

Smarter Data Insights

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and Director, TEFMA Board



Presentation overview

Part 1

TEFMA Smarter Data Insights

Part 2

**RMIT University – Introduction and
Data Lead Decision making**

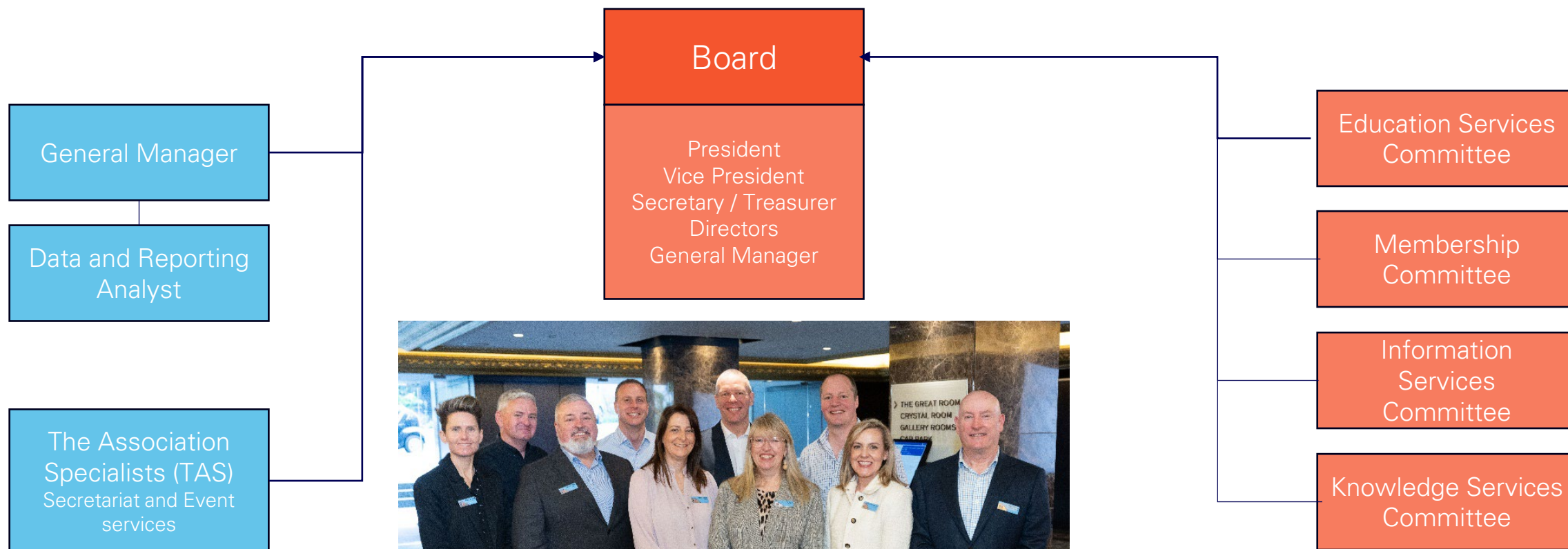


Part 1

TEFMA and Smarter Data Insights



Composition



TEFMA Family

TEFMA has:

- Approximately 2,000 members from institutions and organisations
- 55 participating University and TAFE institutions from across Australia, New Zealand, Fiji and the Philippines
- 55 organisations (business partners) supporting TEFMA



TEFMA Represents

TEFMA members manage:

- Over 16.4 million square meters of gross floor area
- Facilities with a replacement value of some \$69.8 billion (AUD) or R 834 billion (ZAR)
- Spending over \$1.19 billion (AUD) or R 14 billion (ZAR) annually to build, maintain and operate these assets.



Connections Dashboard

TEFMA CONNECTIONS DASHBOARD – 1 to 31 August 2024



MEMBERSHIP

Individual Members
1,895 ↑ +11

Organisations
112 ↑ +1

LinkedIn

Followers 1,287 ↑ +9
Page Views 94 ↓ -1

COMMUNITY

Members
779 ↑ +11 41.1%

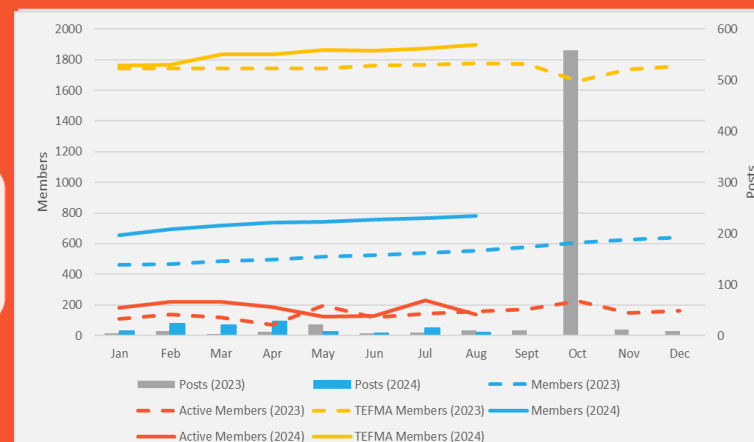
Active Members
138 ↓ -92 17.7%

Member Region
AUS – 655 ↑ +11
NZ – 112 0
Other – 12 0

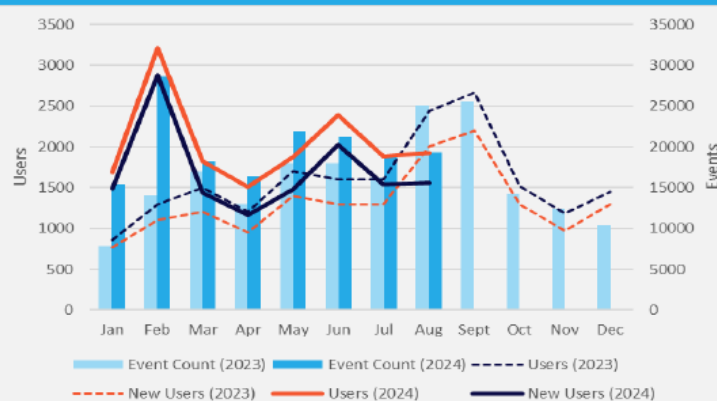
Most Popular Topics
1. Waste management services
2. Artwork collection management
3. Standards Australia Publication

Posts
6 ↓ -9

Responses
3 0



WEBSITE



Connections from

1. Australia
2. New Zealand
3. United States
4. Sweden
5. China
6. India
7. United Kingdom

Top Page Hits	Views	Users	Average Time
1. TEFMA home page	1,059	629	26secs
2. TEFMA Annual Conference	817	532	28secs
3. User Account	813	352	39secs
4. TEFMA24 Conference	361	250	26secs
5. Event Calendar	261	182	31secs
6. Who We Are	143	136	28secs
7. Business Partners Directory	116	101	43secs

A good benchmark for average time on a page is 52secs. On average 55% of visitors spend less than 15secs on a page



Smarter Data Innovations

This year TEFMA has held a Smarter Data Workshop and our annual conference, themed 'The Fellowship of Ideas: Envisioning Tomorrow'

These next slides are examples of what TEFMA Members are working on to enhance their institutions.

Credit to:

LaTrobe University – Sam Wishart

University of Tasmania – Mike Smith

University of Melbourne – Fardin Mollahagahi



Real-life AI in FM – LaTrobe University

Artificial intelligence is technology that enables computers and machines to simulate human intelligence and problem-solving capabilities.

Why AI

- AI learns faster than humans and continues learning – it gets smarter
- AI is simple and effective
- AI is cheaper than it used to be
- AI is a general purpose technology
- AI is digital transformation with intelligence



Real-life AI in FM – LaTrobe University

AI Opportunities

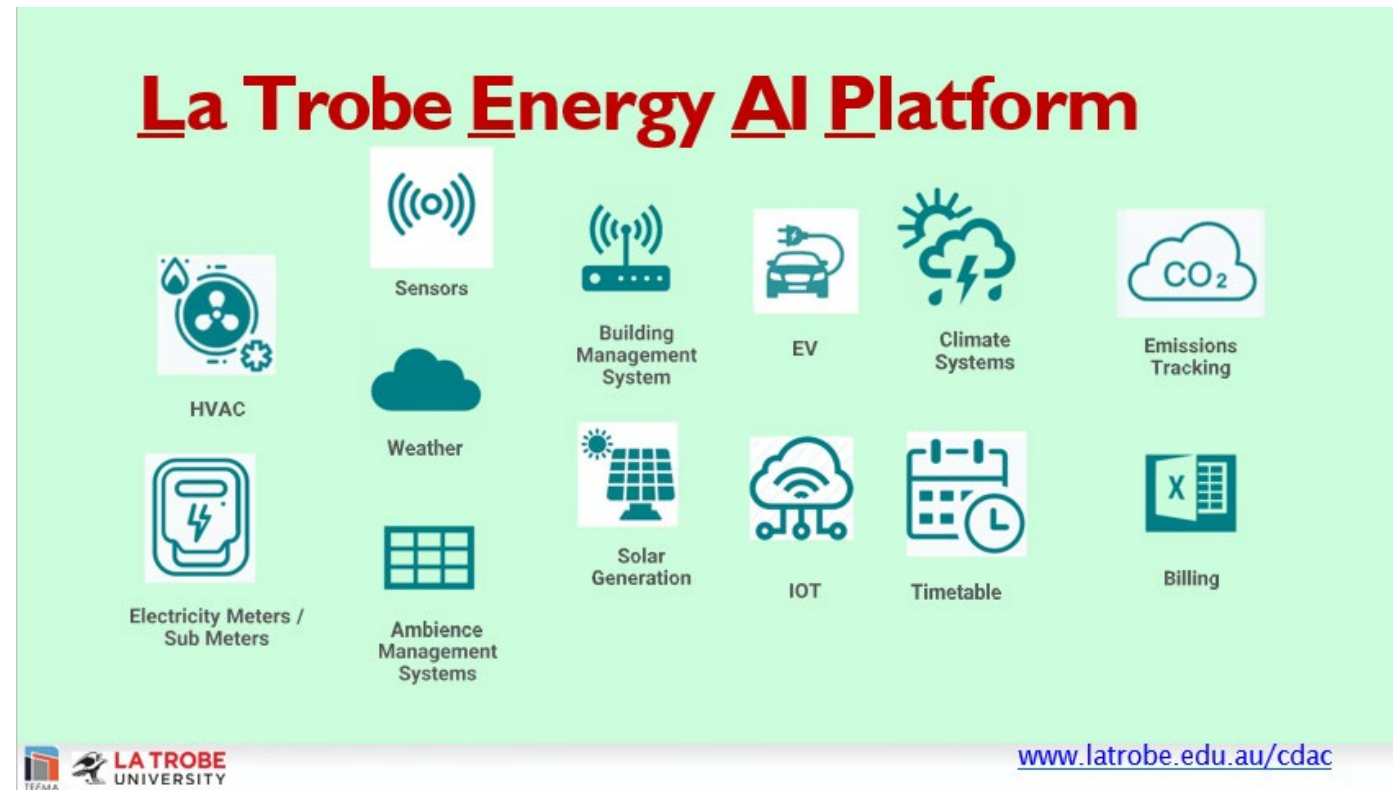
1. Generative AI – repetitive, sequential, conditional
2. Communications – emails, announcements, promotions, flyers, advertisements, tenders
3. Administration – meetings, transcripts, action items, follow ups, slide decks, proposals
4. Research & Development – MS Office Copilot, ChatGPT, ‘free’ R&D conducted by your own team
5. Automation – pairing with robotic process automation
6. Prompt Engineering – free or paid courses
7. Mass Production – piloted by AI champions, rolled out en mass
8. Data & AI Governance Policy – responsible use and adoption
9. Augment, not Automate – deconstruct workflows into tasks, and then automate the tasks using AI, aggregating remaining tasks for the human expert
10. Agile – short, sharp burst of innovation

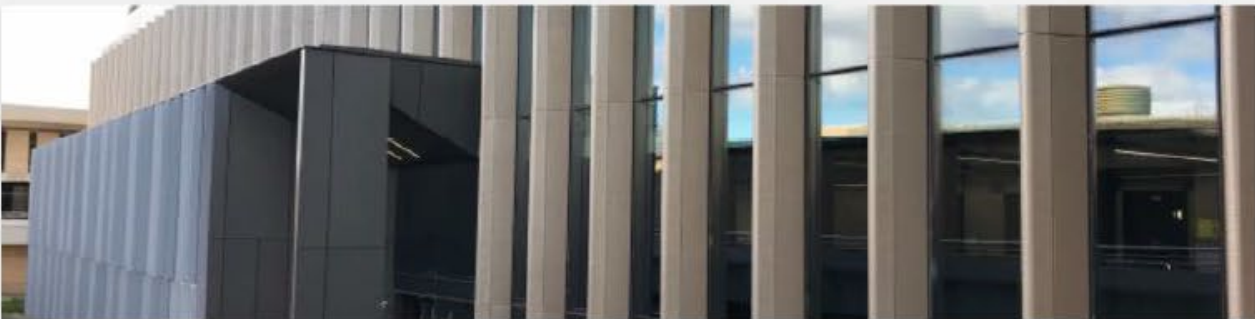


Real-life AI in FM – LaTrobe University

LaTrobe Energy AI Platform (LEAP)

- LEAP is the flagship Analytics and AI initiative of La Trobe's Net Zero Emissions Program
- Complexity of data - over 1,000,000,000 data points, streaming 15 min intervals
- Breadth of capability – data, analytics, AI, predictions, optimisations, data-driven decisions
- LEAP is currently deployed and has been used to generate energy savings of more than \$250,000
- Published 15 academic research articles
- Received the 2022 Clever Campus award at TEFMA
- Enabler of international research collaborations with Lulea University of Technology, Sweden and Aalto University, Finland.





TCI Donald Whitehead Building Virtualised

Actual Data Points 12,109 Expected Data Points 12,192



Construction Type	MIXED	Building Use	MIXED USE
Date Built	1967-06-09	Gross Floor Area	1,658,475.1 SQFT
Total Occupation	47	Total Capacity	552
Total Room Area	5,485.43 SQFT		

VIRTUALISATION CALCULATION: LV_INCOMING_DWB_AREA_MSS.MAIN_INCOMER (+) LV_INCOMING_BH.BOILERHOUSE_MAIN_SUPPLY (+) LV_INCOMING_L.LIBRARY_MAIN_SWITCH (+) LV_INCOMING_LIMST.MAIN_SUPPLY

Total Energy Consumption for the Period (kWh)

2023-12-31 to 2024-05-16

210,129.48

↓ 4.47% Under the projection

Maximum Peak Energy Consumption for the Period (kWh)

2023-12-31 to 2024-05-16

2,278.64

Total Energy Usage YTD (kWh)

2024-01-01 to 2024-05-16

1,920,043.58

↑ 0.61% Compared with 2023-01-01 to 2023-12-31

Total Energy Usage MTD (kWh)

2024-05-01 to 2024-05-16

7,615.06

↑ 0.69% Compared with 2024-04-01 to 2024-04-30

Total Energy Usage WTD (kWh)

2024-05-10 to 2024-05-16

1,532.56

↓ 51.77% Compared with 2024-04-28 to 2024-05-09

Cost Difference with Baseline (AUD)

2023-12-31 to 2024-05-16

4,647.73

↑ 25.32% Over the projection

Estimated Total Cost for the Period (AUD)

2023-12-31 to 2024-05-16

23,001.93

CO2 Emission YTD (tonnes CO2-e)

2024-01-01 to 2024-05-16

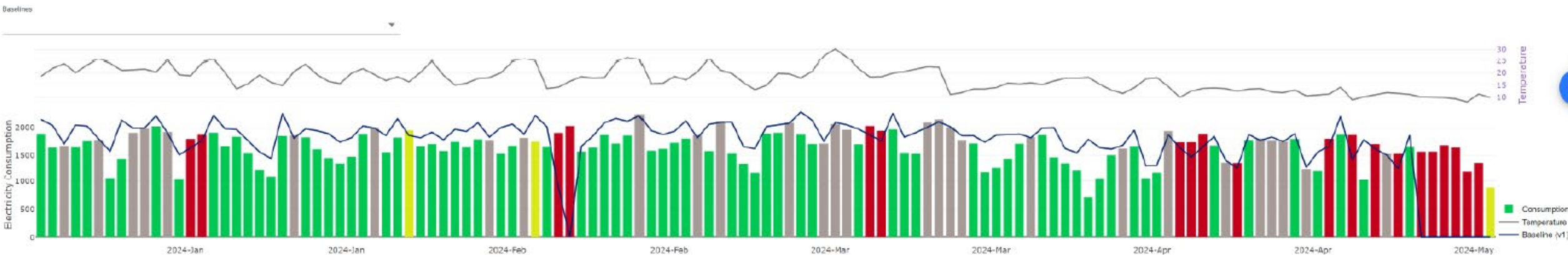
2,054.45

↑ 0.70% Compared with 2023-01-01 to 2023-12-31

Total Electricity Consumption Over Time

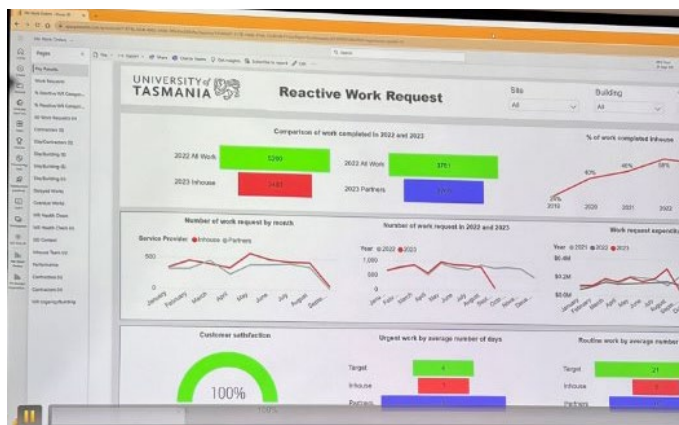
Daily View

+ Add Event

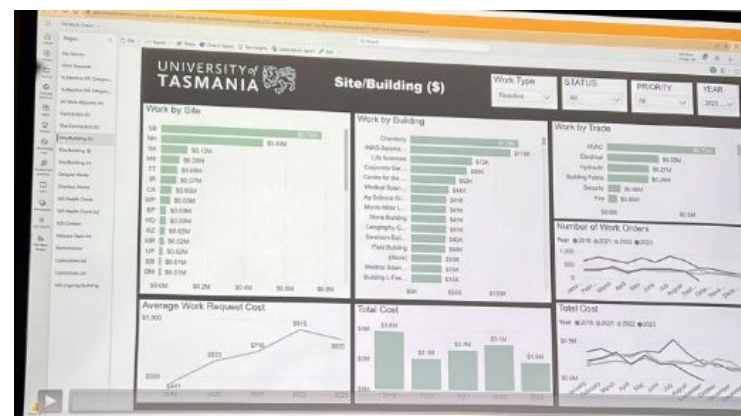


Dashboards – University of Tasmania

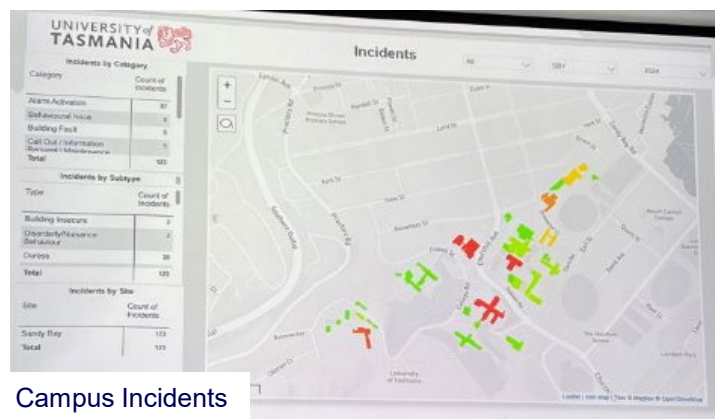
University of Tasmania have invested 2 years in developing a suite of PowerBI dashboards to keep them informed at the touch of a button.



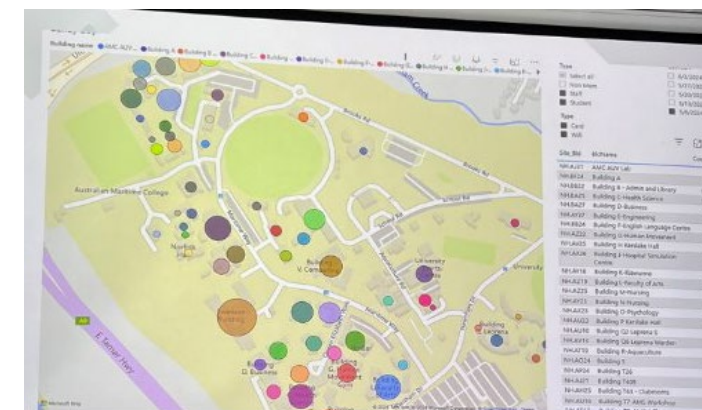
Reactive Work Request Status



Building summary, number of work requests, and \$\$ spent



Campus Incidents



Building occupancy – Wi-Fi and EAC



Data Driven Facilities Management – University of Melbourne

Challenges include:

- Unstructured Data
- Multiple sources of truth
- A cultural shift
- Wide ranging eco system of software and products
- Traditional data collection methods
- Duplication and rework

Answering basic questions about the facilities can involve searching 10 systems and asking 10 humans as each element is managed by a different person and system.

How can they connect these processes for better campus insights?

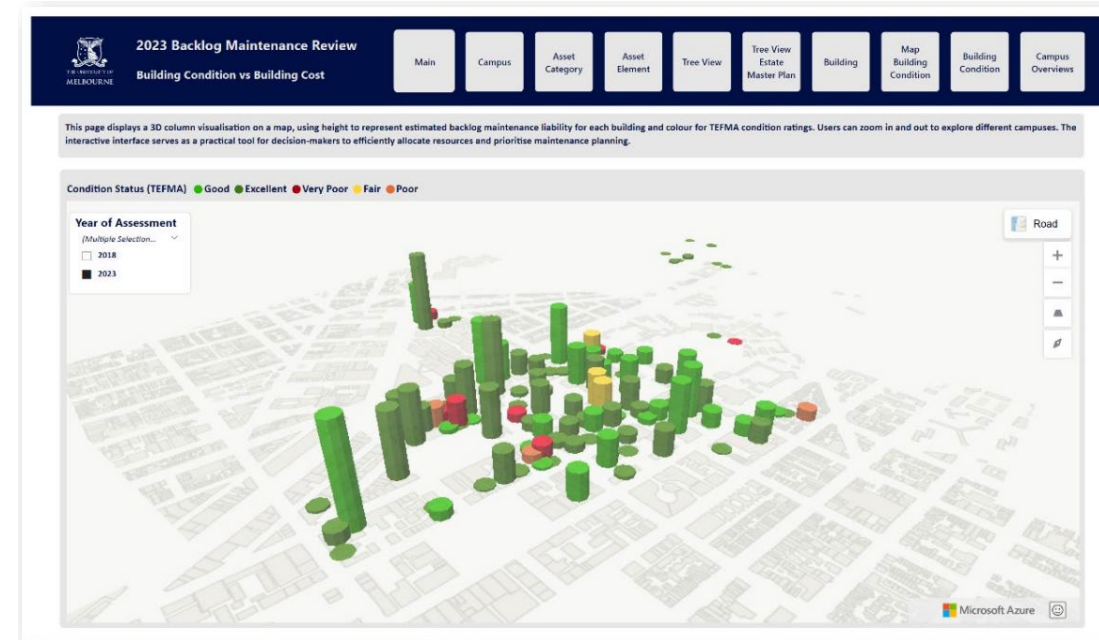
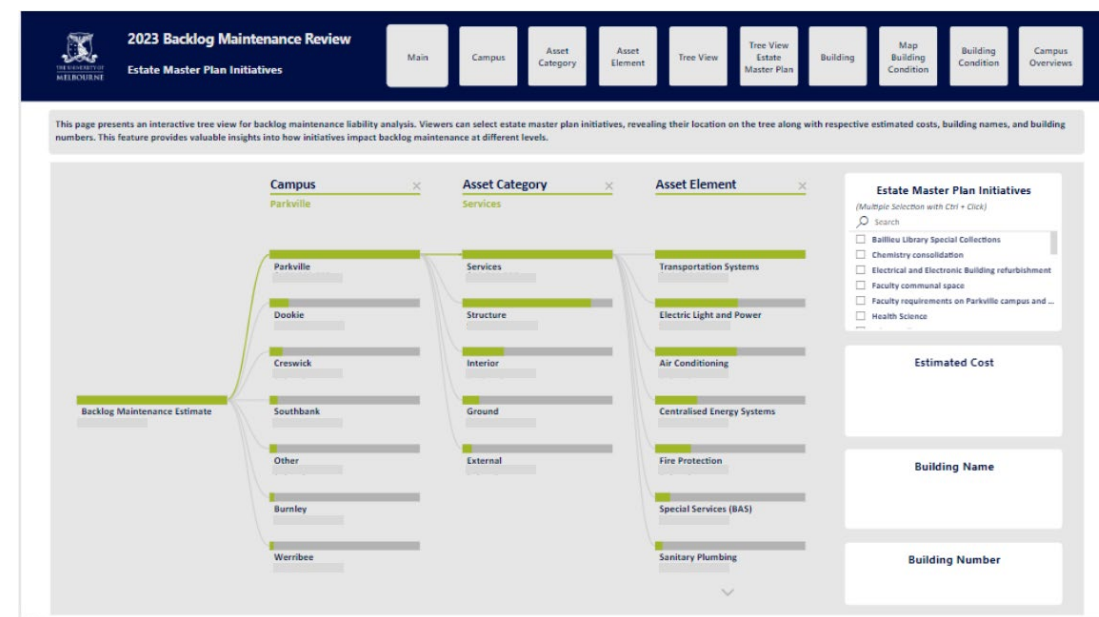
- Standardising locations and naming in all databases
- Being clear on what they need to know
- Drilling down to assets
- Visualising campus condition
- Automating data collection and reporting
- Connecting images, assets and documents in one place
- Offering flexibility and ability to find all the answers in one place



Data Driven Facilities Management – University of Melbourne

University of Melbourne's advice

1. improve, connect and use what you have – avoid 'another new system'
2. Start small, build your case for change
3. Focus on the decision and outcome. Not just 'more dashboards'



Part 2 – RMIT University

Introduction and Data Lead Decision Making



RMIT University Introduction

RMIT is one of Australia's original tertiary institutions, established in 1887 as the Working Men's College with the aim of bringing education to the working people of Melbourne.

RMIT (Royal Melbourne Institution of Technology) was awarded royal patronage by Queen Elizabeth II for its educational service to the Commonwealth and contribution to the war effort.

During the 1990s the institution gained university status and now enjoys an international reputation for excellence in education, research and engagement with industry and community.

- Dual sector University
- With campuses in Melbourne Australia and Vietnam and a site in Barcelona



RMIT Locations

RMIT Australia



GFA: 486,201 m²

UFA: 306,614 m²

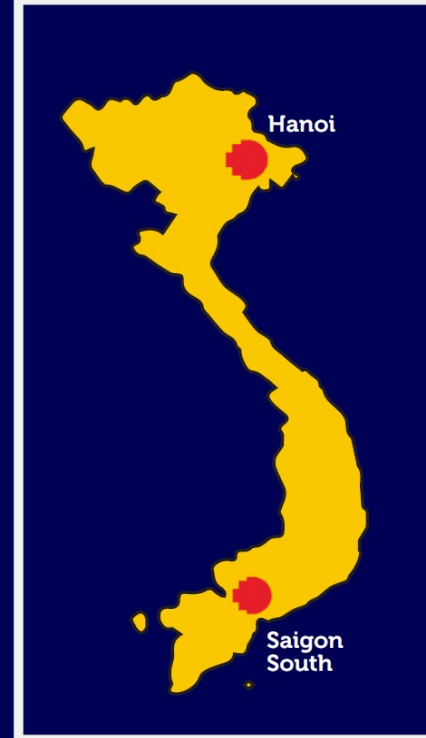
Land: 67.3 hectares

No. of Buildings: 109

Students: 67,927

GFA / EFTSL ratio: 11.3 m²/EFTSL

RMIT Vietnam



GFA: 60,879 m²

UFA: 41,010 m²

Land: 12.4 hectares

No. of Buildings: 14

Students: 12,100

GFA / EFTSL ratio: 8.7 m²/EFTSL

RMIT Europe



GFA: 273 m²

UFA: 263 m²

Land: 0 hectares

No. of Buildings: 1



Space Counters



Background

What we were doing:

- RMIT was undertaking a physical space audit once per year.
- Audit report provides snapshot of frequency & occupancy
- High wastage - booked and not used rate of 28%

We needed a solution to:

- Improve the quality and frequency of data
- Be automated real time capability in providing frequency and occupancy data
- Integrate with the timetable system, Syllabus Plus

Classrooms in use by Day/Timeslot

Period	Monday	Tuesday	Wednesday	Thursday	Friday
08:30	160	164	158	178	156
09:30	228	237	231	223	217
10:30	245	255	252	258	239
11:30	235	246	242	251	243
12:30	211	216	220	235	209
13:30	245	257	248	264	239
14:30	248	254	253	263	235
15:30	233	244	232	229	208
16:30	207	208	199	197	138
17:30	190	190	186	176	101
18:30	150	168	163	136	81
19:30	105	117	123	89	52
20:30	65	70	65	48	37

0+	65+	127+	189+	250+
0% - 20%	21% - 40%	41% - 60%	61% - 80%	81% - 100%



Digital Data Collection Methods Available



Horizontal Wired /
Wireless People
Counting Sensors



Overhead People
Counting Sensors



Mobile Device to
WAP

For all Solutions, consider:

- How the space entrance set up.
- How wide is the entrance.
- Layout and proximity of WAPs.
- Frequency of data you wish to capture.
- What kind of Occupancy do you wish to capture
- Power or POE available at the entrance

Data Driven Analytics can also provide:

- Quality of service for student facilities.
- Retail space optimisation.
- Space design and allocation.
- Logistics planning – special events etc.
- Air conditioning and other utilities utilisation.



Proof of Concept Findings

Mobile Device

- Easy to implement, utilising existing wireless access points (WAPs).
- Links to possible wayfinding solutions, acts as an indoor GPS.
- Integrate with learning analytics.
- Provides security in movement tracking.
- Most devices used by an individual on a day was 17.
- Privacy concerns.
- Accuracy concerns.

Thermal Sensor

- Counts anonymously by tracking body heat.
- Dual view, thermal lens (for counting) and Video Lens (for auditing).
- Counts INS and OUTS to determine room occupancy.
- Requires installed systems and considerable hardware to implement.
- Does not recognise the identity of a person walking past the sensor.



Electronic Recording of Utilisation Outcomes

Weekly Room View For All Rooms on campus CC called 080.03.022 from 09/09/2024 to 15/09/2024 08:30 to 21:30

Created: 22/09/2024 at 21:19:22

Peak Occ.	Freq. By Room	Freq. By Seat	Occ. By Room	Occ. By Seat	Utilisation	Booking Freq.	Booking Occ.	Booking Util.	Attendance Efficiency
20	53.1	53.1	32.3	32.3	17.2	62.3	91.5	57.0	28.7

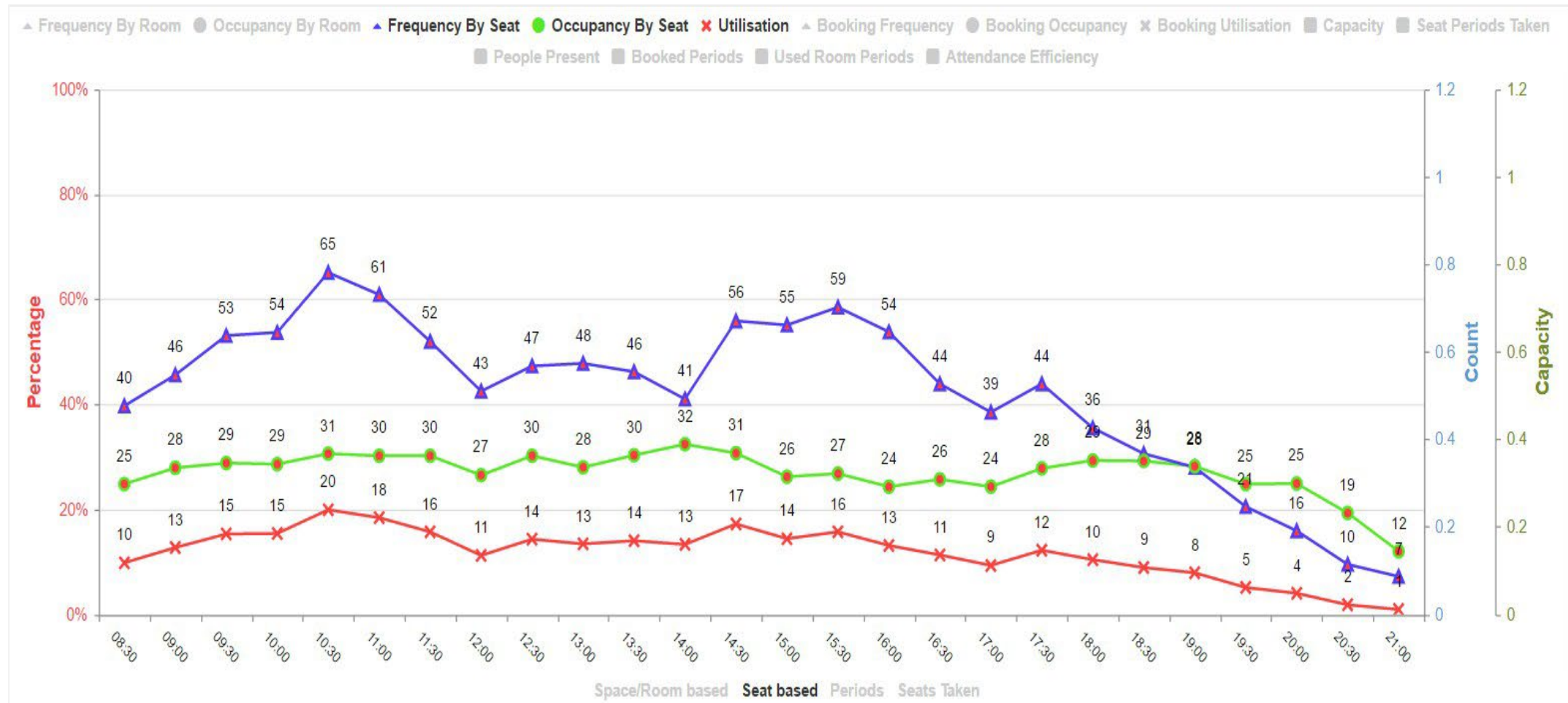
Non Used in Core Period	Non Used in Non Core Period
No Show	Used Period
Squat	Early Finish

	Monday 9/9/2024	Tuesday 10/9/2024	Wednesday 11/9/2024	Thursday 12/9/2024	Friday 13/9/2024
8:30					
9:00					
10:00					
11:00					
12:00					
13:00					
14:00					
15:00					
16:00					
17:00					
18:00					
19:00					
20:00					



Data Available in Real Time

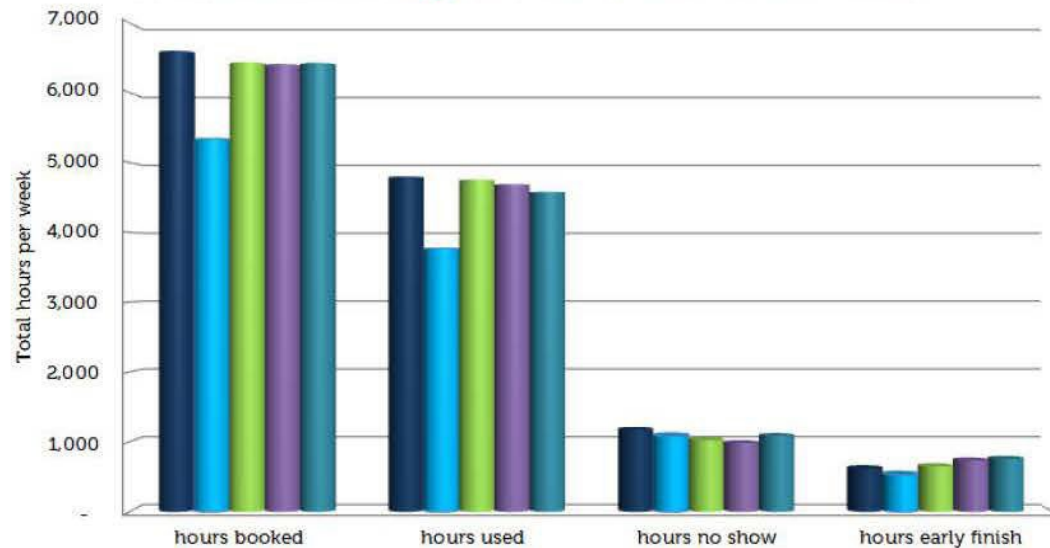
Frequency, Occupancy and Utilisation results



Timetable Integration

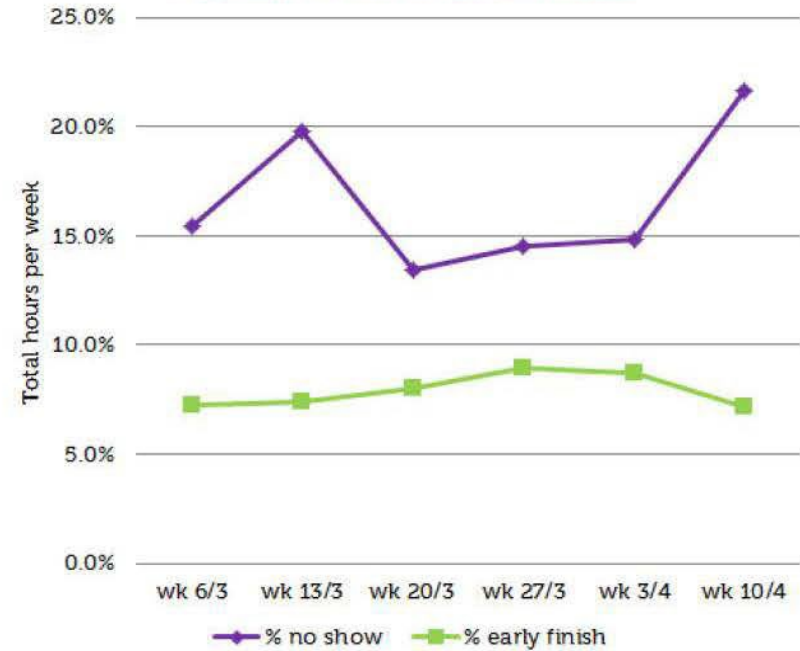


Overall use of teaching spaces with space utilisation counters



	hours booked	hours used	hours no show	hours early finish
■ wk 6/3	6,597	4,798	1,177	622
■ wk 13/3	5,340	3,770	1,087	530
■ wk 20/3	6,433	4,755	1,029	650
■ wk 27/3	6,407	4,689	985	734
■ wk 3/4	6,424	4,578	1,089	758

Overall rooms booked but not used



Weekly Reporting

- Space Counter Use reports originally produced on a weekly basis.
- Reports detailing classes that have not used booked locations for 2 or more weeks are provided to timetable services for follow up.



	Total Hours Booked	Total Hours Used	No Show	Early Finish	Total Hours Unused
College A	6,000	4,000 66.6%	1,000 16.6%	1,000 16.6%	2,000 33.3%
College B	13,000	10,000 77%	2,000 15.4%	1,000 7.7%	3,000 23%
College C	10,000	8,000 80%	1,500 15%	500 5%	2,000 20%

* Indicative data for demonstration

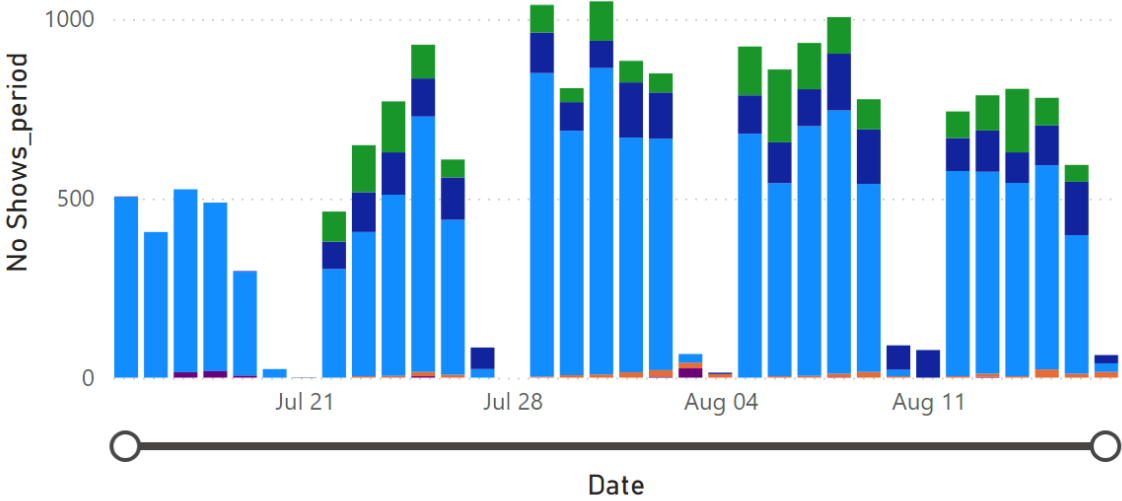


Smart Reporting with PowerBI

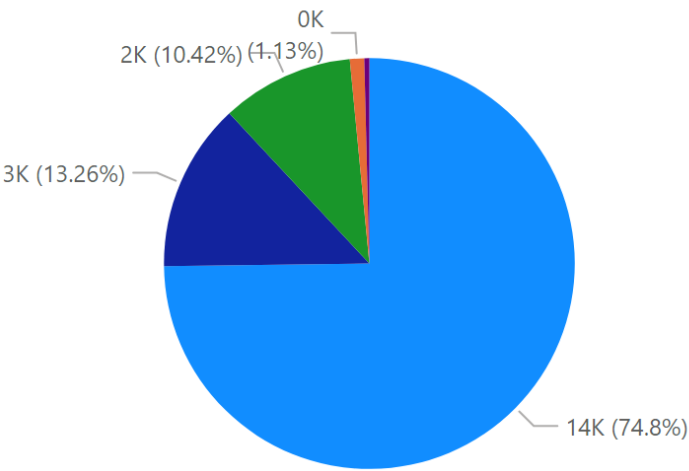


No Shows by College

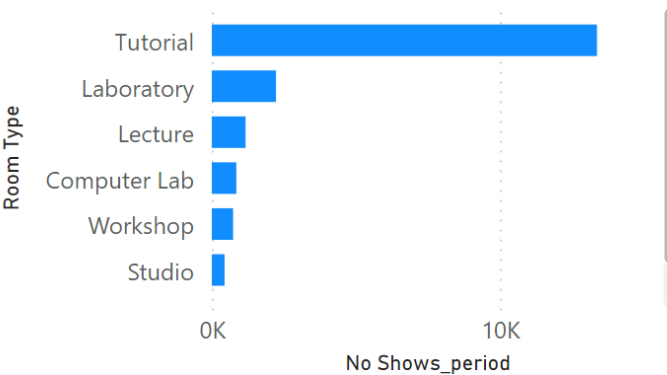
College CMTS CoBL CoVE DSC STEM



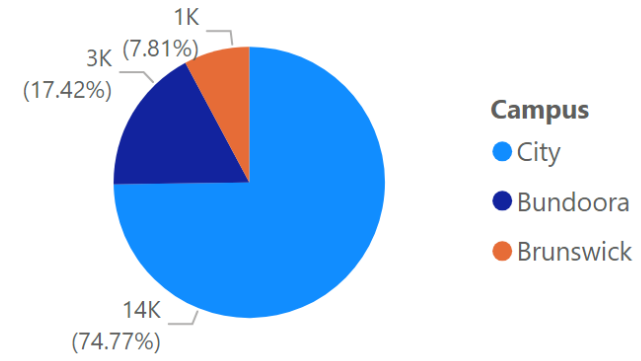
No Shows by Period by College



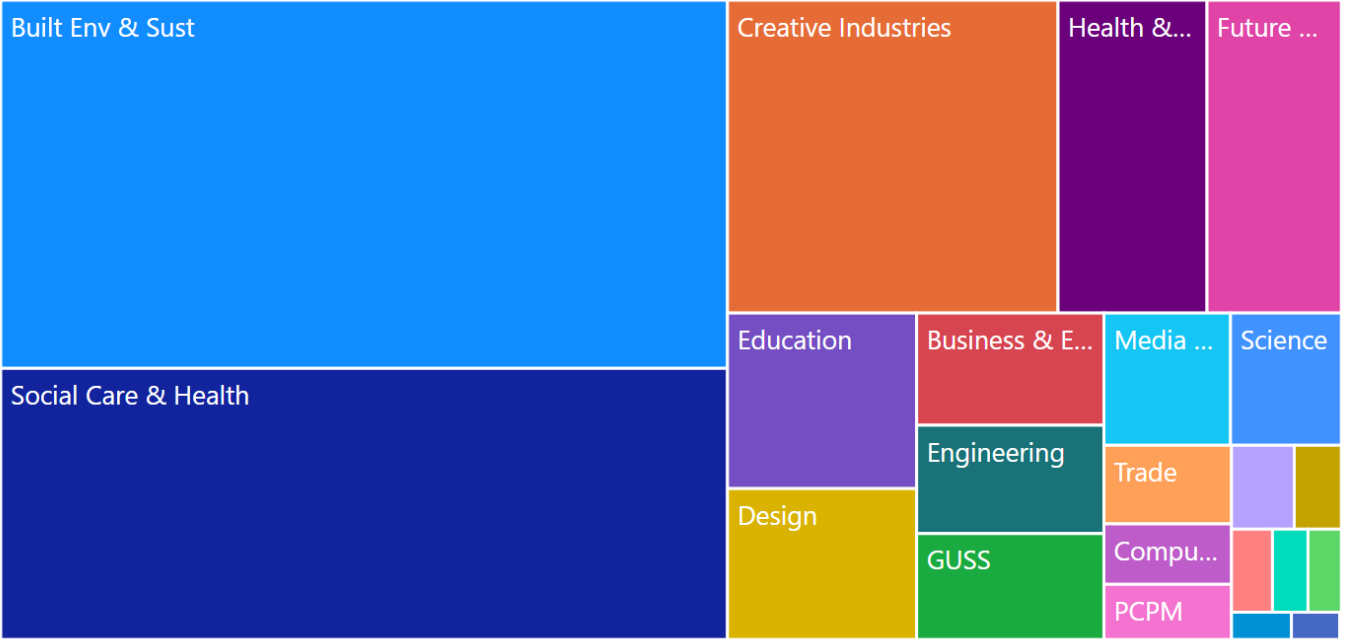
No Shows_period by Room Type



No Shows_period by Campus

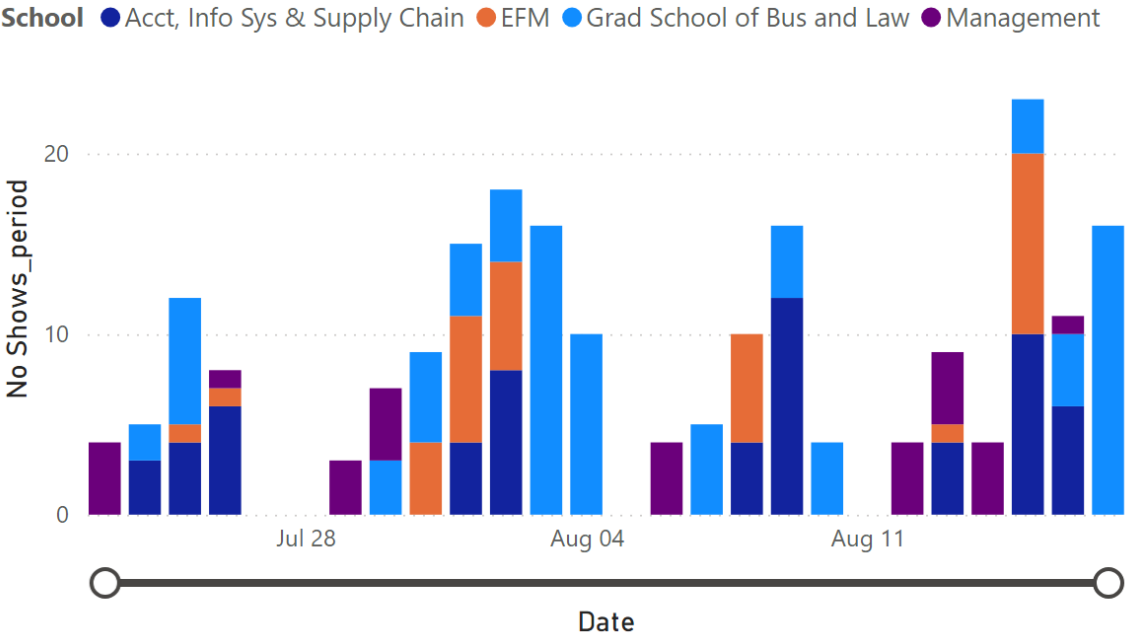


No Shows_period by School

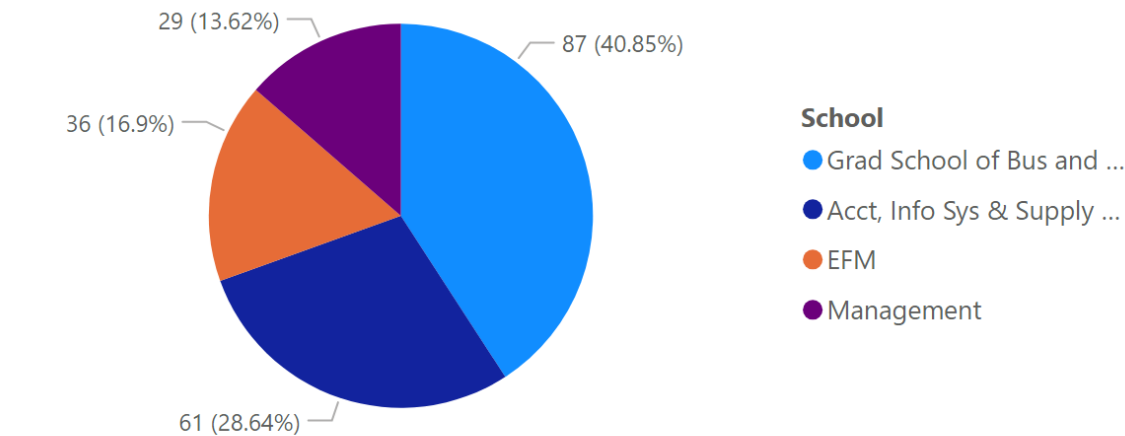


Total No Show Periods	Seat Hr Could have been used by others	Classes Has No Shows	No Show %
19K	344.0K	1011	23.86

No Shows by School

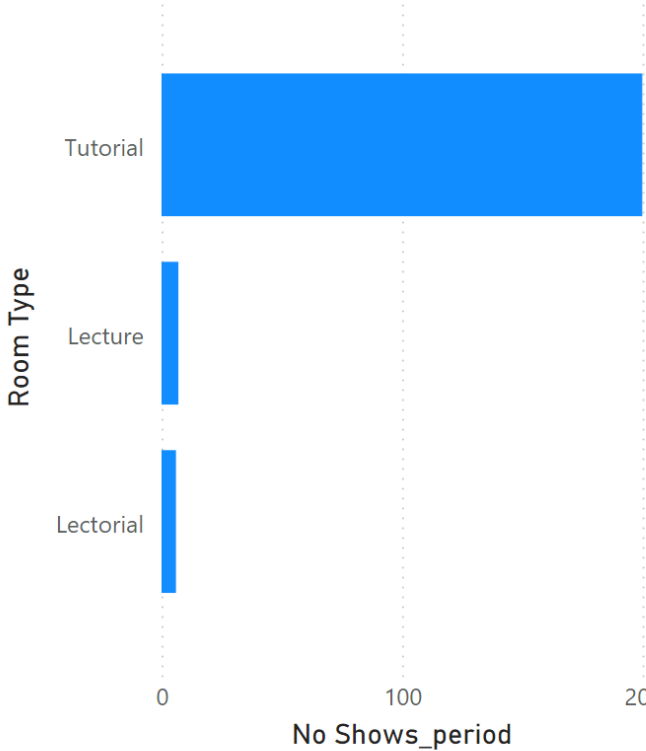


No Shows by Period by School



* Each period is 30 mins

No Shows_period by Room Type



Class	NoShow
BUSM-2572-AUSCY-S2	4
OMGT-1039-AUSCY-S2	4
ISYS-3467-AUSCY-S2	3
MKTG-1474-AUSCY-S2	3
BUSM-2577-AUSCY-S2	3
LAW-2450-AUSCY-S2	2
LAW-2604-AUSCY-S2	2
OMGT-2145-AUSCY-S2	2
LAW-2554-AUSCY-S2	2
BUSM-1094-AUSCY-S2	2
MKTG-1101-AUSCY-S2	1
ACCT-1048-AUSCY-S2	1
BUSM-3922-AUSCY-S2	1
BUSM-4448-AUSCY-S2-INT01/01	1
LAW-1023-AUSCY-S2	1
LAW-1025-AUSCY-S2	1
LAW-2442-AUSCY-S2	1
OMGT-2378-AUSCY-S2	1
Total	41

Date	School	Class	Room	Booking
23/07/24	Management	BUSM-2572-AUSCY-S2	056.03.089	11:30 - 13:30
24/07/24	Acct, Info Sys & Supply Chain	BUSM-1474-AUSCY-S2	008.09.005	12:30 - 14:30
24/07/24	Grad School of Bus and Law	LAW-2554-AUSCY-S2	013.03.015	17:30 - 18:30
25/07/24	Grad School of Bus and Law	LAW-1023-AUSCY-S2	013.03.005	19:00 - 20:30
25/07/24	Grad School of Bus and Law	LAW-2604-AUSCY-S2	013.03.005	14:30 - 16:30

Total No Show Periods	Seat Hr Could have been used by others	Classes Has No Shows	No Show %
213	4193	30	10.28



Next Steps and Outcomes

- Rolling more sensor devices out, sensors are part of our design standards and are included in all classroom refurbishments.
- Ability to display ongoing utilisation trends.
- Occupancy information over the full semester will provide learning analytics.
- Full semester and year utilisation data.
- With this data we have:
 - Repurposed 5,000m² of general learning spaces to specialist learning spaces or research or student study space
 - Closed 7 lecture theatres
 - Repurposed a lecture theatre as a computer lab



Capacity Planning



Capacity Planning

To understand how the University's physical learning and teaching spaces need to respond to accommodate forecast growth in student numbers, we have developed a Capacity Planning model. Our Data & Analytics specialist have transformed a spreadsheet based capacity model into an intelligent Power BI tool.

This tool compiles student forecasts, course delivery practices, learning and teaching (L&T) space information, enabling a quick assessment of campus capacity. Data is refreshed twice per year to monitor capacity with the latest information.



About

The Capacity Planning Model for Australia aims to:

- Provide the stakeholders with a comprehensive view of the projected evolution of the demand, or need for space, and the supply, or available capacity. These are compared in terms of Seat Hours from past year to 5 years in the future.
- Provide a flexible tool that allows stakeholders to model alternate projections based on demand and supply scenarios that they can input themselves

Refresh Schedule

When five-year enrolment projections are updated.

Data Sources

Data Source	Scope
Allocate+	DEMAND - Course sessions/activities: Weekly face to face hours as allocated in the final published timetable (linked to location, space type etc...)
Archibus	SUPPLY - Seats available: List of rooms (linked to location, space type, number of seats etc...)
HEAL	DEMAND - Actual Enrolment and Taught Headcounts from latest year available (linked to programs, courses, locations etc...). Used to obtain Load to Taught HC ratios. These are

Definitions

Show: All 

Term	Definition
Demand	Measured as seat hours required: Taught headcount in Semester 1 x Weekly face-to-face hours (defined for each Program-Campus cohort).
General L&T	General Learning and Teaching space. Corresponds to the following room categories: Lecture, Lab, Tutorial
Average Weekly Course Hours	Average of weekly Virtual + Face-to-face Hours. Defined for every 'Program - Teaching School - Teaching Campus' Cohort.
Demand Scope	Applies to Students & Activities: <ul style="list-style-type: none">· Campus: Enrolled AND Studying on Brunswick, Bundoora or Melbourne City campuses (As a consequence, Offshore & RMIT Online students are also excluded)· Enrolled College: DSC, STEM, COBL & CoVE only.

Known issues

Date Created	Data Type	Note	Status
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Capacity Planning Model - Overview of Semester 1 Projections



Campus

Brunswick

Bundoora

Melbourne City

Sector

HE

VE

Headcount

27 May 2024

Allocate+

SEM1 2023

Supply

19 Oct 2023

	2023	2024	2025	2026	2027	2028	2029
All Capacity (seats)	18,605	18,875	18,815	19,511	19,511	19,511	19,511
Enrolment Headcount	51,920	57,337	60,702	64,002	66,334	68,237	69,911
Taught Headcount	155,736	165,083	174,146	182,274	188,670	194,023	198,871
Taught/Enrolled ratio	3.0	2.9	2.9	2.8	2.8	2.8	2.8

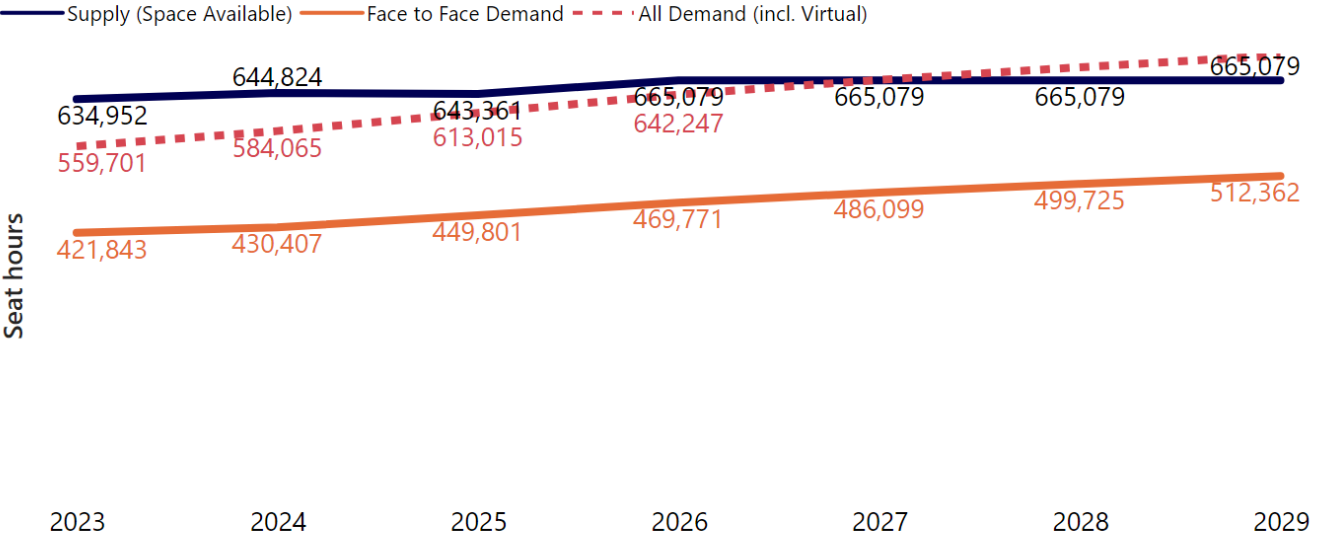
Parameters

Click here for list of Programs

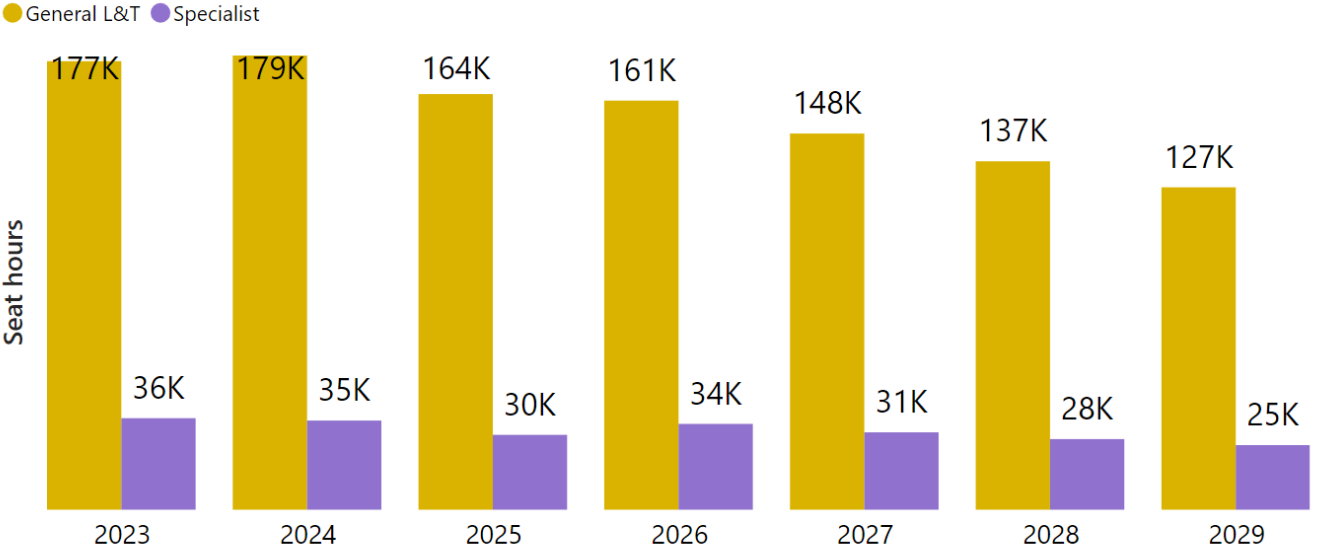
Campus	Space Type	Frequency	Occupancy	Operating hours
<input checked="" type="checkbox"/> Melbourne City	General L&T	75%	75%	13
	Lecture	85%	75%	13
	Specialist	50%	75%	13

Click here for list of Rooms

Supply versus Demand - Weekly Seat Hours in Semester 1



Excess seat hours by space type



Capacity Planning - What-If Scenarios

Campus

Brunswick

Bundoora

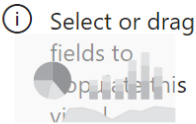
Melbourne City

Last Scenario Update (MEL)

7/1/2024 5:03:04 PM

Show Tables

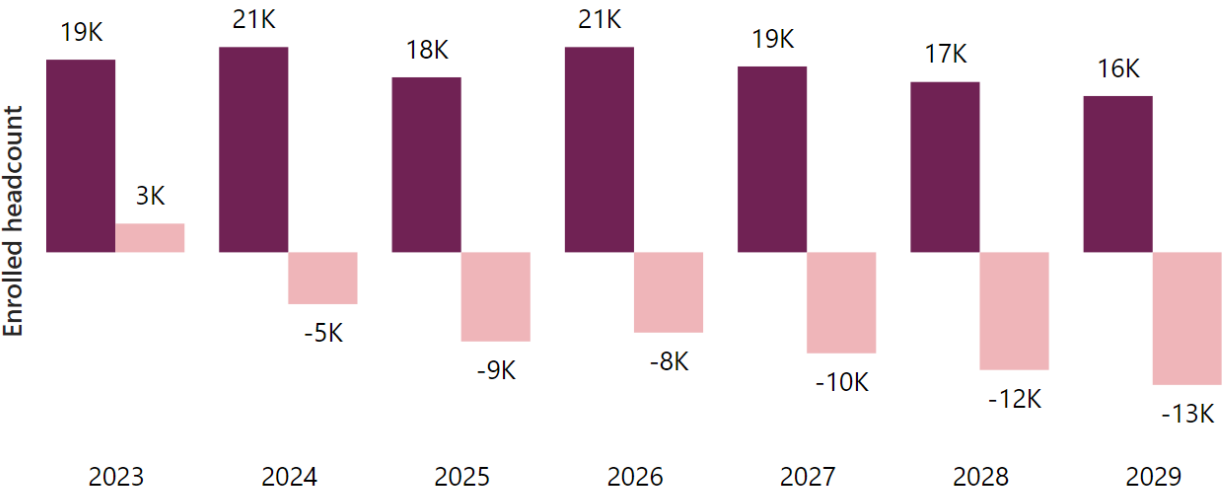
1. Enter Scenario Inputs



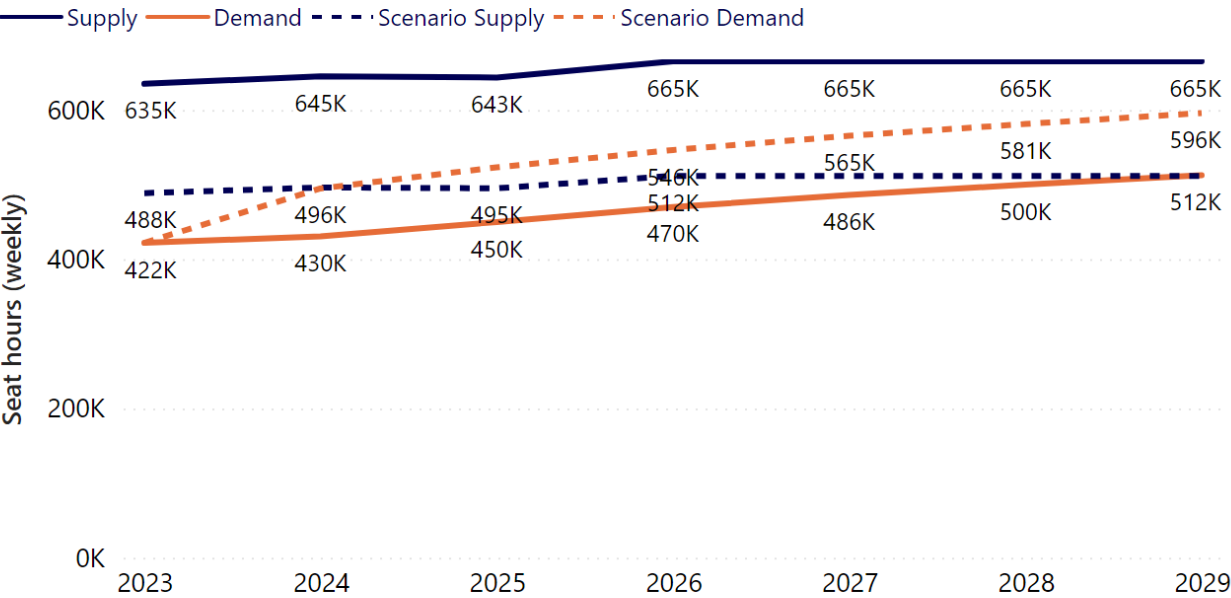
3. Refresh Dashboard (above on the right)

Extra Students Simulation

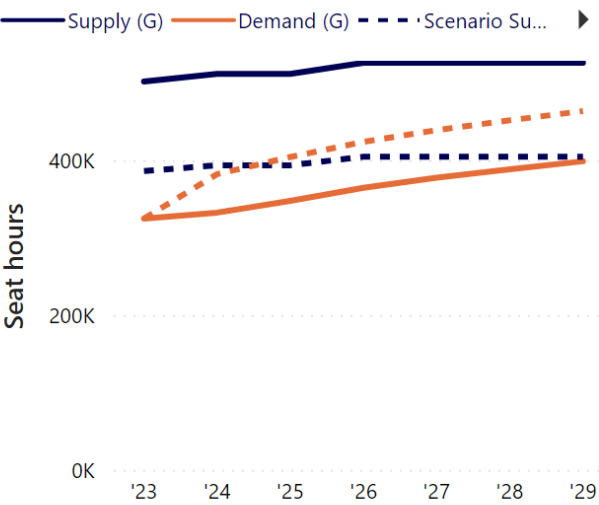
Status Quo Scenario



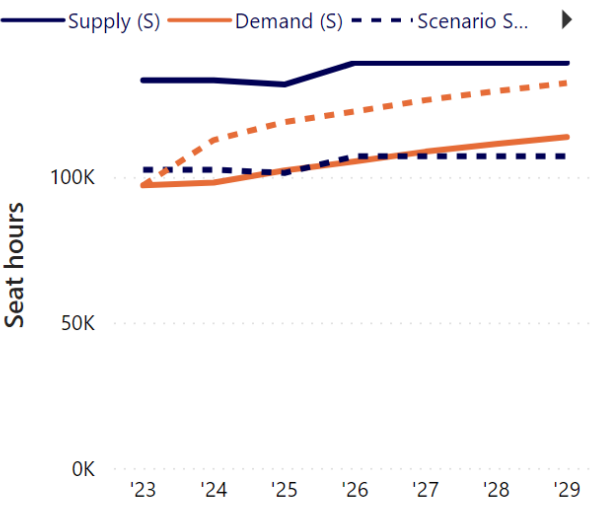
OVERALL - Supply versus Demand - Week Seat Hrs in Semester 1



GENERAL



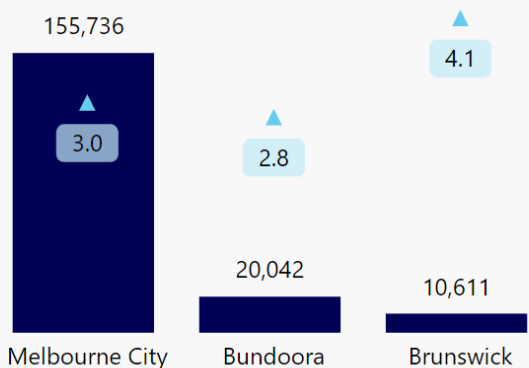
SPECIALIST



ENROLMENT

Taught headcount

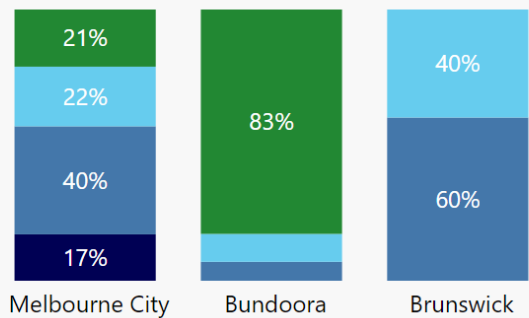
● Taught headcount ▲ Taught/Enrolled ratio



Distribution of Taught Headcount

By College and Campus

● COBL ● CVE ● DSC ● STEM

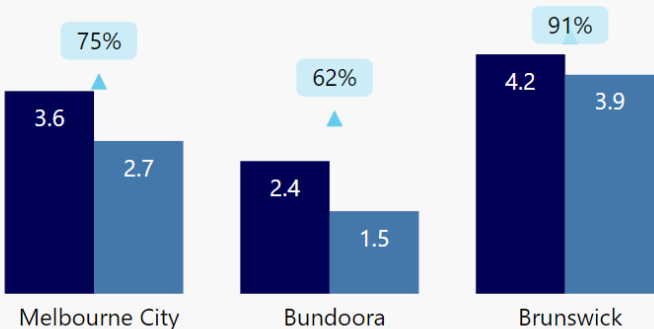


COURSE DELIVERY

Virtual vs Face-to-Face

Unit: Weekly Timetabled Hours

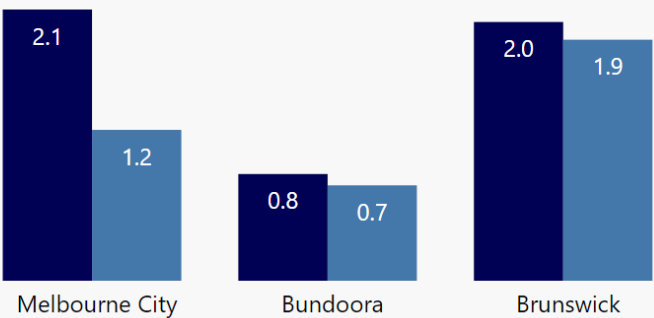
● L&T (incl. Virtual) ● F2F ▲ % F2F



By Space Type

Unit: Weekly Timetabled Hours

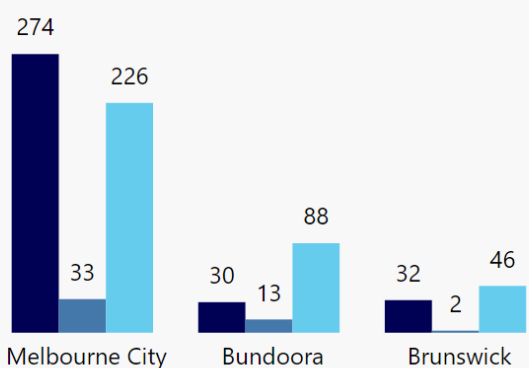
● F2F in General Space ● F2F in Specialist Space



L&T SPACE

Number of Rooms

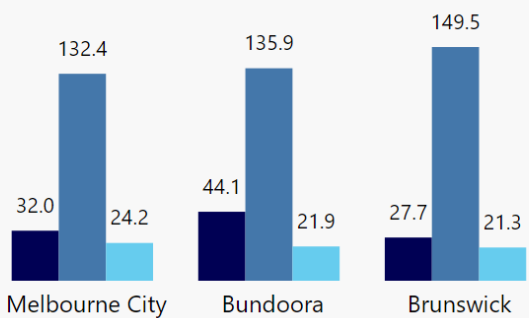
● General L&T ● Lecture ● Specialist



Avg. Room Size

Unit: Seats

● General L&T ● Lecture ● Specialist



RMIT City Campus



<https://www.youtube.com/watch?v=sovjfABcx9s&t=7s>

Thank you

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