

Land rights: the last significant hurdle to Australian CSG development and lower global CO₂ emissions?

I am concerned about global warming¹, and that concern drives my support of the carbon tax.

Over the next 20–50 years, the biggest contributor to increased CO₂ emissions will be the 2 or 3 billion poor in the developing world who will become middle class. These people want the same standard of living the first world has and their current path is to get there by mostly burning coal, which will significantly increase the amount of CO₂ in the atmosphere. China alone is building a new coal-fired electricity plant every 1–2 weeks.

It is not realistic to ask the world's poor to continue going without electricity (i.e. not become middle class), and it is not realistic to ask them to make an immediate transition to expensive renewable energy sources. CSIRO projects that renewables will become cheaper than fossil fuels in 15–35 years, but there are a lot of caveats! (see Fig. 1). This is great news – because if it really happens, short-term economic interests will drive the world to switch to renewables.

If one assumes that economics and innovation (plus a global emission trading

scheme) will drive the switch to a renewable energy future, there is still the problem of several billion people burning coal in the 15–35 year period between now and when renewables become low cost. As you have undoubtedly heard before, natural gas is an ideal transition fuel between now and this future world because natural gas has approximately half the CO₂ of coal with a cost increase of ~50%. So one of the best things Australia can do for the world's environment over the near to midterm is to produce and sell more natural gas, which will hopefully displace coal and lead to lower CO₂ emissions.

But there can be a conflict between local and global environmental solutions; for example, wind turbines are good for the environment from a CO₂ point of view but can be bad for the environment from a migrating bird's point of view. A similar environmental debate is brewing (boiling over?) between those who see CSG and shale developments as bad for water supplies and those who see it as good for the environment.

The Greens, who are wary of any development and advocate an immediate switch to renewables, have been fighting

CSG development. Their arguments, and the counter arguments, are as follows.

Frac chemicals: The fracture stimulation treatments associated with CSG development will contaminate aquifers. Counter argument: Aquifer contamination has not been observed in over 1.5 million frac jobs performed over the past 60 years. But this contamination may be very difficult to detect, so Australia already has additional protection: our regulator prohibits frac jobs close to aquifers.

Fugitive emissions: CSG wellheads and pipelines leak methane to the atmosphere. This methane is an especially damaging greenhouse gas and makes CSG development worse than coal. Counter argument: These leaks are very overstated. Testing is already done to find and fix them. And economics alone makes it attractive to seal any leaks so the gas can be sold.

Aquifer drawdown: CSG development entails pumping large amounts of water out of coal. The water system in coals is connected to surface aquifers and thus CSG development will drain aquifers. Counter argument: It is unlikely that a given CSG well is connected to the surface aquifer. But if any given well(s) are connected to the surface aquifer, this can be detected early and pumping at those wells can be stopped.

But there is an aspect of CSG development that is difficult to argue against: industrial development may not be welcomed in rural areas. Rural property owners in CSG development areas are asked to live and work around new roads, drilling rigs (only temporarily), well heads, compressor stations and pipelines on their properties.

I have a lot of sympathy for these property owners. They live by choice in the bush far from the industrial development of the city. CSG development almost certainly is good for the state and the economy and the environment. Rural property owners however are directly bearing the biggest burden of CSG development but they are not receiving a share of the CSG benefits that is proportional to their burden.

The Greens (with some interesting support from the opposition parties) have

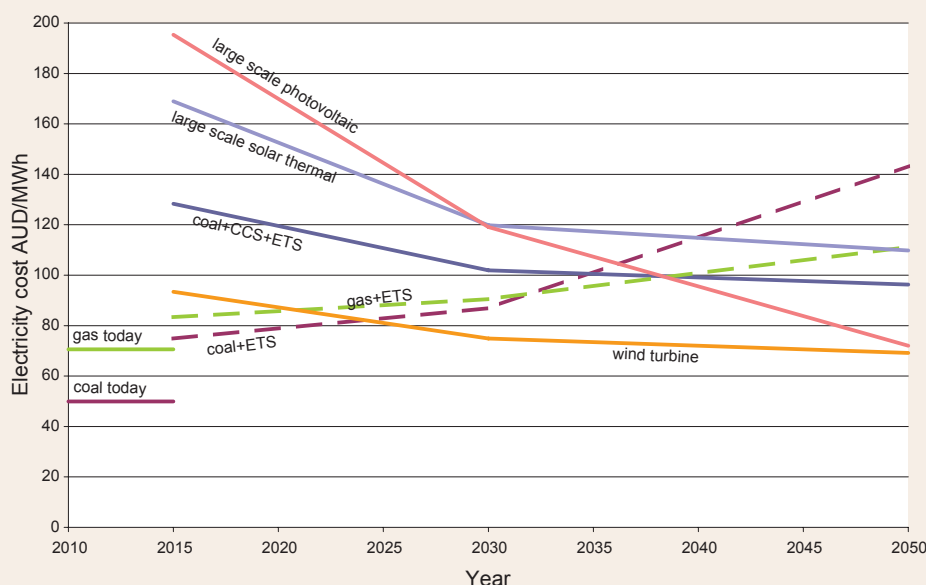


Fig. 1. Current and future costs of electricity from various technologies. Future estimates include escalating permit costs from an emissions trading scheme plus technical innovation. Not included in the costs above is concept of capacity: 80% for all fossil fuels (plants run 80% of the time – down 20% for maintenance) while solar and wind capacity is 25% ('down' 75% of the time for darkness and no wind). ETS = Emissions trading scheme. CCS = carbon capture and storage. Modified from Projections of the future costs of electricity generation technologies, CSIRO Feb, 2011.

been courting the property owners with proposed legislation that would give them the legal right to stop CSG development on their land. This proposal is trying to take advantage of the disenfranchised property owners and use them to stop CSG development. An alternative approach would be to better reward property owners for living with CSG development on their property.

It is interesting to look at the example of shale gas development in the United States. Shale gas development – which is similar to CSG development as both use dense pattern drilling and fracture stimulation – is proceeding quickly in the US, but there is much more opposition to shale development in the eastern states than in the western states. Why?

In the United States private individuals – not the state – own mineral rights, and those mineral rights may or may not be owned by the surface owner. It is more common in western states that a landowner will own the minerals under his land and thus receive royalty

payments from shale gas development. For various reasons, fewer eastern landowners own their mineral rights and receive financial benefit from shale gas development. And thus there is more opposition to shale gas development in eastern states.

CSG development in Australia would almost certainly be less contentious if our surface rights owners received a royalty payment from CSG development on their land. But would that royalty payment be fair to adjacent landowners that don't have CSG wells, but still must deal with the noise and traffic of the CSG development? Or to those landowners who did not receive such a payment in the past? And who would pay such a royalty– the state or the energy companies? And how should that royalty rate be set?

These are tough questions for which I do not have an answer, but I hope they are solved in a way that allows Australia's natural gas to displace coal and lower CO₂ emissions both here and in countries to which we export.

Note: The opinions expressed above are those of the ASEG president and are not meant to represent the opinions of ASEG members or of the ASEG Federal Executive.

¹See my President's Column for August 2011 (*Preview*, Issue 153, p. 5): Climate change: let's not confuse likelihood with consequence.



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Invitation for candidates for the Federal Executive

In accordance with Article 8.2 of the ASEG Constitution ‘...*The elected members of the Federal Executive are designated as Directors of the Society for the purposes of the Act.*’

The Federal Executive shall comprise up to 10 members, and shall at least include:

- (i) a President,
- (ii) a President Elect,
- (iii) a Secretary, and
- (iv) a Treasurer.

These officers are elected by a general ballot of members. Kim Frankcombe has nominated for the position of President.

In addition, the following offices are required:

- (i) First Vice President,
- (ii) the Immediate Past President (unless otherwise a member of the Federal Executive),
- (iii) the Chairman of the Publications Committee,
- (iv) the Chairman of the Membership Committee,
- (v) the Chairman of the State Branch Committees, and
- (vi) one other to be determined by the Federal Executive.

These officers are appointed by the Federal Executive but nominations for these positions are very welcome.

Please forward the name of the nominated candidate and the position nominating

for, along with two members eligible to vote, to the Secretary:

David Denham
c/- ASEG Secretariat
PO Box 8463, Perth Business Centre
WA 6849
Tel: +61 8 9427 0838
Fax: +61 8 9427 0839
Email: secretary@aseg.org.au

Therefore, nominations must be received via post, fax or email **no later than COB Monday 5 March 2012**. Positions for which there are multiple nominations will then be determined by ballot of Members and results declared at the Annual General Meeting, which takes place in Adelaide on Tuesday 3 April 2012.



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New members

The ASEG extends a warm welcome to 14 new members to the Society (see table). These memberships were approved at the Federal Executive meetings held on 29 September and 27 October 2011.

Name	Organisation	State/Country	Member Grade
Eddie Cho	DownUnder GeoSolutions	QLD	Associate
Jamin Anshell Cristall	Vale Exploration	WA	Active
Daniel Card	Southern Geoscience Consultants	WA	Active
Mohammad Emami Niri	University of Western Australia	WA	Student
Hugo Espinosa	Griffith University	QLD	Associate
Victoria Gallagher	Queensland University of Technology	QLD	Student
Valarie Hamilton	DownUnder GeoSolutions	QLD	Active
Sabra Henrik	Avannaa Resources Ltd	Denmark	Active
John Edward Ellis Kingman	Newmont Mining	USA	Active
Russell McChesney	Southern Geoscience Consultants	WA	Active
Omar Adil Mohammad	University of Wollongong	NSW	Student
Frank Nicholson	Nicholson Geophysical	SA	Active
Rebecca Anne Williams	DownUnder GeoSolutions	QLD	Associate
Jillian D. Young-Lorenz	University of Western Australia	WA	Student

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New South Wales

In October, we held our student night and four students from Macquarie University and the University of Sydney gave talks on their studies. All the talks were great and invoked much discussion. The speakers and the titles of the talks were as follows:

- *Gravity modelling of the Thomson Orogen, Northwest New South Wales*: Cam Adams, Macquarie University
- *Paleo-environmental evolution of the southern Australian margin*: Megan Holdt, The University of Sydney
- *Jurassic rifting of the northern Australian shelf in the Timor–Banda segment*: Hamish McKay, The University of Sydney
- *Geophysical data mining for opal exploration*: Andrew Merdith, The University of Sydney

An invitation to attend NSW Branch meetings is extended to interstate and international visitors who happen to be in town at that time. Meetings are held on the third Wednesday of each month from 5:30 pm at the Rugby Club in the Sydney CBD. Meeting notices, addresses and relevant contact details can be found at the NSW Branch website.

Mark Lackie

South Australia/Northern Territory

The SA/NT branch held two technical evenings in October. At the first we welcomed our Branch Secretary, Mike Hatch, to talk about nuclear magnetic resonance and its application in downhole geophysics. A small but enthusiastic crowd attended.

The second October event was our annual Industry night. This year our invited speakers were from the South Australian petroleum companies Santos, Beach Energy and Bight Petroleum. The function room at the Coopers Alehouse was filled to capacity and it was particularly pleasant to see some new faces in the crowd.

Our Melbourne Cup luncheon is always popular, and yet again we filled the function room at the National Wine Centre to capacity. Geophysicists, friends, family and colleagues all got together for an afternoon of networking, fun, good food and wine. Congratulations to all the people on the PIRSA table named 'Last Place Racing' who won first place!

Our Student night was held on 29 November and featured talks from local students who recently completed their honours work at the University of Adelaide. We also opened the 2012 SA/NT ASEG scholarship to applicants. This scholarship is open to end-of-third year students applying for Honours-level geophysics. There are two awards, both valued at \$2000. The two successful recipients also receive a copy of the SEG publication *Encyclopedic Dictionary of Applied Geophysics* by Robert Sheriff.

Finally, our annual Christmas party was held on 8 December. It was an excellent wrap-up to the year and an opportunity for everyone to relax. Many thanks go to our caterer Peter Crettenden and our host Matthew Zengerer.

Our local branch AGM will be held in February 2012. Stay tuned to the website for more details.

We hold technical meetings monthly, usually on a Tuesday or Thursday at the Coopers Alehouse beginning at 5:30 pm. New members and interested persons are always welcome. Please contact Philip Heath (philip.heath@sa.gov.au) for further details.

Philip Heath

Victoria

On 12 October the ASEG Victorian Branch hosted a technical evening at the Kelvin Club in Melbourne's CBD. Professor James Macnae presented *Airborne EM system comparison* to an interested audience followed by many questions and a healthy discussion on the relative merits of various commercially available EM systems and developments.

On 7 December the ASEG will co-host an end-of-year technical luncheon with the local chapters of SPE, PESA and GSA at the Victoria Hotel. Dr Mark McLean from Geoscience Victoria will present *Logistics operations and airborne potential field surveying in the Lambert Rift region, East Antarctica*. We look forward to seeing many ASEG Victorian Branch Members at the last meeting for 2011.

Asbjorn Christensen

Western Australia

Well, it's been a busy few months for the WA branch and Christmas is already on

us. We've had a great run of quality and well-attended presentations at our monthly technical evenings, as well as several special visits and events.

On 10 August, Chris Wijns of First Quantum gave a talk on the Kevitsa Ni-Cu-PGE deposit in Finland. A multitude of geophysical techniques has been applied at the project since before its discovery in 1987 by the Finnish Geological Survey through to today. Geophysical exploration, particularly MT, downhole EM and seismics, continues to play a major role today in hunting for higher grade zones within and near the current pit envelope.

The annual Careers in Geoscience Night was held at nib Stadium on 16 August and was a resounding success. The event was jointly put on by the WA branches of the AIG, PESA, ASEG and Earth Science WA. High school students attended from late afternoon followed by university students. Over 200 students attended, including 70+ from Perth high schools. They made their way through the exhibition booths and displays, which were occupied by various industry, university and government organisations and were able to chat with geoscience professionals from across all geoscience disciplines. The event was well sponsored with major contributions from Woodside and Integra Mining.

On 18 August, Julien Meunier presented the SEG/EAGE DISC course in Perth entitled 'Seismic Acquisition from Yesterday to Tomorrow'. The one-day workshop presented the latest developments in offshore and onshore seismic acquisition focussing on the relationship between acquisition parameters and seismic image quality.

Ken Witherly of Condor Consulting was in town from the USA in late August and took time out to present his talk on the evolution of the use of geophysics in the search for blind VHMS deposits in the Abitibi greenstone belt of Quebec, Canada. It was an excellent case study illustrating the need to now expand exploration areas beyond brownfields and develop effective means to discriminate targets of interest within formational conductors.

The September technical night saw Sverre Tresselt of IPRES Norway give a talk on how risks and uncertainties are factored into technical decisions and what the benefits are. This was followed in October with a presentation on a new

dimension in fracture recognition from seismic implications for exploration and development of resources by Ralph Opperman.

The November technical meeting on Wednesday 9th was our annual Student Evening where Honours students present their thesis topics. The presentations this year were excellent with the following eight students taking part:

- *Basin scale airborne TEM and seismic reflection for groundwater modelling in Northern Perth Basin, WA:* Robert Martin, Curtin University
- *The use of pseudorandom sweeps to reduce interference noise in simultaneous vibroseis surveys:* Hayan Nasreddin, Curtin University
- *Overburden related amplitude/frequency decay analysis using VSP data, Exmouth Plateau:* Carolina Pimental, Curtin University
- *Cross well electromagnetic methods for CO₂ injection into brine reservoirs:*

- Ruan Swanepoel, Curtin University
- *Temperature and gamma-ray logging in the Perth metropolitan area:* Stephanie Tressler, Curtin University
 - *Near surface seismoelectric acquisition using a vibroseis source:* Jason Valuri, Curtin University
 - *Modelling down-hole induced polarisation based on the Centenary gold deposit, WA:* Jarrad Trunfull, The University of Western Australia
 - *Constrained magnetic modelling of the Wallaby gold deposit:* Sasha Banasczyk, The University of Western Australia

We look forward to this time next year when we will be able to present the first awards to successful recipients of the ASEG WA Scholarship Program.

The 24th PESA-ASEG Annual Golf Classic was held on Friday 4 November at Joondalup Resort. The highlight of the day was Wayne Bauer's hole-in-one off the Lake 3 tee. We believe that's a tournament first. First place, and

congratulations, went to team 'Geosoft' of Darin Bryce, Chris Bishop, Adam Martin and Ash Johnson with a final score of 58.875. Second place went to the 'Fugro Imagers' of Simon Stewart, Toby Bridle, Mike Riha and Mick Curran with a score of 59.5 moving them up a rank from their third placing last year. And third place went to the 'Individuals' made up of Paul Rheinberg, Dave Christiansen and Bill Warlock with 59.75 on a countback. This year's NAGA award was taken out by the aptly named 'CGGVeritas Hackers' of Andrew Winch, Suzanne Cashman, Rob Elliott-Lockhart and Chris Manuel with a final core of 71.125. Thanks as always to all the sponsors, in particular platinum sponsor CGGVeritas and gold sponsor PGS.

And lastly, we'll wrap up the year on 14 December with the AGM followed by our Christmas function at the Santa Fe Restaurant in Subiaco.

Anne Morrell

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