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CSIRO Submission 13/490

The Government's Direct Action Plan

Environment and Communications References Committee

February 2014

CSIRO welcomes the opportunity to contribute to the Government's processes in relation to the Direct Action Plan.

CSIRO is a research provider across a wide range of disciplines relevant to the reduction of Australia's greenhouse gas emissions. We have broad research capability related to: the environment; land management and agriculture; resource characterisation; energy production; and socio-economic science.

Based on this expertise, CSIRO would like to comment on the following terms of reference:

> i. whether the Direct Action Plan has the capacity to deliver greenhouse gas emissions reductions consistent with Australia's fair share of the estimated global emissions budget that would constrain global warming to Australia's agreed goal of less than 2 degrees,
>
> iii. the effect of technical issues that arise for measuring abatement under the Direct Action Plan, including additionality and establishing emissions baselines for emitting entities and long-term monitoring and reporting arrangements,
>
> iv. the impact of the absence of policy certainty derived from the Direct Action Plan to encourage long-term business investment in the clean, low carbon economy,

i. Whether the Direct Action Plan has the capacity to deliver greenhouse gas emissions reductions consistent with Australia's fair share of the estimated global emissions budget that would constrain global warming to Australia's agreed goal of less than 2 degrees

CSIRO considers that there are many options for abatement that would enable Australia to reach its emissions target of 5% below 2000 levels by 2020. Whether Australia will or will not capture these abatement opportunities will depend on the detailed design of the program.

Significant opportunities for abatement have been identified in the land, energy and resources sectors, using both technologies available now and technologies currently under development. A summary of some available abatement opportunities is below. The abatement opportunities highlighted are those which have been identified by CSIRO modelling and research as having the potential to make a significant difference for Australia and where CSIRO has an active research program and expertise.

Land abatement

- Land-based emissions abatement in Australia could be significant in the period 2030 to 2050. Due to the time lag for adoption of new technologies, logistics and the nature of carbon sequestration curves (for example, tree planting where growth is slow in initial years), the most significant contribution from the land sector is likely to be achieved after 2030.
- The major opportunities from the land sector exist in afforestation, avoided deforestation, livestock methane and increasing rangeland and savanna carbon stocks through changed fire regimes. Soil carbon in agricultural zones is likely to provide low levels of greenhouse gas abatement.
- Saturation of carbon sinks (the maturation of forests and the restoration of soil carbon levels) means that per annum abatement from the land sector will decline in the decades after project establishment. If forests are harvested and converted to long lived products (such as biochar or building products) or used to substitute for greenhouse intensive products or energy sources, this effect can be reduced as long as the mature trees are replaced with young plants.
- Many land sector projects can contribute environmental and livelihood co-benefits (for example, improved biodiversity or livestock production efficiency) in addition to greenhouse gas abatement, which will be important for uptake of abatement technologies by landowners.

Energy and resources sectors abatement

Fugitive emissions from coal mines

- Fugitive emissions from coal mines are the single largest growing addition to Australia's emissions inventory out to 2020.
- For underground mines, with timely development and deployment of technologies, significant

abatement can be achieved.

- For open cut mines, there are also opportunities for abatement of fugitives, although the risks and costs of abatement are higher than for underground coal mines.

Renewable energy

- Australia has plentiful renewable energy resources for wind, solar, biomass, geothermal, ocean, etc.
- With ongoing cost reduction, these resources could provide a significant share of Australia's energy with zero emissions.
- With careful planning and management, issues such as intermittency do not represent a major barrier to these technologies playing a significant role in Australia's future energy mix.

Low emissions fossil fuel technologies

- Deployment of enhanced coal bed methane (ECBM) technologies using either flue gas or pure CO_2 streams has the potential to provide low cost geological CO_2 storage at scale while enhancing coal seam gas production.
- The direct injection carbon engine (DICE) has the potential to replace traditional coal generation technologies over time while up to halving the emissions compared to existing coal plants.

Commercial and residential building efficiency

- Energy efficiency technologies and tools, such as automated tools for improving building heating, ventilation and air conditioning (HVAC) system efficiency, and tools to determine the energy performance of residential buildings, provide near term, low cost options to create significant abatement.
- Automated tools to improve HVAC efficiency in commercial buildings have potential co-benefits that include avoided network costs due to reduced peak demand, improved building maintenance and commissioning processes, and improved equipment life and building occupant comfort.
- There is also an opportunity for significant abatement through the introduction of a voluntary or mandatory disclosure scheme in relation to the energy, water and greenhouse performance of residential buildings.

iii. the effect of technical issues that arise for measuring abatement under the Direct Action Plan, including additionality and establishing emissions baselines for emitting entities and long-term monitoring and reporting arrangements

Regarding measuring and verifying abatement in the land-sector, CSIRO considers that:

- Realising the opportunities in the land-sector requires the development of low cost methodologies that retain environmental integrity: what is required is that methodologies deliver confidence in the credited level of abatement, not necessarily precision in the sequestered level of carbon.
- For livestock emissions modelling it is possible and would be advantageous for the National Inventory livestock model to be stepped down to operate at a regional level, enabling livestock projects based on improvements in productivity.
- For soil carbon, there is a need for further soil carbon model development to allow methodologies to be simplified over time. In the meantime it would be best for soil carbon methodologies to use a measurement route and the application of classical statistics to the data generated to define critical soil carbon stocks and stock changes, with a defined probability of exceedance.
- Long term maintenance obligations (100 years) associated with carbon sequestration, while securing the best outcome for the environment, will also provide a barrier to participation. Soil carbon projects will require that management changes that have built soil carbon stocks be continued for the obligation period, and afforestation projects will have to maintain carbon stocks in the face of fire, pests, drought and forest aging.

Regarding measuring and verifying abatement of fugitive emissions, CSIRO considers that:

- Measurement methods for fugitive methane capture and abatement from gas drainage of underground coal mines are reasonably robust, however, further work is needed for measuring abatement of ventilation air methane (for example, improved measuring equipment for gas concentration and flow rates) and abatement from open cut mines (for example, development of inverse methods for emissions estimation).

iv. the impact of the absence of policy certainty derived from the Direct Action Plan to encourage long-term business investment in the clean, low carbon economy

- Many land sector projects (afforestation, soil carbon, avoided deforestation, fire management in the rangelands) will only be viable if they can generate carbon credits over long periods of time and align with landholder motivations and capacity to engage in carbon farming activities. Uncertainty of payment may act as a significant barrier to participation for landowners.
- In the energy and resources sector, investments often involve construction of infrastructure that will only provide their full return to investors over a long time period (for example, 15-20 years). In planning such projects, investors will not only consider current market conditions and policy but also carefully consider the potential for change over time and its impact on the return on the investment. If uncertainty about future earnings is too high investment decisions will generally be delayed to allow some of the uncertainty to be resolved.