reticulation has resulted in slow and difficult servicing of rural townships, let alone production agriculture. But gas can be used effectively by some intensive enterprises, and it produces lower emissions than electricity supply.

Modern intensive agricultural production systems need reliable, good quality, year round water supplies. In rural areas, water supply systems meeting these criteria can be difficult to access.

In many areas, irrigation water supplies are available. However, irrigation water supplies are seasonal and subject to inter-annual variability. Therefore, access to irrigation water alone may be inadequate for an operation that requires year round access to water supplies.

Harvesting of water on-farm is an alternative source of water. However, regulation of farm dams and highly variable rainfall mean that the on-farm water harvesting is unlikely to provide water with sufficient reliability.

Groundwater is another alternative source of water. However, the salinity and chemical composition of groundwater interferes with the efficacy of many agricultural chemicals, and therefore is unsuitable for many purposes. For example, hardness ratings affect chemical performance of both herbicides and pesticides. Alkalinity increases breakdown rates of some chemicals causing irreversible reactions. Bicarbonates drastically reduce herbicide efficacy. Suspended clay particles can deactivate some chemicals. The establishment cost of treatment plants at individual sites often becomes prohibitive.

Piped water supplies are typically of a higher quality than other water sources and are available all year round. This makes piped water attractive for intensive agricultural industries. The challenge is that it is extremely costly to provide this infrastructure to production zones located away from townships. And a pumped supply has higher emissions than a gravity fed supply, so the net benefits of the increased production footprint of the intensive agricultural enterprises needs to be significantly greater than that of the extensive enterprise it is replacing.

Questions for consideration:

1. How might these adaptation challenges be addressed?

The challenges as outlined in the Issues Paper assume that the agricultural sector is inherently resistant to change, and while this might be true of the basic personal preferences of many in an aging farm sector, it is not in fact the dominant paradigm which is driving the very significant changes we are seeing in agriculture.

As a general observation, I would recommend that resourcing of desirable change be applied initially where the gains or efficiencies are greatest. The smaller benefits or more difficult outcomes will then not slow the overall sense of movement forward and will foster a favorable climate of change adoption.

The market drivers which I have outlined are far more influential in driving change, but serving the production requirements of the new enterprises is proving much more problematic.

There are two significant findings that I am able to point to in identifying on ground solutions to at least some of these challenges.

The relative emissions footprint of intensive industries.

In 2007, I was the only farm enterprise to become a National Finalist in the Banksia Environmental Awards. I won this award for the work I have done in developing and benchmarking a sustainability footprint for my intensive piggery, The Pig Pen Pty Ltd

I market some 30,000 pigs per year, and produce, at farm gate value, approximately \$6million of export quality pork each year. And since the multiplier for Singapore is about 7, I put over \$40 million each year through the Victorian economy.

I established the set of parameters in which my total environmental performance needed to be measured, (there is no existing standard for this) and then benchmarked my results against a common set of 5 other Australian agricultural enterprises, (one of which was traditional piggeries.)

Details of this are attached in the notes to this submission, Note 1

My emissions are validated through the National Pollutant Inventory (NPI), to which, as a piggery, I am obliged to report annually. And the NPI measure everything, not just

carbon. (If you paint something, the paint emissions have to be included; if you concrete anything, the concrete emissions have to be included...)

The minimum annual reporting threshold for the NPI is 10 tonnes. My two piggery sites come in at less than 7 tonnes each.

The average Australian domestic household annually emits 14 tonnes of carbon alone. So my two piggeries together emit less than a single average domestic household.

This production footprint could be achieved by any other piggery enterprise choosing to follow the same system. And many others do something similar. There just hasn't been the rigorous analysis and verification to support what are somewhat counterintuitive findings.

The other significant achievement in the factoring of intensive enterprises into the landscape has been the development and now full Zoning approval, of the Strathbogie Special Use Zone. This is an area of approximately 473 square kilometers (about 20% of the Shire) as a specific Precinct for intensive agricultural and agroforestry enterprises. It is planned, from the ground up (literally) as a new form of sustainable landscape, with impeccable environmental credentials and a productive capacity which will significantly enhance total Victorian production.

And this delivers on the infrastructure requirements addressed on page 5 above.

Details of this Zoning are in the attached notes, Note 2.

These are two examples of the way that it is possible to achieve significant agricultural change while also obtaining significant environmental as well as production benefits.

The detailed planning and documentation of both of these developments also provides a means of securing the data and the certification needed to facilitate exemplary emissions management.

An enterprise like my own, even though it has a very small land footprint (6.25 ha per site) has also an emissions profile so small that I have the capacity to direct part of my tiny sites to emissions sequestration for other enterprises, while also sequestering carbon to match my own emissions in full. In other words, I am a net carbon sequestration capacity enterprise.

2. What other factors affect the implementation of adaptation measures in the agriculture and forestry sectors?

Land use planning and controls

Existing land use planning processes and controls are designed to serve the needs of traditional low intensity agricultural industries. The shift to the development and operation of aggregated, intensive, agricultural production systems is not likely to be a straightforward issue for land use planners. The provision of appropriate infrastructure and services to these regions (including telecommunications systems) has been discussed. Finally, the potential for farming land to be used for the generation of electricity (through resources such as wind, solar or methane) will also need to be built into the planning process.

Rural lifestyle residents are often making an unplanned incursion into traditional agricultural landscapes. As a result, the number of complaints from residents about agricultural practices has been rising. This has meant that restrictions have been placed on farming enterprises in some areas. While many complaints have been about agricultural operations, issues of visual amenity and aesthetics have also been raised.

Permits are often required for the development of intensive agricultural production systems in rural areas. These permits are commonly objected to on grounds of degradation of amenity. This raises questions of: Who are the owners and beneficiaries of amenity in rural areas?

Due to agriculture using large amounts of rural land, there is an expectation that agricultural enterprises will deliver public benefits from their land management as well as private benefits. Landcare and other programs seek to facilitate natural resource outcomes from private land management. There can be a significant disjunction between productive private land use and the public benefits derived from agricultural land. This disjunction creates substantial uncertainty for the developers and managers of agricultural enterprises.

2. How should responsibilities be shared in dealing with adaptation?

The experience of the successful creation of the Strathbogie Special Use Zone has shown that while it may take some time to complete, an entirely new approach to land management and agricultural production can be achieved.

I attribute a significant part of this success to the direct participation from the outset of agricultural industry, local Shire and some 8 different Government agencies, together with direct State government involvement.

It is a model that delivers because at the design and planning stage, it is able to take into account the inevitable crossovers of jurisdiction or policy differences which, if not addressed early, would have led to undue delay, design compromises or post hoc adjustments which are very destructive of a good investment climate.

And the particular form of Zoning was chosen at least in part because it allows the mandating of superior performance as a condition of operating within this Zone.

I formed and led the industry Panel which was a key driver of this Zoning development. I have been able to ensure that the whole exercise has been templated from top to bottom,

so that it can be replicated by other Shires wishing to address this particular problem in emergent intensive agricultural production.

It has proved the best means to the best outcome in fostering large scale adaptation and change.

The mitigation challenge

- **Diffuse sources and sinks**

There is a serious challenge for agriculture in its dual role as an emitter of greenhouse gases and also as the site for carbon sequestration for other entities' emissions.

Successful ability to do this requires that the footprint of an individual agricultural enterprise be established and that the site has the capacity to completely offset these emissions within its own boundaries. Whatever excess acreage remains over this land requirement is the area available in that enterprise to offset carbon from other enterprises.

Unless this is done, the agricultural enterprise will only be displacing its own emissions unsequestered, with no net gain.

It is thus imperative that we are able to establish the availability of sequestration sites, by first identifying the sequestration capacity for the individual agricultural enterprises.

The variability which is expressed as a problem in the **high diversity of entities (Issues Paper,p.5)** may not be so difficult to deal with. While the exact mix of operations does vary from farm to farm, the overall pattern is one of mix and match, where the variation is not so much in absolute differences as in the different mix of a relatively small number of production styles and strategies.

Benchmarking these would not be so difficult for the various industries which use them, and then, for any particular farm, the requirement would be to establish the area of the farm allocated to each of the various production strategies.

You can get a very diverse result in patterns, but they are all constructed out of a limited number of variable pieces, so the issue is not as unstructured as it might at first appear.

This approach also allows a farm to recalculate its component emission factors each year as it makes different decisions about how the various paddocks etc will be utilised,

This will certainly simplify both calculating and reporting emissions.

Most intensive agricultural enterprises already have highly systematised production information for international trade contractual requirements, so for these enterprises, this process would be relatively straightforward.

Where this may constitute a problem in the security of sequestration would be where the farm concerned changed the production paradigm within the farm and created significantly greater emissions than were the case when the available sequestration capacity of the farm was originally calculated.

This would mean that the long term protection of the sequestered carbon on any farm land would need to impose significant production change protocols to constrain the maximum emissions load of the farms' own operations. This may be achieved by a requirement for the farm to buy new offsets themselves in order to balance the sequestration capacity.

- **High variability of emissions**

While this might not be as significant as the sheer number of farms might suggest, there might be some efficiency and reliability gains in developing regional benchmark indicators for different soil types, rainfall, temperature etc. These could be periodically reviewed and adjusted where change had been identified.

- **Trade exposed industries**

See section on market demands, page 2 of this submission

- **Highly elastic consumer markets**

The emergence of a growing middle class in developing countries such as India and China is driving a significant demand for higher quality food and particularly for access to high quality animal protein in their diets.

The contractual requirements placed on the certification of these food products will go a long way to deriving the requirements for emissions certification.

It is also not true as a generalisation that intensive industries are necessarily heavy users of power. They tend to use it every day on an industrial model, but many enterprises have relatively small total usage.

My own enterprise, The Pig Pen, has an electricity bill of less than \$100 per month per site (and that is the more expensive green energy!) which is a total usage less than most domestic households. The enterprise has been carefully designed to get this result and it could readily be reproduced.

And the consumer demand for a reduced footprint is an existing key driver of adaptation mechanisms to lower energy consumption. Increasingly, the consumer is looking for labelling which will demonstrate both a certified environmental footprint and an animal welfare labelling system.

- **Liability**

There is a dual problem of elastic sinks. The actual ground capacity of any particular soil may be altered over time in its absorption capacity, or its destruction or damage by environmental stresses such as fires, floods, storms, droughts etc

Some level of risk assessment might be applied to any particular area of land, in relation to the likelihood of exposure to these risks, given what we know about climate change impact projections over time for any particular area of Australia. These risk modifiers could then be applied as a formula to the actual on ground base assessment of available land and its sequestration capacity.

Thus long term sequestration commitments might be judged appropriate within an agreed risk parameter. In some sites, this will allow a smaller sequestration total than might have been actually possible, because the possible risks do not eventuate, but this will be offset in the whole system by those sites where risk events larger than the district average take place.

This would at least secure a higher truth factor for the system as a whole.

Final comments: In the opportunities for mitigation there is a need for both basic and applied research, but we do not need to have all the solutions for all of agriculture before we can certify any part of it.

We do need policy support for the promotion of on farm mitigation. But at least for the pioneers, there needs to be both direct financial incentives, and a supportive and co-operative approach to the management of government regulations. Competition or conflict between government agencies is more destructive of advancement than even a lack of support.

Questions for consideration:

**What potential is there for mitigation in the agriculture sector in the short term?
What practical options for mitigation are likely to become commercially viable in the near future?**

There are a number of strategies by which we might secure significant immediate mitigation impacts.

The most significant mechanism available immediately would be the production and deployment of agrichar.

This is done by a process which uses slow pyrolysis technology, requires only a very small land footprint, is able to produce electricity as well as the char product itself, and has both auditable sequestration benefits and a number of significant agricultural benefits as well.

It is able to improve soil biology, increase productive capacity, is able to be certified as organic and so can support that very significantly growing area of Australian agriculture, is a significant replacement for nitrogenous fertiliser (thus reducing a very significant source of agricultural emission) and also is able to make use of agricultural wastes in the production process, thus also removing the emissions as well as the biohazards from these sources.

Agrichar applications to the soil (and they can be almost unlimited in volume without loss of effectiveness) has the capacity to sequester a higher volume of carbon than any tree planting regime on a per acre basis. And it stays there in the soil, whatever the climate may be like.

It is a very cost effective and reliable sequestration strategy.

I have written a letter of support for a submission to this Review from BEST Energies relating to the production and use of agrichar.

What incentives, policy innovations and/or market based mechanisms would guarantee an optimal contribution to the national mitigation effort?

In the fostering of the uptake of change, saying “You should”, or worse, “You must”, has very little positive effect on adoption take-up. But if you can say: “I have done this. Come and see”, there is a significantly higher level of interest and preparedness to adopt the change.

Most people do not like innovation or want to be innovators, but they will follow change readily once it has been demonstrated successfully in practice.

Incentives for industry, especially for pioneers:

Capital grants

Interest subsidies

Information transfer support

Rate relief for innovative enterprises

Find and use the best current performers (Leading the Way, Zero Hero type concepts) and use them as lighthouse innovation leaders with suitable publicity to spread information.

What is the best way to deal with trade exposure if policy measures are implemented to reduce emissions from the agriculture and forestry sectors?

- Ensure that all emissions certification is available in a form that can be used in commercial contracts for product labelling and other trade incentives for market access.
- Ensure that trade certifications which are able to include emissions status of an enterprise are facilitated.

This is especially relevant to market access to the EU, the UK etc., and will increasingly be significant with emergent economies.

Mitigation policy options

Questions for consideration

Accepting existing practical limitations, is direct inclusion in an ETS the most appropriate mechanism for encouraging mitigation in the agriculture and forestry sectors?

Direct inclusion for the agriculture and forestry sectors is essential from the outset in any ETS scheme. The land on which these enterprises are located is also seen as the primary source of land based emission sequestration opportunities.

Sequestration, particularly in the currently very popular tree planting schemes, can not take place in national parks or forests, in State forest, in estuary or riverine reserves, in waterways and their associated reserves, in any urban land spaces or, unless it is in the verges, any land given to road or rail use. Similarly, there is no right of access for this purpose to aboriginal or tribal lands, or to Defence force sites.

In consequence, the only land actually available and able to remain so, for the purpose of sequestration (with its 100 year timeframe contingency) will have to be farming land as it is presently classified.

And, as I have set out above (Diffuse sources and sinks, page 9) , each agricultural enterprise will have an existing emissions profile, and the need to be able to sequester this equivalent on the land of the enterprise will have to be taken into account before any excess available land can be assigned for sequestration.

This means that the calculation of the emissions profile of the agricultural or forestry enterprise will have to be done in order for the sequestrations for all other kinds of enterprises to be considered and then certified.

Inclusion from the start in any ETS scheme is therefore a significant incentive to speed the footprinting of agricultural enterprises.

What policy mechanisms would be more appropriate for these sectors? How would these measures interact with an ETS covering other emitting sectors?

If the agriculture and forestry sectors become service industries for other emitting enterprises, they will need to manage in policy terms which allow them some flexibility of choice about the service they may be able to provide.

Once it is established that an agricultural enterprise has available land for sequestration, then there needs to be a policy framework which respects their right not to make this land available, either for a particular time, or at any time, and also does not constrain their trading options in making this land available.

What would be the economic impacts on the agriculture and forestry sectors of a domestic ETS covering stationary energy and transport?

To the extent to which any particular agriculture or forestry enterprise was a user of stationary energy, fuel or fertilisers etc the enterprise costs would rise. This would be a direct cost and would be unable to be offset in trade terms. The only mitigation of this impact would be whatever direct benefits the agriculture and forestry sectors could obtain from inclusion in the ETS scheme which was contributing to their costs.

It would also be appropriate that the top performing agricultural enterprises in environmental terms should be supported in accessing the infrastructure most suited to their production needs, especially when the energy component of that infrastructure was increasing their direct costs.

It would also benefit agricultural enterprises to be able to access support for the generation of renewable energy on their farms, whether this was to offset their own usage or to be a small embedded generator and thus reduce their own footprint further and also support their communities.

Providing opportunities and questions for consideration:

The opportunities as listed here are appropriate, but all of them would rely on a significant reinterpretation of the planning Schemes in order to get community approval, or at least not total opposition, to the introduction of these energy generating possibilities as listed in the discussion paper.

This has a direct bearing on the issue discussed on page 7 above, (section on land use planning and controls). The visual amenity preferences of the public at large are currently given precedence over the production strategies of the agricultural sector and there seems to be no current discussion about the need to protect agricultural production.

Some recent decisions for instance, have seen an orchardist protecting his grape vines from birds (and it is a contractual requirement for these table grapes that they have no marks on them), being forbidden by the local Shire to use his bird nets.

This was because a local resident who could see the vineyard from his property claimed the nets were unsightly and the red colour was offensive, and thus his amenity was adversely affected.

As a matter of interest, animal welfare actions have recently seen the banning of black monofilament netting because it harms birds and bats, and white netting would have reflected unsuitable amounts of light onto the grapes. And white was equally unacceptable to the protestor. So the orchardist has no acceptable strategy to protect his crop.

Infrastructure, especially for electricity generation, seems to ignite public passions of rejection, in highly activist responses.

The particular opportunities listed in the Issues Paper could not be provided for the agriculture sector unless there was specific government support for it, and a well resourced public information process to explain the values to the country of both this form of generation and also the mitigation benefits it represents.

And that would also require that the whole issue of public amenity being derived from private land without the consent of the owner will need to be revisited.

3.3 Practical considerations for including agriculture and forestry in an emissions trading scheme.

This is a useful table, but it needs to add the issue about amenity and other public attitudinal stances in relation to agricultural production practices. It should be noted, that an intention to plant extensive agroforestry lots attracts the same kind of public opposition as does the development of almost any contemporary agricultural production strategy.

Even traditional shearing sheds are considered unsightly and are required to have extensive screen planting and colour controls, if Shires give permits for their construction or rebuilding at all.

Point of obligation

The issues about how emissions trading might operate in a new scheme, and the impact on the system, both its costs and its efficiencies, are a serious point of concern.

I think there may be some comfort and also some help available by looking at the rollout of water trading when the unbundling of water rights and the introduction of individual trading took place over this last year. Exactly the same concerns over small users,

unfamiliar but legally significant trading etc and matters very like offset aggregation were central to that process.

Despite a very significant number of trades, and the roll out of a new administrative system which required both legal as well as functional transparency and accuracy, the system has been very successful to this point.

Both Agency and Water Authority staff have learned not only new terminology, but also new operating systems and farmers have been significantly active in taking commercial and strategic advantage of the trading opportunities to further commercial developments in their enterprises or to manage the valuable scarce resource most effectively.

And somewhere along the line, the structures to assess what the actual water shares for any property would be, and the differing capacities for their use, were all established.

Samuel Johnson once said, that nothing so focuses a man's mind as the knowledge that he is to be hanged in the morning.

I suspect that in this section of the Issues Paper, the difficulties for the market of the multiplicity of small participants, and concerns over monitoring have both been overrated.

I was appointed in 2007 to the Board of Goulburn Murray Water, which is Australia's largest water Authority, and have been independently working on emissions issues in agriculture. I believe that we could profitably consider the development and rollout of the water trading structures and regulations. We might find them very useful.

Questions for consideration:

Do the economic efficiency gains from including small emitters in an ETS justify the costs of compliance?

These costs may be overestimated. See earlier response on the natural drivers of the market as incentives, page 3 above. And also consider the water trading experience. The inclusion of the multitude of small traders was not an undue burden on the system and in fact had some smoothing out capacity.

How could transaction costs be minimised?

Look at the water trading system. And maybe the oversight of an authority such as the Essential Services Commission could be useful here.

What should be the point of obligation for agriculture and forestry industries in an ETS?

I am not really concerned by the numbers of small traders who may become involved with the introduction of an ETS.

I am more concerned with the definition of the point at which a lifestyle rural resident, or a member of a Managed Investment Scheme enterprise becomes a bona fide farmer – a contentious issue to the Taxation Commissioner, the drought support agencies such as Centrelink and the Rural Finance Commission, the Planning Scheme and other regulations controlled through DPI, the EPA, and others.

The commercial incentives may have perverse outcomes if they are not able to be confined to those who have real farming enterprises. And the structure of the property which contains the land set aside for sequestration purposes also assumes that there is some capacity to put caveats on a piece of land for 100 years and still have that land in some commercial connection with agriculture.

No part of ETS panning as discussed here includes domestic traders.

Should a threshold for liability be applied, and how should it be defined?

My concern with the New Zealand approach is that small beginnings on a very limited number of vectors of the full emissions profile will then mean that every new addition later has to be painfully fought for, and creates new points of anxiety and uncertainty at each stage.

I suspect that we are probably better off with a wider band of threshold measurements, and I have argued in other sections of this response to the Issues Paper, that we should be able to get a reasonable handle on a fair coverage of the emission profile of most agricultural enterprises without undue difficulty, as the market is driving most of the certification issues already.

We are planning the ETS structures for the enterprises of the future. And those who can not or will not heed the market requirements for certification and verification will not be among those future enterprises.

Monitoring and verification of emissions and mitigation, including questions:

I think that the concern over possible calculation errors or verification difficulties may be misplaced. Almost every significant agricultural enterprise will currently have an industry verified and externally audited Quality Assurance certification in place. This covers already a significant number of the areas which would be the subject of emissions scrutiny. Add to this, the additional reporting requirement for the National Pollutant Inventory, and the EPA through the permit process for most enterprises that start up or expand and you already have a system which is familiar, data based, exposed to audit and requiring documentation of pretty well all significant aspects of the enterprise operation which might be of interest in an ETS.

All this has also created a pre-existing preparedness for audited compliance and reporting, and an awareness of the value of this in international as well as national commercial contracts.

And all the enterprises which are already engaged with this kind of monitoring and reporting are also aware that new areas of interest are being regularly added, mostly driven by customer demand. It has been the customer who has driven the inclusion of labelling on animal welfare production details and sustainability performance in the path to market. The measures may go through a period of uncertainty while the purposes of the labelling and the effectiveness of the assessments that support it are put to the test, but in the end, there is a robust certification that emerges – and the companies who are seeking the certification do so actively for perceived market advantage. And that same perception of market advantage is also what ensures that the development phase of any new market certification is as short as possible.

Industry experience in this area would suggest that a vehicle such as the OVERSEER program would probably be cumbersome and ill adapted to individual enterprises. Generally, market experience suggests industry bodies are better at identifying the appropriate areas and management strategies for their particular industry. This templating is generally regularly updated and is the subject of industry training and internal promotion strategies.

This might be the best approach to get both adoption and leverage on producing new certification regimes and compliance strategies for an ETS.

On the issue of stringency: if the variation is real, the requirements need to be lifted to the common level. Transparency will help here.

The value of translating current agreed aggregate measures will help. For instance the NPI use an emissions equivalent unit, and the British have an aggregate Global Warming Potential unit which allows them to compare a wide range of reports while still having industry specific reporting requirements. We could usefully explore this concept.

Sub-sectoral coverage

The issue of sub-sectors in agriculture and forestry is significant. The forestry sector includes production strategies with widely variant harvest regimes, as well as significant variations in establishment practices etc

In agriculture, the differences are even more volatile, as the structural changes to which I have already made reference, are continuing to aggregate.

To include all farming operations on the ETS, it will be necessary, as I have outlined, to benchmark each entity at point of entry or obligation. The issue here will be the speed and extent of the production strategy changes which the individual entities choose to adopt.

In this, we have already seen that a farm enterprise can and will change production strategies swiftly under the pressure of market opportunities or constraints. The move of the very conservative sheep sector into lamb feedlots is one striking example of this.

I believe that the twin drivers of the calculation of sequestering capacity for any enterprise and its current footprint obligations in sequestration offsets will see a very swift move in production strategies to minimise farm originated emissions.

There are already significant moves within the pig industry to move from traditional sheds to the more environmentally friendly deep litter systems. Currently, the cost differential for an existing enterprise to replace established traditional sheds, with new deep litter systems is significant, and the production benefits for at least some sectors of the industry are not yet large enough to justify the cost.

When the issue includes market certifications (already becoming a driver) and a new component of emissions footprinting implications, I believe that we will see a significant shift in production strategy.

The present market crisis within the pig industry will see a significant reduction in existing enterprises. What the remaining ones will look like will reflect in large part the move to set up fewer but larger new replacement enterprises, in locations which better serve the infrastructure needs (especially water) for the enterprise.

Here is an opportunity to enhance this naturally occurring change process, by including the considerations of footprint benefits under an ETS.

It is important that emissions in total are measured and not just single source comparisons. Good footprints, if achieved, can then be used to drive change within industries.

It is an increasingly inaccurate assumption that intensive enterprises have, by definition, higher emissions. The Pig Pen is a working model demonstrating this. Lower land disturbance emissions are one area where intensive livestock enterprises have a naturally smaller emissions footprint than extensive grazing enterprises, especially those where the grass cover cannot be sustained at significant levels all through the year. And optimal feeding regimes in feedlots also result in lower enteric emissions.

There are similar drivers of change in every agricultural industry. I believe that sub-sectoral coverage could easily recognise their changing paradigms.

The trick will be to ensure that an enterprise which does change its production paradigm is reassessed for its emission footprint in a timely manner.

Questions for consideration

Should all agriculture and forestry sub-sectors be included in an ETS? What sub-sectors might be better suited for inclusion?

I believe that it is both practical and desirable that all agriculture and forestry sub-sectors are included in an ETS.

How should economic distortions within the sectors be dealt with?

It is one of the desirable purposes of an ETS that it drives better environmental performance and the adoption of improved production practices.

The distortions considered here are the outcome of current production practices, and in many cases are open to significant change or amelioration if the benefits are clear to the enterprise concerned.

Phasing and Timing

The three stages as set out here may have general support, but an industry, or an individual enterprise, should be able to position itself anywhere from stage 1 to 3 initially, depending its stage of development for auditability.

There would be an expectation that Stage 3 should have as short a timetable to full coverage as possible, in order for an enterprise to be considered able to provide credits/sequestration opportunities for the scheme as well as being liable for emissions.

Questions for consideration:

If a domestic ETS excludes agriculture and forestry initially, but includes them at a later point in time:

What are the advantages /disadvantages of involving these sectors through the inclusion of offsets, or an “opting in “baseline and credit trading scheme?

As I have argued above (Mitigation Policy Options, p13), it will be necessary to determine the sequestration capacity available to the system from the outset, and this will need to involve the agriculture and forestry sectors at this point.

What sort of transitional arrangements should be incorporated in the initial design?

Any agricultural sectors which are ready to take up the role of identifying operational emissions footprints with auditable transparency, should be included immediately so that a start may be made on the identification of the sequestration capacity of the land available for such eventual use.

I believe that there will be an increasing number of such industries which will follow the leaders in the field.

The transitional arrangements are most likely going to be driven by the capacity of the new system administration to deliver on the audit and contract conditions.

Recognition of carbon sinks and offsets.

Prior mitigation action

Bans on deforestation have certainly reduced agricultural emissions, but have also decreased the amount of land available for sequestration purposes.

There will be a need to establish whether the actual regrowth that has resulted from the bans is forest, or as is widely alleged, woody weeds.

In pursuit of a healthy landscape this may need some significant attention.

If the regrowth is determined at any place to be adverse in environmental affect, then arrangements will need to be made to change this for land cover that is more appropriate. This process, when implemented, will certainly result in some increase in emissions arising from the land clearing, but could be replaced with a more environmentally sound cover as carbon offsets.

This could, over time, create a net gain both on the ground, and in the sequestration scheme.

If the vegetative cover is found to be environmentally sound, then consideration could be given to the landowner being able to obtain carbon offsets value for the land that has been sequestered under government regulation.

The baseline date from which such claims might be allowed would need to be the date of the governmental clearing ban coming into force.

I think that this would need to include the consideration as to whether the clearing bans were focussed on emissions effects. Where they were, it should be appropriate for landholders involved to be eligible post hoc for ETS benefits.

Equally, what should be the cut-off point of recognition for farmers who have voluntarily sequestered land for emissions sinks, specifically by reforestation as distinct from simple tree cover or regrowth?

And how can we limit perverse incentives to establish higher levels of emissions in enterprises prior to admission to an ETS scheme, so that they will have something to profit from in emission reductions?

Offsets and international frameworks

Now that Australia has ratified the Kyoto Protocol, we should aim to make all mechanisms as consistent with the CDM and JI protocols as possible.

I note also that international consistency is very significant to trade certification

Beyond this, there is certainly room for the inclusion of offset acceptance in areas which are not thus far included in the existing Kyoto protocols. And it will be certain that developing nations coming in to the Kyoto process will also be looking for new ways to include environmentally valuable land management regimes within their emissions management schemes.

In Australia, this might include a range of management strategies such as those listed in the Issues Paper. More of these will emerge as the spirit of innovation is given more recognition and support. The development of bioenergy strategies and the production of agrichar are two of these that are already in place.

If the baseline setting costs are industry based, the costs of developing them will be significantly reduced to the extent that the industry has pre-existing certification structures from which the new accreditation can be derived.

An interesting aspect of possible double counting anomalies is the emergent strategy of tracking 'virtual' inputs such as water and energy in developing a full environmental footprint for an enterprise.

The 'virtuals' are the energy, water etc that are brought into the enterprise in the materials etc which are used within it. Any industry environmental footprint which is used to help establish baseline data for an ETS would need to ensure that the 'virtuals' were not included, as these would be a real element in the footprint of the source enterprise from which they have come, and this would result in double counting.

Questions for consideration

What types of carbon sink and mitigation measures should be included as offsets or within an ETS? Are there practical and cost effective monitoring solutions available for these measures?

There is potential for significant carbon sequestration benefits from the use of slow pyrolysis technology.

The use of slow pyrolysis technology offers a very significant opportunity for reliable carbon sequestration

(See submission on this Issues Paper from BEST Energies, for which I have provided a letter of support)

It offers a means of producing a highly durable carbon material, **agrichar**, which is able to be included in soils where it has the double benefit of improving soil productivity and also creating an extremely stable carbon material which is significantly more durable than the required 100 years for Carbon Sequestration certification as presently developed.

It also offers the capacity to measure accurately the amount of carbon to be sequestered (you test the sample of the batch to be used) and this will not change over time in the soil, unlike the highly variable amounts estimated by the action of growing trees to sequester carbon.

And it can never be removed (again unlike the harvesting of trees) because once in the soil not even digging up the entire farm and sieving it would retrieve the agrichar particles.

Once sequestered, this carbon stays sequestered.

And it is able to be added to soils in significant amounts (there are currently no known limits to its addition to soils. Some South American topsoils are almost 40%% agrichar, and still amazingly fertile after centuries.)

Per hectare, compared to tree planting, agrichar has an almost unlimited potential for carbon sequestration, together with a high degree of reliability in auditable certification.

How should positive incentives to reduce emissions or perverse incentives to increase emissions prior to inclusion in an ETS be managed?

See my comments in section **Prior mitigation action**, page 21 above..

Should offset regimes recognised under an Australian ETS be limited to those that satisfy international carbon accounting protocols?

Australia may have much to contribute in driving the re-shaping of the agriculture and forestry sector, and the benefits of ETS inclusion will also have individual market benefits to the producer.

Also: See my comments in section **Offsets and international frameworks**, p. 21 above.

Submission ends.

NOTES:

1. Claire Penniceard is the owner and Sole Director of **The Pig Pen Pty Ltd.**

The Pig Pen grows out pigs in North East Victoria, on contract to service specialist export markets.

The enterprise has been designed and operated for eight years as a working model of sustainable, Triple Bottom Line, accountable agriculture.

Water and energy use are a fraction of traditional operational requirements. Emissions are negligible compared to other forms of agricultural production. The Pig Pen is a continuing zero waste enterprise. The land footprint is tiny, and the enterprise is able to regenerate, every year, a greater acreage of land than is required for all its operational land in total, including land required for all the external inputs of the enterprise, such as feed grain.

The enterprise showcases exemplary environmental, animal welfare and production outcomes, and has a national reputation for excellence in the Australian pork industry.

The Pig Pen is innovative and successful in creating a truly sustainable model of 21st century agricultural production.

2The Strathbogie Special Use Zone

A new vision for agriculture in the Shire

This project is about sustainable land use change. In essence, some 470 square kilometers, about 20% of the Shire of Strathbogie, has been re-zoned as a specific precinct for agribusiness.

This creates a zone within the Shire in which intensive agribusinesses, especially those focused on food production, can be established and operated with environmental, social and commercial security.

The area has significant road, rail and air infrastructure at its boundaries, water, power and gas availability, and land which presently is characterized by relatively low value land uses.

The Zone allows for the strategic location of enterprises which require bio-security buffers, and which are users of rural water and power 365 days a year. The co-location of these enterprises will allow for the efficient provision and servicing of the infrastructure required for them.

Like all Shires, Strathbogie is experiencing change in land use. The unplanned nature of this change is a source of social and environmental conflict over amenity and resources. The creation of the Zone provides a unique opportunity to design a new and sustainable rural landscape.

Because the Special Use Zone is a planned land use change, it allows us to mandate superior operational characteristics, technology and accountability in the incoming enterprises. It will shift the land use from low value to high value production, and facilitate export.

The Zone itself will be separated into agribusiness, industrial and conservation sub-sections. Food and other products can be produced in the agribusiness area, serviced and processed economically from the adjacent industrial area and shipped out by the highly strategic transport infrastructure. Valuable conservation areas will be protected and managed for the future.

Economic modeling for the Special use Zone has identified significant investment and employment outcomes from this re-zoning. The Zone also provides unprecedented capacity to meet regional landscape and environmental targets. This creates the opportunity to deliver sustainable growth through triple bottom line benefits for the whole Shire.

The Zoning process has now been completed, with ministerial signoff. A Planning Panel has approved the process, which has included the development of a Technical Issues report, a Strategic Justification Report and a Structure Plan which outlines the uses, activities and running rules of the new Zone.

This is a very significant project which takes a positive and strategic approach to investing in a healthy, sustainable and profitable farming.

Notes end

CURRICULUM VITAE:

Claire Penniceard is the owner and Sole Director of **The Pig Pen Pty Ltd.**

In the last year Claire Penniceard has been the **winner of three significant national Awards.**

In **2006**, she was the Victorian winner of the Australian Pork Limited **Environmental Stewardship Award.**

In **2006**, she was the Victorian winner and a National Finalist of the **Telstra Business Women's Awards in the Innovation category**

In **2007**, she was the only farming enterprise to become a national Finalist in the whole of the Banksia **Environmental Awards.** She was a **Finalist in the Sustainability category.**

Major project award:

In 2006, Claire Penniceard was awarded a DAFF National Resource Innovation Grant. It was for a \$600,000 research project which has been trialling and evaluating the use of grape marc (the residue of skins and seeds after pressing grapes for wine) as a possible bedding material for use in deep litter bedding piggery production systems such as mine.

This is a project of national significance, in that it takes a very problematic waste product from one intensive agricultural industry, uses it to beneficial purposes in another unrelated industry, and then creates from it a valuable co-product much which is ph neutral, friable, full of bio-dynamic soil enriching microbes, has high levels of soil available carbon and has a nutrient profile not very different to superphosphate fertiliser, which in Australia is now a security risk chemical.

Memberships of Victorian Government Bodies:

Essential Services Commission Business Customer Consultative Committee 2005-2007
I had to resign from this appointment to take up a position as

Goulburn Murray Water Authority, Director, 2007

Ministerial Swine Industry Projects Advisory Committee Member 2006-

Ministerial Animal Welfare Advisory Committee Member 2006-

Victorian Farmers Federation Policy Council member 2005-

Victorian Pig Council Member 2004-

Irrigation Futures of the Goulburn Broken Catchment Project,
Technical Working Group Member 2004- 2007

Current Conferences and other presentations:

- Invited to make a poster presentation for the national **Greenhouse 2007 Conference** on the benchmarking and sustainability Life Cycle Analysis I have developed for The Pig Pen.
- Speaker and also a panelist at the **inaugural Banksia Forum on Sustainability** in Sydney in November 2007.
- Speaker at the **Farming in a Changing Climate Conference** being held in February 2008 , a joint initiative of DAFF, through the National Landcare Program, DPI and the East Gippsland CMA.
- Speaker at a pig industry conference for Murray water users on **Water use efficiencies and benchmarking**
- Guest speaker in 2007 for the **Directioneering Company Managers' Business Forum** on drivers of change.
- Speaker at Telstra's own in house launch of the **2007 Telstra Business Women's Awards**

Recent Articles and other publications:

Articles on The Pig Pen have been published by The Financial Review, Business Review Weekly, The Weekly Times, Stock and Land, The Age newspaper and WME Environment Business Magazine, where The Pig Pen was the only farm ever to make a cover story.

Claire Penniceard has been interviewed by ABC Radio National for "Bush Telegraph" and the BBC for their World Business Radio program.

Some current roles:

- Member of the national Pig industry's peak body, Australian Pork Limited, **Technical Reference Group** overseeing the implementation nationally of the **Commonwealth Model Code of Practice for the Welfare of Animals (Pigs)**, which was published by PIMIC in April 2007
- Currently an invited **Victorian representative** of the pig industry in an APL national working group preparing the pig industry sections of the new **National Livestock Transport Code**.

- Consulted by the **Australian Taxation Office** as the pig industry advisor for a major project determining Effective Life schedules for piggery assets.
- Requested to make a personal presentation, as well as a written submission, to the **Victorian Parliamentary Biofuels Inquiry** in 2007.

ENDS