Going for Green

Chair Chris Dumas, Avison Young







Paddy Dillon Architect



#MakingTheatreSustainable

What is the "green state" of UK theatres? What can we do about them?

Laia Carpena, Buro Happold





#MakingTheatreSustainable

What is the state of UK Theatres with respect to sustainability?

- ☐ Site surveys, experience
- Published data
- ☐ Information from theatre representatives

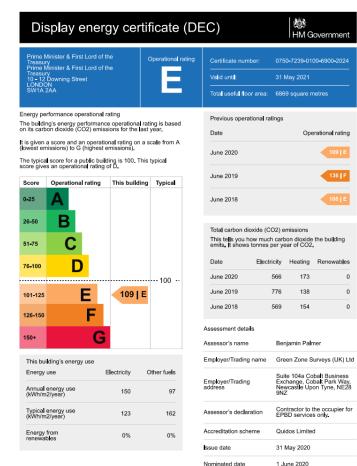
What do we observe from site surveys?

Common issues

- Energy loss through building fabric
- System inefficiencies, old plant
- Poor controls
- Non-detailed metering

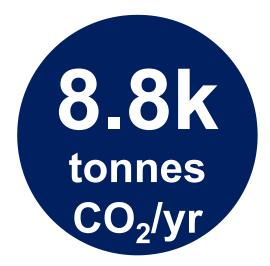
If we look at published data...

- Required for buildings over 250m² occupied by public authority.
- Based on measured energy use.
- Metrics include building area and operating hours.

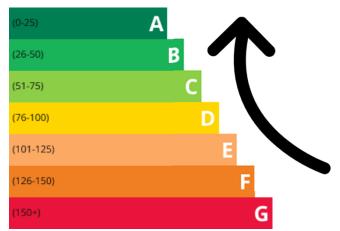


What do the DECs tell us?

There is currently a limited number of published display energy certificates.



However, there are valuable metrics we can extract from them.

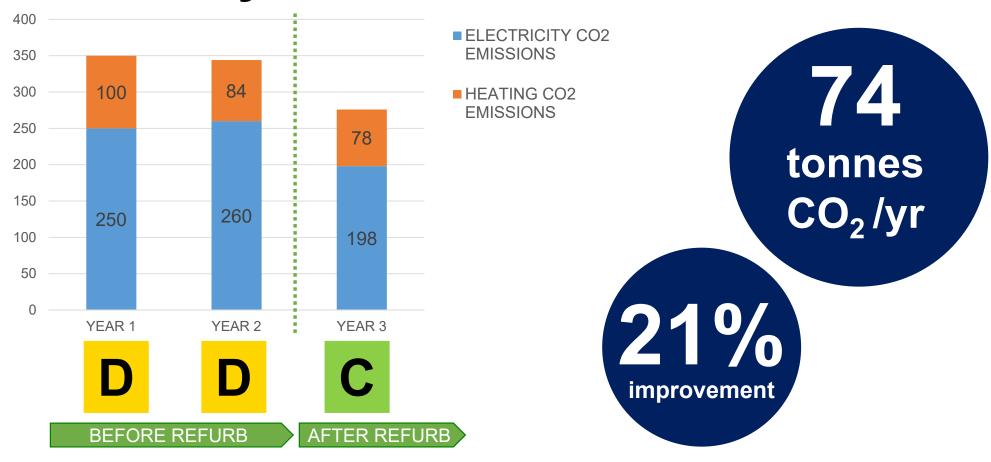


Rating isn't everything...

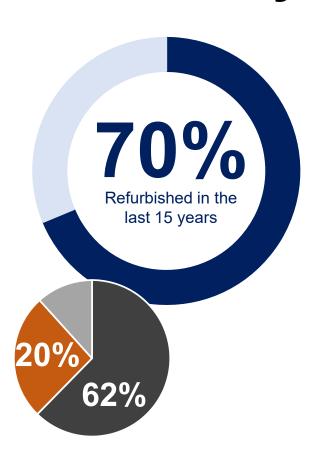
If we "zoom in" to study an example from published data:

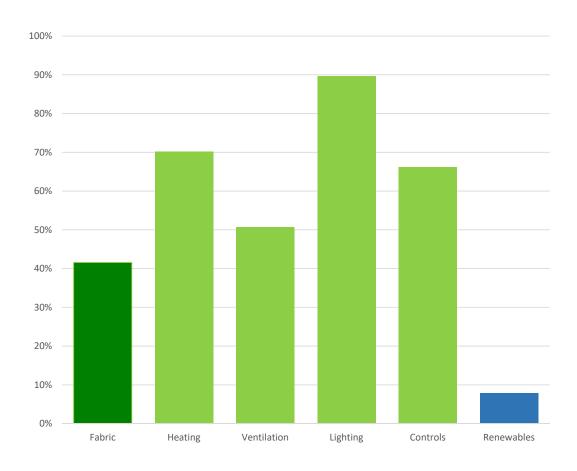
- Around 500 seats.
- Refurbished since first published DEC.

Case Study



We asked you...



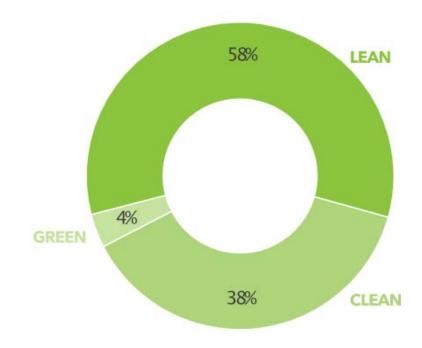


Systems that deliver energy, like the heating system.

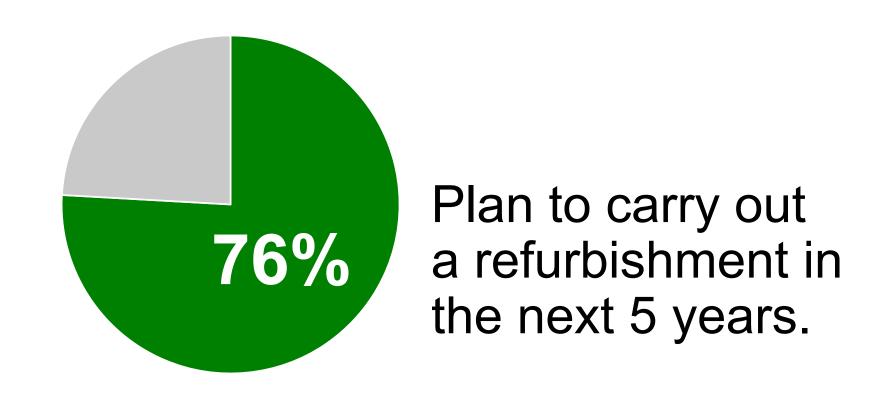
CLEAN

Renewables, like solar panels and heat pumps.

GREEN



Now is the time

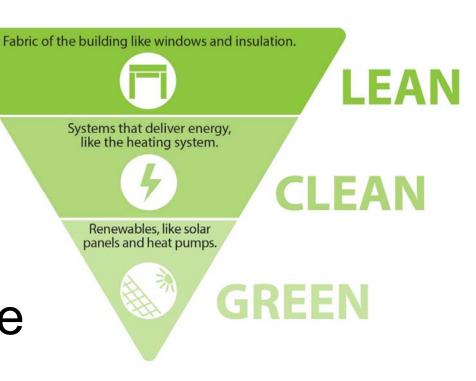


What do we need to do?

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What do we need to do?

- √Know where you are
- √ Follow the Green Book
- ✓ Measure, record, update, share & publicise



What will it cost?

Nav Kang, Bristow Consulting Paul Davis, AECOM









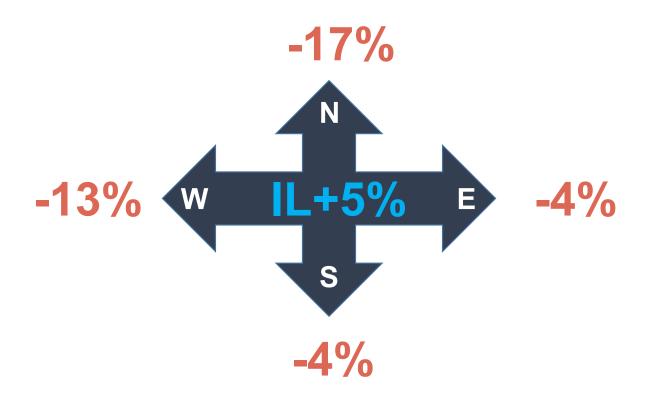
Paddy Dillon Architect

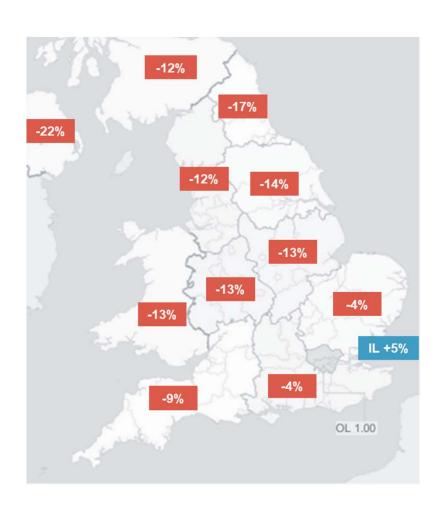


#MakingTheatreSustainable

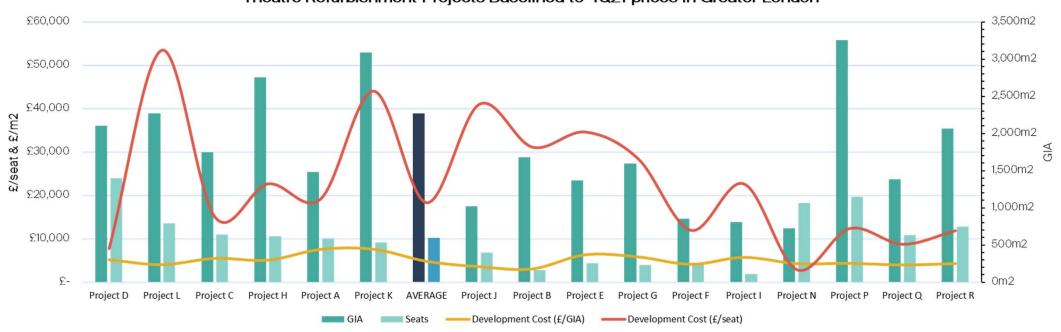


Regional Variances

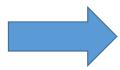




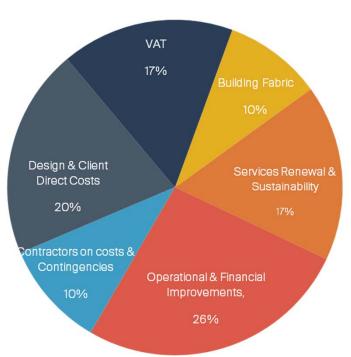
Theatre Refurbishment Projects Baselined to 4Q21 prices in Greater London



Key Metrics	Range	Key Metrics
Seating Capacity	113 - 1400	Seating Capacity
GIA (m2)	805m2 - 10,374m2	GIA (m2)
GIA (sqft)	8-665sqft – 111,666sqft	GIA (sqft)
Year Built	1824 - 1977	Year Built
Age (Years)	196 yrs – 43 yrs	Age (Years)

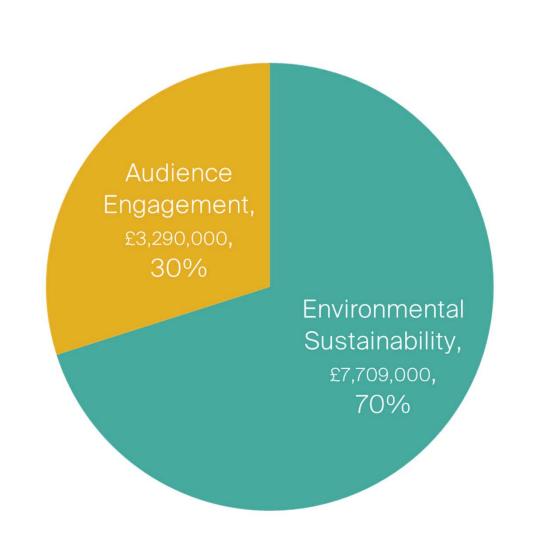


Key Metrics	
Seating Capacity	599
GIA (m2)	2,268m2
GIA (sqft)	24,415sqft
Year Built	1920
Age (Years)	10 1yrs



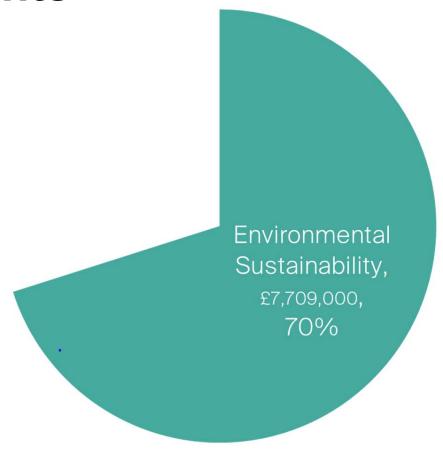
Full Carbon Reduction Implementation - Distribution of Development Costs

REGION 12 GREATER LONDON	£	£/m2	£/seat	% of Development Cost	% of Construction Cost
Building Fabric	£1,042,000	£459/m2	£1,741/seat	9%	15%
Services Renewal & Sustainability	£1,871,000	£825/m2	£3,125/seat	17%	27%
Operational & Financial Improvements (including Accessibility, Entrance & Welcome, Foyer Renewal & Community Engagement)	£2,897,000	£1,277/m2	£4,839/seat	26%	42%
Contractors on Costs & Risk	£1,126,000	£496/m2	£1,881/seat	10 %	16%
Total Construction Cost	£6,936,000	£3,058/m2	£11,587/seat	63%	10 0 %
Design & Client Direct Costs	£2,230,000	£983/m2	£3,725/seat	20%	-
VAT	£1,833,000	£808/m2	£3,062/seat	17%	-
Total Development Cost	£11,000,000	£4,849/m2	£18,374/seat	10 0 %	-



Sustainability Improvements

- Building Fabric
- Building Services
- Renewables



Audience Engagement

- Accessibility
- Entrance & Welcome
- Foyer Renewal
- Community Engagement

Audience Engagement, £3,290,000, 30%

Audit + Minor Fabric Improvements only

Fabric
Insulate roofs
biodiversity

Systems

• No works

Enhanced fabric improvements; major plant replacement & renewables

Fabric

- Insulate roofs& biodiversity
 - Replace / upgrade windows
- External doors

Systems

 Major plant & infrastructure replacement

Full carbon reduction plan implementation

Fabric

- Insulate roofs& biodiversity
- Replace / upgrade windows
- External doors

Systems

- Major plant & infrastructure replacement
- LED lighting
- Renewable technologies
- BMS controls

Fabric Systems Consequential Works On-costs VAT **Total**

48%	£501,000
0%	£0
17%	£180,000
18%	£192,000
17%	£175,000
100%	£1,050,000

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28%	£1,132,000
21%	£866,000
16%	£650,000
18%	£748,000
17%	£679,000
100%	£4,080,000

32%	£3,600,000
18%	£2,040,000
17%	£1,852,000
100%	£11,000,000

Navigating Market Uncertainty



COVID-19 & Brexit



Procurement



Budget



Funding

How close do we get to Net Zero?

Mike Cook, Avison Young





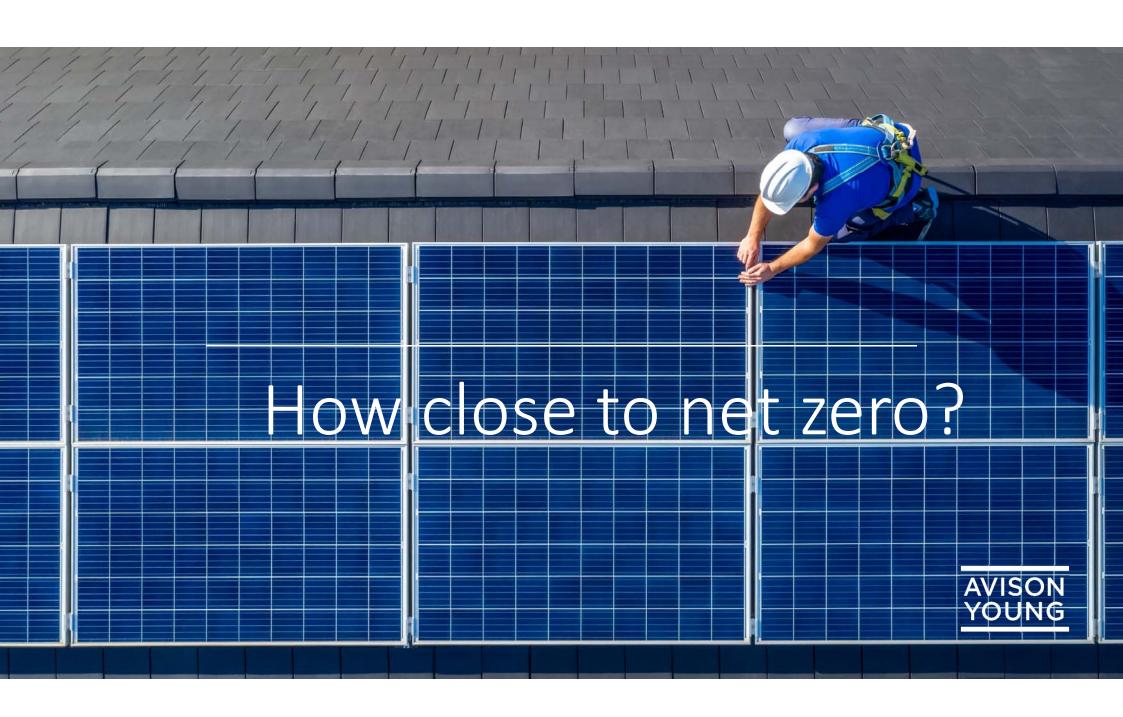




Paddy Dillon Architect



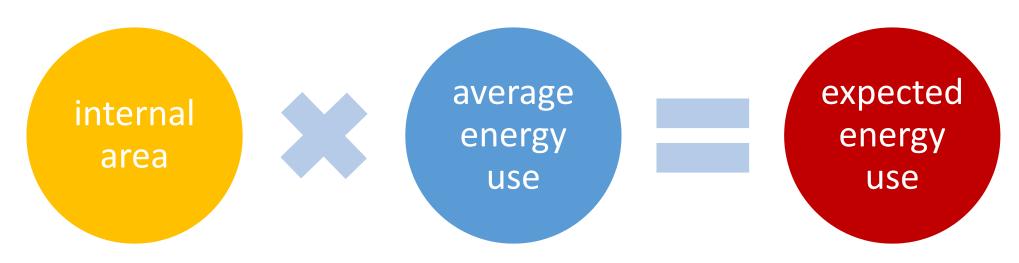
#MakingTheatreSustainable



Estimating CO₂ emission saving potential across UK theatres

Using notional mid-C20 mid-size theatre ...extrapolating across a % UK theatres

Notional theatre Energy calculation flow chart



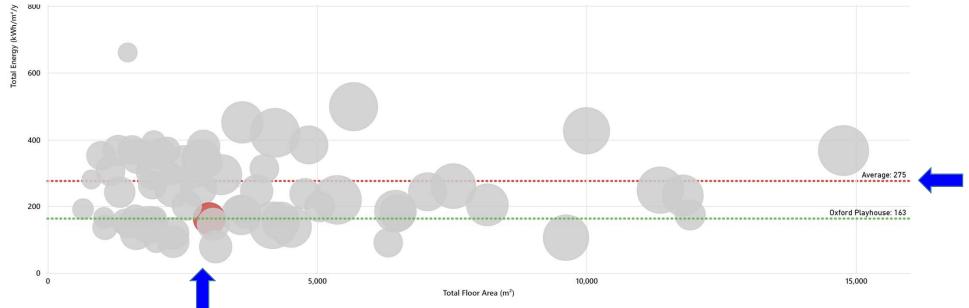
600 seat theatre say 2,250 m² internal area



What is the expected energy use before refurbishment works?

100 publicly available DECs show

- range of energy use (100-500 kWh/m²/yr)
- no significant shift with smaller or larger
- an average value of 275 kWhr/m²/yr





for our notional 600 seat theatre, say 2,250 m² internal area, and apply 275 kWh/m²/yr. annual energy consumption **618,000 kWh**



Notional theatre Energy saving calculation flow chart



consider separately Electric and Gas using cost and CO₂ emission factors.

Assumed proportions 35% Electric 65% Gas

Estimating annual energy cost using 35% Electric and 65% Gas.

	kWh	£/kWh	£/yr	T CO ₂
E 35%	216,000	£ 0.14	£ 30,000	39 T CO ₂
G 65%	402,000	£ 0.04	£ 16,000	93 T CO ₂
	618,000		£ 46,000	132 T CO ₂

Intermediate save	k kWhr	£k	T CO ₂
Air source heat pump	240	-3	30
Control vent fan speed	60	8.5	10
Heat recovery, auditorium	30	1.3	6
Heat recovery, ancillary	54	3.5	4
Refinement of control	30	2.2	6
Total with all measures	415 k	E 12 k	56T

Allowing that not all possible,

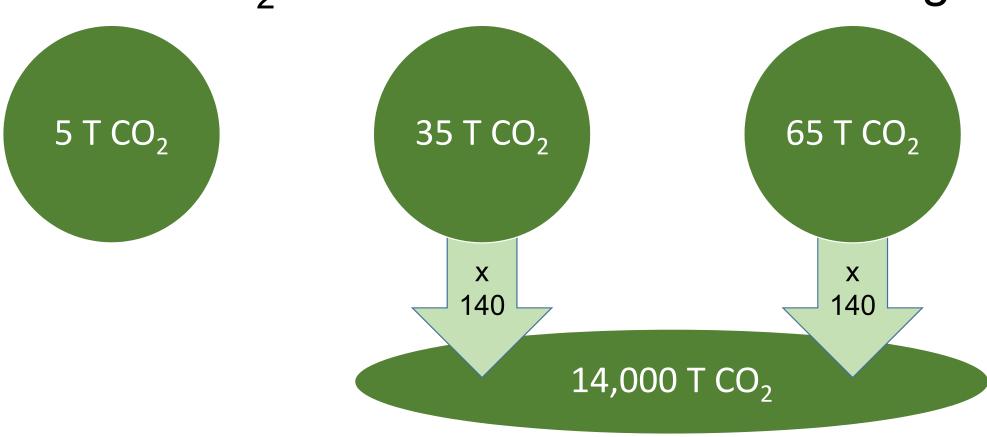
say 35T

full works annual save	k kWhr	£k	T CO ₂
from intermediate	415	£ 12	50
LED Lighting	100	£ 15	23
Renewable technologies (PV)	96	£ 13	22
controls (further 5%)	30	£ 2.5	5
total	640	£ 43	100
make 30% reduction			
crude conservative estimate	500	£33k	65T

Annual CO₂ emission save on average

Initial Intermediate Full £1m £4m £11m 5 T CO₂ 35 T CO₂ 65 T CO₂

Annual CO₂ emission across 280 buildings





How can we make this happen?

Paddy Dillon







Paddy Dillon Architect



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How do we deliver this?

Public funding

ACE annual grants 2012-2018 £57.3m

ACE annual grants 2018-2022 £18.5m

ACE annual grants 2022- £?m

Covid

Reduced theatre reserves

Increased debts

Uncertain revenue

Trusts and Philanthropy

Have not increased to US levels

Have diverted to rescue funding in Covid

Cannot fill the gap

We need to make regeneration cheaper

Challenge 1

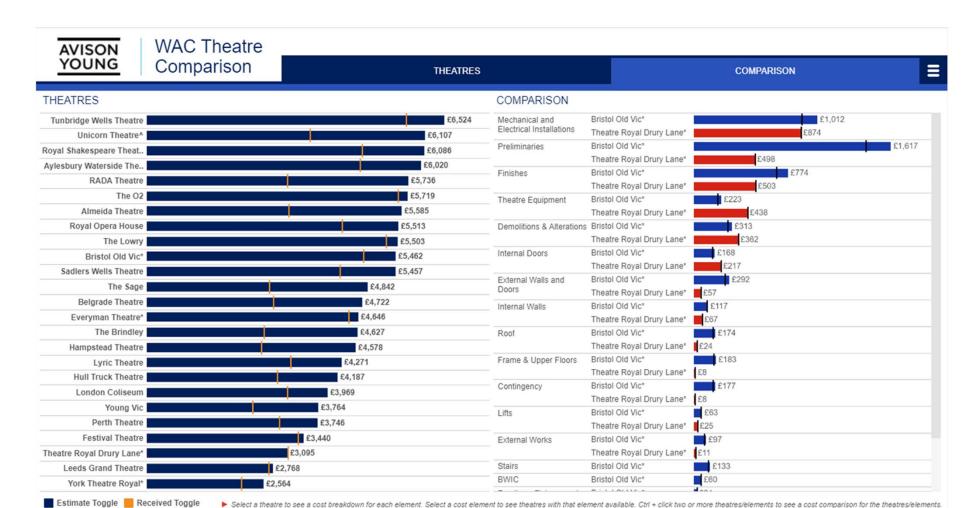
A large number of small, inefficient projects

Challenge 2

Theatres have no R&D fund to invest in capital projects which might not happen

We use data to understand the challenge and streamline our response

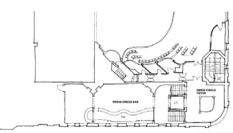




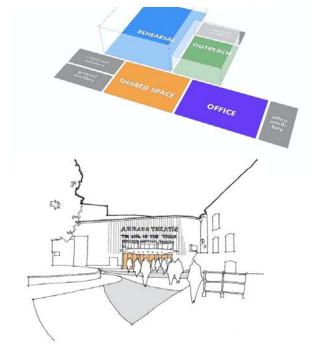
The Theatre Green Book: Sustainable Buildings is an example

Light touch feasibility

- Reduces costs
- Focuses on client need
- Avoids red herrings



FLACKPOOL GRAND THEATHE FLACKY Differ And Your + 5,12,16 First Floor pain plan + 1,125 or A3



Hull Truck Theatre Focus Group Discussions 29th Oct 2019



Focus Group No 1 - 3pm to 4:30pm

Attendees:		
Davide Calogero	(DC)	Director of Development, HTT
Rachel Hogg	(RH)	Theatre Administrator, HTT
Adam Pownall	(AP)	Theatre Programmer & Producer, HTI
Karl Linley	(KL)	Manager, Shoot the Bull
Rachael Clark	(RC)	HU6 Community Ambassador
Kate Plumb	(KP)	Drama Deal Booker
Anne Todd	(AT)	HU6 Ambassador & MS Society
Chris Todd	(CT)	HU6 Ambassador & MS Society
Oliver Brown	(OB)	Head of Technical & Production, HTT
Ruth Cooke	(RC)	Director of Communications, HTT
Tom Sanders	(TS)	Associate Director, Creative Learning
Autom Marine Tona		

Paddy Dillon Architect

Part 1

What was your first experience of this venue

1. Accessibility

Front of House Accessibility praised by many.

Bit: Good accessibility front of house, but Back of House, less so.

CI: "A very friendly building... one of the best accessible buildings I've ever been in."

DE: "19 of the building in the property of the

2 Auditorium Comfort

Auditorium Comfort
 KP noted seats not comfortable, though this was not widely shared

Invitation & Welcon Dhysically, the build

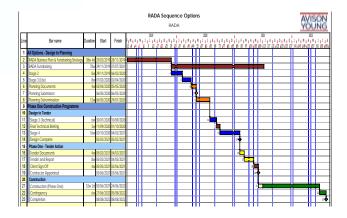
Physically, the building was seen as erecting barriers to the street, "a space for some people and not for others".

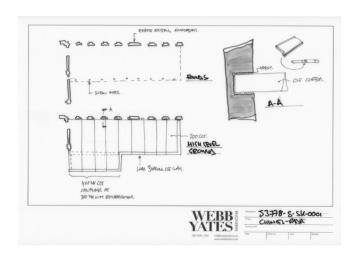
At a human level, staff highly praised for their welcome and helpfulness.

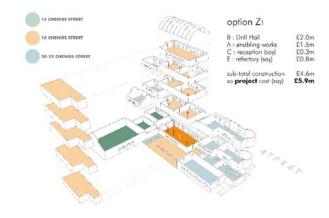
Foyers Generally consi

Generally considered dispiriting

Ts: "Absolutely brillant when it's full and lively, but that isn't always the case ... It' troubling when not full." The colour of floor made it "a black hole".







Reduce costs to planning

Collective procurement

Buy-in from Funders