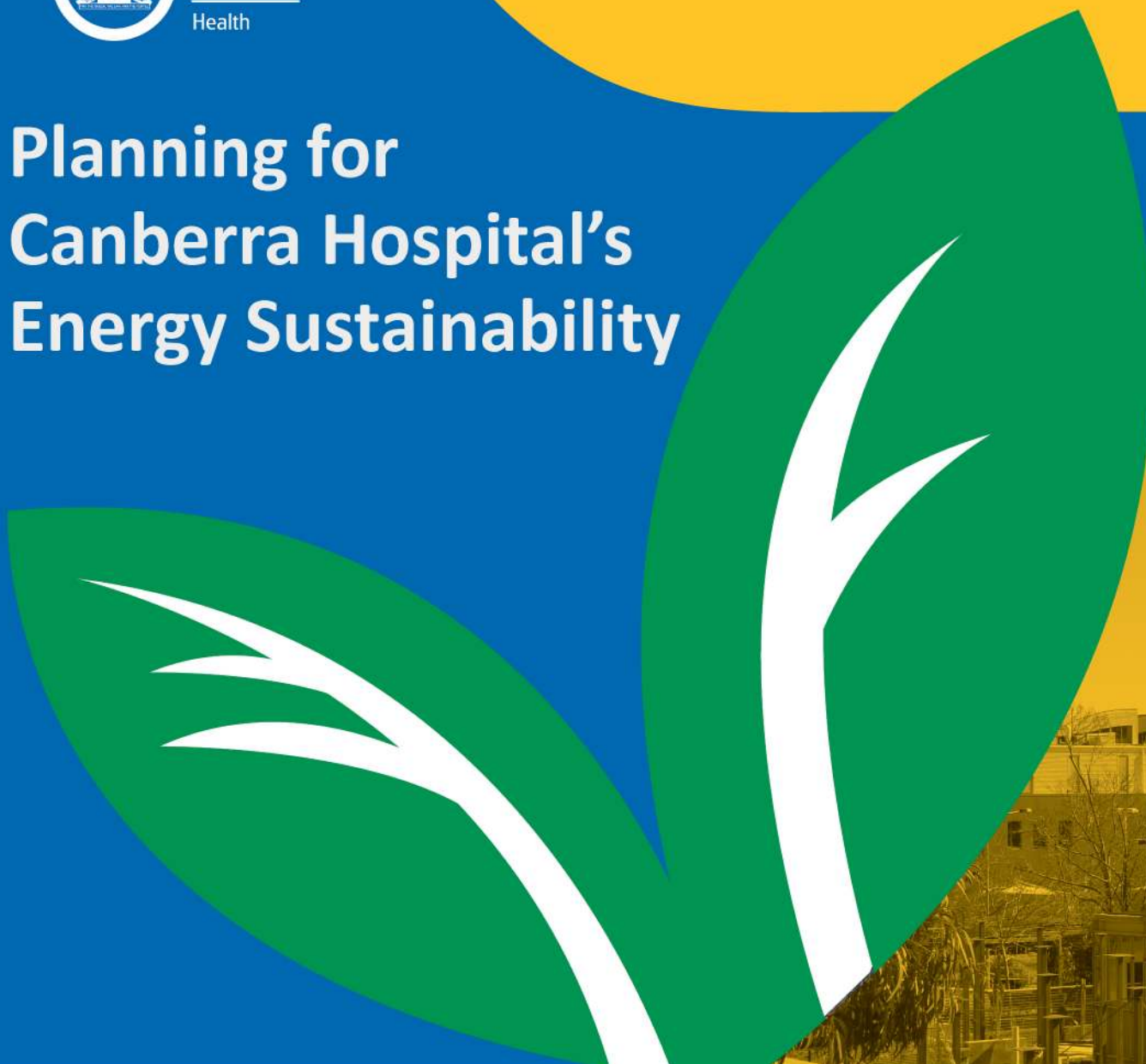




ACT
Government
Health

Planning for Canberra Hospital's Energy Sustainability





Welcome

Health Directorate representative

- Grant Carey-Ide – Executive Director
Service and Capital Planning

Sustainability Consultants

- AECOM
Chris Kornek and Toby Roxburgh

Capital Asset Development Program

For more information visit us at: www.health.act.gov.au



Agenda

- Purpose and Objectives
- Importance to Community
- Future Energy Scenarios
- Opportunities and Constraints
- Next Steps
- Question and Answers

Capital Asset Development Program

For more information visit us at: www.health.act.gov.au



Purpose & Objectives

The Health Directorate is undertaking this study to:

- Determine Canberra Hospital's future energy requirements
- Consider possible scenarios to make the hospital more energy efficient and reduce operating costs
- Engage the community to inform the decision process



Background & Project Needs

- The demand on the healthcare system is increasing.
 - Canberra's population is growing.
 - The population is ageing.

- The Health Directorate Capital Asset Development Program (CADP) is a strategy to meet the growing demand.

- The CADP involves the overhaul and expansion of all aspects of the healthcare system over the next 10-15 years.



Redevelopment of Canberra Hospital





Canberra Hospital Project Drivers

- Increased size of hospital
- Additional health services on site
- New e-health technologies
- Increased energy demand





ACT Government Sustainability Strategy

- ACT Government and the Health Directorate are committed to environmental sustainability.
- All development will align with these sustainability strategies .

These are available on ACT Website





Assessing our Options

Feedback on the following criteria will be used to plan the energy options for the facilities at the Canberra Hospital:

- Reliability - supporting planned services and facilities
- Lifecycle costs
- Green infrastructure
- Environmental Impacts
- Location – impact on Master Plan
- Aesthetics of design



Future Energy Scenarios

Several future scenarios / factors are being investigated

- Current and future energy needs
- Setup & location of equipment
- Technology choices
- Preliminary emission assessment
- Cost benefit analysis





Case Studies

Central energy plants are common in hospitals internationally and in several Australian hospitals such as:

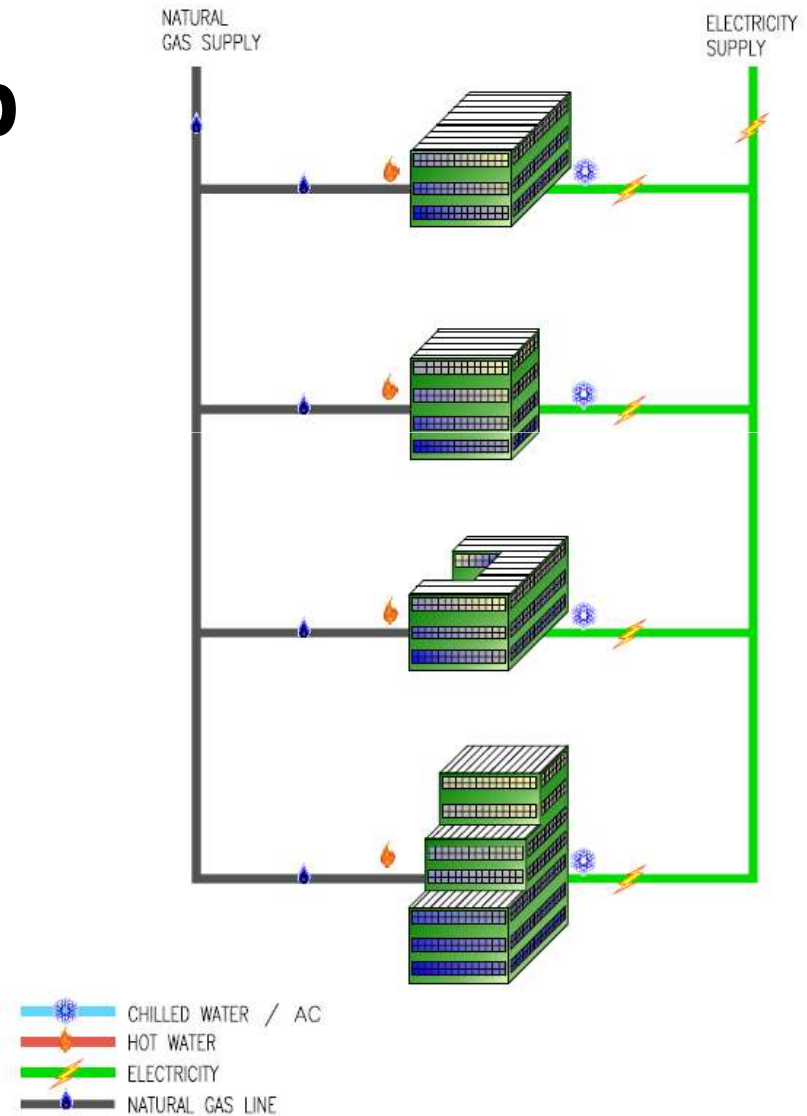
- Royal Melbourne Hospital
- Royal Brisbane Hospital
- Geelong Hospital
- Launceston Hospital





Existing Energy Setup

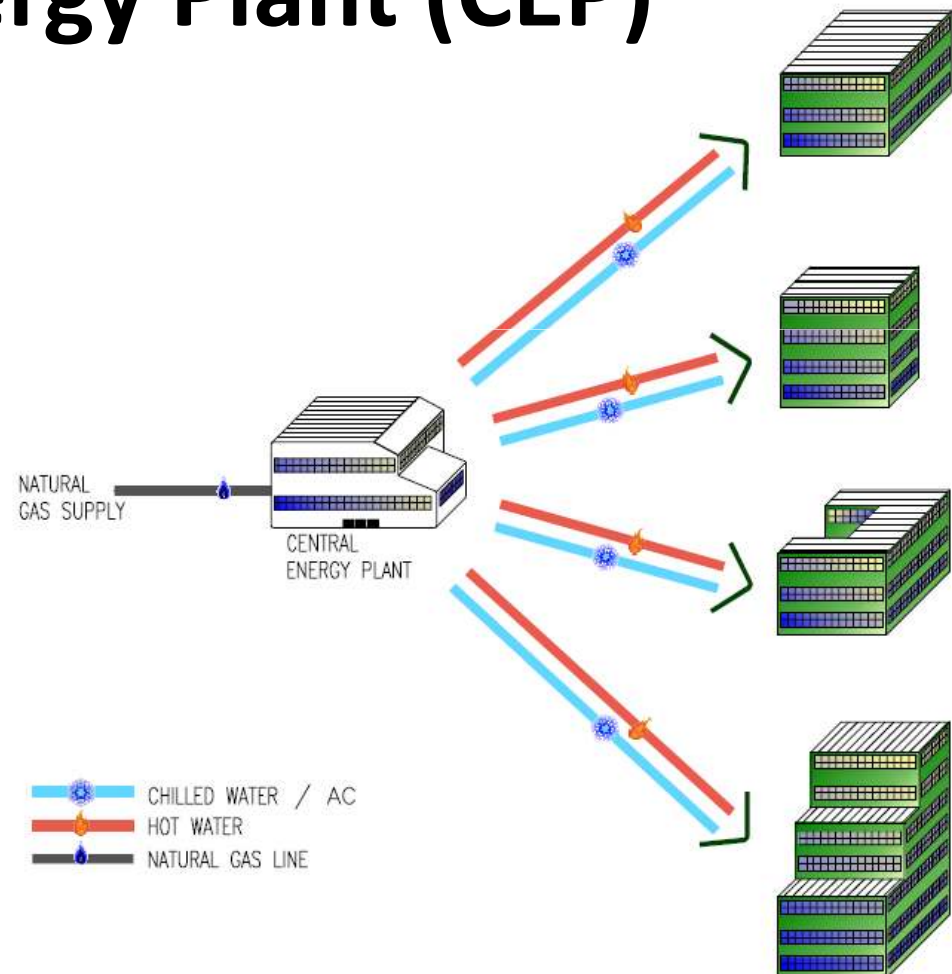
- Separate energy equipment located in individual buildings





Central Energy Plant (CEP)

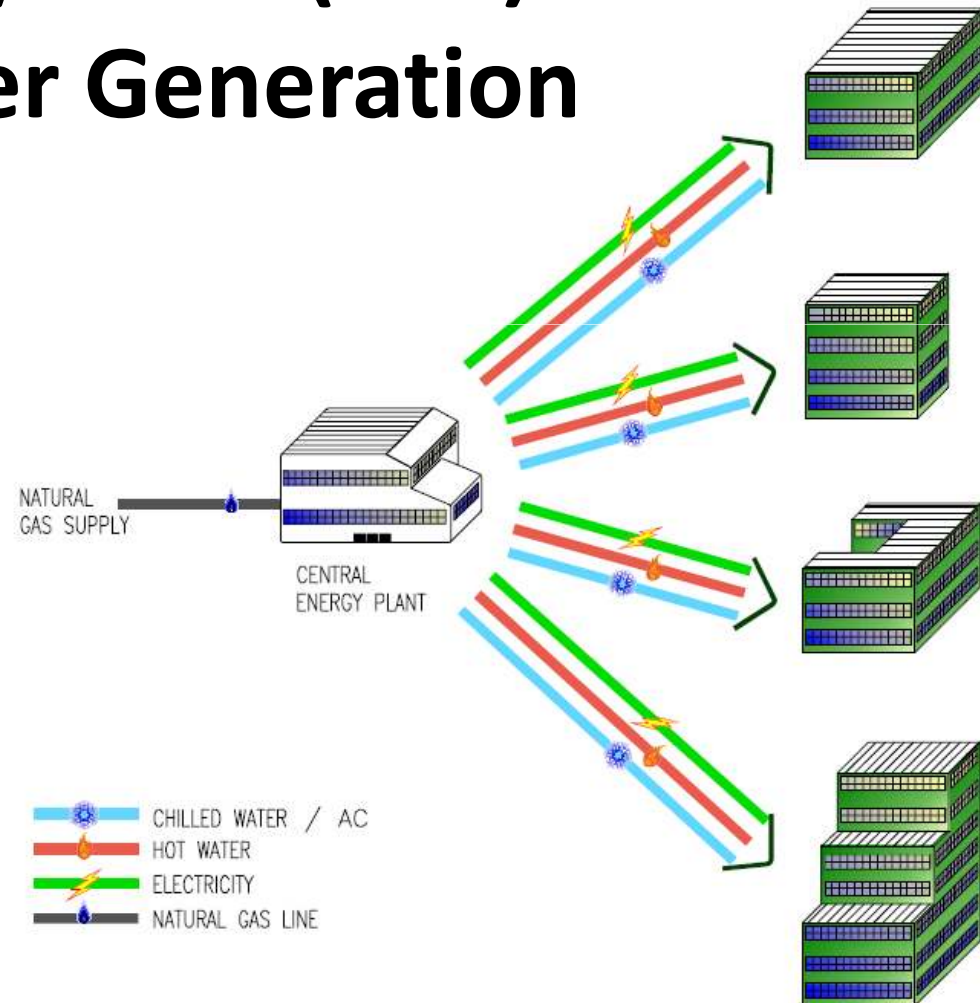
- Base Case for comparison
- All energy equipment located together





Central Energy Plant (CEP) & On-site Power Generation

A CEP with co-generation or tri-generation technologies





Future Energy Scenarios

By grouping building equipment, Central Energy Plants (CEPs) improve energy efficiency and reduce maintenance costs.





Opportunities & Constraints

| Scenario | Tech & site requirements | Lifecycle costs | Green health infrastructure | Modernisation & reliability | Environment | Location & Amenity |
|------------------------------------|--|--|--|--|--|--|
| Existing Energy Setup (EES) | <p>Generates hot and cold water for space heating / cooling in buildings</p> <p>Heating and cooling equipment located within individual buildings</p> <p>Existing use of small-scale gas-fired hot water generators and electrical chillers – often on roof tops</p> | <p>✓ Lower upfront capital expenditure to build</p> <p>× Increased costs - approximately \$375 million over 20 years for construction, operation and maintenance</p> | <p>× Less efficient energy use due to the need for multiple small-scale energy equipment</p> | <p>× Reduced flexibility over the long term due to restriction of future expansion</p> | <p>× Increased Greenhouse House Gas (GHG) emissions</p> <p>× Approximately 72,000 tonnes of CO₂ emissions per year - approximately the same as 16,740 car emissions</p> | <p>× Equipment often on roof tops or in building basements</p> |



Planning for Canberra Hospital's Energy Sustainability

| Scenario | Tech & site requirements | Lifecycle costs | Green health infrastructure | Modernisation & reliability | Environment | Location & Amenity |
|--|---|---|---|--|--|--|
| <p>Central Energy Plant (CEP)</p> | <p>CEP generates hot and cold water for space heating / cooling in buildings across the campus</p> <p>CEP uses natural gas fuel and large scale equipment to create bulk amounts of hot and cold water for campus buildings</p> <p>CEP locates together all the equipment to serve multiple buildings</p> | <ul style="list-style-type: none"> × Increased installation costs ✓ Expected cost savings compared to EES of \$14 million over 20 years ✓ Grouping building equipment reduces maintenance and operational costs ✓ Reduces the effect of future energy price increases | <ul style="list-style-type: none"> ✓ Grouping building equipment can improve energy efficiency by producing hot/cold water in bulk | <ul style="list-style-type: none"> ✓ Increased design flexibility with other hospital infrastructure ✓ Common in building precincts internationally, including many hospital campus sites. | <ul style="list-style-type: none"> ✓ Reduced GHG emissions compared to EES ✓ Approximately 7,000 tonnes of CO₂ saved per year compared to EES – equivalent to taking approximately 1430 cars off Canberra's roads ✓ Reduced noise levels from building equipment | <ul style="list-style-type: none"> ✓ Improved aesthetics as equipment is often housed in a singular building rather than individual spaces ✓ Provides opportunity for alternative use of roof top space × May require an additional building to contain all equipment and may block views / create shadows ✓ A new CEP building would be designed to match the look of the hospital site |



Planning for Canberra Hospital's Energy Sustainability

| Scenario | Tech & site requirements | Lifecycle costs | Green health infrastructure | Modernisation & reliability | Environment | Location & Amenity |
|---|---|--|---|--|---|--|
| <p>Central Energy Plant (CEP) & Power Generation</p> | <p>CEP generates hot and cold water for space heating / cooling in buildings across the campus</p> <p>CEP consolidates in one location all the equipment to serve multiple buildings</p> <p>Power generation through cogeneration technology – burn natural gas fuel in an engine which can be converted to electricity on site</p> | <p>× Highest initial capital installation costs</p> <p>✓ Greatest lifecycle cost savings exceeding \$24 million (in 2011 terms) over 20 years</p> <p>✓ Grouping building equipment can reduce maintenance and operational costs</p> <p>✓ Reduces the effect of future energy price increases</p> | <p>✓ Grouping building equipment can improve energy efficiency by producing hot/cold water in bulk</p> <p>✓ CEP with power generation creates more than double the amount of converted energy from a typical coal power station</p> | <p>✓ On site power generation increases power security</p> <p>✓ Increased Emergency Support Options for the hospital</p> <p>✓ Common in building precincts internationally, including many hospital campus sites</p> | <p>✓ Use of cleaner fuel source – approximately 10,000 tonnes of CO₂ saved per year (in 2011 terms) – equivalent to taking 2330 cars off Canberra's roads</p> <p>× Increase in on site exhaust emissions compared to EES</p> | <p>× May increase the size and need for an additional site building to contain equipment</p> |



Next Steps

- Invite input from the public on the community's views in relation to future energy planning for the hospital.
- Your comments will assist in the development of the hospital.
- A summary of the outcomes will be presented in mid 2012 through further community forums and the website.
- We will continue to engage with the community throughout the redevelopment of the hospital.



What's Important to you...

when considering Canberra Hospital's energy scenarios?

- **Modern and reliable** healthcare services
- **Lifecycle energy costs** – increase in capital investment to reduce long term operating costs
- **Green infrastructure** – reduced carbon footprint
- **Environmental impacts** – onsite emissions
- **Location and Aesthetics** of facilities



Have Your Say

Comments are invited until **Tuesday, 6 March 2012**

- **Emailed** to: yourhealthourpriority@act.gov.au
- **Mailed** to: Canberra Hospital Energy Sustainability, PO Box 11, Woden ACT 2606
- Complete a **feedback survey** today or online at: www.health.act.gov.au/yhop
- **Telephone** Canberra Connect on: 6205 9440



Questions and Answers

PANEL MEMBERS

- **Chris Kornek** – Associate Director - AECOM
- **Toby Roxburgh** – Principal Engineer - AECOM
- **Edward Warcaba** – Principal Consultant CETEC
- **Professor Brian Priestly** – School of Public Health & Preventive Medicine, Monash University - Director, Australian Centre for Human Health Risk Assessment