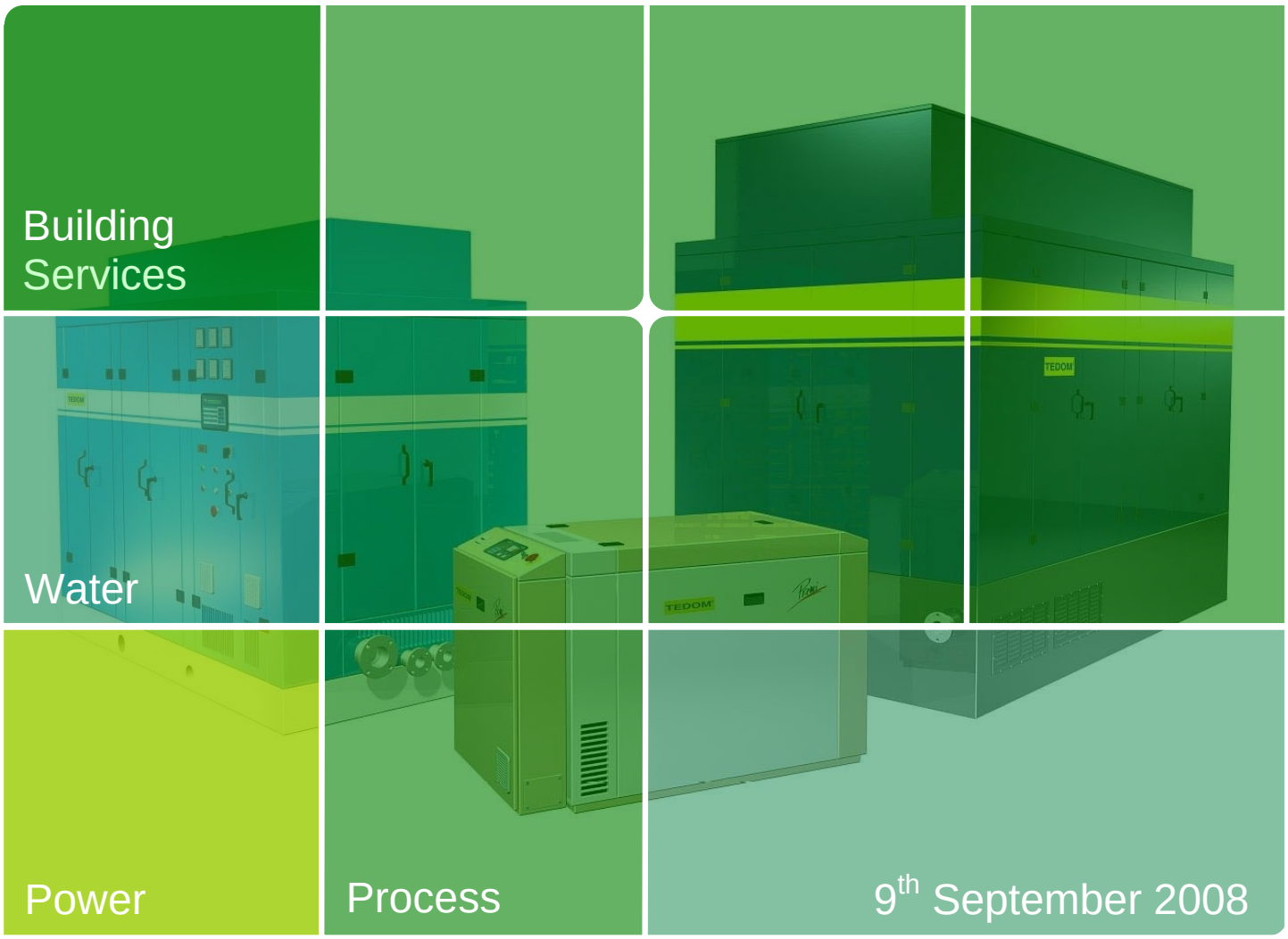


9th September 2008

NSW Department of Planning – BASIX – Cogeneration Demonstration Project

Cambridge Apartments

Period Report:

Report 8 – 11 August 2008 to 9 September 2008

MPI Group Australia Pty Ltd
[M] Lvl 1, 17-23 Merriwa Street
GORDON NSW 2072
[T] +61 2 9499 0000
[F] +61 2 9499 0099
[E] sydney@mpigroup.com.au
[W] www.mpigroup.com.au

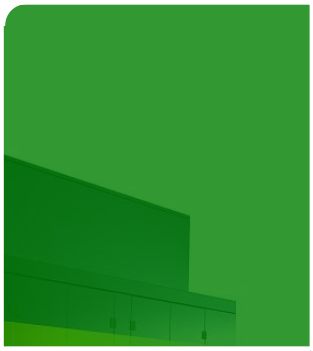


Table of Contents

1 Executive Summary 2

2 Analysis & Conclusion 4

2.1 Costs 4
2.2 Emissions 5
2.3 Payback Period 6
2.4 Carbon Credits 7
2.5 Conclusion 8

1 Executive Summary

This Report details the performance of the Tedom F25AP Cogeneration Unit installed at Cambridge Apartments, Chatswood for the period between the 11 August 2008 and 9 September 2008.

Cost Savings per Month have continued to increased significantly due to altered settings of the unit. The unit is now starting primarily during peak tarrif times, generating significant cost savings compared to previous months. Additionally, the cogeneration thermostat is set to shut the machine off at 70ºC (the machine now starts at a tank temp of 40ºC).

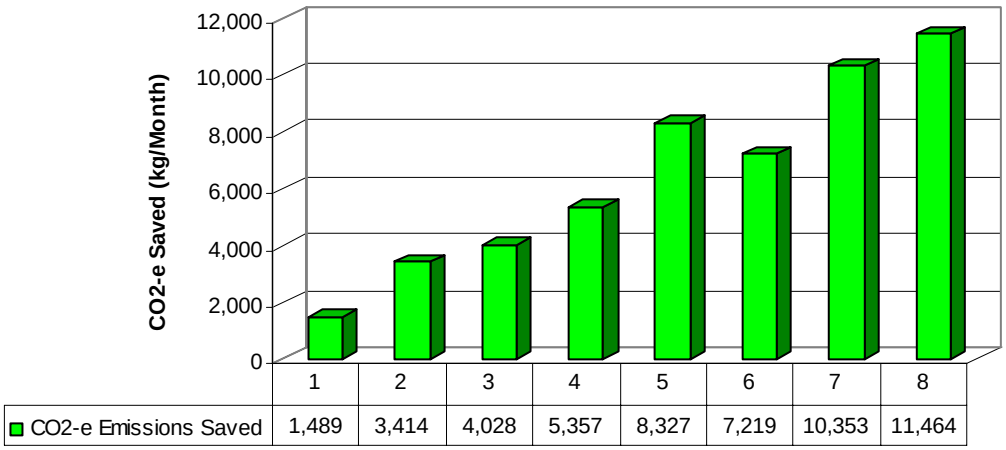
The Raypak hot water units have been set to 58 ºC turn off temperature with a starting temperature of 55ºC to maintain the building system 55ºC temperature. Building occupancy is close to 100%.

Due to improved data acquisition methods - Overall Efficiency (as a ratio of *fuel energy in* : *thermal + electrical energy out*) for this period is now at **77.87%**.

Use of the Cogeneration Unit saved a total of **11,464 kg CO2-e** over a month as compared to a No-Cogeneration Scenario using solely Raypak Gas Boilers for Hot Water and importing Electricity from the grid.

Since Commissioning, the Cogeneration Unit has **saved a total of 53,594 kg CO2-e**. The Emissions Savings (kg CO2-e/month) are shown below:

Monthly CO2-e Emission Savings (kg/Month)



	1	2	3	4	5	6	7	8
CO2-e Emissions Saved	1,489	3,414	4,028	5,357	8,327	7,219	10,353	11,464

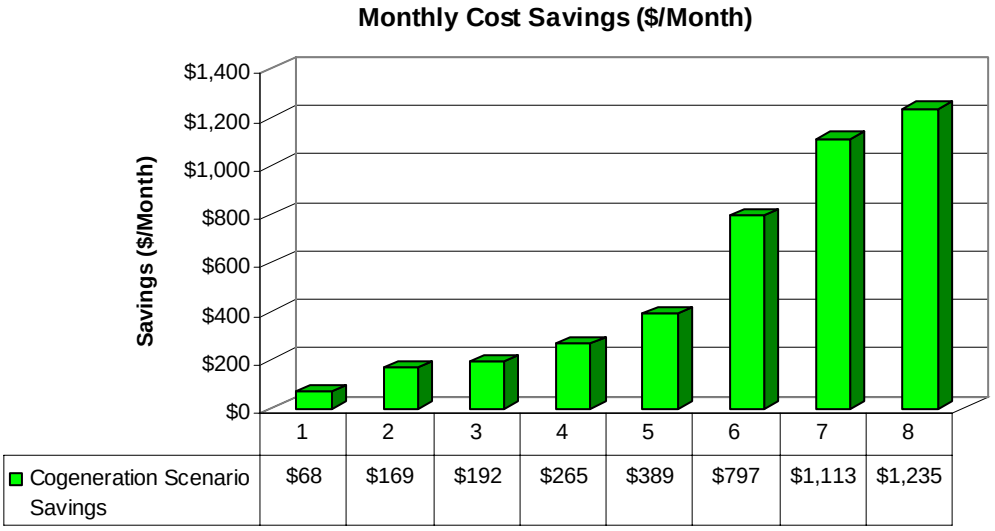
For the Reporting Period, the Cogeneration Unit consumed a total of **5,305 m³** of Natural Gas - generating **14,136 kWh** of Electricity and **26,978 kWh** of Heat.

This gives the unit an **Electrical Efficiency** of **26.77%** and a **Thermal Efficiency** of **51.09%.** As stated earlier, the **Overall Efficiency** of the Cogeneration Unit is **77.87%**.

The efficiencies recorded are consistent with previous months, indicating that the Unit is still operating effectively.

In addition to Emissions Savings, the Cogeneration Unit also provides **Cost Savings** – saving a total of **$1,178** over the Reporting Period when compared to a No-Cogeneration Scenario.

Since Commissioning, the Cogeneration Unit has **saved a total of $4,290**. The Monthly Cost Savings of the Cogeneration Scenario compared to the No-Cogeneration Scenario is shown below:



With the current payback rate of **$1,235/Month**, it will take **12 Years** to pay back the $185,000 Installation Cost of the Tedom F25AP Cogeneration Unit.

This is still an improvement on last month – indicating that the benefits of the Unit have not yet reached their peak, however it is expected that this payback period will now begin to plateau.

It is also worth noting that for the past three reporting periods, the payback period falls within the 25 year expected lifetime of the unit. Thus the project can now be considered financially viable.

These improvements are due to the Cogeneration Unit operating in the proportions of 44.44% Peak/33.33% Shoulder/22.22% Off Peak.

Other savings are being made in relation the current price of Electricity. Electricity prices are rising, and the contract obtained for the building is very competitive.

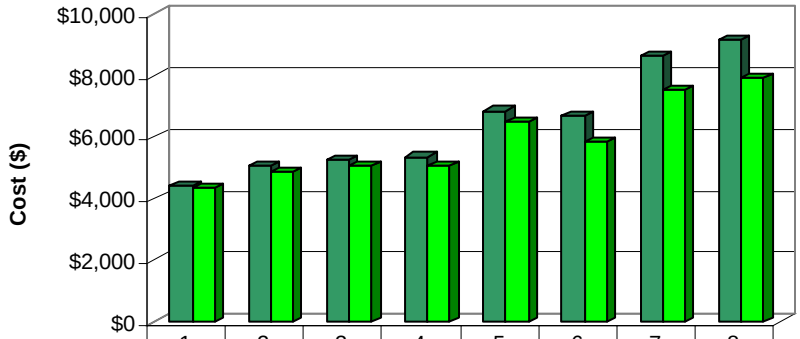
Carbon Credits (including NGACs) have not been included in the analysis.

2 Analysis & Conclusion

2.1 Costs

Monthly Scenario Costs are shown below.

Monthly Scenario Costs ($)

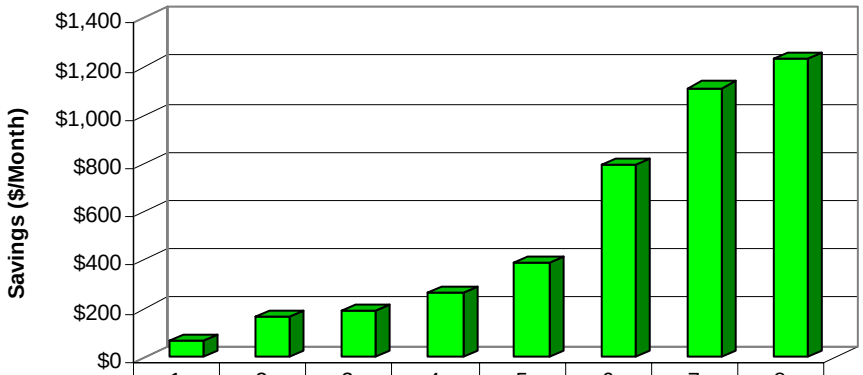


	1	2	3	4	5	6	7	8
No-Cogeneration Scenario Monthly Scenario Cost	$4,429	$5,038	$5,250	$5,357	$6,858	$6,666	$8,631	$9,183
Cogeneration Scenario Monthly Scenario Cost	$4,361	$4,869	$5,058	$5,092	$6,469	$5,869	$7,518	$7,948

Savings per Month have increased once again this month due to the altered settings of the unit. The unit is now starting primarily during peak tarrif times, generating significant cost savings compared to previous months.

Additionally, the cogeneration thermostat is set to shut the machine off at 70ºC (the machine now starts at a tank temp of 40ºC). The Raypak hot water units are set to 58 ºC turn off temperature with a starting temperature of 55ºC to maintain the building system's 55ºC temperature.

Monthly Cost Savings ($/Month)

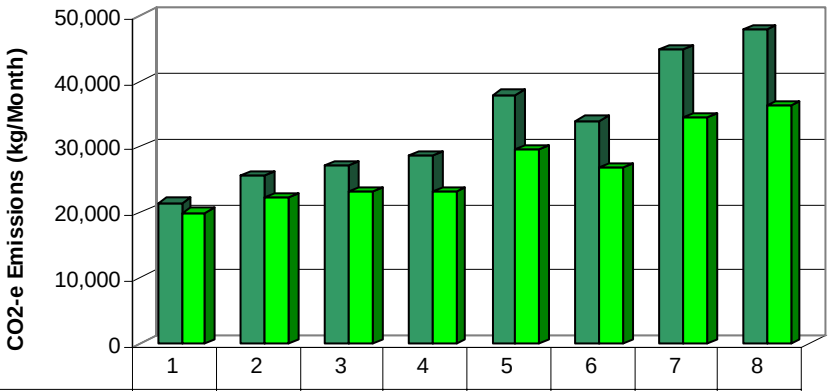


	1	2	3	4	5	6	7	8
Cogeneration Scenario Savings	$68	$169	$192	$265	$389	$797	$1,113	$1,235

2.2 Emissions

The use of the Cogeneration Unit results in a significant CO2-e Emissions reduction (given the size of the unit). A comparison of the Monthly CO2-e Emissions for each Reporting Period is shown below:

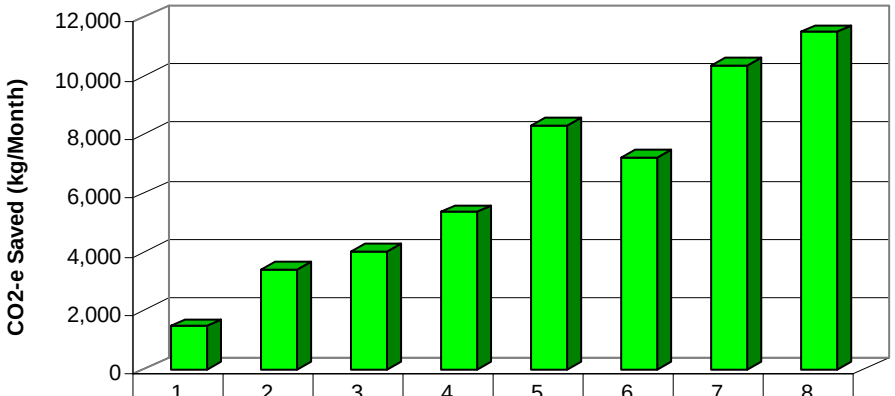
Monthly CO2-e Emissions (kg CO2-e)



	1	2	3	4	5	6	7	8
No-Cogeneration Scenario Monthly CO2-e Emissions	21,480	25,641	27,160	28,604	37,960	34,031	44,822	47,881
Cogeneration Scenario Monthly CO2-e Emissions	19,991	22,227	23,132	23,247	29,633	26,812	34,469	36,417

Emission Savings per Month have increased over previous months, as shown in the graph below. This is due to increased operation of the cogeneration unit and reductions in solar hot-water gains due to low solar exposure and low temperatures throughout the past month.

Monthly CO2-e Emission Savings (kg/Month)

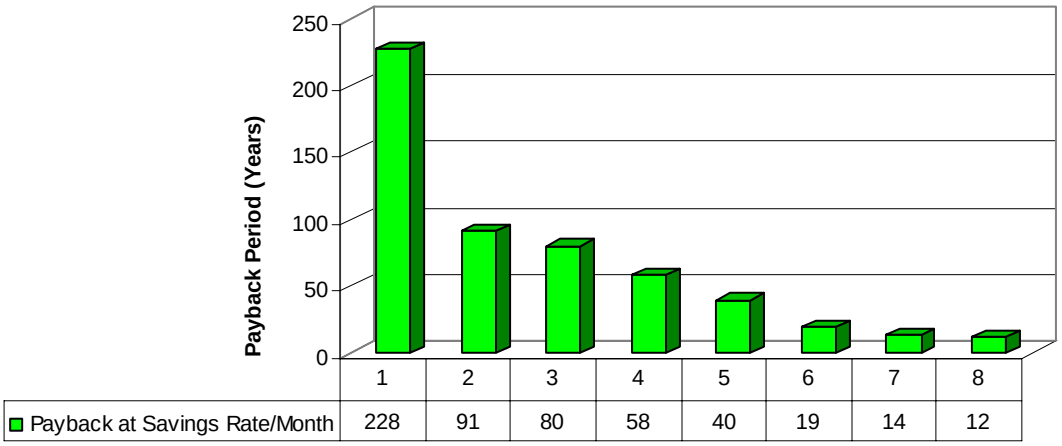


	1	2	3	4	5	6	7	8
CO2-e Emissions Saved	1,489	3,414	4,028	5,357	8,327	7,219	10,353	11,464

2.3 Payback Period

The payback period has continued to decrease, as shown in the graph below:

Payback Period (Years) at Monthly Cost Savings Rate ($/Month)



With the current payback rate, it will take **12 Years** to pay back the $185,000 Installation Cost of the Tedom F25AP Cogeneration Unit.

This is a significant improvement on previous months and still an improvement over last month – however subsequent months are expected to see the payback period plateau. Despite this expectation, the payback period currently falls within the 25 year expected lifetime of the unit. Thus the project can now be considered financially viable.

These improvements are due to the Cogeneration Unit operating in the proportions of 44.44% Peak/33.33% Shoulder/22.22% Off Peak.

Other savings are being made in relation the current price of Electricity. Electricity prices are rising, and the contract obtained for the building is very competitive.

2.3.1 Standard Installation Cost of Hot Water Boilers

The payback of the project can be reduced if the unused hot water system is reduced. The cogeneration unit was installed with the option to turn it off and run on a standard 100% redundancy hot water system.

Future installations should incorporate the cogeneration into the system and hence reduce the size and cost requirements of the hot water system. Sizing the cogeneration unit for the total building needs will result in economies of scale in some applications.

2.3.2 Solar

Initial solar thermal heating on the site reduces the heat requirements for the cogeneration unit with the result that the cogeneration unit savings are reduced.

2.4 Carbon Credits

There **exists the option** for Carbon Trading through the New South Whales Greenhouse Abatement Scheme using certificates known as New South Whales Greenhouse Abatement Certificates (**NGACS**) – NGACS are credited **per Tonne of CO2-e saved** (tCO2-e).

Currently, with **uncertainty in Carbon Tax and Trading Schemes** imposed by the Australian Government, this result does not reflect highly on the advantages of operating a Cogeneration Unit.

This may change in the future with the introduction of a Carbon Tax or Carbon Trading Scheme – where Carbon Credits would be awarded to those who can reduce or offset their Carbon emissions.

2.5 Conclusion

Savings per Month have continued to increase over this reporting period due to altered settings of the unit, so that it starts primarily during peak times.

In addition to this, the cogeneration thermostat is set to shut the machine off at 70ºC (the machine now starts at a tank temp of 40ºC)

The Raypak hot water units have been set to 58 ºC turn off temperature with a starting temperature of 55ºC to maintain the building system 55ºC temperature.

With the current payback rate, it will take **12 Years** to pay back the $185,000 Installation Cost of the Tedom F25AP Cogeneration Unit.

This is a significant improvement on previous months and still an improvement over last month – however subsequent months are expected to see the payback period plateau.

Despite this expectation, the payback period currently falls within the 25 year expected lifetime of the unit. Thus the project can now be considered financially viable.

Additionally, the Emissions Saving is significant for the size of the unit – having saved **53,594kg CO2-e** since installation.

It is recommended to;

- Monitor the system for this month to see:
  - Whether operational savings have peaked or will continue rising.
  - If the start/stop times of the unit remain consistent.

In future is is recommended to:

- Set Cogeneration and Gas Boiler Systems to run at **appropriate times**, i.e. Cogeneration Systems should be operated in Peak times wherever possible, in order to **maximise cost savings**.
- **Size** Cogeneration and Gas Boiler Systems **appropriately** according to the building they are installed in in order to ensure the units **run at maximum efficiency** and produce a **higher emission offset** compared to not using Cogeneration.
- Keep the **Emission Savings potential**, both as **Environmental** (kg/CO2-e emitted) and **Financial** (Carbon Credits Traded), in mind when considering the **long-term benefits** of operating a Cogeneration Unit.