

# CHAMP10NING SUSTAINABILITY

SUSTAINABILITY REPORT  
2018/19



**CHANGI**  
airport group

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## FEEDBACK

We warmly welcome all stakeholders to share their feedback, insights and perspectives about our approach to sustainability and sustainability reporting. These may be directed to [sustainability@changiairport.com](mailto:sustainability@changiairport.com).

# CHAMPIONING SUSTAINABILITY

## INTRODUCTION

Sustainability has always been a focus at CAG. More than our business, we strive to safeguard our people, our community and the future of our planet. As we mark our 10<sup>th</sup> year of operations, we look back on a decade of Championing Sustainability.

Anchored on six pillars, the strong foundation built over the years stands as a testament to our commitment and drive.

We are not content to rest on our laurels. In an ever-changing world, we constantly seek to augment our processes and operations, building on our past efforts for the good of all. In doing so, we advance our quest and drive greater sustainability in the next decade and beyond.

## ABOUT CHANGI AIRPORT GROUP

Changi Airport Group (Singapore) Pte Ltd (CAG) was formed on 16 June 2009 and the corporatisation of Changi Airport followed on 1 July 2009. As the company managing Changi Airport, CAG undertakes key functions focusing on airport operations and management, air hub development, commercial activities and airport emergency services.

# Sustainability Highlights

CHANGI AIRPORT GROUP 2018-19



## Corporate Governance



NOTICES OF NON-COMPLIANCE WITH APPLICABLE LAWS AND REGULATIONS

**Zero**



EMPLOYEE WORK-RELATED FATALITIES

**Zero**



## Social



RANKED **TOP 3** most attractive employer by Randstad for the 5<sup>th</sup> consecutive year



VOTED WORLD'S BEST AIRPORT FOR THE **7<sup>th</sup>** consecutive year



TOUCHED THE LIVES OF **3,220** beneficiaries through Changi Foundation



COLLABORATED WITH **33** AIRPORT PARTNERS for Changi Foundation programmes



## Economic



PASSENGER MOVEMENTS **66.3** million



CARGO TONNAGE **2.14** million



CONNECTED TO OVER **412** cities worldwide



## Environmental



**7.45%** DECREASE IN OVERALL WATER CONSUMPTION



**4,435** TONNES of concrete recycled to repave aircraft parking bays



JEWEL AWARDED **GREEN MARK GOLD PLUS**



**8.5%** waste diverted from incineration

\* Comparing FY2016/17 and FY2017/18

# Chairman and CEO's Message

FY2018/19 marked our 10<sup>th</sup> year of the Changi Airport Group's (CAG) journey. As we commemorate this milestone, we reflect on our achievements in sustainability while identifying areas with long-lasting impact on the economic, environmental, social and corporate governance fronts for us to further engage and enhance. At the same time, having infused sustainability across our organisation, we strive to nurture the same ethos in our airport partners. Together, as a community of over 50,000 individuals united under the ONE Changi banner, we are committed to "Building a future, with passion".

Underpinning all our efforts is our quest for greater sustainability. Our sustainability framework is anchored on six key thrusts – Fulfilling Careers, Safeguarding Lives, Invigorating Travels, Enriching Communities, Thriving Economy and Flourishing Planet – which are mapped to the United Nations Sustainable Development Goals. We have prepared this Sustainability Report according to the Global Reporting Initiative (GRI) Standards, with a reporting timeframe of 1 April 2018 to 31 March 2019.

Changi Airport is constantly evolving. Propelled by our firm belief that design must drive passenger experience, we seek to understand our travellers' needs to continually delight and surprise them. One example is Terminal 4, which welcomed its first scheduled flight in October 2017. Here, departing travellers breeze through check-in thanks to the Fast and Seamless Travel (FAST) suite of self-service options. Then, in the first half of 2019, Jewel Changi Airport transformed the former Terminal 1 open-air carpark into a lush rainforest complete with facilities and unique attractions for the enjoyment of travellers and Singapore residents. Following the unveiling of Jewel, carpark capacity for Terminal 1 almost tripled, from 850 to 2,500 parking spaces. With an eye on the future, we are designing and building Changi East, which will increase Changi Airport's passenger terminal capacity to welcome over 130 million passengers each year.

**"FY2018/19 marked our 10th year of the Changi Airport Group's (CAG) journey. As we commemorate this milestone, we reflect on our achievements in sustainability while identifying areas with long-lasting impact on the economic, environmental, social and corporate governance fronts for us to further engage and enhance."**

## **FULFILLING CAREERS**

Comprising over 1,900 airport professionals, the CAG family is the heart and soul of our organisation. We invest in our employees, creating leadership and development opportunities for them and shaping workplace environments which ignite their creative spark.

Together with our external innovation partners and home-grown start-ups, we designed an innovation space at Terminal 2 where trial and error is embraced and encouraged.



**From left to right:**  
**Liew Mun Leong**  
Chairman  
**Lee Seow Hiang**  
Chief Executive Officer

## Chairman and CEO's Message

As a testament to our efforts in caring for and developing our employees, CAG was also recognised for the fifth consecutive year as Singapore Top Three Most Attractive Employer at the Randstad Employer Brand Awards.

### SAFEGUARDING LIVES

With millions of passengers passing through our terminals every year, we place paramount importance on the lives of our travellers and the airport community. We adopt a many-eyes approach to hazard identification and offer all airport staff multiple channels for hazard reporting, including the Service Workforce Empowerment and Experience Transformation (SWEET) mobile phone application. We also organise and coordinate airport emergency response drills every year to prepare our airport partners and agencies for the unexpected. Moreover, a trained team of CAG staff are always ready to provide

first-level support to passengers' next-of-kin in the event of an aviation or airport crisis.

Our work in safeguarding lives has drawn results. The International Federation of Air Line Pilots' Associations (IFALPA) has awarded Changi Airport a deficiency-free rating since the airport's inception in 1981. In addition, we experienced zero employee work-related fatalities during the financial year.

At CAG, our work and operations are founded on integrity. Our employees and airport partners are well-versed with our zero-tolerance policy towards bribery and we employ various tools to ensure compliance – from an Anti-Bribery Management System and whistle-blowing channels for suspected misconduct, to a Supplier Code of Conduct which is published on our corporate website.

### INVIGORATING TRAVELS

Changi Airport reflects Singapore's dynamism and diversity. It houses new facilities to enhance the travel experience and hosts thematic horticultural displays throughout the year that change in sync with Singapore's festivals. Jewel, in particular, is a refreshing oasis where travellers can enjoy nature and engage in last-minute shopping before their flights depart.

In embracing the ONE Changi culture, our airport partners do their utmost to serve the needs of our travellers, often going beyond the call of duty, and have garnered numerous accolades along the way. One shining example featured in this report involved the combined efforts of staff from CAG, Certis Aviation Security and P-Serv to assist a passenger in need. (See pages 60 and 61.)

### ENRICHING COMMUNITIES

Spearheaded by CAG, Changi Foundation empowers youth beneficiaries to shape their own realities. Actively supporting its initiatives are our CAG family who coach the youth in academic subjects, mentor them in job readiness programmes and engage them through fun avenues including weekly soccer games – CAG-Saturday Night Lights.

We are heartened that our airport partners have been equally enthusiastic in joining in Changi Foundation's programmes. In one instance, their support, and that of CAG, allowed 117 students from NorthLight School to undertake a five-day job attachment at the airport – far more than what would have been possible without their participation.

### THRIVING ECONOMY

Air travel is about connecting family and friends across the globe, creating opportunities to explore the world and enabling new business linkages. To this end, Changi Airport continues to expand air connectivity, with nine new city links to China, Germany, India, Thailand and Poland established during the year.

Back home, Changi is Singapore's aviation gateway to the world. Each year, our air hub contributes to approximately 3% of Singapore's GDP. In FY2018/19, the airport welcomed over 66 million passengers and handled 2.14 million tonnes of airfreight throughput, operating at the tempo of one flight either taking off or landing every 80 seconds.

### FLOURISHING PLANET

We are committed to an environmentally-sustainable airport and have taken active

measures to optimise our energy and water efficiency, and divert waste from incineration. Jewel, our newest addition, is designed with state-of-the-art building control and management systems, and incorporates sustainable elements such as the recycling of water that is used for the rain vortex, high-efficiency solar panels and the upcycling of used cooking oil for conversion to biodiesel for vehicles. With its myriad eco-friendly features, Jewel is certified by Singapore's Building and Construction Authority (BCA) as a BCA Green Mark Gold Plus building. Spurred on by this achievement, we are raising the stakes and are designing Terminal 5 to meet BCA Green Mark Platinum standards.

CAG is accredited at Level 3 of the Airports Council International's Airport Carbon Accreditation, which recognises our efforts to optimise our carbon footprint. Significantly, this represents a standing pledge to engage our airport partners to lower carbon emissions across Changi Airport. Meanwhile, we are strengthening our focus on sustainable procurement by adopting life cycle assessments for goods and services, and driving creative ways to reduce the amount of waste that is generated within the airport environment.

Changi's infrastructure – from the passenger terminal buildings to runways and aircraft manoeuvring areas – incorporates climate mitigation measures. These include siting buildings above the mean sea level and protective measures against lightning strikes. We have to be constantly vigilant and are addressing how best to respond to emerging climate risks such as higher ambient temperatures while reviewing the efficacy of existing measures.

### SUSTAINABILITY – AN INTEGRAL PART OF CHANGI AIRPORT'S JOURNEY

CAG's sustainability journey is intrinsically tied to our ability to continually grow and develop Changi Airport. We are thankful to have like-minded airport partners and will persist in pushing the boundaries to create an even more sustainable Changi Airport for the generations to come.



**LIEW MUN LEONG**  
Chairman



**LEE SEOW HIANG**  
Chief Executive Officer

“CAG's sustainability journey is intrinsically tied to our ability to continually grow and develop Changi Airport.”

# CAG's Sustainability Approach

102-18 | 102-19 | 102-29 | 102-31 | 102-32

“Building a future, with passion.”

## SUSTAINABILITY GOVERNANCE

CAG believes that operating in a sustainable manner is a natural extension of its business and principles. Sustainability has to be integrated across all levels of the organisation and every individual in CAG plays an important role in contributing to sustainable development. This is why CAG's Sustainability Governance structure largely mirrors that of its Organisation Structure, with its leadership being the vanguard of positive change.

## Board of Directors

- The Board sets the tone from the top and holds the ultimate accountability for the integration of sustainability within CAG



## Management Committee

- Management validates CAG's material sustainability matters and sets directions on sustainability strategies, policies, practices and targets
- They monitor CAG's sustainability performance and provide periodic updates to the Board

## Sustainability Working Group Clusters and Divisions

- Stakeholders across Clusters and Divisions implement CAG's sustainability initiatives and continually make improvements to CAG's sustainability process
- They collect and report their sustainability data and information to the Sustainability Working Group




- |   |  |
|---|--|
|  Air Hub Development     |  Corporate                            |
|  Airport Management      |  Engineering & Development            |
|  Changi East Development |  Enterprise Performance & Development |
|  Commercial              |  People                               |







# Stakeholder Engagement

102-40 102-42 102-43 102-44 102-46

Our key stakeholders are entities and individuals that affect, and are affected by, CAG. Through day-to-day conversations and regular interactions, we hear their concerns and matters that impact them most. These valuable inputs enable us to identify the critical sustainability matters to focus on.

Key Stakeholder Groups	Key Interests	Key Engagement Methods
 <b>CAG Employees</b>	<ul style="list-style-type: none"> <li>Employee well-being</li> </ul>	<ul style="list-style-type: none"> <li>Recognition schemes (e.g. Core Value Awards)</li> <li>Employee Engagement Survey</li> <li>Participatory dialogue – Townhall</li> <li>Health programmes</li> <li>In.Touch social networking mobile app</li> </ul>
	<ul style="list-style-type: none"> <li>Employee development</li> </ul>	<ul style="list-style-type: none"> <li>Staff orientation sessions</li> <li>Formal skills training, learning trips</li> <li>Annual performance review</li> <li>Internal newsletters</li> <li>Community volunteering</li> </ul>
	<ul style="list-style-type: none"> <li>Innovation</li> </ul>	<ul style="list-style-type: none"> <li>Innovation workshops and house talks</li> </ul>
	<ul style="list-style-type: none"> <li>Occupational health and safety</li> </ul>	<ul style="list-style-type: none"> <li>Safety Management System</li> <li>Emergency drills (e.g. Exercise Northstar, Exercise Bobcat)</li> <li>Safety audits</li> </ul>
	<ul style="list-style-type: none"> <li>Corporate governance and internal controls</li> </ul>	<ul style="list-style-type: none"> <li>Key and ad-hoc committees and working groups</li> <li>Internal audits and inspections</li> <li>Anti-bribery Management System</li> </ul>
 <b>Contractors &amp; Suppliers</b>	<ul style="list-style-type: none"> <li>Compliance with legal requirements and CAG's standards</li> <li>Service performance standards</li> <li>Supply chain management</li> </ul>	<ul style="list-style-type: none"> <li>Procurement policy and tendering procedures</li> <li>Compliance audits</li> <li>Quality Service Management training</li> <li>Recognition awards (e.g. Annual First Class Service Act)</li> <li>Supplier evaluation</li> <li>Communicating the supplier code of conduct</li> </ul>
	<ul style="list-style-type: none"> <li>Airport planning and development</li> <li>Business continuity planning</li> </ul>	<ul style="list-style-type: none"> <li>Forums and conferences (e.g. Changi Aerodrome Operational Safety Forum, Changi Airport Community Environment Conference, Changi Airport Crisis Seminar)</li> <li>Regular and needs-based meetings (e.g. Changi Airport Airside Operational, Safety Committee meetings)</li> <li>Consultations (e.g. Singapore Changi Airport Operations Committee)</li> </ul>
 <b>Airport Business Partners</b>	<ul style="list-style-type: none"> <li>Airport safety and security</li> </ul>	<ul style="list-style-type: none"> <li>24/7 in-house Airport Emergency Services</li> <li>Online safety reporting and incursion apps (In.Touch, iFeedback, SWEETmini, RIPPLE)</li> <li>24/7 hazard reporting hotline</li> </ul>
	<ul style="list-style-type: none"> <li>Recognition of contributions from the airport community</li> </ul>	<ul style="list-style-type: none"> <li>Annual Airport Celebration</li> <li>Airport Safety Awards</li> <li>Extra Mile Awards</li> </ul>
	<ul style="list-style-type: none"> <li>Collaborative innovation</li> </ul>	<ul style="list-style-type: none"> <li>Trials to test-bed new technologies</li> </ul>
	<ul style="list-style-type: none"> <li>Compliance and corporate governance</li> </ul>	<ul style="list-style-type: none"> <li>Airport orientation programmes</li> <li>Control centres</li> <li>Aerodrome safety audit</li> </ul>
	<ul style="list-style-type: none"> <li>Customer feedback and consumption trends</li> </ul>	<ul style="list-style-type: none"> <li>Sharing of survey results and findings</li> <li>Meetings</li> </ul>

Key Stakeholder Groups	Key Interests	Key Engagement Methods
 <b>Passengers &amp; Visitors</b>	<ul style="list-style-type: none"> <li>Passenger experience and satisfaction</li> </ul>	<ul style="list-style-type: none"> <li>Customer service (e.g. information counters, mobile Changi Experience Agents)</li> <li>Real-time Instant Feedback System for swift action</li> <li>iChangi one-stop app for flight, airline and airport information</li> <li>Fault reporting hotline</li> </ul>
	<ul style="list-style-type: none"> <li>Airport attractions</li> </ul>	<ul style="list-style-type: none"> <li>Festive and themed events</li> <li>Retail and F&amp;B offers and incentives</li> <li>Web and social media platforms (Changi Media Centre)</li> </ul>
 <b>Government &amp; Regulators</b>	<ul style="list-style-type: none"> <li>Airport planning and development</li> </ul>	<ul style="list-style-type: none"> <li>Dialogue with government ministries and agencies</li> <li>Participating in regional groups</li> </ul>
	<ul style="list-style-type: none"> <li>Compliance</li> </ul>	<ul style="list-style-type: none"> <li>Reporting to CAAS and statutory agencies in compliance with regulatory requirements</li> </ul>
	<ul style="list-style-type: none"> <li>Contribution to Singapore's national objectives</li> </ul>	<ul style="list-style-type: none"> <li>Consultative meetings and briefings with CAAS, Ministry of Transport and relevant government agencies</li> </ul>
 <b>Non-Governmental Organisations (NGOs)</b>	<ul style="list-style-type: none"> <li>Networking</li> </ul>	<ul style="list-style-type: none"> <li>Forums and conferences</li> </ul>
	<ul style="list-style-type: none"> <li>Collaboration and partnerships</li> </ul>	<ul style="list-style-type: none"> <li>Joint exhibitions and meetings</li> </ul>
 <b>Media</b>	<ul style="list-style-type: none"> <li>Airport developments and features</li> </ul>	<ul style="list-style-type: none"> <li>Media briefings and airport visits</li> <li>Meetings with key media outlets</li> <li>Press releases and publications (e.g. Annual Report)</li> </ul>
	<ul style="list-style-type: none"> <li>Contributing to our wider community</li> </ul>	<ul style="list-style-type: none"> <li>Changi Foundation programmes</li> <li>Staff volunteering at various charity and social service agencies</li> <li>Curriculum advisory support for tertiary education institutions and the Singapore Aviation Academy</li> </ul>

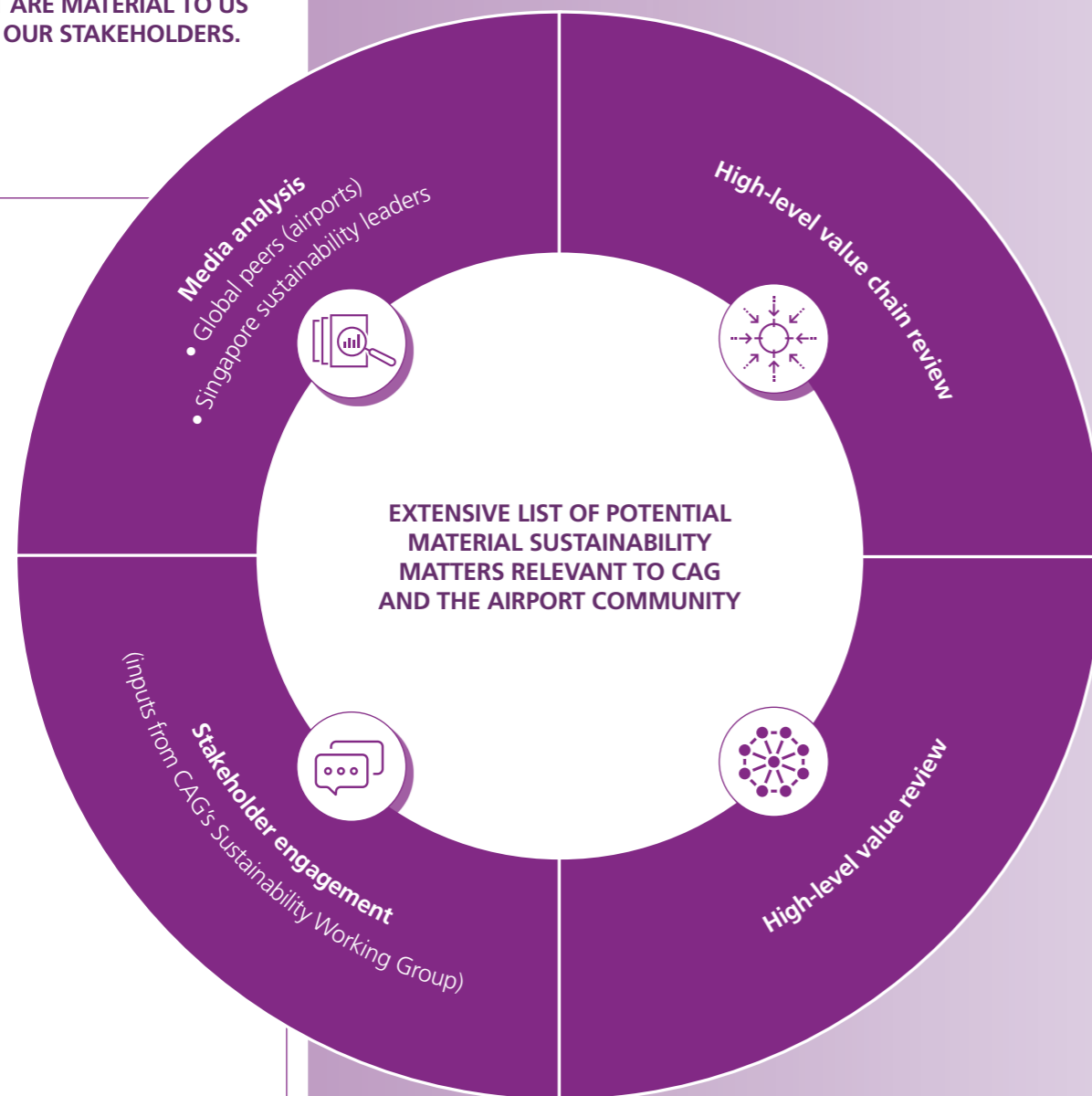
# Materiality Assessment

102-40 102-42 102-43 102-44 102-46

“The things that matter most to you”

Material sustainability topics are defined as matters that significantly impact us and our key stakeholders. Materiality Assessment enables CAG to identify and prioritise the critical sustainability matters to manage, monitor and focus on.

CAG UNDERTOOK THE PROCESS OF IDENTIFYING, PRIORITISING AND VALIDATING THE IMPORTANT SUSTAINABILITY MATTERS THAT ARE MATERIAL TO US AND OUR STAKEHOLDERS.



## 1. Identification

AN EXTENSIVE LIST OF POTENTIAL MATERIAL SUSTAINABILITY TOPICS WAS DETERMINED THROUGH THE FOLLOWING TESTS OF MATERIALITY.

### Media analysis

- Emerging sustainability risks and opportunities, hotbed trends and developments specific to CAG or relevant to the airport industry

### Industry scan and peer evaluation

- Broad sustainability topics typically reported by CAG's peers in the global airport industry and by Singapore's sustainability leaders

### Value chain review

- Sustainable value drivers based on CAG's business model and core competencies, from a value chain perspective

### Stakeholder engagement

- Internal focus group discussions with CAG's Sustainability Working Group to understand the sustainability impact on as well as the key and key interests and expectations of stakeholders
- Understanding the needs and concerns of external stakeholders through day-to-day interactions

## 2. Prioritisation

CAG'S MANAGEMENT COMMITTEE PRIORITISED THE TOP SUSTAINABILITY MATTERS THAT ARE IMPORTANT TO US AND OUR STAKEHOLDERS.

### Materiality workshop

- Internal focus group discussion to prioritise material sustainability matters based on their significance to CAG at a strategic level, as well as their pertinence to stakeholders and society
- These are economic, environmental, social and governance matters that substantively influence the assessments and decisions of stakeholders



INTERNAL FOCUS GROUP DISCUSSION BY CAG'S MANAGEMENT COMMITTEE

## 3. Validation

A TOTAL OF 10 SUSTAINABILITY MATTERS WERE VALIDATED AS MATERIAL AND ALIGNED UNDER SIX SUSTAINABILITY THRUSTS THAT RESONATE WITH CAG.

### Management validation

- The Management Committee works closely with the various divisions to validate, communicate and embed sustainability priorities within CAG



# Sustainable Changi

CONNECTING THE WORLD SUSTAINABLY

Changi co-creates a future that generations can be excited about. CAG's business is to connect people, linking them to the world in a sustainable way. Our destination is a shared future – for Singapore, for the world and for future generations.

A Sustainable Changi is underpinned by six sustainability thrusts that lead to the 10 sustainability matters which are material to Changi Airport. These priorities and values radiate internally from the CAG family all the way out to the surrounding community, Singapore and the global ecosystem.



## Fulfilling Careers

### Strategic Thrusts

We care about building a workplace based on diversity and equal opportunities. We invest in our people, equipping them with deep skills, knowledge and experience to realise their potential.

### Material Matters



-  Fair Employment Practices
-  People Development



## Safeguarding Lives

We ensure that organisational norms and frameworks are in place to deliver corporate governance excellence.


We value lives by upholding a high standard of safety at Changi Airport for our passengers, the public and all airport staff.

-  Good Corporate Governance
-  Airport Safety



## Invigorating Travels

We continue to deliver an exceptional Changi experience for our travellers, in partnership with multiple airport stakeholders.

-  Airport Experience and Passenger Satisfaction



## Enriching Communities

We want to make a difference and empower the lives of communities beyond the airport.

-  Community Investment



## Thriving Economy

We play an important role in developing Changi as the international gateway for Singapore to the world, impacting the Singapore economy through creating jobs, growing air connectivity and enabling trade and travel beyond our shores.

-  Contribution to the Economic Development of Singapore



## Flourishing Planet












We are committed to upkeeping a healthy planet and to create a sustainable future for generations of travellers to explore. We optimise technologies and explore innovative environmental solutions for the future.

-  Energy and Emissions Management
-  Water and Effluents Management
-  Waste Management

# CAG's Sustainability Targets

Aligning our sustainability targets with national and global goals, we want to continue our sustainability journey to drive real progress on the ground.

103-2

STRATEGIC THRUSTS	MATERIAL MATTER(S)	TARGET(S)	PERFORMANCE FY2018/19
Fulfilling Careers	 <b>People Development</b>	Employees attending at least 1 training programme, yearly	On track (91.4%)
		Implement a new Enterprise Learning Management System by FY2019/20	On track
Safeguarding Lives	 <b>Good Corporate Governance</b>	Zero tolerance for corruption	Existing policy
		Zero notices of non-compliance with applicable laws and regulations, yearly	Achieved
		Zero number of fines, yearly	Achieved
		Zero employee work-related fatalities, yearly	Achieved
	 <b>Airport Safety</b>	Deficiency-free rating from the International Federation of Air Line Pilots' Associations (IFALPA), yearly	Achieved (38 times consecutively)
Invigorating Travels	 <b>Airport Experience and Satisfaction</b>	Good yearly performance for the Customer Satisfaction Index of Singapore (CSISG)	Achieved (78%)
Enriching Communities	 <b>Community Investment</b>	Achieve 25% staff volunteerism yearly by FY2020/21	On track
		Achieve 3,000 volunteer hours yearly by FY2020/21	On track
		Engage 35 airport partners in Changi Foundation programmes yearly by FY2020/21	On track
		To offer minimally 80 job attachments to youth beneficiaries yearly from FY2020/21 onwards	On track
Thriving Economy	 <b>Contribution to the Economic Development of Singapore</b>	Completion of T1 expansion project by FY2019/20	Achieved
		Build capacity ahead of growth with Terminal 5 planning and development	Ongoing Effort
Flourishing Planet	 <b>Energy and Emissions Management</b>	Maintain ISO 14001:2015 certification	Achieved
	 <b>Water and Effluents Management</b>		
	 <b>Waste Management</b>		
	 <b>Energy and Emissions Management</b>	Reduce carbon emissions intensity by 20% by FY2029/30 (based on FY2017/18 levels)	On track
		Maintain Airport Carbon Accreditation (ACA) Level 3 certification	Achieved
	 <b>Waste Management</b>	Achieve 8.5% waste recycling rate by FY2019/20	Surpassed



Fulfilling Careers

# ASPIRATIONS

Our people stand at the heart of all we do. Every award and accolade is a testament to the teamwork, integrity and spirit of excellence demonstrated by each individual.

At CAG, we aspire for our people to shine. By continually investing in them and shaping a work environment anchored on diversity and equal opportunities, we support our people towards achieving their potential and fulfilling their aspirations within our organisation.



# Fair Employment Practices

Fulfilling Careers

103-1 103-2 103-3



## Our Priorities

Our people play vital roles as value creators within and outside the airport community. By encircling them with the right people strategies, we drive employee morale, staff engagement and retention, while grooming future leaders to secure CAG's continued growth.

## Our Processes



### POLICIES

- CAG's Employment Philosophy



### PRACTICES

- Freedom of association and collective bargaining
- Grievance mechanism and non-discrimination
- Employment benefits and welfare

## Our Change Agents

TALENT MANAGEMENT COMMITTEE

PEOPLE MATTERS COMMITTEE



PEOPLE TEAM

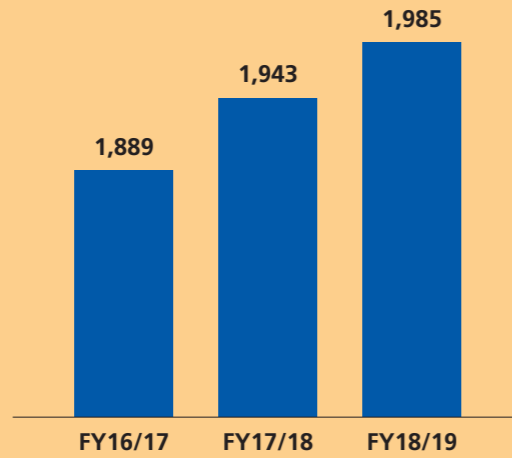
PEOPLE SERVICES & REWARDS

PEOPLE DEVELOPMENT & EXPERIENCE

## Our SDGs

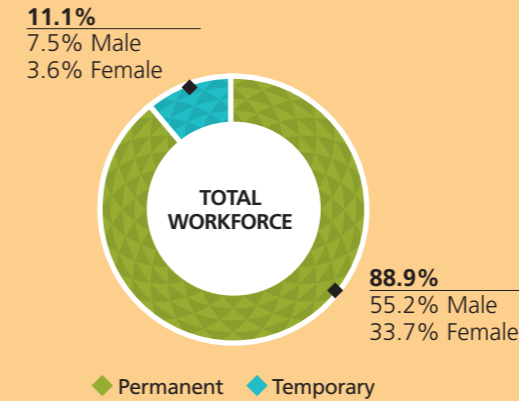


### Total Employees

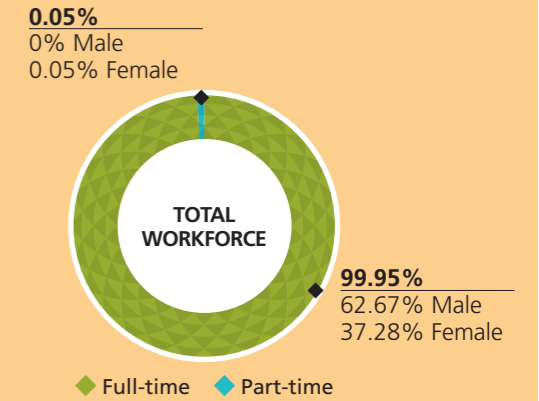


### FY2018/19

#### Total Employees, by Gender and Employment Contract



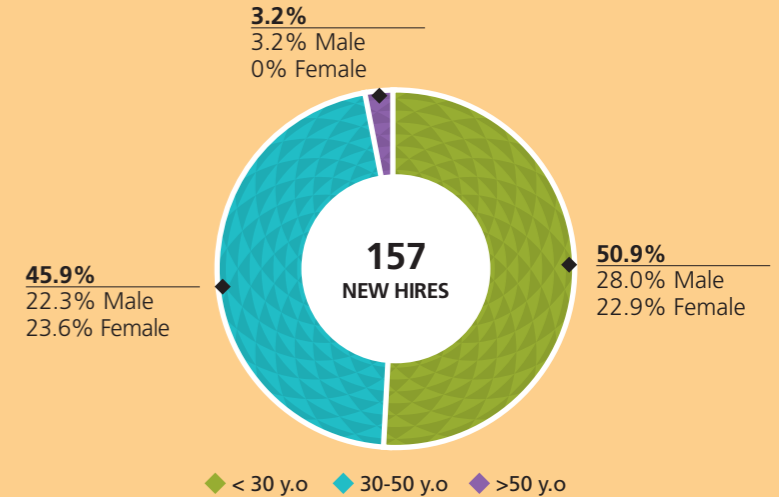
#### Total Employees, by Gender and Employment Type



#### Number of New Hires, by Gender and Age Group



CAG's new hire rates are largely comparable across gender and age groups, with an overall new hire rate of 7.9%<sup>2</sup>. At the same time, we are recruiting more people with digital expertise and developing our data capabilities so as to better understand our customers' behaviours and preferences.

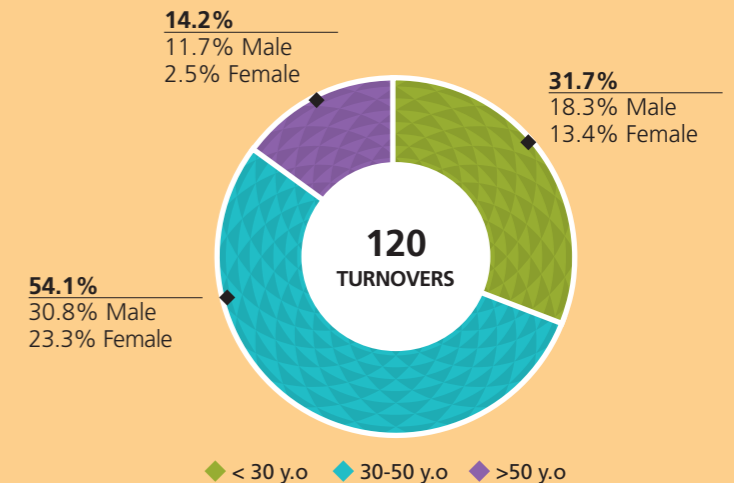


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#### Employee Turnover by Gender and Age Group

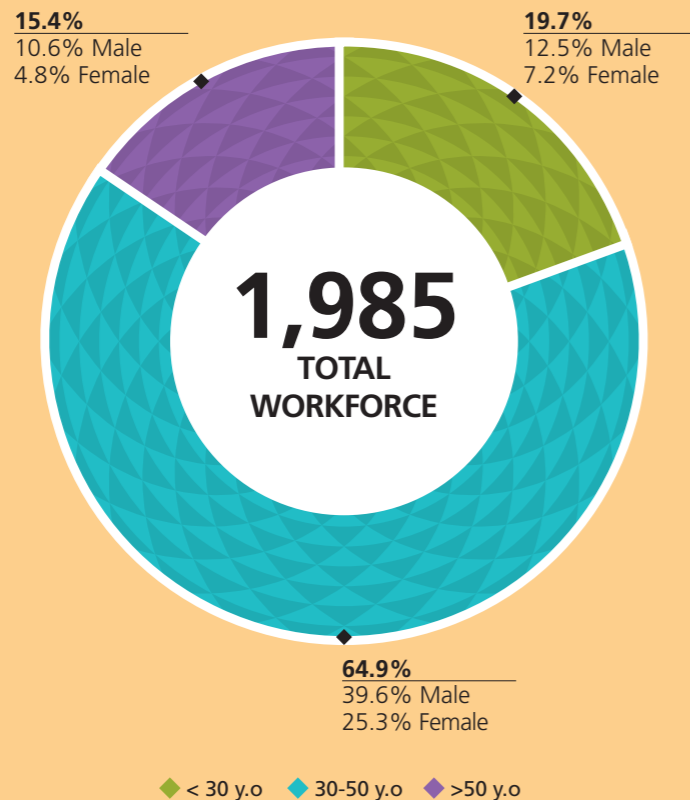
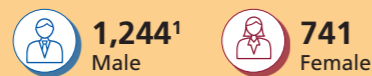


Employee turnover at CAG is fairly healthy, with an annual turnover rate of 6%<sup>3</sup>. CAG's employee turnover rate is well below the annualised national labour turnover rate (21.6%)<sup>4</sup> and that of the air transport industry (12.0%)<sup>4</sup>, demonstrating our deep commitment towards retaining our talents.



401-1

### Total Employees, by Gender & Age Group



\* Figures are rounded to the nearest one to two decimal places  
1 In FY2018/19, 38% of CAG's male employees were from Airport Emergency Services (AES). A sizeable portion of CAG's workforce comprises the AES team; due to the nature and physical expectations of these careers, the AES profile has predominantly been younger males.

2 New hire rate is computed by measuring the number of new employees against the total workforce.  
3 Employee turnover rate is computed by measuring the separated employees against the total workforce.  
4 Ministry of Manpower, Labour Market Report 2018

## Fair Employment Practices

### ENSURING EQUAL OPPORTUNITIES, UPHOLDING BEST PRACTICES

#### Our Employment Philosophy

At CAG, we recognise the importance of ensuring our people receive equal opportunities in the workplace without discrimination. As a Human Capital Partner of the Tripartite Alliance for Fair and Progressive Employment Practices (TAFEP), we uphold a corporate policy that is aligned with the 5 Principles of Fair Employment Practices endorsed by TAFEP. At the same time, we remain committed to honing our employees' skills and knowledge at all stages of their career with us, while sharing best practices with TAFEP's community of employers.

In FY2018/19, our efforts earned us the title of Singapore's Most Attractive Employer at the Randstad Employer Brand Awards, which recognises Singapore's most attractive employers. The award is a testament to our excellence in career progression, financial health, interesting job content, work atmosphere and the active adoption of innovative technologies.

102-16

### IMPROVING WELFARE, FACILITATING MEANINGFUL DIALOGUE

#### Freedom of Association and Collective Bargaining

Comprising employee representatives from the Group's different functions, the CAG Staff Branch works closely with the Singapore Manual and Mercantile Workers' Union (SMMWU) to ensure fair and equal terms and opportunities for all our employees. Through negotiations, CAG and SMMWU inked a new collective agreement, effective 1 June 2019, with enhanced employment terms including the extension of the retirement age for CAG's firefighting crew. In order to ensure the health and safety of our people, uniformed employees of the Airport Emergency Service (AES) and employees involved in maintenance and repair work are provided with adequate operational and

safety gear. In addition, CAG has an established grievance handling mechanism so that employee issues at all levels are promptly addressed.

As our success is fuelled by the efforts of the entire airport community, we actively seek to improve the welfare of airport workers by maintaining close partnerships with airport unions and the NTUC Aerospace and Aviation Cluster. Through regular dialogues with key airport unions, we uncover operational challenges and work to solve them. Over the financial year, we sought to enhance working conditions within the airside through improvements such as upgraded rest areas and toilet facilities. In addition, we opened a new staff lounge, Recharge@B10, and a bistro café, Georges, at the Changi Airfreight Centre, and organised festive celebrations for the enjoyment of our airside workers.

102-41 403-4 407-1

**64%** of CAG employees are safeguarded by Collective Bargaining Agreements that cover general terms and conditions of employment.

**32%** of CAG's employees are part of SMMWU, which represents commerce and service workers in the private sector and is affiliated to the National Trades Union Congress (NTUC).



**Bottom:**  
New staff lounge, Recharge@B10

### BUILDING INCLUSIVITY, PREVENTING DISCRIMINATION

#### Grievance Mechanisms and Non-discrimination

We have established proper channels through which employees can address their grievances. Leveraging a fair and objective grievance mechanism, we manage each incident with due process and reason across the Group. As an equal opportunity employer, we take a firm stance against all forms of discrimination at the workplace as well as those that target our stakeholders. All employees are welcome to contact the CEO directly to raise their complaints or suggestions.

102-17 406-1

### SAFEGUARDING HEALTH, PROTECTING FAMILIES

#### Annual Onsite Health Screening

At CAG, we safeguard the well-being of our people and embrace their loved ones as an extension of the CAG family. Our employees as well as their spouses and dependents are covered by our staff benefit plan and participate in the annual health screening exercise at our office premises, where they receive a complimentary basic screening package. More extensive health screening packages can be paid for using their credits from the Wellness Spending Account or the Flexible Spending Account. After the sessions, our staff also enjoy complimentary one-to-one post-health screening consultations. In conjunction with the health screening, a lifestyle survey is carried out to better understand each employee's health interests and needs. In FY2018/19, 682 staff took part in the health screening exercise.

**Top:**  
Annual onsite health screening

**Bottom:**  
Changi Airport Recreation Club



At the corporate level, the results of the annual health screening can highlight potential health risks and trends. This data aids us in developing new programmes to address such issues.

401-2

### ENHANCING WELLNESS, INSPIRING INTERESTS

#### Changi Airport Recreation Club (CARC)

In encouraging our people to embrace a healthier lifestyle, all CAG employees receive free membership at the CARC, which houses a broad spectrum of facilities to support holistic wellness needs. Featuring a gym, an eatery, sauna, badminton courts, karaoke rooms, a culinary studio, a movie room and various spaces for MICE activities, CARC also hosts regular exercise classes – from yoga and K-pop fitness to Zumba and Tai Chi – to promote

active living. It also organises lifestyle activities such as culinary workshops, art and craft classes and health and wellness talks to cater to its members' diverse interests. 189 such activities were held during 2018, of which 66 of them were organised under CAG's Healthy Habits Healthy Life (HHHL) programme. Our employees' spouses and airport partners can sign up as members for a nominal fee.

Representatives from CAG and the Civil Aviation Authority of Singapore (CAAS) form the CARC committee. Elected members within the committee are in charge of different sports, such as soccer and bowling, and manage and plan these activities for the club. The committee also actively engages the Singapore Government's Health Promotion Board to bring health-related events to its members.

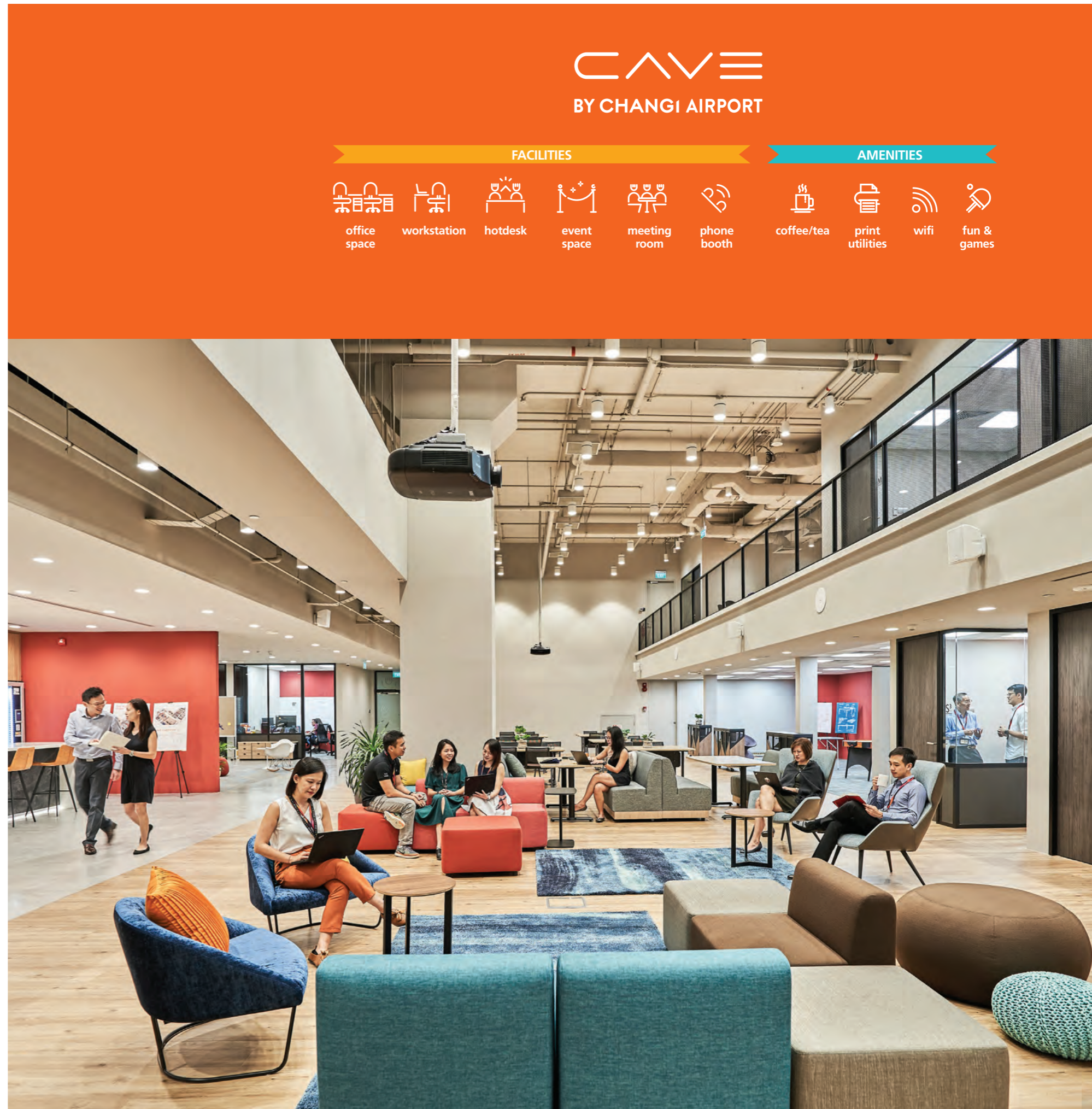
401-2

# Nurturing Innovation with CAVE

As part of our Workplace Transformation initiative which began in 2017, we revamped our office space, turning it from a traditional work setting into an environment that fosters collaboration and innovation. Today, our workplace features open-concept workstations, thoughtfully-designed pantries and meeting areas that can host both formal meetings and casual conversations.

Aimed at nurturing creativity and promoting a culture of innovation at CAG, we unveiled an innovation space (CAVE) in early 2019 where trial and error is embraced and encouraged. Here, employees can dream up ideas, brainstorm projects and put them to the test alongside our external innovation partners – start-up companies who work on prototypes for CAG as well as their own projects. CAVE also houses talks and workshops that expose our staff to the innovation ecosystem, with most of the participants reporting that the content was relevant and helpful to their work.

Bottom and left:  
CAVE



CAVE  
BY CHANGI AIRPORT

## FACILITIES

- office space
- workstation
- hotdesk
- event space
- meeting room
- phone booth

## AMENITIES

- coffee/tea
- print utilities
- wifi
- fun & games

Fulfilling Careers  
**People Development**

103-1 | 103-2 | 103-3



### Our Priorities

At CAG, we understand that learning and development is an unending journey. In ensuring every knowledge milestone remains fun, refreshing and relevant, our People Team scans the corporate training landscape and explores new learning platforms that go beyond the classroom.

### Our Processes



#### POLICIES

- CAG's Learning Policy



#### PRACTICES

- Training programmes
- Performance Management Framework
- Annual Potential Assessment Exercise

### Our Targets

**ON TRACK 91.4%**

Employees to attend at least 1 training event, yearly

**ON TRACK**

Implement a new Enterprise Learning Management System by FY2019/20

### Our Change Agents

TALENT MANAGEMENT COMMITTEE

PEOPLE MATTERS COMMITTEE

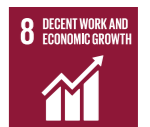


PEOPLE TEAM

PEOPLE SERVICES & REWARDS

PEOPLE DEVELOPMENT & EXPERIENCE

### Our SDGs



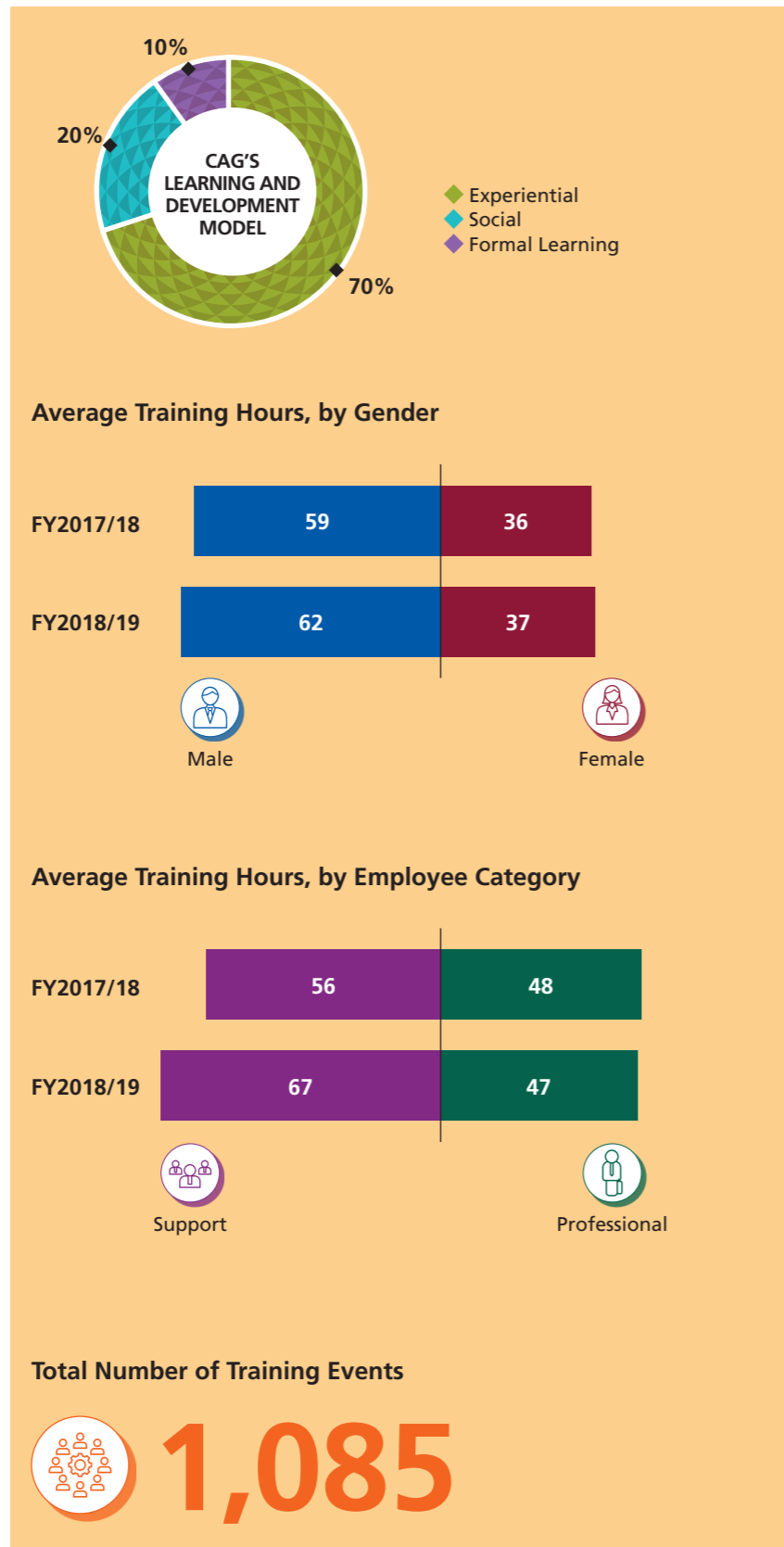


**BUILDING PEOPLE,  
 IGNITING GROWTH**

We believe in empowering our people to realise their full potential and achieve their best. Aimed at developing people and advancing their careers, we seek to build an Agile, Capable and Engaged (ACE) workforce and support all employees in taking an active role in their long-term professional development.

At CAG, Learning and Development is the joint responsibility of every individual and their reporting officer. Together, through meaningful conversations during the annual Performance and Development Planning exercise, they uncover each employee's development needs and aspirations, and are encouraged to hold ongoing discussions throughout the year to support these plans.

The People Team (People Development) drives corporate learning and development while overseeing talent management matters. Beyond organising corporate-wide core programmes including CAG Essential topics and Leadership Development programmes, the team also partners the Divisional Learning Coordinators on training matters. The latter work with the respective Cluster and Division Heads to plan and implement the training.



\* Average training hours are computed by the total employee numbers of the relevant gender/age group as of year-end, rounded to the nearest decimal place.

**Types of Training Programmes**

Leadership Development	People Manager Skills	Onboarding	Foundation Programmes	Functional Training
<ul style="list-style-type: none"> <li>Leadership Milestone Programme</li> <li>CAG Leadership Dialogue</li> </ul>	<ul style="list-style-type: none"> <li>Performance Management in CAG</li> <li>Conducting Career Conversations</li> <li>ThinkHR</li> <li>Interviewing skills</li> <li>Authentic conversations</li> </ul>	<ul style="list-style-type: none"> <li>New Hire Orientation Programme</li> <li>Accelerate @ CAG</li> </ul>	<ul style="list-style-type: none"> <li>CAG Essentials</li> </ul>	<ul style="list-style-type: none"> <li>External training events</li> <li>Trainings organised by the Division or Cluster</li> </ul>

404-1 404-2

**UNDERSTANDING ASPIRATIONS,  
 SETTING GOALS**

**Performance Management Framework**

All regular CAG employees benefit from our structured Performance Management Framework which is designed to support their professional aspirations and our organisational goals. This comprises

three Annual Performance and Career Development Reviews. At the start of each financial year, employees and their reporting officers engage in Performance and Development Planning to uncover the developmental needs and career plans of our people as well as define performance goals that are aligned with CAG's business objectives. A mid-year

review is then conducted to track and check progress and allow for any necessary corrective action. This is followed by a year-end performance review where each individual's performance and areas for improvement are discussed.

404-3

**ENHANCING LEARNING,  
 BUILDING KNOWLEDGE**

**Digital Learning**

Aimed at bolstering knowledge development at CAG through learning technologies and applications, we embarked on a digital learning transformation journey in FY2018/19 by going beyond the classroom and introducing new learning methods. In doing so, we seek to make learning personalised, accessible to a wider audience and part of our daily lifestyle.

In the first year of our journey, the People Development team focused on producing more content and

explored diverse learning avenues such as gamification, microlearning content and TED Talks videos. In addition to these, blended learning was introduced into existing classroom training sessions such as Performance Management.

Moving forward, the team will continue to work closely with the divisions to convert existing training into digital learning content to enable more timely and effective learning, as well as identify new areas to weave in learning technologies to aid learning. As we build our efforts in digital learning, we are continually monitoring the consumption of content to improve the learning experience of our employees.

**GROOMING LEADERS,  
 DEVELOPING COMPETENCIES**

**Leadership Development**

CAG provides a two-year Leadership Milestone Programme for all our reporting officers and leaders to learn and develop leadership capabilities and skills. Based on the CAG Leadership DNA competencies, the Programme consists of two modules and includes profiling instruments to help our leaders understand their own leadership styles and preferences better and how they can be more effective when leading their respective teams.

A series of facilitated group coaching sessions known as Action Learning Sets (ALS) are organised to help leaders put into practice what they have learnt in this Programme and provide an opportunity for them to come together to support each other on their leadership development journey.

To equip our Reporting Officers with more people management skills, we offer diverse people management skills training such as STAR Interviewing Skills, Performance Management Skills, Career Conversation Skills and Authentic Conversation Skills.



**Top:**  
 Leadership training session

**Connecting U!  
 Mobile Application**

This digital learning platform is open to all new employees undergoing the orientation training programme. Max, our service mascot, guides the player through the departure experience to complete challenges to earn points at each checkpoint.

**Welcome On Board CAG**

0/3 challenges completed

Welcome on board! The People Team will be serving you for the next 2.5 days. We have prepared a fun-filled programme specially for you. Now, it's time to get to know one another and make new friends!

Continue

**The Journey**

0/13 challenges completed

During the journey, there are many activities such as teambuilding, sharings from various divisions and clusters, lunch with Senior Management and experiential tours. We hope you will gain a better understanding of CAG's businesses during the journey. Bon voyage!

Continue

**Immigration**

0/8 challenges completed

At immigration, you are greeted by the various airport partners (airport police, ICA officers, etc), each of whom has a different but important role. Similarly in CAG, each division plays a unique role in contributing to the success of the world's most awarded airport. Let's find out more!

Continue

**The Changi Experience**

0/6 challenges completed

At Changi Airport, we spell service with a capital S. Our Quality Service Management team collaborates closely with all our airport partners to deliver a Changi Experience that exemplifies our Changi Service DNA. Let's find out more.

Continue

**Boarding**

0/8 challenges completed

Congrats, you've made it to the Boarding Gate! Now, get to know some of the benefits on board as our staff.

Gentle reminder: Boarding date/time is 17 Jan 2018, 8:45am @ CARC Seletar Room. Gate closes at 9.00am sharp. See you! :)

Continue



## Safeguarding Lives

# PR10 RITY

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We place top priority on human lives. At Changi Airport, we uphold high safety standards that safeguard our passengers, the public and airport staff. Behind the scenes, we establish good governance and prudent risk management strategies to defend against the increasingly complex and interconnected risks that threaten Changi Airport and our stakeholders.

In today's dynamic world, we are constantly rethinking and revamping our approach in the face of evolving risks. In doing so, we fortify our assets, while protecting everyone who enters our doors.



Safeguarding Lives

# Good Corporate Governance

102-30 | 103-1 | 103-2 | 103-3



## Our Priorities

With an eye on the future, we seek to build a thriving, sustainable business – one that safeguards our brand and reputation and makes our stakeholders proud. We work hard to achieve and uphold high standards of corporate governance, professionalism and integrity. At the same time, we are resolute in our stand to remain accountable to those in our immediate business and regulatory environment as well as the global community.

## Our Processes



### POLICIES

- CAG's Risk Management Policy
- CAG's Enterprise Risk Management Framework
- Code of Conduct
- Anti-Bribery Policy
- Whistle-Blowing Policy



### PRACTICES

- Training and awareness (e.g. Anti-Bribery Awareness training)

## Our Targets



**ACHIEVED**

Zero tolerance for corruption



**ACHIEVED**

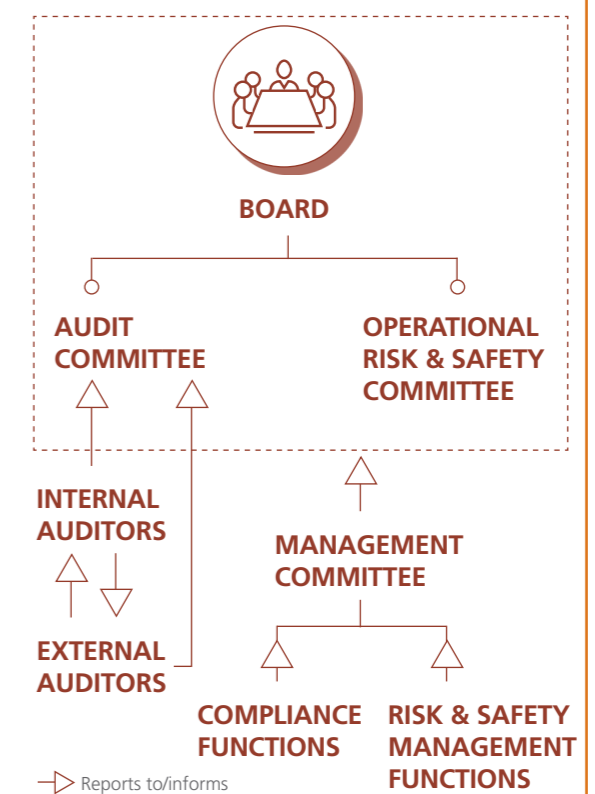
Zero notices of non-compliance with applicable laws and regulations, yearly



**ACHIEVED**

Zero fines

## Our Change Agents



## Our SDGs



**MITIGATING RISKS, PLANNING AHEAD**

**Risk Management**

Risks are anything that can hinder us from achieving CAG's business goals. These are managed via our Risk Management Policy and Enterprise Risk Management (ERM) framework.

Under the Risk Management Policy, we limit the occurrence of risks and their impact by identifying and analysing them early, planning and executing mitigation measures and monitoring them after.

We adopt a robust approach to governing and managing risks, guided by the overarching philosophy, principles, requirements and responsibilities defined in our ERM framework. Through this, we aim to:

- develop a comprehensive risk profile for CAG's Management, Board of Directors and stakeholders;
- manage enterprise risks effectively by instituting a consistent process to prioritise and allocate resources as well as coordinate existing individual risk management actions; and
- encourage proactive risk management and limit uncertainty within CAG.

Our ERM framework is adapted from International Organisation for Standardisation (ISO) 31000 Risk Management, Committee of Sponsoring Organizations of the Treadway Commission (COSO) ERM Framework and the Risk Governance Guidance for Listed Boards. While it sets out our objectives, attitude and approach to ERM, the document details our risk governance structure with the roles and responsibilities of our stakeholders, and contains methods to guide them in identifying, monitoring and managing risks. Stakeholders can use the tools and enablers available to categorise their findings, develop appropriate risk matrices and registers to steer our ERM activities.

102-11

**VALUING INTEGRITY, STRENGTHENING STANDARDS**

**Code of Conduct**

Integrity is at the heart of everything we do at CAG. Our Code of Conduct defines the standards expected of our staff on a daily basis. Emphasising the need to take responsibility for our actions and hold each other accountable, it outlines the principles and beliefs of CAG and serves as a guide when exercising judgement in our everyday work.

The Code complements other company guidelines and policies, such as IT, Corporate Communications and HR policies, and is to be followed in conjunction with local laws and regulations. As a living Code, it is reviewed and revised from time to time to ensure continued relevance.

102-16

**ENSURING COMPLIANCE, ENGAGING STAKEHOLDERS**

**Compliance**

We make sure CAG operates in compliance with applicable laws and regulations. To that end, we engage and carry out dialogue with our stakeholders, who include the Government of Singapore, the Civil Aviation Authority of Singapore (CAAS) and the International Civil Aviation Organization (ICAO).

102-16 417-3 419-1



**Strengthening Our Stand Against Bribery and Corruption**

At CAG, we have zero tolerance for bribery. We communicate our expectations of conducting business with integrity to our employees, and have in place whistle-blowing channels for them to report in good faith on suspected misconduct.

At the same time, we continue to enhance our Anti-Bribery Management System (ABMS). In the last year, this included the following initiatives.

01

We expanded our Legal function to include a dedicated Compliance practice which has the responsibility and authority for the design and implementation of the ABMS.

02

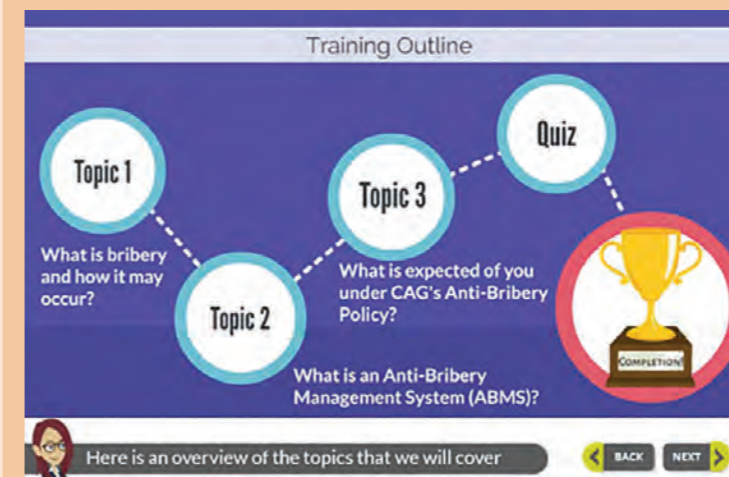
We developed and published the CAG Anti-Bribery Policy to ensure our staff are well-informed of CAG's zero tolerance for bribery, the potential bribery risks that may arise in our operations, and the duty to raise concerns of possible violations of the Anti-Bribery Policy.

03

We updated our Whistle-blowing Policy so that it extends to CAG subsidiaries and third parties. The updated Policy explains how a whistle blower can raise concerns with the Audit Committee Chair if he or she feels raising a concern via the whistle-blowing email and phone channels are not appropriate. The updated Policy goes on to provide guidance on what to do in the event a whistle blower faces or suspects retaliation.

04

We launched an online Anti-Bribery Awareness Training module which was completed by all employees in March 2019. New employees are required to complete the module within two months of joining CAG.



05

We developed the CAG Supplier Code of Conduct and published it on our corporate website for easy reference by suppliers.

A copy of the Code was also sent to existing Suppliers and it is included in the conditions of contract for new supplier engagements.

Although suppliers are independent entities, through association, their conduct and actions can potentially impact us. The Code sets out our expectations of suppliers to comply with applicable laws and regulations and to ensure that all their business dealings are conducted with integrity, honesty and transparency. The Code also explains that any suspected misconduct by a CAG employee or anyone acting on behalf of CAG should be promptly reported via CAG's whistle-blowing channels.

All concerns raised are reviewed by the CAG Audit Committee during its meetings to ensure they are independently investigated and adequately resolved. We will continue to review the policy periodically for effectiveness and relevance.

102-17 205-2 205-3

Safeguarding Lives  
**Airport Safety**

103-1 | 103-2 | 103-3



### Our Priorities

Safety is paramount at CAG. We are committed to upholding it as a core value and a basic right for every employee and individual. We believe that safety is everyone's business. Any act or inaction on our part may have consequences for ourselves and our colleagues. As such, we are dedicated to infusing a strong safety culture across CAG to create a safe environment for all.

### Our Processes



#### POLICIES

- CAG's Safety Policy
- CAG's Safety Management System
- CAG's Fire Safety Manual



#### PRACTICES

- Airport Emergency Plan
- Safety Hazard Reporting
- Annual Airport Safety Awards
- Safety briefings
- Induction trainings

### Our Targets



**ON TRACK**

Zero employee work-related fatalities, yearly



**ON TRACK**

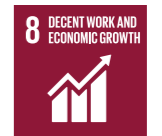
Deficiency-free rating from the International Federation of Air Line Pilots' Associations (IFALPA), yearly

### Our Change Agents



**OPERATIONAL RISK AND SAFETY COMMITTEE**

### Our SDGs



**0**  
Work-related fatalities among CAG staff

**2.90**  
Work-related injury rate

**UPHOLDING SAFETY, ANCHORING OUR CORE VALUE**

**Our Safety Management System**

Ensuring the safety of our workforce, airport users and aircraft operations is of utmost importance to us. We uphold safety as our core value and strive to achieve this through the effective implementation of our Safety Management System. Beyond continually improving safety performance and risk management, the Safety Management System supports an open and learning culture and surrounds our people with the necessary resources and training. We work hand-in-glove with our airport partners – from ground handling agents to airlines and regulators – to foster a proactive and robust safety environment.

Through our Safety Management System, we are committed to four key goals.



“Ensuring the safety of our workforce, airport users and aircraft operations is of utmost importance to us.”

**Right:**  
Recertification Steering Committee and Audit Recertification team



**ENSURING COMPLIANCE, SECURING WELL-BEING**

**Aerodrome Safety and Workplace Safety and Health**

The International Federation of Air Line Pilots’ Associations (IFALPA) recognises CAG as a dependable airport operator that upholds high standards and safety in the provision and management of aviation infrastructure and services. To date, Changi Airport has not received any deficiency reports from IFALPA since its establishment in 1981. Working tirelessly with our airport partners, we are dedicated to ensuring that the airport fulfills aerodrome safety requirements by maintaining the aerodrome certification issued by CAAS.

In our efforts to ensure continued compliance with stringent aerodrome safety standards, CAAS conducted four phases of comprehensive aerodrome

audits from July 2018 to February 2019, as part of the Changi and Seletar aerodrome recertification process. Audit preparations began in December 2017 with the formation of the Recertification Steering Committee, chaired by the Executive Vice President of Airport Management, and the appointment of the Audit Recertification Team which comprised 24 representatives from the divisions involved in the recertification audits. Through the collaborative efforts of many internal stakeholders, we successfully completed all four phases of recertification audits with no significant safety findings.

With more than 50,000 airport personnel under our care, we recognise our role as a responsible duty-holder of the Workplace Safety & Health (WSH) Act to secure their safety and well-being. We work closely with our contractors and airport

partners to ensure we continually meet the WSH requirements at the airport. Adopting a proactive approach to WSH management, we carry out risk assessments to identify safety hazards and enforce safety risk controls for all work activities.

All work-related staff injuries and ill health cases are closely monitored and analysed. We also take immediate preventive measures to avoid their reoccurrence. During the year in review, CAG’s employee work-related injury rate registered an improvement, dropping from 3.62 in FY2017/18 to 2.90. These mainly comprised training injuries sustained by personnel from the Airport Emergency Service (AES) division, owing to the realistic and demanding firefighter training needed to prepare them for real-world operations.

403-2

**IDENTIFYING HAZARDS,  
FACILITATING SAFETY**

**Safety Hazard Reporting**

We proactively detect and manage safety hazards that can potentially threaten or weaken our safety defences. Taking a many-eyes approach to hazard identification, all airport staff and users are empowered to report hazards or offer suggestions to tackle them. They can report hazards requiring immediate attention via the 24/7 hotlines, while less urgent cases can be reported through the following channels:

- CAG e-Services portal
- Corporate safety email
- 24/7 hotlines
- SWEET mobile app

Our e-Services portal and corporate safety email, which contain the online hazard reporting form, are voluntary and confidential reporting channels managed by the Aerodrome Safety Unit (ASU).

During the year, the SWEET mobile app welcomed 3,159 new users and received 1,082 hazard reports. By facilitating prompt action to resolve safety hazards, our efforts have contributed to a safer airport environment for both passengers and staff.



**3,159**  
New users of  
SWEET mobile app

**SAFETY PROMOTION CARDS DISTRIBUTED TO THE AIRPORT COMMUNITY**

**News Feed**



**Flight Search**



**Documents**



**iFeedback**



**SWEET**  
Changi Airport

The **SWEET** mobile app empowers the airport community with useful tools to be able to contribute to the Safety, Efficiency and Passenger Experience at Changi Airport.

Welcome Aboard our  
Changi Safety Culture



**SHARING KNOWLEDGE,  
STRENGTHENING  
EMERGENCY RESPONSE**

**Changi Airport Crisis Seminar**

Staying ready is a vital part of emergency preparedness. To this end, CAG organises an annual Changi Airport Crisis seminar that brings together airport partners including the airline community and key mutual aid agencies. This platform allows them to share the lessons learnt from Exercise Bobcat – an annual full-scale aircraft emergency exercise drill – and enables industry experts to share learning points from case studies and crisis management concepts. This year's edition in March 2019 drew 150 participants, comprising CAG staff with crisis portfolios, government agencies, participating carriers for Exercise Bobcat 2018, the airline community and airport partners ranging from security to ground handlers and medical companies. Beyond facilitating knowledge sharing and close coordination with airport partners, the seminar strengthened our emergency response efforts and readiness across the airport community.

**PROVIDING CARE,  
SHOWING COMPASSION**

**Caring Action in Response to an Emergency (CARE) Training**

When disaster strikes, we go beyond tackling the situation to surrounding those affected with care and compassion. As a pillar of CAG's emergency preparedness plan, CARE officers are trained to provide support to the affected passengers' next of kin in the event



**From top to bottom:**  
Medical professionals attending to casualties at Exercise Bobcat;  
CARE officers in action during Exercise Bobcat

introduction to the CAG emergency preparedness plan, crisis management and psychological reaction in a crisis, as well as familiarisation training at the Relatives Holding Area (RHA), among others. Helping to facilitate the sessions were the People Team, the Business Continuity Plan Unit, CAG's AES and external facilitators. The trained CARE officers will have opportunities to practise their skills during annual emergency exercises such as Exercise Bobcat.

**STAYING READY,  
RESPONDING SWIFTLY**

**Airport Emergency Services**

As a highly-trained specialist unit, CAG's AES is capable of conducting fast-action rescue and fire protection operations, as well as handling other emergency situations such as chemical, biological and bomb threats.

of an aviation- or airport-related crisis. As part of our continuous efforts to build a community of CARE officers, three CARE training sessions spanning two days each were conducted during the financial year.

Open to all CAG employees, the training covered an



# Ensuring Safety from the Ground Up

Having risen through the ranks to become an AES Operations Commander after 10 years with CAG, Lim Bock Chew knows exactly what it takes to keep the airport safe. Together with his team, he responds to all sorts of emergencies, from fires to accidents, saving lives and property to ensure it remains business as usual for everyone else.



## So what's your job like?

We provide aircraft rescue and fire protection at both civilian airports (Changi and Seletar) as well as RSAF airbases around Singapore to the standards set by the International Civil Aviation Organisation (ICAO). Our main role is to respond to aircraft emergencies and make sure that the lives and safety of all passengers are being taken care of. In addition, we also respond to domestic incidents such as fires in the terminal buildings, or road traffic accidents that occur in and around Changi Airport. In all emergencies, the safety of the people involved is always our priority.



## How do you ensure your team is ready to respond?

Train, train and train. All officers must go through a rigorous training programme comprising lectures, drills and training exercises. In addition, the School of Airport Emergency Services at the Singapore Aviation Academy organises regular workshops and talks conducted by professionals from the aircraft fire fighting and rescue fraternity, so we get to learn and appreciate what others are doing as well, and this helps to uplift our skills and knowledge.



## What's your most memorable experience on the job so far?

I was the Duty Officer when an aircraft overshot the runway in December 2002. I was the first to arrive on the scene and assisted one of flight crew out of the aircraft safely. This was Changi Airport's first major accident and thanks to the efforts of the team that day there were no fatalities.



## What's the best part of your job?

It certainly is not an easy job to perform, but at the end of the day, knowing that we are able to make a difference to the lives of the passengers and members of the public gives me tremendous satisfaction at work. I'm proud to be part of the AES family.



## How do you motivate your team?

As leaders, we lead by example. For me, I think being able to establish a safe space for my team to openly share with me their personal problems or issues at work is important for building trust and team spirit. As our work is hazardous, we must trust and take care of each other during every incident.

**Lim Bock Chew**  
AES  
Operations Commander CAG



## Upgrading Our Fleet

We are always on the look out for ways to enhance our response and rescue capabilities and better safeguard the airport. Our recent acquisitions include replacements for existing vehicles to renew our fleet, as well as a brand-new fleet in anticipation of upcoming facilities, such as Runway 3.

The new firefighting equipment features advanced capabilities, which allows the AES unit to focus manpower on the time-critical tasks in rescue and firefighting operations. One such vehicle is the new Rosenbauer Foam Tender, also known as the Panther. It features state-of-the-art firefighting capabilities that strengthens its effectiveness, while enhancing the safety of our firefighters.

Boasting an impressive storage capacity of 12,500 litres of water and 1,500 litres of foam, this high-performance vehicle is also faster than its predecessors. It can go from 0 to 80km/hr in under 32 seconds and reach a top speed of 120km/hr. In addition, the Panther's Roof Turret has a greater throw range, extending about 10 metres more than before, which allows firefighters to combat fire at safer distances.

Furthermore, the Panther comes equipped with smart safety features to protect firefighters. These include roll stability control which reduces the risk of overturn when manoeuvring corners, and specially designed cabins to store equipment safely.

**Bottom:**  
The Rosenbauer Foam Tender can store up to 12,500 litres of water and 1,500 litres of foam.



## Taking on Rescues at Sea

More than land emergencies, CAG's AES unit is also able to respond to aircraft incidents out at sea. It manages a fleet of emergency resources from a Sea Rescue Base (SRB) located just off the waters of Changi Airport, which takes on any aircraft emergencies in accordance with ICAO requirement on aerodrome safety. Given our emphasis on airport safety, their presence is particularly important in areas where a significant portion of the approach and departure operations take place over water.

To ensure their availability 24/7, the SRB houses water rescue equipment and services that can cover both water and swampy areas and cater for different sea rescue requirements. These include highly-specialised emergency equipment and vessels, ranging from fire boats for sea command, to Rigid Hull Inflatable Boats for ocean commanders and hovercrafts for search and rescue purposes – with the SRB recognised as the only hovercraft operator in Singapore.

**Bottom:**  
AES hovercraft used for sea rescue operations



## Securing the Changi East Development Site

At Changi Airport, we are constantly expanding and upgrading with the future in mind. As we embark on our next phase of development at Changi East, we are working hard to ensure the safety of all involved.

Come 2020, a huge plot of land next to Changi Airport will be transformed into a massive construction site when major tunnelling works begin for the construction of a new passenger terminal. When construction peaks at the Changi East site, about

20,000 workers will be based there, up from the current figure of 3,000. To ensure there are no disruptions to flight operations, we launched several initiatives that will protect the workers and secure the site.






Currently, the Changi East Command Centre (CECC) facility provides round-the-clock surveillance for works within the airfield at Changi East. Meanwhile, contractors from different projects will be allocated spaces at the command centre so that they can keep an eye on their

staff through video surveillance systems and electronic tracking of workers and vehicles. Alongside this, a digital map provides an overview of all ongoing works and key information such as the contact details of each project's supervisor – which can also be retrieved off-site or on the ground via mobile devices. Through this, the system enhances coordination and streamlines processes resulting in more effective operations and improved safety.

### Changi East Command Centre Functions

-  **Daily Safety Coordination**  
Review monitoring and inspection of works within the aerodrome
-  **Daily Situation Reporting**  
Daily situation reports to project teams and management
-  **Incident Fact Finding and Escalation**  
Carry out preliminary investigation into incidents

### Tools

-  Daily works declaration process
-  Detailed SOPs aligning safety processes
-  22 scenarios identified and aligned with contractor's Emergency Response Planning
-  Real-time tracking of personnel and obstacles through electronic tracking
-  CCTV monitoring of work areas using technologies such as smart glasses and automated height infringement detection system (AHIDS)





Invigorating Travels

# CONNECTIONS

Every day, over 50,000 airport staff unite as ONE Changi to deliver the award-winning Changi experience to all our passengers and guests.

We join hands with our partners. Through welcoming smiles, inspiring spaces and exceptional service, we create heart-warming memories for locals while forging lasting connections with millions of visitors the world over.



Invigorating Travels

# Airport Experience and Passenger Satisfaction

103-1 103-2 103-3



## Our Priorities

Embracing Changi Airport's unique position as the gateway to Singapore, we work hard to create amazing first impressions and lasting memories for all passengers as they arrive and leave our shores. Each day, we strive to do better than the last, driven by a fervent commitment to service excellence, innovation and operational efficiency that inspires all we do.

## Our Processes



### POLICIES

- Changi Quality Service Management



### PRACTICES

- Creating a WOW passenger experience
- Harnessing technology and innovation
- Bringing out the best of ONE Changi

## Our Targets

**ACHIEVED 78**  
(above industry average)

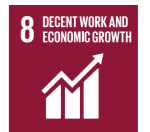
Good yearly performance for the Customer Satisfaction Index of Singapore (CSISG), yearly

## Our Change Agents



**AIRPORT OPERATIONS AND MANAGEMENT**

## Our SDGs



**P.S. I ♥ CHANGI**



**Personalised**

Every customer is unique

To Serve  
vs  
To Engage

- Be Welcoming
- Be Interested
- Be Attentive



**Stress-free**

To provide customer with peace of mind

To Deliver  
vs  
To Anticipate

- Be Knowledgeable
- Be Resourceful
- Be Responsive



**Positively Surprising**

To create good memories for every customer

To Satisfy  
vs  
To Delight

- Be Involved
- Be Enthusiastic
- Be Creative

**SHAPING MEMORIES,  
 CREATING EXPERIENCES**

Changi Airport offers an exceptional airport experience that has drawn praise from passengers and visitors alike. We maintain our focus on consistently delivering the Changi experience infused

with the Changi Service DNA of personalised, stress-free and positively surprising.

At the same time, it is important for all our partners in the airport community to understand and uphold the elements of the Changi Service DNA while

ensuring alignment with our goal of providing quality service. Beyond fostering a stronger service culture, the Changi Service DNA guides the service team in their interactions across all touchpoints in the traveller's value chain.

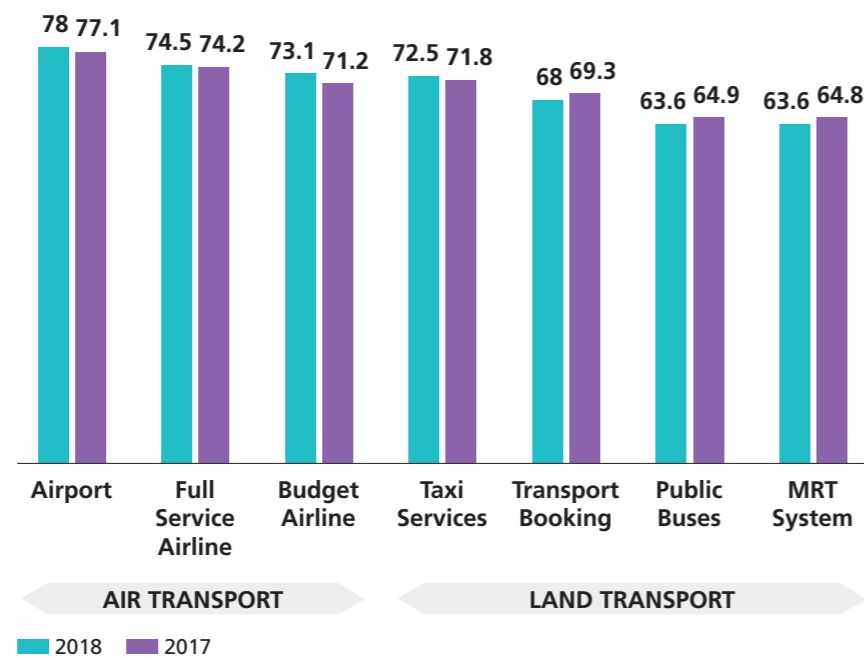
**PURSUING EXCELLENCE,  
 GAINING RECOGNITION**

**FY2018/19 Awards and  
 Accolades**

As a testament to our service excellence, CAG achieved a Customer Service Index of Singapore (CSISG) score of 78 in 2018, improving on the 77.1 result attained in 2017. This places us above both the national and air transport sector scores of 73.5 and 75.4 respectively.

In 2019, Changi Airport was named the World's Best Airport for the seventh consecutive year at the annual Skytrax World Airport Awards. This win adds to the over 600 accolades received by Changi Airport since its opening in 1981.

**CSISG Scores**



**Something**

**NEW**

**with Every Visit**

Every visit to Changi Airport promises a new discovery. In fostering a lively, vibrant airport environment, we are committed to continually refresh the airport experience with a delightful array of events and activities designed to charm our passengers and visitors.



**A Peranakan Touch to Terminal 4**

Marking our first collaboration with the National Heritage Board (NHB) is the Peranakan Gallery. Tracing Singapore's Peranakan heritage from the 1880s to the 1950s, the 150sqm space at the new Heritage Zone in Terminal 4's Departure Transit Area invites visitors to explore the material culture of the Peranakans and its influence on contemporary local design. The gallery's displays, which currently include a dollhouse model depicting Peranakan shophouse architecture and historical portraits of pioneers, will be refreshed periodically.

Taking centre stage at the Heritage Zone is an art façade featuring a row of brightly-coloured

shophouses reminiscent of the Peranakan houses in Singapore's Katong and Joo Chiat districts. Evoking a sense of nostalgia, familiar traditional brands such as *Bee Cheng Hiang*, *Bengawan Solo*, *Curry Times*, *Eu Yan Sang* and *Heavenly Wang* dot the scene, accented with heritage-themed designs and furnishings. Nestled within the three-storey shophouse façade is a 10 metre-by-6 metre LED screen that entertains passengers with a six-minute theatrical performance of a Peranakan Love Story set in 1930s Singapore. Developed together with Singaporean composer and artiste Dick Lee, the unique production taps the island's local talents including Adrian Pang, Koh Chieng Mun, Amy Cheng and Benjamin Kheng.

**LEVERAGING TECHNOLOGY,  
 ENHANCING EFFICIENCY**

**Technology and Automation**

We take pride in delivering exceptional passenger experience infused with leading-edge technology. Aimed at delivering greater efficiency and service while driving the Changi Experience, we harness innovation to enhance our facilities and shape an airport of the future.

# DEVELOPING A FUTURE-READY CHANGI

As we design the airport of the future, we are constantly reviewing our value chain from the customer's perspective. Our quest to ensure our passengers enjoy a stress-free, seamless experience at Changi Airport is grounded upon our ability to secure the highest levels of operational efficiency.

**Fast and Seamless Travel (FAST)**

When Terminal 4 opened its doors, it marked the first time that a fully automated departure process under our FAST initiative was introduced at Changi Airport. Through FAST, we seek to automate conventional airport processes with the aim of driving productivity and efficiency. By automating check-in, bag drop, immigration and boarding processes, it presents passengers with end-to-end self-service options.

Today, Terminal 4 is equipped with 65 automated check-in kiosks, 50 automated bag-drop machines, 18 lanes of automated immigration

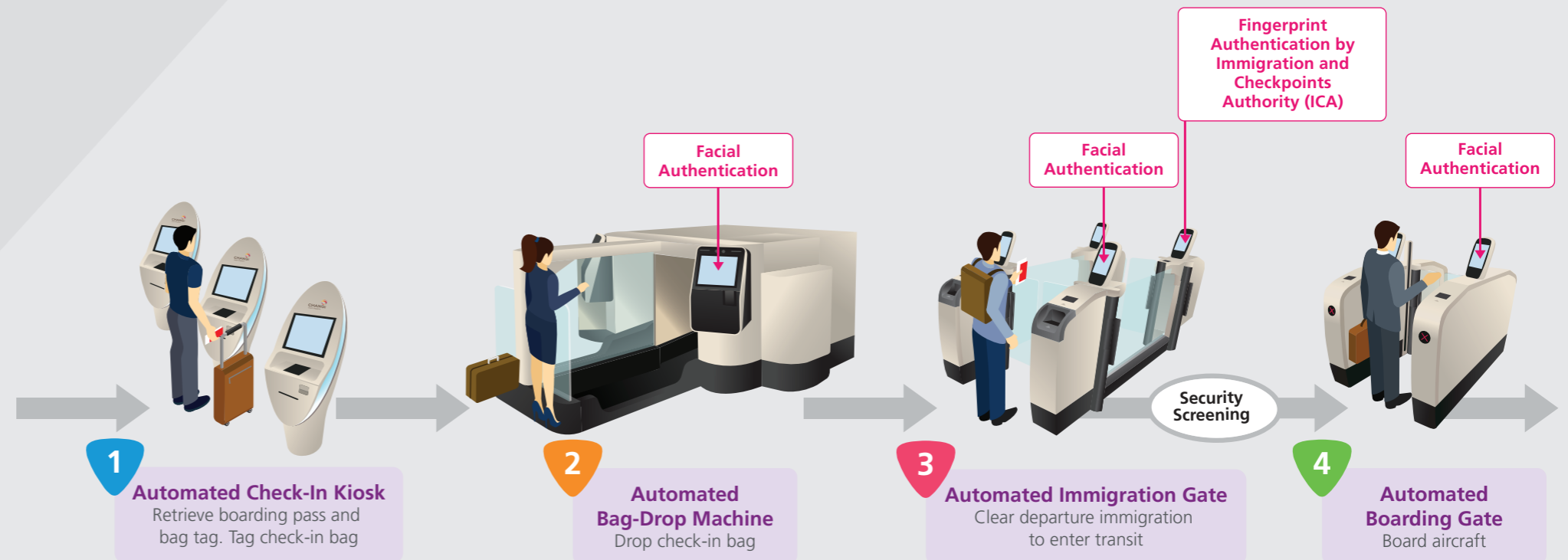
gates and 46 automated boarding gates. These allow us to make better use of our manpower while improving the Changi Experience, in light of Singapore's tightening labour market. The successful launch of FAST at Terminal 4 came after 12 months of rigorous trials involving 2,500 airport staff and 7,500 trial passengers.

In another first for Changi Airport, Terminal 4 houses a new hand luggage screening system that combines a computed tomography (CT) scanner with an automatic tray return system. This was introduced at all the security checkpoints. Designed to enhance

efficiency while offering greater convenience to passengers, the CT scanner employs advanced three-dimensional (3D) screening technology, allowing passengers to undergo security checks without having to remove their electronic devices, such as laptops and tablets, from their hand luggage. Meanwhile, the automatic tray return system with parallel divestment stations frees our security staff from having to manually return the trays, thus allowing them to focus on our passengers. Additionally, the new screening system enables two passengers to be screened at any one time, which speeds up the entire process.



## FAST Departure Journey Process Flow



# ONE Gracious Changi 2018

Every year, the ONE Gracious Changi campaign takes flight at the airport as an annual reminder for the airport community to adopt gracious behaviours at work and in daily life. The airport-wide initiative emphasises five gracious behaviours: returning trays, giving up seats to those in need, pushing trolleys aside to keep walkways clear, picking up litter and showing care to those in need.

In the 2018 edition, the adorable Max Airplane Topiary took pride of place at Terminal 2 to enliven the work environment. The three-month-long campaign stretching from June to August was packed with a series of graciousness-themed activities, ground walks and sharing sessions to encourage gracious behaviours within the airport.

Bolstering our efforts, our ONE Changi partners also conducted in-house graciousness activities for their own staff, while strong inter-agency collaborations saw various partners unite to carry out activities and events designed to infuse the airport with graciousness.



**From top to bottom:**  
 Max Airplane Topiary at Terminal 2;  
 In-house graciousness activities

# ONE Changi Cares 2018

We actively support our ONE Changi partners in caring for their staff. In 2018, we forged collaborations between them and the Health Promotion Board (HPB) to bring workplace health programmes to their doorstep. Together with airport partners such as Certis Aviation Security, DFS Changi, Ramky Cleantech and Smarte Carte, HPB created customised programmes comprising health check-ups, workshops on diet and nutrition, exercise sessions on stretching and ergonomics, and weight management workshops.

We also partnered HPB and Certis in the airport-wide ONE Changi Steps Challenge. Aimed at promoting healthy living, the event garnered participation from 5,633 airport staff across the airport community who collectively clocked an amazing 1 billion steps over the challenge period.



**From top to bottom:**  
 Customised diet and nutrition talk;  
 Hands-on activities on nutrition

**WORKING TOGETHER,  
DELIVERING SERVICE  
EXCELLENCE**

**ONE Changi**

Beyond the enhancements to our hardware, it is the heartware of our 50,000-strong airport community that has played a key role in Changi Airport's success. We remain steadfast in building the ONE Changi culture. Through this, we seek to inspire all partner agencies to unite as one so as to deliver greater value and the highest standards of service quality to the millions of passengers and visitors we serve at Changi Airport.

## Going the Extra Mile to Save a Life: Our All-Star Service Team of the Year 2018

On 23 September 2018, Customer Service Officer Feroz came across a passenger experiencing breathing difficulties at Terminal 1's Arrival Hall. Worried by his sickly appearance, Feroz quickly headed to the nearby information counter and sought assistance from Changi Experience Supervisor Jay-R, who immediately activated the Raffles Medical Group clinic. While waiting for help to come, the passenger started vomiting, prompting Jay-R to accompany him to the washroom. Once the medical team arrived, Changi Experience Executive Elaine directed them to the washroom and kept the passenger's luggage safe.

After the passenger had been transferred to a hospital, Changi Experience Manager Zorah and Changi Experience Executive Christian, who were manning the information counter at the time, were informed by the hospital that the passenger had been admitted to the Intensive Care Unit and they needed to contact his next-of-kin urgently. The duo hunted for clues via social networking sites and found some information among his belongings such as his flight details and a company card. Duty Terminal Manager Ben then reached out to the airline but to no avail. Meanwhile, Christian contacted the company on the name card and was informed that the passenger was an ex-employee.

At this point, Changi Experience Executive Josell helped uncover the passenger's current company via a professional networking site and sought help from the Embassy of the Philippines to identify his next-of-kin. Later, the Embassy staff headed to the hospital where they met the company's representative and the passenger's brother.

The team was relieved and thankful to learn that their efforts had paid off. Even though their job was done, Josell kept in contact with the passenger's brother and the team visited him at the hospital several days later, where they were glad to discover he was on the road to recovery.

Commenting on their efforts, the grateful passenger said, "I am very thankful and impressed that each of your staff – across all ranks, levels and functions – are very skillfully trained in responding to unusual emergencies like mine, from knowing what to do to offering comforting words and contacting the right people to help. Without this, I could easily have lost my life. I have never expected such impressive emergency-readiness from an airport. Your airport service team stands out – you save lives."

**From left to right:**

- Gomez Elaine Montayre**  
Changi Experience Executive, P-Serv
- Josell Roland Racpan Lat**  
Changi Experience Executive, P-Serv
- Gatdula Jay-R Quijano**  
Changi Experience Supervisor, P-Serv
- Lee Yu Xiang, Ben**  
Duty Terminal Manager  
Changi Airport Group
- Lara Christian Mark Balansag**  
Changi Experience Executive, P-Serv
- Feroz Khan S/O Rahim Khan**  
Customer Service Officer  
Certis Aviation Security (People Advantage)
- Zorah Binte Yazid**  
Changi Experience Manager, P-Serv





Enriching Communities

# COMPASSION

Beyond our people and partners, we embrace the potential of the less fortunate within our community. With sincerity and passion, we seek to uplift them towards success. Together with our staff volunteers and partners, we inspire them to dream and transform aspirations into reality.



Enriching Communities  
**Community Investment**

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**Our Priorities**

**We believe in the potential of people. Through various community efforts including staff volunteerism, corporate philanthropy and stakeholder partnerships, we go beyond our business to empower young lives within our community.**

**Our Processes**

Our Corporate Social Responsibility (CSR) efforts comprise diverse initiatives, including outreach and development programmes, corporate philanthropy, staff volunteerism, stakeholder partnerships and impact assessments, among others.



**POLICIES**

- Changi Foundation (CF) Framework



**PRACTICES**

- CSR activities
- Airport partner engagement

**Our Targets**

**ON TRACK**

Achieve 25% staff volunteerism yearly by FY2020/21

**ON TRACK**

Achieve 3,000 volunteer hours yearly by FY2020/21

**ON TRACK**

Engage 35 airport partners in Changi Foundation programmes yearly by FY2020/21

**ON TRACK**

To offer minimally 80 job attachments to youth beneficiaries yearly from FY2020/21 onwards

**Our Change Agents**

Armed with a mandate to build a culture of lively volunteerism at CAG, a dedicated CSR unit within the People Team champions our Community Investment efforts.

**Our SDGs**



**SHAPING LIVES,  
UNLOCKING HOPE**

Our quest to touch lives is anchored on the CF – CAG’s philanthropic arm and the main conduit for our community efforts. Specifically, CF invests in the lives of disadvantaged youths. By surrounding them with positive role models, good support systems and the right influence, we believe that these youths can thrive and contribute to society if provided with the right opportunities.

Closely aligned with our corporate mission and values and driven by our core competencies, our CSR efforts

uphold CAG’s business objectives. While advancing our vision for the less fortunate, our initiatives offer our staff and airport partners opportunities for collaborations, leverage Changi’s operational service excellence and realise our service ideal of working together to enhance lives in our community.

**ENCOURAGING VOLUNTEERISM,  
LIFTING SPIRITS**

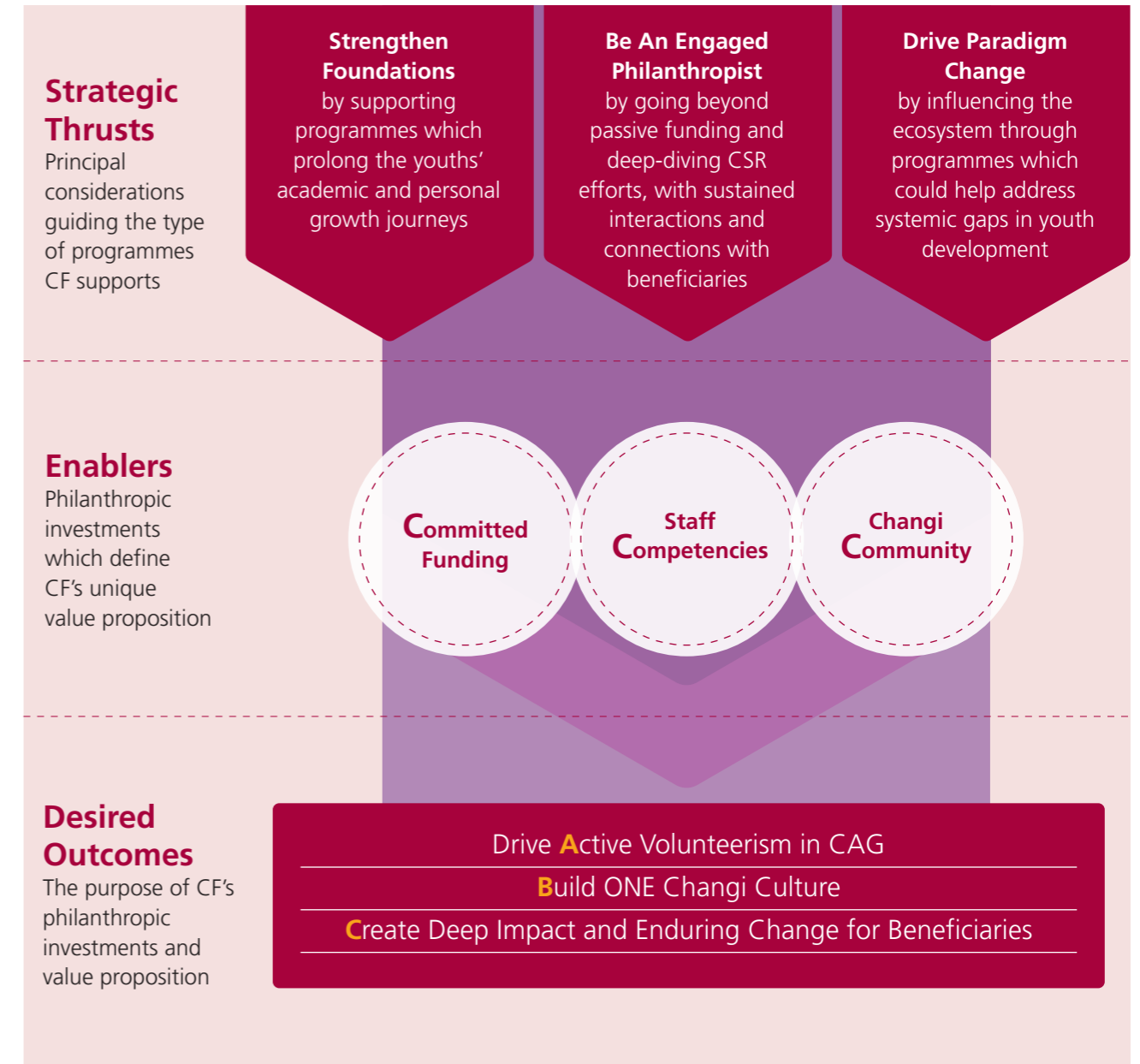
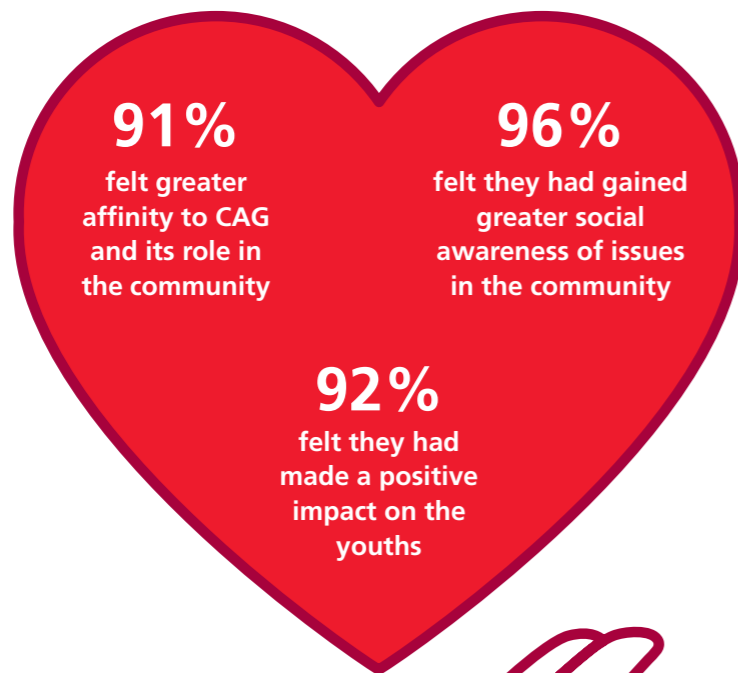
**Volunteer Service Leave (VSL)  
Policy**

We encourage our people to serve the less fortunate. Every year, CAG offers all employees five days

of VSL – two of which may be used for any charitable causes, while the remaining three are dedicated to CF’s CSR activities that support its main beneficiaries, NorthLight School and Metta School. In 2018, our people clocked a total of 2,500 volunteer hours.

Through surveys, we measured how volunteering at NorthLight School and Metta School impacted our staff with three key measurement indicators, and were encouraged that they experienced rich takeaways from the experience.

**IMPACT OF VOLUNTEERISM ON CAG’S  
EMPLOYEE VOLUNTEERS**



**INSPIRING YOUTHS,  
EMPOWERING THEIR FUTURE**

**Changi Foundation**

Since 2012, CF has adopted disadvantaged youths as its social cause to embolden those with fewer means and greater challenges in life to achieve success. CF embraces the vision of “Connecting with youths today, Empowering them for a better tomorrow”, and co-designs programmes with its partners to equip disadvantaged youths with opportunities, tools and knowledge

to lead meaningful lives. Since 2014, we have adopted NorthLight School as part of our long-term CSR engagement plans.

During a review of our adopted social cause and beneficiaries in FY2018/19, we determined that our support of disadvantaged youths continues to be a meaningful one. We undertook the decision to continue our support of NorthLight School from FY2018/19 to FY2020/21 and took on Metta School as our second beneficiary for the same period.

With the adoption of Metta School, the CSR team engaged the school and various stakeholders to develop customised programmes with learning values and outcomes that would meet the students’ learning needs. The team rallied CAG volunteers to support the students in the activities and equipped volunteers through pre-event volunteer training. Regular check-ins were held with the school and airport partners so that we could act on feedback in a timely manner and refine the programmes where necessary.



The CF logo epitomises the stage of metamorphosis from a cocoon to a beautiful butterfly in a myriad of colours.

In the same way, CF hopes to aid in the metamorphoses of the lives of youths, transforming their dreams into beautiful realities and helping their futures take flight.

We believe that an all-rounded approach is needed to help and inspire the youths along their journey of transformation.

**BUILDING CONFIDENCE, DEEPENING OUR ENGAGEMENT**

**NorthLight School**

We value long-term, deep engagements where we can contribute meaningfully. With this aim, we renewed our partnership with NorthLight School for another three years. The extension allows us to further tap the skills of our staff and airport partners to build the job readiness of the students.

CF's signature programmes with NorthLight School include the Youth Passport Programme and the Career Development Programme. The Youth Passport Programme is designed for Year 2 students. Held at Changi Airport, the Learning Journey gives them insight into some of the jobs available here.

Other than expanding their world view, it helps them gain a better understanding of the vocation choices in Year 3. In FY2018/19, 140 students participated in the programme, guided by 28 staff volunteers who put in a total of 112 hours.

Targeting Year 3 students, the Career Development Programme comprises a series of workshops covering customer service skills, grooming and communication skills. 117 students went on to undertake a five-day job attachment with CAG and our airport partners.

Through feedback forms, we measure the efficacy of our programmes among students with four outcome indicators.

**IMPACT OF PROGRAMMES ON NORTHLIGHT SCHOOL'S YOUTHS**

**87%** felt inspired about their future



**85%** felt inspired about their future careers



**84%** felt an increase in self-esteem



**79%** felt greater engagement in school



**Touching Lives One Step at a Time**

My first interaction with Nabil was not an easy one.

"How are you today?" I asked. Ignoring me, Nabil ran off while I tried to catch up with him.

I tried again. "What do you want to eat today?" This time, he walked to the roti prata stall with his money clenched in his hand.

Luckily, I remembered what Elsie, a fellow colleague, did to reach out to him. Nabil loves to draw and would doodle during their interaction time together.

So, armed with a pen and a notepad, Nabil and I started spending our time together at the Terminal 2 canteen where he would draw a variety of things. The first thing I remember him drawing were trains – multiple pages of trains in different perspectives, from the side view to a train approaching from a distance. Occasionally while drawing, he would say, "Train!" and I would encourage him with "Nice!" It was only a one-word response but it was a big deal for Nabil!

From running away from me during our first meet up, Nabil gradually warmed up. During one of his recent activities with me, he surprised me by drawing a picture of us together eating in the canteen. As he sketched my long hair, he pointed to my likeness and said, "You." It was a treasured moment for me. Nabil then asked me to draw him a picture of the book he was reading that day, Hansel and Gretel, adding that he loved the story. That was a lot for Nabil to express and even his teacher was amazed.

For a child with autism, including a stranger in his imaginative world, even for a brief moment, spoke volumes about how comfortable he felt with me. The best part? Nabil willingly posed for photos with me – something that was unthinkable months ago.

Interacting with an autistic kid is never easy. But I hope our encounters helped Nabil realise that he is able to deal with different situations as he becomes increasingly independent. I am sure that one day, his drawing of us will be joined by sketches of the many other "strangers" who will rally around him and cheer him on in his journey!

Stephanie Ho  
People Team

**Bottom:** Stephanie looking on as Nabil sketched a picture of them together in the canteen



**ENHANCING EMPLOYABILITY,  
GROWING EXPERIENCE**

**Metta School**

Driven by our firm belief in building an inclusive society, we adopted Metta School as our second beneficiary. Working closely with the school, we developed two programmes that cater to the needs of their students with Mild Intellectual Disability and/or Autism Spectrum Disorder (ASD). Under the Job Trial Programme in FY2018/19, we provided seven students with opportunities to enhance their employability via work placements with two airport partners, Nando's and Swensen's.

The Social Competence Learning Programme allows students to take advantage of the airport's facilities to glean independent living skills, such as learning how to purchase food and groceries. Over four months from April to

September 2018, we conducted four runs of the programme which benefitted 23 students. A total of 53 staff volunteers spent 106 hours guiding students in purchasing groceries and food, after which they rated their abilities against the school's checklist.

Other than the students, our staff and airport partners also gained fresh volunteering opportunities with a different beneficiary profile, thereby enhancing their understanding of them while reinforcing the ONE Changi culture. We will continue to engage our airport partners to support both programmes.

As a testament to the success of the partnership, we were one of four organisations to receive the inaugural Community Chest Volunteer-Partner award at the Istana.

Doing Good as  
**ONE Changi**

**CF anchors CAG's dream for the whole airport community to come together and make a difference. By collaborating with our airport partners, we seek to enhance our impact on the lives of our young beneficiaries.**

One such partner is NTUC FairPrice. In FY2018/19, they readily supported us in the Social Competence Learning Programme for Metta School by allowing its students with ASD to practise buying groceries at the supermarket in Changi Airport Terminal 2. During a preliminary discussion, the issue of the students needing more time to understand the amount to pay and calculate the change they received was brought up, and we suggested that the store might want to open another cashier counter in the event of a queue. Group Manager (Finest), NTUC FairPrice, Mr Victor Yap's response was heartening. He said that letting customers wait a little longer would help promote inclusivity and foster better understanding of differently abled persons. He also assured us that they would open up more counters if the queue became too long.

When the day arrived, NTUC FairPrice took the initiative to lower the volume of their in-store music to accommodate the audio sensitivities of the students. Meanwhile, their cashiers patiently waited for them to count out their money and made the effort to speak with them clearly and slowly to ensure the students understood.

We are always very encouraged by the passion and commitment of our partners and this was no exception. Heartwarming encounters like these, accompanied by the triumphant smiles of the students at accomplishing their tasks, continue to fuel our desire to serve the less fortunate as ONE Changi.

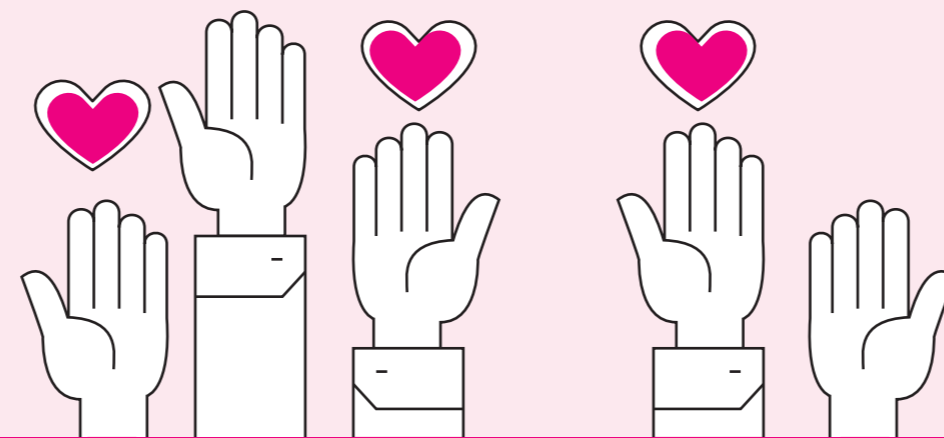
**FUNDING NEEDS, DOING MORE**

**Other Contributions**

We recognise that by supporting the efforts of others, we can do more. Beyond our ongoing partnerships with NorthLight School and Metta School, we also provide funding support for programmes targeting disadvantaged youths run by social service agencies. Some of these programmes include apprenticeship schemes, character-building initiatives and book prizes. Internally, we have also set up the Making A Difference (M.A.D) project fund under Changi Foundation to build a culture of active volunteerism by supporting staff-driven CSR projects.

413-1

**Bottom:**  
Social Competence Learning Programme in action where Metta School students got to practise buying groceries at an NTUC FairPrice supermarket



“Under the Job Trial Programme in FY2018/19, we provided seven students with opportunities to enhance their employability via work placements.”



Thriving Economy

# TRANSFOR MATION

Our ever-changing Changi skyline, with new terminals and the unveiling of Jewel, is a physical reminder of our quest for increased connectivity and business sustainability. But the impact of what we do reverberates well beyond the air transport industry.

More than our business, our persistent efforts to link people and cities also transforms the nation's economy. Today, as the international gateway for Singapore, Changi Airport manages one of the world's highest passenger and cargo volumes, creating job opportunities and enabling trade linkages beyond Singapore.



Thriving Economy

# Contribution to the Economic Development of Singapore

103-1 | 103-2 | 103-3



## Our Priorities

One of Singapore's key infrastructure assets, Changi Airport influences the nation's economic development. As its manager and operator, CAG partners government agencies and the private sector to design the airport's future-ready strategies. From enhancing Changi's connectivity and attractiveness, to strengthening cargo and airline route development as well as airport capacity, we plan for the long haul to secure Changi Airport's future competitiveness, strengthen Singapore's position as a leading global air hub and, in turn, create a thriving economy.

## Our Processes

- CAG actively works with airline partners to drive global connectivity
- CAG also closely partners our trade counterparts in driving Singapore's appeal as a leisure destination and gateway to the rest of the world

## Our Targets

-  **ACHIEVED**  
Completion of T1 Expansion Project by 2019
-  **ONGOING EFFORT**  
Build capacity ahead of growth with Terminal 5 planning and development

## Our Change Agents



ACROSS ALL CAG DIVISIONS

## Our SDGs



## Contribution to the Economic Development of Singapore

### ENHANCING GROSS DOMESTIC PRODUCT (GDP), SUPPORTING REVENUE GENERATORS

#### Economic Impact of Singapore's Air Hub

Each year, the air hub directly contributes to approximately 3% of Singapore's GDP and generates 88,000 jobs. In addition, there are wider economic benefits which include boosting tourism and economic growth through trade, investments and productivity – collectively termed as catalytic impacts<sup>1</sup>.

203-2

### CREATING VALUE, IMPACTING LIVES

#### Sustainable Economic Value

Over FY2018/19, the Group generated economic value amounting to S\$3.1b, marking an increase of 15.9% against the previous year. This was transferred to our stakeholders in the form of employee wages and benefits, taxes, purchases from suppliers and community investments. The remainder was channelled towards the upkeep of airport facilities as well as capacity enhancement projects such as the expansion of T1, Jewel, the three-runway system and the ongoing Changi East development.

Our outreach efforts are helmed by our philanthropic arm, the Changi Foundation. Details on our activities can be found in the Community Investment section of this Sustainability Report.

For further details on CAG's financial information, please refer to our Annual Report FY2018/19.

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### FORGING NEW CONNECTIONS, EXPANDING OUR REACH

#### Passenger Movements

In FY2018/19, Changi Airport handled a total of 66.3 million passenger movements, achieving a 5.2% increase year-on-year and a new record for us.

We also welcomed four new airlines – Guangxi Beibu Gulf Airlines, Juneyao Airlines, LOT Polish Airlines and Shandong Airlines, further adding to Changi Airport's airline community of over 100 international carriers. In FY2018/19, we also established nine new city links to China (Nanchang, Xuzhou), Germany (Berlin), India (Guwahati, Pune, Vijayawada), Indonesia (Belitung), Thailand (Chiang Rai) and Poland (Warsaw).

G4-A01

### PROPELLING CONNECTIVITY, GROWING AIR TRAFFIC

#### Aircraft Movements

Changi Airport is Asia Pacific's leading air hub. Strategically situated within two hours of a catchment population numbering 10 million, it offers excellent connectivity across the globe – allowing airlines to tap growing world-wide appetite for air travel.

Our partner airlines connect Singapore with 412 cities in 99 countries and territories. Their combined aircraft movements account for a flight taking off or landing at Changi Airport roughly every 80 seconds. FY2018/19 saw aircraft movements grow 2.3% year-on-year to reach 386,000.

G4-A02

### ENABLING TRADE, BUILDING CAPABILITIES

#### Air Cargo Performance

Changi Airport is the eighth largest airport in the world in terms of international air cargo traffic and consistently ranks among the region's key air cargo hubs.<sup>2</sup>

During the year in review, the airport handled 2.14 million tonnes of airfreight throughput. Import, export and transshipment flows remained flat, impacted by the slowdown in world trade and a challenging global air freight market. Despite the headwinds, we maintained a steady focus

on long-term fundamentals to develop a sustainable air cargo hub by building connectivity and capacity while deepening handling capabilities.

At the close of the financial year, Changi Airport served 23 cargo airlines with more than 330 weekly scheduled freighter flights to 48 cities. In October 2018, FedEx Express began operating 8x weekly flights between Singapore and Sydney, which grew the company's network in Singapore to 50 weekly flights. With the added capacity, Changi's freighter capacity on the Singapore-Australia route experienced incremental growth of over 60%.

This augments Singapore's position as a gateway to the Southwest Pacific region for cargo flows.

Meanwhile, we persisted in our efforts to enhance Singapore's pharmaceutical handling capabilities together with the Pharma@Changi air cargo community. During the year, we held dialogue sessions on best practices in pharmaceutical transportation and conducted a feedback review session at the annual Pharma Shipper forum organised by CAG. We are an active Strategic Member of Pharma.Aero.<sup>3</sup>

G4-A03

Bottom:  
Changi's air-freight handling capabilities



<sup>2</sup> Airports Council International 2018  
<sup>3</sup> Pharma.Aero is an organisation which facilitates cross-industry collaboration for pharma shippers, IATA CEIV Pharma certified cargo communities, airport operators and other air cargo industry stakeholders towards the achievement of excellence in reliable end-to-end air transportation for pharmaceutical shipments.



# Transforming Air Travel between the United States and Singapore

The United States is Singapore's largest trading partner. In 2018 alone, its foreign direct investments in Singapore totalled S\$244b. Underscoring the importance of this connection, we are shaping travel industry dynamics and positioning Changi Airport as Southeast Asia's leading aviation hub to the United States.

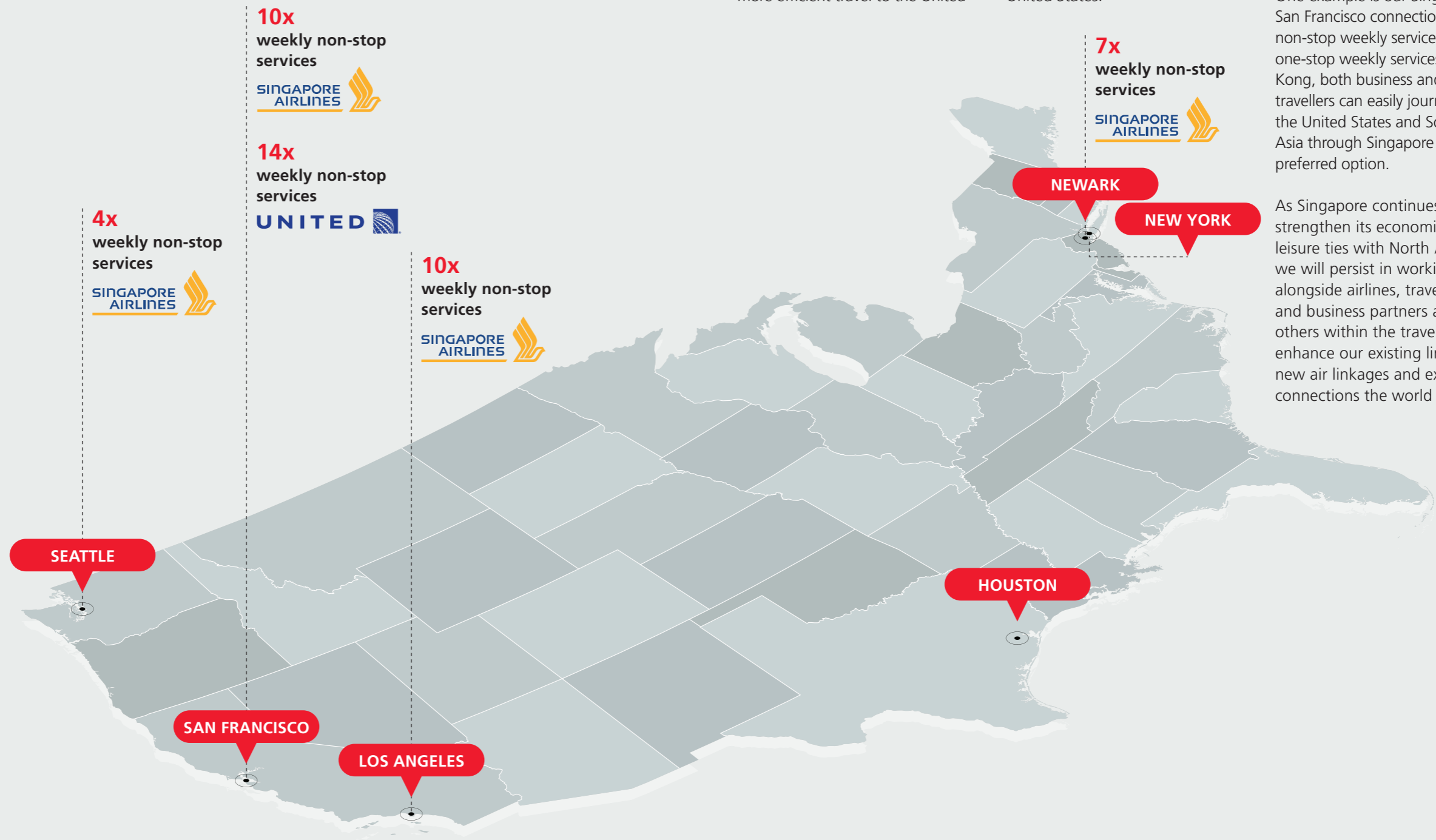
Currently, Changi Airport handles 71 weekly services to five United States cities. Comprising both non-stop and one-stop flights, these services offer over 17,500 weekly seats. Today, our non-stop flights cover 45x weekly services which make up more than half of the total weekly flights between the two countries.

In September, we expanded our non-stop air links to Seattle, making it our fourth non-stop destination after San Francisco, Los Angeles and Newark. In addition, Singapore Airlines operates the world's longest flight from Singapore to Newark – a record that entrenches the airport's status as an international air hub. Together, these recent developments translate into quicker, more efficient travel to the United States, considering that Changi only served this market with one-stop flights just two years ago.

Beyond the four non-stop destinations, Changi Airport is also linked to Houston and New York City via one-stop flights. Through offering passengers greater connectivity, the expanded air links resulted in a 10% spike in traffic from Singapore to the United States.

Changi Airport's well-balanced mix of non-stop and one-stop flights to the United States offers passengers diverse options that cater to their travel needs and budget. While business travellers generally prefer non-stop flights for their shorter travel times, leisure travellers with less time-sensitive schedules may opt for a one-stop service or even a stopover at the transit point. One example is our Singapore to San Francisco connection. With 24x non-stop weekly services and 7x one-stop weekly services via Hong Kong, both business and leisure travellers can easily journey between the United States and Southeast Asia through Singapore using their preferred option.

As Singapore continues to strengthen its economic and leisure ties with North America, we will persist in working alongside airlines, travel trade and business partners as well as others within the travel industry to enhance our existing links, build new air linkages and expand our connections the world over.



**Changi's non-stop links to the United States**

- 5 city links to the United States
- 2 airlines that fly to the United States
- 4 non-stop services to the United States

**"Changi Airport handles 71 weekly services to five United States cities."**



## Flourishing Planet

# INNOVATION

We are constantly pushing boundaries and exploring new ways to increase our proficiency in using valuable resources. Powered by innovation, we take a proactive approach to trial leading technologies and invest in highly-efficient equipment as good environmental stewards.

Through this, we seek to realise a future with a thriving, flourishing planet – one that will be enjoyed and explored by the generations to come.

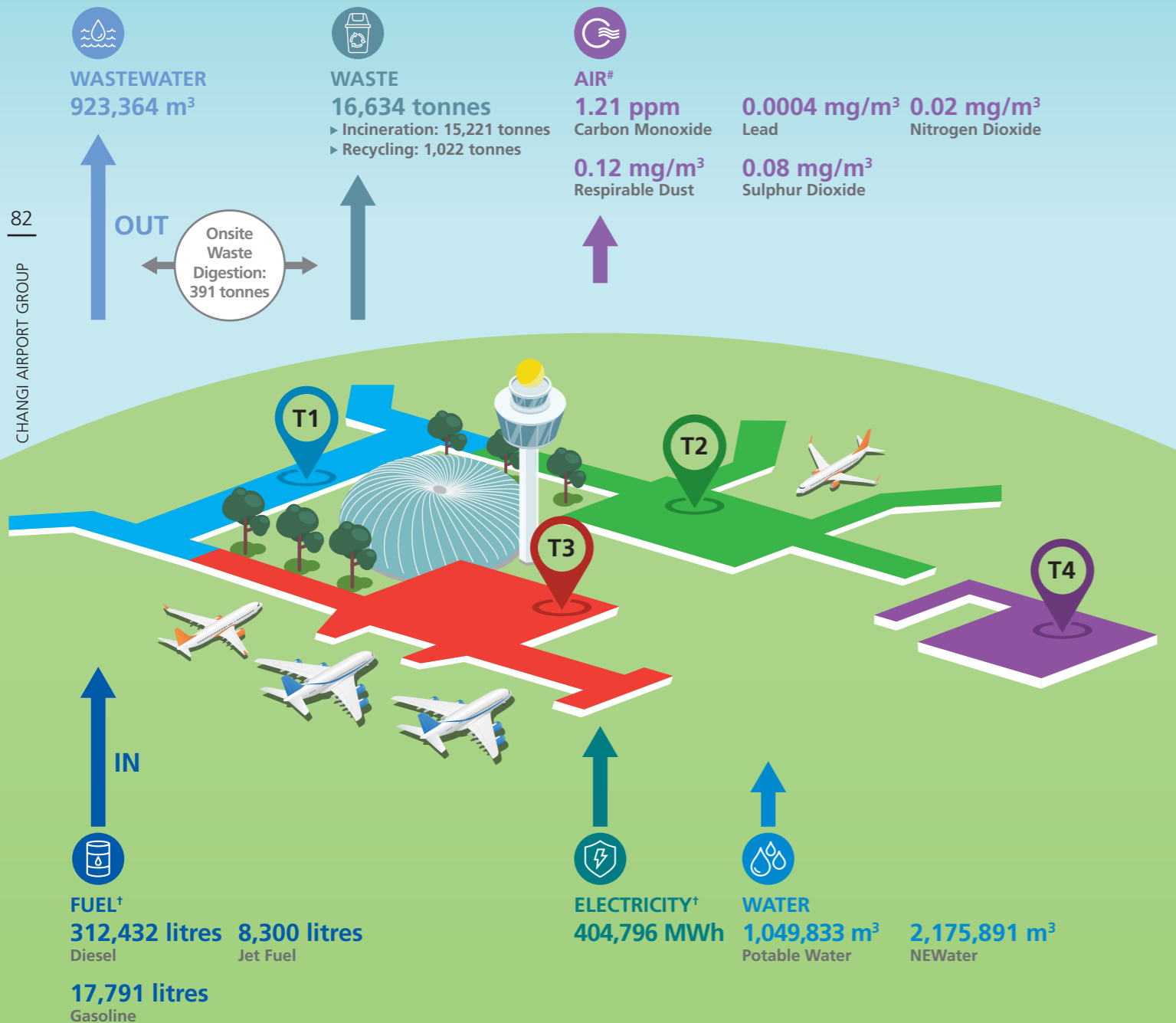


# Environmental Footprint

CHANGI AIRPORT GROUP

## SAFEGUARDING OUR PLANET AT CHANGI

At CAG, we understand the impact that our business has on the environment. As we continually shape Changi Airport to ensure the comfort of all passengers and visitors, we do our utmost for our planet – going beyond regulatory compliance and standards to reduce our environmental footprint. To this end, we work closely with our airport partners to explore new avenues to conserve resources, increase resource efficiency, lower greenhouse gas (GHG) emissions and develop more sustainable waste disposal methods.



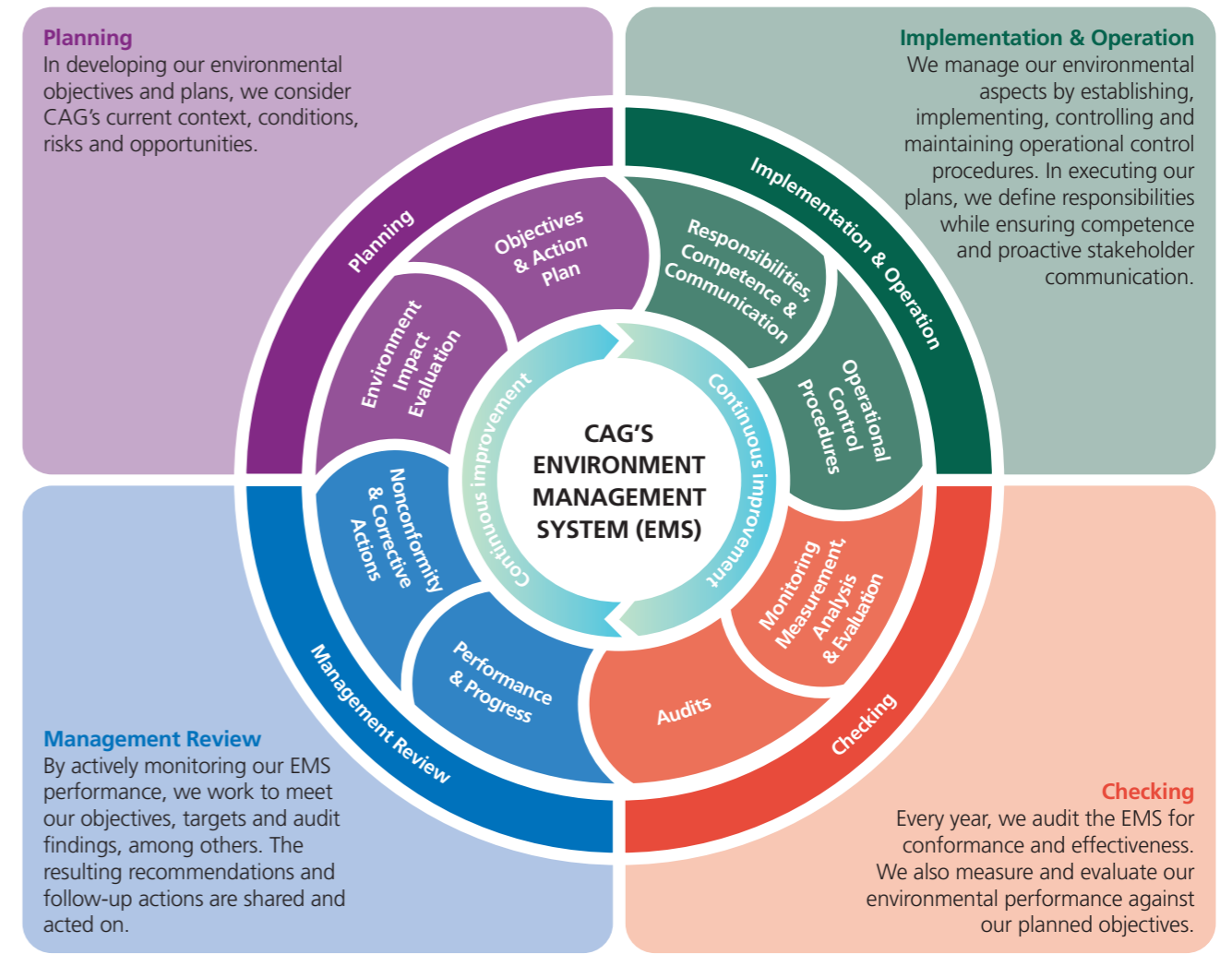
<sup>†</sup> FY2018/19 energy and GHG emissions data is subject to validation, and excludes Terminal 4 and Jewel in accordance to the Airport Carbon Accreditation methodology. T4 and Jewel's data is measured for multi-year baselining and will be included in our carbon footprint in following years.  
<sup>#</sup> Average air quality indicators across Terminals 2 and 3 from the Industrial Hygiene Monitoring study in FY2018/19.

## Planning

In developing our environmental objectives and plans, we consider CAG's current context, conditions, risks and opportunities.

## Implementation & Operation

We manage our environmental aspects by establishing, implementing, controlling and maintaining operational control procedures. In executing our plans, we define responsibilities while ensuring competence and proactive stakeholder communication.



## Management Review

By actively monitoring our EMS performance, we work to meet our objectives, targets and audit findings, among others. The resulting recommendations and follow-up actions are shared and acted on.

**Checking**  
Every year, we audit the EMS for conformance and effectiveness. We also measure and evaluate our environmental performance against our planned objectives.

## OUR ENVIRONMENTAL POLICY

CAG oversees sustainable development at Changi Airport. From new developments to upgrades and operations, we constantly enhance our environmental performance across our business and are firmly committed to:

- maintaining a sustainable environment by conducting activities responsibly while lowering pollution to safeguard the local community;
- continually improving our performance through environmental targets and action plans aimed at key environmental areas; and

- adhering to all legal and other requirements which apply to our business and environmental aspects.

## OUR ENVIRONMENTAL MANAGEMENT SYSTEM<sup>1</sup>

Our EMS supports our Environment Policy commitments and is ISO 14001:2015 certified. It comprises an environmental manual and operational control procedures to guide staff in implementing it effectively. Aimed at better managing and continually improving our environmental performance, the EMS adheres to a Plan-Do-Check-Act (PDCA) cycle,

which is the operating principle of ISO management systems.

Achieving our environmental goals requires the support of every employee. We surround them with learning opportunities and cross-functional involvement to infuse a culture of environmental stewardship throughout the airport. In FY2018/19, 26 Environment Representatives from various divisions across CAG underwent training on "Environmental Aspects Identification and Significance Assessment" to further develop their skills in enforcing a robust EMS.

<sup>1</sup> CAG's EMS covers airport management and operations, development and construction at Changi Airport within CAG's control and sphere of influence.

**A STRONG FOUNDATION BEGINS WITH SUSTAINABLE DESIGN**

We adopt a life-cycle perspective in managing our environmental footprint. We integrate sustainable features at the design and development stage of new terminals and structures, and when renovating and retrofitting existing ones.

**Green Buildings**

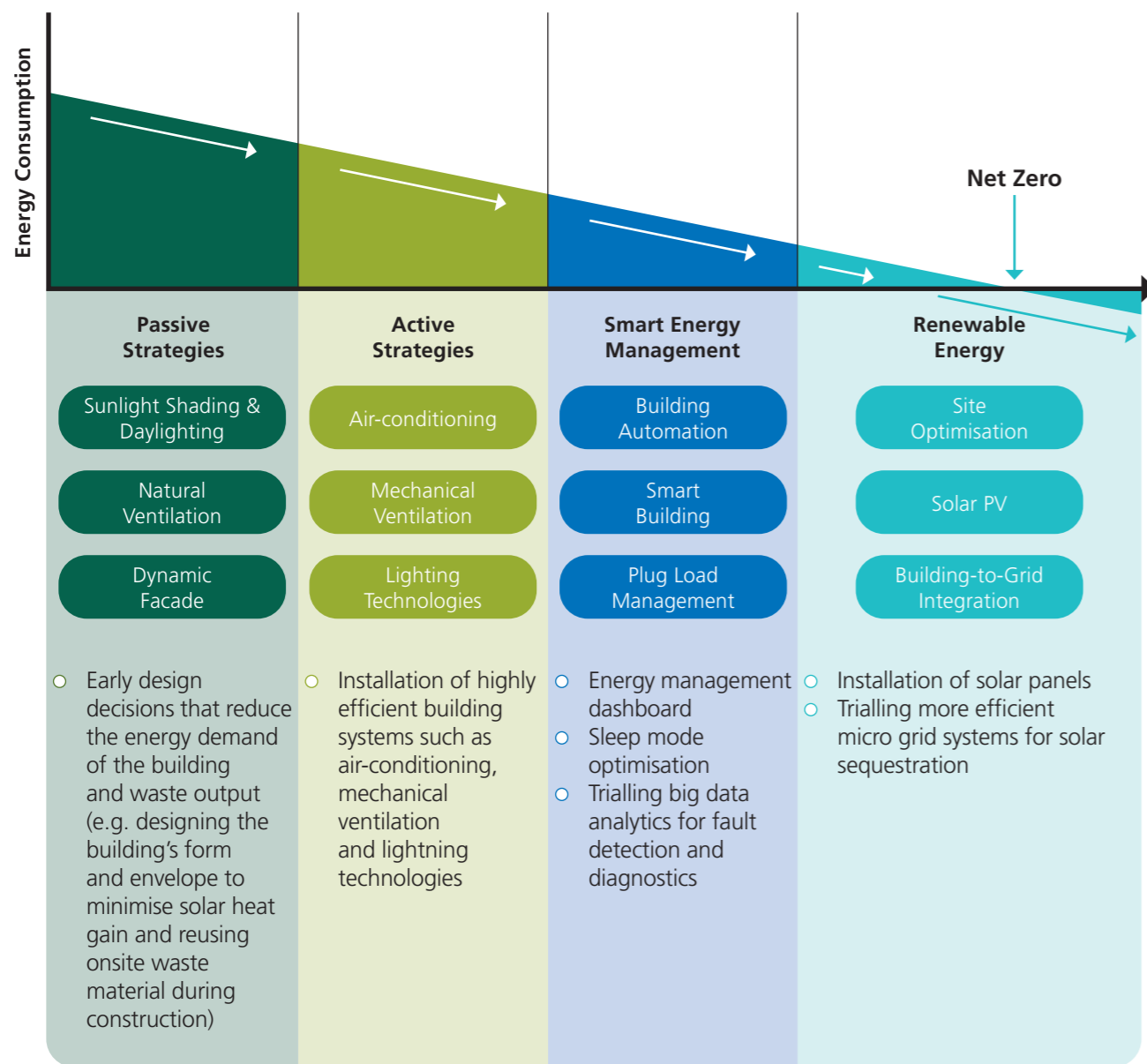
As buildings consume approximately one third of the world's energy, we discover many avenues to reduce consumption by looking at Changi Airport from the inside out. Green buildings are key focal points towards achieving environmental sustainability, enabling us to unlock energy savings and reduce our impact

on the environment. CAG adopts sustainable building principles and the building energy reduction strategies<sup>2</sup> of the Building and Construction Authority (BCA) that prioritise four areas: passive strategies, active strategies, smart energy management and renewable energy.

Many of these design strategies have been used in the construction of our passenger terminals as well as our newest building – Jewel Changi Airport (Jewel). Despite round-the-clock operations, we achieved high BCA Green Mark building standards.

Building	Green Mark
T3	Gold
T1	Gold
T2	Gold
T4	Gold Plus
Seletar Airport	Platinum
Jewel Changi Airport	Gold Plus

**ENERGY REDUCTION STRATEGIES OF TERMINAL BUILDINGS<sup>2</sup>**



<sup>2</sup> Building Construction Authority: Super Low Energy Building Technology Roadmap [https://www.bca.gov.sg/GreenMark/others/SLE\\_Tech\\_Roadmap.pdf](https://www.bca.gov.sg/GreenMark/others/SLE_Tech_Roadmap.pdf)  
 Building Construction Authority: Building Planning and Massing <https://www.bca.gov.sg/GreenMark/others/bldgplanningmassing.pdf>



**Sustainable Jewel**

Jewel is designed as a unique and breathtaking symbiosis of nature, commerce and play. Its iconic dome architecture allows natural light into the building with limited heat gain through optimised passive environmental design strategies.

Active energy-efficient strategies were used to cool the building's interior while smart systems were engaged to proactively reduce water usage and maintain the green landscape. In addition, Jewel's walls and flooring are embedded with sustainable construction materials.

Together, these approaches have created a sustainable Jewel that delights visitors and allows them to enjoy the offerings within the building and its lush greenery throughout the day, which would otherwise not be possible in our tropical heat.

# Sustainable Jewel

## Integrated Cooling Strategy and Thermal Stratification

Excessive warm air exits the building through vents triggered automatically by higher temperatures.

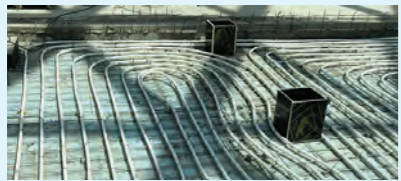
Deployable solar shading under the event plaza glass facade and localised shading from trees

- Localised shading from trees
- Highly-efficient chiller plant and air distribution system reduces a significant amount of energy consumption
- Air-conditioning diffusers at occupied zones (up to 2 metres from the ground)

Chiller system efficiency achieves **0.56 kW/ton**



- Chilled water pipes embedded in the flooring to take away solar heat gain and radiate coolness to pedestrians



## Multi-Layered Solar Control Strategy

Jewel's glass façade comprises over **9,000 unique glass panels**.

Each panel comprises 3 layers.

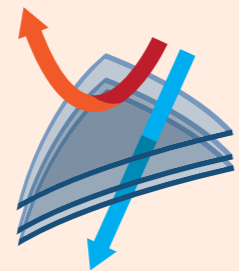


Solar selective coating was also applied to allow maximum daylight while keeping solar heat gain out.

### Benefits

Reduces building cooling load by minimising solar heat penetration

Allows natural light into the building and ensures health of greenery



## Sustainable Construction Materials

Jewel's construction extensively involved sustainable products certified under the Singapore Green Labelling Scheme.

- Steel was used in the façade (which is more sustainable than concrete)
- Recycled concrete aggregates and green cement form part of the floors and beams

Recycled materials were used for the interior construction and fit-out such as ceiling boards, drywall partitions, toilet partitions, plastering coating, waterproof membranes, plaster, rockwool for the façade, adhesive for the floor tiles, landscape drain cells and more.



- Low volatile organic compound (VOC) paints

## Gardens with Efficient Irrigation

- Special foliage of more than **2,000 trees** and over 100,000 shrubs form the entire landscaping in Jewel
- Integrated Soil Moisture Management System auto-irrigates the landscape with recycled water
- Soil sensors maintain optimal moisture levels



Some of the benches in Jewel are made from the trunks of trees that once grew in the carpark that Jewel was built on.



## Jewel's Iconic Rain Vortex

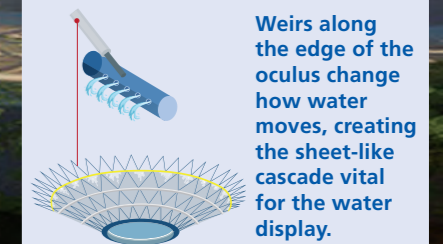
At Jewel's core is the world's tallest indoor waterfall at a height of **40 metres**.



Rainwater is funnelled through the 11-metre-wide oculus and cascades over 7 storeys.



Purified water is cycled back to the oculus via pipes embedded in the façade.



Weirs along the edge of the oculus change how water moves, creating the sheet-like cascade vital for the water display.

Flourishing Planet  
**Energy and Emissions Management**

103-1



Departu

**Our Priorities**

We understand that our carbon footprint affects the global community. We constantly innovate and proactively partner the airport community to trial leading technologies to reduce our carbon emissions collectively. We target our largest source of energy consumption – cooling our terminals – with highly-efficient cooling systems and technologies that reduce the amount of heat entering our buildings.

As we increasingly experience the impacts of climate change now, we have mapped its potential risks, such as an increase in temperatures, extreme rainfall, lightning frequency and rising sea levels. We are implementing adaptation measures that will ensure safety and business continuity for Changi Airport.

**Our Processes**



**POLICIES**

- CAG's Environment Policy
- CAG's Environmental Management System



**PRACTICES**

- CAG's Carbon Management Plan
- Airport Carbon Accreditation (ACA)
- Annual energy reporting
- Carbon reduction initiatives
- Internal assessment and auditing
- Training and awareness

**Our Targets**



**ON TRACK**

Reduce carbon emissions intensity by 20% by FY2029/30 (based on FY2017/18 levels)



**ACHIEVED**

Maintain ACA Level 3 certification



**ACHIEVED**

Maintain ISO 14001:2015 certification

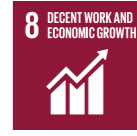
**Our Change Agents**



**ENVIRONMENT STEERING COMMITTEE**

- ENGINEERING & DEVELOPMENT
- FACILITIES MANAGEMENT
- ENVIRONMENT & SUSTAINABILITY
- AIRPORT MANAGEMENT
- PEOPLE TEAM

**Our SDGs**



# Carbon Footprint

CHANGI AIRPORT GROUP

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Every journey begins with a step in the right direction with the destination in mind. For Changi, this begins with reducing its footprint for future generations of travellers to make their mark.

## CAG'S CARBON FOOTPRINT<sup>1</sup>

Greenhouse gases (GHG) in the atmosphere are largely responsible for the greenhouse effect – which is one of the leading causes of global warming. Carbon footprinting enables CAG to quantify the amount of carbon dioxide equivalents (CO<sub>2</sub>e) emitted across the upstream and downstream activities in its value chain.

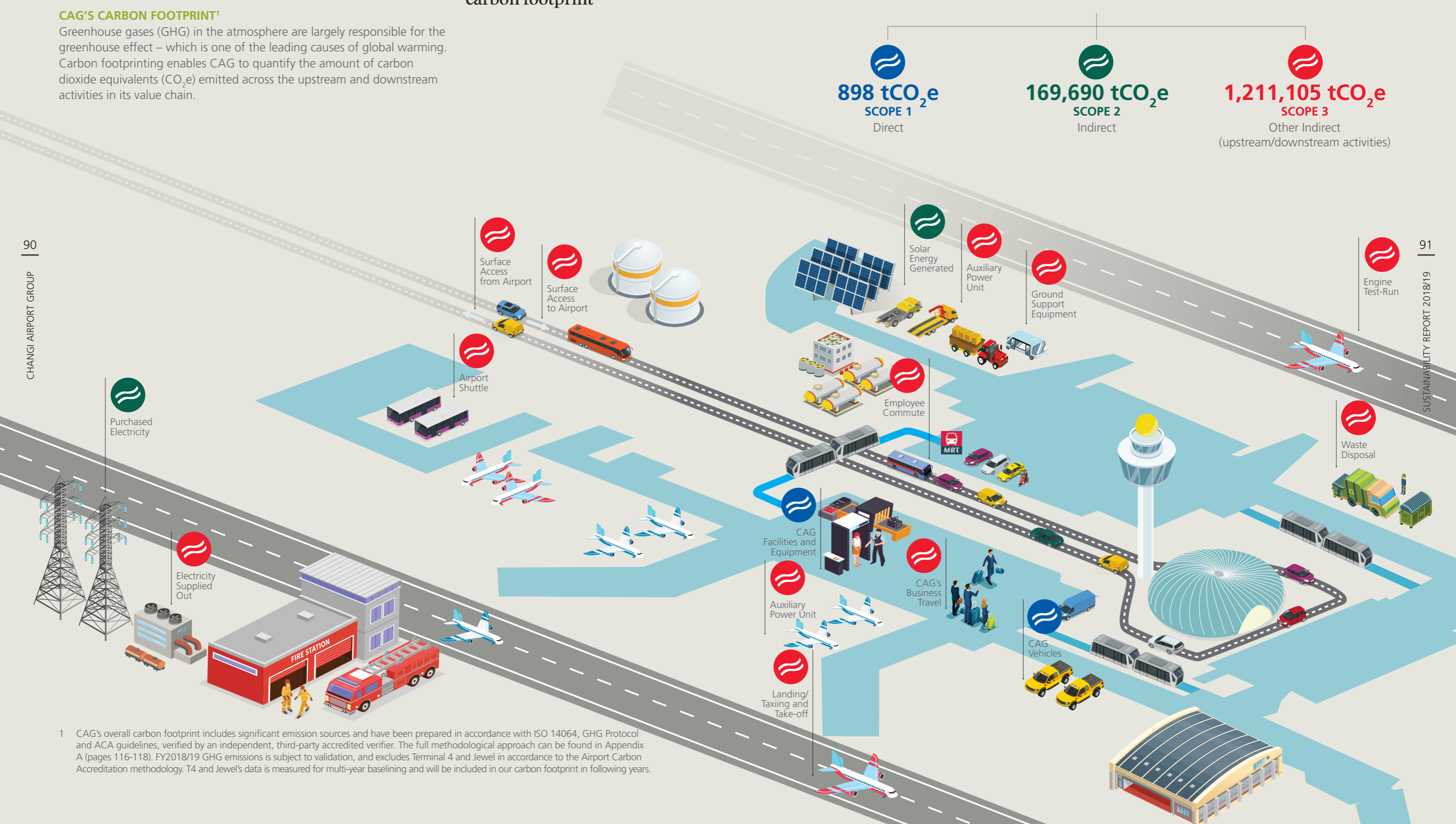
“Reducing our carbon footprint”

1,381,693 tCO<sub>2</sub>e  
TOTAL GHG EMISSIONS

898 tCO<sub>2</sub>e  
SCOPE 1  
Direct

169,690 tCO<sub>2</sub>e  
SCOPE 2  
Indirect

1,211,105 tCO<sub>2</sub>e  
SCOPE 3  
Other Indirect  
(upstream/downstream activities)

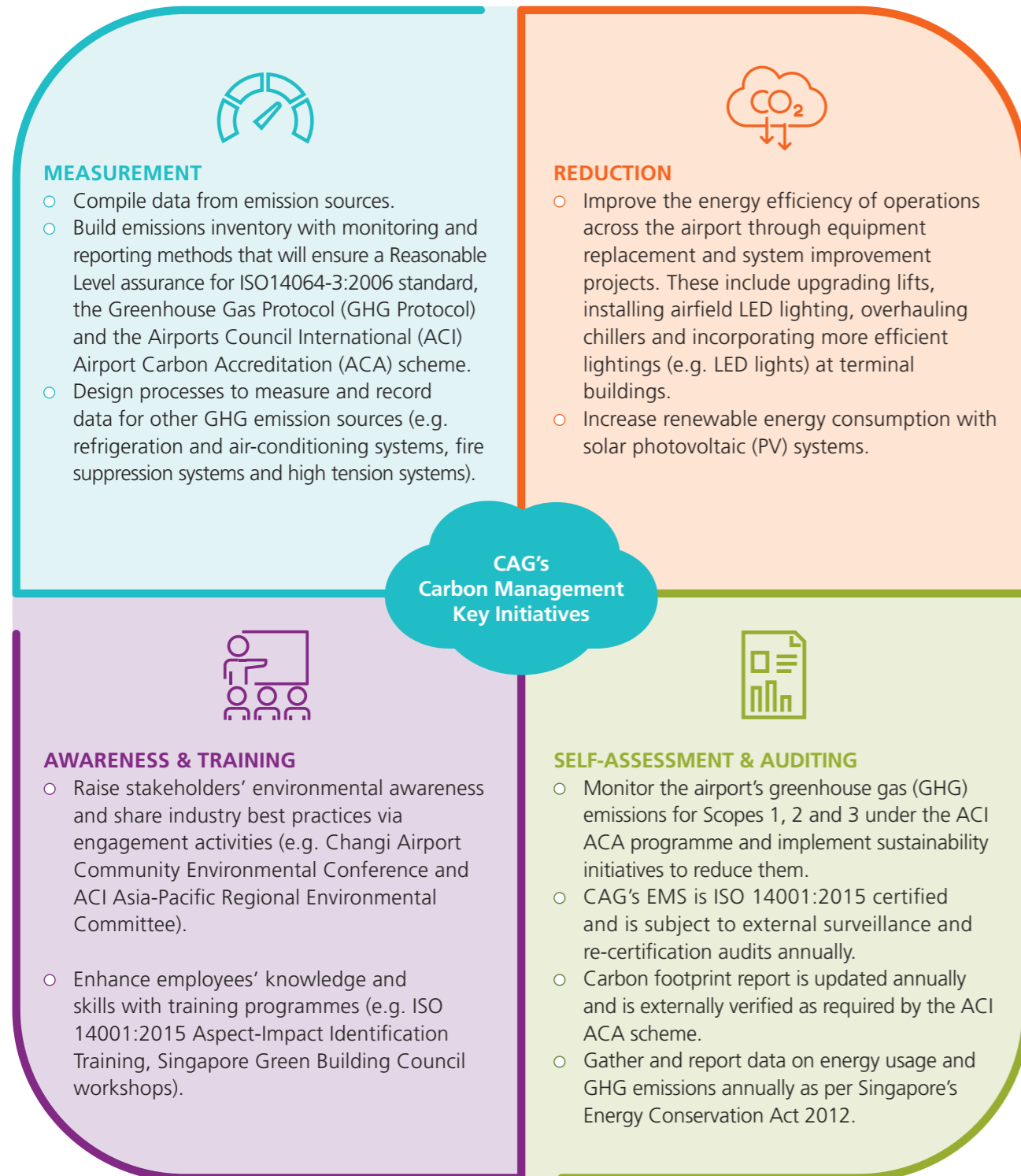


<sup>1</sup> CAG's overall carbon footprint includes significant emission sources and have been prepared in accordance with ISO 14064, GHG Protocol and ACA guidelines, verified by an independent, third-party accredited verifier. The full methodological approach can be found in Appendix A (pages 116-118). FY2018/19 GHG emissions is subject to validation, and excludes Terminal 4 and Jewel in accordance to the Airport Carbon Accreditation methodology. T4 and Jewel's data is measured for multi-year baselining and will be included in our carbon footprint in following years.

**RAISING EFFICIENCY, CONSERVING RESOURCES**

**Carbon Management Plan**

Changi Airport's roadmap to manage climate change is anchored on the Carbon Management Plan – a four-pronged action plan comprising measurement, reduction, self-assessment and auditing as well as awareness and training.



**UPHOLDING STANDARDS, ACHIEVING ACCREDITATION**

**Airport Carbon Accreditation**

266 airports are accredited under the ACI ACA scheme which accounts for 43.8% of global air passenger traffic. There are four accreditation levels that encompass three scopes:

- Scope 1: All direct GHG emissions including airport fleet

vehicles and stationary sources that are owned and controlled by the airport

- Scope 2: Indirect GHG emissions from the consumption of electricity purchased by the airport
- Scope 3: Other indirect emissions including tenant, airline and ground handling emissions as well as public transport

We have mapped our own as well as third-party emissions (Scopes 1, 2 and 3) and have set a target for reducing carbon emissions intensity.

In 2019, we maintained our accreditation at ACA Level 3 and are undergoing third-party verification for the airport's FY2018/19 carbon footprint, which will be published in subsequent reports.



**LOWERING EMISSIONS,  
SETTING GOALS**

**GHG Emissions\* and Reduction Target**

A total of 1,381,693 tonnes CO<sub>2</sub>e of GHG emissions<sup>2</sup> was recorded in FY2018/19, with Scopes 1 and 2 accounting for 0.1% and 12.3% respectively. We prioritise and constantly look for ways to reduce Scope 1 and 2 GHG emissions that are directly within our control

and influence. Our GHG emissions reduction target is aligned with Singapore's national target and aims to reduce 20% of GHG emissions intensity by FY2029/30 based on FY2017/18 levels.

Scope 3 emissions form the largest proportion of our footprint at 87.7%, showing the importance of working closely with our partners to actively engage the airport community and encourage their

partnership to collectively reduce our airport's emissions footprint.

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In FY2018/19, Terminal 1 underwent a major expansion to accommodate an expected increase in passenger traffic. This contributed to a 0.8% rise in GHG emissions intensity, attributed mainly to our Scope 2 emissions from electricity consumption.

**TARGETING CONSUMPTION,  
PREPARING FOR THE FUTURE**

**Electricity Consumption**

Electricity consumption constitutes 99.5% of CAG's Scope 1 and 2 emissions, with the majority being used to power our air-conditioning systems followed by terminal lighting and baggage handling systems.

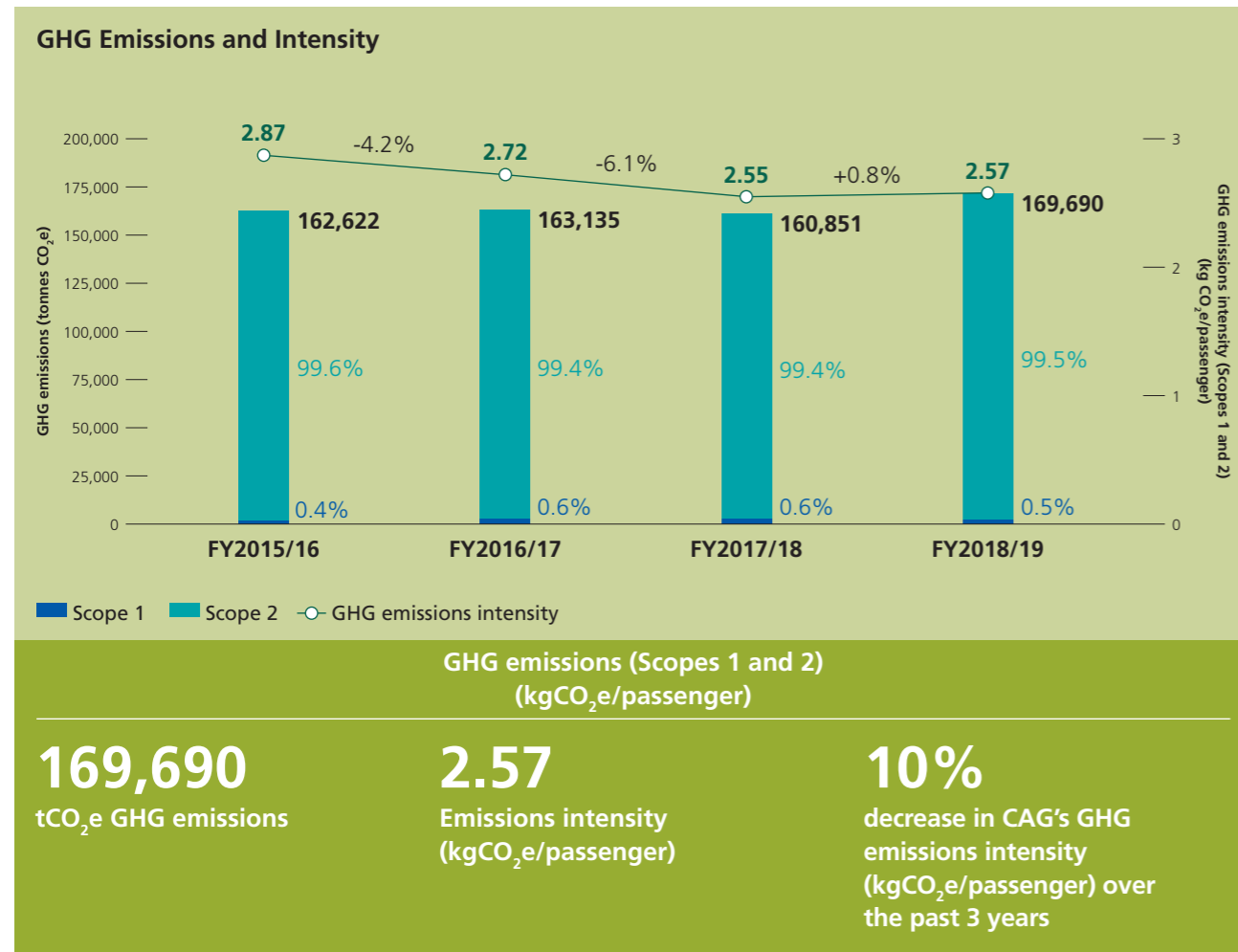
In FY2018/19, total electricity consumption<sup>3</sup> across Terminals 1 to 3

was 404,796 MWh, a 0.8% increase in electricity intensity from FY2017/18 due to Terminal 1's major expansion and full operations.

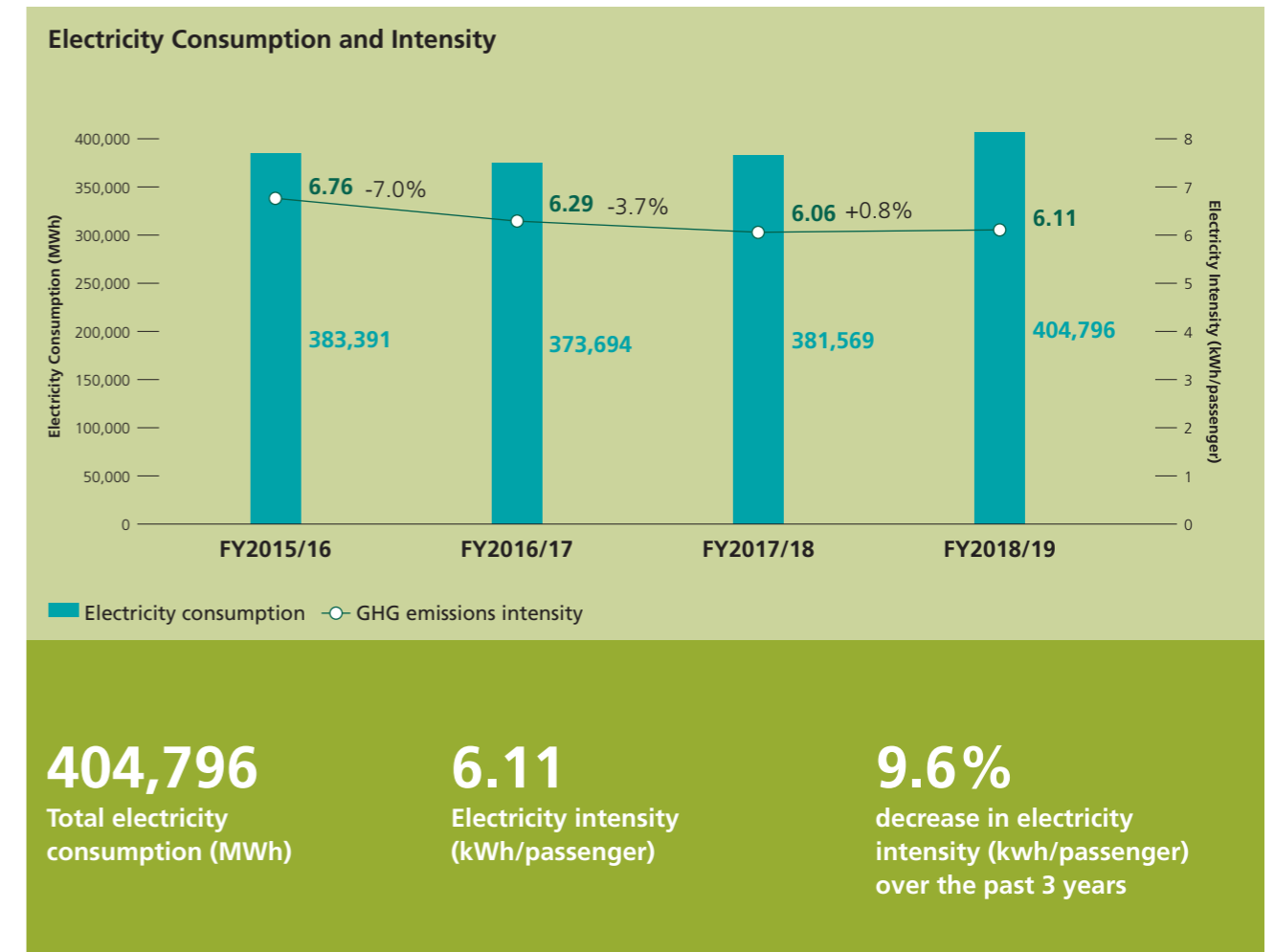
Our baggage handling capacity was increased with two more baggage belts added to the existing eight and check-in rows 12 to 16 equipped with 68 FAST self check-in kiosks. The baggage handling system at Terminal 1 was upgraded to a fully-automated,

self-service check-in, bag-drop and self-sorting system. With CAG's investment in electrical equipment for long-term terminal efficiency, we saw an increase in our electricity consumption per passenger in preparation for greater passenger traffic.

However, CAG still maintained a significant decrease in GHG emissions and electricity intensity over the past 3 years.



\* Figures are rounded to the nearest decimal point.  
 2 GHG emissions values have been prepared in accordance with ISO 14064, GHG Protocol and ACA guidelines and verified by an independent, third-party accredited verifier. The full methodological approach can be found in Appendix A (pages 116-118). FY2018/19 GHG emissions and electricity data is subject to validation, and excludes Terminal 4 and Jewel in accordance to the Airport Carbon Accreditation methodology. T4 and Jewel's data is measured for multi-year baselining and will be included in our carbon footprint in following years.



3 Estimation of the net electricity usage is achieved by deducting electricity supplied to tenants, private developers (i.e. companies who have leased their own piece of land on the airport property), Terminal 4 and Jewel, from the total electricity imported. The full methodological approach can be found in Appendix A (pages 116-118).

**UPGRADING SYSTEMS,  
 IMPROVING EFFICIENCY**

**Carbon Reduction**

CAG's cross-Cluster Environmental Steering Committee drives the implementation of its environmental policy, ensuring that our carbon reduction targets are achieved and that CAG's Carbon Management Plan is implemented effectively.

Over the next few years, multiple initiatives will be carried out to improve the energy efficiency of terminal buildings through a series of equipment replacement and system improvement projects. These include upgrading to energy-efficient chiller systems for cooling and replacing existing lighting with more energy-efficient types.

Besides energy efficiency, Changi Airport is also reducing emissions from the direct combustion of fossil fuel, by enabling the

electrification of traditionally diesel-powered ground service vehicles, including baggage tractors on the airside.

Looking ahead, we will trial and implement environmental sustainability projects in collaboration with our suppliers and airport partners. These include improvements to the cooling efficiencies of terminal buildings and the upgrading of mechanical and electrical systems to more energy-efficient technologies.

Our Changi East development will harness an energy-efficient design so as to ensure that the airport's carbon emissions are kept to a minimum. This will include making sure that Terminal 5 building systems uphold Green Mark Platinum standards as well as integrating solar photovoltaic systems in a purposeful way to harness clean and renewable energy.

**REDUCING POLLUTANTS,  
 ENHANCING AIR QUALITY**

**Indoor Air Quality**

We continually monitor and improve our indoor terminal air quality based on the Singapore Standard Code of Practice for Indoor Air Quality for air-conditioned buildings. These parameters – air temperature, relative humidity, air movement, carbon dioxide, carbon monoxide, formaldehyde, volatile organic compounds, respirable suspended particles, PM2.5 and viable bacterial count – are monitored across 2,000 points to secure high air quality standards and a pleasant environment for our airport users.

**Air Quality Monitoring**





We conduct Industrial Hygiene Monitoring annually to test the air quality across 100 points in the baggage handling areas to ensure a healthy environment for our airport workers. The deployment of electric vehicles in the apron area have resulted in improved air quality.

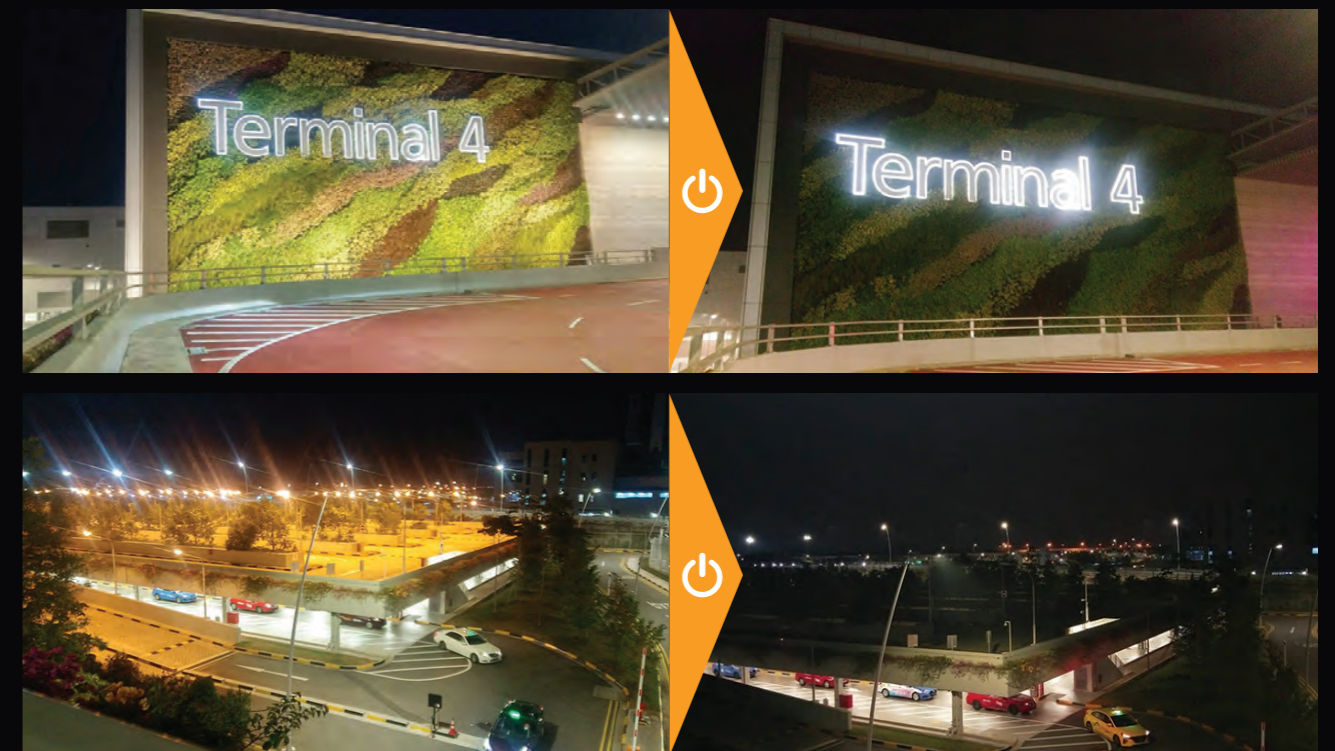


**Right:**  
 Trialling energy innovation that reduces building cooling load.

**Doing Our Part**

# Earth Hour

-  Changi Airport has taken part in Earth Hour every year since its incorporation in 2009
-  By participating in the world-wide movement, we hope to spark action for the environment.
-  Each year, the lights for certain decorative features across the airport, including fountains and plants, are turned off. At the same time, selected non-essential lights at all four terminals are dimmed – some by up to 80%.
-  Apart from Earth Hour, we also make a concerted effort throughout the rest of the year to reduce energy consumption wherever possible. These include dimming the lights at our terminals every day during the low peak hours of 12am to 6am for Terminals 1 and 3, and 3am to 5am for Terminal 2.



# A Cool Place to Be

With our airport operating around the clock, it is critical that we maintain a comfortable temperature for our passengers and visitors throughout the day. We adopt active strategies to procure highly energy-efficient chiller systems that run optimally for everyone's comfort.

Chillers are key components of centralised air-conditioning systems that serve vast building spaces like our airport environment. To maintain optimum performance and reliable serviceability, CAG's Engineering & Development cluster has been regularly monitoring and reviewing the existing operating conditions of our chillers and proposing timely replacements and upgrades.

In the Terminals 1 and 2 pier chiller replacement project, which was carried out in 2013 and 2014, we chose the market's most efficient chiller at that time – the Carrier 23XRV series screw chiller certified with the Singapore Green Labelling Scheme (SGLS). We also redesigned the chillers' layout and operations to meet our growing cooling needs and achieve the highest possible efficiency.

A screw chiller compresses the refrigerant gas more efficiently than the traditional centrifugal

chillers. Centrifugal chillers operate at full load capacity, whereas screw chillers can run at variable speeds and have the highest efficiency at 70% part load instead of the traditional 100%. These variable speed drives allow for the power curve to be reduced especially during off-peak load.

Through this replacement and upgrading project, we not only increased our overall cooling capacity for current and future needs by 20%, but also achieved system efficiency of about 33%, which in turn translates into about S\$1.2m in annual energy savings. The replacement and upgrading project was recognised by the Building and Construction Authority (BCA) under its Green Mark Incentive Scheme (GMIS) and awarded the Green Mark Gold Certification in 2018.

CAG worked closely with our equipment provider, Carrier Singapore, to install, test and commission the highly-efficient screw chillers, and partners Indeco Engineers to service and maintain them. Our valued partners and contractors in the airport community are the unsung heroes who ensure that comfort and energy efficiency are not compromised as we strive to keep Changi Airport cool.

From left to right:  
**Chong Tze Tai**  
Carrier Singapore  
**Wang Mei Yang**  
CAG Engineering  
Management and Systems  
Planning team  
**Yee Mon Soe**  
Indeco Engineers

Flourishing Planet  
**Water & Effluents Management**

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### Our Priorities

Working in tandem with national strategies to reduce water consumption and recycle wastewater, CAG builds a water-resilient future while efficiently operating airport facilities and delivering the best passenger experience possible for millions of travellers.

Our efforts in ensuring good water management are centred on reducing potable water consumption across our terminals. In creating an endlessly reusable resource, we close the loop by collecting and reusing water for non-potable use. Looking ahead, we will continue to strengthen our water supply and manage consumption wisely by harnessing more water-efficient management systems and trialling emerging water technologies.

### Our Processes



#### POLICIES

- CAG's Environment Policy
- CAG's Environmental Management System



#### PRACTICES

- CAG's Water Optimisation Strategy
- SMART metering of water consumption
- Certified Water Efficient Building by the Public Utilities Board (PUB)

### Our Targets



**ON TRACK**

Trialling various water optimisation technologies

### Our Change Agents



**ENVIRONMENT STEERING COMMITTEE**

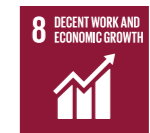
FACILITIES MANAGEMENT

ENGINEERING & DEVELOPMENT

ENVIRONMENT & SUSTAINABILITY

PEOPLE TEAM

### Our SDGs



**CONSERVING WATER, SAFEGUARDING OUR FUTURE**

**CAG's Water Optimisation Strategy**

We adopt a Water Optimisation Strategy to lower usage and raise efficiency as we journey towards a water-resilient future. With the majority of water consumption across our terminals attributed to building cooling, toilets, irrigation and external cleaning, the strategy adopts a two-pronged approach which targets the use of potable and non-potable water.

**1. Reduce potable water usage**

- Retrofit more water-efficient devices such as water thimbles at water taps.
- Facilitate highly-responsive leakage and repair management with more convenient fault reporting.

- Engage the public and staff through water conservation messages.

**2. Reduce non-potable water usage**

- Conduct periodic maintenance and replacement of Cooling Tower infills to increase water efficiency.
- Explore technologies that reduce our building cooling load and in turn lower water usage in the cooling towers.
- Harness technologies that keep water for non-potable use clean for longer periods of time, which will reduce the need for new water.
- Harvest rainwater for irrigation.
- Recycling condensate water for irrigation and use in cooling towers.

**MEASURING USAGE, ENHANCING ENVIRONMENTAL PERFORMANCE**

**SMART Metering of Water and Electricity Consumption**

We work closely with our tenants to reduce Changi Airport's water and energy footprint. We will pilot a smart utilities metering system (SUMS) at Terminal 3. SUMS will proactively monitor our tenants' water and electricity consumption via an integrated system of smart meters, communications networks and data management systems – known as an Advanced Metering Infrastructure – which will be installed at the terminal. This enables a concerted effort by the airport community in our drive to track and improve our environmental performance and advance our sustainability goals.



**7.45%**  
decrease in overall water consumption



**923,364m<sup>3</sup>**  
Total estimated water discharged

**REDUCING CONSUMPTION, INCREASING EFFICIENCY**

During the year, we withdrew a total of 3,225,725m<sup>3</sup> of water at the four terminal buildings, marking a decrease in overall water consumption by 7.45% year-on-year. This was due to:

- improvements to the filtration system in the cooling tower, which resulted in 13% water savings;
- the adoption of water-efficient fittings and water-saving cleaning methods;
- the closure of toilets in Terminals 1 and 2 for renovation works; and
- pipe improvement works.

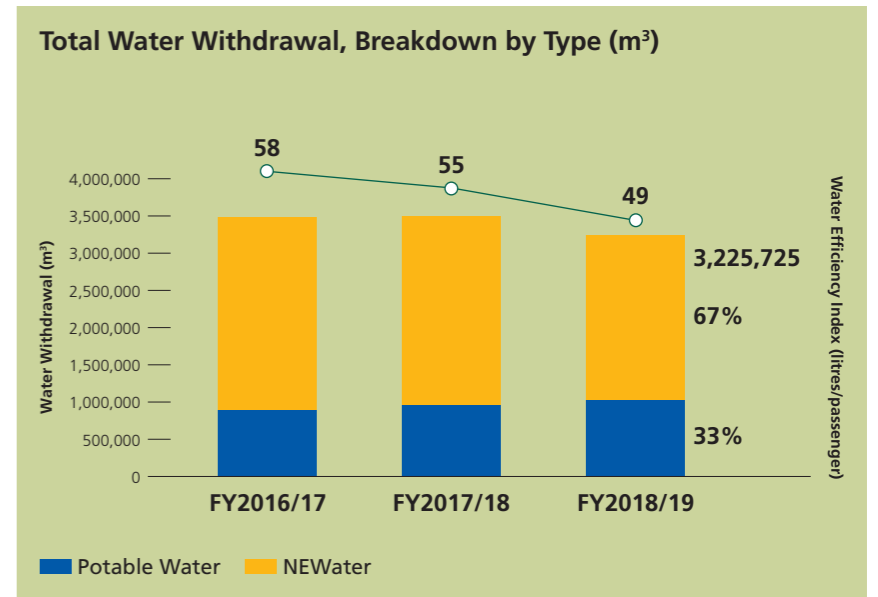
As required, we tapped potable water for our fire hydrants instead of NEWater. The move significantly decreased our use of NEWater and increased potable water usage.

Over the years, our efforts have resulted in a steady decline in the amount of water used per passenger, with FY2018/19 recording a 12% reduction against the previous year.

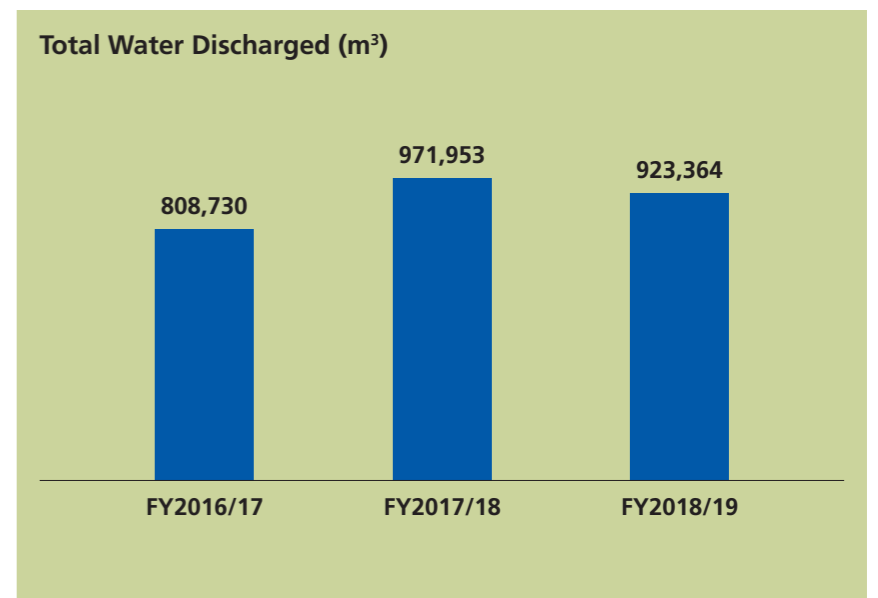
**LOWERING WATER OUTPUT, RECYCLING WASTEWATER**

**Water Discharge**

With the decrease in overall water consumption, our total estimated water discharge to the sewerage system for the year stood at 923,364m<sup>3</sup>, reflecting a 5% drop compared to the previous financial year.



303-1



306-1



## Every Drop Counts at Our Pantries



Our constant drive to lower unnecessary water consumption extends to our staff office pantries. In our search for a water-saving yet effective thimble for our taps, we trialed various devices over a span of three months. During this period, we carefully evaluated the water flow and staff feedback, and eventually decided on a water thimble that maintained sufficient flow while halving water usage to 3 litres per minute. It has since been installed at all our office pantries.



**From left to right:**  
**Kenneth Ho**  
CAG Terminal 4 Integrated Facilities Management team  
**Nguyen Thi Thanh Huong**  
800 Super - Cleaning Services

## Cleaning Up the Eco-friendly, People-friendly Way

Keeping Changi Airport clean the conventional way involves an arsenal of chemicals to target different types of stains and surfaces. While costly in terms of storage space, this method also requires cleaners to know the right chemicals to use and how to use them, which can be confusing, especially for elderly workers. Moreover, most of these chemicals need to be rinsed off, thus increasing water usage.

Understanding the situation, we set about finding a new cleaning agent – one that was safe and easy

to use, environmentally friendly, multipurpose and economical. Our search led us to Z Water, a purified pH12.5 ionised alkaline water made with advanced Japanese technology that is chemical and odour free and requires no rinsing.

We decided to put Z Water to the test at Terminal 4. Since then, we found that surfaces stayed cleaner for longer as Z Water did not leave any chemical residue. Without the need to rinse it off, we saved a significant amount of water. We also reduced our chemical use by 70%, with our cleaners reporting

that it was easier to clean using one product instead of four to five different chemicals. As an added plus, Z Water is produced onsite at the airport, which eliminates the need for external vendors to transport cleaning products to us and lowers our carbon footprint.

While making cleaning easier for our staff, Z Water is also used by our multi-racial cleaning robots, 亮亮 (Liang Liang), 晶晶 (Jing Jing), Palich Palich and Bersih, to keep the terminal sparkling.

Flourishing Planet  
**Waste Management**

103-1 | 103-2



### Our Priorities

Singapore has designated 2019 as the “Year Towards Zero Waste”. Singapore’s Zero Waste Masterplan charts national adoption of circular economy principles which also includes increased regulation of electronic, packaging and food waste.

Well-aligned with the nation’s goal, waste is managed at CAG as an inefficient, untapped resource to be reduced, reused and recovered. Our sustainable solid waste management involves driving resource efficiency across each material’s life cycle. In enhancing circularity, we prioritise reducing waste via sustainable designs and thoughtful procurement decisions, while engaging in recycling efforts and lowering waste volumes as much as possible.

### Our Processes



#### POLICIES

- CAG’s Environment Policy
- CAG’s Environmental Management System



#### PRACTICES

- Operational control procedures for proper waste disposal
- Onsite food waste digestion
- Exploring and trialling technologies to reduce waste volumes
- Building stakeholder awareness

### Our Targets



**ON TRACK**

Surpassed waste diversion from incineration rate of 8.5% for passenger terminals by FY2019/20

### Our Change Agents



ENVIRONMENT STEERING COMMITTEE

LICENSED WASTE CONTRACTORS

- FACILITIES MANAGEMENT
- ENGINEERING & DEVELOPMENT
- ENVIRONMENT & SUSTAINABILITY
- COMMERCIAL
- PEOPLE TEAM

### Our SDGs



**391 tonnes**  
Total amount of food waste diverted from incineration

**STRENGTHENING OUR PROCEDURES, CONTROLLING WASTE TOGETHER**

**Operational Control Procedures for Proper Waste Disposal**

At CAG, we have in place stringent procedures to ensure our waste streams are properly disposed of. Each year, we audit our waste control procedures for alignment with local statutory requirements and CAG's standards, and check the waste disposal licenses of our waste contractors.

Our terminals' general waste goes to incineration plants, recyclables are recovered at a material recovery facility and food waste is digested onsite. Our F&B tenants have taken into consideration food waste collection procedures and the size of food waste bins into the design and set up of their units.

103-2 103-3

**STAYING AHEAD OF REGULATION, SEGREGATING FOOD WASTE**

The National Environment Agency (NEA) has announced that it will be mandatory for large commercial premises to segregate food waste for treatment by 2024<sup>1</sup>. Ahead of regulation, CAG installed its first food waste digester in 2015. The financial year saw all 11 food waste digestors functioning at higher operational capacity, causing a 26% increase in food waste diverted from the landfill compared to last year.

**HARNESSING TECHNOLOGY, REDUCING WASTE**

**Technology Trial**

We actively explore and leverage new technologies in our quest to lower waste volumes and recover more material and energy from our waste streams. We are working with the NEA and a technology provider to trial an onsite municipal waste processing system.

**PARTNERING OUR TENANTS, ENCOURAGING ENVIRONMENTAL RESPONSIBILITY**

**Stakeholder Engagement**

We recognise the need to partner others to further our waste management efforts. To this end, we rally the support of our key stakeholders, from F&B and retail outlets to our cleaners, passengers and staff. Our Commercial team communicates closely with F&B and retail outlets, encouraging them in the good management of waste materials, substances and air quality. Circulars were sent out to tenants with maps detailing the location of recycling points. During the year, as part of quality service training, appropriate environmental behaviour was conveyed to our tenants. The team also organised tours to increase awareness of good recycling practices in sorting materials and to show tenants the location of our recycling areas in the bin centres to promote recycling.

**16,634 tonnes**  
Total waste disposed at four terminal buildings<sup>2</sup>

**8.5%**  
Waste diverted from incineration

**RAISING EFFICIENCY, LOWERING INCINERATED WASTE**

**Waste Disposal**

During the year, our passenger traffic increased by 5.2%. However, with an efficient waste management system, our waste sent for incineration rose at a slower rate of 4.1%. A total of 16,634 tonnes of waste was disposed at our four terminal buildings. This comprised general waste, recyclables, electronic waste and food waste.

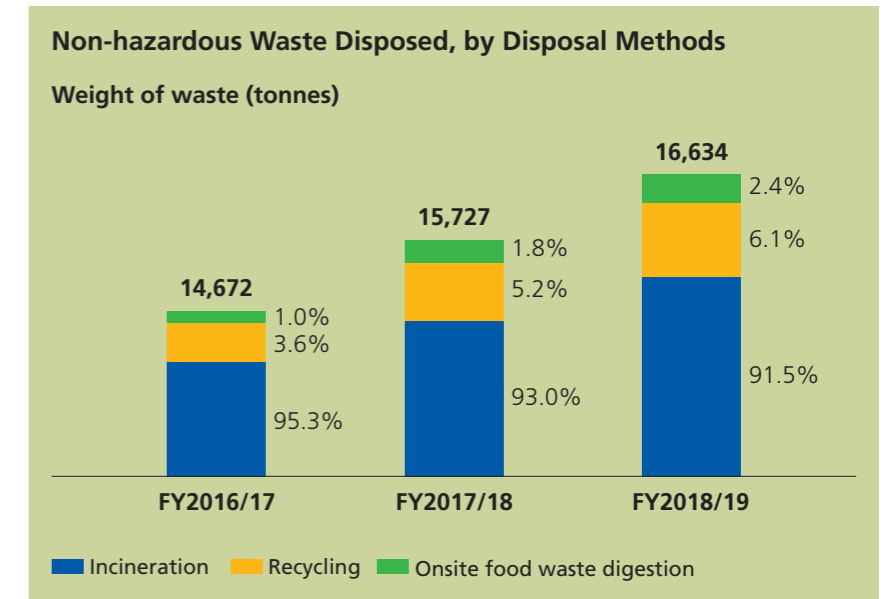
306-2

**EXCEEDING TARGETS, ENGAGING OUR COMMUNITY**

**Waste Diversion Targets**

Our waste diversion rate from incineration rose from 7.0% in FY2017/18 to 8.5% in the year in review.

Our combined efforts in engaging the airport community and shifting



behaviour have driven up our waste diversion from landfill rate by 22% against the previous year. This allowed us to successfully achieve our target rate of 8.5% for passenger terminals in FY2019/20 – one year ahead of schedule. Currently, we are on track to exceed Singapore's national recycling rate of 8.7% for malls, and are reviewing our waste diversion targets.

These achievements come on the back of three key initiatives. Our engagement efforts improved recycling activity among our airport community. At the same time, an increase in regular weighings allowed us to track our waste more effectively and with greater accuracy. During the year, we also ramped up the usage of our food waste digestors to digest more food waste.

<sup>1</sup> <https://www.nea.gov.sg/media/news/news/index/nea-to-implement-mandatory-reporting-of-packaging-data-waste-reduction-plans-in-2020>

<sup>2</sup> This report discloses the municipal solid waste disposed at the four terminal buildings. All other waste outside this scope is excluded from this report.





Team behind our Terminals 3 and 4's PWCS  
From left to right:  
**Chervina Tan**  
CAG's Facilities Management  
**Leslie Sia**  
CAG's Engineering & Development team  
**Zhang Chun Yan**  
Ramky – Cleaning Services  
**Muhammad Bin Mohd Esa**  
800 Super – Recycling Services

# A Change for Good

## New Hardware and Heartware in Waste Management

Moving waste to the bin centres using conventional methods involves pushing waste across the airport building.

At Terminals 3 and 4, we employ the Pneumatic Waste Conveyor System (PWCS), which uses suction to transport refuse from the loading stations at each terminal floor to the bin centres via pipes.

This results in less spillage and, in turn, reduces the amount of washing needed for the compactors and the bin centres. At the same time, the PWCS successfully contains waste and odour, thus reducing smells and pests while raising hygiene levels.

Within the terminals, the incorporation of the PWCS has increased productivity as our cleaners now have shorter distances to physically transport the waste, which can be unsightly as well.

Recycling rates have also improved at both terminals. The system's small chutes are unable to accept bulky recyclable items, making it necessary for these to be brought to the recycling points.

We train and empower all our tenants and cleaners at Terminal 4 to separate recyclable and general waste as part of their day-to-day operations, and only dispose general



Top:  
Terminal 4's PWCS Loading Station

waste into the PWCS loading stations. We conduct regular visits to check that waste management procedures are followed, and actively support our tenants in their efforts. We assign them the nearest loading station to their unit and allow them to dispose items at various timeslots throughout the day, so as to minimise any inconvenience and ensure their operations are not impacted.

Terminal 4's PWCS is fully enclosed, ensuring all odours and pests are contained within the system. Hence, the waste compactor bins are hauled away only when they are full, resulting in an estimated 45% reduction in haulage trips and lower carbon emissions.

# Paving the Way to a Sustainable Future

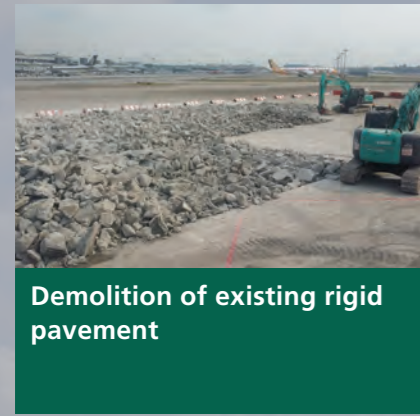
An aircraft parking bay typically has a lifespan of 25 years. In the past, the repaving and reconstruction of these parking bays meant that old materials were discarded as construction waste and new construction material was used, comprising a

concrete mix batched with 100% new stones. Today, through an engineering collaboration with a local university, such works incorporate 50% new stones and 50% recycled stones in a concrete design mix. This Recycled Concrete Aggregate (RCA)

maintains the required quality and durability of the parking bays. Continuing collaboration with innovative partners and sourcing for sustainable alternatives enables more circularity in Changi Airport as we move towards a zero-waste economy.



**4,435 tonnes**  
of concrete recycled to repave aircraft parking bays



Demolition of existing rigid pavement

1



Harvesting of rainwater onsite for use as a binding agent in the concrete mix

3



Water spray reduces dust particles for better air quality

2



Repaving aircraft parking bays with RCA

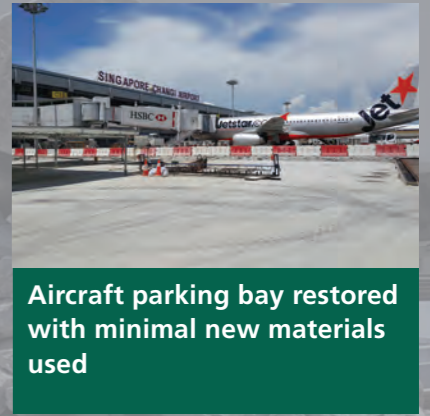
4



Condition of pavement before rehabilitation



Removing the pavement for rehabilitation



Aircraft parking bay restored with minimal new materials used

## Processing of RCA



Demolition of existing rigid pavement



Crushing and removal of foreign materials



Sieving into various sizes



Stockpiling of RCA to be used for concrete batching plant

# Teaming Up to Tackle Textile Waste

Spearheaded by Changi Foundation in partnership with our adopted beneficiary, Metta School, the Textile Donation Drive brings together CAG staff and persons with special needs in an effort to reduce textile waste.

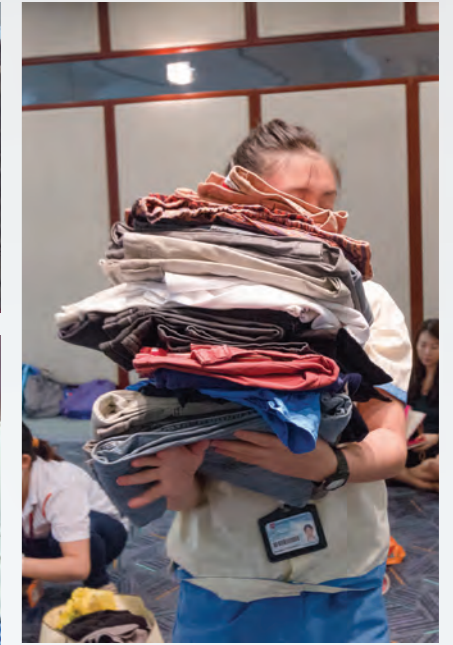
Employees from across CAG contributed a total of 773kg of pre-loved items to the cause, ranging from clothes and towels to bedsheets, shoes and stuffed toys. After receiving the donated textiles, 18 Metta students alongside 19 CAG staff volunteers began sorting the items and making conversation. As they interacted with each other, our staff volunteers gained new perspectives and grew empathy for the students, while the students practised their interpersonal

relationship skills – it was a fun, meaningful experience for everyone.

Once they finished sorting, the items in relatively good condition were handed to the Metta Welfare Association and resold, with the proceeds channelled to Metta School. The more worn items were donated to the non-profit organisation, GreenSquare, to be recycled into other materials.



**773kg**  
of textiles reused  
and recycled



**Left:**  
Behind the scenes at Metta School.

**Right:**  
CAG volunteers and Metta students come together to reduce textile waste.

While CAG staff collected items for Textile Donation Drive, Metta School students were busy refining their folding and interpersonal skills during their vocational training and soft skills lessons in preparation for the event. They also underwent two training sessions conducted by Halogen Foundation Singapore to better understand their roles and responsibilities.

**Metta School's Volunteer Teacher, Mr Dennis Teo Ming Chian, shares more about how such initiatives encourage these differently-abled youths.**



**How are activities like the Textile Donation Drive good for the students?**

Any activity which provides our students with opportunities to interact with their community benefits them immensely. It builds up their confidence and self-esteem when they realise they can use the knowledge they gained in school to collaborate on projects with members of the public. From such activities, students understand the relevance of what they are learning and put in more effort into acquiring skills.



**How was the experience like for the students?**

Our students definitely enjoyed participating in the Textile Donation Drive. They are very honest and wear their hearts on their sleeves. When they enjoy an activity, they will give you their full cooperation and do their best in every task. Our students were very happy interacting with the CAG volunteers, as they took the initiative to start conversations with them.



**How did you feel when you saw your students participating in this initiative?**

I was delighted to see them happily joining in the Textile Donation Drive. Our school's vision is to empower every student to lead an independent and meaningful life. I feel that the students were able to complete their tasks independently and contribute meaningfully as they worked alongside the CAG volunteers.



**On a personal note, how are such initiatives meaningful to you?**

Such initiatives strengthen our community by creating an inclusive society where people with different abilities can complement each other to achieve a common goal for the good of society.

# Appendix A: GHG Emissions Quantification Methodology

This section explains the calculation boundaries, methodologies and assumptions used in the preparation of CAG's Scope 1, 2 and 3 emissions for CAG. The carbon footprint is prepared in accordance with ISO 14064-1, Greenhouse Gas (GHG) Protocol and the Airport Carbon Accreditation (ACA) guidelines.

## REPORTING SCOPE AND PERIOD

CAG uses an adaptation of the Operational Control Approach, under which the company accounts for 100% of the GHG emissions from operations over which it has control. Following requirements for Level 3 "Optimisation" Airport Carbon Accreditation, this carbon footprint takes into account the sources and activities that are controlled by CAG, namely, Scope 1 and Scope 2 GHG emissions, as well as the sources that the airport can guide or influence through effective partnership (Scope 3 GHG emissions). CAG focuses on

calculation of carbon dioxide (CO<sub>2</sub>) emissions for all three scopes.

Data for GHG emission calculations includes T1, T2 and T3. It excludes T4's and Jewel's FY2018/19 data for multi-year baselining, and will be included in our carbon footprint in following years. Electricity usage of T4 and Jewel is measured and registered separately, and subtracted from CAG's total electricity consumption for FY2018/19.

Data from the following reporting periods have been included in Sustainability Report FY2018/19:

- FY2016/17; FY2017/18 and FY2018/19 – 1 April 2018 until 31 March 2019, for Scope 1, 2 and 3 emissions.

CAG's energy and emissions data will be published when they have been externally verified on an annual basis. In this report, CAG's energy and emissions data for FY2018/19 have been disclosed with verified FY2017/18 data for comparability. Verified FY2018/19 data energy and emissions data will be published in CAG's subsequent Sustainability Report FY2019/20.

## CALCULATION METHODOLOGIES

Methodologies are consistent with the Airports Council International (ACI) Guidance Manual on Airport GHG Management and the GHG Protocol. Emissions are divided according to ownership and control of the source:

### Scope 1

Scope 1 emissions are direct GHG emissions which occur from sources that are owned or controlled by CAG. This includes emissions from both stationary sources (power generators, dynamic-uninterruptible power supply [D-UPS], water pumps, electrical switchgears and other stationary equipment) and mobile sources (company-owned cars, trucks, motorcycles and heavy-duty equipment). Activities and process emissions (i.e. from firefighting exercises) contribute to less than 0.01% of total emissions and are therefore excluded.

Quantity of Scope 1 GHG emissions is calculated by multiplying the fuel usage (activity data) by their respective emissions factor. The data for fuel usage is accumulated based on invoices of procured and/or topped up fuel.

### Scope 2

Scope 2 emissions are indirect GHG emissions which occur from the generation of purchased or acquired electricity, heating, cooling and steam consumed by CAG. At CAG, Scope 2 emissions only relate to purchased electricity from the grid.

Quantity of Scope 2 GHG emissions is calculated by multiplying electricity usage (in kWh) by the grid emission factor. Data for electricity usage is derived from receipts issued by the electricity supplier. The grid emission factors used in calculation are based on the grid emission released annually by the Energy Market Authority (EMA) in accordance with the United Nations Framework Convention on Climate Change (UNFCCC) guidelines.

### Scope 3

Scope 3 emissions are other indirect GHG emissions that are a consequence of CAG's activities, but occur at sources not owned or controlled by CAG. Due to the variety of Scope 3 GHG emission sources within the scope, a range of methodology has been used.

For emissions resulting from activities involving aircrafts (landing and take-off cycle, engine test-run and aircraft auxiliary power unit), the Airport Carbon and Emissions Reporting Tool (ACERT) is used. For emissions resulting from ground activities that are carried out by our partners (ground support equipment, surface access, electricity resold, waste management), a similar calculation approach used for quantifying Scope 1 and Scope 2 emissions was used. Emissions from the shuttle bus operations was calculated with the use of the GHG Emissions Calculation Tool. Finally, for business travel, the International Civil Aviation Organization (ICAO) Carbon Emissions Calculator was used. For every calculation tool/model used, CAG has applied suitable assumptions to the input data. Refer to the table on the following page for the respective emission factors used.

Emission Sources	Emission Factors	Unit
<b>Scope 1 emissions</b>		
<b>Stationary source</b>		
Diesel stationary	2.6920	kgCO <sub>2</sub> /litre
Jet A-1 stationary	2.5060	kgCO <sub>2</sub> /litre
Motor Gasoline stationary	2.2860	kgCO <sub>2</sub> /litre
Sulfur hexafluoride (SF6)	23,500	kgCO <sub>2</sub> /kg
<b>Mobile source</b>		
Diesel mobile	2.6760	kgCO <sub>2</sub> /litre
Gasoline mobile	2.2720	kgCO <sub>2</sub> /litre
<b>Scope 2 emissions</b>		
<b>Electricity consumption</b>		
FY2017/18 National grid (Location base)	0.4192	kgCO <sub>2</sub> /kWh
FY2016/17 National grid (Location base)	0.4244	kgCO <sub>2</sub> /kWh
FY2015/16 National grid (Location base)	0.4224	kgCO <sub>2</sub> /kWh
<b>Scope 3 emissions</b>		
<b>Ground support equipment</b>		
Diesel mobile	2.6760	kgCO <sub>2</sub> /litre
Gasoline mobile	2.2720	kgCO <sub>2</sub> /litre
<b>Surface access</b>		
Coach	0.0348	kgCO <sub>2</sub> /vehicle-km
Minibus / Van	0.2933	kgCO <sub>2</sub> /vehicle-km
Motorcycle	0.1174	kgCO <sub>2</sub> /vehicle-km
Private Charter	0.2131	kgCO <sub>2</sub> /vehicle-km
Private Hire car	0.2131	kgCO <sub>2</sub> /vehicle-km
Private Hire Shared Ride	0.2131	kgCO <sub>2</sub> /vehicle-km
Privately Owned Car	0.2131	kgCO <sub>2</sub> /vehicle-km
Taxi (Grab Taxi)	0.2131	kgCO <sub>2</sub> /vehicle-km
Taxi (Phone Booking)	0.2131	kgCO <sub>2</sub> /vehicle-km
Taxi Street (hail)	0.2131	kgCO <sub>2</sub> /vehicle-km
Mass Rapid Transit (MRT)	0.0739	kgCO <sub>2</sub> /passenger-km
Public Bus	0.0348	kgCO <sub>2</sub> /passenger-km
<b>Electricity re-sold</b>		
FY2017/18 National grid (Location base)	0.4192	kgCO <sub>2</sub> /kWh
FY2016/17 National grid (Location base)	0.4244	kgCO <sub>2</sub> /kWh
<b>Waste management</b>		
0% load	0.6529	kgCO <sub>2</sub> /km
50% load	0.2350	kgCO <sub>2</sub> /tkm
100% load	0.1384	kgCO <sub>2</sub> /tkm

**REFERENCES FOR EMISSION FACTORS**

- 1 Airports Council International (ACI), Airport Carbon and Emissions Reporting Tool (ACERT) version 5.1
- 2 World Resources Institute (2015), GHG Protocol Tool for Stationary Combustion version 4.1
- 3 World Resources Institute (2015), GHG Protocol Tool for Mobile Combustion version 2.6
- 4 Intergovernmental Panel on Climate Change (IPCC) (2014), Fifth Assessment
- 5 Energy Market Authority of Singapore (EMA) (2018), Singapore Energy Statistics
- 6 Energy Market Authority of Singapore (EMA) (2017), Singapore Energy Statistics
- 7 Energy Market Authority of Singapore (EMA) (2016), Singapore Energy Statistics
- 8 International Civil Aviation Organization (ICAO), Carbon Emissions Calculator version 10
- 9 United States Environmental Protection Agency (US EPA) (2018), Emission factor for greenhouse gas inventories
- 10 UK Government Conversion Factors for Greenhouse Gas (GHG) Reporting (2018)

# Appendix B: UN SDG Index

In FY2018/19, CAG mapped each of its material sustainability matters to the Sustainable Development Goals (SDGs) targets. This exercise enables CAG to identify areas where its activities have a direct or indirect impact on the SDGs, and CAG's creation of value in the short, medium and long term.

CAG's Material Sustainability Matter	The United Nations Sustainable Development Goals (UN SDGs)																
	1 NO POVERTY	2 ZERO HUNGER	3 GOOD HEALTH AND WELL-BEING	4 QUALITY EDUCATION	5 GENDER EQUALITY	6 CLEAN WATER AND SANITATION	7 AFFORDABLE AND CLEAN ENERGY	8 DECENT WORK AND ECONOMIC GROWTH	9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	10 REDUCED INEQUALITIES	11 SUSTAINABLE CITIES AND COMMUNITIES	12 RESPONSIBLE CONSUMPTION AND PRODUCTION	13 CLIMATE ACTION	14 LIFE BELOW WATER	15 LIFE ON LAND	16 PEACE, JUSTICE AND STRONG INSTITUTIONS	17 PARTNERSHIPS FOR THE GOALS
Fair Employment Practices					●			●		●							
People Development				●				●	●								
Good Corporate Governance												●				●	
Airport Safety			●		●			●	●		●	●				●	●
Airport Experience and Passenger Satisfaction							●	●		●	●						
Community Investment	●			●				●		●							●
Contribution to the Economic Development of Singapore	●							●	●	●	●						●
Energy and Emissions Management			●				●	●	●	●		●	●				
Water and Effluents Management			●				●	●	●		●	●					
Waste Management			●				●	●			●						

Key Priority and Impact Areas



**Take urgent action to combat climate change and its impacts**

- Engaging in GHG emissions disclosure initiatives (e.g. Airport Carbon Accreditation, Sustainability Reporting, etc.)
- Aligning environmental targets with national and international Climate Action goals through reduction of CAG's GHG emissions intensity by 20% from FY2017/18 levels by FY2029/30



**Strengthen the means of implementation and revitalise the global partnership for sustainable development**

- Partnering with government, civil society and stakeholders (e.g. Singapore's Committee on the Future Economy, Air Transport Industry Tripartite Committee, Airport Council International, etc.)
- Collaborating with innovation-driven companies through CAG's Living Lab Programme



**Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all**

- Generating sustainable economic value through the value chain as a leading global air hub and community
- Fostering full and productive employment through integrating fair employment practices in CAG's Employment Philosophy, conducting regular performance reviews and people development programmes



**Build resilient infrastructure, promote inclusive and sustainable industrialisation and foster innovation**

- Adopting a life-cycle approach in investing, developing, managing and retrofitting airport infrastructure (e.g. upgrading of existing terminals, development of Changi East, etc.)



**Make cities and human settlements inclusive, safe, resilient and sustainable**

- Providing a safe, secure and green airport environment for the airport community and all passengers
- Increasing accessibility and connectivity, locally and globally such as developing a new focus on becoming a trusted and reliable pharmaceutical air cargo hub

High Priority and Impact Areas



**End poverty in all its forms everywhere**

- Community investment and corporate social responsibility programmes (e.g. outreach to disadvantaged youths through Changi Foundation)



**Ensure healthy lives and promote well-being for all at all ages**

- Enhancing airport and CAG's workplace facilities to continually support the well-being of airport users and CAG employees
- Maintaining high standards of ambient air quality at the airport through adopting leading practices and conducting annual monitoring exercises



**Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all**

- Providing equal opportunities in training and development of all CAG employees
- Supporting the vocational development of youths (e.g. internship opportunities at CAG, partnerships with NorthLight School and Metta School, etc.)



**Achieve gender equality and empower all women and girls**

- Respecting women's rights and ensuring no discrimination and harassment at the airport and CAG's workplace
- Supporting women's leadership and their empowerment across CAG



**Ensure availability and sustainable management of water and sanitation for all**

- Providing access to clean water and sanitation at the airport (e.g. availability of drinking fountains and amenities)
- Ensuring sustainable water withdrawal and water efficiency at the airport (e.g. growing share of NEWater)



**Ensure access to affordable, reliable, sustainable and modern energy for all**

- Growing share of renewable energy consumption at the airport (e.g. use of solar energy, biogas, electric baggage handling tractors, etc.)
- Ensuring sustainable energy consumption and energy efficiency at the airport achieved through various carbon reduction initiatives



**Reduce inequality within and among countries**

- Promoting the socioeconomic inclusion of all people at the airport and in the community through engagement with airport partners and offer job attachments to disadvantaged youths



**Ensure sustainable consumption and production patterns**

- Establishing and maintaining a proactive Environmental Management System
- Measuring, monitoring and reporting sustainability indicators internally and externally (e.g. voluntary sustainability reporting)
- Implementing circular systems at the airport (e.g. food waste digester, recycling programmes)



**Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels**

- Working closely with stakeholders at the airport in combating terrorism, illicit arms flows, human trafficking, etc. such as enhancing total emergency preparedness through Exercise Bobcat and Exercise Northstar
- Adopting a zero tolerance stance towards corruption of all forms

# Appendix C: GRI Content Index

CAG's Sustainability Report FY2018/19 has been prepared in accordance with the GRI Standards: Core option. This GRI Content Index is a navigation tool that provides an overview of which GRI Standards have been used, which disclosures have been made, and where these disclosures can be found. The full content of the GRI Standards is publicly available on the GRI portal (<https://www.globalreporting.org/standards>).

## Abbreviations

SR: CAG Sustainability Report FY2018/19  
AR: CAG Annual Report FY2018/19

## General Disclosures

Disclosures	Reference(s) or Reasons for Omission (if applicable)
<b>GRI 102: General Disclosures (2016)</b>	
<b>102-1</b> Name of the organisation	SR: p1
<b>102-2</b> Activities, brands, products, and services	SR: p1 AR: p15, 87-88
<b>102-3</b> Location of headquarters	CAG is headquartered in Singapore
<b>102-4</b> Location of operations	AR: p15, 87-88
<b>102-5</b> Ownership and legal form	SR: p1
<b>102-6</b> Markets served	SR: p76-77 AR: p15, 87-88
<b>102-7</b> Scale of the organisation	SR: p1, 22 AR: p29-32, 81-88
<b>102-8</b> Information on employees and other workers	SR: p22-23
<b>102-9</b> Supply chain	CAG procures services and products from various suppliers and seeks to implement sustainable procurement practices throughout its supply chain.
<b>102-10</b> Significant changes to the organisation and its supply chain	AR: p1-13, 29-32
<b>102-11</b> Precautionary principle or approach	SR: p38-39 AR: p33-37
<b>102-12</b> External initiatives	SR: p14-15, 24, 26-27, 45, 58-61, 110-111, 114-115
<b>102-13</b> Membership of associations	SR: p10-11, 24
<b>102-14</b> Statement from senior decision-maker	SR: p4-7
<b>102-16</b> Values, principles, standards, and norms of behaviour	SR: p24-25, 30, 36, 38-39 AR: p14
<b>102-17</b> Mechanisms for advice and concerns about ethics	SR: p24-25, 38-39
<b>102-18</b> Governance structure	SR: p8-9 AR: p20-27, 33-37
<b>102-19</b> Delegating authority	SR: p8-9 AR: 33-37

## General Disclosures

Disclosures	Reference(s) or Reasons for Omission (if applicable)
<b>GRI 102: General Disclosures (2016)</b>	
<b>102-22</b> Composition of the highest governance body and its committees	AR: p20-27, 33-37
<b>102-23</b> Chair of the highest governance body	AR: p33
<b>102-29</b> Identifying and managing economic, environmental, and social impacts	SR: p8-9
<b>102-30</b> Effectiveness of risk management process	SR: p38 AR: p33-37
<b>102-31</b> Review of economic, environmental, and social topics	SR: p8-9 AR: p33, 36-37
<b>102-40</b> List of stakeholder groups	SR: p10-11
<b>102-41</b> Collective bargaining agreements	SR: p24
<b>102-42</b> Identifying and selecting stakeholders	SR: p10-11
<b>102-43</b> Approach to stakeholder engagement	SR: p10-11
<b>102-44</b> Key topics and concerns raised	SR: p10-13
<b>102-45</b> Entities included in the consolidated financial statements	AR: p87-88
<b>102-46</b> Defining report content and topic boundaries	SR: p10-13
<b>102-47</b> List of material topics	SR: p14-15
<b>102-48</b> Restatement of information	Nil
<b>102-49</b> Changes in reporting	Nil
<b>102-50</b> Reporting period	SR: p4
<b>102-51</b> Date of most recent report	SR: p4
<b>102-52</b> Reporting cycle	SR: p4
<b>102-53</b> Contact point for questions regarding the report	SR: p0
<b>102-54</b> Claims of reporting in accordance with the GRI Standards	SR: p4
<b>102-55</b> GRI content index	SR: Appendix C
<b>102-56</b> External assurance	No external assurance has been sought for this Sustainability Report.



**Material Topic: Fair Employment Practices**

Disclosures		Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>		
<b>103-1</b>	Explanation of the material topic and its Boundaries	SR: p20-21
<b>103-2</b>	The management approach and its components	SR: p20-21, 24-25 AR: p68-69
<b>103-3</b>	Evaluation of the management approach	SR: p22-25
<b>GRI 401: Employment (2016)</b>		
<b>401-1</b>	New employee hires and employee turnover	SR: p22-23
<b>GRI 405: Diversity and Equal Opportunity (2016)</b>		
<b>405-1</b>	Diversity of governance bodies and employees	SR: p22-23 AR: p20-27
<b>GRI 406: Non-discrimination (2016)</b>		
<b>406-1</b>	Incidents of discrimination and corrective actions taken	SR: p24



**Material Topic: People Development**

Disclosures		Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>		
<b>103-1</b>	Explanation of the material topic and its Boundaries	SR: p28-29
<b>103-2</b>	The management approach and its components	SR: p28-31 AR: p69
<b>103-3</b>	Evaluation of the management approach	SR: p30-33
<b>GRI 404: Training and Education (2016)</b>		
<b>401-1</b>	Average hours of training per year per employee	SR: p30
<b>404-2</b>	Programmes for upgrading employee skills and transition assistance programmes	SR: p31
<b>404-3</b>	Percentage of employees receiving regular performance and career development reviews	SR: p31



**Material Topic: Good Corporate Governance**

Disclosures		Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>		
<b>103-1</b>	Explanation of the material topic and its Boundaries	SR: p36-37
<b>103-2</b>	The management approach and its components	SR: p38-39 AR: p33-37
<b>103-3</b>	Evaluation of the management approach	SR: p38-39
<b>GRI 205: Anti-corruption (2016)</b>		
<b>205-3</b>	Confirmed incidents of corruption and actions taken	SR: p37
<b>GRI 307: Environmental Compliance (2016)</b>		
<b>307-1</b>	Non-compliance with environmental laws and regulations	SR: p37
<b>GRI 419: Socioeconomic Compliance (2016)</b>		
<b>419-1</b>	Non-compliance with laws and regulations in the social and economic area	SR: p37



**Material Topic: Airport Safety**

Disclosures		Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>		
<b>103-1</b>	Explanation of the material topic and its Boundaries	SR: p40-41
<b>103-2</b>	The management approach and its components	SR: p42-45 AR: p56-58
<b>103-3</b>	Evaluation of the management approach	SR: p42-43
<b>GRI 403: Occupational Health and Safety (2016)</b>		
<b>403-2</b>	Types of injury and rates of injury, occupational diseases, lost days, and absenteeism, and number of work-related fatalities	SR: p43
<b>GRI 416: Customer Health and Safety (2016)</b>		
<b>416-2</b>	Incidents of non-compliance concerning the health and safety impacts of products and services	SR: p43





**Material Topic: Airport Experience and Passenger Satisfaction**

Disclosures	Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>	
<b>103-1</b> Explanation of the material topic and its Boundaries	SR: p52-53
<b>103-2</b> The management approach and its components	SR: p54-61 AR: p40-55, 60-63
<b>103-3</b> Evaluation of the management approach	SR: p53



**Material Topic: Community Investment**

Disclosures	Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>	
<b>103-1</b> Explanation of the material topic and its Boundaries	SR: p64-65
<b>103-2</b> The management approach and its components	SR: p66-71 AR: p70-71
<b>103-3</b> Evaluation of the management approach	SR: p65
<b>GRI 413: Local Communities (2016)</b>	
<b>413-1</b> Operations with local community engagement, impact assessments, and development programmes	SR: Materialising these outcomes (p66-71, 114-115)



**Material Topic: Contribution to the Economic Development of Singapore**

Disclosures	Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>	
<b>103-1</b> Explanation of the material topic and its Boundaries	SR: p74-75
<b>103-2</b> The management approach and its components	SR: p76-79 AR: p42, 44-46
<b>103-3</b> Evaluation of the management approach	SR: p75-77
<b>GRI 201: Economic Performance (2016)</b>	
<b>201-1</b> Direct economic value generated and distributed	SR: p76 AR: p29-32, 81-86
<b>GRI 203: Indirect Economic Impacts (2016)</b>	
<b>203-1</b> Infrastructure investments and services supported	SR: p76-79
<b>203-2</b> Significant indirect economic impacts	SR: p76-79
<b>GRI-G4 Airport Operators Sector Disclosures: Market Presence (2011)</b>	
<b>AO1</b> Total number of passengers annually	SR: p76
<b>AO2</b> Total number of aircraft movements	SR: p76
<b>AO3</b> Total amount of cargo tonnage	SR: p77



**Material Topic: Energy and Emissions Management**

Disclosures	Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>	
<b>103-1</b> Explanation of the material topic and its Boundaries	SR: p88-89
<b>103-2</b> The management approach and its components	SR: p90-99
<b>103-3</b> Evaluation of the management approach	SR: p89-96
<b>GRI 302: Energy (2016)</b>	
<b>302-1</b> Energy consumption within the organisation	SR: p90-91
<b>302-3</b> Energy intensity	SR: p90-91, 94-95
<b>302-4</b> Reduction of energy consumption	SR: p90-95
<b>GRI 305: Emissions (2016)</b>	
<b>305-1</b> Direct (Scope 1) GHG emissions	SR: p90-95, 116-118
<b>305-2</b> Energy indirect (Scope 2) GHG emissions	SR: p90-95, 116-118
<b>305-3</b> Other indirect (Scope 3) GHG emissions	SR: p90-95, 116-118
<b>305-4</b> GHG emissions intensity	SR: p90-95, 116-118
<b>305-5</b> Reduction of GHG emissions	SR: p94-95, 116-118
<b>GRI-G4 Airport Operators Sector Disclosures: Emissions (2011)</b>	
<b>AO5</b> Ambient air quality levels	SR: p96

Appendix C:  
GRI Content Index



**Material Topic: Water and Effluents Management**

Disclosures	Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>	
<b>103-1</b> Explanation of the material topic and its Boundaries	SR: p100-101
<b>103-2</b> The management approach and its components	SR: p101-105
<b>103-3</b> Evaluation of the management approach	SR: p102-103
<b>GRI 303: Water (2016)</b>	
<b>303-1</b> Water withdrawal by source	SR: p103
<b>GRI 306: Effluents and Waste (2016)</b>	
<b>306-1</b> Water discharge by quality and destination	SR: p103



**Material Topic: Waste Management**

Disclosures	Reference(s) or Reasons for Omission (if applicable)
<b>GRI 103: Management Approach (2016)</b>	
<b>103-1</b> Explanation of the material topic and its Boundaries	SR: p106-107
<b>103-2</b> The management approach and its components	SR: p107-115
<b>103-3</b> Evaluation of the management approach	SR: p108-109
<b>GRI 306: Effluents and Waste (2016)</b>	
<b>306-2</b> Waste by type and disposal methods	SR: p109



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