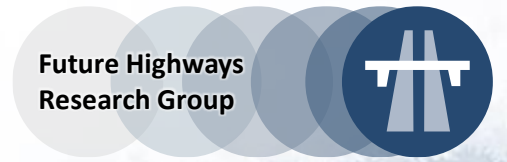


Future Highways Research Group

Q2 2020, Waypoint Update

2019 / 2020 Research Programmes & Concepts Pioneering
& The Value for Money Benchmarking Club



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Agenda

- **Introductions**
 - **Individual Authority Updates**
 - Key strategic and operational developments.
 - Impact of COVID-19.
 - Impact (strategic, operational, financial).
 - Responses.
 - **Update from ADEPT**
 - General.
 - Live Labs monitoring.
- 11.00 – 11.15 Break**
- **FHRG and VFM Benchmarking Club**
 - Value Analyser – Introducing v12.
 - Features and benefits.
 - Annual, independent VFM assessments.
 - Membership and funding proposals.

Agenda (Continued...)

- **Market Review and Service Delivery Options Study**
 - Scope and approach.
 - Proposals for sharing outputs.
- **SMART Places Update**
 - Range of opportunities under consideration.
 - Business case development progress.
 - Network Assets Prospectus (NAP) and Network Access Agreements (NAA).
 - Development status and next steps.
 - Strategy Analyser (SA)
 - Features and benefits.
 - Extension of SA to encompass NAP and NAA for individual projects
 - Using solar load as an example
- **AOB & Date of Next Meeting**

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Research Group



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Authority Updates

Roundtable Discussion

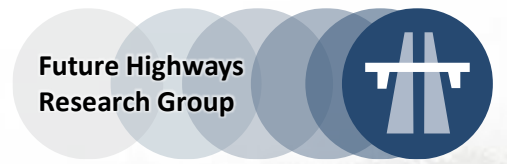
Authority Updates

- **Authority & Members' News**

- Strategic & Operational Changes
- Carbon Emergency (COVID-19 & The “Anthropause”)
- Electric Scooters Trial
- Future Funding Issues & Expectations
- COVID-19 (*See Next Section*)

- **Research Themes Updates**

- Income Generation (Commercialisation, Costs Recovery & Costs Offsetting)
- Network & Assets Prospectuses & Access Concessions (*See Update*)
- Community Engagement & Resources Utilisation
- Intelligence Gathering: Citizen Perceptions, Concerns & Priorities
- Effective Communications
- Agile Commissioning & Client / Provider Mutuality
- Services Devolution & Democratising Services (Districts, Towns & Parishes)
- Climate Emergency Response Planning



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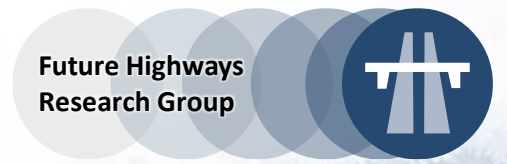
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ADEPT Update

Hannah Bartram



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ADEPT Innovation Conference

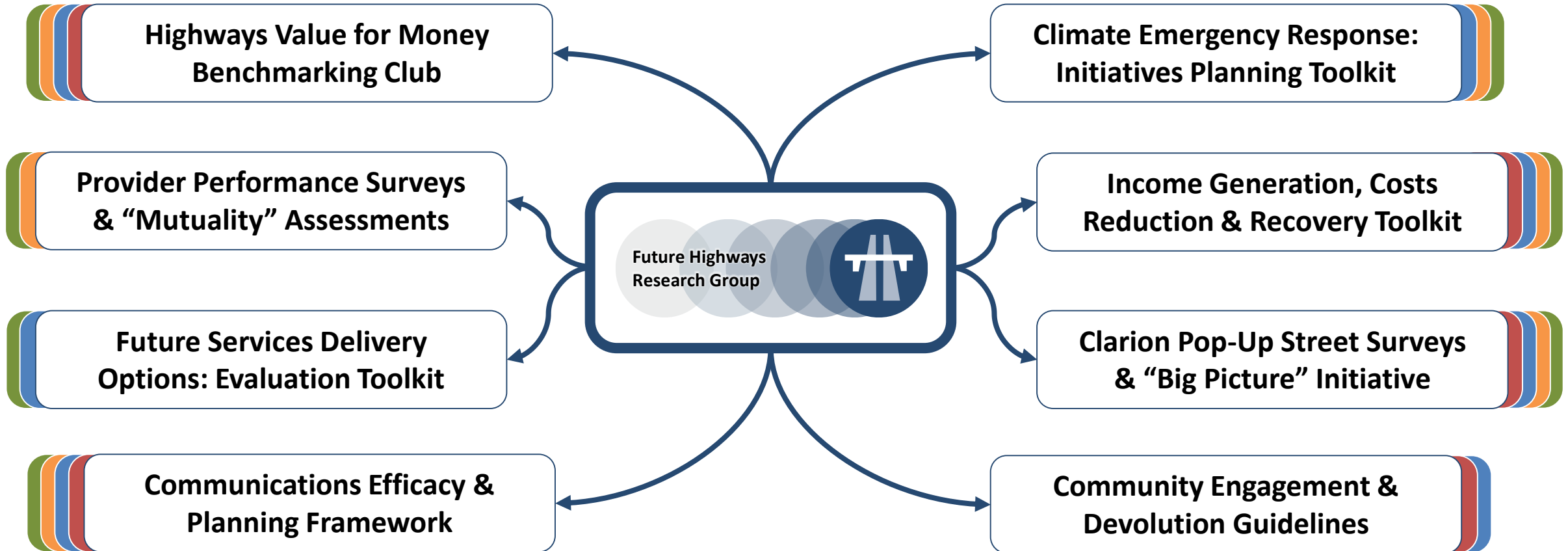
27th February 2020

Conference Overview

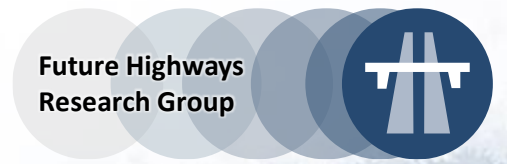
- **All local authority ADEPT members invited.**
 - Promoted by ADEPT to share our activities with the wider membership.
- **61 seats were booked.**
 - Representing 35 authorities.
 - The event was oversubscribed.
- **Presented the FHRG programme and authority-based initiatives.**
 - Case studies from Dorset, Suffolk, Lincolnshire, Oxfordshire & Derbyshire.
- **Excellent feedback from the wider ADEPT membership.**
- **A separate, ADEPT corporate sponsors event will be run shortly.**
 - Sharing the strategic aspirations and initiatives of the sector with partners.

Research Outputs

Toolkits, Processes, Data Sharing & Guidelines



■ Software Toolkits ■ Data Sets & Analysis ■ Template Processes ■ Guidelines & Case Studies



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University of Derby

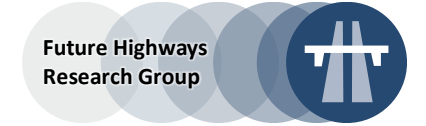
Highways Engineering: Centre for Mineral Products

University of Derby & FHRG Collaboration

Preliminary Discussions

- **400+ Students (Diploma & Degree Courses)**
 - Highways Engineering
 - Asphalt & Pavement Technology
- **Research Programmes & Interests**
 - Materials Technology Reviews
 - Maintenance Processes & People Performance Assessments
 - Impact of AI & Machine Learning
- **Testing Sector Offers**
 - Validating Product / Materials Claims
- **Skills Development & Succession Management**
 - Part-Time Learning & Distance Learning
 - On-Going Training
 - Student Placements

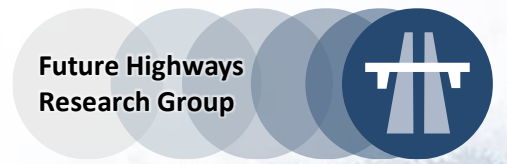
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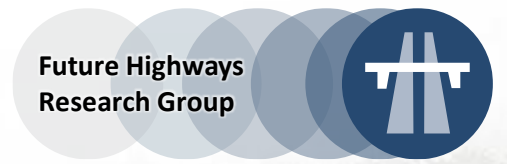
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COVID-19: Highways Operations Impact & Response Assessment

Value Analyser™: Add-In Factor Set (v12)



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Smart Working: Beyond COVID-19

The New “Normal”

New Priorities? New Communities?

“Millions of people have had the chance to experience days without long commutes and stressful city work environments... This might be a chance for a great reset in terms of how we work.”
Matt Mullenweg, CE, WordPress and Tumblr, The Times

Roads, Rail & Air Infrastructure

“In the Netherlands, home working arrangements and the range of a bike, electric bike or e-scooter may quickly become the drivers of a new focus on local living, working and shopping.”
“The End of City Living?”, By Audrey Garric, Le Monde

Vs

Digital Infrastructure & Localised Services

“77% of employers feel employees have done a good job handling the remote work transition. 68% feel they are either more productive or equally productive [when staff work from home].”
Rob Moss, Personnel Today

“Residents in 133 German cities have formally submitted applications for pop-up bike lanes to be made permanent, according to Environmental Action Germany (DUH), an environmental NGO.”
“e-bike alternative to public transport”, The Guardian

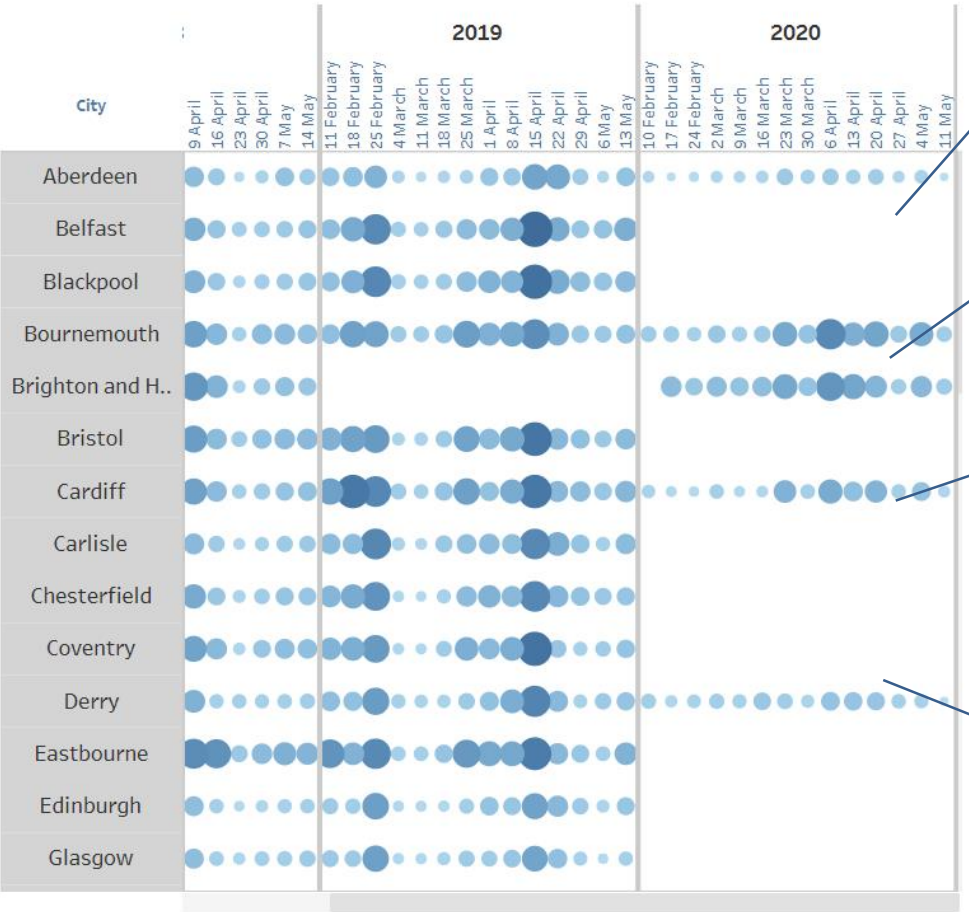
COVID-19 Lockdown: Environmental Impact

European Environment Agency

Cities with available data



Average weekly concentration (ug/m3)



NO₂ ↓ 17%

PM2.5 ↓ 38%

PM10 ↓ 51%

CO₂ ↓ 8%

“The new home working arrangements are permanent. In future, staff who previously worked in RJ offices, will have to explain why they need to travel to work.”
Mike O’Neill, MD, Ringway Jacobs

“Perhaps this is the moment to re-define how we should all live and work. It’s time to turn our backs on decades-old practices that have outlived their relevance and usefulness.”
Boris Johnson, May 17, 2020

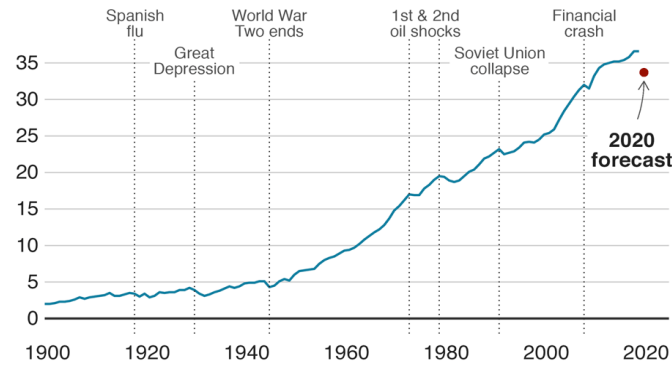
Reduced Pollution: Impact on Health & Mortality

BBC & The Lancet

“We estimate that improved air quality during the 24-day quarantine period avoided a total of 8,911 NO₂-related deaths, 65% of which were from cardiovascular diseases (hypertensive disease, coronary heart disease, and stroke) and COPD. Furthermore, we estimate that reduction in PM_{2.5} during the quarantine period avoided a total of 3,214 PM_{2.5}-related deaths in China, 73% of which were from cardiovascular diseases and COPD.”

Global CO2 emissions, 1900-present

Billion tonnes of CO2 per year

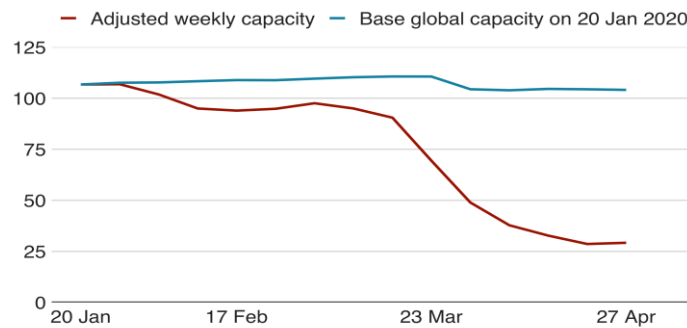


Source: Global Carbon Project, CDIAC & IEA

BBC

Airline capacity hit by coronavirus

Scheduled seats (millions)



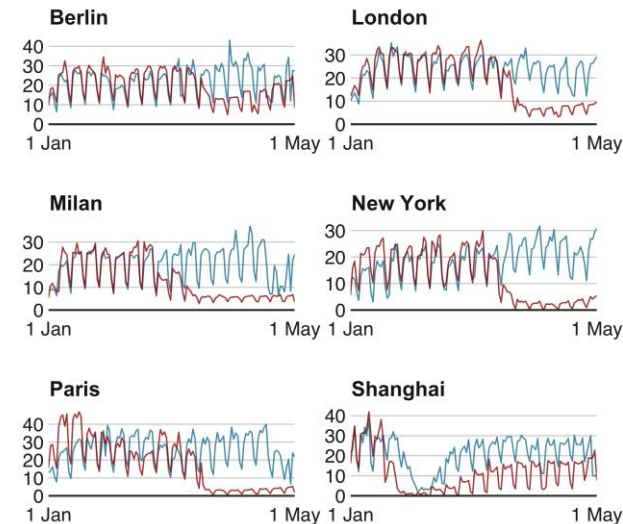
Source: OAG

BBC

Traffic flows in selected cities

Average congestion per day

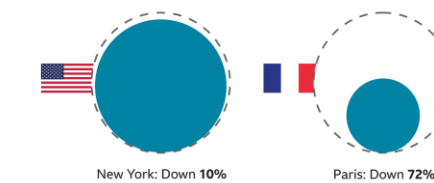
— 2019 — 2020



Source: TomTom, 5 May 2020

BBC

Lockdown impact on CO2 emissions in March



BBC

“Applied to the UK, deaths related to NO₂ and PM_{2.5} [during lockdown] are estimated to fall by 377 – with most reductions [in mortality] in London, Birmingham, Manchester and Glasgow.”

COVID-19 Impact: Sustaining the Positives

Services Impact: Strategic & Operational

- **Roundtable Discussion**

- Services affected.
- Operational impact.
- Air quality and health impact.
- Strategic and political impact.
- Financial impact.
- Impact mitigation.
- Recovery and restoration.
- Project SafeStart (Mark Stevens)

- **Longer-Term Implications & Opportunities**

- Supporting new modes of transport?
- Operating models?
- Working practices and staff protocols?
- Contracting and supply chains?
- Work backlog, network and asset condition?
- Citizen needs and expectations?




COVID-19: Impact & Recovery Assessment Toolkit

Built for Value Analyser v12

COVID-19: Impact & Response Assessment

Highways Services Operations: Factor Set Development, Multi-Scenario

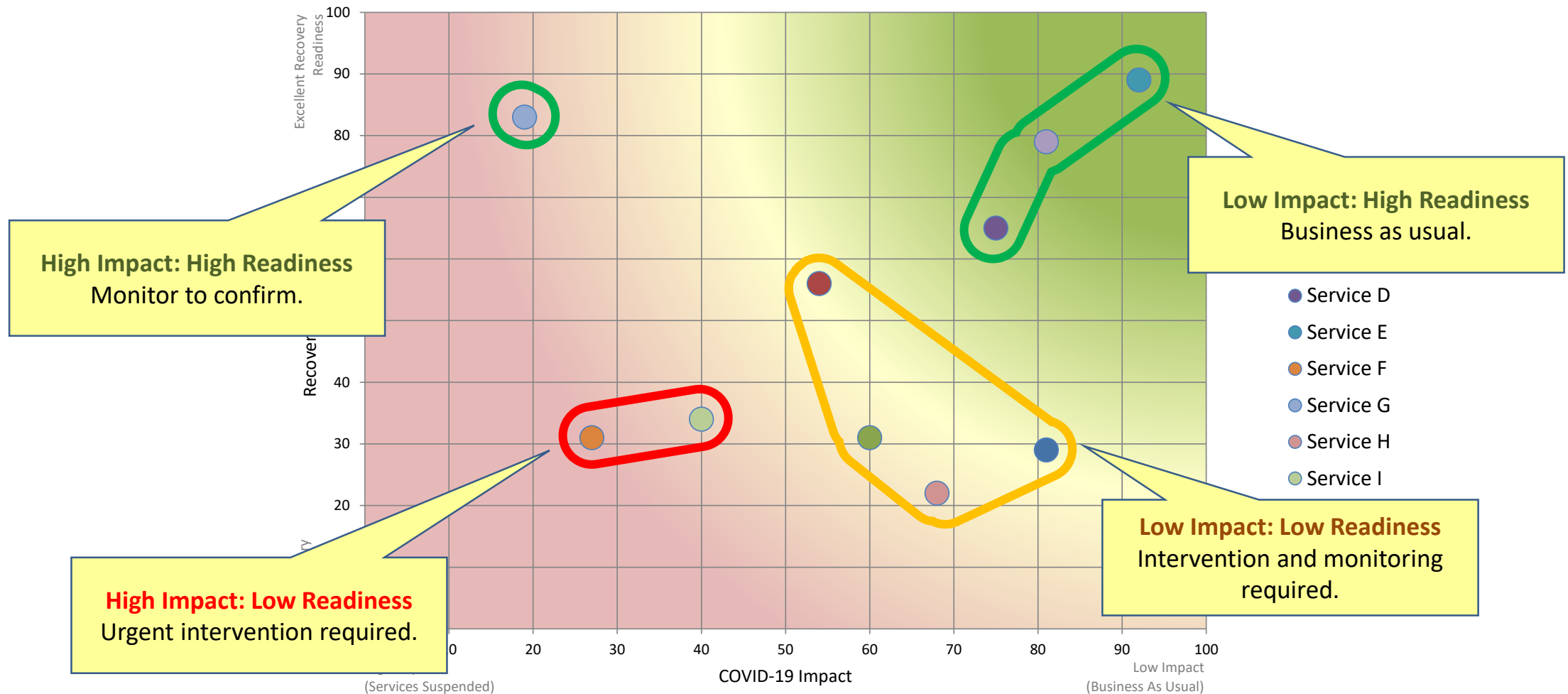


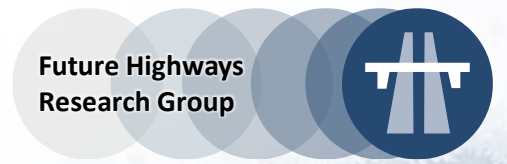
-  Available for Testing
-  Awaiting Calibration
-  Under Development

COVID-19: Position Analysis

Value Analyser™ v12 Add-In

COVID-19 Position Analysis





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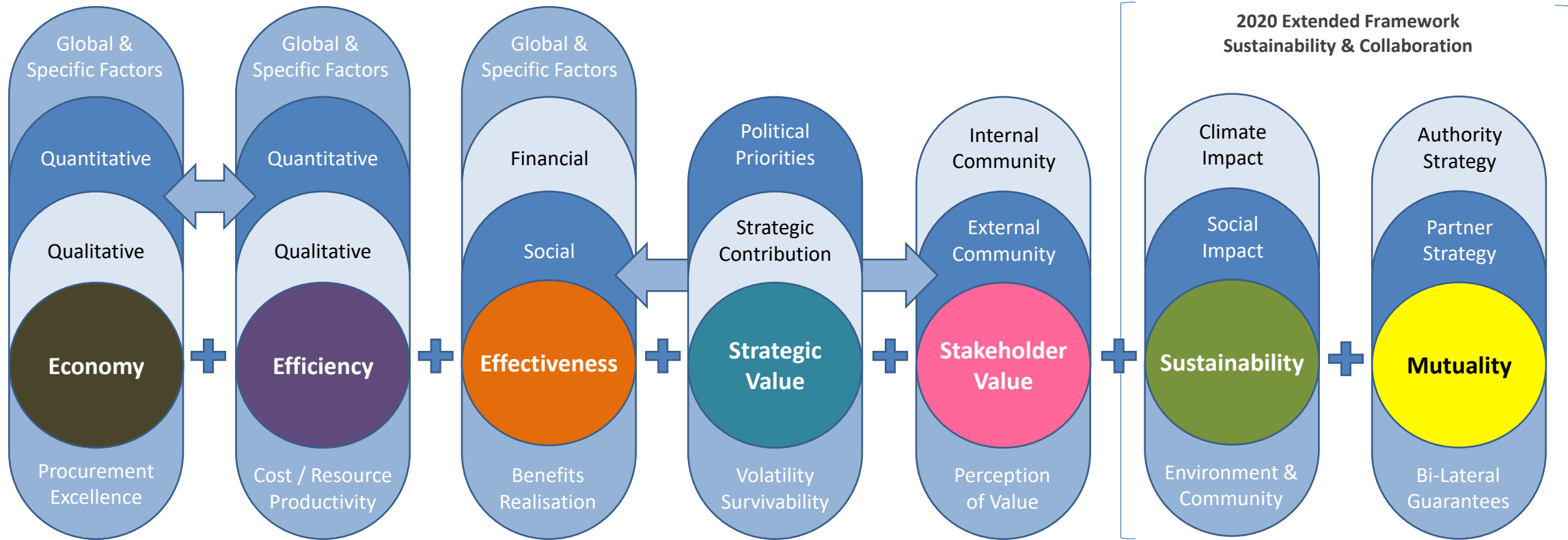
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Combined Research Club & Value for Money Benchmarking Group

Launching November 2020

Value for Money Analysis: New 2020 Factor Set

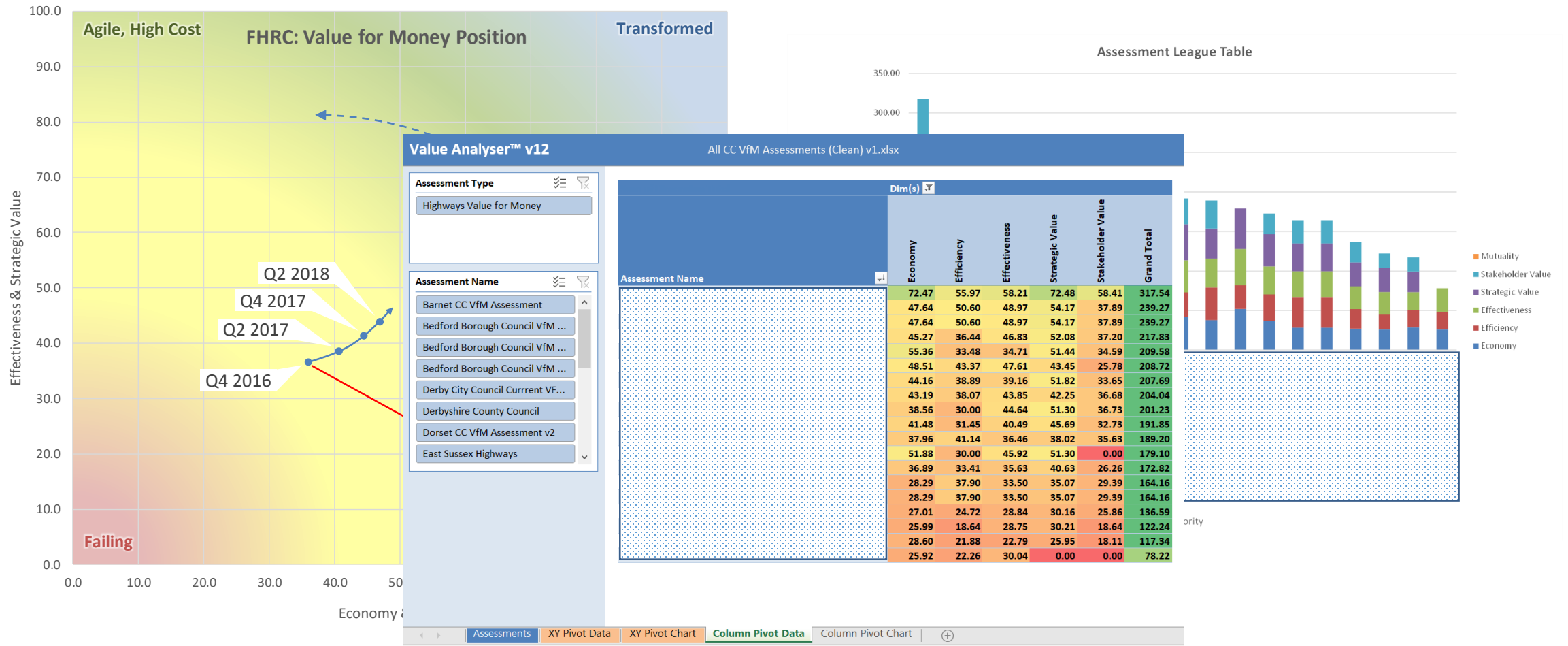
Identifying & Proving Best Value & Sustainable Services



Research Programme (CVRC, 2011) ©Proving, Farquharson, Perrin & Wilson 2020

Benchmarked Positions

Sample Position Plots



VfM Benchmarking Club 2020

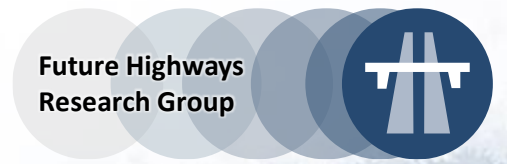
What's New



- **Currently 22 FHRG Club Members**
 - Developing relationships with academia, industrial partners and other public sector organisations.
- **Value Analyser™ 2020 (v12)**
 - Many new capabilities and a new reports dashboard.
- **A new and extended VfM factor set (refreshed annually).**
 - Fully refreshed for 2020 assessments.
 - Two new dimensions:
 - **Sustainability** (e.g. socially beneficial, carbon reducing, AQ improvement).
 - **Mutuality** (e.g. future services commissioning and bi-laterally beneficial relationships).
- **Enhanced quantitative analysis.**
 - Actual values, in any format, can now be added to any assessed factor.
 - Quantitative analysis is supported on the new dashboard.
 - Dynamic link to CQC and NHT surveys (Karen Farquharson working with Measure2Improve).
- **VfM assessments can optionally include peer reviews and suggestions.**
 - Much missed from HMEP reviews and will be trialled in the 2020 VfM assessments.
 - **Peer reviewers selected from FHRG members.**

Advantages & Benefits of Combined Membership

- **All tools and outputs free to members.**
 - 9 research themes, 4 toolsets, 92 strategic options, 11 new methods, 2 market reviews.
- **Conferences for members.**
 - At Cranfield University and virtual workshops.
 - Annual innovation conference.
- **Promotion of members as sector pioneers.**
 - Trialling new concepts and methods.
- **Annual, independently-assessed Value for Money benchmarking.**
 - Annually-refreshed VfM framework.
 - Supported by a peer review.
 - Access to benchmark data sets.
- **Annual membership fee: £4,950 + VAT**
 - 1st November 2020.
 - Senior stakeholders only and authorities seeking learning and collaboration.
- **Feedback So Far: Universally Positive**



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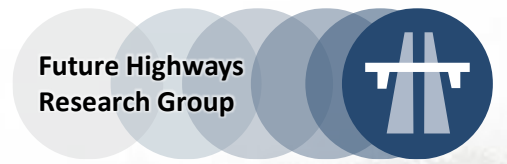
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Marketplace Review & Future Highways Services Delivery Options

Update



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Marketplace Review

Karen Farquharson

Marketplace Review

Overview



Within the next five years, twenty-four local highways authorities will be coming to the end of their current highways delivery arrangements. Seven of these authorities (who are also members of the FHRG have commissioned Proving to undertake a review of the marketplace and evaluate future service delivery options.

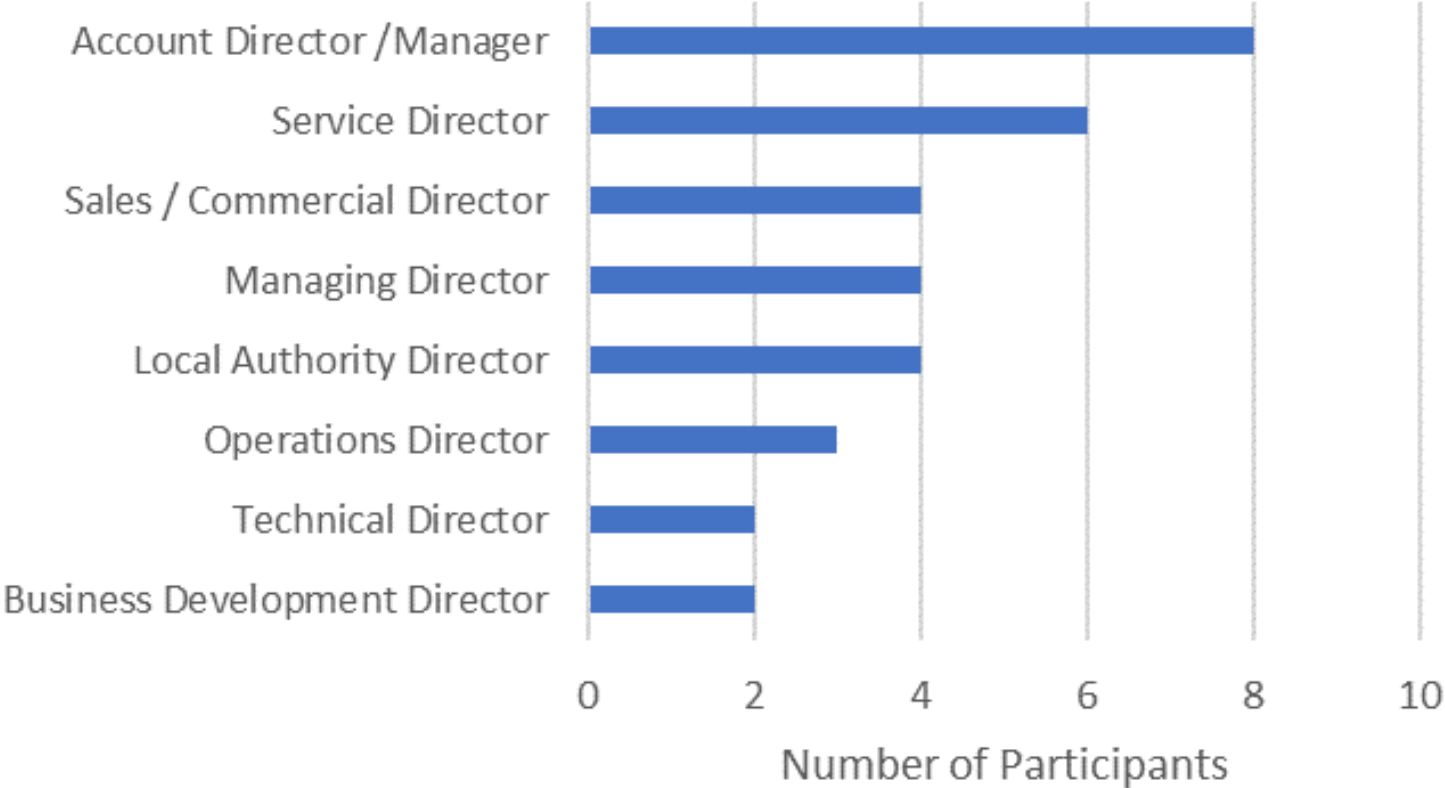
A key objective of the review is to better understand how authorities and their partners can improve contractual and collaborative relationships to deliver mutually beneficial outcomes.

Scope of Interview & Provider Participation

- **Amey**
- **Atkins**
- **Balfour Beatty**
- **Costain**
- **Jacobs**
- **Kier**
- **Ringway**
- **Ringway Jacobs**
- **Skanska**
- **Tarmac**
- **WSP**
- **SSE**
- **Bird & Bird** (Procurement Specialists)
- **BT** (Informal Discussion)

Analysis of Participants

Number of Study Participants By Role

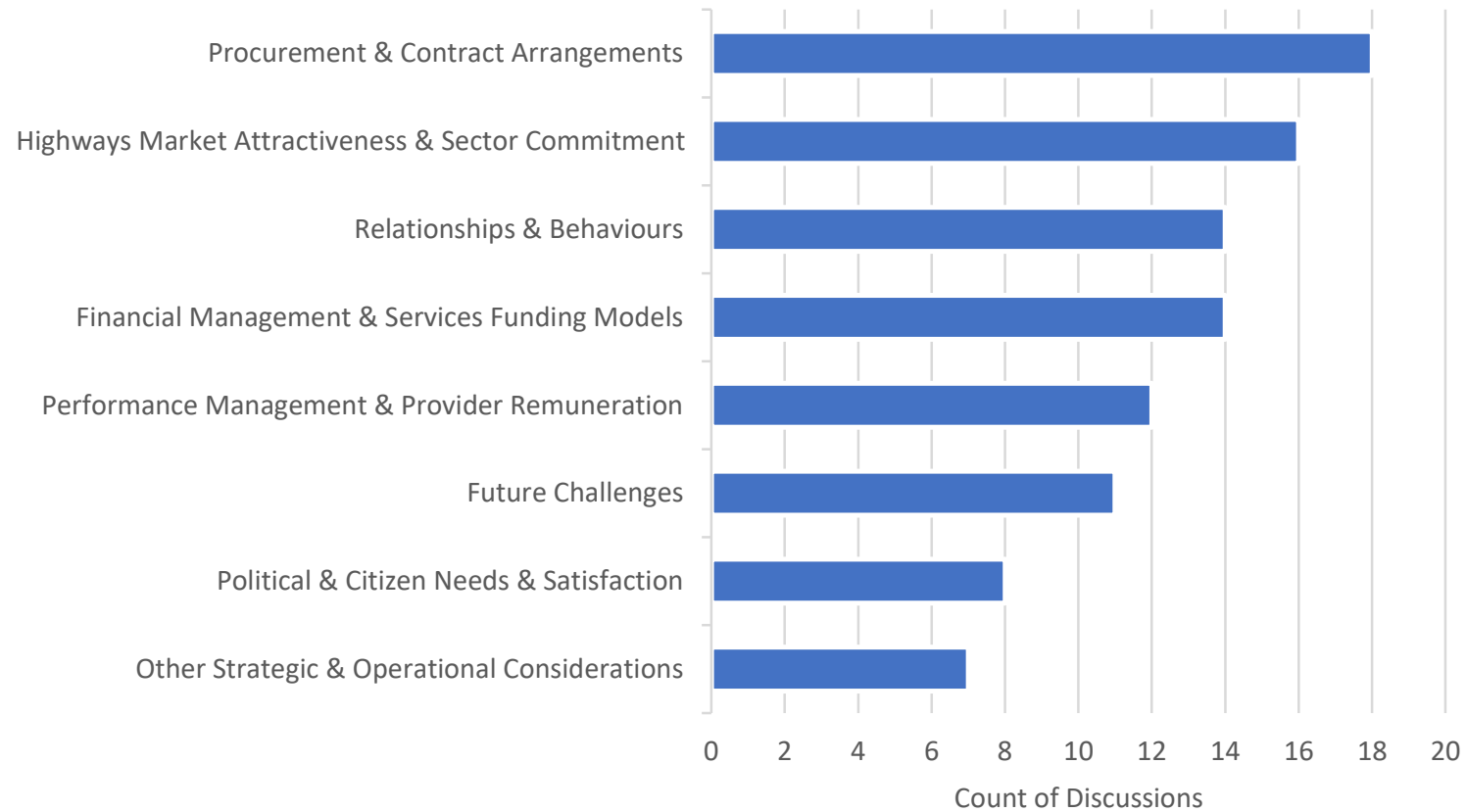


Scope of Discussions

- **Highways Market & Sector Commitment.**
 - Perceptions of clients and client behaviours, market ambitions, target clients and readiness to bid.
- **Procurement & Contract Arrangements.**
 - Including post-OJEU procurements, early engagement and flexible contracting frameworks.
- **Financial Management & Services Funding Models.**
 - Costs transparency, ensuring services are properly funded and future revenue generation and sharing.
- **Performance Management & Provider Remuneration.**
 - Simplified KPIs, rebalanced client / provider roles and accountability and better gain / share arrangements.
- **Future Challenges.**
 - Condition of the network, asset uses, shifting priorities expectations, evolving operating models.
- **Relationships & Behaviours.**
 - Better collaboration, client / provider mutuality, developing and sustaining trust.
- **Political & Citizen Needs & Satisfaction.**
 - Engaging with the public, prioritising and meeting citizen demands, accommodating political volatility.
- **Other Strategic & Operational Considerations.**
 - Preparing for post-COVID operations, carbon-neutral services, commercialisation and succession management.

Focus of Discussions

Count of Discussions by Topics

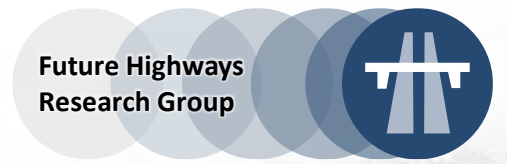


Review Stages

- **Provider interviews.**
- **Collate findings.**
- **Interim report drafted.**

- **Shared with providers (for comments, confirmation and feedback).**

- **Share with commissioning FHRG members.**
- **Share with wider FHRG.**
- **Share with ADEPT members (autumn 2020).**



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Future Services Delivery Options Study

Andy Perrin

Future Service Delivery Options - FHRG Participants

Authority	Workshop 1 Strategic Drivers	Workshop 2 Option Scoring – Strategic Fit	Workshop 3 Option Scoring – Attractiveness & Achievability	Workshop 4 Review of Outcomes and Next Steps
Buckinghamshire	2 March	22 May	28 May	TBC
East Sussex	16 April	23 April	27 April	TBC
Hertfordshire	20 May	30 June	28 July	TBC
Oxfordshire	TBC	TBC	TBC	TBC
Somerset	18 May	4 June	24 July	TBC
Suffolk	TBC	TBC	TBC	TBC
Surrey	30 April	5 May	6 May	TBC

These authorities represent seven of the 24 authorities coming to market over the next three years. More authorities are now expressing an interest in this study.

The Options Analysis Tool (Illustrative scoring)

Refresh Data



		Strategic Performance								Total	Weight-Adjusted Score
Option Family	#	Option Name	Optimise and improve network performance for all users under all conditions.	Enhance the local economy through network expansion and improvement to meet the growth agenda.	Sustain a financially resilient service that delivers best value with the resources available.	Engage effectively to understand and meet the needs of our citizens and communities.	Embrace best practice, innovations and new technologies enabling the service to continuously evolve.	Develop and sustain collaborative partnerships that deliver the objectives of all partners.	Attract, develop, empower and retain the best people capable of driving a dynamic and agile service.		
Do Nothing	1	Current Service Model	66	66	66	66	66	66	66	66	58
Single Provider	2	Contractor & Designer (Separate)	66	100	66	33	66	100	100	76	66
	3	Integrated (Contractor + Designer)	66	100	66	100	66	100	100	85	75
Multiple Providers	4	Multiple Providers Per Service Area	33	33	33	33	33	33	66	38	33
	5	Function-Orientated Service Providers	100	33	100	66	66	66	66	71	62
Framework	6	Primary + Secondary (Risk Sharing)	0	0	0	0	0	0	0	0	0
	7	4-Year Framework Agreement	33	33	33	33	33	33	33	33	29
Teckal	8	JV	66	100	33	100	66	100	66	76	66
	9	Pseudo JV (Partner + Profits Sharing)	33	66	66	100	66	100	66	71	62
Private Finance	10	Arms-Length Company	66	100	33	100	66	66	66	71	62
	11	PF2	0	0	0	0	0	0	0	0	0
Mixed Economy	12	Cyclical & Reactive In-House	66	33	66	33	33	66	66	52	45
	13	Best Option By Function / Service	100	66	100	66	66	66	66	76	66
	14	Highways Alliance								0	0
Shared Services	15	All In-House	100	100	33	100	33	33	66	66	58
	16	Primary Design + Add On	66	66	66	66	66	66	33	61	54
	17	Shared Service (Neighbouring Authority)	33	66	100	66	100	66	33	66	58
	18	Regional Combined Service	0	0	0	0	0	0	0	0	0
Factor Importance			100	100	100	100	100	100	100	100	
Average Factor Score			53	57	51	57	49	57	53	0	

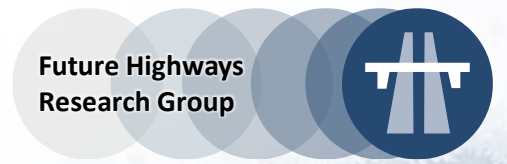
Attractiveness Analysis (VfM)						
Economy	Efficiency	Effectiveness	Stakeholder Value	Total	Weight-Adjusted Score	
66	66	66	66	66	66	66
100	66	66	66	75	75	75
33	100	66	66	66	66	66
33	33	33	33	33	33	33
66	100	66	66	75	75	75
0	0	0	0	0	0	0
33	33	66	66	50	50	50
66	66	66	33	58	58	58
100	66	66	66	75	75	75
66	66	66	33	58	58	58
0	0	0	0	0	0	0
33	33	66	33	41	41	41
66	100	66	66	75	75	75
66	66	66	66	66	66	66
66	66	100	66	75	75	75
100	33	33	33	50	50	50
0	0	0	0	0	0	0
100	100	100	100	47	47	47
53	53	52	45			

Achievability Analysis										
Complexity (Inherent Risk)	Capability & Capacity	Affordability	Authority Readiness	Provider Readiness	Sector Success Stories	Governance & Reporting	Partner Management	Cultural Alignment	Total	Weight-Adjusted Score
100	100	100	66	66	66	33	33	66	70	65
66	100	100	100	100	100	100	100	66	92	78
66	100	100	100	100	66	100	100	66	89	75
33	66	33	33	33	33	33	33	33	37	32
100	100	100	100	100	100	66	66	66	89	79
0	0	0	0	0	0	0	0	0	0	0
33	66	66	33	33	33	33	33	33	40	36
33	33	33	33	33	33	33	66	66	40	33
66	66	66	66	66	33	66	100	66	66	55
33	33	33	33	66	33	33	66	66	44	37
0	0	0	0	0	0	0	0	0	0	0
33	66	33	66	33	66	66	66	66	55	44
100	100	100	66	66	66	66	66	66	77	68
									0	0
33	33	66	33		66	66	100	100	62	42
100	100	100	100	66	66	66	33	66	77	69
33	66	66	100	66	33	33	66	66	59	51
0	0	0	0	0	0	0	0	0	0	0
100	100	100	75	100	75	25	50	75	38	32
49	61	59	55	52	47	47	55	52		

Position Analysis	
Attractiveness, Achievability & Strategic Performance	Rank
63.0	7
72.8	1
71.8	2
32.7	13
71.8	3
0.0	14
38.1	12
52.4	9
63.9	6
52.3	10
0.0	14
43.5	11
69.7	4
0.0	14
55.4	7
65.9	5
52.9	8
0.0	14

Key: Anticipated Performance

- Not Applicable (In This Context)
- 0 Critical Issue / Barrier to Implementation
- 33 Poorer Than Current Performance
- 66 Unknown or Parity (At Best) Performance
- 100 Parity Or Better Than Current Performance



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Smart Places Working Group

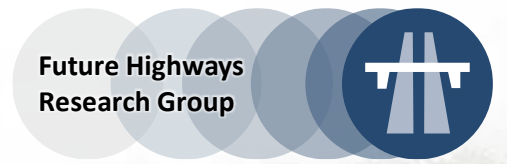
Update

Scope of Opportunity

Update

Scope of Opportunity

- **Value Exchange**
 - Land for Energy
 - Assets Access for Revenue
 - Co-Promotion for Social Value
- **Scope**
 - Energy Generation
 - Heat Networks
 - EV Infrastructure
 - Fibre to Campus
 - 4G Infill
 - 5G on Public Infrastructure
 - Wireless In-Home Support



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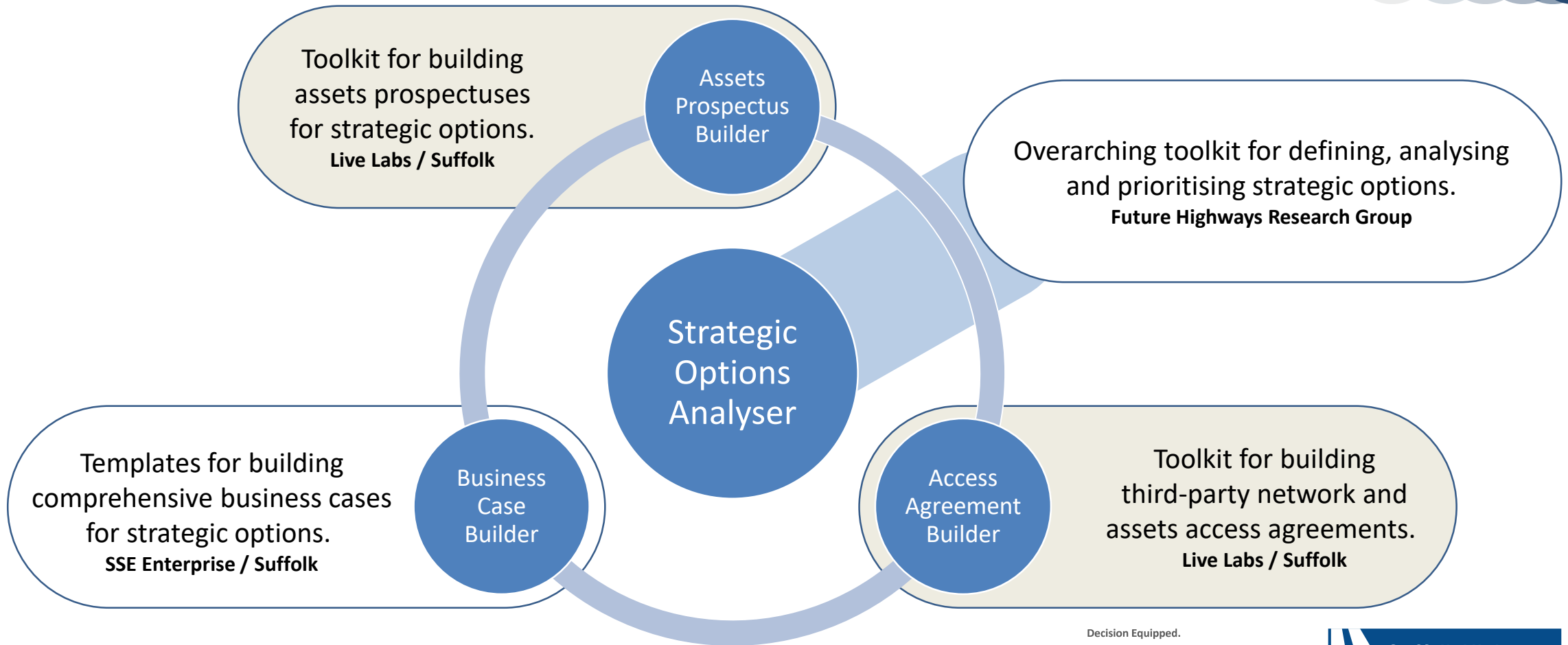
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Extending Strategy Analyser New “Case Builder” Capabilities

Live Labs + Development

Toolkit Components



Built for Strategic Options Analyser

Strategic Options Analyser (v0-19 - RC1) (version 1)

File Home Insert Page Layout Formulas Data Review View Developer

AutoSave Off

Simon Wilson SW

1. Select or create an option.

3. Create an assets prospectus for the opportunity.

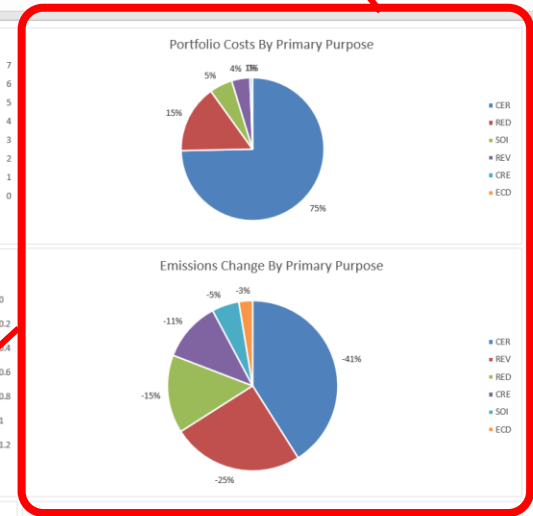
ID	Option	Portfolio	Project Cost	Avg. Op. Profit	£ Payback Period	CDE Avg. Chan	CDE Payback Period	Quality	SV Value	Stakeholder Support	Option Achievability	Viability
1010	Reduce Roads Capacity / Increase Private Vehicle Journey Times	No	£ 3,900,000	£ 2,952,000	1.3 Years	-13,916	1.0 Years	55.6	13	-2.6	70.8	35.0
1020	Increase Cycling & Pedestrian Priorities (Rights of Way)	No	£ 1,900,000	£ 34,800	No Payback	-13,555	1.1 Years	55.6	24.0	8.4	55.0	60.0
1040	Workplace Parking Charges	No	£ 960,000	£ 1,152,000	0.8 Years	-20,180	0.4 Years	68.9	-4.0	-11.9	63.3	25.0
1060	Congestion & Pollution Charging Zones	No	£ 2,200,000	£ 471,000	7.7 Years	-13,657	1.2 Years	57.8	-28.0	0.0	25.8	45.0
1070	License EV Taxis Only	Yes	£ 560,000	£ 50,400	11.1 Years	-19,800	0.9 Years	68.9	25.3	-4.0	26.0	80.0
1080	Differential Charging for Parking Permits (Polluter Pays)	Yes	£ 250,000	£ 168,000	1.5 Years	-19,672	0.5 Years	55.6	-12.0	-4.9	37.0	56.3
1090	Differential Charging for Car Park Parking (Polluter Pays)	Yes	£ 1,440,000	£ 1,471,000	1.0 Years	-16,627	1.0 Years	64.4	0.0	-1.3	45.8	55.0
1100	Car Sharing Clubs & Benefits	Yes	£ 138,000	£ 66,000	No Payback	-19,562						
1110	Conversion of Fleet to EV / Hydrogen Vehicles	Yes	£ 4,160,000	£ 553,200	No Payback	-18,015						
1120	Local Incentives for EV Ownership & Use	Yes	£ 500,000	£ 115,200	4.3 Years	-12,562						
1130	New Developments: EV Charging Plazas & Restricted Car Parking	Yes	£ 217,000	£ 61,000	No Payback	-15,066						
1140	New Developments: Delivery Hubs & Use of Drones / Cargo Bikes	Yes	£ 595,000	£ 115,200	5.2 Years	-16,935						
1150	New Developments: Higher Than Minimum Standards for Energy Efficiency	Yes	£ 1,700,000	£ 31,800	No Payback	-13,373						
1160	New Developments: Develop District Heating	Yes	£ 12,900,000	£ 1,512,000	7.9 Years	-14,176						
1170	New Developments: Require Solar Thermal, PV or Heat Pumps	Yes	£ 870,000	£ 56,000	No Payback	-13,745						
1180	Electric Buses On Subsidised Routes	Yes	£ 2,850,000	£ 548,300	5.2 Years	-16,238						
1190	EV Charging With Local Micro-Generation	Yes	£ 4,900,000	£ 792,000	6.2 Years	-13,794						
1200	Minimum Energy Efficiency Standards In Private Rented Sector	No	£ 282,000	£ 33,800	8.3 Years	-12,180						
1210	Connect Energy Companies & IoT Households to Improve Efficiency (BEIS, 2019)	No	£ 77,000	£ 11,520	6.7 Years	-11,208						
1220	Retrofit Council-Owned Properties to EPC C or Higher	No	£ 32,000,000	£ 666,400	No Payback	-16,094	0.0 Years	30.0	-12.3	-11.4	37.0	70.0
1230	Enforce Building Standards: Test for Planning Permission Compliance	No	£ 115,000	£ 112,000	No Payback	-14,093	0.6 Years	33.3	93	0.1	39.0	31.3
1240	Implement Circular Economy Waste Policies	No	£ 11,500,000	£ 936,000	12.3 Years	-16,584	1.1 Years	46.7	-23.7	-23.3	60.0	50.0
1250	Zero Waste to Landfill or Incineration	Yes	£ 4,500,000	£ 6,480,000	0.7 Years	-21,208	0.8 Years	62.2	21.3	1.7	70.0	68.8
1260	Bio-Mass for Bio-Gas (CHP e.g. Bio-Mass Crops)	Yes	£ 5,190,000	£ 498,000	No Payback	-14,916	0.8 Years	48.9	20.0	-4.4	66.0	80.0
1270	Industrial Waste Heat to Housing / Community Properties	Yes	£ 27,000,000	£ 2,304,000	11.7 Years	-13,458	0.5 Years	66.7	6.7	-9.7	20.0	20.8
1280	Identify NPFF Compliant Sites Suitable for Renewable Energy Generation	Yes	£ 318,000	£ -	No Payback	0	0.5 Years	61.1	21.3	-25.3	44.0	54.2
1290	Dim Street Lights	Yes	£ 1,900,000	£ 492,000	4.4 Years	-17,357	0.6 Years	31.1	34.0	-12.0	67.5	31.3
1300	Adaptive LED Street Lighting	Yes	£ 2,250,000	£ 568,800	4.0 Years	-14,451	0.5 Years	60.0	5.3	6.6	34.2	50.0
1310	Encourage Virtual / Home Working Over High-Speed Broadband	Yes	£ 2,600,000	£ 288,000	9.0 Years	-13,420	0.8 Years	42.2	5.3	16.0	52.5	50.0
1330	Authority Properties Use Renewable Energy	Yes	£ 5,600,000	£ 432,000	13.0 Years	-16,718	0.7 Years	44.4	-21.3	-8.9	71.0	43.8

2. Qualify and quantify the scope, costs, benefits and risks.

5. Create a network and assets access agreement.

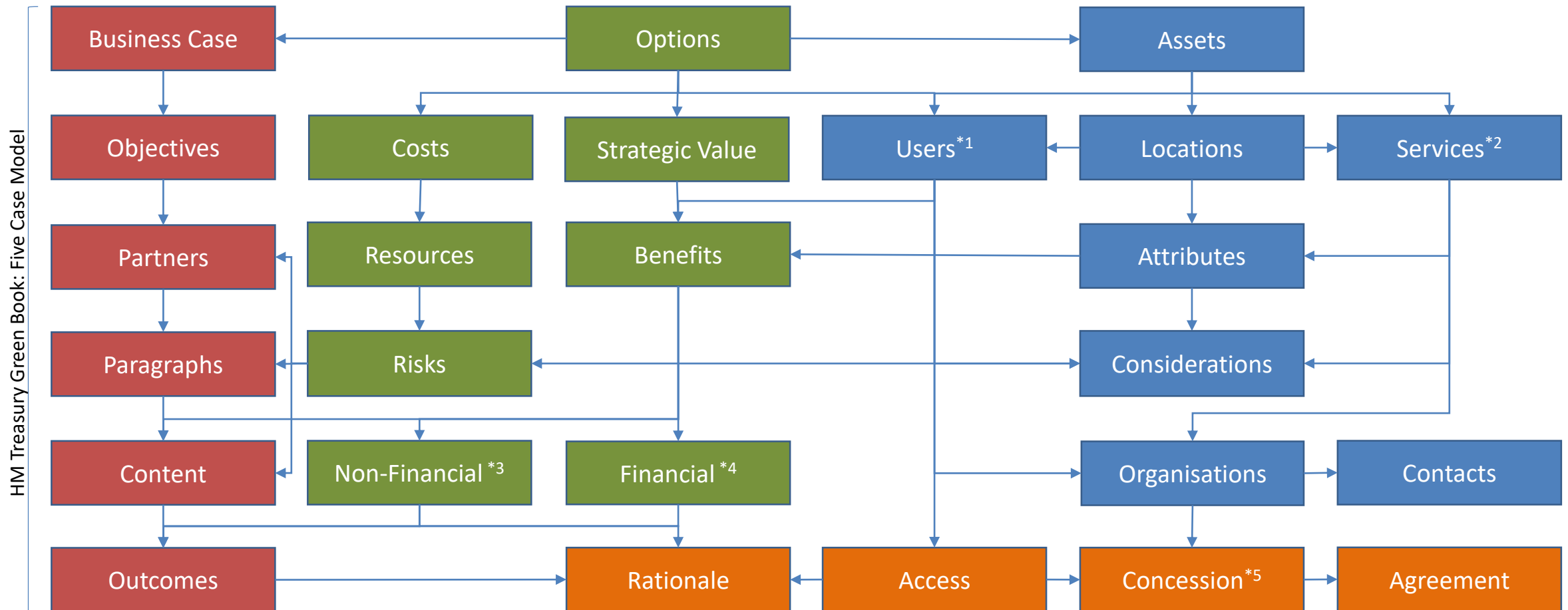
4. Develop a business case (using template five case model).

3. Create an assets prospectus for the opportunity.



Options Analysis & Case Development

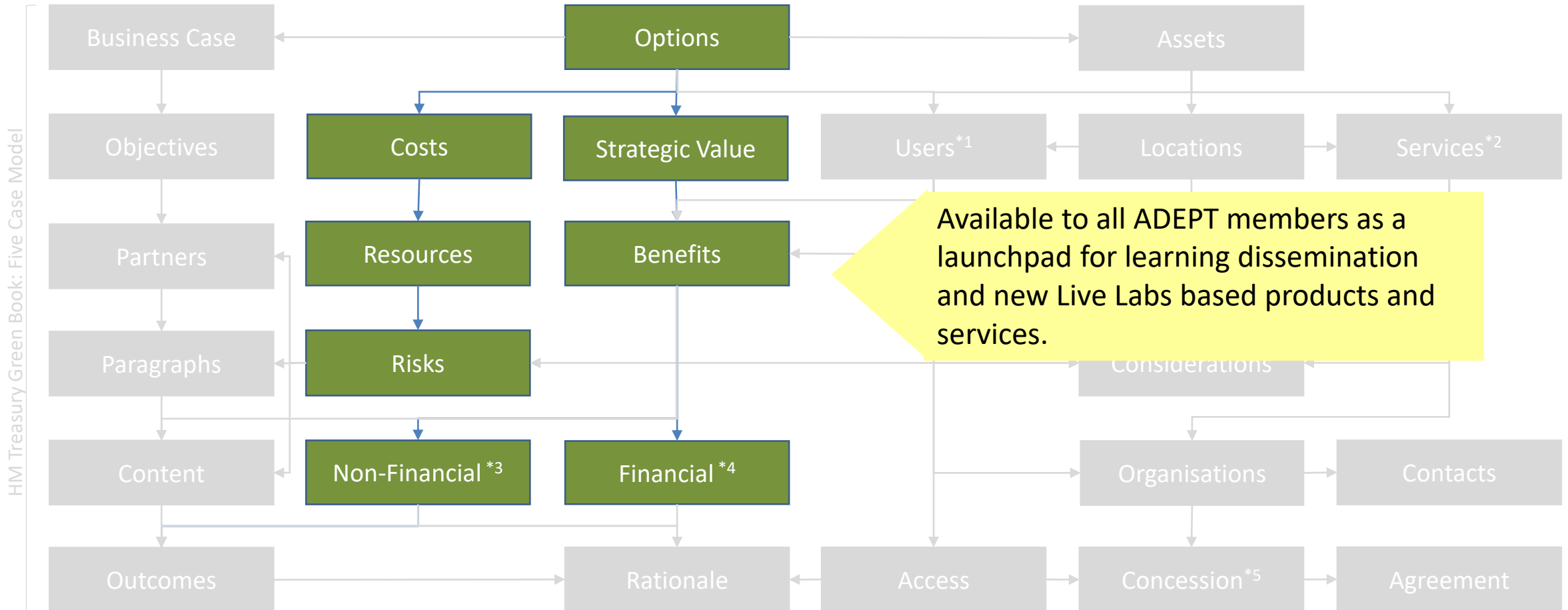
Outline Structure



*1: Current and potential, costs and revenue. *2: Services available at location. *3: Non-cashable performance related, social, environmental and reputational. *4: Cashable benefits. *5: Where applicable.

Strategic Options Analyser

Core Application



*1: Current and potential, costs and revenue. *2: Services available at location. *3: Non-cashable performance related, social, environmental and reputational. *4: Cashable benefits. *5: Where applicable.

Strategic Options Analyser

Decision Equipped.



Future Highways
Research Group



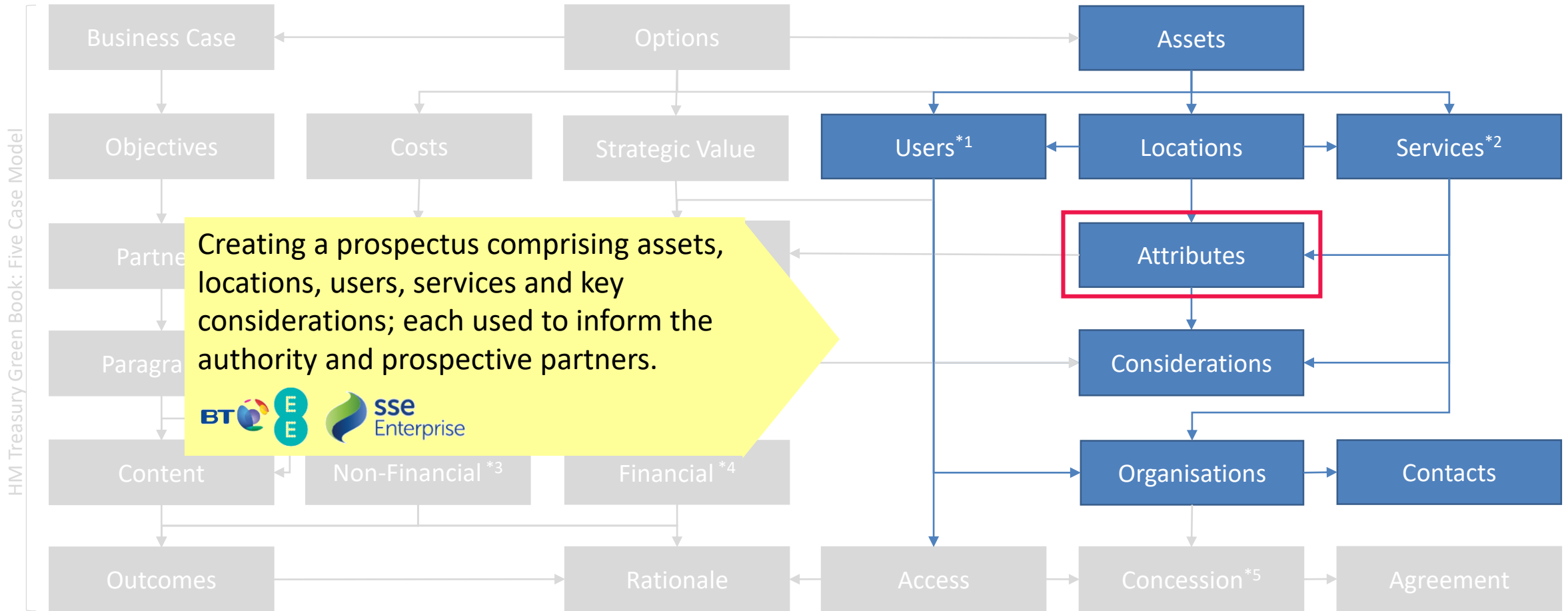
Strategic Options Analyser
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Double-Click on [Option] to open the analysis worksheet.

ID	Option	In Portfolio	Project Cost	Income Generation		CDE (Emissions) Change		Air Quality	Social Value	Stakeholder Support	Option Achievability	Commercial Viability	Le
				Avg. Op. Profit	£ Payback Period	CDE Avg. Chang	CDE Payback Period	AQ Score	SV Score	STK Score	ACH Score	ACH Viability	
1010	Reduce Roads Capacity / Increase Private Vehicle Journey Times	No	£ 3,900,000	£ 2,952,000	1.3 Years	-15,916	1.0 Years	55.6	13	-2.6	70.8	35.0	
1020	Increase Cycling & Pedestrian Priorities (Rights of Way)	No	£ 1,900,000	-£ 34,800	No Payback	-11,555	1.1 Years	55.6	24.0	8.4	55.0	60.0	
1030	Reduce Aviation Expansion / Number of Flights	No	£ 800,000	-£ 120,000	No Payback	-12,604	1.2 Years	26.7	-9.3	13	61.0	50.0	
1040	Workplace Parking Charges	No	£ 960,000	£ 1,152,000	0.8 Years	-20,180	0.4 Years	68.9	-4.0	-11.9	63.3	25.0	
1050	Ultra-Low Emission Zones	No	£ 3,800,000	£ 2,690,000	1.4 Years	-16,282	0.8 Years	33.3	-32.0	-21.5	59.2	45.0	
1060	Congestion & Pollution Charging Zones	No	£ 2,200,000	£ 471,000	4.7 Years	-13,667	1.2 Years	57.8	-28.0	0.0	25.8	45.0	
1070	License EV Taxis Only	Yes	£ 560,000	£ 50,400	11.1 Years	-19,800	0.9 Years	68.9	23.3	-6.0	26.0	80.0	
1080	Differential Charging for Parking Permits (Polluter Pays)	Yes	£ 250,000	£ 168,000	1.5 Years	-19,672	0.5 Years	55.6	-12.0	-4.9	37.0	56.3	
1090	Differential Charging for Car Park Parking (Polluter Pays)	Yes	£ 1,440,000	£ 1,471,000	1.0 Years	-16,627	1.0 Years	64.4	0.0	-1.3	45.8	55.0	
1100	Car Sharing Clubs & Benefits	Yes	£ 138,000	-£ 66,000	No Payback	-19,855	0.9 Years	64.4	6.7	0.9	32.0	68.8	
1110	Conversion of Fleet to EV / Hydrogen Vehicles	Yes	£ 4,160,000	-£ 553,200	No Payback	-18,015	0.9 Years	31.1	-8.3	-11.9	48.0	41.7	
1120	Local Incentives for EV Ownership & Use	Yes	£ 500,000	£ 115,200	4.3 Years	-12,562	1.2 Years	57.8	9.3	17.6	64.2	83.3	
1130	New Developments: EV Charging Plazas & Restricted Car Parking	Yes	£ 217,000	-£ 61,000	No Payback	-15,066	1.1 Years	46.7	34.7	5.2	47.0	68.8	
1140	New Developments: Delivery Hubs & Use of Drones / Cargo Bikes	Yes	£ 595,000	£ 115,200	5.2 Years	-16,935	0.5 Years	64.4	10.7	7.9	83.3	37.5	
1150	New Developments: Higher Than Minimum Standards for Energy Efficiency	Yes	£ 1,700,000	-£ 31,800	No Payback	-13,373	0.6 Years	28.9	12.0	0.0	46.7	31.3	
1160	New Developments: Develop District Heating	Yes	£ 12,000,000	£ 1,512,000	7.9 Years	-14,176	0.8 Years	62.2	16.0	8.0	75.0	40.0	
1170	New Developments: Require Solar Thermal, PV or Heat Pumps	Yes	£ 870,000	-£ 56,000	No Payback	-13,745	0.7 Years	42.2	0.0	0.0	33.0	62.5	
1180	Electric Buses On Subsidised Routes	Yes	£ 2,850,000	£ 548,300	5.2 Years	-16,238	0.6 Years	20.0	17.3	25.3	55.0	37.5	
1190	EV Charging With Local Micro-Generation	Yes	£ 4,900,000	£ 792,000	6.2 Years	-13,794	0.9 Years	26.7	30.7	2.6	63.0	40.0	
1200	Minimum Energy Efficiency Standards In Private Rented Sector	No	£ 282,000	£ 33,800	8.3 Years	-12,180	1.3 Years	37.8	-33.3	8.7	40.0	75.0	
1210	Connect Energy Companies & IoT Households to Improve Efficiency (BEIS, 2019)	No	£ 77,000	£ 11,520	6.7 Years	-11,008	1.0 Years	37.8	0.0	7.0	50.0	62.5	
1220	Retrofit Council-Owned Properties to EPC C or Higher	No	£ 32,000,000	-£ 666,400	No Payback	-16,094	0.6 Years	35.6	-13.3	-17.4	57.0	70.8	
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Portfolio Data | Dashboard | Prospectus | (+)

Network & Assets Prospectus Component



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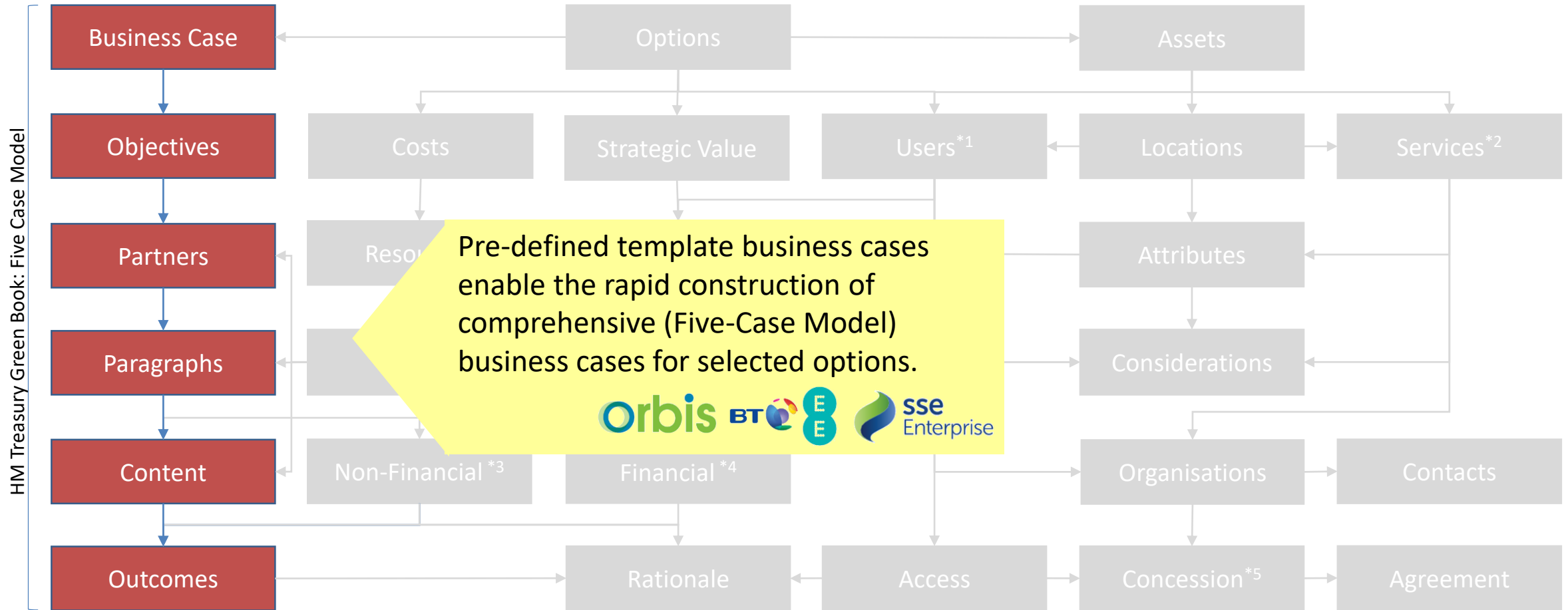
Assets Prospectus

Entity Example: Location Attributes

Key questions used to qualify, quantify and develop the best case.

Field	Description
Access Restrictions	Site access restrictions (standard list).
Access Permissions	Site access permissions (standard list).
Site Restrictions	Site usage restrictions.
Avg Wind Speed	m/s
Avg Wind Direction	Cardinal direction.
External Surface Area	For buildings only (M ²).
Internal Surface Area	For buildings only (M ²).
Useable Surface (Solar)	M ²
Elevation	MASL
Orientation	Relative to north.
Gradient	Average for site.
Number of Floors	For buildings only.
Shared Asset	Other site occupiers / rights of way.
Flooding Risk	Environment Agency Risk Scale (0 - 100)
Property Load	Site load (e.g. school, car park, etc).
Local Load	Local load (under 2Km).
Local Load Type	Authority, industrial, commercial, residential, mixed, TBD.
Distance To Load	Metres.
Distance To Substation	Metres.
Connection Type	Private wire, etc.
Reusable Heat Output	From site.
Max Generation	MWh
Max Load	MWh
Max Saving	£
Min Generation	MWh
Min Load	MWh
Min Saving	£
Data Confidence	0 - 100 Score.

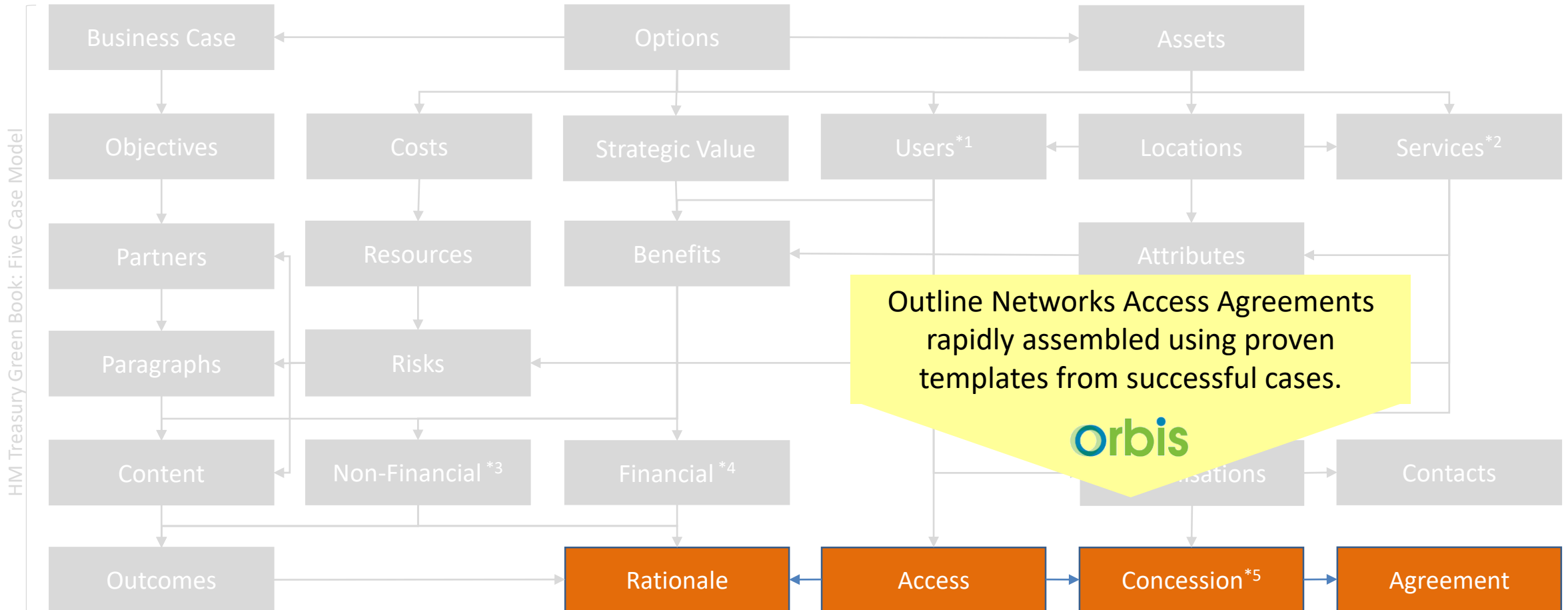
Business Case Development Component



*1: Current and potential, costs and revenue. *2: Services available at location. *3: Non-cashable performance related, social, environmental and reputational. *4: Cashable benefits. *5: Where applicable.

Network Access Agreement (Concession or Partnership)

Component



*1: Current and potential, costs and revenue. *2: Services available at location. *3: Non-cashable performance related, social, environmental and reputational. *4: Cashable benefits. *5: Where applicable.



Next Meeting

September FHRG Conference (Real and / or Virtual)?

Dates? Speakers (EE & BT, Bird & Bird, University of Derby)?