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PARLIAMENT OF TASMANIA

PARLIAMENTARY STANDING COMMITTEE ON PUBLIC WORKS

Natural Gas Energy Solution for the Launceston General Hospital

Presented to His Excellency the Governor pursuant to the provisions of the Public Works Committee Act 1914.

MEMBERS OF THE COMMITTEE

Legislative Council	House of Assembly
Mr *Harriss* (Chairman)	Mr *Best*
Mr *Hall*	Mrs *Napier*
	Mr *Sturges*

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INTRODUCTION

To His Excellency the Honourable William John Ellis Cox, Companion of the Order of Australia, Reserve Forces Decoration, Efficiency Decoration, Governor in and over the State of Tasmania and its Dependencies in the Commonwealth of Australia.

MAY IT PLEASE YOUR EXCELLENCY

The Committee has investigated the following proposal: -

Natural Gas Energy Solution for the Launceston General Hospital

and now has the honour to present the Report to Your Excellency in accordance with the *Public Works Committee Act 1914*.

BACKGROUND

This proposed development aims to take advantage of the introduction of natural gas into Tasmania. The Launceston General Hospital (LGH) wishes to capitalise on this opportunity by converting the current LPG appliances and hot water heaters, plus replacing the heavy fuel fired steam boilers in the East Wing (Laundry) which need to be replaced within the next five years. In addition the LGH is also installing a natural gas powered co-generation plant which will enable the LGH to generate a majority of its own energy needs (up to 80%) which will give the LGH more long term cost saving benefits as well as the ability to continue providing health care services to the public in times of power outages.

Primary Objectives

The primary objectives are to:

- provide a cost effective natural gas alternative energy source for the LGH;
- install a co-generation plant to produce electrical power in the West Wing and remove risk to service continuity in the event of prolonged or unplanned power outage;
- install two new natural gas steam boilers to replace old heavy fuel boilers in East Wing to operate laundry equipment;
- refurbish the boiler house and remove the associated chimney and fuel tanks;
- establish a long term, secure supply of natural gas to the LGH;
- realise the financial benefits identified in the project business plan; and
- establish a long term performance based operation and maintenance agreement for the co-generation plant.

Benefits

Benefits of the project will be to:

- reduce recurrent expenditure on energy costs;
- provide flexibility in source of energy;
- generate own electrical energy;
- improve emergency energy capacity;
- eliminate pollution and contamination problems in the East Wing that impact on the environment;
- improve visual amenity with removal of existing East Wing chimney (which is a condition required by the Department of Economic Development in order to facilitate the sale of the old LGH site);
- a solution for the replacement of the oil fired boilers in East Wing; and
- remove LPG vessel which will reduce risk to hospital and make urgently required space available for increased parking on the main Hospital site.

General Scope

The general scope of the project will consist of the following:

- system design and costing;
- planning and development including co-ordination and approvals;
- procurement of construction services and capital equipment through appropriate tender processes;
- establishment of a Gas Distribution and Supply Agreement (GDSA) with distributor;
- securing of appropriate retail gas supply agreements through an open tender process;
- conversion of the existing LPG fired hot water heaters to natural gas;
- conversion of the kitchen appliances from LPG to natural gas;
- removal of LPG vessel from the hospital site, plus removal of associated infrastructure, services, footings and enclosure, making good and increasing the available parking area;
- installation of two new natural gas 3MW steam boilers to replace the ageing boilers in existing East Wing boiler house;
- modification to existing boiler house, including removal of asbestos to accommodate new boilers;
- removal of underground heavy fuel tanks and demolition of the existing boiler house chimney, clean up and refurbish site;
- installation of a 1.8MW co-generation plant in West Wing (main Hospital);
- modification of the existing energy system and facilities to integrate the new co-generation plant, plus removal of redundant plant equipment; and
- ensure the hospital has the capacity to automatically revert to use of external electricity supply, including necessary infrastructure.

Site Considerations

The West Wing will house the natural gas co-generation plant in its existing level one plant room.

Full consideration has been given in relation to the size of the proposed co-generation plant to ensure that full accessibility to the plant room is available. Engineering consultants have confirmed that the co-generation plant will fit through the access door and that adequate space is available.

Connection to the main natural gas line work should have minimal interruption to road traffic and visitor parking access.

When the conversion is complete and the current LPG vessel is removed there will be increased parking capacity on the main hospital site with an extra eight car parking spots available. This is a significant gain for the hospital as considerable demand for parking currently exists.

The East Wing will house the new steam boilers within the current boiler house. GHD engineers have inspected the boiler house and have determined the scope of refurbishment work required.

The refurbishment work will include the following:

- removing asbestos ceiling and replace with cement lining;
- removing asbestos pipe insulation;
- replacing East wall with infill panels including demountable sections & glazing;
- adding ventilation louvers to east and west walls;
- replacing glass roof section;
- adding new non-combustible doors;
- replacing old with new guttering, painting walls etc;
- doing any general building work as required; and
- removing chimney.

Part of the recommendations to facilitate the sale of the old hospital site is to remove the boiler house chimney which will be performed under the scope of this project.

NEED FOR THE PROJECT

General

In general, there is a need to ensure that the LGH operates in the most efficient and cost effective manner possible. The Hospital's duty of care policy requires the ability to continue to function when wide area power outages occur, caused by storms, high winds or other unplanned events.

The ability to generate its own electricity by a natural gas co-generation plant would lessen the hospital's reliance on external electricity supplies, while at the same time enable it to revert to use of external supplies, if required.

Replacement of the current steam boilers in the East Wing is an essential requirement and will need to be done within the next five years with increasing risks of failure if this project were not to proceed. Replacing them with natural gas boilers would be an economical option in the current fuel market.

Changing Energy Resource Needs

The introduction of natural gas into the State has afforded the LGH a unique position to select the most economical energy solution available to Tasmania.

By converting to the cheaper natural gas alternative, upgrading boilers to natural gas and installing a co-generation plant, the LGH would be utilising the most efficient and economical form of energy available in the State at this present time. This conversion would also ease our reliance on external electricity supplies.

The reduction in costs will be achieved through the price difference between natural gas, electricity and liquid fuels, taking into account the anticipated change in prices for these commodities in the future. On a conservative basis, the price for electricity is anticipated to increase by CPI plus 1% and liquid fuels CPI plus 2%. Under the proposed distribution and supply agreements, the price of natural gas will increase by no more than the CPI; hence the anticipated reduction in energy expenditure.

Strategic Direction

The development of this project supports Tasmania Together primarily through its environmental benefits. In particular the project supports standard's 7, 8, and 12 of the section entitled "Our Environment".

This project also aligns itself to the Department of Health and Human Services Corporate Plan 2003-2006, specifically point twelve "Improving the Service System Capacity". In order to achieve this goal within the Strategic Priorities, a safe, reliable and economic energy system is required.

In order to achieve the goals outlined in the Launceston General Hospitals Strategic Plan 2006-2010 'Our Future Direction, Towards 2010' and the 'Strategic Asset Management Plan' (SAMP) it is critical that the hospital has the most cost effective energy solution available. The Natural Gas Project would allow the LGH to meet this objective in the most cost effective manner.

Use of Existing Accommodation

Consistent with the SAMP and in line with the objective of ensuring the most effective use of available assets, it is planned to utilise existing accommodation for the major components of the project. The new boilers will be housed in the existing boiler house in the West Wing with the co-generation plant to be housed in the level

one plant room of the LGH East Wing. No new buildings will be required for this project.

Summary of Project Outputs

This project will deliver the following outputs:

- long term Gas Distribution Services Agreement;
- long term Gas Supply Agreement
- long term operation and maintenance agreement for co-generation plant;
- construction works;
- procurement and installation of co-generation plant in West Wing;
- conversion of boilers in West Wing to natural gas;
- removal of existing LPG storage tank in West Wing;
- conversion of kitchen gas appliances;
- installation of natural gas fired boilers in East Wing;
- removal of old boilers, chimney stack and fuel tanks in East Wing; and
- value for money.

Maximising Value through Approach and Design

Use of Existing Building Infrastructure

Through the use of current building infrastructure, the Department has been able to eliminate any costs associated with new construction. The co-generation plant will be housed in the existing level one plant room of the main hospital building and the existing boiler house will be utilised to house the new boilers.

Staging

The project is to be implemented in stages to ensure the installation of plant equipment (steam boilers and co-generation plant etc) and the conversion from LPG to natural gas will have minimal effect on patient care.

Stage 1

- establish gas distribution and supply agreements.

Stage 2

- connect West Wing of the Hospital to the main natural gas line, supplied by Powerco Pty Ltd;
- convert LPG appliances in the kitchen and heaters;
- removal of the existing LPG vessel and refurbishment of the site;
- refurbish old boiler house and remove asbestos;
- installation of two new natural gas boilers in East Wing's current boiler house;
- connection of East Wing to main natural gas line;
- dismantle and remove existing chimney stack ; and
- removal of existing under-ground heavy fuel tanks and site refurbishment works.

Stage 3

- installation of a co-generation plant in the West Wing;
- connection to main natural gas line;
- integration of the new co-generation plant into the hospital's existing power network;
- conversion to Natural Gas; and
- converting to natural gas alone would be, in itself, a very productive cost saving exercise for the LGH. By replacing the heavy fuel steam boilers and installing a co-generation plant will only enhance the efficiencies and other benefits achieved by the LGH.

Replacing Steam Boilers

The current heavy fuel steam boilers, located at the East Wing supply the steam for the laundry. These boilers need to be replaced within the next few years, as they are more than thirty years old and have just about come to the end of their functional operational life. Cost estimates for replacing the boilers alone is in the vicinity of $540,000.

Installing a co-generation plant will enable the LGH to generate approximately 75% to 80% of its own energy, including electricity and steam generation for heating water, which lessons the burden on the existing hot water heaters and enables reduced energy expenditure.

COST

Cost Reductions

By converting the LGH to natural gas, replacing the boilers and installing a co-generation plant, significant reductions will be achieved on energy expenditure at the LGH (see tables below).

It is anticipated that a reduction in energy costs of approximately $20.818 million will be achieved over a fifteen year period. This reduction in expenditure is based on conservative cost escalation rates for electricity of CPI plus 1% and for liquid fuels of CPI plus 2%.

Aurora's electricity prices have been increasing over the past twenty-four months and in the last twelve months it has increased by CPI plus 2%. Going forward it is expected that electricity prices will increase by CPI plus 1%. This projection is based on an expected annual increase of 9% in transmission charges (as approved by ACCC) and tightening of the supply and demand conditions in the Tasmanian market.

Expenditure trends for LPG indicate the possibility of costs increasing by CPI plus 5%. To be conservative, cost escalation of CPI plus 2% for LPG has been assumed.

A CPI of 3% was used in the cost modelling, even though CPI is currently running at closer to 4%.

Scenario 1
Electricity price escalated by CPI +1%
Liquid fuels escalated by CPI +2%
Reductions $'000

Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
885	941	1000	1063	1129	1198	1271	1348	1430	1516	1606	1702	1802	1908	2020

However it is anticipated that price escalation rates for electricity of CPI plus 1% and for liquid fuels of CPI plus 5% are possible. Under this scenario, over the fifteen year project period it is anticipated that energy expenditure would be reduced by $28.015 million by converting to natural gas.

Scenario 2
Electricity price escalated by CPI +1%
Liquid fuels escalated by CPI +5%
Savings $'000

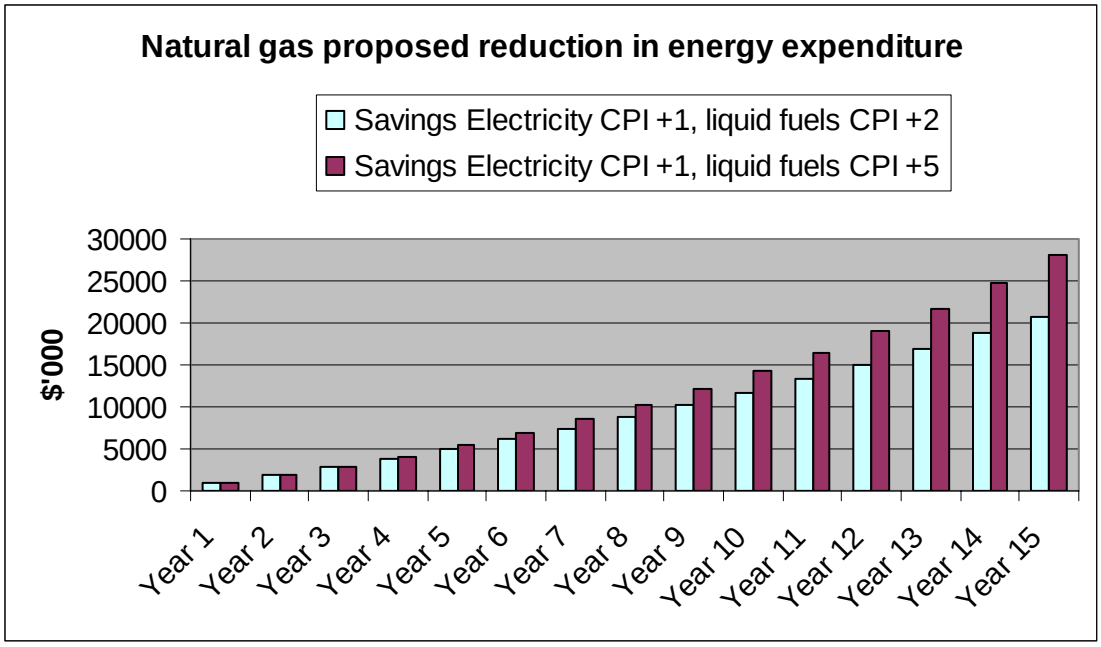
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14	Year 15
885	980	1083	1195	1316	1447	1590	1744	1912	2094	2290	2504	2735	2985	3255

Capital Payback

On Scenario 1, the payback period for the project is 3.98 years.

Expenditure on the project will be identified and accounted for separately within the Department's general ledger and will be funded through its operating account using revenue generated by the Department but not paid into the Consolidated Fund. The accounting for this project will not affect the level of funds against the Special Deposits and Trust Fund, which are fully accounted for and recognised by the Department in a ledger specifically created within the Department's Finance System. All trust account obligations are cash backed by the Department to ensure that it meets its fiduciary responsibilities.

The capital and other establishment costs of the project will be paid back over five years in equal instalments of $773,400 per annum through cost savings from the project, leaving the LGH with a reduction on expenditure of $16.951 million over the fifteen year project period.



Non financial-Benefits

- provide flexibility in source of energy;
- improve emergency energy capacity as currently the Hospital only has 20% emergency power backup instead up to 80% provided by the project;
- improved visual impact with removal of existing East Wing chimney;
- a solution for the replacement of the oil fired boilers in East Wing;
- elimination of pollution and contamination problems that impact on the environment;
- removal of LPG vessel which will reduce risk to the hospital and make space available for parking;

PROJECT COSTS

Capital Equipment + Installation + Refurbishment + Fees	$'000
Co-generation plant + works	$2,206
Steam plant + works	$929
Conversion of appliances	$85
Removal of LPG vessel + works	$20
Project development	$250
Legal / consultants	$170
Existing boiler room works	$182
Building Management System (BMS) computer integration	$25
Total project costs	$3,867*

* The cost estimate of $4.4 million detailed in the Message from His Excellency the Governor-in-Council was based on the most accurate cost estimates available at that time. Subsequent to the Minute two events reduced the cost estimate:

a) A decision was made to not demolish the current boiler house which saved the project $500,000;
b) The consultants GHD submitted updated cost estimates for the project which achieved a further reduction of $33,000.

Other Expenditure

In addition to the above costs a long term comprehensive agreement will be established for operation and maintenance of the co-generation plant. The cost of these services is estimated to be $174,000 per annum.

EVIDENCE

The Committee commenced its inquiry on Tuesday, 5 December last. The Committee inspected the site of the proposed works and heard the following witnesses who made the Statutory Declaration and were examined by the Committee in public at Henty House, Launceston:-

- Michael Graver, GHD Pty Ltd;
- Dr Stephen Ayre, Chief Executive Officer, Launceston General Hospital;
- Mr Mark Cahill, Manager Industry, GHD Pty Ltd;
- Richard Lette, Business and Risk Strategy, Department of Health and Human Services; and
- Cameron Matthews, Director of Corporate Services, Launceston General Hospital.

Overview

Dr Ayre provided the Committee with the following overview of the proposed works:-

> *Essentially this is an opportunity at the Launceston General Hospital to convert our gas supply from the LPG system, which is a major issue for us, to natural gas. That has been afforded by the provision of natural gas to Tasmania, which has recently occurred.*
>
> *I think we have a number of problems and issues at Launceston General and some of these are associated with the current infrastructure. The infrastructure is ageing, the hospital is about 30-odd years old. The prime issue for us is in the replacement of our boilers, which provide heat and steam to the linen service. They are in need of replacement and are currently using old technology. They are manned boilers and they use heavy oil, which obviously has pollution effects. With the advent of natural*

gas there was a real opportunity for us to convert, replace the boilers and reap the benefits of the use of natural gas as opposed to heavy oil in that area. At the same time, with the natural gas passing the hospital, we have the opportunity to use natural gas in our heating needs in the hospital and our cooking areas. We have also looked at that and we believe that that will be a major asset to us in converting to natural gas. Natural gas is cheaper and pollution free and is also a safer gas than LPG, as we have heard in our site visit.

The third arm is to improve the capability of the Launceston General Hospital in an emergency situation. Currently in the failure of the electricity supply we can only support the hospital to 20 per cent of its capacity for up to four hours. We believe that with natural gas there is an opportunity to introduce a co-generation plant whereby we can make our own electricity and provide up to 80 per cent of the hospital's needs in an indefinite sense. So, if the electricity supply were to fail in the community, we would still be able to function indefinitely using up to 80 per cent of our capacity. That would essentially make us fully functional because that 20 per cent would be in areas that are really not critical in the hospital.

I think this solution is really a win-win for us in that it provides cheaper energy to the hospital and will also improve the capacity of the hospital in an emergency situation.

Financing of the project

The Committee questioned the witnesses as to how the project was proposed to be funded. Mr Lette responded:-

At any point in time the department carries significant cash balances in its operating account as a result of its retained revenue, which is not paid into the Consolidated Fund. So by utilising that funding we can make the funds available for this project. It is a cash-flow issue for us. Because this project generates significant financial benefits for the LGH, that provides us with the means to pay back those funds into the department's operating accounts. So there is no net impact on the department's operating account.

… The special deposit and trust funds are excluded from the funds that are made available for this project.

The witnesses were asked to expand upon that response as follows:-

***Mrs NAPIER** - So what you are indicating is that the funding is not coming from private patient and other fees and charges*

associated with medical procedures. Where do the funds come from?

***Mr LETTE** - The private patient fees are a particular stream of revenue and are applied against the special deposit accounts. The department earns revenue in a number of ways - I am trying to think of the different revenue sources that we have - bed-day fees is one.*

***Dr AYRE** - The bed-day fees are treated differently from the patient fees, so the bed-day fees go into general revenue. The cafeteria - we provide food services to some of the aged-care facilities so there is income related to that. The linen service -*

***Mrs NAPIER** - I think you provide cook-chill for others.*

***Mr LETTE** - That is another source of fees.*

***Dr AYRE** - We also generate revenue through the linen service.*

***Mr LETTE** - It's not just restricted to the revenue that is generated by the hospital either. It is the revenue generated by the department.*

***Mrs NAPIER** - By the department overall?*

***Mr LETTE** - Yes. As you can imagine, there are various sources of revenue across the department.*

***Mrs NAPIER** - The reason for asking is whether redirecting these funds to a project of a capital nature would detract from ongoing patient deliveries?*

***Mr LETTE** - No. As I said, the intention is that those funds are repaid. There will not be any loss of funds for other purposes.*

Estimated savings

The Committee sought an explanation of the anticipated savings in expenditure on power that may result from the proposed works. Dr Ayre responded:-

We believe that the electricity cost is going to escalate quite significantly with the joining to the National Electricity Market, so these are very conservative estimates. We think it will be much higher.

The Committee put to the witnesses that in reality the 'bottom-line' cost savings over that 15-year period could be more than $21 million, Dr Ayre responded "exactly". Mr Matthews added:-

We probably should note here that we have used CPI of 3 per cent and CPI is currently 4 per cent, so we've tried to be as conservative as possible with our figures.

As to savings in recurrent costs, Dr Ayre added:-

There's a significant improvement because these are unmanned boilers. There are two staff members who are having to run the current boiler as a manned boiler. So that will be a significant saving as well. The maintenance costs initially will be very low but I understand that they are built into the scenario.

Life span

The Committee questioned the witnesses as to the anticipated life span of the project. Mr Cahill responded:-

You would be pretty disappointed if you got less than 20 years out of a modern boiler but they're not quite as good as the old Trevor ones used to be. You're talking about the same time scale, 15 to 20 years, as far as the generator set is concerned. Around about 10 years, you may need to do a bit of a refit on it. A lot of the auxiliaries and so on wear out. But that would come under general maintenance. The arrangement you have put in place for the generator is that it is a build and operate; it is not an own. So the hospital will own the generator, and this goes to Powerco's area but their intention is that the people who put the generator in will also operate it for the life of the contract.

Mr Lette added:-

That reduces operational risk during the life of the project because the company that we acquire the generator from will also enter into a long-term maintenance agreement with them. They will be best placed to be able to maintain that unit.

Contingencies

The Committee sought further clarification of the contingencies component of the works. The witnesses responded as follows:-

***Mr LETTE** - It's the best estimate that could be provided before we go out to the market. There will always be some uncertainty, particularly with something as specialised as co-generation plant. The response we get from the market will change over time so it's very hard to be totally precise with something like this. But certainly this is based on the best information available to us.*

***Mr GRAVER** - You need to understand that it's a design and construct contract so what we've shown you today is in-principle*

works. The supplies of equipment have to be detailed out. They have to come through and say, 'We're going to fit our unit in here and we're going to connect it into this existing infrastructure in the hospital'. Depending on the nature of the agreement, it will affect those workers as well. In terms of being definitive about pricing, that's all contingent on that tender process.

***Mr LETTE** - Some suppliers may have better solutions than others - more cost-effective solutions - so we are leaving some latitude in the specification for the works to enable the people that specialise in this area to put forward what they believe to be the best solution to the set of functional specifications. There will be some flexibility. It is just so that we don't set a particular solution or identify one when that may not be the most cost-effective one available.*

Emissions

The Committee questioned the witnesses as to what would be emitted from the flume. Mr Cahill responded:-

… *Hot air - nothing more than that - is going up the shaft. Then there is an exhaust pipe which discharges at the end of the shaft. Any of the combustion products from the engine will be discharged at the end of the exhaust pipe out the top of the shaft. All that is occurring in the shaft is the warming of the air for cooling purposes. There is nothing worse than hot air in that shaft - that is what is there at the moment.*

… *The intention there is that obviously the tenderers need to include in their tender documents the fuel consumption in the operation of their plant. In comparing the different tenders, you would be looking at the efficiency of operating that piece of plant and that will go for the boilers as well. Over the whole life of the project the actual capital cost is quite small. The energy consumption is where your real costs are, so obviously any efficiency saving you can make up front over the life of this sort of plant is well worth doing. That is why in comparing tenders you do not just look at the bottom line price; you are actually looking at the effect of their fuel consumption as well. That is where you are picking up your efficiencies in looking at one co-gen plant versus the other. It will be not only the capital cost but also the fuel consumption.*

Impact of the operation

The Committee questioned the witnesses as to what sound and vibration impact, if any, would be produced by the plant. The witnesses responded:-

Mr CAHILL *- The intention would be that the plant going in there should have no impact on increasing the noise or the vibration levels within the hospital.*

And further.

Mr CAHILL *- When the emergency generators are running there have been no tests done on the noise levels that I'm aware of.*

Dr AYRE *- It hasn't been raised as a major issue at all. I think people are aware of a noise when they're on but it's not significant. The patient care areas are two levels higher so there is level 3 above the level 2 kitchen service areas. Level 3 is the ambulatory area, the emergency department, so the in-patient areas are another level up.*

Mr MATTHEWS *- The emergency source at the moment is directly below pathology and has a vent that goes outside the hospital, next to pathology. If you are walking outside the hospital you can hear it and you can probably hear it also in pathology, but again, away from the patient areas.*

DOCUMENTS TAKEN INTO EVIDENCE

The following document was taken into evidence and considered by the Committee:

- Department of Health and Human Services, Acute Care Services – Natural Gas Energy Solution for the Launceston General Hospital – Submission to the Parliamentary Standing Committee on Public Works, November 2006

CONCLUSION AND RECOMMENDATION

Through the conversion of the existing LPG and heavy fuel oil equipment to natural gas, replacing the East Wing steam boilers and installing a co-generation plant in the West Wing, the Launceston General Hospital will have the most cost effective energy solution available which materially reduces operational risks, due to the potential failure of a very old steam plant and of power supply outages.

The economics of converting to natural gas, replacing the boilers and installing a co-generation plant as one project will produce the optimum economic and security of supply outcomes. The evidence supports expected operational cost savings in excess of $20m to the LGH over the next 15 years.

The Committee notes that the Message from His Excellency the Governor-in Council specified a project total of $4.4 million but in evidence the Department of Health and Human Services provided an amended budget of $3.867 million. The Committee recommends the project.

Parliament House
Hobart
6 February 2007

Hon. A. P. Harriss M.L.C.
Chairman