Case study Gundagai Meat Processors

Hidden Energy. Real Returns.

Staged Waste Heat Recovery and Heat Pump, as a System

GMP Est. 1974

AMPC AUSTRALIAN MEAT PROCESSOR CORPORATION

HOCTOR industrial refrigeration

Gundagai Meat Processors

One of Australia's leading lamb processors

Established in 1974

By the Barton family. A family-owned lamb processor based in Gundagai, NSW

~1M sheep & lambs

25,000 t/HSCW processed annually

350 (FTE) employees

~20 active exporting countries

Gundagai Meat Processors

One of Australia's leading lamb processors

Trusted partnerships

Built on innovation, quality and long-term partnerships with producers and customers.

Energy & refrigeration systems

Operates a medium-sized ammonia refrigeration system alongside gas-fired hot water generation for sterilisation, sanitation and cleaning.

GMP Challenges

Rising costs and ageing infrastructure could no longer be solved by adding boiler capacity alone

GMP Challenges

Capacity Under Pressure

2 MW boiler
Regularly operating at or above capacity

15°C winter water
Increased heating demand

82°C sterilisation temperature
Difficult to maintain occasionally interrupting production

Looming Capital Cost

$400,000 capital cost
To upgrade the existing boiler

2.5 MW boiler
Required to keep pace with production growth, with no improvement to energy efficiency

Rising Gas Prices

+50%
Increase in GMP's gas price at contract renewal

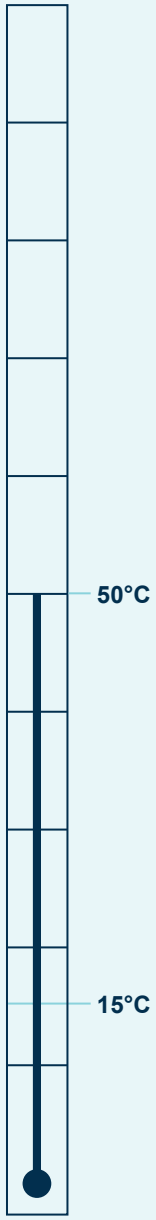
$18/GJ
Representative delivered gas price with little near-term relief

THE PROBLEM

This combination of rising fuel costs and looming capital expenditure prompted GMP to look for an alternative to simply increasing boiler capacity.

THE SOLUTION

A Staged Heat Recovery and Heat Pump



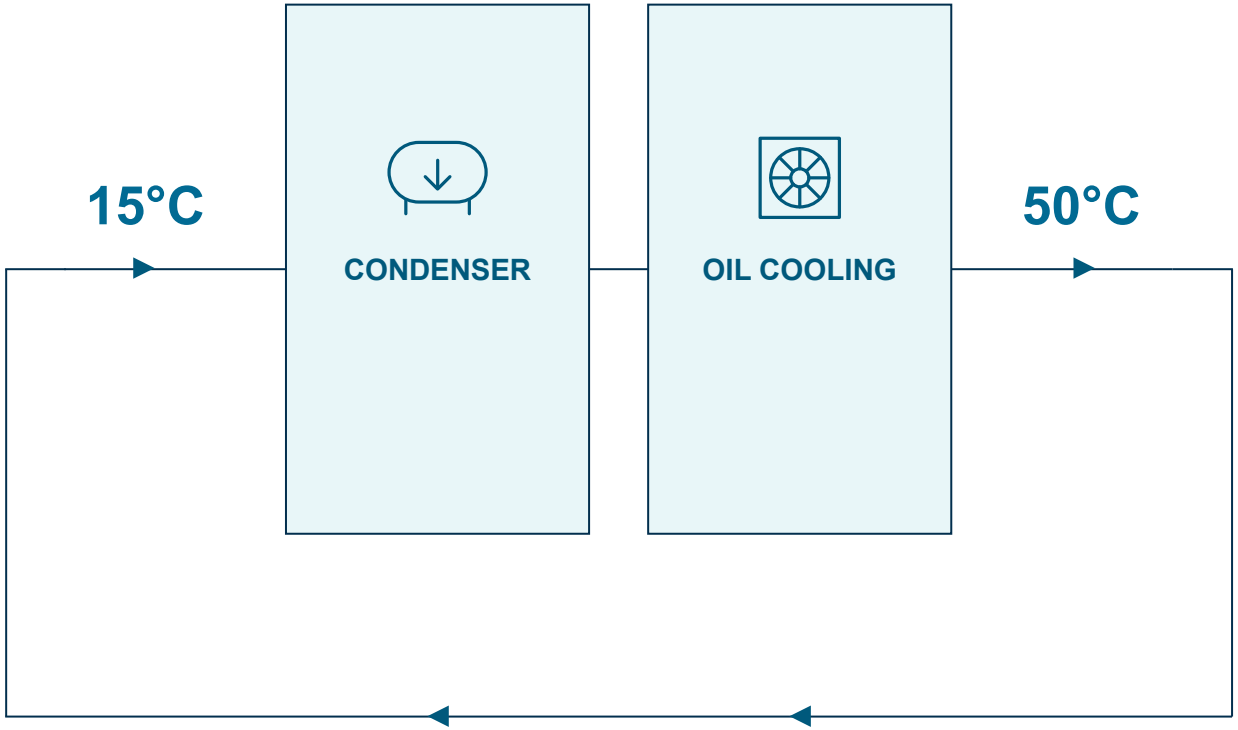
A Staged Heat Recovery Philosophy

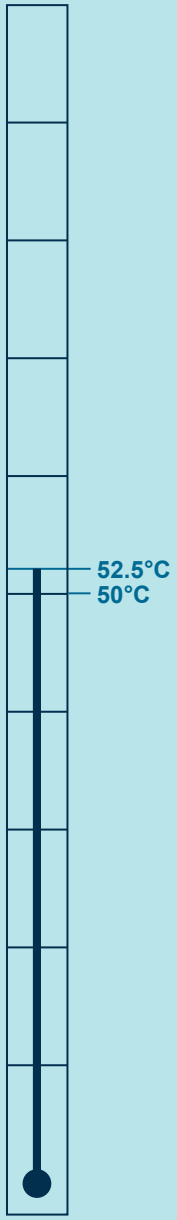
Every degree gained passively reduces the energy needed at the next stage

Closed-loop, isolated water circuit — plate heat exchangers, continuous pH monitoring, automated alarms and independent isolation valves keep process water fully protected from refrigeration fluids.

Stage 1A Condenser & Oil Cooling

IN OPERATION





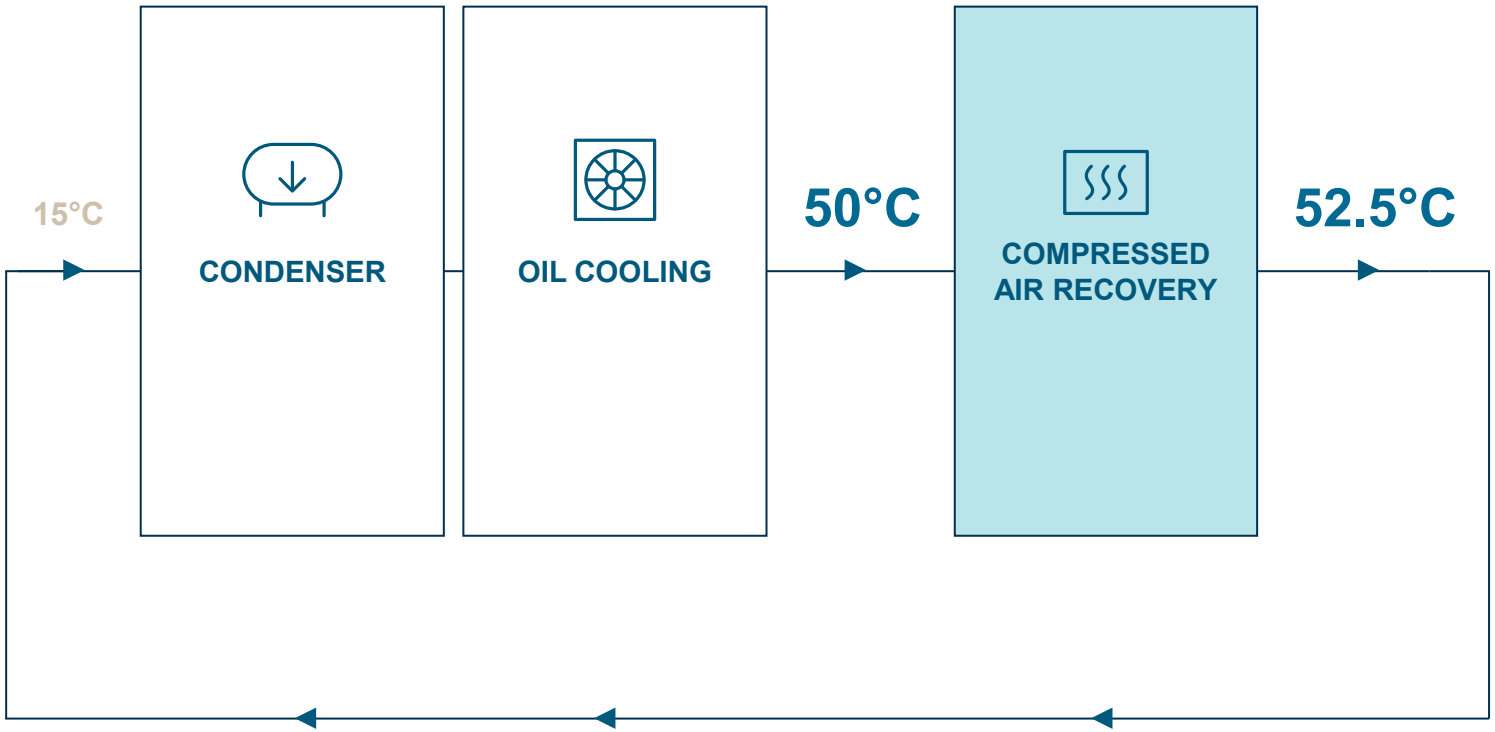
A Staged Heat Recovery Philosophy

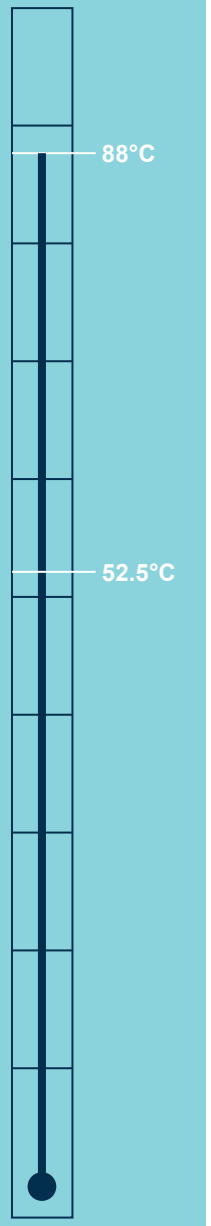
Every degree gained passively reduces the energy needed at the next stage

Closed-loop, isolated water circuit — plate heat exchangers, continuous pH monitoring, automated alarms and independent isolation valves keep process water fully protected from refrigeration fluids.

Stage 1B Compressed Air Recovery

FUTURE





A Staged Heat Recovery Philosophy

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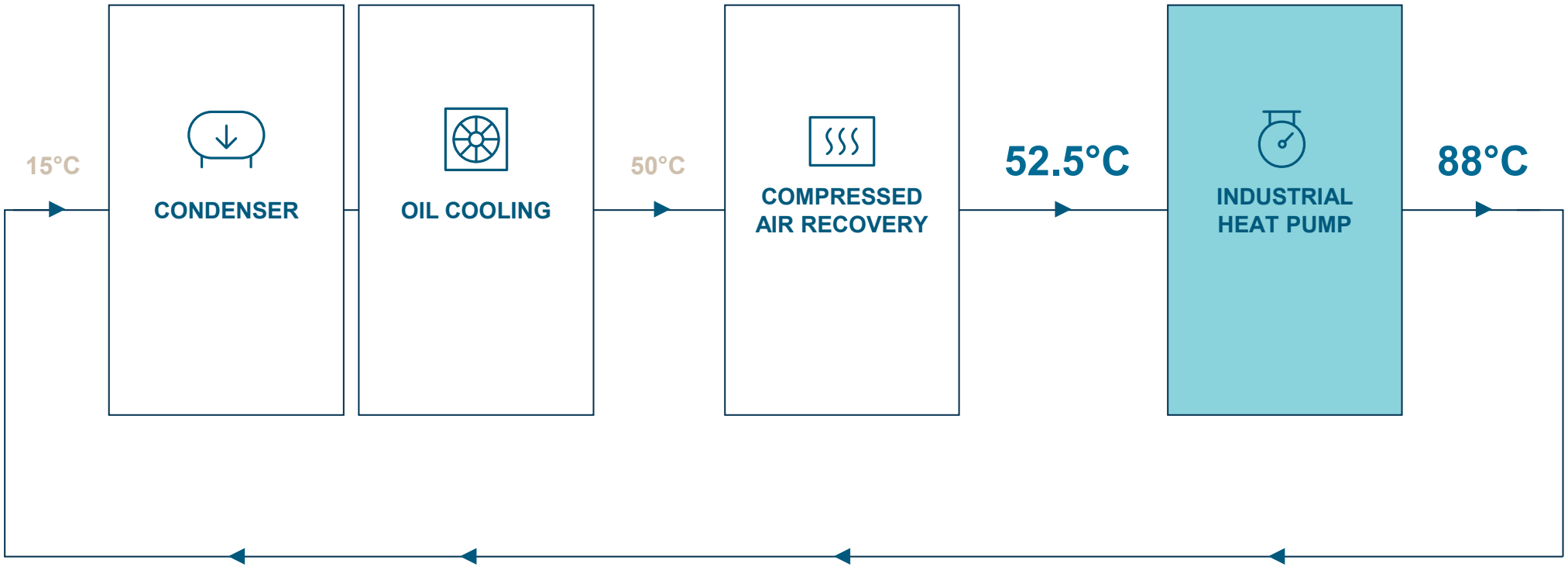
Closed-loop, isolated water circuit — plate heat exchangers, continuous pH monitoring, automated alarms and independent isolation valves keep process water fully protected from refrigeration fluids.

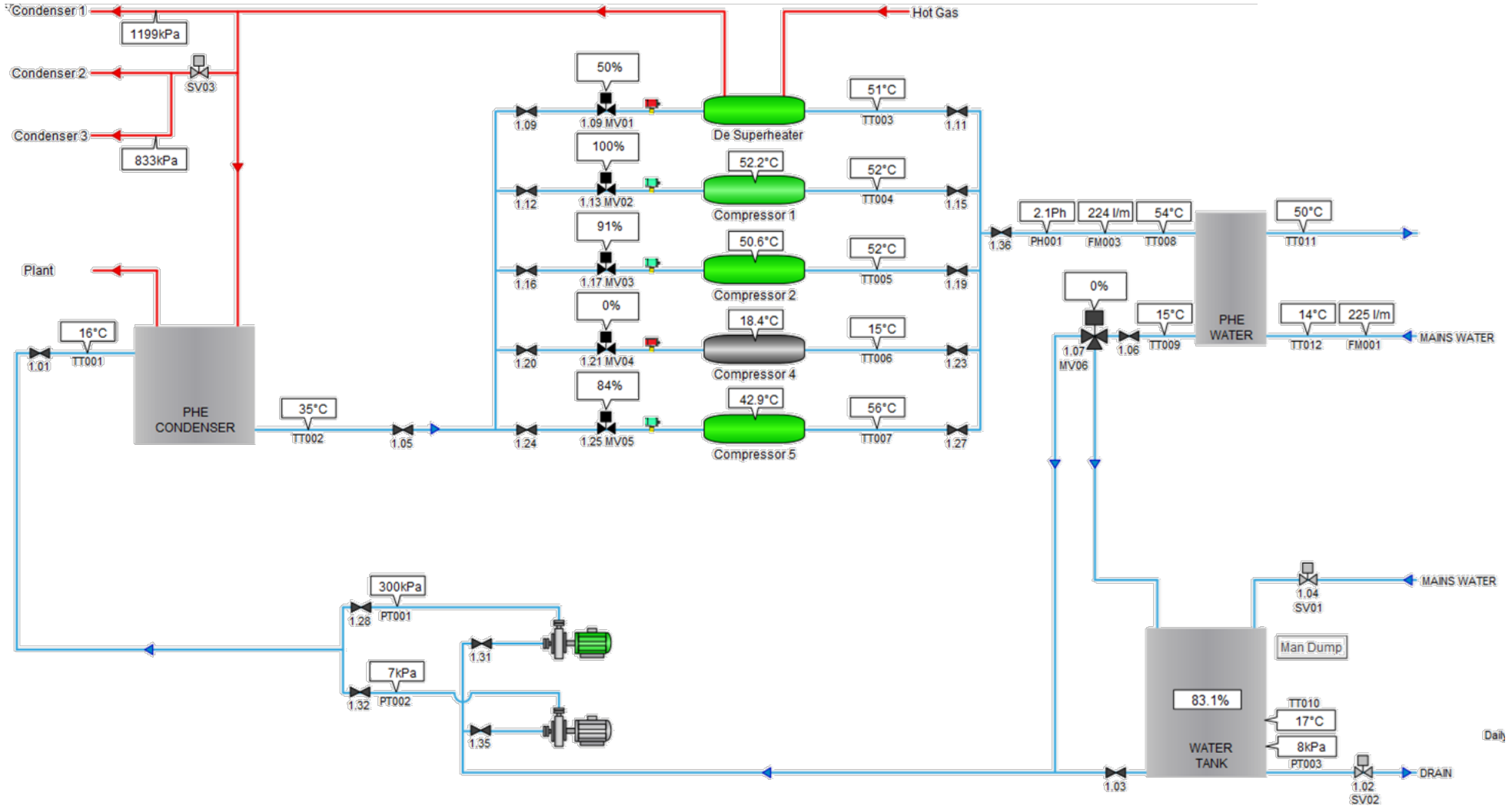
Stage 2 Industrial Heat Pump

FUTURE



Stage 1A Condenser & Oil Cooling Recovery

The system operating today



Performance

	STAGE 1A Condenser + Oil Cooler	STAGE 1B Compressed Air	STAGE 2 Heat Pump	Combined
	IN OPERATION	FUTURE		
Avg heating load	671.3 kW	68.0 kW	721.4 kW	1460.6 kW
Cooling load			478.0 kW	478.0 kW
Power	3.0 kW	0.5 kW	113.0 kW	116.5 kW
Coefficient of performance				
Heating	223.75	135.92	6.38	12.54
Cooling			4.23	4.10
Combined	223.75	135.92	10.61	16.64
Gas offset	~ 30 %	~ 4 %	~ 66 %	100 %

Forecast Financial Performance

Stage 1A measured and estimated benefits

All values are approximate

Operational savings

PER YEAR

$135,500 Gas

$7,100 Condenser power

$6,900 Condenser water use

$1,300 Wastewater discharge

TOTAL

$150,800

Capital costs

AVOIDED

$400,000 Boiler

$96,000 Condenser capacity

TOTAL

$496,000

Future stages

SAVINGS PER YEAR

$10,000 Stage 1B

$108,000 Stage 2

Additional savings expected as future stages further increase gas displacement and system efficiency.

TOTAL

$118,000

Return on Investment

Project Cost $450,000

Cost-Avoidance Basis

Cash-positive	From day one
~$400,000	Avoided boiler upgrade
~$96,000	Condenser capacity avoidance

Return on Investment

Project Cost $450,000

Utility Savings Only

3 years	Approximate payback
~$150,800	Combined utility savings
$540/day 30 GJ/day	Gas savings

Return on Investment

Project Cost $450,000

Utility Savings + Incentives

2 years	Approximate payback
~$150,000	Benefit from energy efficiency certificates (ESCs)

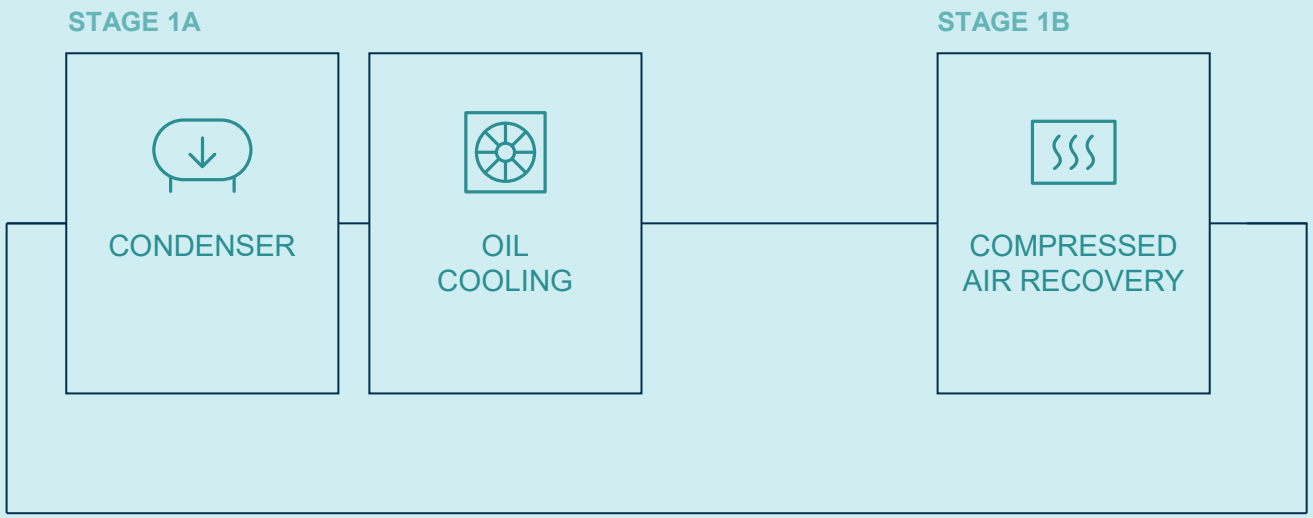
Eligible incentive mechanisms
Subject to jurisdictional requirements

ESCs	NSW Energy Savings Certificates
VEECs	Victorian Energy Efficiency Certificates
ACCUs	Australian Carbon Credit Units

Industry Learning

Doing Stage 1 first lowers the equipment size and running cost of Stage 2

Stage 1 Non Render



NO ACTIVE HEAT PUMP REQUIRED

Passive recovery from

Condensers

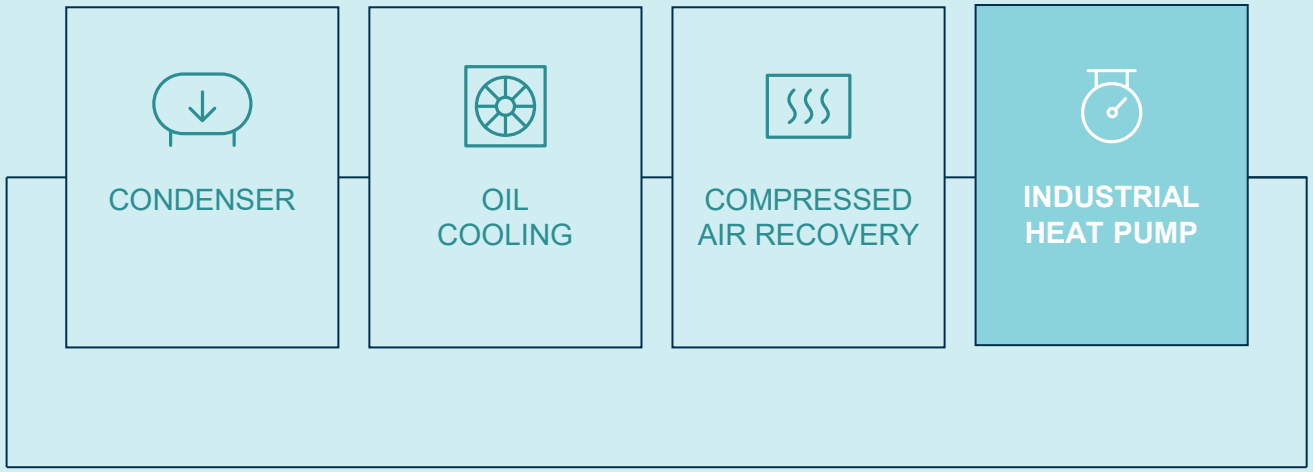
Oil coolers

Compressed air

Industry Learning

Every gigajoule of waste heat recovered is a gigajoule of natural gas that no longer needs to be purchased or combusted.

Stage 2



Higher baseline temperature requires

Less capacity

Lower capital cost

Lower running cost

RESULTS

Site Summary

Natural Gas Reduction

Controlled ON/OFF testing confirmed sustained savings

Average gas reduction

30 GJ/day

Estimated gas savings

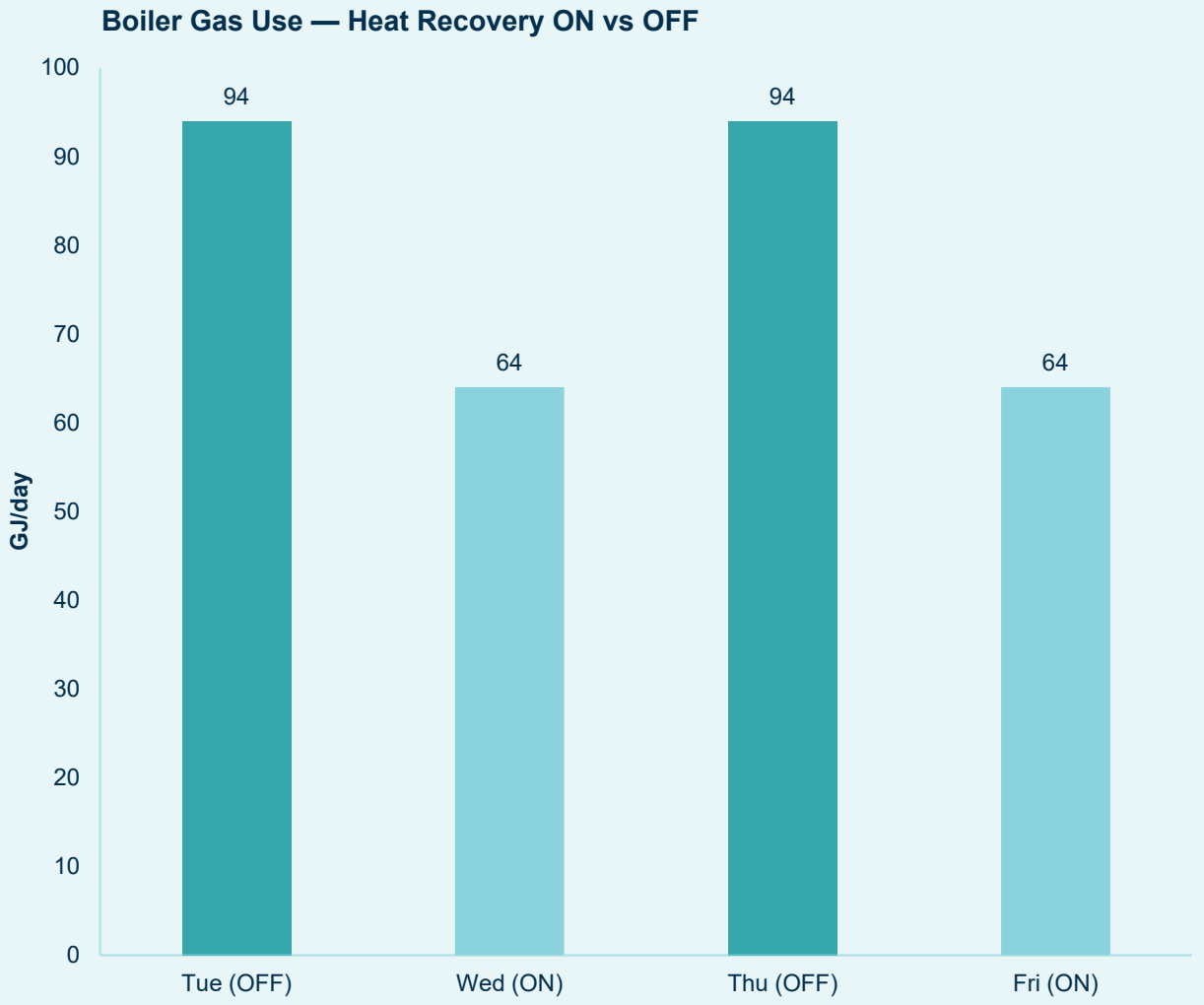
32% overall

7,530 GJ/annum

Estimated cost saving

$540/day

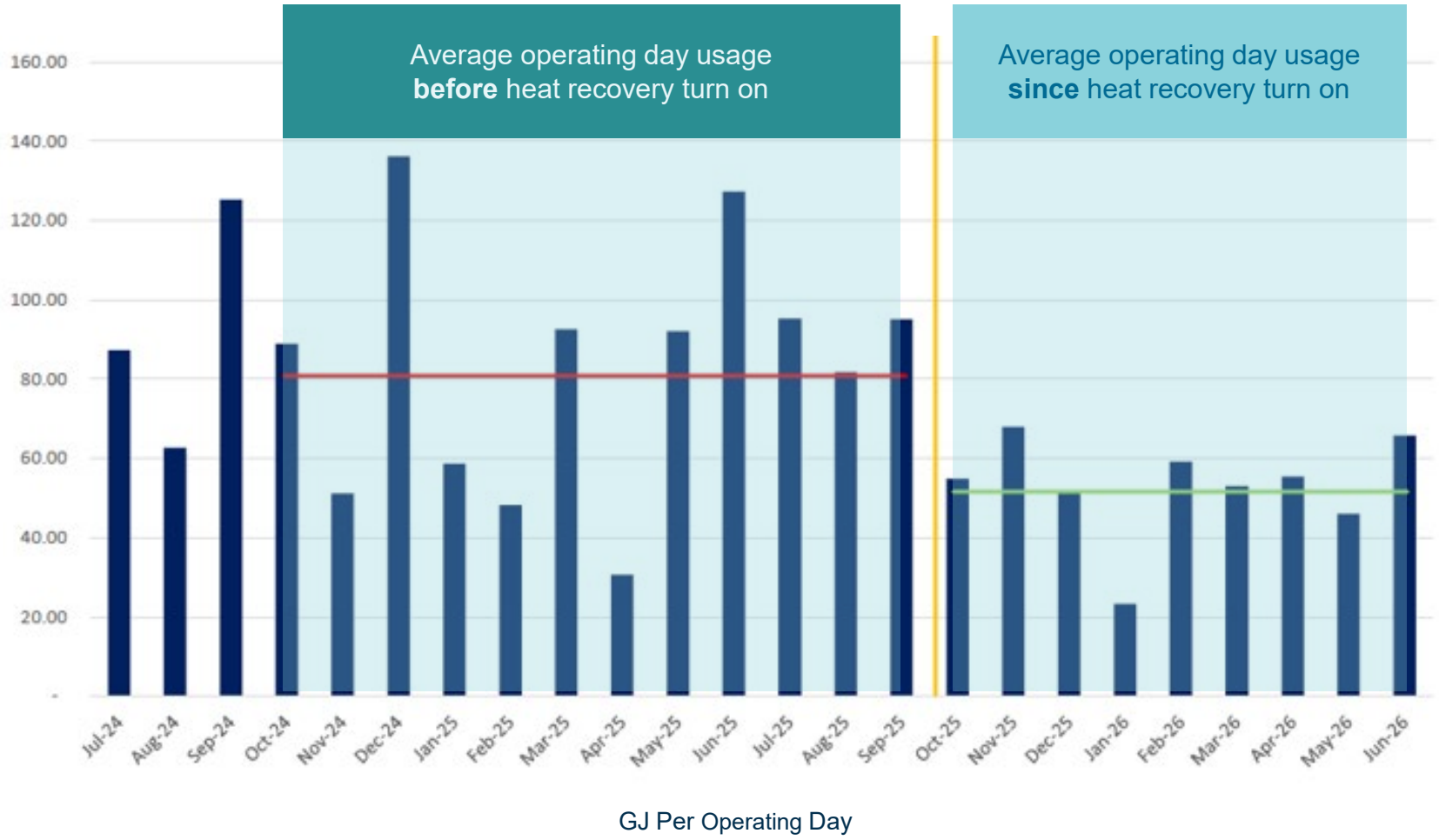
$135,500/annum



Monthly SCADA trends confirm average gas consumption has fallen consistently since heat recovery began operating.

Plant Monthly Gas Usage **Gigajoule**

System ON Gas Usage GJ per operating day



Clearly see the average usage is coming down since starting the heat recovery in October

Note

Reading Variance is due to the read date of the month

Onsite Improvements & Performance

What GMP has seen on the ground since Stage 1A went live

Improved boiler performance

Boiler cycles steadily between high and low fire instead of running continuously at high fire.

Extra condenser capacity

The system acts like an additional condenser, removing heat from hot ammonia gas, equivalent to roughly 400 kW of extra capacity.

Minimal maintenance or management

Fully automatic control via SCADA/PLC.
“I have been impressed with how little attention the system requires, it just works.”

Free heat

Heat recovered from refrigeration condensers and compressor oil coolers that was previously rejected to atmosphere.

Questions & Discussion

Thank You

Project support and industry funding

AMPC
AUSTRALIAN MEAT PROCESSOR CORPORATION

Design, delivery and commissioning

HOCTOR
industrial refrigeration

Engineering and equipment

GMP
Est. 1974