

## Coal exports, trees and the nation's carbon balance

**Australia's contribution to global carbon dioxide levels is largely through fossil-fuel emissions related to the nation's export of coal, according to CSIRO carbon expert Dr Vanessa Haverd.**



Credit: UWS

'Fossil fuel exports are one-and-a-half times our fossil fuel emissions,' Vanessa told a large audience of researchers at the recent 2013 TERN Symposium.

'And that is after accounting for NBP [net biome production], which offsets our fossil fuel emissions by 38 per cent.

'We know that emissions from land-use changes have levelled off, and account for about 1 per cent of Australia's net primary production.'

Net primary production (NPP) is roughly the difference between the total photosynthesis and total respiration of plants in an ecosystem. NBP is the difference between carbon added to and carbon lost from a biome, or ecosystem, including from human disturbances and use.

Haverd and her team at CSIRO Marine and Atmospheric Research (CMAR) have been modelling data to investigate Australia's contribution to global carbon dioxide concentrations, and have been able to fine-tune the models to improve how well they predict.

'We believe our work has significantly improved NPP estimates over earlier Australian studies and some global studies,' she says.

Data streams made available through the CSIRO/TERN [OzFlux](#) facility were critical to the research. Dr Helen Cleugh, the Director of OzFlux, highlighted the relevance of OzFlux and other TERN facilities in linking research to policy needs in an earlier presentation.

'TERN's infrastructure 'ecosystem' is offering the new capabilities needed to collect ecosystem data at continental scales to inform policy needs', she says.

In another presentation at the carbon session, Professor David Ellsworth, at the Hawkesbury Institute for the Environment, described the [EucFACE experiment](#) he is conducting to measure how eucalypt woodlands might respond to an increase of carbon dioxide in the atmosphere.

‘Carbon dioxide experiments allow us to see where we’re going. They act as a sort of time machine, enabling us to see ahead of time in a real eucalypt forest what changes may occur due to increased atmospheric carbon,’ Ellsworth says.

The research team will measure the response of *Eucalyptus microcorys* forest to carbon concentrations in the atmosphere of 540 parts per million (ppm), the amount that is predicted to be present by 2050. (The current concentration is about 390 ppm.)

‘We are using leaf nitrogen as a measure. It is a key ecosystem variable. Leaf nitrogen in canopies is relatively stable over time, and can be remotely sensed,’ Ellsworth says.

The team had determined that they could get robust data by sampling two leaves on each of three trees in each measurement plot. As well as taking long-term measurements, the research team will investigate other variables from time to time, as opportunity presents.

‘Will we notice any changes from day-to-day environmental events, for example, the temperature spike of the 46°C day we had at Richmond in January? We don’t know, but we’ll look at them.’

Source: TERN

From ECOS online <http://www.ecosmagazine.com/?paper=EC13039>