

Energy Sector Carbon Economic Effect

Localisation, Convergence and Opportunity

Australian Institute of Energy Symposium

May 2009

Presenter

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Introduction

Our quality of life stems from our ability to produce, transport and use energy. Adjusting to a carbon constrained economy is essentially a reversal of the mechanisms for prosperity that began in the later part of the 19th Century.

- Carbon Economics & Climate Change Essentials
- Energy Sector's Context
- Localisation
- Convergence
- Opportunity
- End Notes

What is Carbon Economics?

The study of how individuals, society, business, government and nations address the limited capacity of the planet to sustainably absorb greenhouse gases in an attempt to maintain and improve their quality of life.

“Global climate change ... is a growing threat to human well-being. The challenge now is” to accelerate efforts to develop “mitigation measures to prevent the degree of climate change from becoming unmanageable and adaptation measures to reduce the harm from climate change that proves unavoidable”
(IPCC February 2007)

Climate Change Essentials

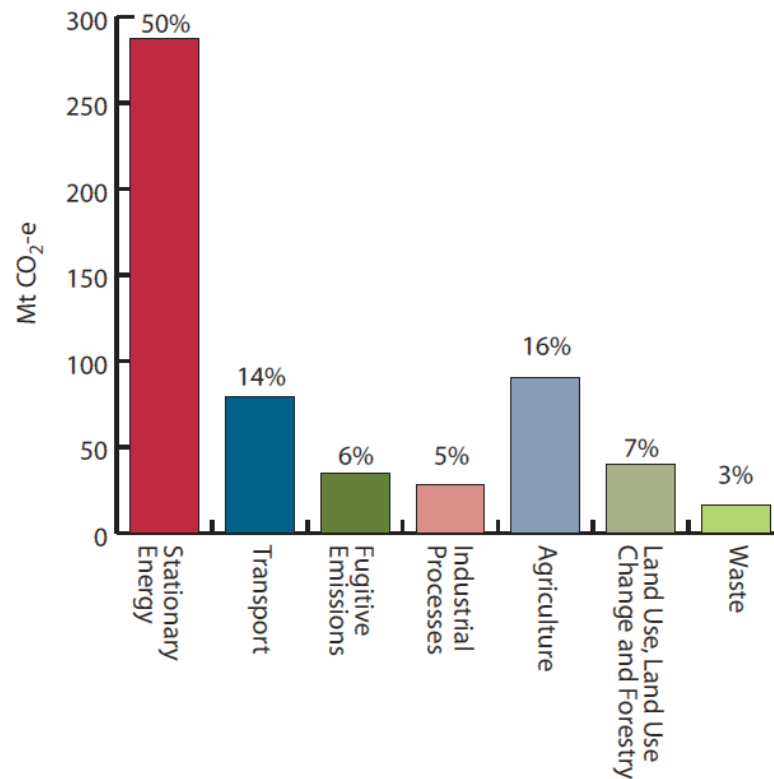
- Current global GHG emissions due to economic activity are estimate between 38~50Gt CO₂e (variation in relation to scope)
- Global capacity to absorb GHG is estimated at ~5Gt CO₂e
- If everyone lived like an Australian, this capacity equates to the planet only able to support approximately 200 million people (or if like Japanese, a non-energy exporting country, 0.5 billion)
- Excluding one-off land use and forestry abatement efforts, Australia's emissions have increased by 7% per capita since 1990
- Economic growth is correlated to energy usage and this has to date been correlated with GHG emissions

Energy Sector's Context

- Largest contributor to GHG emissions (>60%)
- ~40% of global energy is traded across borders
- Traded energy has a higher carbon intensity resulting in the displacement of an 14Gt CO₂e via trade
- Australia's 27% share of world coal trade and 2% of natural gas (in ktoe terms) represents the export of >500 Mt CO₂e
- 60% of the net energy is lost in generating electricity
- 17% of the electricity generated is used or lost in the process of providing the service to the end-user

Energy Sector's Context

Australia's estimated greenhouse gas emissions by sector in 2006



Australia's National Greenhouse Accounts 2006

Localisation

The shift from national and regional interdependence to sub-regional and local independence for energy.

- Lower dependence on distant stationary power sources
- Lower dependence upon continuous supply
- Counter-process collectivisation to overcome minimum scaling of energy technologies and transport solutions

Localisation Drivers

- Energy security has become a key Government policy component
- Renewable energy is not as portable
- Material energy sector efficiency stems from addressing:
 - ∞ the energy loss in conversion (non-renewable sources)
 - ∞ the energy loss in distribution
- Material industrial and residential efficiency stems from utilising waste – waste heat, organic waste, thermal leakage, friction loss...

Global trade in energy may eventually be seen as a 20th Century event

Convergence

The structural change in the supply and demand for energy combining previously unrelated industries.

- Re-pricing in both markets
- Re-direction of resources in markets to the “new” opportunity
- Removal of suddenly uncompetitive product or service solutions
- Realignment of market shares

Convergence Drivers

- Solutions to waste heat efficiency losses (e.g. Co-generation)
- Lower energy certainty (nationally and individually)
- Dissimilar carbon intensities from traditional energy sources
- Regenerative energy sources
- Organic rather than fossil sources for transport energy
- Increased utilisation of stationary energy sources for transport
- Shift from private to shared or public transport modes

Opportunity

Constraining carbon means the reversal of 140 years of economic development being dependent upon coal for electricity and then oil for transport.

The 2nd Industrial Revolution (1870-1910) started the journey to this point. It dramatically transformed the balance of world trade, the commercial world and the nature of employment.

So today, we begin the 'Carbon Revolution' as we target 2050 in addressing climate change.

Opportunity Drivers

- Replacement and re-distribution of electricity supply
- Disparity between the timing for energy generation and energy use
- Emergence of waste heat as a material energy source
- Requirement for distributed control and monitoring of energy supply
- Re-pricing of distance
- Advocacy for self sufficiency in Environmentally Sustainable Development best practice
- Lack of requirement for efficiency in renewable energy life-cycles

End notes

- The Carbon Economic effect on the Energy Sector has started
- No participant is immune to the effects
- Ensuring the opportunities are not threats will require long term strategic planning and short term responsive action
- Consumption based economies are less suited to responding due to the perverse pricing incentives and inelasticity of demand for energy sources. Therefore there is a need for significant and co-ordinated Government participation and stewardship in order to realise the national opportunities.

Questions

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