

Business Continuity: Unlocking Green Performance From Airport Assets

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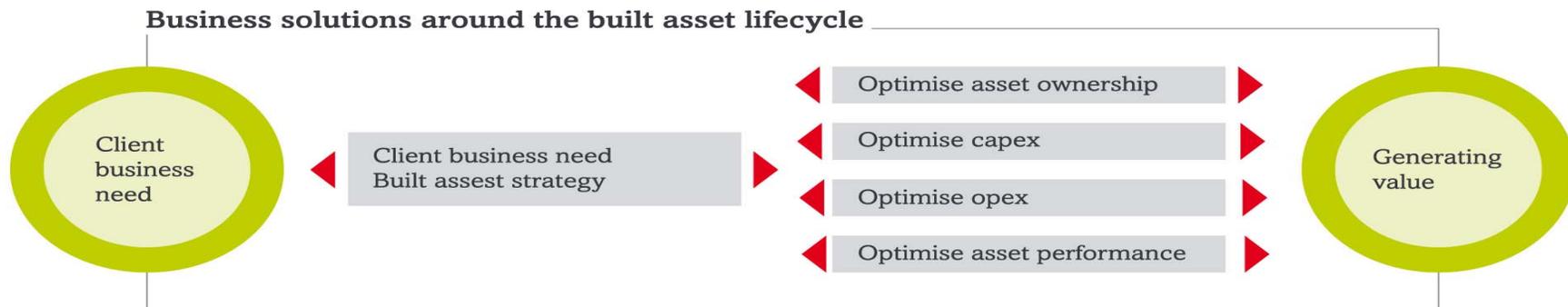
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HKARMS 香港風險管理與安全協會
Hong Kong Association of
Risk Management and Safety

Overview

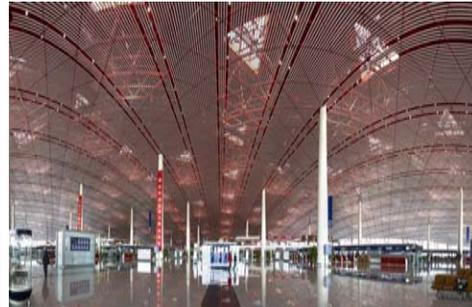


1	Setting The Scene	▶	High level 'fly through'
2	Aviation Industry Insight	▶	Unlocking Sustainable Asset Performance Through Operational Efficiency
3	Robust Risk Management	▶	Business Continuity Across the Development Cycle



The Green Premium = Costs vs Value

What Is A Sustainable Built Asset



New Buildings	Existing Buildings
How sustainable? Certification?	Solid Walls
Location	Asbestos
Typology	Heritage + biodiversity
Massing	Poor thermal performance
Orientation	Appropriate innovation
Material choices	Site constraints
Energy systems	Space limitations
Renewable energy sourcing	Air tightness
Intelligent control systems	Existing infrastructure
Innovative technologies	Limited design flexibility
Flexibility in choices	Restricted choices

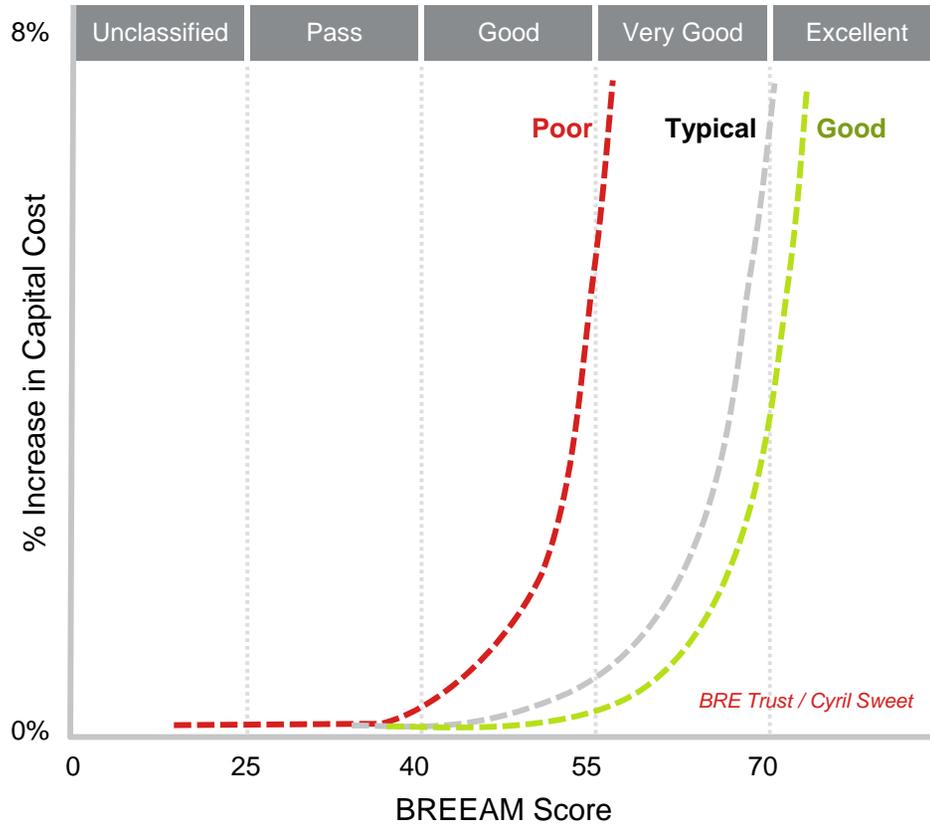


Sustainable built assets embody environmentally responsible and resource efficient designs, systems + functions throughout their life-cycle

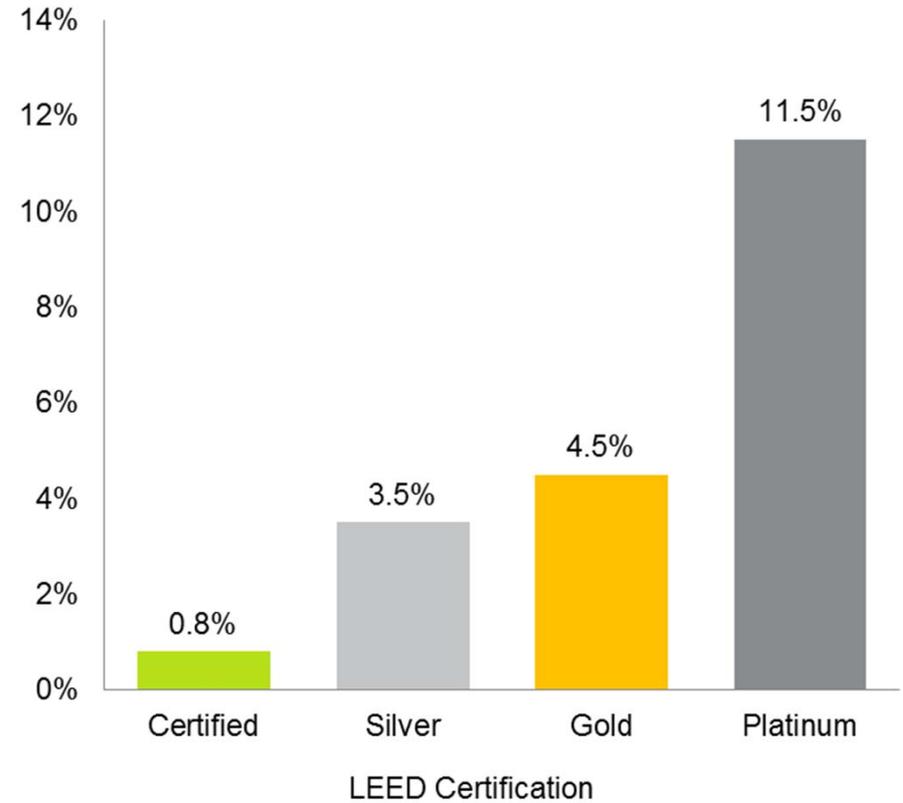
Sustainability Costs More



Putting a Price on Sustainability



Cost Premium for LEED Buildings



Innovation + Market Forces Driving Costs Down

Delivering Value



Legal Compliance + Financial	Business Assurance + Viability	Reputation + Brand Value
Building Regulations	Business Continuity	CSR
EPC + DEC's	Business Interruption	Differentiation
CRC	Future Proofing	Competitive Advantage
Corporate Reporting	Fuel Price Certainty	Recruitment + Retention
Planning Requirements	Climate Change	Productivity
Environmental Compliance	Market Value	Sickness Reduction
Renewable Energy Targets	'Licence to trade'	Value of the Brand



Sustainability Acts As a Proxy for Risk, Operational Efficiency + Positive Cost Performance

'Easy Wins' + Whole Life Cost Savings



'Easy Wins'

Project Type	Payback (yrs)
Lighting upgrades	3.3
Insulation (Loft, Cavity Wall, Roof, Double Glazing)	3.8
Lighting controls	3.2
Pipe work Insulation (Cooling, Heating)	2.7
Voltage optimisation	3.4
Heating (e.g. controls, zone control valves)	3.2
BEMS - remotely managed	3.2
Insulation - draught proofing	3.6
Boilers - control systems	3.3
Time switches	1.9
Heating – TRVs	3.2
Hot Water (Distribution improvements, point of use)	3.3
BEMS - bureau remotely managed	3.6
Ventilation (distribution, controls, air handling units)	2.4

Whole Life Cost Savings

→ Based on a comparison of BREEAM buildings against building compliance standards (BRE Trust/Cyriel Sweet):

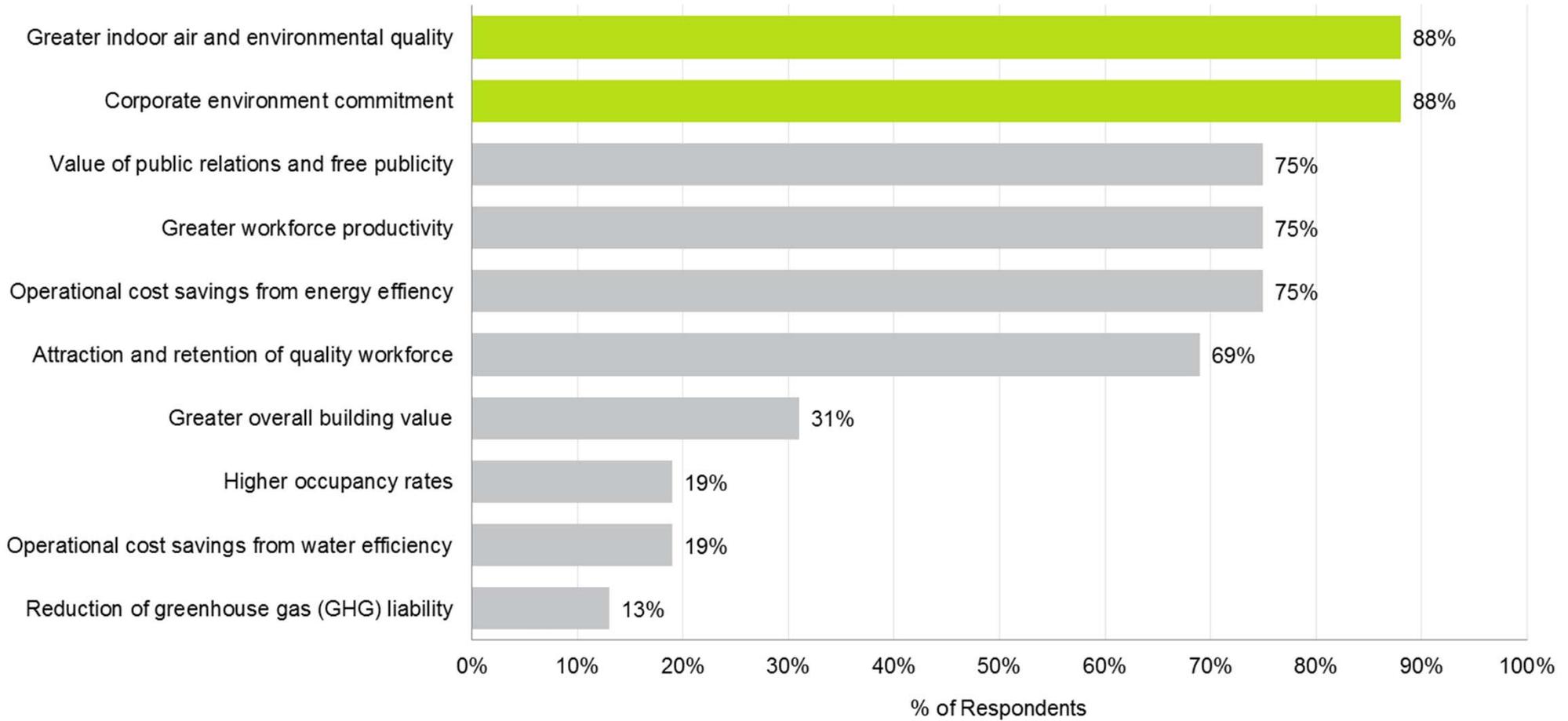
Naturally ventilated office:
 → Energy savings of 17%
 → Water savings of 71%

Air conditioned 'prestige' office:
 → Energy savings of 26%
 → Water savings of 55%



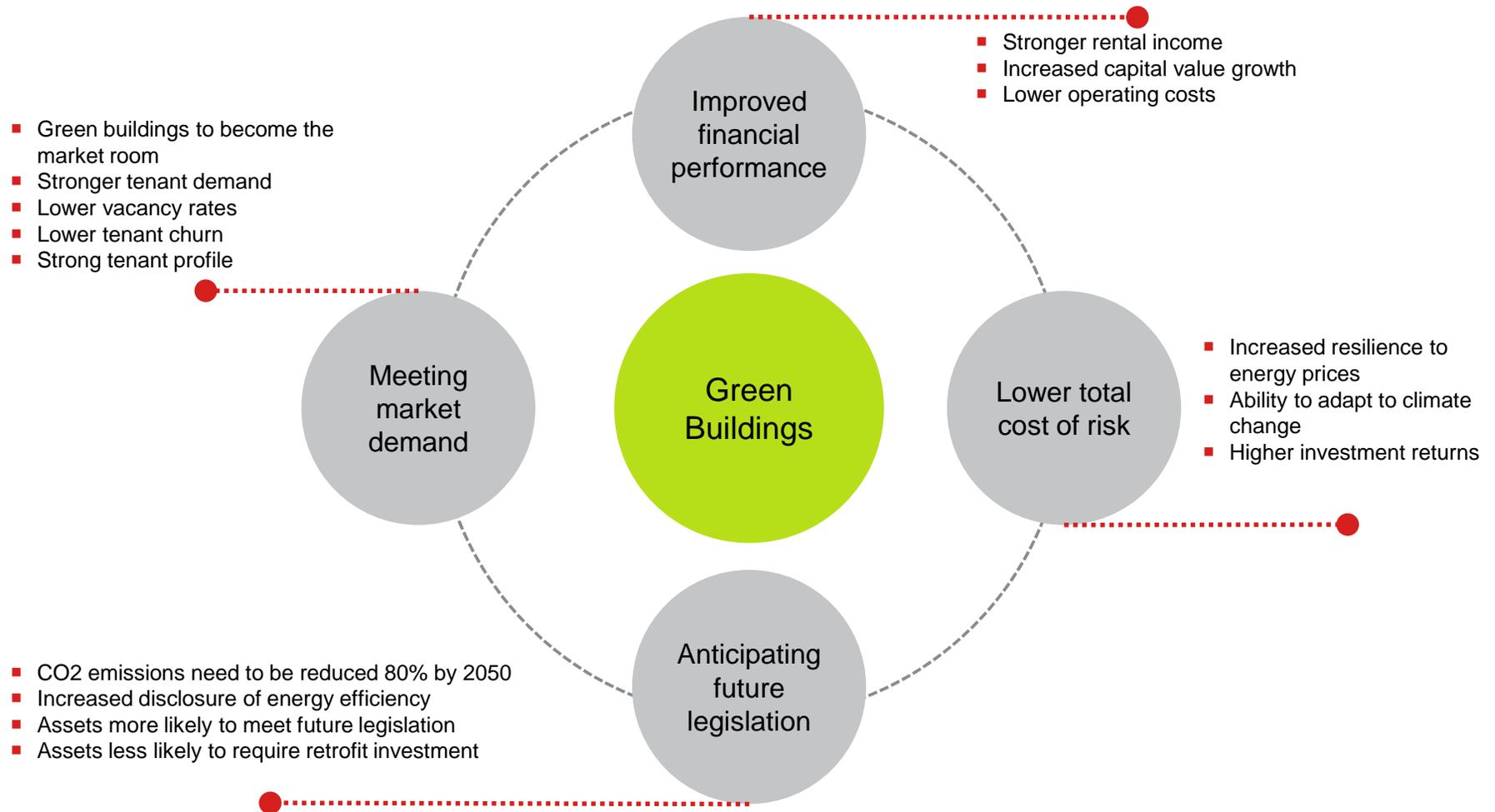
Sometimes Less Delivers More – Always Look for the 'Easy Wins'

What Drives Green Development



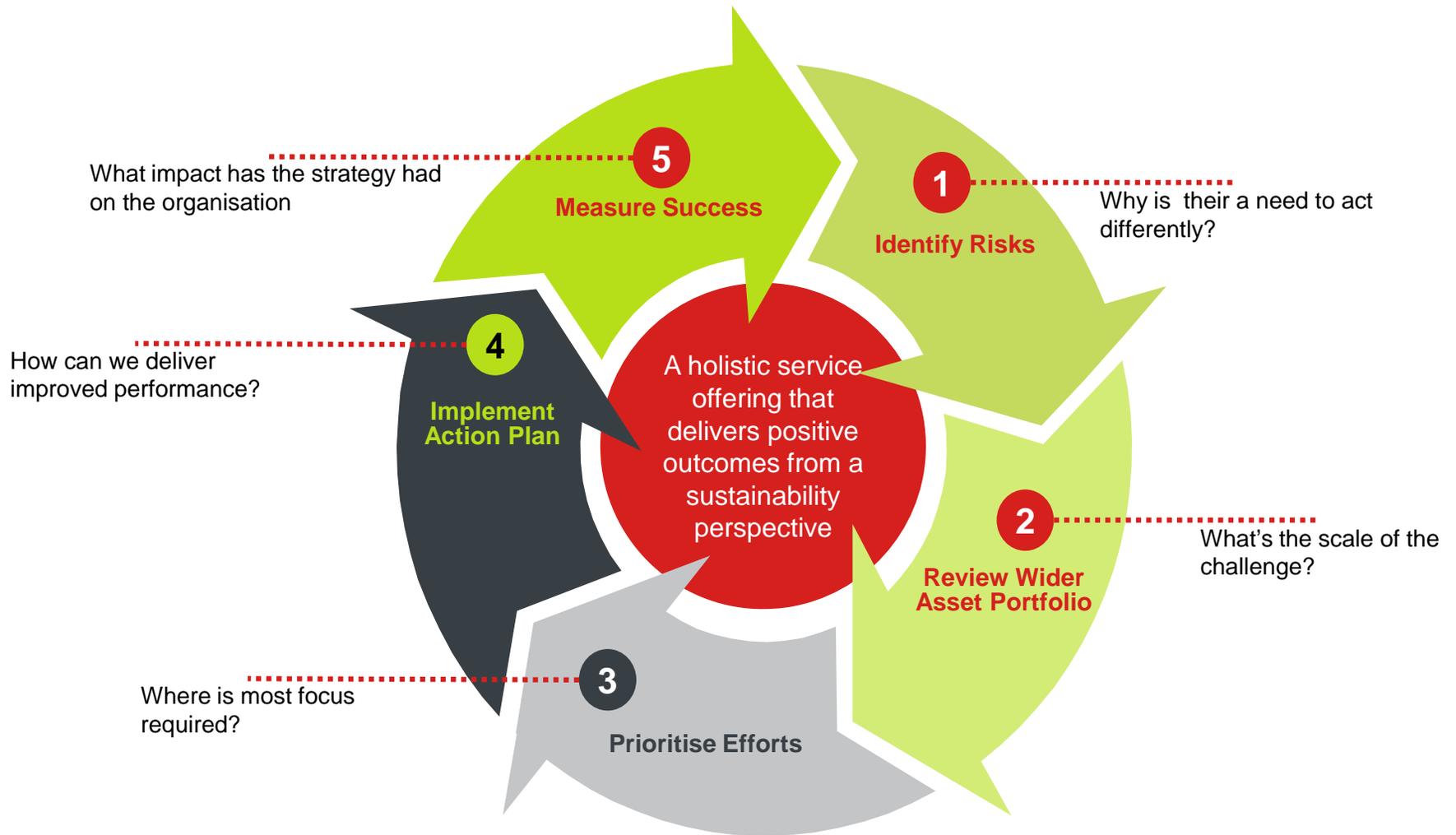
The Market View

Sustainability Benefits



Green Buildings deliver operational benefits + simply just stack-up.

Sustainable Asset Management Approach



Embedding sustainability principles across design philosophy, built asset performance cycles + decision-making

Who Pays + Who Gains



Stakeholder Benefits						
	Investors	Developers	Designers	Contractors	Occupiers	
					Owners	Tenants
Reduced Costs	Capital costs	Maintenance costs and of capital costs, plus cheaper refits and faster lets	Design time and snagging	Resource use and waste on site	Maintenance & operational costs and downtime in using building	Maintenance & operational costs and downtime in using building
Reduced Risks	Reduced risk on capital	Letting voids	Quicker planning permission	H&S, pollution liabilities and time savings, no over run penalties	Asset value risks and H&S liabilities	H&S liabilities and flexible accommodation for future subletting
Higher Returns	Faster return of capital	Increasing net lettable area and higher rents and occupier retention		Repeat work due to satisfied clients	Improved staff productivity	Improved staff productivity
Satisfaction		Personal satisfaction / intellectual challenge	Personal satisfaction / intellectual challenge	Personal satisfaction / intellectual challenge	Improved staff satisfaction / retention	Improved staff satisfaction / retention
Image	Demonstrable performance for SRI FTSE4 good eligibility	Profile & distinctive buildings on market	Repeat work due to satisfied clients	Improved image to clients and improved public image	Improved image to clients and improved public image	
Experience Gained		Future marketability	Future marketability	Future marketability		
Business Flexibility	Flexibility of investment potential	Flexibility of letting / sale potential	Flexibility of building use	Flexibility of building use		



In reality, how do we make this work

Unlocking System Efficiency In Dynamic Operating Environments



Significantly Reduce Aircraft Delay, Fuel Burn + Emissions

- Target performance improvements in ground operations:
 - 10-15% reduction in outbound taxi time + fuel-burn for each aircraft departure
 - 5% reduction in inbound taxi time + fuel burn for each aircraft arrival
 - No increase in stand delay times for aircraft departures / arrivals



Average 2 minute reduction in taxi time per ground movement

- Target overall improvements in punctuality and operational consistency:
 - Optimise sequencing for inbound / outbound aircraft
 - Reduce queuing at RHAs + apron entry / exit points
 - Eliminate airfield 'bottlenecks' + high aircraft loading in key manoeuvring areas
 - Tighter 'block-time' distributions



Innovation is the driving force behind providing the right solutions to shape aviation's sustainable future.



Airport Capacity and Carbon Efficiency

Using Innovative Approaches

- AC²E is an analytical, rule-based tool used to **accurately estimate + quantify fuel burn + CO₂ emissions** for aircraft operations in the LTO Cycle (i.e. up to FL030).
- Through simulating actual traffic schedules in fast-time, the **detailed movement history + actual operational interactions**, including pushback times, APU use, taxi distances + holds, can be established for each aircraft movement in the schedule.
- Individual aircraft fuel burn + CO₂ emissions performance **“DNA”** is then calculated, taking account of actual or representative **time-in-mode, aircraft engine + APU types**.
- **Carbon ‘hot-spots’** can be identified + **solutions to improve efficiency** formulated + tested using a scenario based approach in AC²E + deep operational insight.

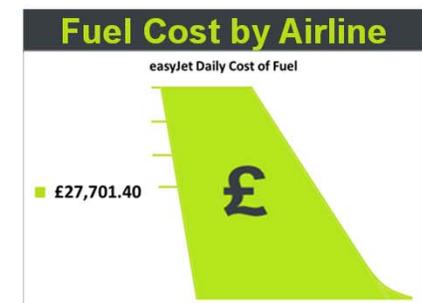
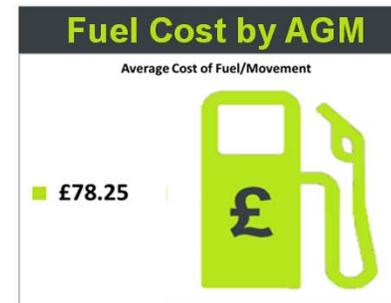
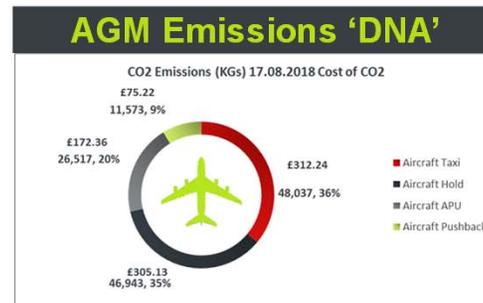
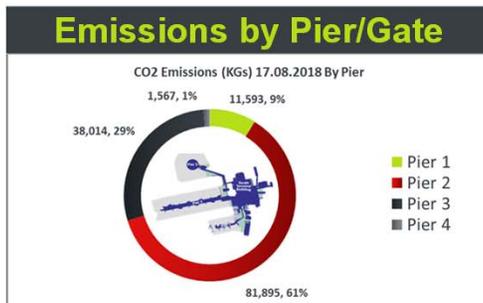
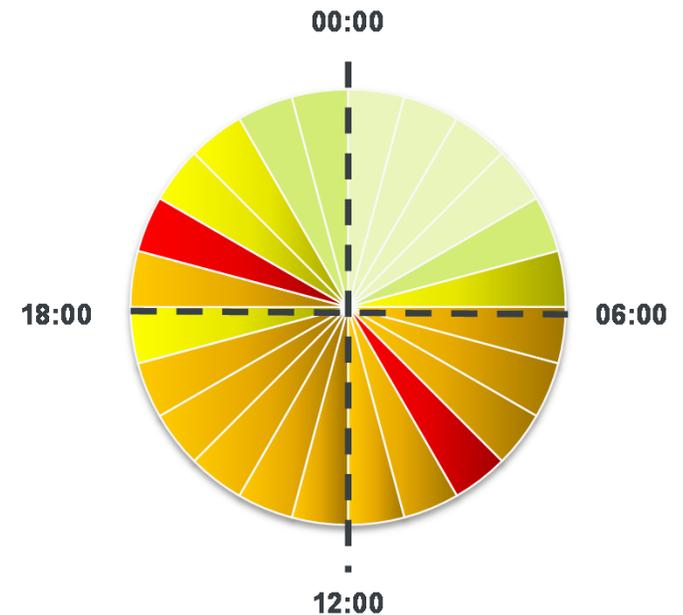


Combining innovative techniques in computer-aided modelling + operational performance to drive accurate analysis.

Key Strengths

- A key strength of AC²E is the granularity of data used for the build-up of **airfield infrastructure, operational procedures, delay, fleet mix, aircraft speed profiles, engine thrust settings + ATC procedures**
- Full examination of every system element with a high level of precision.
- **Pin-pointing of “system stressors/delay bottlenecks”** – taxi route network, infrastructure use, slot coordination and airfield capacity, ATC procedures and/or airline schedules.
- Below FL030 **CO₂ emissions** are based on certified engine fuel flow rates from **ICAO’s Aircraft Engine Emissions Databank**.

CO2 Emissions Intensity by Hour



Provides a powerful evidence base to justify future capital investment + business plans, to support ACA certification + to strengthen CSR programmes.

Methodology Overview

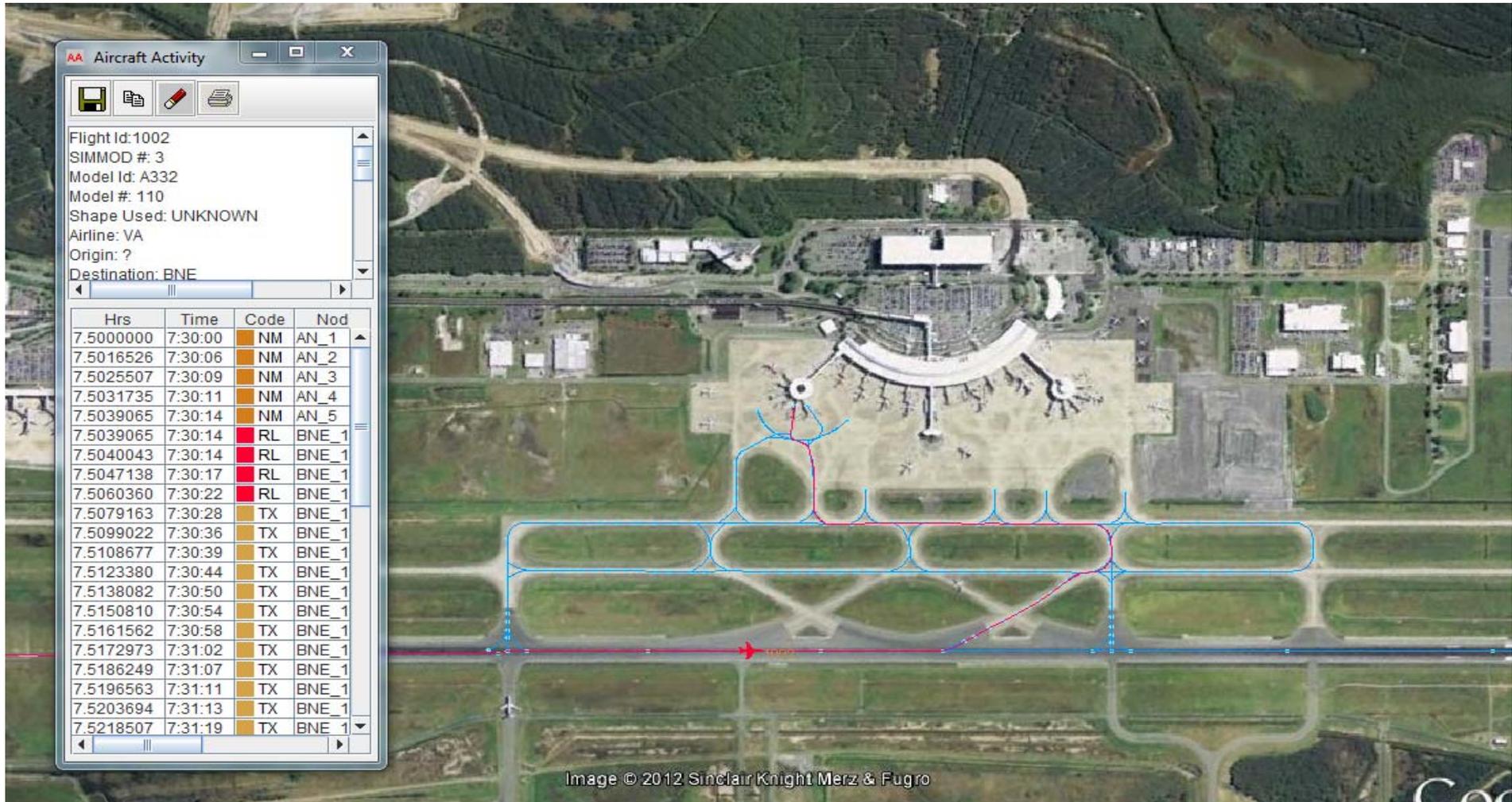


“AC²E = Precision + Accuracy in the calculation/assessment/reporting of fuel burn, CO₂ emissions and cost performance.”



Robust, systematic steps in a coherent framework from which to quantify aircraft fuel burn, GHG emissions + cost performance.

Using Fast-Time Simulation + SOPs For Precision Analysis



Profiling the 'DNA' of every flight phase in the LTO Cycle to pinpoint system 'stressors' + identify solutions to enhance performance.

Adding Value



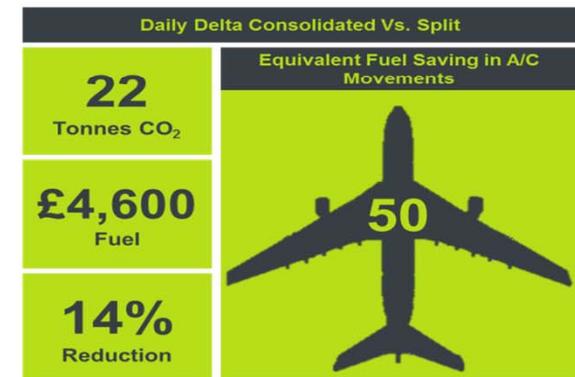
Key Drivers Behind Improved CO₂ Emission + Fuel Burn Performance

- ➔ **Consolidation of daily operations** into single terminal, moving closer to the predominant runway end (75:25 split).
- ➔ **RET** procedures operated by all aircraft arrivals and departures.
- ➔ **400Hz FGEP systems** installed at all stands to replace the use of aircraft APUs during flight turnarounds.
- ➔ **Elimination of airfield conflicts** on taxiways at various points on the airfield, particularly holds between inbound/outbound traffic.
- ➔ **Streamline inbound taxiway routings** to reduce and avoid the number of major delay points encountered by Split Operations.

Potential CO₂ Emissions + Fuel Burn Savings

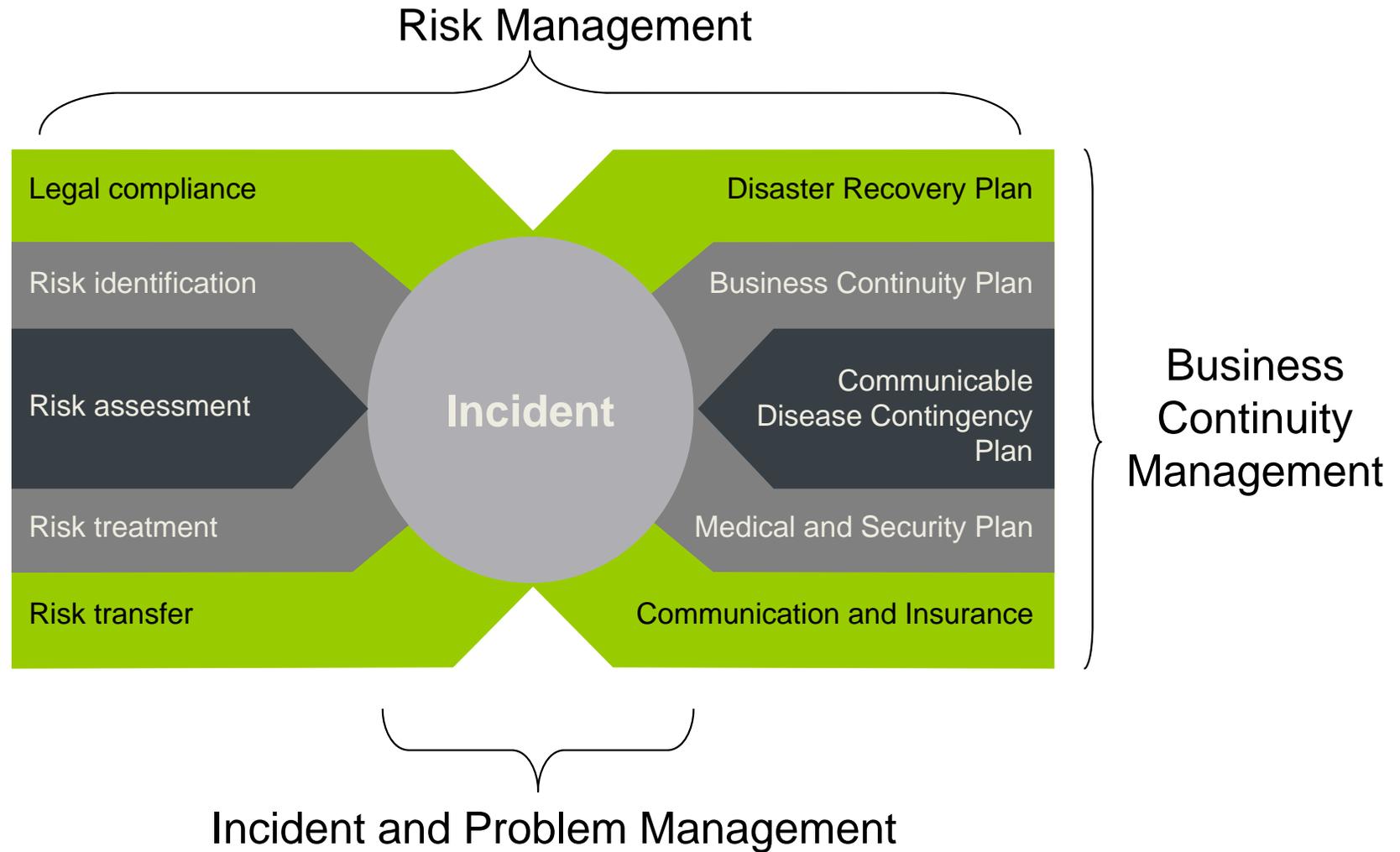
Aircraft Taxi Cost Saving
5%

Aircraft Hold Cost Saving
29%



Driving 'SMART' business decisions which deliver 'REAL' value to shareholders, the community + the 'Environment'.

Assurance Stages



Business continuity management should be integrated with risk and incident management system

Business Continuity Planning

- Defining business-as-usual requirement, critical operations and facilities
- Business Impact Analysis along supply chain
- Short term and long term considerations
- Integration with risk and incident management system
- Scenario development and planning
- Develop testing criteria, mode, scale and required resources
- Independent observations for gaps and improvement
- Debrief covering observations, recommendations, improvements and update on Business Continuity Plan



Business Impact Analysis

People



Brand



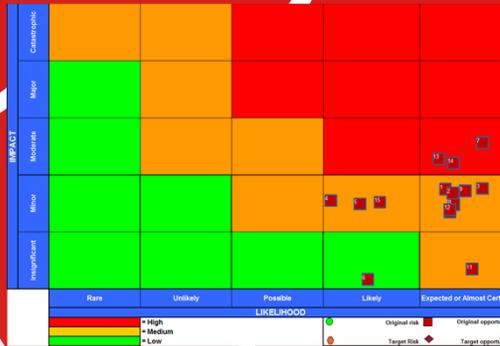
Internal Resource

External Resource

Environment



Business + Finance



Sustainability should be considered in business continuity management



Any Questions



Open + interactive discussion driving knowledge share.

Key Contacts



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Enhanced environmental performance translates into improved operational efficiency, direct 'bottom-line' savings & sustainably driven outcomes.

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Our key people to follow up your queries.