

**Canberrans for Power Station Relocation
Incorporated (CPR Inc.)**

Submission

Response to the Canberra Technology City -
Draft Environmental Impact Statement

12 December 2008

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Executive summary

Canberrans for Power Station Relocation incorporated (CPR Inc.) is a voluntary citizen group comprised of members of the community from Canberra.

CPR Inc. having considered all the documents, submissions and rhetoric from the proponents of this development and the ACT Labor Government, considers it is not in their best interests to allow a privately owned gas fired power station and data warehouse complex to be built on Broadacre Tuggeranong Block 1610.

Accordingly, proposal DA no 200704152 does not have the support or acceptance of the community and the community rejects in the entirety this development proceeding on this site.

Precisely the community rejects this, or any private development, containing a privately owned gas fired power station that will only benefit the profits of the private real estate consortium and provide services solely for the benefits of those real estate developers. The community has seen no proof of benefits flowing to it from this polluting project but has calculated risks and negatives directly resulting from this gas fired power station which the community considers too great a cost and negative attribute for the community to bare.

CPR Inc. submits this document and the contents herein, as a response to the draft Environmental Impact Statement (EIS) authored by GHD and filed by them on behalf of the proponents, ActewAGL and Technical Real Estate (TRE) (the proponents) of the proposed development (known as Canberra Technology City (CTC) of a gas fired power station and data warehouse (the proposal) complex on Block 1610 District of Tuggeranong (the site) (DA No. 200704152).

Throughout this document “we” refers to members of the community and members of CPR Inc.

We rely on the information contained within the two submissions made by CPR Inc. in response to the Development Application (DA), dated 27 May, 2008 and June 14, 2008

We further rely on the submission made to the now defunct Health Impact Steering Group (HIASG) dated 1 August 2008

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| Submission of: | Canberrans for Power Station Relocation Incorporated (CPR Inc.) |
| Response to: | Canberra Technology City – Draft Environmental Impact Statement |
| Date | 12 th December, 2008 |

Evidence

All claims made within this submission, such as the lack of response, the selection of the original site by Mr Jon Stanhope, the direct lie and blame of the community for the down scaling made by Mr Stanhope on 27 May 2008 etc can be substantiated and evidenced by the authors of this report. We suspect this is considerably more than can be said of the development application and the GHD EIS

Health Impact Assessment Steering Group

The Health Impact Assessment Steering Group (HIASG) was commissioned by the Minister for Health on 17 June 2008 and comprised of Dr Charles Guest, Chief Medical Officer of the ACT, Professor Capon and Professor Keleher both health and community experts and respected in their community health and educational fields.

The community responded to the requirement imposed by the government to engage with the HIASG in July 2008. The community was allocated by the government a "community advocate" Ms Cahill-Lambert who was enrolled as part of this expert HIASG panel to ensure the views and wishes of the community were considered by the expert panel.

After engaging in a workshop and attending two meetings, the community filed a submission, which was written for the expert panel. This information was intended for the analysis and consideration by the HIASG expert panel on the basis they had the skills and expertise to correctly and expertly analyse this information and report back honestly, accurately and with integrity, their expertly concluded findings.

The HIASG was supported in facilitating the relationship between the community and the medical experts on the panel by Golders, a consultancy group. Golders staff explained on several occasions they were not experts in health, community health or the issues raised by the public in respect of the proposal.

The community accept that Golders are not community health experts. Golders have neither promised, assured nor implied they had such expertise and have delivered no such expert reports.

In August 2008, coinciding with the release of the ACT Preliminary Assessment (PA) Evaluation and the increasing vocalisation of the expert panel's discontent with the treatment of the community in respect to this development, the government sacked the HIASG and instigated instead this narrowly scoped and non-independent so-called EIS.

Golders took the information provided to the expert panel and has filed a report around their findings and conclusions associated with the submissions made by members of the community and CPR Inc.

This HIA, as referred to by the government, remains outside the statutory process. Although this is the first time the community has seen this report, it is unable to respond to it, comment on it or contribute to it in any way because it is authored by self confessed consultants with no medical, community health or community or social service expertise.

It is compiled using data and reports filed for the use of, and within the expertise of, those members of the HIASG who were expert and skilled enough to interpret, analyse and use that information.

The information used by Golders was not given to them, or intended for them, or been approved by the community to be used by them to compile this report.

The community notes the lack of relevant expertise within the authors of this report, the lack of statutory framework and therefore accountability associated with this report and therefore does not recognise the validity of this report.

The community considers therefore that those issues and matters raised within the community submissions to the HIASG remain outstanding and un-addressed.

In order to address these issues respectfully, accurately and in the manner these issues deserve to be addressed, the community requests that the original HIASG be reconvened and tasked with continuing their work as an expert panel considering the health and holistic affects on the community caused by and potential with this development.

Until this occurs the community considers the consideration of the potential, real and perceived impacts on the health and well being of the community to have been ignored within this process.

Addressing the GHD Opinion – called by GHD, an Environmental Impact Statement

CPR Inc. attests this process has been fundamentally flawed, mismanaged and abused by the proponents and government since its conception in July 2007.

The community has not been included in any meaningful consultation with the proponents and many reasonable concerns, letters and requests for assistance have remained unanswered by most elected Labor MLA's, including the Chief Minister Mr Jon Stanhope.

CPR Inc. and many members of the community, having considered both submissions made in respect of this proposal; have in response themselves submitted reasonable and expertly compiled research which concludes that this development has not shown in any way that it will provide the Territory with any benefits sufficient to offset the negative impacts this development will bring.

The community has innumerable examples of data centres currently existing or being developed and built throughout Canberra which neither create the angst or concerns for the community nor provide the claimed economic diversification or benefits as those claimed by this proposal.

It is a bizarre and unsubstantiated nonsense for the government to support this proposal above and beyond any other data warehouse development on the basis that it and it alone, is vital to the future economic well being of Canberra.

It is comparable to allowing a superstore to open one big warehouse store in the midst of small, boutique grocers, and local shops and then claim the closure of the smaller shops, disintegration of community and the ensuing monopoly on sales services created by the warehouse store is economic diversification. Or to use the phrase recently invented by the government to re-define this development as "evolutionary technology" to fit the government's purpose.

It is guaranteed that jobs and any developments made by this development will be at the expense of the smaller businesses currently delivering services in an ethical and often partially sustainable way and in harmony with the community – whilst they remain unsupported by government.

The issue of Broadacre

We note that in line with the ACTPLA Evaluation of this developments' PA, GHD have remained silent on the issue of whether this development can actually be defined as a "communications facility" such as the definition exists under the Territory Plan and therefore capable of being developed on Broadacre zoned land.

GHD will be aware that the community filed a legal opinion in August 2008 which detailed why this development could not be defined as a "communications facility" under the relevant Territory Plan and could not therefore proceed under the current DA or PA.

Although at the time, Mr Stanhope, ACTPLA and the proponents, all claimed they were in possession of a contrary legal opinion – although despite repeated requests from the community and MLA's from outside the Labor Party, for copies of this legal opinion, no such opinion has been sighted or delivered. - the community notes that Mr Stanhope has oddly found this issue clearly of concern enough to warrant incorporating specific legislation to "clarify" that this proposal is a "communications facility".

CPR Inc. and the community are however certain that this development cannot be defined as a "communications facility" unless of course Mr Stanhope changes the definition of what a "communications facility" is supposed to be.

GHD have remained silent on this. It is therefore an issue, which remains un-addressed and until it is adequately and accurately and legally addressed, this matter cannot progress to approval of this development.

Message to potential businesses considering Canberra

The government has claimed that in refusing to accept this development, the community is delivering a negative message to those in the business world considering investing in the Territory. In support of his odd accusation, Mr Stanhope has tabled the *Development Application (Block 20 section 23 Hume) Assessment Facilitation Bill 2008* stating in the attending press release his Bill counters this negative message.

In the midst of the Bill, in Clause 9, however it seeks to “clarify” that this development is a “communications facility” by virtue of its “evolutionary technology”.

Perversely though it is only this development which can be defined as a “communications facility” and no other, because no other data centre development can take advantage of this unique definition. It is a definition, which exists only in this Bill and has no accountability or quality measure outside this development or the life of this Bill.

It is worth noting too that those developers who deal within the business of data warehouses would not consider this particular development as being “evolutionary technology”. Many other data centres exist with their own power stations on site using the heat for cooling etc.

This development can be considered evolutionary for Canberra as it will be the largest single pollutant, producing infrastructure in the Territory and is likely to hold this title until the Williamsdale 500MW power station is built – and then perhaps the Williamsdale Power Station can be defined as a “communications facility” too.

Throughout the life of this development the message being delivered to potential businesses considering investing in Canberra is that this Territory is run in an ad hoc manner; undisciplined, unaccountable and erratic in every way, dependent on the whims and patronage of the Chief Minister and his close elite group of allies.

Whilst the planning laws, on paper at least, require community consultation, the adherence to strict environmental protection measures and compliance to tight definitions within the Territory Plans and the principles of the planned city of Canberra, it has been obvious that these principles and laws apply only to less privileged groups. These proponents have not adhered to any of these expectations but they have remained doggedly within the consideration of the planning application process despite failing to achieve any of the normal requirements expected of normal business development applications.

Community consultation

There has been no meaningful community consultation within this process.

It is not an acceptable stretch of the definition of “consultation” to include a community being told what is about to happen to it, as “engaging in a consultation process” or claiming, as Mr Stanhope does in the preamble to his Assessment Facilitation Bill 2008, referring to being told what is about to happen to it as “the community has been consulted with”.

The community rejects that it has been consulted or considered in any aspect of this development including the compilation of the GHD EIS.

The planning process, as well as innumerable other government processes requires a level of meaningful community consultation and allows for the consideration of those reasonably expressed views.

That is at least the theory espoused by the present government in such publications as “*Citizen centred governance*” and in Mr Stanhope’s speech to the 7th Assembly on 9 December 2008 in which Mr Stanhope claimed to be advancing consultation with the public and entering a phase of transparent, accountable government spurred on by the application of a new relationship with the ACT Greens as a supportive minority government partnership.

The reality is however the community finds no practical realistic evidence of transparency, accountability or meaningful consultation within the governance and execution of this planning process. On the contrary the community has been consistently ignored, minimised and dismissed throughout this process. We are left considering the proposition that if the community, who have consistently expressed their views in an expert, professional and well thought-out manner, are not listened to, considered or even acknowledged as they respond to an application to build a privately owned gas fired power station and immorally close to established homes.

- What is the point of the community ever responding to any government calls for involvement?
- What is the point in any member of the community ever objecting to any private business developer expressing a wish to build a noisy, polluting gas fired power station, right next to a health facility?
- Even if the land the developer wishes to build on is not zoned for the development?
- Or if the development will lower the price of houses?

It can and is dismissed as being a NIMBY issue and therefore not worthy of consideration.

That the pollution that pours out of a gas fired power station and combines with the background pollution of an area, has no concept of what is a “backyard” and no idea how to be contained other than within a valley, or by wind patterns is beside the point, for the purposes of minimising the voice of the community.

Bias and inaccurate noise reports are being delivered as factual evidence that three enormous turbines and vent shafts are not going to create any noise or inconvenience to those living a mere 1 km or so away. Meanwhile the community’s voice is dismissed when it vocalises real and contemporaneous evidence to the contrary.

The truthful, contemporaneous evidence of members of the wider community is dismissed off hand. Yet there are many people who have lived within 10 or 20km of one or two turbines and vent shafts and have complained they are too noisy and can be heard from many kilometres away. Rather than acknowledge the reality – the response by the proponents, the government and now by GHD, has been to continue to ignore, dismiss or discredit the community.

It is ludicrous for authors of the GHD report, who have stood 1 km away from a similar turbine driven gas fired power station and vent shafts, similar or smaller to the one proposed to be built on Tuggeranong Block 1671 and know themselves the noise, vibration and overwhelming presence of these machines, to suppose that there are no residents of the Territory who are also cognisant of the noise levels and have had the unpleasant experience of standing near a similar sized turbine.

It clearly needs stating again here for perhaps the last time – we know and you know that despite the minimisation and inaccuracies contained, for example in the noise reports, these turbines and this development will be noisy and vibrate and can clearly be heard from more than 1 km away.

Likewise it is ludicrous for the language used in these reports to attempt to minimise and distract from what the proposal really is. For example – this proposal may be able to be described as a “co-generation facility” – and using such language may make members of the ACT Greens and those proponents with a conscience, more comfortable whilst they continue supporting the building of a new privately owned fossil fuel burning polluting gas fired power station. However the reality of the proposal is that it remains a fossil fuel burning privately owned gas fired power station that will pollute a large portion of southern Canberra and create hot spots of pollution which will negatively affect those younger members of the community, the elderly, those who are home bound and those with existing lung function problems.

It is immoral that members of the community who will be directly affected by this and wish to object to the development find they have no place in this planning process. They are minimised and scape-goated and directly accused of losing for the Territory millions of dollars of potential investment. After all, it is *just* a “co-generation facility”.

That the community expresses their objection to this development – and it is a reasonable and sound objection to express – is retaliated to by the government and the proponents and now by GHD.

Nowhere are any of the reasonable, evidenced and logical concerns of the community acknowledged, justified or even sympathised with. Rather they are minimised, claimed as untrue, and dismissed. This is not meaningful consultation - it is ongoing propaganda. GHD have fallen in with presenting the government and the proponents the propaganda they commissioned.

Chris Wark of GHD, facilitated a meeting on 16 October 2008 as part of the compilation of the “so called EIS”. The subject is detailed as “ACT Government Agency Stakehold [sic] Meeting”. Amongst those who were invited to attend include a representative of the Queanbeyan Council, Otis Projects, CBR Ellis, PCL and the Land Development Agency.

We note that:

- nobody from the Aboriginal Council was invited despite heritage significant artefacts being found on the site
- no members of the ACTNowaste who run the Waste recycling plant opposite the proposed site were invited and
- most importantly we note that no member of the community, including CPR Inc. were invited to participate

This is not an unusual experience for the community and is consistent with the way we have been marginalised throughout this process by every official, government MLA or proponent representative involved in this application. GHD merely continued to marginalise, minimise and ignore the community and this is illustrated throughout this draft report.

As a final comment on the lack of community consultation – CPR Inc. has written around 10 letters, to the Chief Minister and the Minister for Planning, over a period of the preceding three weeks. Each letter requested assistance and asked for a response to a particular problem, concern or issue directly relating to this proposal and the community's involvement in the process.

The community notes that the government has responded instantly and actively to the requests of the proponents, arranging meetings, providing support and assistance, and smoothing issues and concerns to achieve the needs and wants of the real estate developers, the community remains without an acknowledgment or a response to even the most obvious issue –such as should the community continue to respond to this EIS given the government filed a Bill to move the development?

The Environmental Impact Statement

The community does not consider the report filed by GHD to equate to an Environmental Impact Statement (EIS).

An EIS under the old Act is required to include matters as directed by the Minister as well as those set out in the regulations (see s.120 repealed Land Act and s.123 Minister's directions power). Regulation 5 sets out required content for an EIS in the old scheme:

<http://www.legislation.act.gov.au/sl/1992-5/20080331-36223/pdf/1992-5.pdf>

As an aside it is interesting to note that the Minister for Planning has the authority vested in the position by virtue of his appointment to the portfolio but the power he requires to execute those decisions relating to that authority is given under law.

He retains that power until it is taken off him under law. With a majority of MLA's in the Assembly believing this development should not go ahead on this site – it is worth noting that those MLA's who stand by their pre-election promises have the power to remove the power vested to the portfolio of the Minister for Planning should he consider approving this development on this site – but we digress.

The Minister's direction for the EIS requirements for the power station is at:
<http://www.legislation.act.gov.au/ni/2008-348/current/pdf/2008-348.pdf>

The requirements of an EIS, under the new 2007 ACT Planning and Development Act are set out in regulation 50 (*Planning and Development Regulation 2008*). We have included them here to remind GHD of the intent of the protective measures within planning laws, especially for States and Territories such as the ACT which have signed the bilateral agreement with the Commonwealth to adhere to and uphold the meaning and intent of those protective measures as delivered under a true, independent and expert EIS – which this GHD opinion is not.

Generally speaking it requires an EIS to include the following:

- (a) a non-technical summary of the EIS, including a summary of its recommendations;
- (b) a glossary of technical terms and any abbreviations and acronyms used in the EIS;
- (c) a description of the proposal, including various land descriptions, descriptions of leasing details, the purpose for which the land may be used, the proposal's objectives, relevant time frames, details of alternatives considered etc;
- (d) a description of the EIS process, including—
 - (i) any statutory approval obtained or required for the proposal; and
 - (ii) the base information used for predicting each potentially significant environmental impact identified in the scoping document for the EIS; and**
 - (iii) the criteria used for assessing the significance of each environmental impact and the performance of any alternative to the proposal considered under paragraph (c);**

- (e) a statement about the proposal's compatibility with the principles for environmental sustainability in the Territory Plan, Volume 1, Part 2.1 (Statement of Strategic Directions);**
- (f) for each potentially significant environmental impact identified in the scoping document for the development proposal—**
- (i) an identification of the relevant environmental values; and**
 - (ii) an identification of the findings and results of any environmental investigation in relation to the land to which the proposal relates; and**
 - (iii) a description of the effects of the environmental impact (including cumulative and indirect effects) on physical and ecological systems and human communities; and**
 - (iv) an analysis of the significance of the potential environmental impact of the development; and**
 - (v) a statement of the approach proposed to be taken to the environmental management of the land to which the proposal relates, including any proposed impact prevention, mitigation or offsetting measures to deal with the environmental impact of the proposal (which may be set out in a management plan for the land);**
- (g) a description of consultation undertaken for the EIS;**
- (h) the EIS's recommendations.

As the bilateral agreement has been signed between the ACT and the Commonwealth, for matters which are of a 'national environmental significance' and in this case the likely relevant matters under the EPBC Act would be that the proposal may have an affect on threatened species and ecological communities or listed migratory species, additional measures which would need to be addressed in an EIS are set out in Schedule 4 of the EPBC Regulations 2000:

[http://www.comlaw.gov.au/ComLaw/Legislation/LegislativeInstrumentCompilation1.nsf/0/F13F247B2FF81178CA257288007AC7AF/\\$file/EnvirProtBiodivConser2000.pdf](http://www.comlaw.gov.au/ComLaw/Legislation/LegislativeInstrumentCompilation1.nsf/0/F13F247B2FF81178CA257288007AC7AF/$file/EnvirProtBiodivConser2000.pdf)

Broadly they include:

- general information,
- a description of the action including relevant impacts and proposed safeguards
- mitigation measures to deal with the impacts and feasible alternatives,
- the environmental record of the person proposing the action and
- relevant information about the source of the information used (eg currency, reliability, sources etc).

Items 3 and 4 set out in detail what information must be included to address the relevant impacts and the proposed safeguards and mitigation measures.

Broadly speaking EIS's are a process for ensuring that decision-makers are informed of the environmental impacts of a proposed development or activity and they can allow the public to participate in the decision-making process and improve the quality of the decisions.

We have made bold those areas where we feel the GHD opinion fails to deliver the independent expert site-specific standard expected of an EIS.

GHD defines an Environmental Impact as:

“In relation to a proposal that is the subject of a defined decision, includes the following potential effects of the proposal (if carried out), either by itself or in combination with the potential effects of another such proposal:

- (a) environmental effect on a community*
- (b) physical, biological or cultural transformation of an area;*
- (c) environmental effect on the social system of the ecosystems of an area;*
- (d) change to the aesthetic, recreational, scientific or other environmental qualities, or values, of an area;*
- (e) environmental effect on any premises or land or the surroundings of any premises or land, that has heritage significance;*
- (f) the endangering, or further endangering, of a community or an area;*
- (g) the endangering, or further endangering, of any species of fauna or flora;*
- (h) long-term environmental effects including those with potential to place demands on the social system*
- (i) curtailing of the range of beneficial uses of the environment;*
- (j) pollution*
- (k) problems associated with the disposal of waste*
- (l) increased demands on natural resources that are, or are likely to be, in short supply;*
- (m) change to the values or lifestyles of particular groups and communities or to existing social relationships;*
- (n) socioeconomic effect.*

It becomes an exercise in futility to express in detail, in what ways the GHD opinion does not constitute an independent, site specific EIS. Nor does it provide a level of security, safety, sound reasoning and balanced advice from which the Minister for Planning or members of the community, can rely on to make safe planning decisions.

Those experts within the GHD team who understand and appreciate the contents, requirements and purpose of a full and independent EIS are well aware that this is not one. It should be read with the consideration of

“if this privately owned gas fired power station was proposed to be built within 1 km of your home (which you had bought and worked all your life to maintain, because it was close to a quiet rural landscape) or your children, or your loved ones, who may already have lung function problems, would be breathing this pollution and the combined background pollution in 24 hours a 7 days a week, in work, in school, in play – would this GHD report add anything to your understanding or your ability to make the decision whether this privately owned gas fired power station is completely safe, noise free and wont negatively affect the health and well being of your community, local wildlife, combined environment and your lifestyle or your life choices?”

Sadly and truthfully the answer is **no**.

GHD have not added any site-specific survey to those gaps and flaws identified within the community submissions and indeed within the ACTPLA PA Evaluation.

What GHD have done, in this EIS, is continued the work they commenced in the government commissioned Hume Industrial Plan Study (HIPS). GHD does not need reminding of the nature of the HIPS, but for the benefits of anyone bothering to read it, and this would in the unlikely event include the Planning Minister, as equally as unlikely his close executives or GHD representatives – it may be worth pointing out that GHD was commissioned to produce a report on the options for the potential and possible development of industrial land throughout Hume. GHD produced the report, which was an internal government document and not for wider dissemination, without having conducted any site specific surveys or consulted with any member of the community about what they wanted in respect of the Broadacre land.

As a digression it is also worth reminding GHD – whose clear loyalties appear enmeshed with development and building sections of society – that Broadacre is land for which future development or allocation has not been decided. That means just because it is Broadacre land does not necessarily mean it has to be rezoned for development, industrial or otherwise – it is just as probable that it can be zoned protected land, or recreational such as horse agistment.

As a further digression too, it might be worth reminding the Planning Minister that just because the government considers it requires a quick influx of money via land sales, does not necessarily mean that the community feels that industrial sites need to develop right to the edge of established residential areas.

It is worth noting too that whilst GHD made their recommendations for a development of the entire area to Industrial without ever conducting a site-specific survey, community consultation or an economic feasibility study, they did file the HIPS report believing it was completely internal to the government.

Once the site was selected, for the gas fired power station (second power source for Canberra) by Jon Stanhope in July 2007, ActewAGL commenced reviewing and considering the land they had obtained.

CBR Ellis acquired a copy of the HIPS report via their role, acting as consultants for the proponent ActewAGL, in this matter. As a consequence members of CBR Ellis separated from CBR Ellis and in August 2007 formed Technical Real Estate (TRE) to commence partnership with ActewAGL. The HIPS report, was then quoted by the proponents as a supporting document within their applications for this development to ACTPLA – despite the community not having access to the report and the report being compiled without any community consultation or site specific survey.

GHD clearly has a reputation and standing invested in the HIPS report and stands to loose credibility if that report is not continued to be upheld given it has been relied upon by the government to allocate this land and the proponents to support their application. It is a far cry from the independence and expertise envisaged when the requirement for an EIS was drafted into legislation.

Of most concern is the erratic way GHD has rationalised various concerns to produce a minimising affect of the issue.

For example – in response to the concern that the visual impact of the proposal will cause a negative affect on house prices, social and visual amenity in the local area, bordering the development – GHD have dismissed this as being minimal because the entire area will become industrialised, as per their recommendation within the HIPS. This development, GHD states, will therefore blend into the overall infrastructure and developments, warehouses and the like, which will inevitably grow around this development.

For the concerns around security and lack of infrastructure GHD state this development is one of many, proposed for the area.

Conversely, later in the report however as a means to rationalise the community concerns around noise, GHD states this is one development. As a sole development it will not cause a problem.

This is used to minimise the potential drop in house prices and the increase in pollution.

It is clear to the community that any level of study or reading of this GHD report reveals no balance and no independence. It is delivered and presented as it was commissioned, as a means to present one result – that this development offers no problems and should advance.

GHD have worked hard to manipulate and create the answers they desire rather than spend professional time balancing and discerning consistent and clearly analysed investigations of concerns and issues. If the simple and obvious questions are obviously so manipulated, it stands to reason the complex, technical data has likewise been manipulated and buried under mountains of irrelevant facts.

Project need and justification

Whilst GHD have included an interesting history on data centers, we remain no more informed than we were prior to the details of this proposal being leaked.

“An investigation of the data centre market has identified an urgent demand for purpose-built data centre campus facilities that have been designed around secure, environmentally sustainable and scalable power and cooling infrastructure. Without the development of such infrastructure, there are risks that these types of facilities and associated IT resources from the Canberra region will be compromised.”

1. We have not had access to the details, results or commissioning agenda of this “investigation”.
2. This proposal is not environmentally sustainable – that GHD have written that in relation to this proposal either means they fundamentally misunderstand that natural gas is a fossil fuel which requires mining and extracting from the earth and will run out, or they are deliberately “spinning” the rhetoric to complement that used by the proponents. This is not helpful nor particularly honest in a report, which should be “independent”, “expert” “accurate” and “add to informing honestly and in a balanced manner the readers”.
3. It is troubling to note that this entire “need and justification” paragraph contains no independent, or balanced analysis from GHD. GHD have taken the liberty of repeating the proponents premise that this proposal is a “state significant” proposal created to address a need in the Territory which is, in some unaccountable, unjustified way, yet is presented as being essential to the very health and well being of the Territory.

For the record - this proposal does not address an identified need in the Territory. This proposal certainly does not offer a unique solution to whatever need for data centres exist in Canberra either. Many data centre developers are setting up their businesses currently on Industrial Land, without “co-generation” power stations on site but with higher levels of sustainability and less carbon foot prints than the TRE/ActewAGL proposal.

This proposal was created originally in order to provide a second power source for the Territory – as per Jon Stanhope’s election promise of 2004. The site was,

selected by Mr Stanhope, on 15 July 2007. (Please see the previous submissions made by CPR Inc., which attach the brief to this affect, with Mr Stanhope's signature and date).

CBR Ellis was employed as a consultant for ActewAGL to assist in the development of this proposal. TRE was incorporated from CBR Ellis senior partners in August 2007. The computer warehouse component was developed as a financial enabler to the power station, to off set some of the financial outlay and risk. It was not the main component. It was an opportunity for private real estate developers to create profit from having immediate access to a gas fired power station on cheap land.

The land Tuggeranong Broadacre 1671 was selected for the gas fired power station, not for the data centre. The Hume site Block 20 Section 23 had been the primary choice for ActewAGL right up until Jon Stanhope realised in July 2007 this Industrial zoned land was too valuable – he noticed this after reading the HIPS report by GHD.

Despite there being valuable Aboriginal heritage artifacts on the site, ActewAGL even volunteered to pay for an archaeologist to remove the finds quickly. Mr Stanhope was determined to divide Hume Block 20/23 into sections to release its potential value – estimated by GHD at around \$55 million – so directed ActewAGL to take the un-surveyed Broadacre Block 1671 in Tuggeranong.

Interestingly although Hume 20/23 is now the block which was determined by Mr Stanhopes' Chief Ministers' Department Executive Task Force in Site Selection, conducted over 4 days – as the second best site for the data warehouse and “co-generation” facility – Andrew Campbell, Director of TRE, stated in August 2008, that Hume Block 20/23 was “too small, too near NCA land, too close to flight paths, prone to flooding and no investor or tenant would ever risk development on that block”.

In February 2008, around four months after the supporting documents - that GHD have relied upon in this EIS - had been commissioned by ActewAGL, on the basis this was a state significant development providing an essential service to the Territory, it became apparent to the proponents that it was not actually financially viable to build the second power source on this site.

Rather than throw the entire project away – this was after all the first time the new “project team” from the Chief Minister's Department had managed such a big project - they decided to continue with the data warehouses and give the power station to the private developers personally. Rather than reveal this fundamental change to the public, re-commission reports, which reflected more honestly and accurately the true nature of the project, the proponents decided to file their reports and continue with the “smoke screen” of this being essential to the needs of Canberra.

The proponents considered it necessary to file their disingenuous application in order to avoid the new land planning Act which came into force on April 1st and would have required a full and independent, site specific EIS which, the one GHD produced, as we have discussed - in little over 65 days, is not.

The proponents continued to tell the community throughout this first “consultation” phase – which was in reality the proponents telling the community what they intended to do – that this was essential to Canberra, Canberra needed a second power source, it would benefit everyone, etc.

During the community consultation with the proponents, the proponents showed the community a blank overhead projector screen and stated “this was the reason

for the project development” – blackouts would occur if this project did not go ahead.

Behind the scenes, however, the proponents were already preparing their alteration to their first application, which again in reality, was refilling a new application.

This new application, when finally revealed on 27 May 2008, was, as we now see, a private gas fired power station solely for the use and profit making purposes of a private real estate development built on non-industrial land contrary to the Territory Plan and the needs, views and wishes of the community.

It does not fulfill a need of the Territory.

The Territory will have no control over the clients TRE choose to rent their spaces to.

The rhetoric used by the government and by TRE and carried on in the GHD report merely continues the unsubstantiated and rather baseless misinformation that this proposal in some way creates Territory-wide benefits, which therefore out weigh the concerns and costs borne by members of the community in Southern Canberra.

It does not – it is a private real estate development which has so far ridden on the back of the original ActewAGL case to supply a second power source to Canberra and in doing so found cheap land and the unswerving support of the Labor Government and through them the ability to avoid community consultation, manipulate planning laws and avoid the need to compete within an open and balanced competitive business field.

It is disappointing that GHD and otherwise professional people have slipped into using the rhetoric and fallen in with believing without question the basic premise presented most vocally by Jon Stanhope – that Canberra needs this proposal and this data centre, and without it Canberra will economically fail.

It is utter nonsense of course.

Had GHD been in the least bit interested in conducting even the vaguest independent research around proving or disproving the propositions and reports filed on behalf of the proponents – this would have been one of the easiest matters to show balance and thoughtful investigation.

A quick review of the existing and developing data warehouse business within the ACT shows there are a number of data warehouse businesses who are either here already or who are in advanced development stages of their business plans. Some of these have high levels of sustainability, lower carbon foot prints and other options for increasing truly green power such as solar. These measures are in direct contrast to this proposal, which cannot even accommodate solar panels on the roof – so intent is it to use the cheap European pre-fabricated warehouse modules.

What is apparent too is the lack of any guarantee of the number of jobs claimed by this proposal.

Independent studies around potential job creation presented within submissions by the community remain unanswered.

Historically the proponents have claimed a wild variety of jobs which they claim are attached to this proposal ranging from 650 to as low as 5. These estimates have changed and varied from day to day and appear dependent on nothing other than the

integrity of who is giving the figures. It appears to have settled recently at around 300 jobs.

At the first information giving day held on 28 April 2008, when the proposal was still being claimed as a 210MW power station – potential job creation figures were estimated by the proponents to be “between 5 and 50”. Below is a brief summary of other large data centres around the world and their employment figures. On this evidence we have estimated this data warehouse to employ potentially 30 people at a maximum.

Data Warehouses traditionally create low job numbers. This is the nature of the work. These proponents are essentially real estate developers, hoping to rent out storage space at high cost for low overheads. Hence these proponents desire to have their own private power station on site as it lowers their overheads. They will not be responsible for employment within the data warehouses. They will simply rent out the space to companies who will ensure they have some support but at low cost.

The work is dealt with remotely and hence businesses in Sydney or Canberra can use data warehouses in India, USA or elsewhere. There is no proof that the creation of a data warehouse in one city attracts businesses and other infrastructure close to the warehouses. Canberra remains, with or without these data warehouses with the problem of attracting technical and highly qualified employees to live in Canberra. Creating a job vacancy does not fill the vacancy.

Employment figures for Data warehouses across the world via storage size.

| Data Warehouses | Size | Employees |
|--|--|------------------|
| Microsoft's European Data Centre in Dublin. (www.rte.ie/business/2007/1106/microsoft.html) | 51,000 ft ² (0.5 times CTC) | 10-15 |
| Microsoft's San Antonio Data Centre (www.mysanantonio.com/news/MYSA011907_01A_Microsoft_1bc19da_html7565.html) | 470,000 ft ² (4.7 times CTC) | 75 |
| Micorsoft's Quincy Data Centre (www.greenm3.com/2007/12/teeny-purple-ya.html) (www.greenm3.com/2008/01/of-data-center.html) | 140,000 ft ² (1.4 times CTC) | 50 |
| Yahoo's Quincy Data Centre (http://www.greenm3.com/2008/01/of-data-center.html) | 170,000 ft ² (1.7 times CTC) | 50 |
| CTC (Tuggeranong site only – not including Belconnen) (based on www.galileoconnect.com/1.3.0.0.products.html) | 100,000 ft ² | 300? |

Benefits to Canberra by allowing this private power station.

Sustainability

A recent pre-feasibility study gave the current ACT Labor government the thumbs-up for a 22+MW solar thermal plant, comparable in power to the Tuggeranong gas-fired plant. The ACT government has asked the federal government to assist with a solar thermal plant from infrastructure funds.

The Chief Minister did not join the Premiers of Queensland and Victoria in discussing solar thermal options with expatriate entrepreneur David Mills from AUSRA, endorsed by California's Arnold Schwarzenegger. Nor did he publicly respond to Worley Parson's announcement to build in Australia by 2020, 34 solar thermal power plants of 250MW costing \$1 billion each.

If the Chief Minister puts his hand up he could secure for the ACT two pollution-free 250 MW solar thermal plants and a \$2 billion investment, without the pollution of ActewAGL's 500MW gas fired proposal. In clarifying his stand, he may also clean up proliferation of **misleading information by CTC proponents, that the carbon-footprint of a gas-fired plant is only 57% of a coal-fired plant. According to National Greenhouse Accounts Factors (Department of Climate Change), this 57% relates only to scope-1 emissions (power plant), not to scope-3 emissions (mining).**

A more appropriate figure for the ACT and NSW is 73% and accounts for the large CO2 content of Cooper Basin gas (10% to 30% volume) that is flared.

Plume study

Summary

- The CALPUFF model is geared for long-distance pollution studies. Usage is cautioned for near-source pollution studies, such as the Tuggeranong location. The DEM terrain dataset from geoscience Australia is too coarse and too inaccurate to confidently predict effects of Isaacs Ridge on levels and distribution of regional pollution and local pollution hotspots. Despite this deficiency the study clearly shows ridge-related pollution hotspots in Macarthur-Fadden, Wanniasa, Farrer-Mawson with an enhanced pollution spur towards Garran, Upper Mugga Lane and Hume. These hotspots are consistently identified for all four pollutants studied: NO₂, SO₂, PM₁₀ and formaldehyde. These hotspots may also have higher background levels than measured at the Monash monitoring site. Background levels at the hotspots should be monitored locally and individual results applied in modelling studies.
- Results from the CALPUFF study should be treated as indicative only. Effects of Isaacs Ridge on distribution of pollutants should be studied using several models and their outcomes should be compared for consistency. Patterns of consistency between outcomes from different models may be interpreted more confidently. Clearly, the Tuggeranong location near Isaacs Ridge is a dangerous location for a power station.
- The Tuggeranong location near Isaacs Ridge is the worst possible location for a polluting gas-fired power station. Permanent development of pollution hotspots is a near certainty. The power station should be relocated onto an open plain whose simple terrain minimises risks for development of pollution hotspots and where shape and extent of the pollution plume can be predicted with adequate confidence. The Canberra Spatial Plan needs to be revisited regarding a perceived imbalance between requirements for preservation of open plain nature reserves (eg. the proposed Callum Brae Nature Reserve) and requirements to site polluting industrial facilities at safe distances from residential developments.
- Extensive water usage in the chilled absorption process needs reconsideration in regard to the cap on net water usage in the ACT. Adding absorption chillers to the power plants' exhaust stacks may save 9MW of power, but adds substantial negatives that are not addressed in ActewAGL's planning documents. Cooling requires yearly consumption of 435 ML. The cooling water evaporates and is lost, locking up more than 1% of the ACT allocation from the Murray-Darling system. This will strain ACT water restrictions and pricing. The water will come down from Tantanger Dam, losing its potential energy.
- Yet this water and its potential energy can readily be used through existing Snowy Hydro infrastructure in generating pollution-free power whilst conserving the water for the Murray-Darling. Alternative purchase of 9MW of power from Snowy Hydro means that no new investment is required for absorption chillers, steam exhaust stacks, dedicated water storage, water transport and pumping. Absence of steam reduces fog and smog potential. Absence of chillers means hotter exhaust gasses, thus stronger plume rise and less heat dissipation at ground level. Heat stress on flora and fauna will be less and so will bushfire risk. Clearly, proposed re-use of waste heat from the exhaust stacks for cooling the data centres does not "stack" up as the advantageous process promoted by ActewAGL. With so little in favour of co-location of power plant and data centres and so much against it, power for the data centres should be generated at a more appropriate off-site location.

- With global climate change galloping out of control, it is highly irresponsible to construct a gas-fired power plant, which does not capture its CO₂ emissions. Operation of such a plant could become restricted under foreshadowed government requirements to reduce Australia's carbon footprint by at least 60% by 2050. The ACT government should show the foresight expected of it, follow the lead of the Queensland, Victorian, Western Australian [1][45] and New South Wales governments [33], climb out of the pockets of the fossil fuel industry, and actively pursue non-polluting renewable energy alternatives.
- The revised plan is clearly geared for upscaling. Personal assurances to the contrary are not guarantees. The only guarantee against up-scaling, is downscaling of water, gas and high-voltage grid infra-structure commensurate with requirements for the downscaled power station.
- NO₂ and SO₂ from the Tuggeranong power plant and the proposed peaking power plant may cause acid rain effects. The ACT and adjacent NSW is nearly entirely made up of acid volcanics and acid granites with very little limestone deposits and thus little capacity for alkaline buffering against acid rain. Renewable energy alternatives need to be considered seriously.
- A full and independent Environmental Impact Study is required to address in particular:
 - pollution dangers to residents of the Tuggeranong, Woden and Jerrabombera valleys;
 - impost of absorption chilling on the ACT water supply;
 - potential for acid rain damage to the ACT, nearby NSW and the Kosciusko and Namadgi National Parks.

Recommendations

- No polluting gas-fired power station should be allowed to operate near Isaacs Ridge because of dangers of permanent pollution hotspots.
- Arguments against co-generation far exceed arguments in favour of co-location of power station and data centres. A polluting gas-fired power station should be located off-site on an open plain
- CO₂ emissions from the power plant should be sequestered.
- Alternative sourcing of energy, in particular solar thermal and/or geothermal, should be vigorously pursued.
- A full and independent Environmental Impact Study needs to be conducted.
- We do not recognise the GHD Opinion as an independent Environmental Impact Study as defined and intended as a protective measure with Planning Development applications.

Pollution concerns

1.1 Strength/limitations CALPUFF

CALPUFF is a puff model that is generally regarded superior to the AUSPLUME plume model. The US EPA approved CALPUFF for study of long range pollution transport beyond 50 km, but advises that use of CALPUFF at shorter distances requires approval by reviewing authorities on a case-by-case basis [2][3][4]:

[4] *“The EPA has proposed the use of CALPUFF for applications involving long-range transport, which is typically defined as transport over distances beyond 50 km. Therefore, the use of CALPUFF for EPA regulatory applications involving transport distances of less than 50 km requires approval by the relevant reviewing authorities. As described in Section 7.2.8 of the EPA’s proposed Guideline on Air Quality Models, the CALPUFF model may also be used in special cases involving complex flows on a case-by-case basis with concurrence from the reviewing authorities.”*

CALPUFF uses grided data [2]. Unavoidably, finer topographic detail is lost in the gridding process. This drawback has the stronger negative effects on studies of pollution in complex terrain close to the pollution source. This drawback impacts in particular on study of the effects that Isaacs Ridge and offshoot ridges have on distribution of pollution from the Tuggeranong power plant.

Evaluation of CALPUFF pollution predictions against observations and also against predictions from other models calls for vigilance in interpreting modelled outcomes. A US analysis of CALPUFF by Chang and co-workers in 2003 [5][6] found results to be heavily dependent on the wind field model used (note that the present CALPUFF study lacks on-site wind data), had a mean bias within 35%, had random scatters of a factor 3-4, and no more than 50-60% of CALPUFF’s predictions were within a factor of 2 of observations. An Australian evaluation of CALPUFF and comparison with AUSPLUME and TAPM by Dr Hurley and co-workers of the CSIRO Division of Atmospheric Research [7][8][9] documents several cases of considerable underestimation of observed pollution by both AUSPLUME and CALPUFF and also a case of extreme overestimation by CALPUFF. Hurley argues that CALPUFF should be used with caution [9].

On the strength of these evaluation studies and US EPA guidelines for usage, the outcomes of the present CALPUFF study should be treated with considerable caution. Further caution is required because the CALPUFF modelling of complex terrain effects was based on a topographic dataset that was too widely grided and too inaccurate in altitude to adequately represent the complex terrain of Isaacs Ridge.

1.2 Inadequate topographic data

The CALPUFF study underestimates effects of Canberra’s valleys and ridges on pollution hotspots. Modelling of pollutants distributions suffers from poor location and altitude sampling of the complex terrain of Isaacs Ridge and associated ridge offshoots. Terrain values are based on a US Geological Survey dataset with a resolution no better than 1 km and on a Digital Elevation Model (DEM) from Geoscience Australia with a resolution no better than 250 m. Such wide sampling smooths Canberra-type topography by reducing terrain steepness through lowering and uplifting of adjacent hill and valley sections respectively. Sampling representation is worsened by accuracy limitations of the DEM data, obtained from a fixed-wing aircraft engaged in other geophysical studies. Locations have accuracy common for 1:250,000 scale maps (Canberra maps are generally at 1:25,000 scale and some may be at 1:10,000 scale) and altitudes have an average root mean square error of 20 m and up to 200 m in steep terrain [10]. Such a coarse and crude topographic dataset poorly identifies pollution hotspots and underestimates levels of pollution.

The rationale for usage of such a coarse and crude datasets is not presented in the pollution study. The consortium may well have had access to a more refined topographic dataset. On the second community consultation meeting organised by ActewAGL (15/6/2008) a detailed drive-through GIS panoramic study was shown on a wide screen. The level of local detail in topography was considerable and suggests that it was derived from a topographic dataset more detailed than the DEM from Geoscience Australia. Why was this more detailed dataset not used in the CALPUFF study? If CALPUFF cannot handle higher resolution datasets then it is not well suited to determine pollution distributions and pollution levels for the complex terrain of Isaacs Ridge and ridge offshoots between Macarthur-Fadden, Fadden-Wanniassa and Wanniassa-Farrer. If CALPUFF can handle detailed topographic data then available detailed datasets should be used for proper evaluation of pollution risks.

CALPUFF requires grided terrain datasets [2]. It is unavoidable that finer detail of complex terrain is lost in the gridding process, irrespective of the scale of the dataset. This is a serious drawback for proper analysis of effects of pollution by nearby complex terrain, such as around Isaacs Ridge and offshoots ridges. Usage of a grided, and therefore flattened, topographic dataset in the CALPUFF pollution study unavoidably leads to underestimation of levels of pollution levels. Locations of the more substantial pollution hotspots may be less affected.

1.3 Inadequate meteorological data

The CALPUFF study relies on meteorological observations from stations at Canberra Airport and Tuggeranong Hill. This is some improvement over the AUSPLUME study that relied on data from Wagga Wagga. However, the CALPUFF study, like the AUSPLUME study, suffers from absence of local meteorological observations, covering block 1610 and other areas in the Isaacs Ridge, Long Gully Road and Mugga Lane precinct. This is a region of complex terrain, its meteorological behaviour has to be properly observed and cannot be extrapolated with sufficient confidence from other stations. Local observations should cover a substantial, representative, period. The US EPA recommends for CALPUFF studies a five year observation record:

[4] *“For a regulatory analysis, such as that supporting a permit to construct a source of air pollution, the considerations regarding the length of meteorological period are similar when applying CALPUFF in screening mode as when applying other models. The EPA’s Guideline on Air Quality Models prescribes the use of five continuous years of representative meteorological data. Also, the Interagency Workgroup on Air Quality Modeling (sic) (IWAQM) demonstrated the year-to-year variability in CALPUFF screening impacts using a five-year meteorological period in their Phase II report. Based on this demonstration, IWAQM also recommends that five years of meteorological data should be used with CALPUFF in the screening mode in order to identify long-range transport impacts that could reasonably be considered to be the highest.”*

[11] *“Five consecutive years of the most recent representative sequential hourly National Weather Service (NWS) data, or one or more years of hourly sequential on-site data.”*

However, the present CALPUFF study relied on a one-year only record from an off-site location, Tuggeranong Hill.

1.4 Pollution studies on the run

Blind Freddy can see that the complex terrain of the Tuggeranong location is highly unusual for a power station and that such complex terrain requires adequate local topographic and meteorological input to safeguard local residents from adverse impacts. Yet local input is manifestly lacking in the present CALPUFF study. Use of off-the-shelf datasets in both the CALPUFF and AUSPLUME pollution studies are poor examples of studies on the run. These studies do not, and can not respond adequately, to the legitimate health concerns of local residents. ActewAGL has to collect for the specific purpose of pollution studies, local topographic and meteorological data, spanning a representative period and adequately covering the areas of concern. Anything less constitutes shoddy practices and whitewashing attitudes.

1.5 Pollution hotspots

The present CALPUFF study in all its crudeness clearly establishes Isaacs Ridge-related pollution hotspots in Macarthur-Fadden, Wanniasa, and Farrer-Mawson with a spur towards the Garran hospital [12]. There are further pollution hotspots in the upper part of Mugga Lane and in Hume. A broad swath of enhanced pollution extends from Isaacs Ridge westwards towards the Tuggeranong town centre-Kambah region and another broad swath extends from Isaacs Ridge to southern Jerrabombera. The location of the pollution hotspots is consistent for all four pollutants studied, eg: NO₂ [12, fig. 7.1]; SO₂ [12, fig. 7.3]; PM₁₀ [12, fig. 7.6]; formaldehyde [12, fig. 7.8]. These pollution hotspots are most worrying, foremost for potential health effects on local residents, but also for potential local acid rain effects, and not unimaginably for possible dumping from local ridge-confined eddies of heavy Uranium particulates and/or heavy gaseous elements from Naturally Occurring Radioactive Materials (NORM's, see my objection lodged on 26/05/2008 [13]). The message is loud and clear. Better to be safer than sorry. Relocate the power station away from Isaacs Ridge, onto an open plain.

1.6 Monitoring background levels at individual pollution hotspots

The same complex terrain that leads to pollution hotspots from the power station also may lead to similarly located hotspots containing pollution from other industrial and residential activities in the Tuggeranong, Woden and Jerrabombera valleys. This requires ongoing monitoring of "background" pollution levels, locally at identified pollution hotspots. Justification has to be demonstrated, not just assumed, for application of a regionally uniform background pollution level in any pollution study.

1.7 Cumulative pollution levels: background & co-generator & peaking plant

Outgoing CEO and incoming Chairman of ActewAGL, John Mackay, is quoted in the Canberra Times of 21/06/2008 [14] as saying:

"After this project is sorted out the consortium will go straight back to the peaker plant".... "He believes there are only six sites for a peaker plant including the four which were assessed for the Tuggeranong power station. The remaining two are the former Hume timber mill and the old abattoirs at Oaks estate near Queanbeyan"

This means five of the six sites under consideration by ActewAGL for a peaking plant are in the vicinity of the co-generator with some in the immediate vicinity. Pollution hotspots for the co-generator identified in the present CALPUFF study — Macarthur-Fadden, Wanniasa, Farrer-Mawson towards Garran, Mugga Valley and Hume — are also likely hotspots for background pollution and also for pollution from the proposed peaking plant. Residents in these pollution hotspots may have to bear the cumulative effects from two, and possibly three, sources of enhanced pollution. Very worrying are various statements by the incoming CEO of ActewAGL, Michael

Costello, about increasing the output of peaking plant from 100MW in the original proposal to 350 to 450MW or 400 to 600MW [15] with consequent increases in pollution.

[15] *"Mr Costello said the consortium was told three weeks ago a 100MW peaking station was commercially unviable. He said the firm spent weeks perusing other options before making the announcement to scrap the peaking station on the Tuggeranong site and scale down the data centre." "It's too small. It has to be 350 to 450 [megawatts] so that site was not suitable whether there were protests or not," Mr Costello said. He said ActewAGL was committed to building a 400-600MW gas power station in Canberra, but it would be well away from town centres."*

These kind of planning attitudes demonstrate insensitivity of ActewAGL management for the well-being of local residents and may border on criminal negligence.

As if three sources of pollution were not already bad enough, an ACTPLA planning report on development of the Hume Industrial Estate, obtained under an FOI request, proposes two sites along Isabella Drive, just east of Macarthur-Gilmore, as likely sites for a cemetery [16]. Possible extension with a crematorium would add a further source of pollution for the region and in particular for the above identified pollution hotspots.

1.8 Variability in polluting content of sourced gas

The CALPUFF plume study only considers a single natural gas source, it is unclear whether it represents gas from the Moomba gas field or from gas fields in Bass Strait.

"EXECUTIVE SUMMARY

*ActewAGL proposes to construct and operate a natural gas-fired cogeneration facility in Tuggeranong, Australian Capital Territory. This project involves installing three Caterpillar Titan 130-20501S Axial Gas Turbine Generators. **Each unit has a rated output of 14 MW and uses natural gas as its sole fuel source.** The intended capacity of the facility is 28MW continuous electrical generation provided by the operation of two gas turbines, the additional gas turbine will be employed as a standby."*

However, it highly likely that over the lifespan of the power plant coal seam gas from Queensland and New South Wales coal basins will be used as sources. As was pointed out in a previous objection of 26/5/2008 to variations in impurities of coal seam gas sources and in particular to higher concentrations of Naturally Occurring Radioactive Materials (NORM's) in NSW coal fields compared with Queensland coal fields. Such variability in gaseous and particulate content is not addressed in the present CALPUFF plume study, but is likely to affect content and level of pollution. Study results therefore have to be treated with considerable caution.

Gas sourced from the Moomba gas field is well known for its very high CO₂ content in comparison to other gas sources [17]. Apparently it is such an embarrassment for the operator of the gas field that SANTOS has offered to geo-sequester the CO₂ gas captured by their client consumers [18][19]. It is not clear from the present CALPUFF pollution study whether this very high CO₂ content of the Moomba gas is used in the quoted figure for the Tuggeranong power plant's CO₂ emission of 188 Kt CO_{2-e}/yr. It has to be clarified whether the figure used properly represents expected emissions rather than an underestimation based merely on an undisclosed average gas composition.

1.9 Inter-comparison of diverse model predictions

The CALPUFF model outcomes on distribution and level of pollution and location of pollution hotspots should not be treated as hard facts. The above concerns do warrant their usage for indicative purposes only. Outcomes of different models, such as AUSPLUME, CALPUFF, TAPM, AERMOD, that show consistency can be interpreted with greater confidence. The dangerous location of the power plant in the near vicinity of the complex topography of Isaacs Ridge system requires such inter-comparison. The CSIRO Division of Atmospheric Research has the expertise to inter-compare numerical modelling studies. Follow-up analogue studies can be undertaken at the Geophysical Fluids Laboratory of the Research School of Earth Sciences, ANU. Relocation of the power plant to an open plain environment will reduce the need for elaborate modelling studies.

2 Security of gas supply myth

The development consortium advances security of gas supply as a major reason to supply the data centres with gas-fired power. However, Australia has experienced three major explosions in gas distribution systems over the past decade alone. The Esso Longford gas explosion in Melbourne (25/9/1998 [20]) and the Apache Energy Varanus Island gas explosion (03/06/2008 [21][22]) caused major and prolonged disruption to gas supplies in Victoria and Western Australia. The Moomba gas plant, the proposed supplier of gas for the Tuggeranong power plant, suffered a gas explosion on New Years Day 2004 [23][24] that caused substantial supply problems [25].

Mining of coal seam gas is not without danger either as evidenced by the more than occasional occurrence of coal mining incidents [26][27]. In contrast, the Australian national electricity grid has no record of outages of magnitudes experienced with gas explosions as described above. This exposes the argument of security of gas supply as an unjustified, if not dangerous, myth.

3 Polluting power plants best located at sea-level

The Tuggeranong power plant will be located at an altitude of about 630 m and will operate in a temperature range between -5°C and +40°C. Air at 630 m of altitude is more than 7% less dense than air at sea-level [28]. The quoted temperature variations will cause a further 13% variation in air density [28]. The two effects are cumulative. On a hot afternoon, the air around the power plant could be up to 20% less dense than air at sea-level. Yet, the power plant will emit the same amount of pollutants as at sea-level. Air that is 20% less dense will thus be 20% more polluted. People breathing this less dense air will have to breathe greater volumes for the same oxygenation, thus will breathe 20% more pollution!

No data are provided regarding anticipated performance of the Titan turbines at an altitude of 630 m. Pollution characteristics may be equivalent to operation at sea-level, but could be worse.

Clearly polluting power plants are best located at sea-level where the air has optimal density and where temperatures vary within the limited range of a sea-climate. This is where the major power plants in NSW are located, namely in the lower Hunter Valley and near Lake Macquarie. Operation of a polluting gas-fired power plant at the altitude of the ACT and across the wide temperature range of ACT's land climate is a poor choice of options.

4 Manipulation of background pollution levels

The original AUSPLUME pollution study applied a background level for nitrous dioxide (NO₂) of 75.6 microgram/m³. The source of this figure could not be established. The CALPUFF pollution study in the revised plan applies a NO₂ background level of 131 microgram/m³. This represents the highest one-hour-average recorded by the Monash monitoring station during the 2003 bushfires. Capital Territory Ambient Air Quality Reports [29] data show an average background level of NO₂ for the period 1998-2006 of 89.8 microgram/m³ (see my objection of 26/05/2008), with data for the bushfire year 2003 excluded as non-representative.

It is inconsequential to apply an unrepresentatively low background level of NO₂ in the AUSPLUME study of the original plan and an unrepresentatively high background level of NO₂ in the CALPUFF study of the revised plan. This practice reeks of data manipulation – in the original study to keep worst case scenario emissions of the larger power plant just below the NSW EPA allowable maximum of 246 microgram/m³ – in the revised study to belittle potential health effects of the emissions of the scaled-down power plant.

ActewAGL cannot have it both ways. The CTAQR average background level of 89.8 microgram/m³ should have been applied in both studies.

5 Impost on ACT net water consumption

The ACT government and other state ministers agreed in late May 2008 to cap the ACT net water consumption from the Murray-Darling system to 40GL/yr. The revised power plant will consume 435 ML/yr in a process that re-uses heat from the exhaust stacks to drive absorption chillers. This water is said to be acquired (ActewAGL community briefing 28/4/2008) from Tantanger Dam so as not to strain the ACT's own water supply. However, buying increasingly scarce water from the Snowy Mountains, if available at all, will not be cheap.

The cooling procedure is promoted to save 9MW in power from the electricity grid. However, it is not reported that the 435 ML will evaporate and be lost, thus locking up more than 1% of the ACT's allowed net water consumption from the Murray-Darling system. Such a loss will strain water pricing by ActewAGL and will strain water restrictions in the ACT. Lost also is the potential energy of the water stored at altitude in the Snowy Mountains. The water will just flow down the Murrumbidgee or be piped down to the ACT. However, the potential energy of this water can readily be used through the Snowy Hydro scheme for generation of pollution-free power, potentially in multiple cycles of pumped storage through the Tumut-3 hydro-electric station, and the water will still be available for use within the Murray-Darling system.

Alternative purchase of 9MW of power from the Snowy Hydro scheme will buy pollution-free power, will retain the water for further use and will not strain the ACT water budget. This readily available alternative also eliminates the need to install bulky absorption chillers, steam exhaust stacks, a dedicated water storage and water pumping and transport facilities. Furthermore, absence of steam will substantially reduce fog and smog potential. This alternative also reduces pollution at ground level (scenario 3 of the CALPUFF study, pp 27) as plume rise, is not restricted by the absorption chillers (scenario 1). Clearly this readily available alternative is superior by far over ActewAGL's purported clever re-use of exhaust heat.

6 No valid argument for co-location

The above valid arguments against operation with absorption chillers also mean that there is no valid argument for co-generation and thus no valid argument for co-location of power station and data centres [30][31][32].

[31] *“Cogeneration (also combined heat and power, CHP) is the use of a heat engine or a power station to simultaneously generate both electricity and useful heat ... CHP is most efficient when the heat can be used on site or very close to it. Overall efficiency is reduced when the heat must be transported over longer distances.”*

ActewAGL’s argument for co-location of power station and data centres is based primarily on efficiency gained in re-using the power station’s exhaust heat through absorption chillers for cooling of the data centres. A far lesser argument for co-location is reduction in transmission losses of electricity. If implementation of absorption chillers is not feasible because of the severe impost on the ACT’s net water allocation, then the argument for co-location of power station and data centres will hinge solely on reduction in transmission losses. Any user of electricity and any producer of electricity faces such losses. Such losses do not constitute a valid argument for co-location of power station and data centres on the same site. As is happening anywhere else, power can be generated very effectively off-site, limiting pollution dangers for local residents.

ActewAGL’s arguments for co-location of power station and data centres and the ACT’s government support for a polluting gas-fired plant as the territory’s first independent energy source are in stark contrast to the energy policy of the NSW government. In a policy approach that leaves ActewAGL and the ACT government squarely in the Luddite corner, the NSW government will supply energy for the Sydney desalination plant from the 63 turbine Capital Wind Farm that is currently under construction in Bungendore [33]. This \$1.7 billion desalination project is comparable in cost to the original (\$2 billion) and scaled-down (\$1 billion) power station cum data centres project. Energy demands of the NSW desalination plant and the ACT project are also comparable, 210/28 MW versus the output of 63 wind turbines. If the NSW project can operate with non-polluting renewable power that is generated off-site, so should the ACT project be able to operate. It all boils down to the political will to go for non-polluting power sources *“that do not produce a single kilogram of CO₂ emissions”* [34] and do not further aggravate global climate change. The NSW government’s approach leaves the credibility of ACT government’s climate change approach in tatters. ACT residents will suffer the polluting consequences of poor government policy.

7 Evident potential for upscaling

The revised plan scaled down the data centres from 13 to 8 by omitting the southernmost 5 data centres. The size of the block on offer was reduced, by omitting its southernmost part. The size of the power station was scaled down to 3 turbines and 3 chillers and these were moved disingenuously about 150 m southwards and about 100 m closer to Tuggeranong residents. A secure holding area was created. Its size is large enough to fit the original 9 turbine power station. The revised plan states that the secure holding area is required for construction purposes. This looks like a smokescreen. No such holding area was envisaged in the original plan even though this required more extensive construction.

There has been no downsizing of gas pipes, water mains or high voltage power lines. They are all the same as in the original plan. Clearly, the scaled-down setup of the revised plan can painlessly be up-scaled into the originally planned set-up. Upscaling can be extended even further and farther into adjacent parts of block 1610 that were not included in the original plan. This has transpired from communications from the deputy chief of the Chief Minister’s department [35], obtained under an FOI request.

Assurances that upscaling of the power plant would not occur at the proposed site are not believable when infrastructure is not reduced commensurate with requirements for the scaled-down power station.

8 Heat dissipation into adjacent bushland

Co-location of the gas-fired power station and the data centres means that both the heat from the electricity generation and the heat from the electricity consumption are dissipating at the same time at the same location. This is a highly unusual situation. The power station will generate from at least 2 turbines at least 28 eMW for use by the data centres. Further energy equivalent to another 9 eMW will be generated from the absorption chillers. According to Canberra Technology City's documentation on co-generation, handed out at the second community consultation meeting (15/06/2008 [36]), 98% of this 37 eMW will dissipate as waste heat from the data centres. This heat hardly can dissipate upwards into the plume of hot exhaust gasses. It will have to dissipate mainly at low levels into the surrounding environment of timbered Broadacre land and bushland reserve. The amount of heat dissipating from nearly 37 eMW on a 24/7 basis is substantial and represents a sizable portion of electricity consumption by Canberra residents (possibly more than 30% although factual data on electricity consumption in the ACT are hard to come by for commercial-in-confidence restrictions). ActewAGL's revised development application does not address the existence, shape and magnitude of a local heat-island, nor what effects such a temperature hotspot may have on local flora and fauna and on bushfire risks.

Note that the original site investigation report prepared by Bill Guy & partners, dated November 2007, is included in the revised plan without modification. The report states that a water flux of 60 l/sec is required. This would mean ~1.9 GL on a yearly basis. Clarification is required whether the figure of 435 ML/year quoted in the main report supersedes the figure of 1.9 GL/year and also supersedes the figure of 0.6 GL/year quoted in the original plan. If a peak supply of 60 l/sec is required for fire fighting purposes then it should be clarified whether co-location of the gas-fired power station and the data centres and consequent formation of a ground-level heat-island would increase the potential for fires in the data centres.

9 Greenhouse gas emissions

Emissions from the power station are estimated at 188 Kt CO_{2-e}/yr. This is promoted as a reduction of 56% in emissions compared with power obtained from the national electricity grid. It is also promoted as a mere 0.0336% of total Australian greenhouse gas emissions for the 2005 inventory year, estimated at 559.1 Mt CO_{2-e}.

This promotion reads as if the world is not facing an unprecedented climate crisis. If CO₂ emissions could be kept at their current level, it is now widely accepted that a global temperature rise could be contained to 2 °C and a sea-level rise to 6 m. The severe effects of such global changes are hard to imagine. Rise of emissions beyond these dire predictions are to be avoided at all cost. The federal government has committed to a 60% reduction in CO₂ emissions against 1990 or 2000 levels [37] and the upcoming Garnaut Report is anticipated to call for even more stringent reductions of 70% to 90%.

It is therefore more proper to describe the power station's greenhouse gas emissions (188 Kt CO_{2-e}/yr) in terms of a 100% increase in emissions compared with non-polluting renewable energy options and in terms of 0.336% of the reduced Australian greenhouse emissions called for in the Garnaut Report.

If the ACT is going to **increase** its greenhouse gas emissions when emissions need to be **reduced**, other states will have to make greater sacrifices! Non-polluting renewable energy options are available (see the objection of 26/05/2008 and below) and can be pursued by a more forward-looking government. The polluting option

advocated by ActewAGL would not come cheap, at an estimated 20\$/t to 40\$/t the 188Kt CO_{2-e} emissions would come at a yearly cost of 3.8 to 7.2 million dollar. Such costs alone would make renewable energy options attractive.

10 Renewable energy alternatives

I have addressed in the objection of 26/05/2008 renewable energy options as follows:

- Geothermal heat pump
- Solar photovoltaic
- Solar thermal
- Geothermal, Hot Fractured Rock

The ACT has a further non-polluting renewable energy option available, by using the Cotter catchment to generate hydroelectric power. The Cotter catchment has three dams: Corin (70.9 GL), Bendora (11.5 GL) and the Cotter (3.9 GL) [38]. Head between the Corin and Bendora dams is 173 m and head between the Bendora and Cotter dams is 280m [39], well in excess of the head of the Tumut-3 dam (150.9 m) which can deliver 1500 eMW [40]. The Cotter dam will be enlarged to 80 GL. This offers an opportunity to install a hydroelectric power station. Pumped storage from the Cotter dam into the Corin and/or Bendora dams could better aerate the proposed recycled water supply [41] from the Lower Molonglo sewerage treatment plant [42].

11 Lip service to renewable energy and climate change

The ACT government as 50% owner of ActewAGL is paying lip service to setting and pursuing renewable energy targets and to combating climate change. Its budget papers for 2008-2009 [43][44] promote investments of 100 million dollar over the period 2008-2012 *“To Meeting the Challenges of Climate Change”* [44]. This works out as primarily an investment in tree planting (~36%), with a mere 0.4% investment into unspecified renewable energy targets, and a mere 0.07% investment into a solar farm feasibility study. In contrast, the ACT government as part owner of ActewAGL was, and still is, prepared to invest the ten times larger amount of 1 billion dollar into a polluting gas-fired power station. This disparity in financial commitments is astounding on the mere figures alone. It is even worse considering the additional damage to regional and local flora and fauna that may derive from acid rain emanating from the polluting gas-fired power station. This disparity in financial commitments certainly gives the lie to the ACT government’s claim of:

“A Proven Commitment to Sustainability. *The Government has worked to improve sustainability since 2001-02, implementing wide-ranging actions to address climate change and committing to a reduction of 60 per cent of emission levels by 2050.*“

It is telling observation that whilst the ACT government keeps promoting a polluting gas-fired power station, the premiers of Queensland and Victoria and a high-level government delegation from Western Australia are touring western North America inspecting solar thermal power stations in anticipation of construction within Australia [45].

12 Land planning priorities require reassessment

The Hume Industrial Land Planning study [24], made available under a FOI request, proposes extension of the Hume industrial estate towards Tuggeranong suburbs, so close that a planned cemetery is to be used as a buffer between industrial development and residential suburbs.

[16] *“This study has identified Area 8E to the east of Monaro Highway as potential developable land for a cemetery site and recommends that this site be subject to a planning variation that amends the Territory Plan map and written statement ‘B8’. It is proposed that Area 8E to the east of the Monaro be varied to accommodate Industrial Precinct ‘a’ land uses. Such a Territory Plan variation would consolidate the stretch of industrial development along the Monaro Highway, whilst also increasing the area of land available for general industrial development. The section of Area 8E to the west of the Monaro could retain its current land use zoning status or be rezoned to a Broadacre land use, making provision for an alternative cemetery site. This form of land use preserves the heritage significance of Rose Cottage and provides a visual and aesthetic buffer between the Hume Industrial Area and neighbouring residential developments.”*

Canberrans may well argue that a cemetery deserves more respect than to function as a buffer between industrial development and residential development.

Planning for extension of industrial development very close to Tuggeranong suburbs starkly contrasts to planning for nature reserves in the ACT, in particular for the Callum Brae Nature Reserve in Symonston [16][46]. Part of the proposed Callum Brae Nature Reserve is open plain land at considerable distances from ridges. Such land would be far better suited for a power station than the proposed location on Tuggeranong block 1610 near to Isaacs Ridge.

There may well be perfectly good arguments for safeguarding threatened flora and fauna in proposed nature reserves. There are also perfectly good arguments to safeguard the wellbeing and health of Canberra residents. Canberra planners may have to revisit their arguments for planned extension of an industrial estate cum power station up to the border of Tuggeranong suburbs, whilst planning at the same time for preservation of nature reserves in open spaces that are well away from suburbs and that are seemingly well suited for industrial development. I am a keen nature lover, yet I value my health above preservation of some valuable grasslands and protection of some threatened fauna.

13 Acid rain dangers

The objection of 26/05/2008 details the potential of a gas-fired power plant to cause acid problems within the ACT, adjacent NSW and the Kosciusko and Namadgi National Parks. CPR Inc. concerns related to a proposed 210MW gas-fired power plant. The present proposal for a 28 MW power plant and a just announced plan for a 500MW power plant on the ACT-NSW border near Williamsdale [47] seriously aggravate the potential for development of acid rain. In absence of substantial limestone deposits, the region has little capacity for alkaline buffering and acid rain problems could gallop out of control. Alternative energy sourcing from non-polluting renewable energy sources needs serious consideration.

14 Environmental impact statement

The points discussed above call for a full and independent Environmental Impact Study to address specifically: dangers of pollution hotspots caused by locating the co-generator close to Isaacs Ridge; impost of the absorption chilling process on water supply to the ACT; potential for development of acid rain problems in the ACT, neighbouring NSW and the Kosciusko and Namadgi National Parks.

It is inconceivable that ActewAGL has not carried out its own environmental impact study, given the proposed location of the power plant as close as about 900 m to Macarthur residents. ActewAGL's failure to carry out such a study is the more surprising with ActewAGL's outgoing CEO, John Mackay, stating on ABC Local Radio (25/06/2008) words to the effect that a proposed 500 MW peaking plant at Williamsdale is located " *about 6 kilometer from the few nearest residents*" and "*probably needs an EIS*"! [48].

References

- [1] <http://www.abc.net.au/pm/content/2008/s2274415.htm>
- [2] http://www.epa.gov/scram001/guidance/guide/appw_05.pdf
- [3] http://www.epa.gov/scram001/dispersion_prefrec.htm
- [4] <http://www.src.com/calpuff/FAQ-answers.htm>
- [5] [http://ams.allenpress.com/perlserv/?request=get-abstract&doi=10.1175%2F1520-0450\(2003\)042%3C0453%3AEOCHAV%3E2.0.CO%3B2](http://ams.allenpress.com/perlserv/?request=get-abstract&doi=10.1175%2F1520-0450(2003)042%3C0453%3AEOCHAV%3E2.0.CO%3B2)
- [6] <http://portal.acm.org/citation.cfm?id=772194.772212>
- [7] Hurley P.J. 2006. An evaluation and inter-comparison of AUSPLUME, AERMOD and TAPM for seven field datasets for point source dispersion. *Clean Air and Environmental Quality*, 40, 45-50.
- [8] Hurley P.J. & Luhar A.K. 2005. An evaluation and inter-comparison of AUSPLUME, CALPUFF and TAPM – part 1: the Kincaid and Indianapolis field datasets. *Clean Air and Environmental Quality*, 39, 39-45.
- [9] Hurley P.J., Hill J. & Blockley A. 2005. An Evaluation and Inter-Comparison of AUSPLUME, CALPUFF and TAPM – Part 2: Angelsea and Kwinana Annual Datasets. *Clean Air and Environmental Quality*, 39, 46-51.
- [10] <http://asdd.ga.gov.au/asdd/tech/zap/basic-full.zap?&target=ga-1&syntax=html&cclfield1=all&cclfield2=phrase&cclfield3=any&cclterm1=topo%20dem&cclterm2=&cclterm3=&start=1&number=1> [Metadata Geoscience Australia 9 Second DEM (DEM-9S)]
- [11] <http://www.epa.gov/scram001/guidance/guide/checklist.pdf>
- [12] http://www.actpla.act.gov.au/_data/assets/pdf_file/0003/9084/appendixk.pdf (as an example, see Fig.7.1)
- [13] http://www.arpansa.gov.au/pubs/norm/cooper_norm.pdf
- [14] <http://www.reedfirstsource.com/news/members/lnstory~did~810306112~topic~100002733.asp>
- [15] <http://canberra.yourguide.com.au/news/local/news/general/chief-in-dark-on-gas-plant-backflip/780583.aspx>
- [16] GHD. 2007. ACT Planning and Land Authority. Hume Industrial Planning Study, Final report, September 2007, pp 123. Made available in response to a Freedom-of-Information request.
- [17] Wycherley H., Fleet A. and Shaw H. 1999. Some observations on the origins of large volumes of carbon dioxide accumulations in sedimentary basins. *Marine and Petroleum Geology*, 16, 489-494.
- [18] <http://www.santos.com/Content.aspx?p=340>
- [19] http://www.santos.com/library/Santos_Moomba_Carbon_Storage.pdf
- [20] http://en.wikipedia.org/wiki/1998_Esso_Longford_gas_explosion
- [21] <http://www.theaustralian.news.com.au/story/0,25197,23883858-5006789,00.html>
- [22] <http://www.abc.net.au/news/stories/2008/06/23/2282979.htm>
- [23] <http://www.abc.net.au/7.30/content/2003/s1020673.htm>
- [24] <http://www.theage.com.au/articles/2004/01/06/1073268035805.html>
- [25] <http://www.theage.com.au/articles/2004/01/05/1073267967464.html>
- [26] <http://www.library.uow.edu.au/eresources/UOW026491.html>
- [27] <http://www.ema.gov.au/>
- [28] <http://www.air-dispersion.com/formulas.html>
- [29] http://www.ephc.gov.au/pdf/Air_Quality_NEPM/Monitoring2006/2006_ACT_Report.pdf

- [30] http://en.wikipedia.org/wiki/Peaking_power_plant
- [31] <http://en.wikipedia.org/wiki/Cogeneration>
- [32] http://en.wikipedia.org/wiki/Combined_cycle
- [33] <http://www.abc.net.au/news/stories/2008/05/13/2243677.htm?section=australia>
- [34] <http://www.news.com.au/dailytelegraph/story/0,22049,22584625-5001021,00.html>
- [35] <http://canberra.yourguide.com.au/news/local/news/general/gas-plant-was-first-planned-for-hume/785062.aspx#>
- [36] Canberra City Technology. Cogeneration – Data centre energy requirements. pp 2.
- [37] <http://www.garnautreview.org.au>
- [38] <http://www.actewagl.com.au/water/catchment/default.aspx>
- [39] <http://maps.bonzle.com/c/a?a=p&p=207325&cmd=sp>
- [40] <http://www.snowyhydro.com.au/LevelThree.asp?pageID=244&parentID=66&grandParentID=4>
- [41] <http://www.actew.com.au/water2water/>
- [42] <http://www.actewagl.com.au/wastewater/treatment/default.aspx>
- [43] http://www.treasury.act.gov.au/budget/budget_2008/files/paper2/bpaper2.pdf
- [44] Australian Capital Territory. 2008. Budget Highlights 2008-2009, Ready for the future. ACT Treasury, 16pp
- [45] <http://www.abc.net.au/pm/content/2008/s2274415.htm>
- [46] <http://apps.actpla.act.gov.au/spatialplan/maps/index.htm>
- [47] <http://www.abc.net.au/news/stories/2008/06/25/2284823.htm>
- [48] ABC Local Radio, Ross Sully interview of John Mackay on 25/05/2008 at ~8.45 am. Record available from ABC Tape Sales.

Water

Power plant — impost on ACT net water consumption cap

It has just come to my attention (ABC local news 27/5/2008, Ross Sully reporting) that the ACT Government has negotiated with other states a cap of 40 GI on its net water consumption from the Murray-Darling system. The proposed Tuggeranong power plant will consume 0.6 GI, reportedly to be acquired (ActewAGL community briefing 28/4/2008) from Tantanger Dam. This water will evaporate and constitutes therefore a net impost on the consumption cap. Locking up 1.5% of the ACT's potential water usage in a power plant of disputable merits seems poor policy in itself. Renewable energy alternatives (see the objection lodged 26/5/2008) do not impose on the ACT water consumption cap and unmask such lock-up as an unacceptable proposition.

Increased pressure on water resources

- Cooling for the power plant is estimated at 600 MI/year. This is the equivalent of about 5 days of water usage during shoulder seasons and close to 1% of current water usage in the ACT. Such usage, and the necessary provisions for security of supply, will considerably increase pressure on water supply for the population of the ACT and surroundings and will worsen water restrictions.
- It is disingenuous to claim that water will be obtained separately from Tantanger Dam. ActewAGL is eyeing the Tantanger supply already for use by Canberra residents. ActewAGL will be in competition with itself and with any other user of scarce supply in the Murray Darling Basin in its bid for water supply from Tantanger earmarked for this power plant.
- If ActewAGL would obtain water supply from Tantanger earmarked for the power plant, it is unclear how ActewAGL will separate it from supply for Canberra residents. Unless there is substantial new investment in infrastructure, ActewAGL will have to use the same supply and purification channels. It is also unclear how ActewAGL will manage priorities of supply with the certainty of forthcoming and ongoing scarcity problems. Will supply for the power plant, have priority over residents?

Pollution & climate change concerns

- The plan does not show provision for collection and sequestration of CO₂. Emission of CO₂ is substantial according to the figures provided. The Preliminary Assessment Report refers to “best practice natural gas emissions between 514 and 658 kg CO₂ per eMWh”. In prolonged peak operation this would mean emission of 2,590,560 kg CO₂/day (514*24*210) to 3,316,320 kg CO₂/day (658*24*210). CPR will come back later as to why prolonged peak operation can be expected. A figure between 2.5 to 3.3 million kg CO₂/day is substantial and will increase Australia’s carbon footprint. This when Australia is committed to reducing its carbon footprint by 60% by 2050. CPR is surprised that there is no mention of consultation with the Greenhouse gas CRC. This CRC is housed in the Canberra CBD. Its head, Dr Peter Cook, is a long-term Canberra resident, was the instigator of CO₂ geo-sequestration in Australia and headed a previous Government-funded CO₂ geo-sequestration CRC.
- The plan shows no provision for scrubbing of nitrous oxides on entry of the plant, nor on exit through the exhaust stacks. Provision of gas is planned from the Cooper Basin, which is derived originally from Permian coal seams, and also as coal-seam-gas from Permian seams in the Sydney-Gunnedah-Bowen Basin. Coal-seam-gas can be impure. It may be cleaned at the point of extraction for the purpose of the average power plant user, but the Tuggeranong power plant cannot be described as the average power plant. Its planned location at 600 m from an ACT government health facility and less than a kilometre from Macarthur residents is closer than common for a gas-fired power station. The plan mentions that plume studies indicate maximum NO₂ emissions of 245 microgram/m³ at ground level, just ¼ of one percent below the EPA maximum level. In the absence of local control on the level of pollution of the gas entering the power plant it is ridiculous to claim that this figure complies with EPA recommendations and insulting to concerned residents to call this ¼% a safety margin. Furthermore the plan does not consider that prevailing western winds may cause a downdraft over Isaacs Ridge with potential trapping of NO₂ in an eddy between the ridge and the power plant, leading to potentially higher concentrations at ground level. Nor does the plan consider the particular location of the power plant close to the upper parts of three populated valleys: Jerrabombera, Tuggeranong and Woden. Prevailing western winds may cause eddy-trapped NO₂ to roll down Jerrabombera Valley and accumulate. Easterly seawinds may push NO₂ across Isaacs Ridge into the Woden and Tuggeranong valleys. It would be difficult to choose a more problematic, if not dangerous, location than the current one near the upper parts of these three heavily populated and populating valleys.
- The 12 turbines will operate in frequent stop-start mode. This will lead to incomplete burn-off. Consequently considerable quantities of unburnt methane gas will escape. Methane gas is a far more powerful greenhouse gas (>20 times) than CO₂. With greenhouse gas emissions soon to be considerably taxed and/or charged this plant may not be economical.
- Steam from the three steam turbines will act as condensation cores. This will increase potential for fog conditions in the Jerrabombera, Tuggeranong and Woden valleys. Also, and more worrying, combination of steam and polluting particles will increase potential for smog and consequent health effects.

Questionable economics

- The location of the power plant minimises distance to existing power infrastructure (high-voltage power lines, gas lines, water mains). ActewAGL is minimising its infrastructure costs, yet it charges its customers a fixed abstraction charge for provision of infrastructure.
- Frequent start-stop operation of the power plant has little to do with power provision for the data hub — its energy requirements are entirely predictable. It has more to do with ActewAGL minimising its exposure to spot prices on the energy markets at times of unforeseen energy demand from ACT consumers.
- Forthcoming tax and other charges on greenhouse gas pollution will negatively affect the economics of the power plant. ActewAGL may well be forced to chase spot price delivery to the national grid, increasing operational usage at the cost of noise and toxic gas pollution of Canberra residents.
- If not forced economically, urgent national demand in times of scarcity may force the plant to operate at far higher usage, if not peak level, than local supply requires.
- Nothing may stop ActewAGL management to chase spot price delivery to the national grid, just to increase its financial bottom line. If not management policy, it may be the operator-on-duty who is chasing spot-price delivery to increase their performance bonus.

Missed opportunities

- Canberra is the birthplace of at least three concepts that are going to, or can, make a substantial contribution to averting the global crisis of climate change: CO₂ geo-sequestration (Dr Peter Cook); geothermal energy from hot-fractured-rocks (Dr Doone Wyborn and Dr Prame Chopra); solar thermal energy (Dr Keith Lovegrove). The former concept cares for reducing greenhouse gas emissions. The latter two concepts will provide pollution-free renewable base-load energy. Energy from hot-fractured rocks is within a few months of establishing proof-of-concept through Geodynamics. There are reasonable expectations of delivery, on a decade timescale, of 10,000 eMW of pollution-free renewable energy from the Cooper Basin alone. ActewAGL could secure a share of supply, just like its main competitor, Origin Energy, has done. The ACT has a substantial budget surplus. As half-owner of ActewAGL it could invest part of its surplus in the development of HFR and other base-load renewable energy supplies, meanwhile sparing it having to contribute to a 2 billion dollar polluter. In building on these home-grown concepts the ACT government would be seen as an innovative world leader in combating climate change. Yet in building a polluting gas-fired power plant virtually at the doorsteps of its residents, Canberra risks to become known as Australia's pollution capital.

National & global concerns

Carbon dioxide emissions

ActewAGL's planning documents do not show plans for capture and sequestration of CO₂. Carbon dioxide is the greenhouse gas that is mainly responsible for accelerating global warming and an impending global climate crisis of increasingly alarming magnitude and speed. Data provided indicate at peak output an emission rate of 3000 tons of CO₂ per day. This surely will not help Australia to reach its Kyoto target, nor its commitment to 60% reduction of CO₂ emissions by 2050. Neither to reach reductions of 70% to 90% called for by the Garnaut review [1]. With the ACT's power plant increasing total emissions for Australia, other states will have to go through more pain to reduce their emissions. Is the ACT's approach a fair one to an Australia-wide and global problem? Should or would the Commonwealth Government let its territory get away with it? Will future climate-change legislation allow the ACT to operate this plant in this way? These are questions to be addressed more widely than just within the ACT.

On a more pedestrian note, with CO₂ emission charges expected in the range of \$20-\$40/ton (carbon trading has started in Australia at \$19/ton [19/5/2008], European trading is currently at about 20 Euro/ton), a daily bill of \$60,000 to \$120,000 will not be kind to ActewAGL's bottom line. The plant may only be economical in chasing the lucrative spot market. This would mean running the plant up to peak capacity, often and for prolonged periods. ActewAGL management has informed concerned residents that the plant would only occasionally run at peak capacity. This may be their intention, but will their intention be maintainable in the face of adverse economics? Capture of CO₂ emissions is expected to reduce power output by more than 30%. Retaining a peak output of 210 eMW would require installation of additional power plant facilities with an output of about 70 eMW. In turn this would increase other emissions, such as nitrous oxides by more than 30% – unless scrubbing for nitrous oxides and also sulphur oxides is installed, in turn further reducing output.

The ACT, Australia and the world are facing an unprecedented challenge to reduce CO₂ emissions. It is highly irresponsible to install a substantial CO₂ emitter it is even more irresponsible to not plan for CO₂ capture. On this ground alone this Development Application should not be allowed to proceed. There surely are realistic renewable energy alternatives but this Development Application has not addressed alternatives in any serious way.

Regional concerns, ACT, NSW, Kosciusko National Park

Acid Rain

Acid rain develops from nitrous oxides and sulphur oxides mainly produced by cars, fossil fuel burning power plants and lightning [2][3] — the ACT and surroundings experience frequent summer lightning. Acid rain becomes a problem on the ground when a region has insufficient capacity for NO₂ uptake by vegetation and soil and/or insufficient natural alkaline capacity to neutralize acidity. Capacity for NO₂ uptake by vegetation is a contentious issue [4] — vegetation may be a net emitter or a net absorber.

The ACT, and its upstream water catchment in adjacent NSW and in the Kosciusko National Park, has little natural capacity for neutralizing acid rain. The geology of this region consists mainly of acid volcanics and acid granites with only very limited occurrence of carbonates (limestone). The nearest substantial carbonate deposits are more than 50 km from Canberra. Carbonate deposits near Yass and Taemas are downstream of the ACT and carbonates at Blue Water Hole and near Wee Jasper are outside the ACT water catchment. These carbonate deposits do nothing to buffer alkalinity in ACT water streams. There is a carbonate deposit of some note upstream of the ACT near Bredbo, but its size is not comparable to the Wee Jasper deposit.

This precarious geological situation — lack of sizable carbonate deposits and abundance of acid rocks — is comparable to eastern North America [3], a region with wide regions of bedrock, exposed from land-ice scraping during the last ice age, with precariously little carbonate deposits. It was here that acid rain was first recognised as a serious problem and traced to emissions of major power plants. Surely the proposed power plant in Tuggeranong may not be of the size of power plants in North America, but accumulation of pollutants over time has to be considered. It is a question of maintaining or exceeding balance.

Can balance be maintained or will accumulation of acid rain agents over time run out of control? Present levels of nitrous oxides and sulphur oxides may be below the critical load of the ACT region, so there may be no noticeable occurrence of acid rain. However, it is open to questioning whether this will remain so with the additional emissions from ActewAGL's gas-fired power plant. The plant's emission of nitrous oxides is considerable according to the DA documentation provided by ActewAGL. Emission of sulphur oxides, another contributor to acid rain, is not even addressed in the Development Application. Why not? Yet such emissions are to be expected from to-be-supplied coals seam gas. Coal contains sulphur and gas extracted from coal will contain sulphur. Amounts will vary with the particular coal seam that is mined.

If the power plant's contributions increase nitrous oxides and sulphur oxides concentrations above the critical load factor, then acid rain development will get out of control. We will then experience slow acidification of streams in the ACT and slow acidification of the ACT water supply. Vegetation will start dying back with dire consequences for the Kosciusko National Park and the Namadgi National Park, for the extensive government and private plantations in the region and for frequency and magnitude of bushfires. When the cause of such disasters is traced back, who is going to compensate whom? Will the ACT government have to compensate the NSW government? Will ActewAGL have to compensate private investors in plantations?

In absence of a widely present natural alkaline buffer, it is not clear what capacity or capability the ACT has to prevent acid rain developing other than through removal of nitrous oxides and sulphur oxides from the exhaust stacks. However this will reduce

the power output. Anticipated Commonwealth Government requirements to limit carbon dioxide emissions will further reduce the power output. Conceivable, the plant may sooner or later cease to be economical and may have to shut down in favour of more economical renewable energy alternatives. Such alternatives are becoming realistic options that can be implemented in time frames of years, far less time than realization of carbon geo-sequestration, and should be seriously researched now!

Local concerns

Nitrous oxides and other impurities

ActewAGL's exhaust plume study concludes to an expected maximum concentration of nitrous oxides at ground level of 245 microgram/m³. Its executives claim this to comply with the maximum allowable level (246) set by the NSW EPA. It is very brave, if not foolish, to claim a margin of less than half of one percent as safe, the more because of obvious inadequacies in the plume study:

- a) The study used a numerical model (AUSPLUME) that is described in readily available literature as inappropriate for the valley-and-ridge topography of the proposed Tuggeranong site and as underestimating emissions in case of such considerable topography [5][6]. AUSPLUME is also described as to inadequately model dispersion in extreme (high) concentrations for point sources with stack heights less than 100 m and for dispersion in complex terrain such as plume impact on hills [7][8];
- b) The study did not include on-site meteorological data even though ActewAGL has demonstrated its capacity to obtain such data by carrying out extensive wind studies for potential location of wind farms. Local wind data are important in case of the valley-and-ridge topography of the proposed Tuggeranong site and are known to lead to better model performance [9];
- c) The study did not consider present or future variations in nitrous oxides, sulphur oxides and other impurities of to-be-supplied coal seam gas, sourced from varying deposits and basins. This is not an inconsequential issue. Coal seam gas is extracted from coal seams and will reflect the level and kind of impurities of the coal that is being fractured (in-situ) in the extraction process [10]. Without wanting to be alarmist it should be pointed out that NSW coal is known for average concentrations of Naturally Occurring Radioactive Materials (NORM's) – Uranium, Thorium and Radon to mention a few – that are 2 to 10 times higher than Queensland coal [11].

Background level NOx

The Plume study by SDA ENGINEERING used a background level for nitrous oxide of 75.6 microgram/m³. However the latest Capital Territory Ambient Air Quality Report (2006) [12] details a background level of 0.044 ppm for 2006. Average background level for the period 1998-2006, the 2003 bushfire year excluded, is 0.04375. The 2006 value of 0.044 ppm therefore is quite representative. The two above values equate at standard P & T to 90.32 microgram/m³ and 89.9 microgram/m³ respectively. Taking 90 microgram/m³ as representative, and substituting this for the value of 75.6 used in the plume study makes for a worst-case scenario that exceeds the NSW EPA maximum by more than 14 microgram/m³. This is totally unacceptable, the more so because the NSW EPA maximum (246 microgram/m³) exceeds maxima set by other states in Australia and countries overseas.

Sulphur dioxide emission data not provided

The DA and PA documents provide no data on sulphur emissions. Yet coals seam gas is know to contain sulphur and SO₂ formed from burning of coals seam gas is a known contributor to formation of acid rain. Provision of data on SO₂ emissions is essential to ascertain acid rain potential within the ACT, surrounding NSW and the Kosciusko and Namadgi National Parks. See my point above on acid rain.

Turbine emission specifications at 630 m altitude

It is unclear whether the DA emission data are based on actual performance data of the Titan turbines at an altitude of 630 m or whether they are extrapolated from operational observations at lower altitudes. If the latter, what are the expected error ranges and confidence levels for emissions?

Dangerous topography

The proposed Tuggeranong site is near the upper parts of three populated valleys – Jerrabombera, Tuggeranong and Woden – and close to Isaacs Ridge. This is an unusual and inadequate site and could be considered as one of the worst possible locations for a power plant. Fossil fuel power plants are generally located on open plains for best control on size and shape of the exhaust plume and expanding plume head. Possible effects of eddies, downwind of Isaacs Ridge, for trapping of nitrous oxides and incomplete combustion of toxic gases have not been addressed in reports filed for consideration by the Community or ACTPLA. The presence of secondary ridges – shooting from Isaacs Ridge, between Macarthur and Fadden, between Fadden and Wanniasa and between Wanniasa and Farrer – further increases potential for eddy formation and gas entrapment.

You do not have to be a rocket scientist, or even a mere rock scientist, to appreciate the dangers of eddies. Downwind eddy-potential of the Tuggeranong site, with its highly unusual topography for a polluting power plant, warrants detailed, on-site, study of expected concentrations of nitrous oxides and sulphur oxides at ground level, of potential for incomplete combustion of carbon monoxide trapped within eddies, and of potential for eddies to preferentially dump heavy NORM elements at ground level.

Pressure on airport noise corridor and flight paths

The plan does not contain a risk assessment of thermal turbulence to commercial and private aviation. The plant is designed for frequent stop-start operations and may well be called upon to operate, frequently, unscheduled, at peak power. Yet there is no assessment whether/how thermal turbulence from the plant will affect private and jet flights in and out of Canberra Airport. The plant will be located about 2 km from the western edge of the Canberra Airport noise corridor, about 3 km to the west of the departure trajectory and about 4 km to the west of the landing trajectory. Any substantial thermal turbulence risk will push aircraft movements away from the western part of the noise corridor. Proposed residential development in Tralee, Environa and the Poplars, outside control of the ACT government, will increase pressure to limit aircraft movements in the central and eastern parts of the noise corridor. The unavoidable effect will be increased noise pollution for Jerrabomberra residents and the wider Canberra community.

Affects on flight path and Canberra-Queanbeyan noise sharing

The exhaust plume and spreading plume head may affect plane movements and noise sharing across Canberra and Queanbeyan. The Tuggeranong site is 2.4 km from the western edge of the Canberra Airport Noise Corridor [13], about 3.5 km from the main airport departure trajectory and 4.7 km from the main landing trajectory [14][15]. Planes may have to avoid the western edge of the corridor in order to avoid turbulence and pollutants within the plume head (if not, frequent flyers may soon start referring to the customarily experienced shake and smell as the Canberra-Hump-And-Dump and to Canberra as the Humpty-Dumpty Capital). However, extended and frequent use of the central and eastern parts of the corridor is already under threat by the proposed developments of Tralee, Environa and The Poplars [16] – within NSW and outside direct control of the ACT government. Pressure may increase for noise sharing across Canberra and Queanbeyan.

Security of location

ActewAGL told the Tuggeranong community at a briefing of concerned residents (28/4/2008) about possible security requirements for the data centre. Data from the Department of Defence could be stored there amongst others. Is a site opposite the Mugga Lane landfill really secure? This landfill has an extensive network of pipes, burrowed through the landfill for extraction of methane. This is environmentally beneficial, but also dangerous as a ready-made terrorism target. The network of pipes could easily be used in reverse to pump an explosive mixture through the landfill or to dump explosives directly down the pipes – a worrying prospect for an adjacent 2 billion dollar plant complex and its gas mains. Preventive plugging of the pipes has downsides too. It would remove a potential methane-generated energy supply for the power plant. The landfill site, thoroughly primed for flow, would keep accumulating methane, a greenhouse gas with more than twenty times the potency of CO₂.

Power requirements

The planning documents fail to properly point out the power requirements for the data centre and for the ACT that would justify construction of a 210 eMW power plant. In absence of such justification, and with apparent up-scaling from a supposed previously proposed power plant in Hume proper, the proposal reeks of stacking as many power modules on the proposed Tuggeranong site as ActewAGL can get away with under health and safety regulations. Surely there must be better justification to risk live and well-being of the Canberra and Queanbeyan populations rather than the maximising of ActewAGL's corporate profits and a flawed health risk analysis.

Cogeneration myths

The article in the Financial Times London (14/05/2008), reprinted in the Canberra Times (24/05/2008, News p11) sheds a different light on what may have prompted the cogeneration of power plant and data centre, promoted as essential by ActewAGL. Rather than being an established essential requirement "Jeremy Green, principal analyst at Ovum, says that while the idea of siting energy-intensive activities close to power stations is ""not uncommon"" he believes this may be the first time it has been done with a large data centre". This refutes ActewAGL's argument that co-generation is a vital requirement for the data centre. If large data centres can operate elsewhere without co-generation, then they should be able to operate in that way in the ACT.

The article also states "The decision to site the CTC next to a power station is central to its efficiency. Normally, 10 to 15 per cent of electricity is lost in transmission from the power station to the distribution grid. Because the data centre will draw its energy from the adjacent power station, this energy loss is eliminated". This highlights a more believable reason for co-generation. It indicates that a single preferred client may benefit from increased efficiency and presumably cheaper rates in a sweetheart deal. A deal that is presumably not available to other off-site clients that draw electricity from this station through the grid. The estimate of 10% to 15 % savings in energy is higher than transmission losses quoted elsewhere [Geodynamics] and relates only to the particular client that happens to be on-site. Energy savings of that magnitude are not available to other off-site clients.

The article debunks the myth that co-generation is essential for operation of the data centre and shows it for what it is, just a sweetheart deal with limited overall energy savings for the total of on-site and off-site clients.

Flawed logic in security of energy argument

The proposed power plant is promoted as a secure source of energy during a supply crisis. This argument is dangerously flawed. Times of supply crises are quite likely also times of very heavy pollution. The Canberra bushfire of 2003 is a telling example of this. It is irresponsible planning to have to rely in such crises on maximum output, and consequent maximum pollution, from a polluting gas-fired power plant. Under such conditions, if the background level of pollution itself is not already above the NSW EPA limits, combined background and power plant emissions surely will. Reliance should be on a non-polluting energy source instead. Health officials should be aware!

It is questionable whether it would be legal to construct and operate a power plant that is specifically meant to operate under the very conditions that would make its operation illegal. Lawyers should be aware.

Restrictions on further development

Presence of a power plant that drives pollution up to maximum allowable levels, if not above, will constrain further development in the region, certainly emission-intensive developments. Operation of the proposed Tuggeranong power plant may well pre-empt further developments in the Hume industrial area. It is hard to imagine that this could be the intention of the ACT government. Hume is a designated industrial area and is still in the process of development. The proposed power plant also may restrict light industrial and/or residential developments in the Jerrabomberra, Tuggeranong and Woden valleys.

Renewable energy alternatives

Provision of renewable energy has not been addressed in the Development Application as a realistic alternative to the gas-fired power plant. Conversations with ActewAGL executives during the community briefing of 17/05/2008 make me wonder whether they are sufficiently aware of renewable energy alternatives that are currently available. The ACT government should call for independent advice on renewable energy options. In the opinion, of an experienced geoscientist with an interest in renewable energy, renewable energy can provide the planned 210 eMW in combinations of intermittent and base load power:

- Energy for cooling and heating of the data centre can be provided by a geothermal heat pump system. Geoscience Australia has demonstrated the capacities of such a plant to reduce the energy requirements for a large building.
- A purpose built roof stacked with solar panels can provide the 33MW of power thought required by the data centre, during hours of sunshine. The Tuggeranong site has a total surface of 211,048.3 m². High performance commercially available, solar panels (Solartec [17], base pack, 6 panels over 7.2 m² delivering 1.29KW) can provide 33MW with a footprint of 184,186 m². Solar panels currently under development, eg Prof Andrew Blakers ANU [18], will provide in the near future higher output at lower cost.
- The 210 MW peak output of the power plant can be provided additionally and/or alternatively by base load renewable energy, either through solar thermal plants such as under development at the ANU [19, Prof Keith Lovegrove] or overseas [20, Prof Andrew Mills], or through HFR geothermal plants under development in Australia [21, Geodynamics].

Canberra is the birthplace of the Hot-Fractured-Rock geothermal energy concept, conceived and now being realized by local resident Dr Prame Chopra and former resident Dr Doone Wyborn. Both have long associations with Canberra indeed – ANU graduates, BMR/AGSO employees and ANU Visiting Fellows. Their brainchild has led to an entirely new industry. Starting from scratch and evolving in less than a decade, there are now more than 30 companies exploring for geothermal energy within Australia. Exploration is expanding at astonishing pace – more than \$750 million dollar of expenditure is expected for the coming year – and the world is watching what Australians are pioneering.

Australia is uniquely endowed with geothermal energy resources and provision of 10,000 eMW, coming progressively on stream within decades and sustainable over at least fifty years, is projected from Geodynamics' tenements in the Cooper Basin alone [21]. To put this into proper perspective, this is the output of five large power plants of Hunter Valley size (2000 eMW), about 85% of the total power capacity of NSW in 2005[11], and close to 50 times the output of the power plant proposed by ActewAGL. Geothermal energy is shaping up as a leading opportunity to reach Australia's renewable energy target of 20% by 2020.

The ACT has the opportunity for an enormous PR coup by sourcing its new energy requirements entirely through renewable, Canberra-developed, energy sources: geothermal heat pump system (Geoscience Australia); solar panels (ANU, Prof Andrew Blakers), solar thermal (ANU, Prof Keith Lovegrove), HFR geothermal (Drs Prame Chopra and Doone Wyborn). The ACT can lead the nation by applying local innovations! What a promotion of local know-how and local can-do! What a contrast with a polluting, gas-fired, power plant! If London can become the renewable energy showpiece of the UK [22], surely Canberra as Australia's national capital can do it!

References

- [1] <http://www.garnautreview.org.au>
- [2] http://en.wikipedia.org/wiki/Acid_rain
- [3] <http://www.ec.gc.ca/acidrain/>
- [4] <http://www.sciencemag.org/cgi/content/full/sci:289/5488/2291>
- [5] <http://www.mfe.govt.nz/publications/air/atmospheric-dispersion-modelling-jun04/index.html>
- [6] <http://www.environment.nsw.gov.au/resources/air/ammodelling05361.pdf>
- [7] http://www.cmar.csiro.au/cgi-bin/abstract_srch.pl?_abstract_available_1376
- [8] Hurley P.J. 2006. An evaluation and inter-comparison of AUSPLUME, AERMOD and TAPM for seven field datasets for point source dispersion. Clean Air and Environmental Quality, 40, 45-50.
- [9] Hurley P.J. & Luhar A.K. 2005. An evaluation and inter-comparison of AUSPLUME, CALPUFF and TAPM – part 1: the Kincaid and Indianapolis field datasets. Clean Air and Environmental Quality, 39, 39-45.
- [10] http://en.wikipedia.org/wiki/Coalbed_methane
- [11] http://www.arpansa.gov.au/pubs/norm/cooper_norm.pdf
- [12] http://www.ephc.gov.au/pdf/Air_Quality_NEPM/Monitoring2006/2006_ACT_Report.pdf
- [13] http://www.canberraairport.com.au/an_hnc.htm
- [14] http://www.canberraairport.com.au/an_pfm.html
- [15] http://www.airservicesaustralia.com/reports/nfpms/2002/CBR_Aug02.pdf
- [16] http://www.planning.nsw.gov.au/planningsystem/pdf/bp_irp_qbyn.pdf
- [17] <http://www.solartec.com.au/>
- [18] <http://solar.anu.edu.au/>
- [19] http://engnet.anu.edu.au/DEResearch/solarthermal/high_temp/thermochem/index.php
- [20] <http://www.ausra.com/>
- [21] <http://www.geodynamics.com.au/IRM/content/home.html>
- [22] <http://www.abc.net.au/catalyst/stories/2244790.htm>

Catastrophic release of CO₂

The proposed eight data centres (GC1*3, GC2*3, GC3*2) of Canberra Technology City's Tuggeranong plant all use substantial amounts of liquified CO₂ for cooling. Catastrophic release of this CO₂ may pose substantial dangers for the populations of Jerrabombera, Tuggeranong and Woden valleys. It is not unthinkable for a catastrophic release to occur. Co-generation causes the highly unusual situation that the heat released from generating power and the heat released from consuming this power for cooling the data centres is dissipating at the same location at the same time and will create a substantial heat island at the site (see objection dated 25/06/2008). This poses risks for an on-site generated fire. There are also substantial bushfire risks. Many bushfires have gone through the Long Gully-Mugga Lane area in the past.

Liquified CO₂ will be gassified quickly in a large-scale fire. Such a mass of CO₂ gas may undergo an initial thermal uplift but may soon descend because a CO₂ cloud is heavier than air. The cloud will hug the terrain whilst descending towards the lower parts of the topography where it will accumulate. CO₂ in substantial concentration is lethal.

[1] *"CO₂ gas has a slightly irritating odor, is colorless and heavier than air. It cannot sustain life."*

[2] *"According to occupational exposure and controlled atmosphere research into CO₂ toxicology, CO₂ is hazardous via direct toxicity at levels above 5%, concentrations not encountered in nature [except perhaps at or near an active volcano or at water-logged soils]. At these high levels there is risk of death from carbon dioxide poisoning. At lower levels there may health effects and there certainly are complaints of exposure at lower levels."*

[3] *"According to the Australian Maritime Safety Authority, "Prolonged exposure to moderate concentrations can cause acidosis and adverse effects on calcium phosphorus metabolism resulting in increased calcium deposits in soft tissue. Carbon dioxide is toxic to the heart and causes diminished contractile force. At concentrations of three per cent by volume in air, it is mildly narcotic and causes increased blood pressure and pulse rate, and causes reduced hearing. At concentrations of about five per cent by volume it causes stimulation of the respiratory centre, dizziness, confusion and difficulty in breathing accompanied by headache and shortness of breath. At about eight per cent concentration it causes headache, sweating, dim vision, tremor and loss of consciousness after exposure for between five and ten minutes."*

A chilling example is the death of more than 1700 people in the catastrophic CO₂ release from Lake Nyos in Cameroon in 1986 [4][5][6][7].

In previous submissions it has been pointed out (see objections dated 26/05/2008, 25/06/2008) that the particular location of the Tuggeranong plant, in the higher part of Jerrabombera Valley and near the upper parts of the Tuggeranong and Woden valleys, is dangerous for polluting and toxic gasses. Jerrabombera Valley is primarily at risk from a directly descending CO₂ cloud. Tuggeranong and Woden valleys are at risk from a descending CO₂ cloud that is first lifted across Isaacs Ridge. Ridge-related pollution hotspots identified in the CALPUFF study (see objection dated 25/06/2008), eg Macarthur-Fadden, Wanniasa, Mawson-Farrer with a pollution spur towards Garran, Upper Mugga Lane and Hume, are particularly at risk.

It is doubtful that much pre-warning can be given for catastrophic CO₂ gas release and descend of a CO₂ cloud. It is even more doubtful that entire valleys can be evacuated in time. This dangerous situation should not be allowed to develop. Data centres with liquefied CO₂ cooling should be located in the lower parts of a valley, well away from ridges and watersheds where catastrophically released CO₂ clouds can be lifted into adjacent valleys. CO₂-cooled data centres should not be allowed at the dangerous Tuggeranong location.

Recommendations

- Ascertain potential for catastrophic CO₂ release as part of a full and independent Environmental Impact Study.
- Ascertain dangers of a catastrophic CO₂ release for the populations of Jerrabombera, Tuggeranong and Woden valleys.
- Ascertain potential for co-locating the Tuggeranong and Belconnen data centres with the proposed Williamsdale power station and ascertain potential for catastrophic CO₂ release against local topographic conditions and local populations.
- Ascertain potential for alternative cooling through extensive use of geothermal heat pumps (see objections dated 26/05/2008 and 25/06/2008).

References

- [1] <http://www.airliquide.com.au/prodserv/propgases.php>
- [2] <http://www.inspect-ny.com/hazmat/CO2gashaz.htm>
- [3] http://en.wikipedia.org/wiki/Carbon_dioxide
- [4] http://en.wikipedia.org/wiki/Lake_Nyos
- [5] http://www.geology.sdsu.edu/how_volcanoes_work/Nyos.html
- [6] <http://www.newscientist.com/article/mg13518344.400-the-deadly-cloud-hanging-over-cameroon-a-lethal-gas-bubbled-up-from-the-bottom-of-lake-nyos-six-years-ago-killing-thousands-of-people-and-livestock-years-of-study-have-revealed-why-but-the-risk-of-disaster-remains-.html>
- [7] <http://www.snopes.com/horrors/freakish/smother.asp>

Conclusion

The community is in no doubt that GHD, the government, ActewAGL and TRE will not consider this response, nor any other response, which does not accept their point of view or deliver a supportive message in respect to their development ambitions.

The community has consistently provided sound, expert and reasonable reasons detailing why this development should not be allowed to advance on this site. These have all been ignored, minimised or in unsubstantiated ways - refuted. In the case of the concerns expressed to the specific expertise of the HIASG – the government’s response was to sack the HIASG.

Unlike the community, the proponents in this matter have benefited in an extraordinary way from the unswerving and vocal support of the Chief Minister to their development plans. As detailed within the Auditor General’s report, this support is all the more extra-ordinary when it is considered that it commenced very early in the life of the project – before the format of the consortium was determined, before a business case was filed and before the development itself had been settled upon – and continues in the same, unswerving way to the present – despite there still being no cost/benefits analysis filed and despite it being clear that this development does not singularly fulfill the needs of the Territory.

Michael Costello, the current CEO of ActewAGL wrote in the Australian last year, commenting on the 2020 Summit, that we should “*not focus on the immediate at the expense of what is important*”. Sadly this is exactly what ActewAGL, the government and these proponents have done. They are caught in their own rhetoric and ambition and have lost sight of the importance of bringing the community with them on projects, of ensuring that sound planning laws protect the environment and the community and have in the pursuit of achieving their development ambitions abused and manipulated the planning system.

Mr Stanhope had the hypocrisy to chastise other party political MLA’s from maintaining their election promises and demanding this development does not go ahead on this site, claiming that exercising this power was politicising the planning process.

That he is no stranger to using a majority in the Assembly to legislate a way out of planning difficulties has been clearly forgotten.

Any other private real estate development faced with enormous public rejection, site selection and process difficulties, 21 flaws found in the ACTPLA Evaluation and the prospect of battling in a court to determine whether the definition is rightfully applied to the development, would have resulted in the project being dismissed by the planning authorities long ago.

This development however shades under the patronage of the Chief Minister.

Dealing with the community and the protections contained within the planning laws have clearly become too difficult for the ambitions of the Chief Minister and, as he did in the Gungahlin Drive Extension, when faced with public rejection – he has now decided to legislate a path through to achieving his aims.

To this end Mr Stanhope tabled the *Development Application (Block 20 Section 23 Hume) Assessment Facilitation Bill 2008*.

To summarise this Bill, Mr Stanhope proposes to move an unknown and undetermined development, via the merit track, on to Hume Industrial Block 20 Section 23 – despite that this development may contain a gas fired power station of now unknown size and this legislation places no limitations on this development – Mr Stanhope has taken the precaution of removing the ability to appeal decisions made under this legislation and of changing the definition of the Territory Plan to allow this development to call itself a communications facility.

He has gone further and allowed the development of anything, anywhere, provided it is claimed to support the main development on Hume 20/23.

Mr Stanhope has included in the preamble to the Bill the statement that this development is important to Canberra.

For any MLA to honestly and with integrity support this Bill without asking for these offending clauses to be removed would be a travesty of their role and responsibilities as elected, accountable representatives of the citizens of Canberra.

Resulting from this legislation, if passed as proposed on Thursday 11 December 2008 after being filed on Tuesday 9 December 2008, will be the confusion of what to do with the GHD “EIS” and what to do with the community response to this EIS.

The government intends to merit track the new development without the need for any protective reports or survey’s attached. It has already commented on the concept that the development will be able to “take with it” the reports and surveys already completed.

The community finds this extra-ordinary and therefore states that this response to the GHD opinion (EIS) relates only to this opinion (EIS) and cannot be transferred to another development on another site.

Of equal importance are the concepts around this process and at what point would the government ever feel able to acknowledge or engage with the community. Within the Auditor General’s report, government agencies commented that they should keep the public at arms length so as not to expose the department to an accusation there was favouritism. It is sad that whilst attempting to appear unbiased, the reality was very clear that they had formed allegiances with the proponents and that they had already identified their own needs with those of the private real estate developers – and that appears to have continued un-checked.

The community has once again been placed in the stressful and virtually overwhelming position of having to consider the Auditor General’s report, the proposed Legislation to move the development and respond to this opinion (EIS) over the next two days.

Despite requesting assistance, support and guidance from the Chief Minister and the Minister for Planning Mr Andrew Barr, by writing and emailing innumerable times over the last three weeks, the community has not received an acknowledgement, response or consideration to any of these reasonable requests. Comparing this silence and isolation to the immediate and active responses given to the proponents in this matter, it has come as a shock to many members of the community who are now actively and realistically contemplating the evidence that the government has placed the interests and needs of a private real estate consortium above considering or addressing the needs and best interests of members of the community.

Neither Mr Stanhope or his deputy Ms Gallagher appear to be able or willing to acknowledge that there is now a large portion of the community who feels isolated and disenfranchised from government in a very fundamental way. They feel that the government has been able to place the best interests of a private real estate developer above the needs, views and best interests of the community – for no other reason than it appears impossible for this government to step back and admit mistakes and re-focus on the community.

CPR Inc. relies on all the previous submissions filed within these proceedings and would like to also endorse and rely on the Auditor General's report as supporting the poor process, mismanagement and isolation felt by the community because of the poor way this process has been managed.

CPR Inc. remains clear that building a gas fired power station on this piece of Broadacre is immoral, inappropriate and unnecessary.

We have reviewed and studied the data carefully and drawn upon the experts who live in the community to assist with this.

CPR inc and many members of the community have been hampered by the lack of will within these proponents and the elected politicians to address the difficulties with community consultation and it appears have settled to not attempting to address or engage the community. The lessons regarding community consultation remain unaddressed.

This GHD opinion (EIS) is a classic example of how the same mistakes have continued to be made within this process. The report is unavailable in Tuggeranong, too large to download onto a small home computer and too heavy for most older people to carry home. It is huge, unwieldy, full of impenetrable technical jargon and should anyone in the community be brave enough to explore the tone and contents, they would be hard pressed to find any balance, acknowledgment or concession for the community within the report.

It is clearly not the purpose or intent of this government or these proponents to create a community focus to their work or to attempt to ameliorate the concerns of the community, in a practical or realistic way.

The intention is clear – to conform to the barest minimum and considering the government is determined to push this through there is no question of having to actively and with integrity address the views of the community

CPR Inc therefore files this response as it has all the other responses.

It is immoral and inappropriate to select a site for the development of a gas fired power station – privately owned – within 440 metres of a residential facility and 660 metres from established residents. Even if every test determined pollution would fall within acceptable WHO limits, the community notes that none of the plume studies or surveys around pollution has included the new turbines at the Canberra Airport.

The reports contained with the GHD opinion (EIS) do not contain any new information for the Development Application. Where there is an obvious gap, which requires filling – the community notes that GHD went to other sites in Australia to gather information. These were unfortunately at differing times of the year, several years ago.

The community noted that despite this being a consistent flaw within the first two applications made by ActewAGL and TRE, GHD have chosen not to address it here in the draft EIS. Instead the community notes the GHD, as the proponents did before them, have manipulated background levels to suit their purpose, and included data just after the bushfires which is hardly typical for Canberra but provides a background which is favourable to the clients rather than the best interests of the children.

CPR therefore recommends that this development on this site does not progress.

Of great concern to the community is the undue haste in which Mr Stanhope is pushing through his legislation to move this development from the Tuggeranong site to the site in Industrial Hume, and of course the added advantages and powers he is taking efforts to incorporate into this particular Bill for this particular development.

Mr Stanhope filed this Bill on the first day of sitting 9 December 2008 and wants it passed today on 11 December 2008. The final day for submissions for this draft "EIS" is 12 December 2008.

On the 12 December 2008 therefore it is completely possible for the Minister to do his duty and dismiss this development application.

Mr Stanhope has known since the election results in October that there was now no legitimate way this development could advance on Block 1671 in Tuggeranong. The power to exercise any authority in the Assembly is vested by the support of the majority of the Assembly, which this development on this site does not have.

Indeed it would be more truthful to say that had this development been without high level political interference and support from Mr Stanhope, it would have been rejected:

- by Mr Stanhope and his Cabinet when they were first asked to consider and support a project that did not have a settled business plan, filed no cost benefits analysis, did not have a financial feasibility plan, and closely involved ACTEW and therefore risks to the Territory, as well as involving a core proposal which constituted (and still constitutes) creating the single most polluting development to be built in the Territory
- by ACTPLA when the proponents first requested such profound and all encompassing changes to their application to be accepted as "alterations".
- by ACTPLA when the results of the community responses had been finally considered and compared to the proponents submissions
- by ACTPLA when they compiled their evaluation of the PA and found 21 flaws
- by the government and ACTPLA when they considered and received the considered legal opinion which set out why this development did not fit the definition of a "communications facility" [see the Auditor General's Report which details how the proponents and government have again misled the community when they responded to the release of this legal opinion by claiming they had their own – which they felt safe relying on]
- by the Minister when he considered the 21 flaws from ACTPLA - *at which time he should also have considered the submissions from the public and the interim concerns beginning to be voiced by the Expert panel HIASG*
- by the Assembly MLA's - when they have honestly considered the entire merits against the obvious costs to the community – rather than become caught up in the bizarre unsubstantiated rhetoric of this particular development being vital to the future of the Territory.

The community is therefore suspicious of Mr Stanhope's legislation. Mr Stanhope has been a very real and powerful advocate for this development, despite, as detailed in the Auditor General's report, not having any proof or reason to trust the

claims that this proposal brings benefit and being keenly aware of the expert reports and passionate feelings expressed by the community in rejecting this proposal.

The community is confident that should anyone with independence and expertise in development planning who considers this matter, in its entirety, with a focus on the best interests of the Territory and its inhabitants rather than one elite private real estate development, would consider it a sound judgment to now reject this development application. The expectation would then be for this consortium to compete, legitimately without advantage or high level political patronage, with every other data warehouse developer in the Territory in filing complete, well thought out, sound and considerate planning applications.

What Mr Stanhope has created with this Bill is:

- a backdoor way of fast tracking and legitimising a planning application which should have been rejected from the start for its lack of sound and considerate planning.
- he has legitimised an incorrect and unintended use of a definition within the Territory Plan.
- he has opened up the possibility that this development now has no limits to scale, purpose, site and concept and
- he has removed any potential for the community or industry competitors to object or appeal.
- he has used this Bill to increase the power of this development to merit track and to reduce the power of the community to be involved in a meaningful way
- he has removed the ability for anyone in the Territory to appeal to an external independent quality control or auditor such as the courts in respect of this development
- he has given a clear message to business that the Territory will favour some developments over others and will not allow open, legitimate competition against business within his patronage.

Mr Stanhope is doing this before 12 December 2008 thus removing the prospect of someone pointing out that it would be completely credible and justified and reasonable for the Planning Minister to reject this development application on 13 December 2008.