



- TSB research funding
- Project consortium
- ‘Lifecycle’ tools
- Rapier concept
- Rapier models
- User interface concept
- Demonstration...?
- What features would you like to see in a software tool like this?

COME AND FIND OUT HOW RAPIER WILL HELP YOU REVOLUTIONISE YOUR BUILDING DESIGNS!

RAPIER is a unique new software tool that rapidly produces cost, energy, and carbon lifecycle analysis of new build projects from early concept stage. Capturing the combined expertise of four industry leaders in sustainability, RAPIER provides immediate results, graphic clarity, depth of information, and ease of use.

Gain new insight into the impact of your design decisions immediately with this cloud-based software that runs in your web browser and mobile device.

Optimise key decisions earlier and be ahead of the game.

Come and demo the software at one of our afternoon sessions on Tuesday 20th March, 29-30 South Gallery, Excel, or join us for our main presentation at 4.30pm, with drinks afterwards.

[REGISTER HERE](#)

A new generation collaborative optioneering tool for Architects, Engineers, Cost Consultants, Developers and Investors.

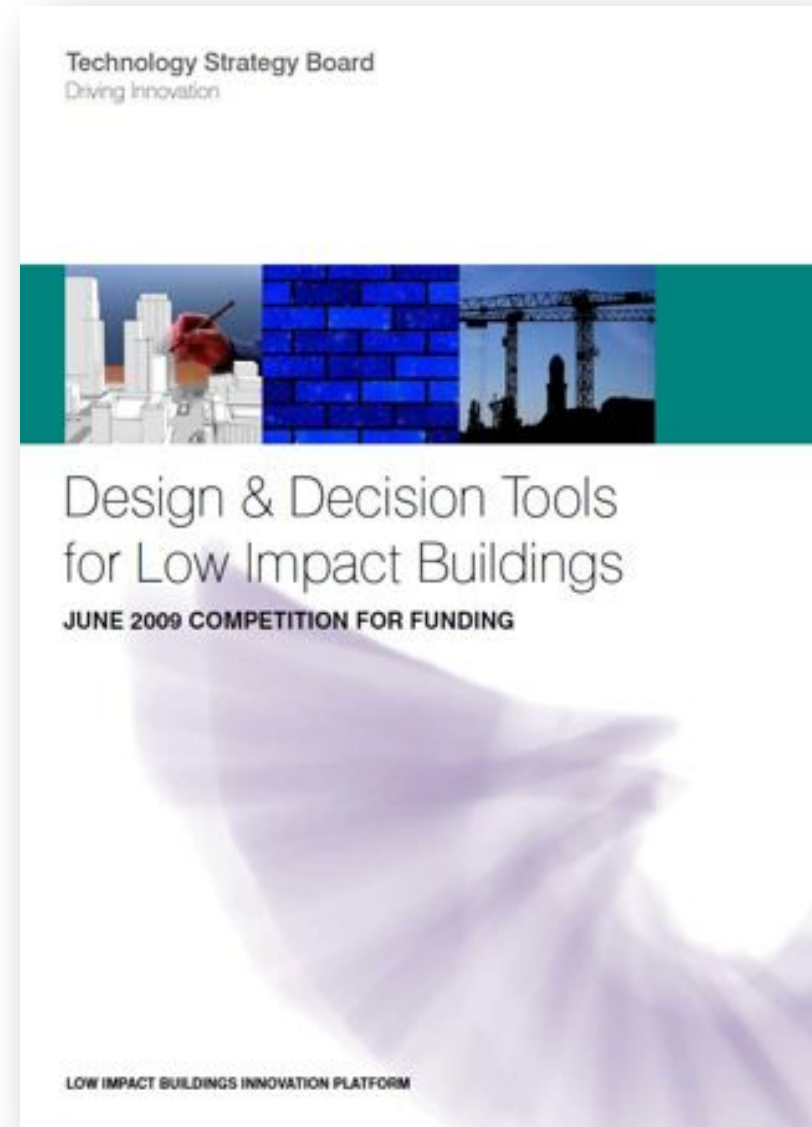


- 2 year R&D project (£937k) April 2010 – April 2012
- 46% funded by the Technology Strategy Board (TSB)
- “Design & decision tools for ‘low impact’ buildings” focusing on **new build** early stage & concept design
- 13 projects funded
- £4million total funding

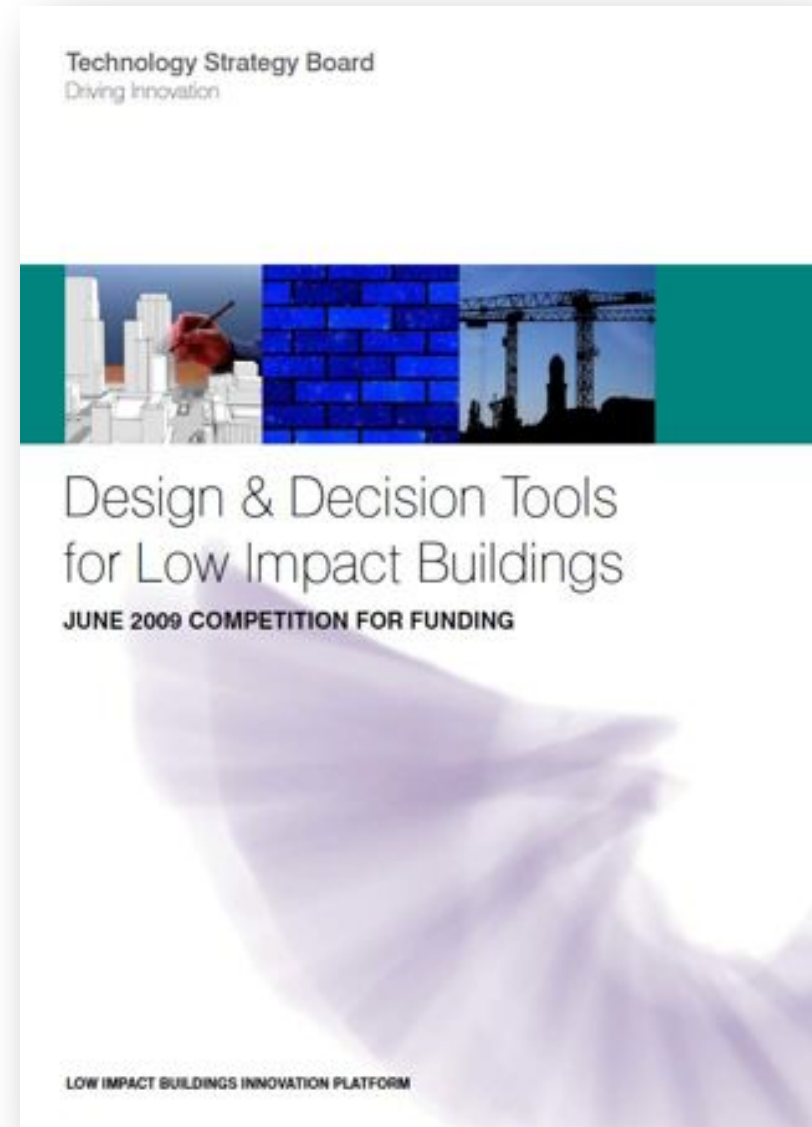


...Designers cannot easily predict the impact of alternative design decisions on building performance and cost - whether capital cost, whole life financial cost or carbon cost...



Currently available tools

- Often only address the needs of one specialism or phase of design
- Are not accessible to smaller practices
- Offer little support at conceptual design stages
- Have a poor ability to visualise and communicate relative impact to clients and design team



TSB identified a need for:

- Tools that provide dramatically better guidance of design decisions to deliver zero carbon and low impact buildings in the UK for 2016 and 2019
- Tools that enable designers to make better decisions at every stage of the design process, based only on information typically available at that stage
- Significantly improved accessibility to design and decision tools for all practising designers, **however small the practice**



- **BDSP Consulting Engineers**

MEP & Environmental Engineers



- **Sweett Group**

Cost & Project Management Consultancy



- **Architype**

Architects & Sustainability Specialists



- **greenspaceLive**

The Green Building Internet Company



International engineering and environmental consultancy

- BDSP Engineering
- BDSP Environmental
- BDSP Simulation
- BDSP Lighting



House in Wales
Pembrokeshire, UK



**National Assembly
for Wales**



**London 2012
Olympic Velodrome**



Bocconi University
Milan, Italy



Central Market
Abu Dhabi, UAE

Sweett Group provides clients with global expertise coupled with local sector knowledge including:

- Cost Management
- Programme and Project Management
- Strategic Advisory
- Property Development Services



London Eye
£15m – Capsule refurb



Hong Kong Police HQ
HK\$2.2m



Melbourne Law Courts
Aus\$108m



Titanic Quarter
£90m



CMA Tower
Riyadh

Architype Ltd is an awarding winning and regularly published Architectural practice, with:

- Projects ranging from £100K to £17million
- Offices in Hereford & London
- Recognised expertise in sustainable design
- Strong collaborative & consultation ethos
- At forefront of low energy buildings research



West Office - Barn
Ecological refurb



UEA – NRP Centre
Negative carbon building



Bushbury Primary
Passivhaus school



Genesis SCA&T
Sustainable construction



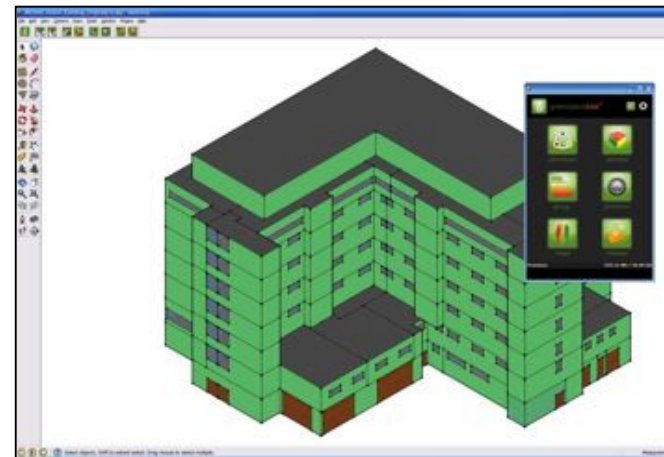
York House
Low energy complex

Energy and low carbon software spin-out from the University of the Highlands and Islands:

- 5 year R&D programme
- 3 year partnership with Green Building Studio until acquired by Autodesk
- First energy analysis plugin for Google SketchUp
- Global business partnerships and users



gWorkspace
collaboration and sharing
messaging and alerts



gModeller
Automatic attribution of SketchUp faces to
generate gbXML spaces, surfaces etc...



gEnergy
Integration with energy analysis engines
SAP, EPC & Energy reports



- Comprehensive Database for recording all building components
- Only usable on fully designed or completed buildings
- Additional capital & lifecycle carbon factors added on
- Data from UK Building Blackbook & CESMM4
- Now called Cap₂IT.....



...an IT aid to calculate life cycle cost and the environmental impact of the design and components for both new build and refurbished residential buildings....

- Excel based with link to CAD
- Lifecycle Cost, Energy and Embodied Carbon
- Based on BLP's database of component and materials performance
- In the 'early stages of user dialogue
- Hope to launch a full working application by Launch Q4 2012

www.blpinsurance.com/sustainability/butterfly/



Butterfly calculations



The screenshot shows the software interface with a 3D model of a house. An 'Inputs' table is visible on the right side of the screen, containing the following data:

Inputs	
User inputs	
CAD input	
Use CAD input?	Yes No
Block and dwelling options	
Site Postcode	WAT
Block GFA	220 m ²
Block Orientation	0 Degrees

Below the 3D model, a list of actions is visible:

- 15 CHANGE DIMENSIONS
- 16 Change unitDepth
- 17 Change orientation, unitDepth
- 18 WRITE TO EXCEL

...The overall aim of IMPACT is to integrate Life Cycle Assessment, Life Cycle Costing and Building Information Modelling...

- Based on BRE Environmental Profiles Data Release
- Basically Envest2 integrated with CAD models
- BRE manage databases and verifies compliant software
- Phase 1: IES undertaking software development
- Phase 2: IFC compliant protocol for use of IMPACT by other developers / BIM
- Launch Q4 2012

www.IMPACTwba.com



The screenshot shows the IMPACT website homepage. At the top left is the IMPACT logo, and at the top right is the tagline "Integrated Material Profile And Costing Tool". A navigation menu includes Home, Features, How to get IMPACT, The IMPACT team, Integration, For developers, Training/consultancy, and FAQs. The main heading is "Will this low-impact solution cost extra?". Below this, there are sections for "What is IMPACT?", "How do I get IMPACT?", "Features:", and "Updates". The "Features:" section lists: "Integration with whole building assessment schemes", "Whole building life cycle assessment (LCA)", "Life cycle costing", and "Interoperability (from Phase 2)". The "Updates" section states: "An early-beta version of IMPACT was demonstrated on the IES stand at Ecobuild." and "Phase 1 (IES) IMPACT tools due for public release in 2012." There are also promotional banners for "IMPACT for SketchUP™ coming soon..." and "ecobuild your future At ExCeL, London Tuesday 20 - Thursday 22 March 2012 get your free tickets now". At the bottom, there are logos for IMPACT Partners (bre, ies, WILMOTT DIXON, construction products) and Supporters (FAITHFUL+GOULD, n55, RIBA). The footer contains "Contact" and "Terms & Conditions".



International sales & support 

- Home
- Products
- Downloads
- Training
- Consultancy
- Support
- Partners
- About Us
-

Latest News

- 11 Jan 2012 DesignBuilder v3 qualifies for calculating US tax credits under section 179D
- 15 Jun 2011 Demo of new v3 HVAC and Radiance daylighting features

Shortcuts



- Software
- Consultancy
- Training
- Corporate
- Support
- Research






Global thought leaders in measurable sustainability. We help businesses reduce the carbon emissions of buildings like nobody else can. We enhance our customers' triple bottom line: economic, social and environmental - shaping a sustainable future, today.

[More about IES](#)



Benefits - Accurate Conceptual Cost Modeling

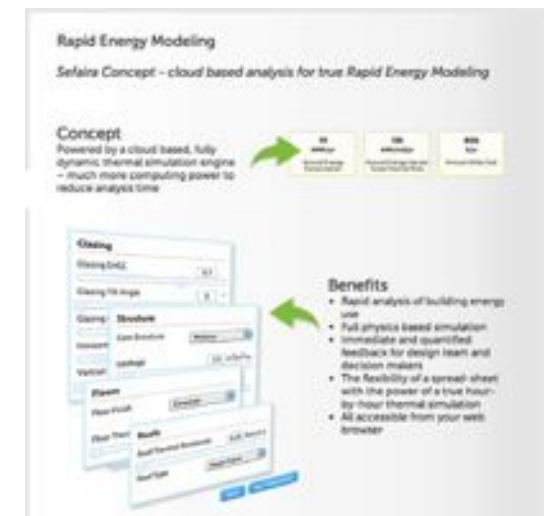
Performance Case Studies

Museum Tower	TRAINS AMPLIFIC	1 Revolution	OSD Adairson HS	Confidential
				
BUILDING TYPE: High-end Residential	BUILDING TYPE: Office/Maintenance	BUILDING TYPE: Corporate Office	BUILDING TYPE: Public High School	BUILDING TYPE: Mixed Use
LOCATION: Dallas, TX	LOCATION: Fort Bliss, TX	LOCATION: Houston, TX	LOCATION: Dallas, TX	LOCATION: Dallas, TX
OWNER: Brooks Partners, Inc.	OWNER: Texas Army National Guard	OWNER: Crescent Power	OWNER: Dallas Independent Schools	OWNER: Confidential
GSP: \$91,000	GSP: \$41,800	GSP: \$1,000	GSP: \$21,800	GSP: \$80,000
SCOPE: Core/Shell/Interiors	SCOPE: Core/Shell/Interiors	SCOPE: Core/Shell	SCOPE: Core/Shell/Interiors	SCOPE: Core/Shell/Interiors
DOCUMENTS: Concept Design	DOCUMENTS: Schematic Design	DOCUMENTS: Concept Design	DOCUMENTS: Schematic Design	DOCUMENTS: Design Development
HARD COST: \$100.2 Million	HARD COST: \$45.1 Million	HARD COST: \$88.1 Million	HARD COST: \$60.1 Million	HARD COST: \$88.8 Million
SG-FT COST: \$207.26	SG-FT COST: \$100	SG-FT COST: \$188.40	SG-FT COST: \$100	SG-FT COST: \$174.21
ACCURACY OF ESTIMATE: 1%-2%	ACCURACY OF ESTIMATE: 3%	ACCURACY OF ESTIMATE: 1%-2%	ACCURACY OF ESTIMATE: 3%	ACCURACY OF ESTIMATE: 3%
VALUE: The Architect & Contractor (Beck) was able to ensure seamless data flow from architectural concepts through to cost estimating and preconstruction.	VALUE: Project cost had to be accurate and communicated clearly to the stakeholders. Project was at risk of being defunded if the budget was not adhered to.	VALUE: The Client needed to rapidly respond to evolving architectural concepts for budget tracking purposes throughout the Conceptual Design phase of the project.	VALUE: Public school with strict budget oversight via Program Manager. Unique design challenges associated with existing historic structure. Visible pricing market.	VALUE: The Client needed immediate an independent budget. Complete conceptual estimate package was provided in less than 1 day with a supporting Design-Criteria & Estimate Clarifications.

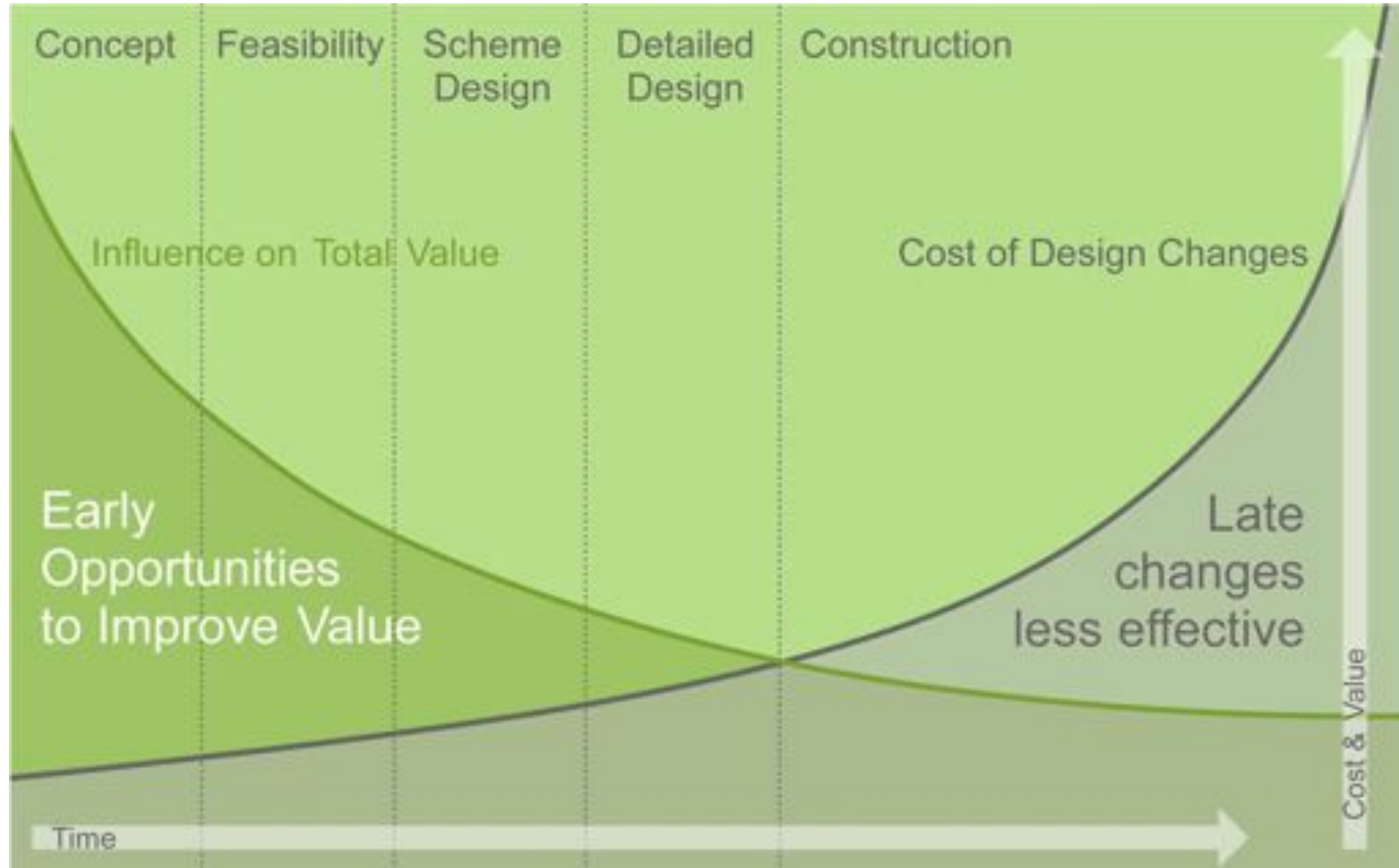
...Sefaira's mission is to remove the barrier's to building green. We make web software to help users design, build, operate, maintain and transform green buildings...

- A web based application
- 'Realtime' comparison of strategies
- Retrofit & Newbuild
- Integrates with Sketchup
- Just Energy – at the moment
- No Whole Life Carbon or Cost
- 'Early Adopter Program'

www.sefaira.com





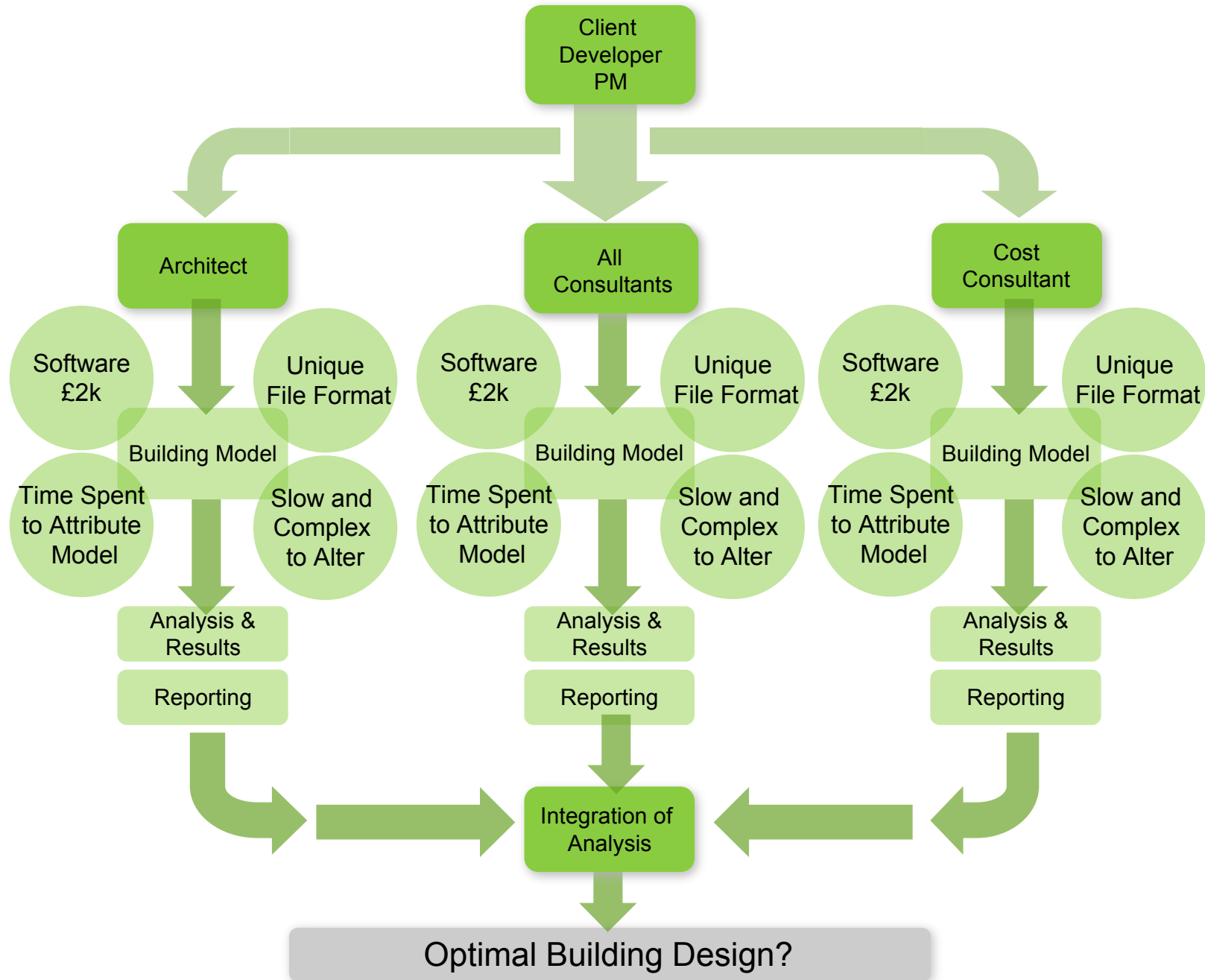


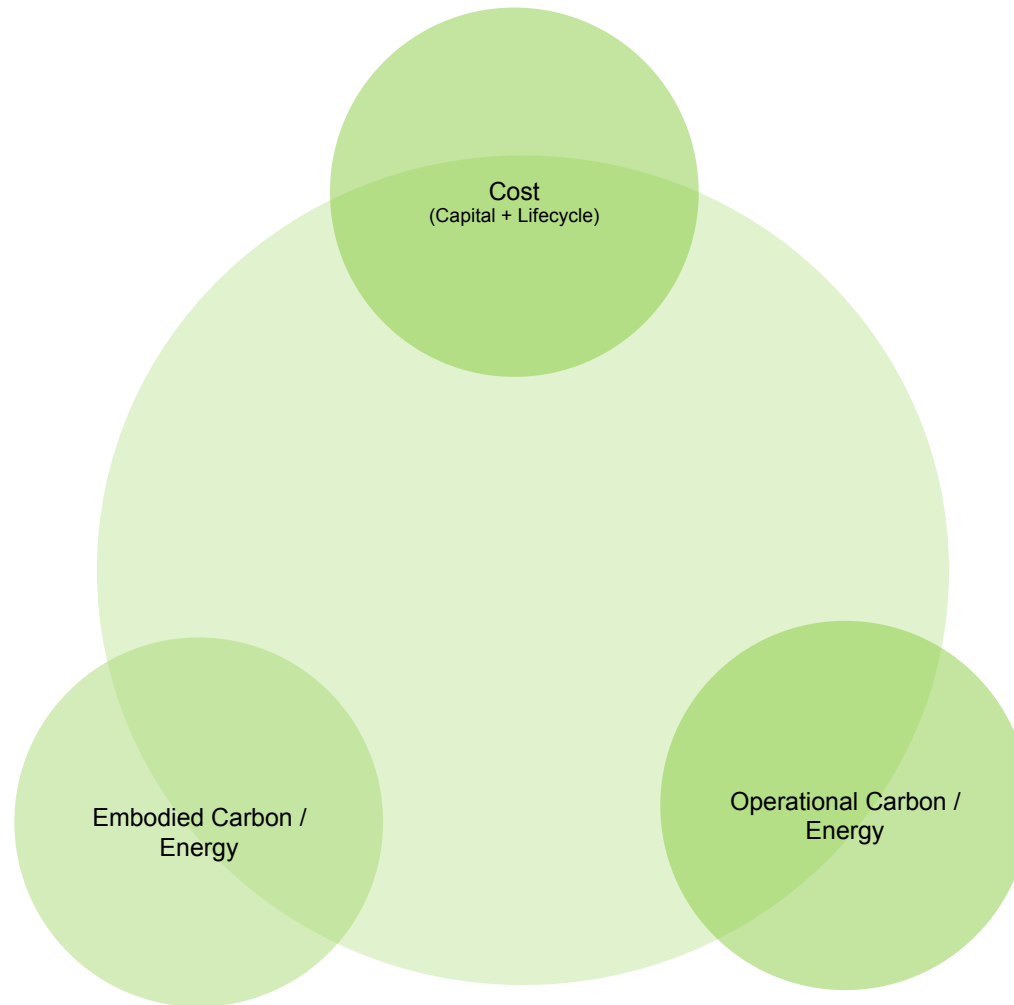
Early Design Stages

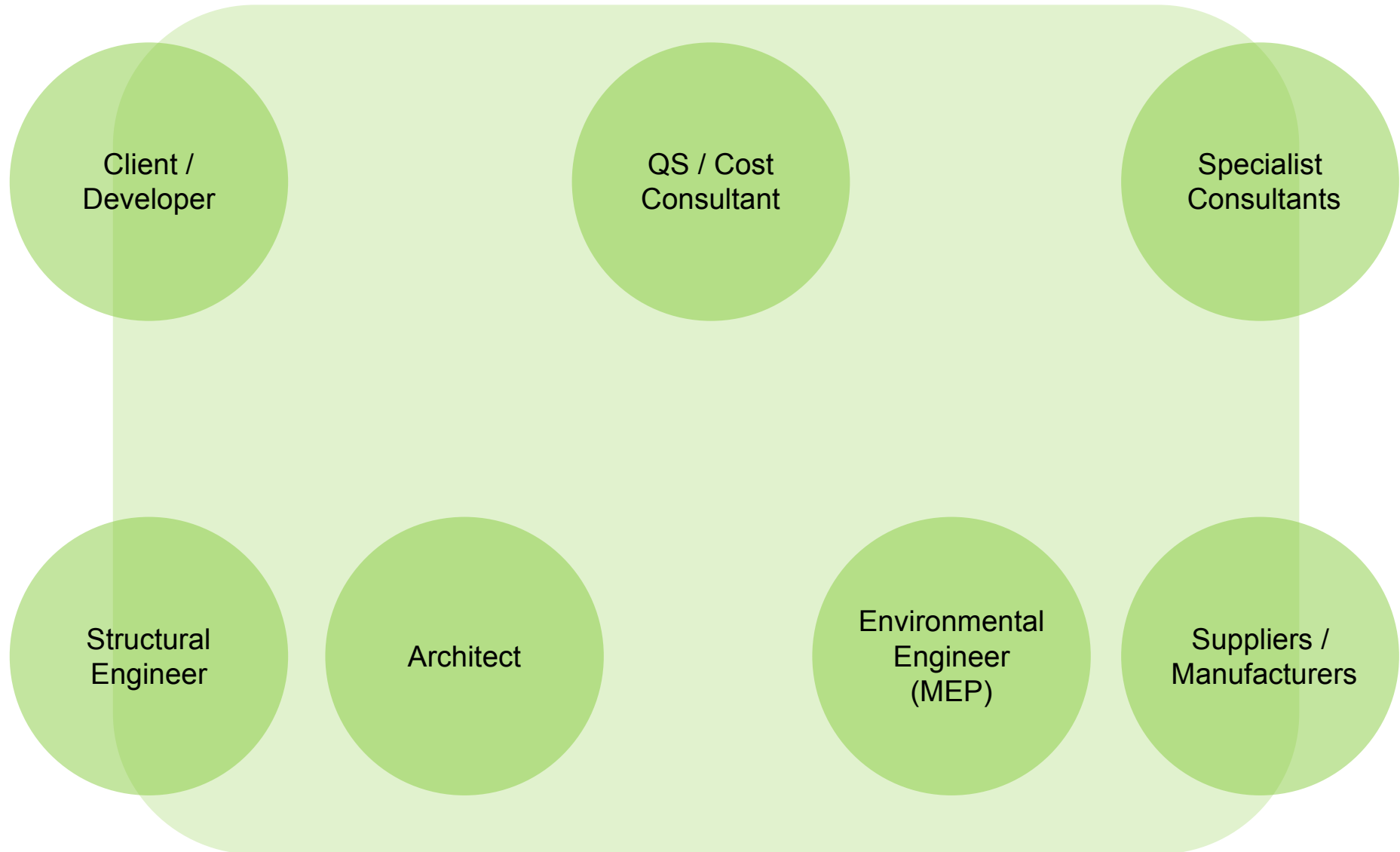
- Specialist consultants not appointed
- Limited fee & time available

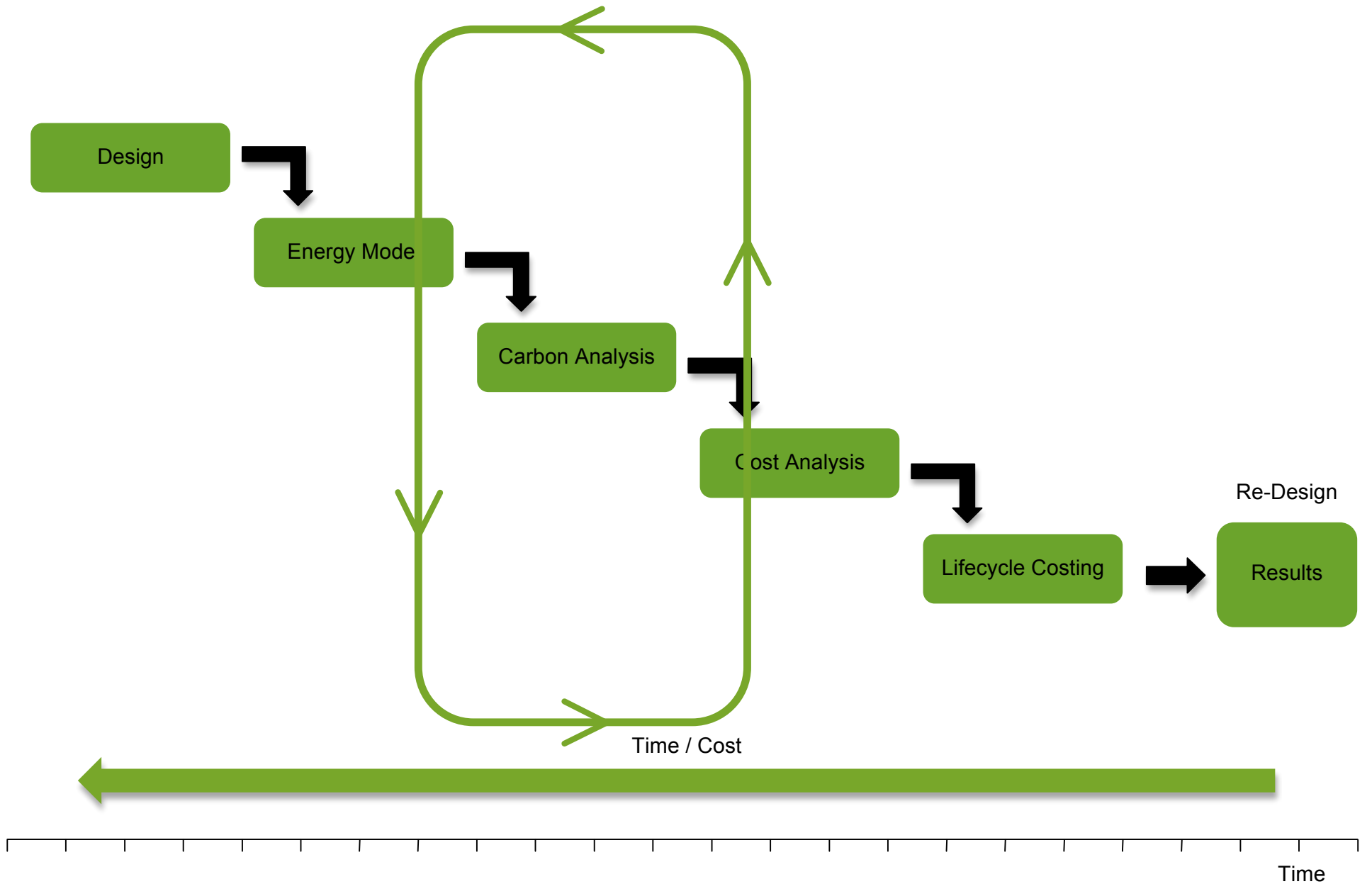
- Very difficult to quickly establish:
 - Lifecycle costings (Net Present Value)
 - Operational energy & costs
 - Embodied carbon
 - Impact of location, siting & form
 - Total cost & carbon benefits to client of pursuing alternative design strategies











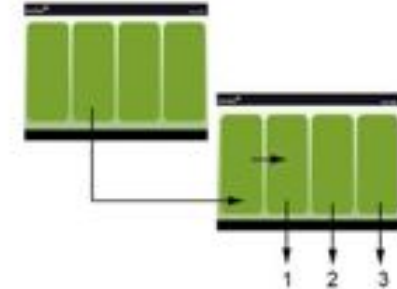
Architect
 MEP Engineer
 Cost Consultant
 Contractor
 Client
 Developer
 Agents
 Local Authority
 Sustainability Consultant
 Manufacturer
 Academic



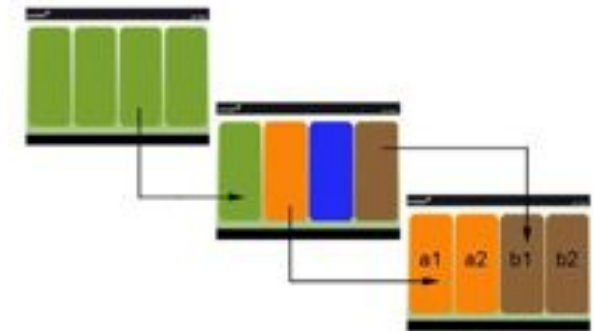
1) Building Procurer or Client, using RAPIER to set targets



2) Client or Construction Professional, using RAPIER to evaluate options at feasibility stage

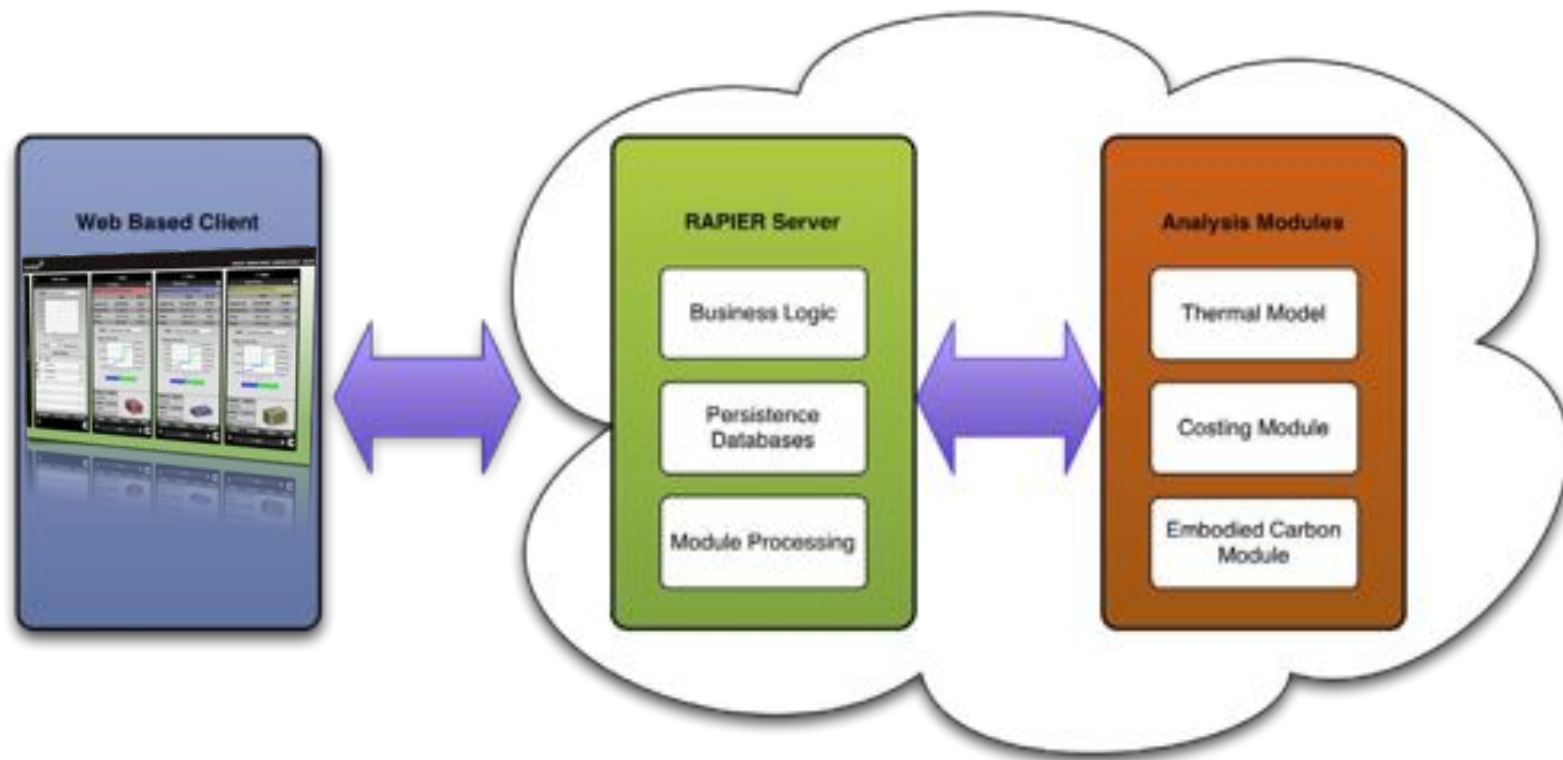


3) Construction Professional, using RAPIER to test and evaluate detailed options in terms of costs and carbon



RAPIER Brief	Support for the client	Support for the client	Support for the client	Support for the client
<ul style="list-style-type: none"> 1.1. Introduction 1.2. Objectives 1.3. Scope of the project 1.4. Deliverables 1.5. Timeline 1.6. Budget 1.7. Risk management 	<ul style="list-style-type: none"> 2.1. Client background 2.2. Client needs 2.3. Client expectations 2.4. Client objectives 2.5. Client constraints 2.6. Client resources 2.7. Client risks 2.8. Client opportunities 2.9. Client challenges 2.10. Client success factors 	<ul style="list-style-type: none"> 3.1. Project overview 3.2. Project goals 3.3. Project objectives 3.4. Project scope 3.5. Project deliverables 3.6. Project timeline 3.7. Project budget 3.8. Project risks 3.9. Project opportunities 3.10. Project challenges 	<ul style="list-style-type: none"> 4.1. Project goals 4.2. Project objectives 4.3. Project scope 4.4. Project deliverables 4.5. Project timeline 4.6. Project budget 4.7. Project risks 4.8. Project opportunities 4.9. Project challenges 	<ul style="list-style-type: none"> 5.1. Project goals 5.2. Project objectives 5.3. Project scope 5.4. Project deliverables 5.5. Project timeline 5.6. Project budget 5.7. Project risks 5.8. Project opportunities 5.9. Project challenges

- Web based user interface
- Device agnostic – Desktop, Mobile, Tablet
- Powerful Cloud based processing



- Detailed research and data analysis to inform Cost, Energy, Carbon & Lifecycle engines by industry leading companies
- Models based on industry standards to provide robust and compliant results

Capital & Lifecycle Cost Model
Based on Sweet Group cost analyses
of recent project data

£

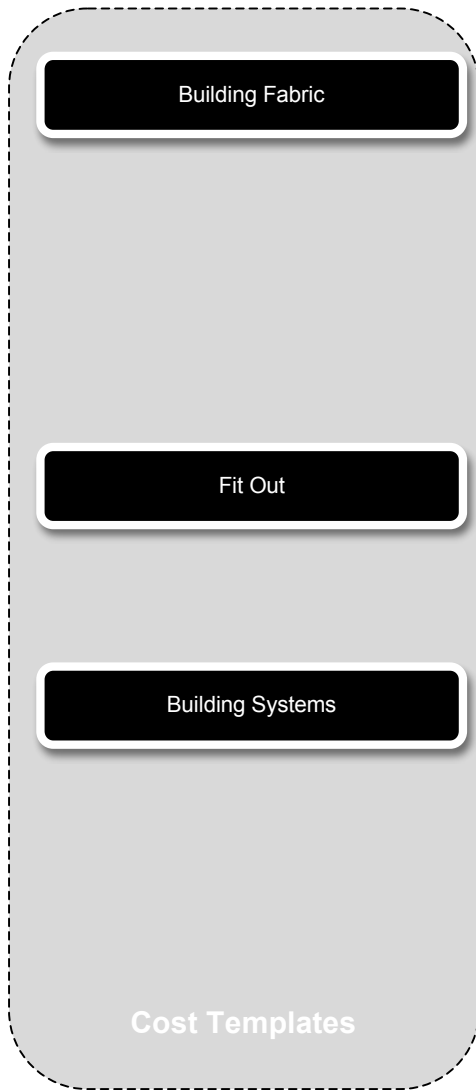
Energy & Services Model
Based on BDSP Suntool rapid
thermal engine

kWh

Embodied Carbon Model
Based on Archtype in-house embodied
carbon calculator

CO₂e





Structure

Facades

Roof

Fit Out

Building Services

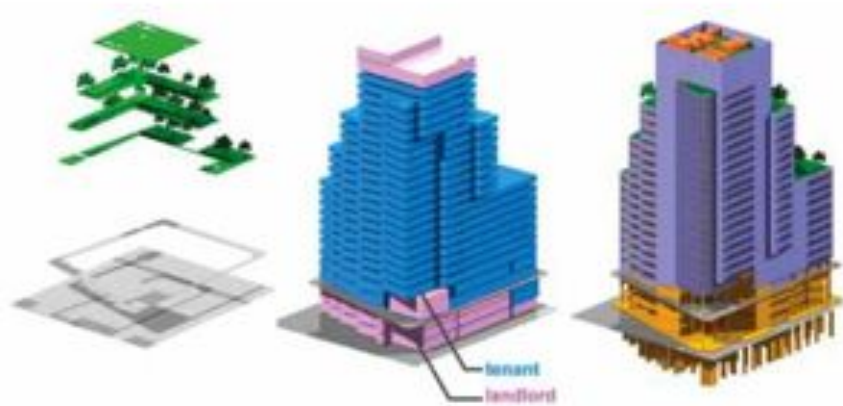
HVAC

Lift, etc

Special Installations



structure + central plant + facades



+ roof + fit out = Complete building

Capital Cost Model

1	Substructure		
1A	Substructure		
1A1	1	Substructure	
1A2	1A	Substructure	
1A3	1A1	Substructure	
1A4	1A2	Substructure	
1A5	1A3	1A1	1
2	1A4	1A2	1A
2A	1A5	1A3	1A1
2A1	2	1A4	1A2
2B	2A	1A5	1A3
2B1	2A1	2	1A4
2C	2B	2A	1A5
2C1	2B1	2A1	2
2C2	2C	2B	2A
2C3	2C1	2B1	2A1
2C4	2C2	2C	2B
2C5	2C3	2C1	2B1
2D	2C4	2C2	2C
2D1	2C5	2C3	2C1
2D2	2D	2C4	2C2
2D3	2D1	2C5	2C3
2E	2D2	2D	2C4
2E1	2D3	2D1	2C5
2E2	2E	2D2	2D
2E3	2E1	2D3	2D1
2E4	2E2	2E	2D2
2E5	2E3	2E1	2D3
2F	2E4	2E2	2E
2F1	2E5	2E3	2E1
2F2	2F	2E4	2E2
2G	2F1	2E5	2E3
2G1	2F2	2F	2E4
2G2	2G	2F1	2E5
2G3	2G1	2F2	2F
2G4	2G2	2G	2F1
	2G3	2G1	2F2
	2G4	2G2	2G
		2G1	2G1
		2G2	2G2
		2G3	2G3
		2G4	2G4



Cost metrics:

- Floor Area
- Volume
- Façade area
- Basement volume



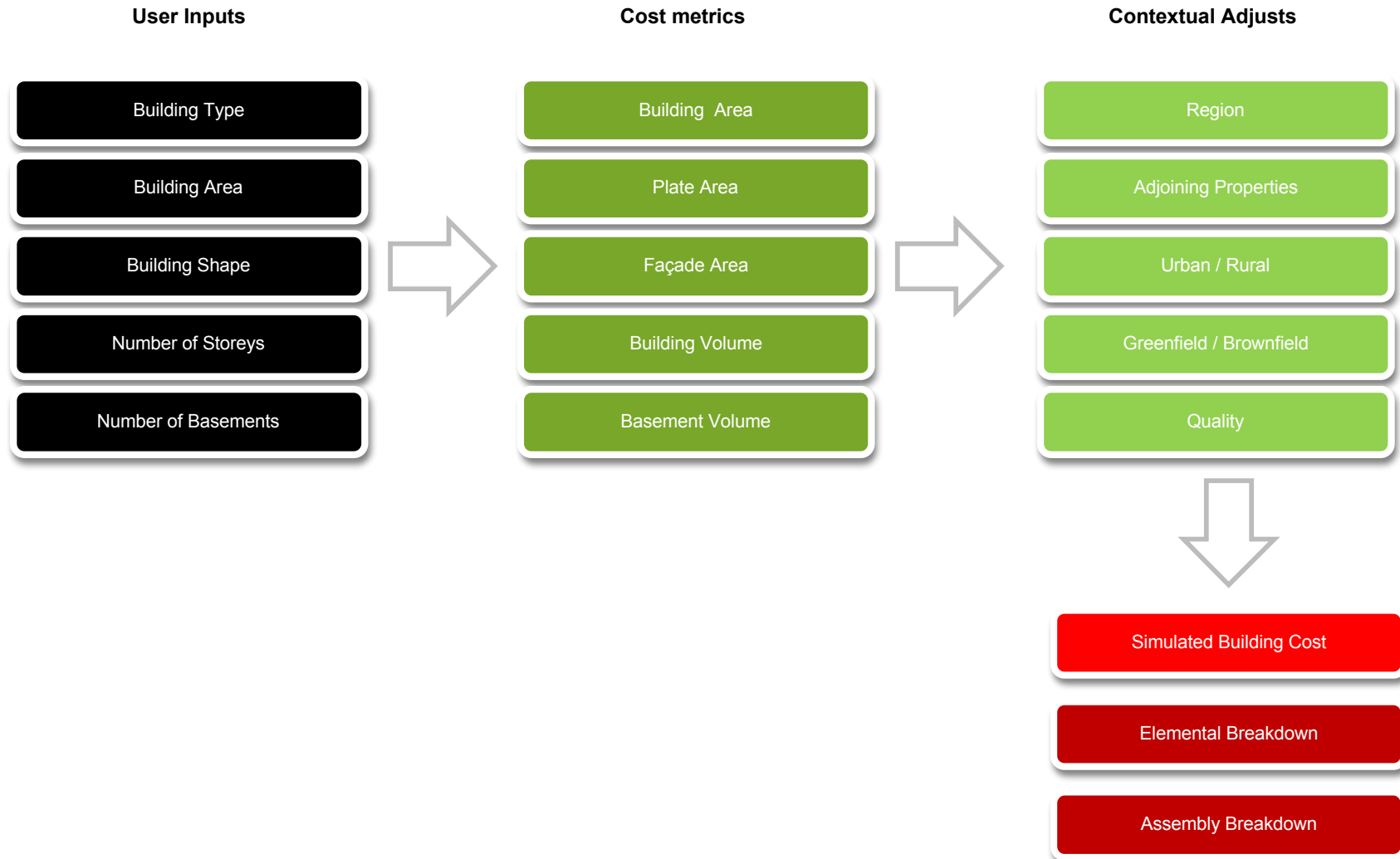
Context:

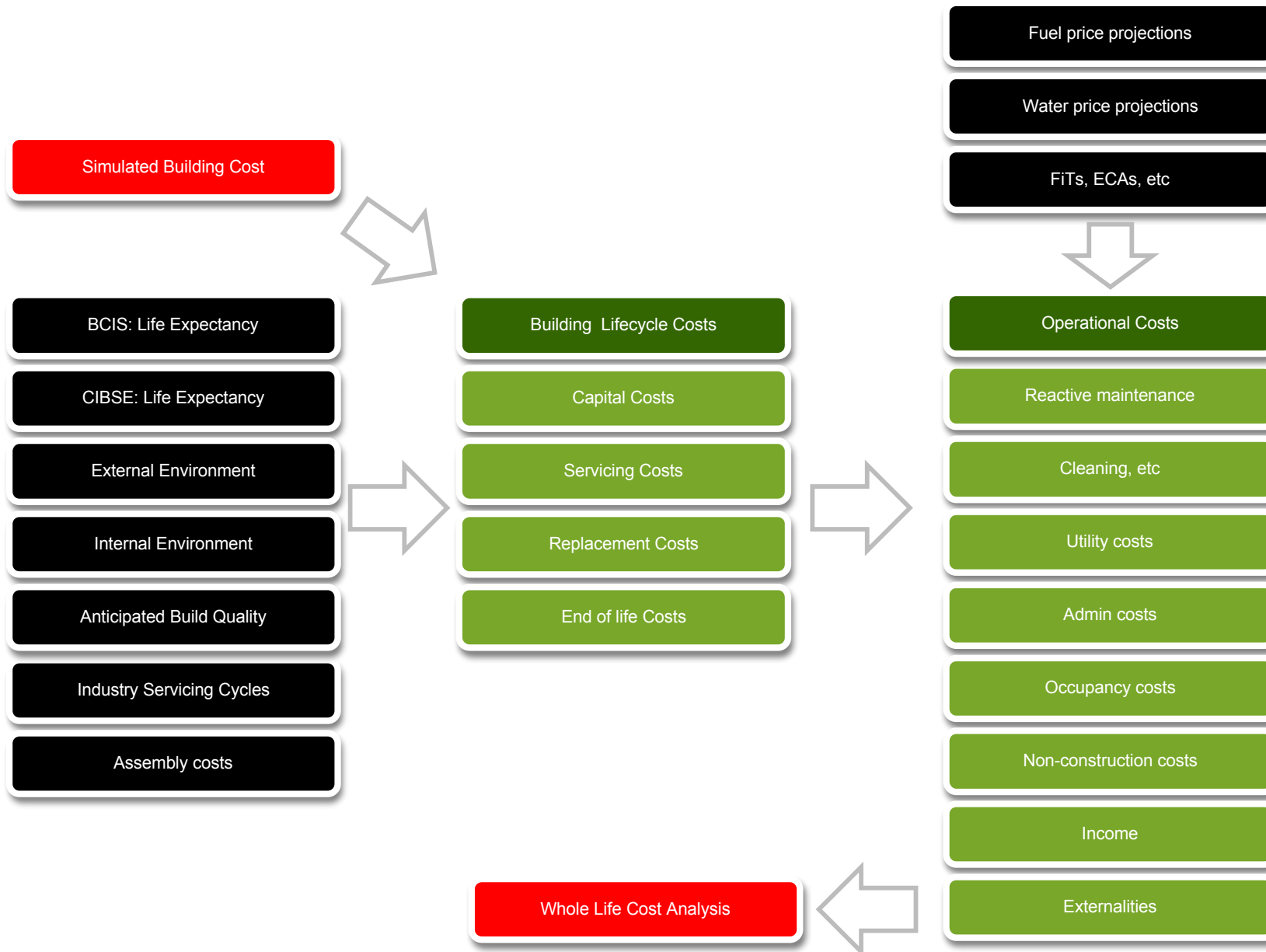
- Quality
- Site Constraints
- Usage



RAPIER MODEL

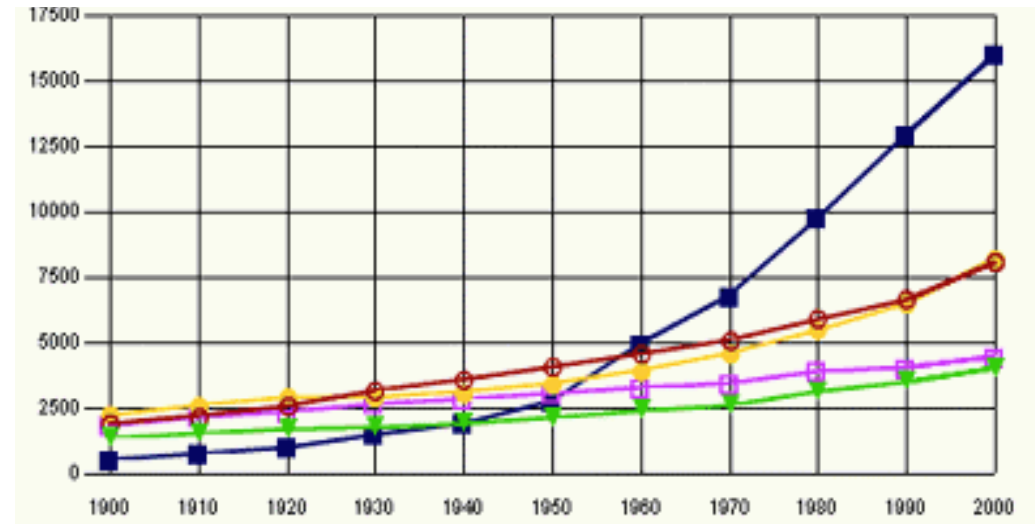
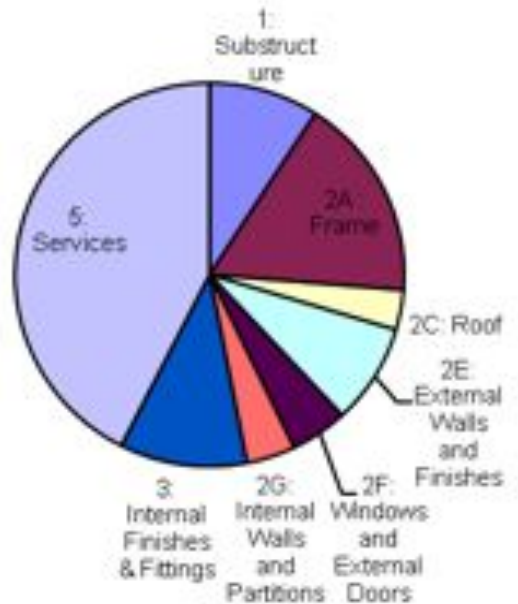
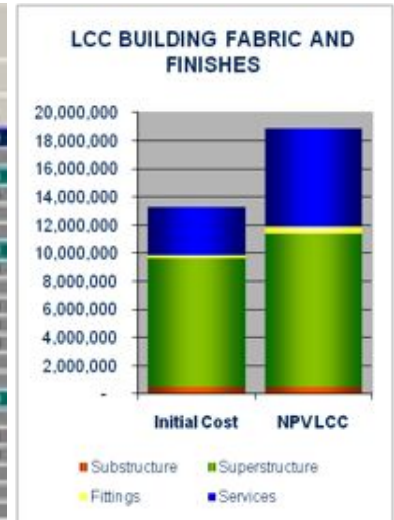
1	Substructure
1A	Substructure
1A1	Standard Foundations
1A2	Special Foundations
1A3	Lowest Floor Bed/Slab
1A4	Basement Excavation
1A5	Basement Retaining Walls
2	Superstructure
2A	Frame
2A1	Frame
2B	Upper Floors
2B1	Upper Floors
2C	Roof
2C1	Roof Structure





ELEMENTAL COST ANALYSIS		Total Cost	Cost / m ²	% Total
TOTAL CONSTRUCTION WORKS COST		672,026	1,497.92	100.00%
1	Substructure	72,845	162.37	10.84%
1A	Substructure	72,845	162.37	10.84%
1A1	Standard Foundations	-	-	0.00%
1A2	Special Foundations	42,545	94.83	6.33%
1A3	Lowest Floor Bed/Slab	30,300	67.54	4.51%
1A4	Basement Excavation	-	-	0.00%
1A5	Basement Retaining Walls	-	-	0.00%
2	Superstructure	169,480	377.76	25.22%
2A	Frame	17,675	39.40	2.63%
2A1	Frame	17,675	39.40	2.63%
2B	Upper Floors	-	-	0.00%
2B1	Upper Floors	-	-	0.00%
2C	Roof	53,605	119.48	7.98%
2C1	Roof Structure	22,725	50.65	3.38%
2C2	Roof Coverings	25,490	56.82	3.79%
2C3	Roof Drains	5,390	12.01	0.80%

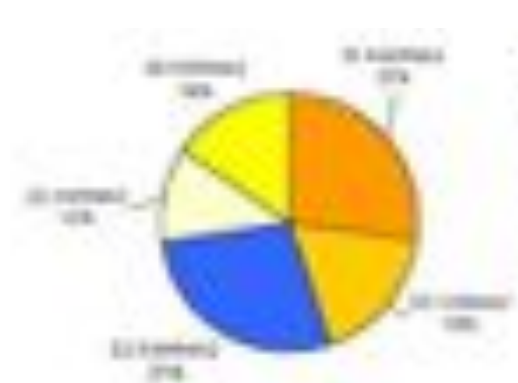
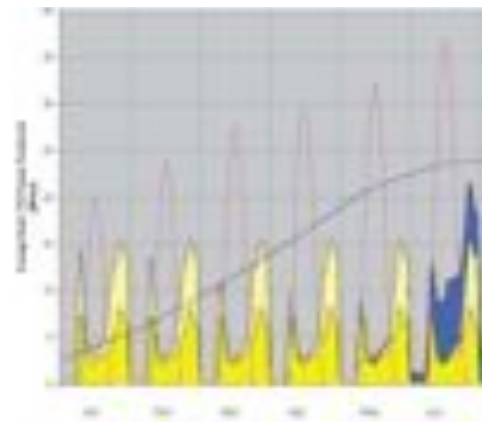
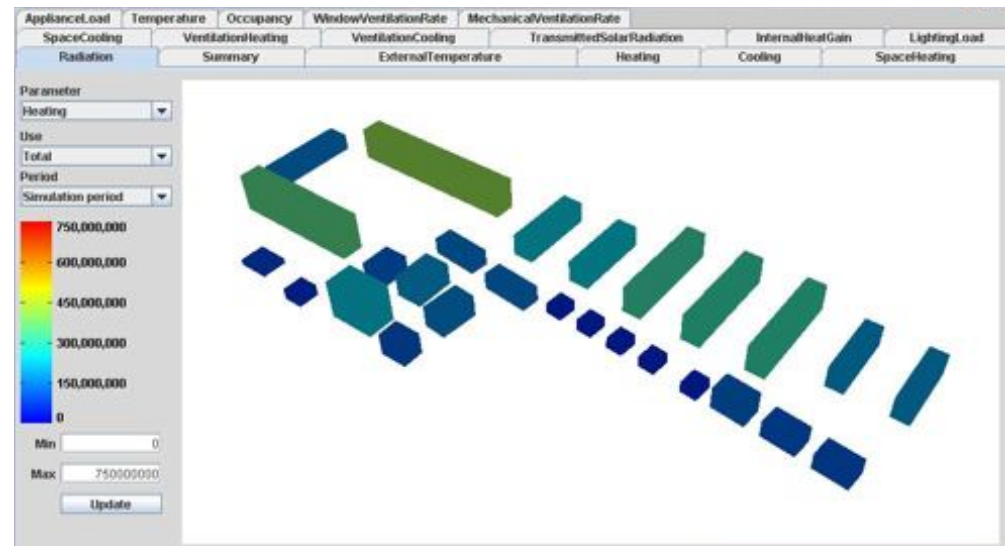
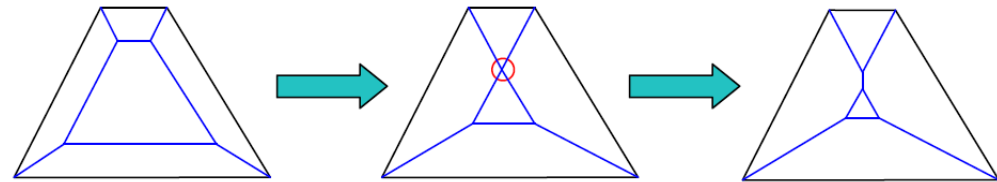
LIFE CYCLE ANALYSIS		Initial Cost	NPV LCC	Total Cost	% Total
Construction costs		£ 672,026	£ 672,026	£ 1,498	100%
1.1	Construction works costs	£ 672,026	£ 672,026	£ 1,498	100%
1.2	Other construction related costs	-	-	-	-
1.3	Client definable costs	-	-	-	-
Maintenance costs		£ 774,394	£ 124,468	£ 1,600	10%
2.1	Minor replacement costs	£ 498,287	£ 95,768	£ 700	4%
2.2	Subsequent refurbishment and adaptation costs	-	-	-	-
2.3	Replacements	£ 195,332	£ 21,517	£ 140	1%
2.4	Minor replacement, repairs and maintenance costs	£ 195,332	£ 21,517	£ 140	1%
2.5	Unscheduled replacement, repairs and maintenance	£ 71,998	£ 8,000	£ 50	0%
2.6	Structural maintenance	-	-	-	-
2.7	Client definable costs	-	-	-	-
Operation costs		£ 684,057	£ 276,748	£ 900	6%
3.1	Cleaning costs	-	-	-	-
3.1.1	Process and external surfaces	£ 2,500	£ 1,200	£ 1	0%
3.1.2	Internal cleaning	£ 30,011	£ 48,000	£ 320	2%
3.1.3	Specialist cleaning	-	-	-	-
3.1.4	External works cleaning	-	-	-	-
3.2	Utilities costs	-	-	-	-



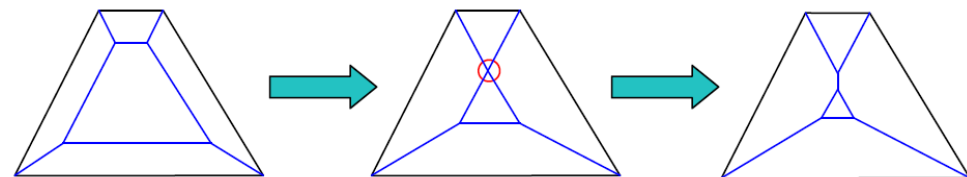
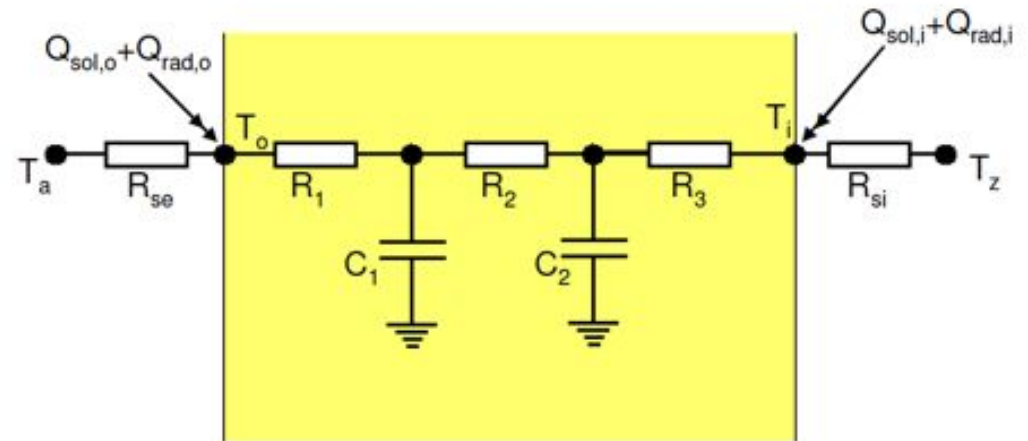


SUNTool

- Development and extension of existing model (SUNtool)
- Fast solving modeller returning detailed and accurate results in seconds
- Supports gbXML model geometry and constructions
- Validated results

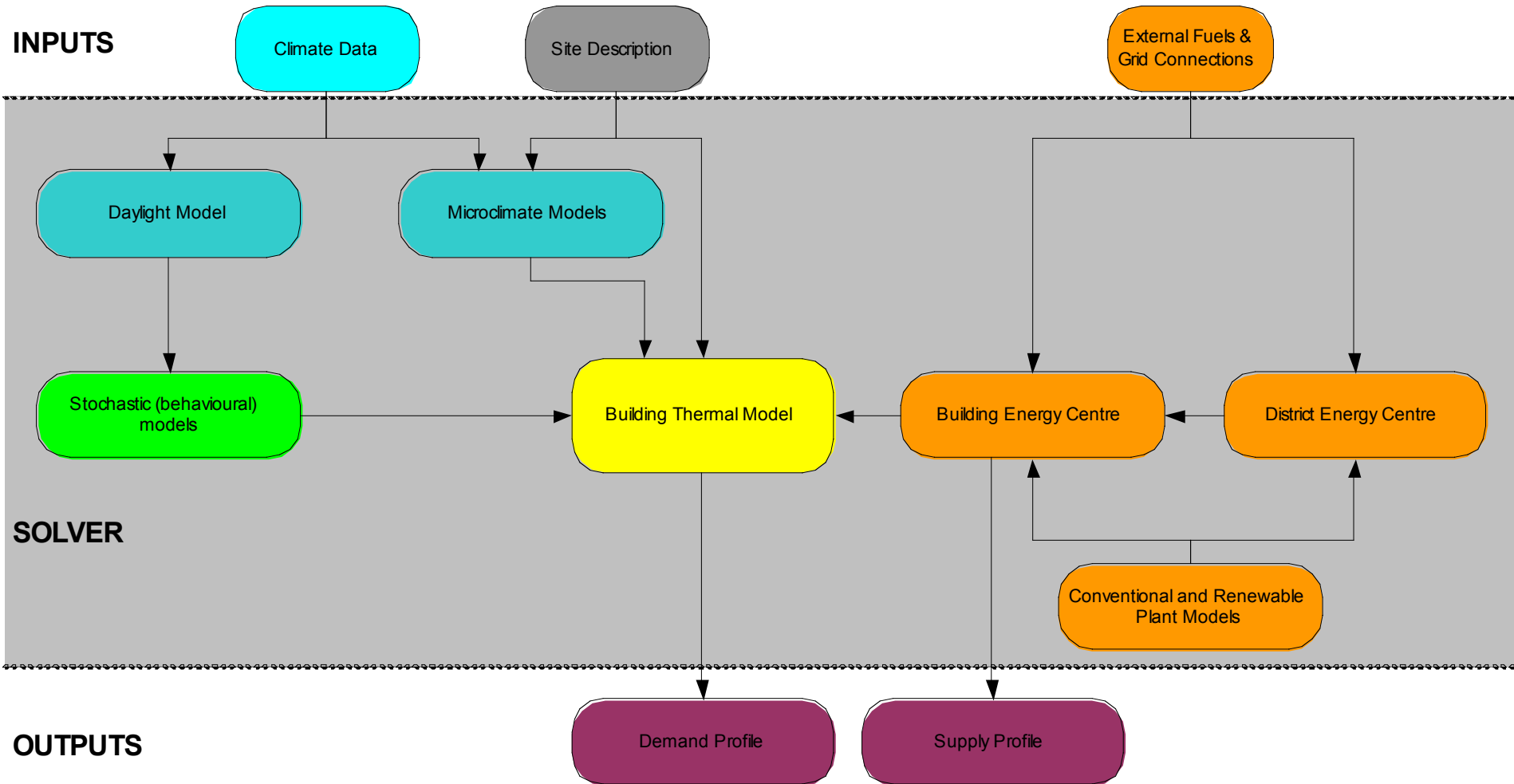


- Fast solving (optimisation/optionseering)
- Physically based
- Coupled thermal and plant solver
- Hourly or sub-hourly timestep
- Automatic (implicit) zoning
- Advanced solar + daylighting calcs.
- Plant & equipment models (sizing)
- RES models
- District energy supplies
- Surrounding buildings
- XML inputs and outputs



Limitations:

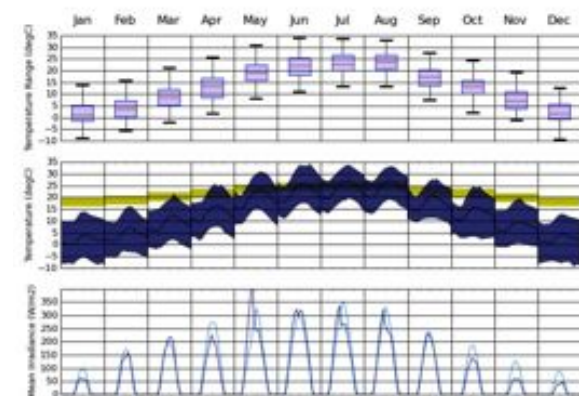
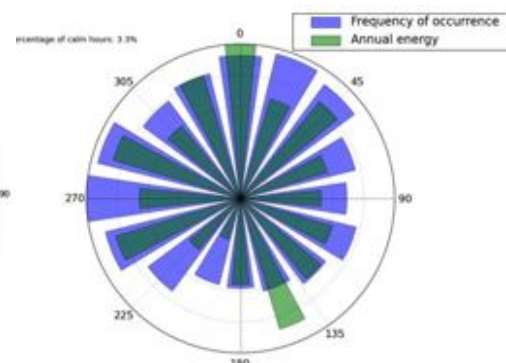
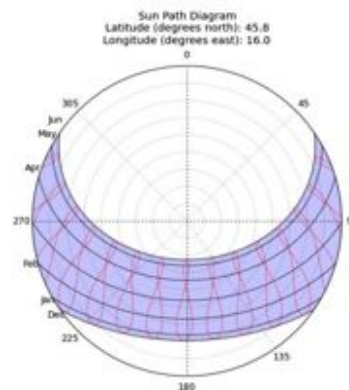
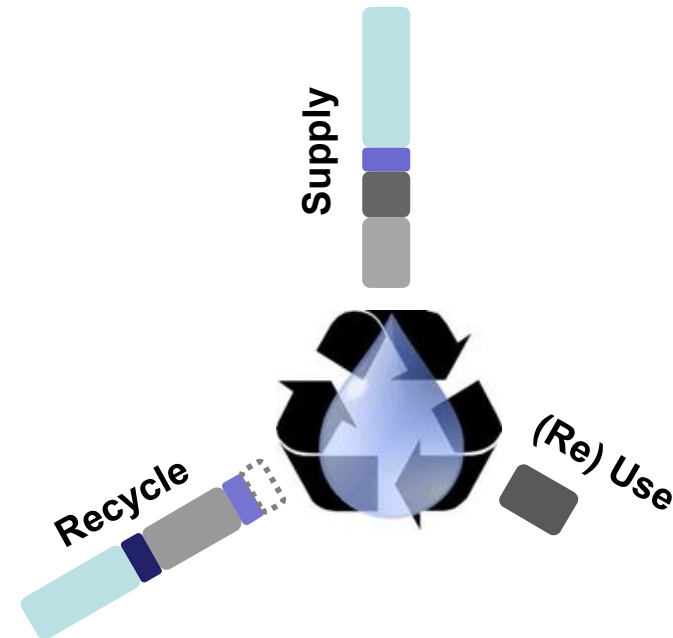
- Simplified geometries
- Glazing ratios (not explicit windows)



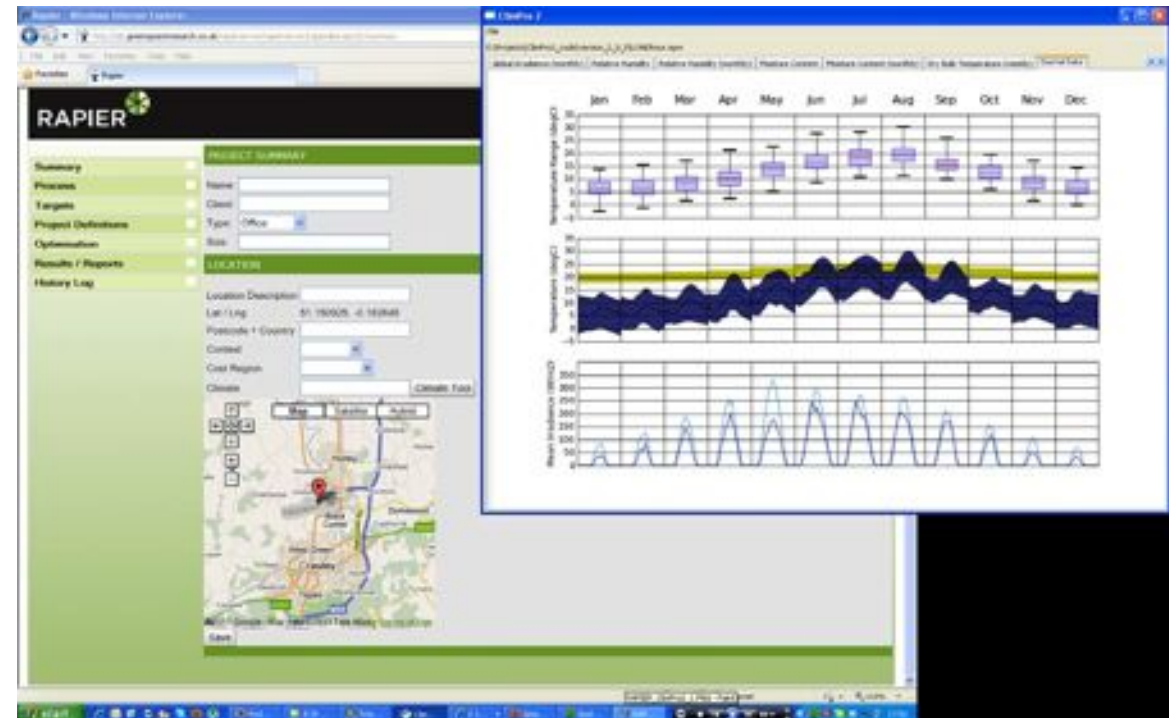
Specialised Engines

Engines developed to provide early stage accurate guidance for:

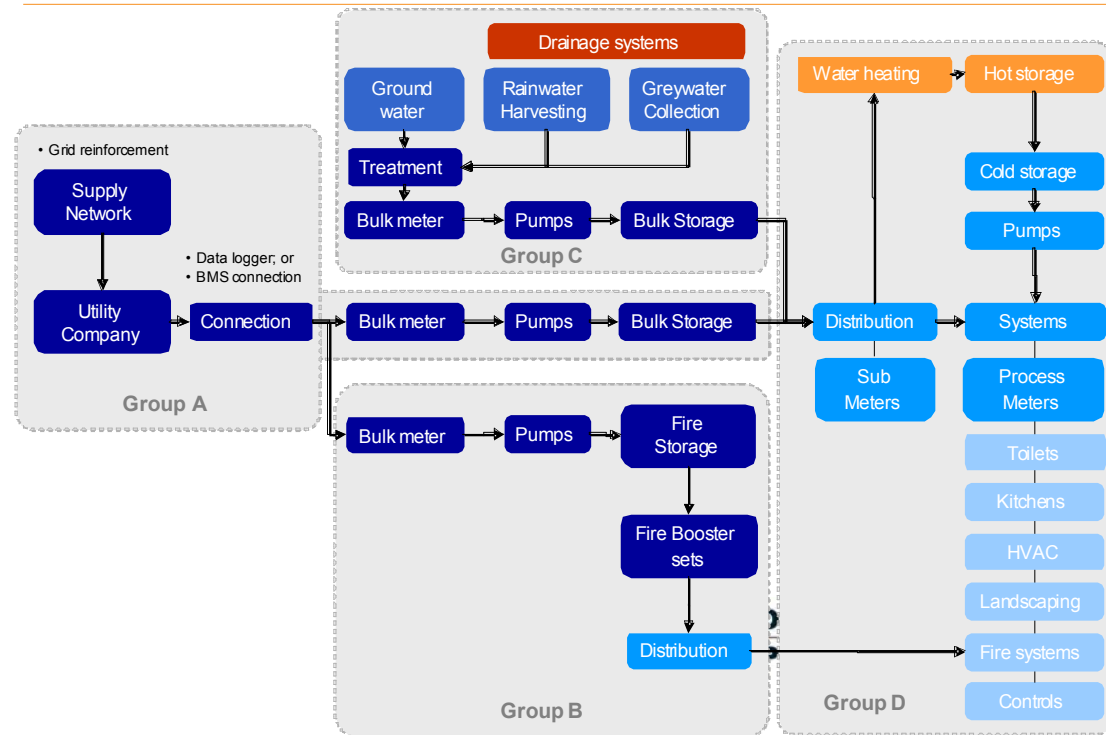
- Water services
- Plant room sizing
- HVAC services optimiser
- Lift quantifier
- Climate analysis tool



- Development of in-house C++ tool
- Auto-generation of climate file
- Visualisation of climatic data
- Climate change weather files (IPCC)



- Water supply and demand
- Sizing of tanks (plant space)
- Water efficient strategies
- Cost optioneering



Supply



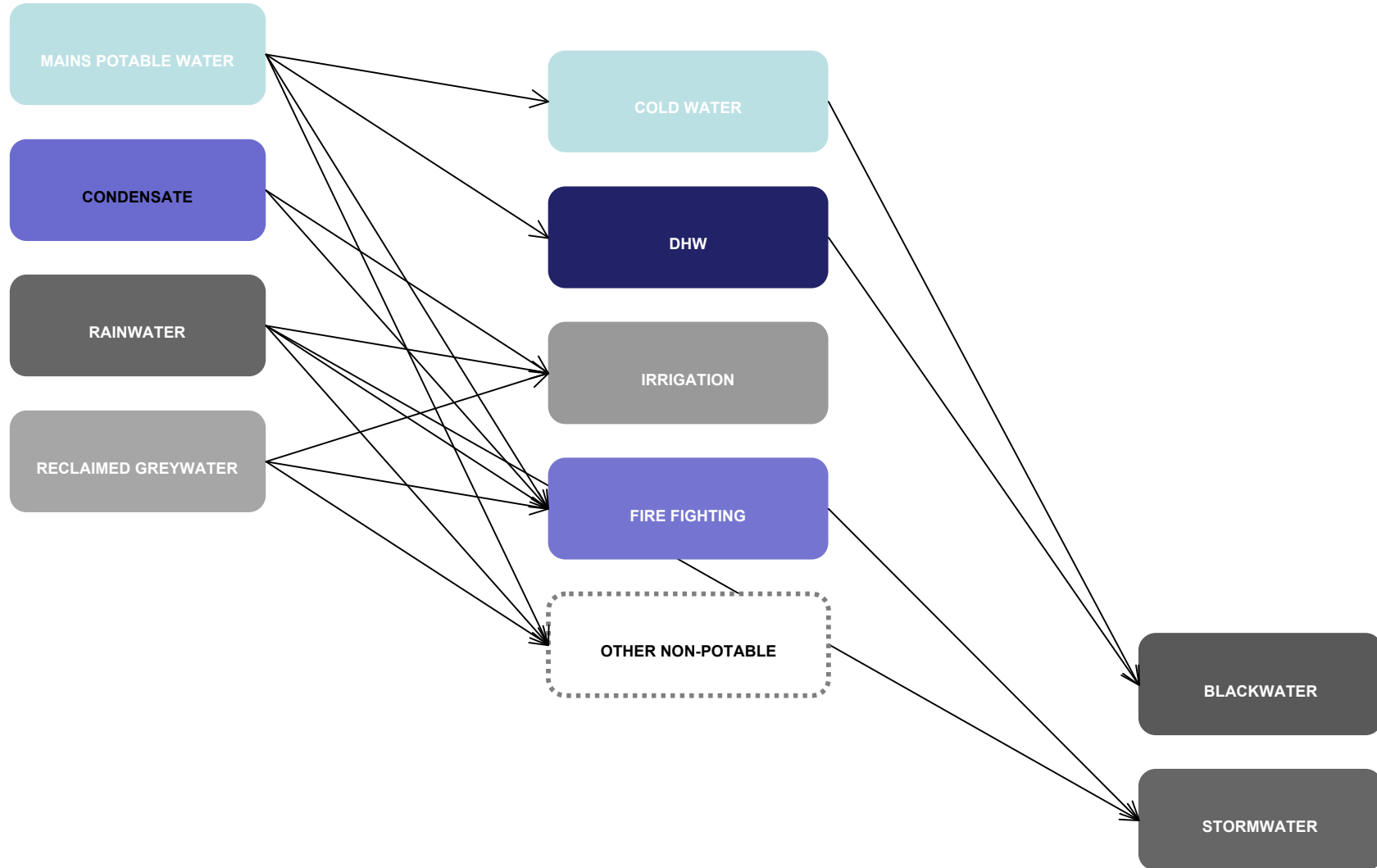
Recycle

Use

Supply:

Use:

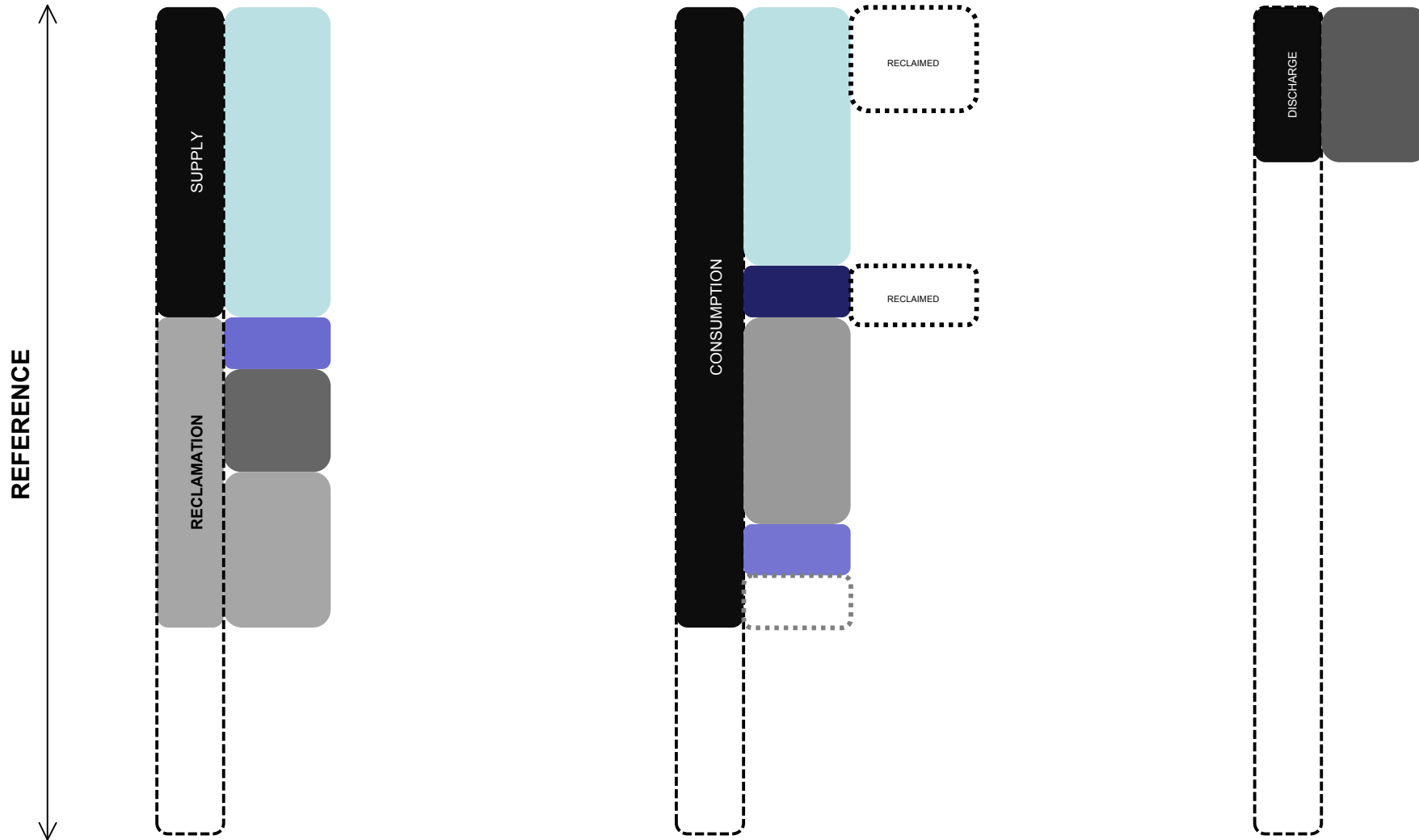
Discharge:

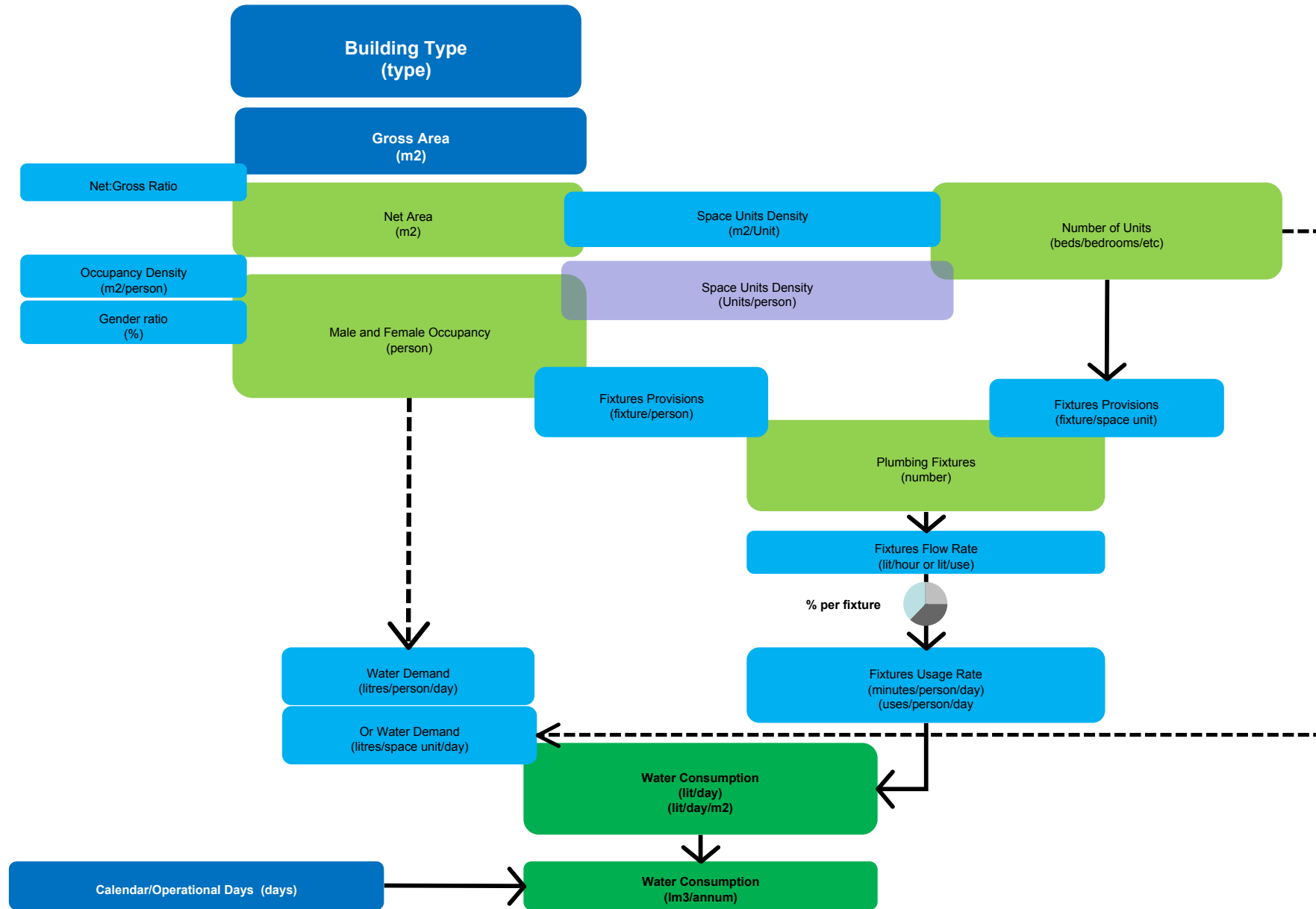


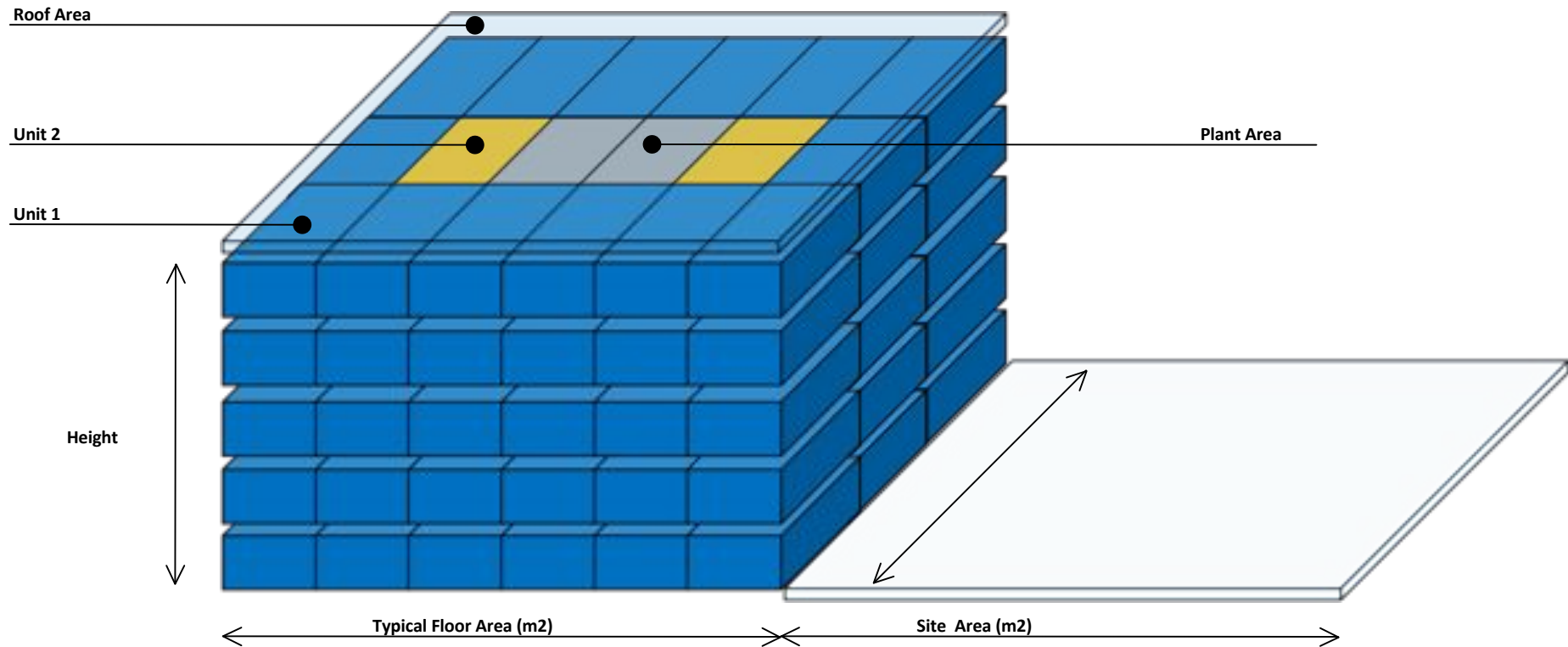
Supply:

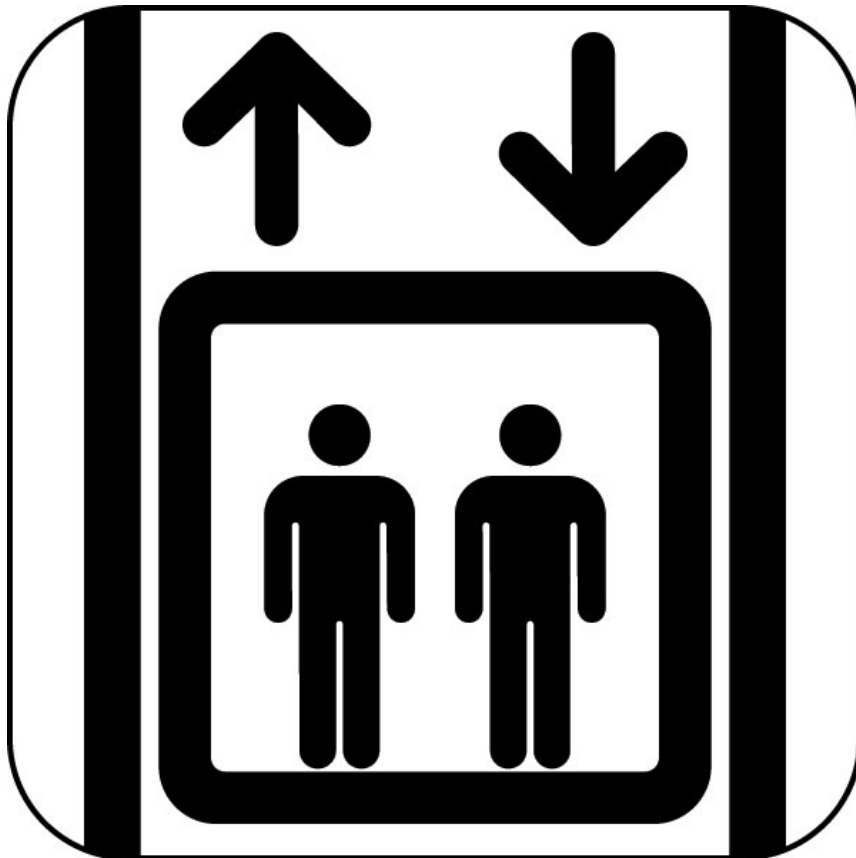
Use:

Discharge:

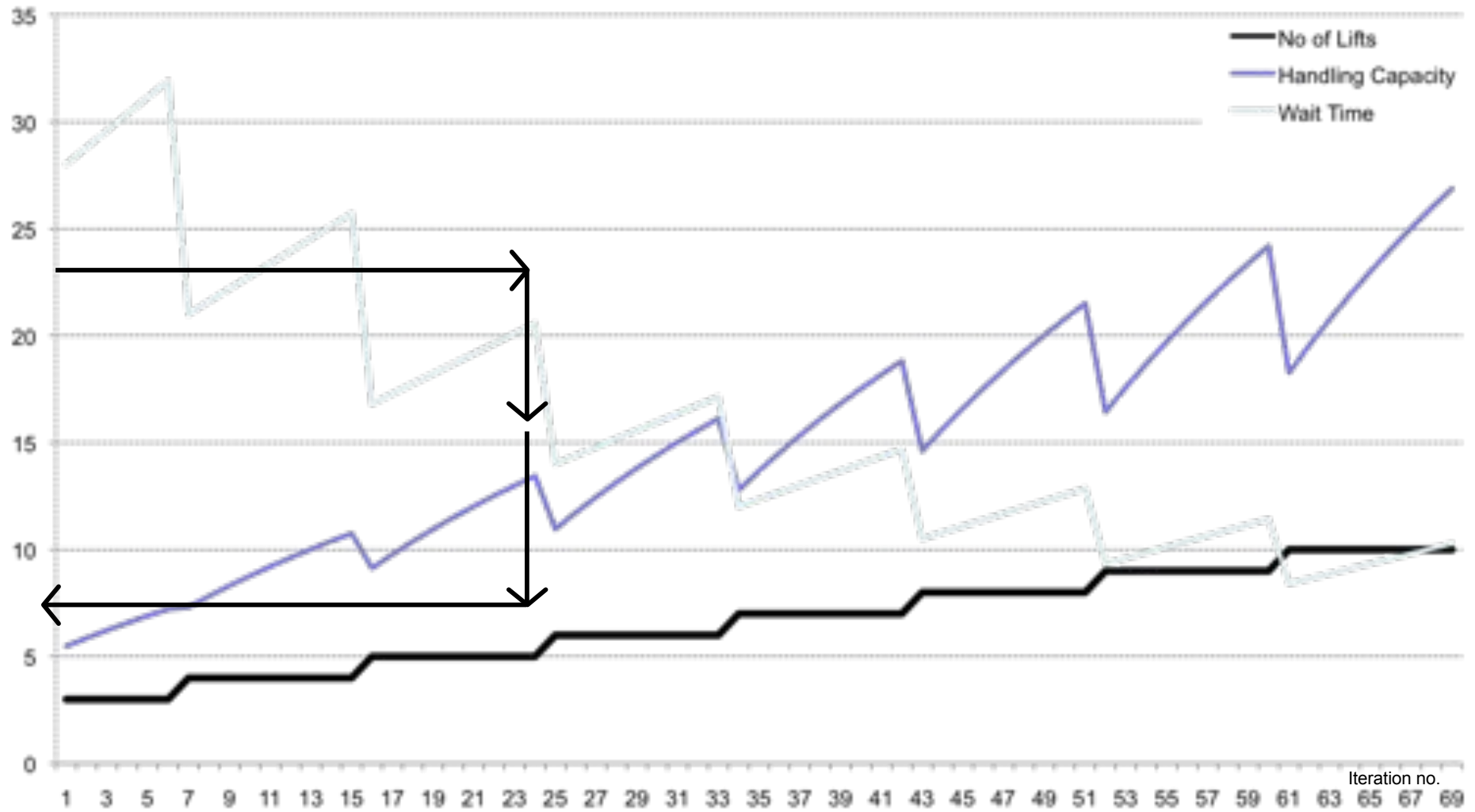




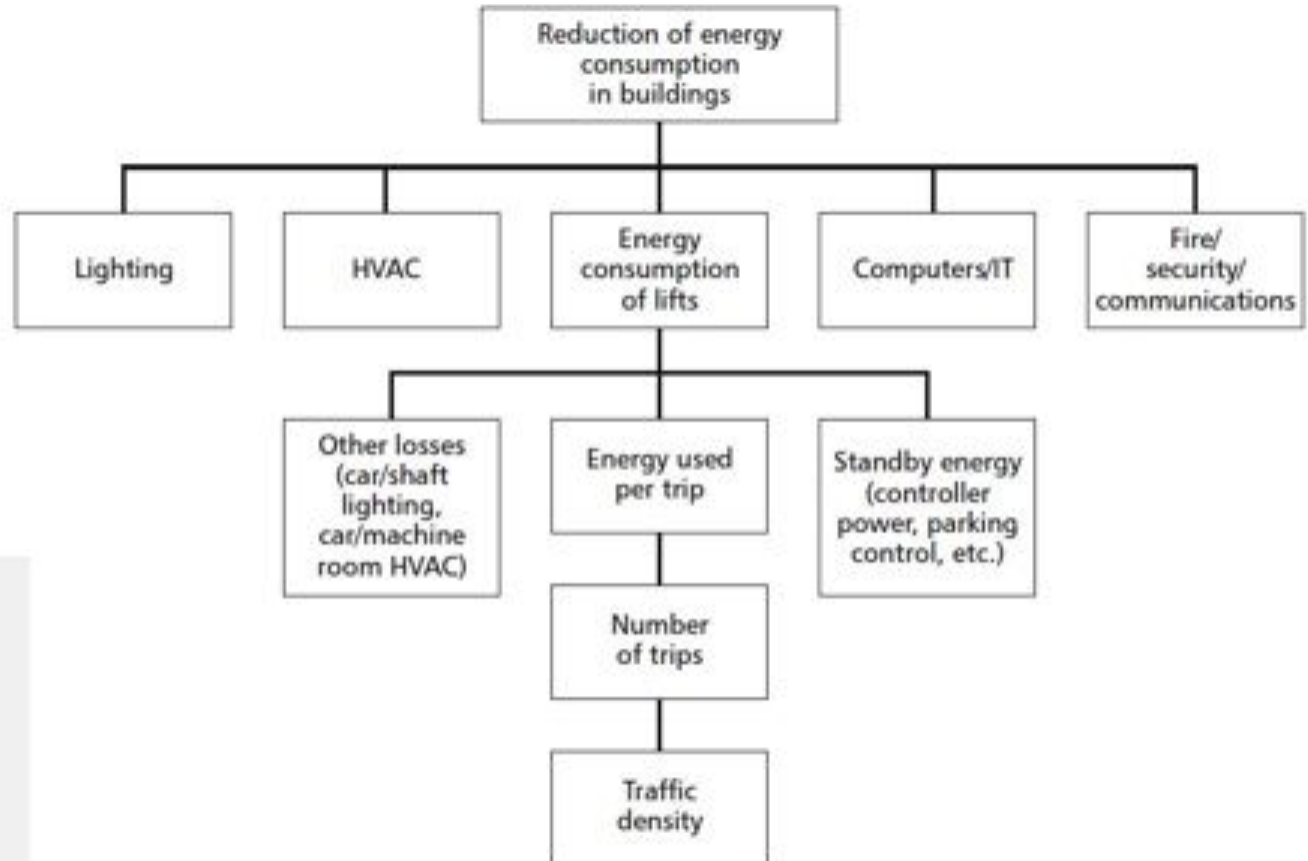
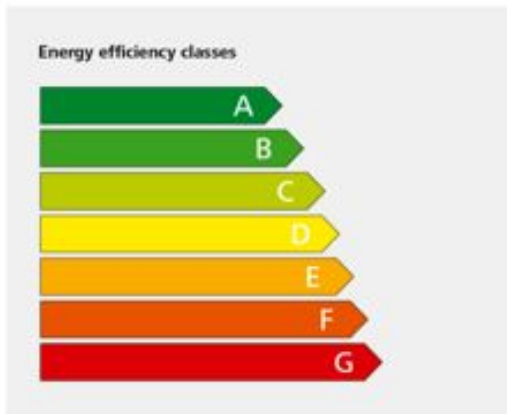




Occupancy (person/m ²)	12
Lobby Floor Height (m)	5
Average Storey Height Above Lobby (m)	5
Number of Floors Served Above Lobby (no)	5
% Load Factor	80
Wait Time (sec)	30
Maximum Handling capacity (%)	25
Minimum Handling capacity (%)	12
Single Passenger Transfer Time (sec)	1
Door Opening Time (sec)	0.8
Door Closing Time (sec)	0.1
Maximum Number of Lifts	6
Minimum Lift Weight (kg)	1000
Maximum Lift Weight (kg)	1200
Average Contract Speed (m/sec)	2.5



Manufacturer: 	
Place:	Test tower
Elevator Model:	HighEfficientUpDown 1.0
Type:	Traction elevator
Nominal Load:	630 kg
Speed:	1 m/s
Standby: ≤50 W (Class A)	Operational: ≤0,80 mWh/(m kg) (Class A)
Category of usage 1 (VDI 4707) Comparison of energy efficiency classes are only possible considering the same category of usage.	



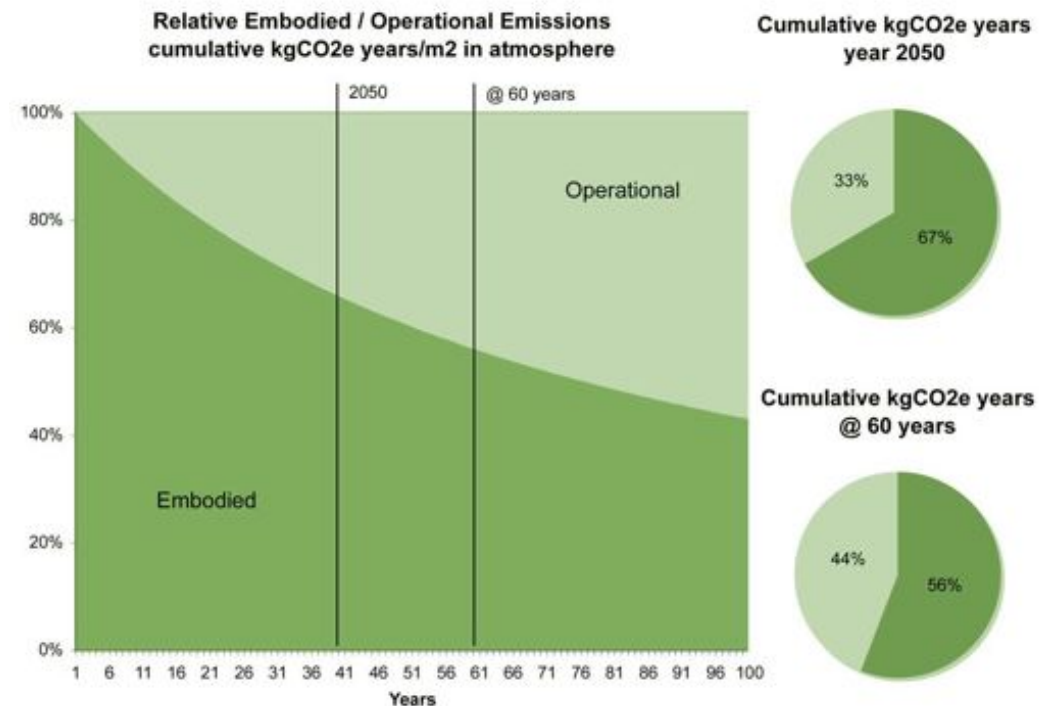
VDI 4707 / CIBSE Guide D



- ISO 14040 & ISO 14044 – Life Cycle Assessments
- PAS 2050 (rev2011) – Carbon footprinting
- PAS 2060 – Carbon Neutrality
- BRE Environmental Profiles Method
- WRI/WBCSD GHG Protocol – Product Life Cycle Accounting & Reporting Standards
- CEN TC/350 for Construction – currently being finalised
- Sustain’s QuickSteps – A streamlined embodied carbon method for products
- ISO 14067 (due 2012) – Carbon Footprinting
- French Environmental Label (2011)

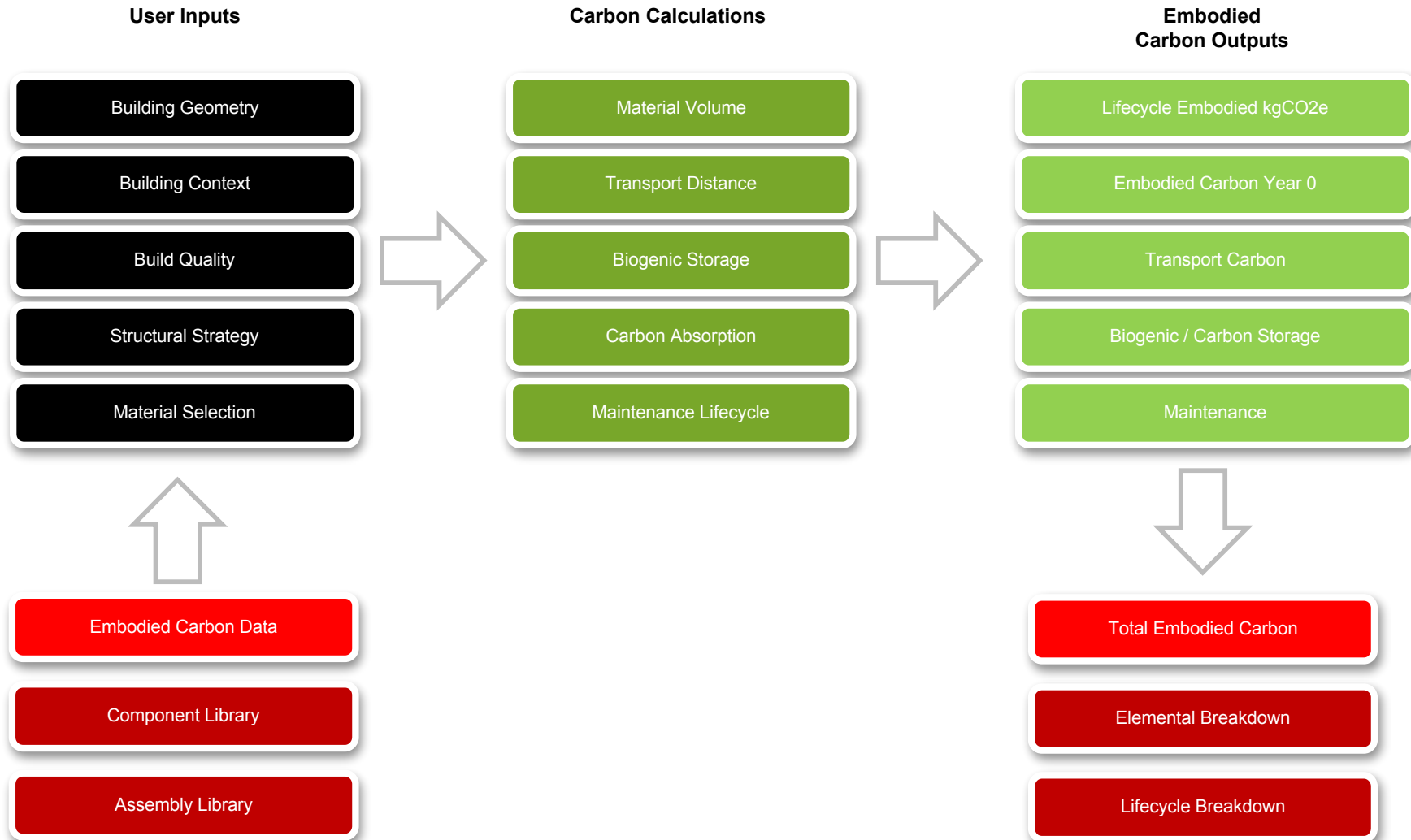


- Model developed by Architype to support in-house research and analysis of live projects
- Rich and traceable data sources of CO2e data from ICE v2.0, DECC & selected manufacturers
- PAS 2050 compliance
- Cradle-to-Gate and beyond: transport, construction, operation, end of life, re-use
- Carbon storage (sequestration)
- Carbon absorption (e.g. GGBS / Lime)
- Dynamic global transport model
- Customisable reporting & metrics
- Transparent reporting

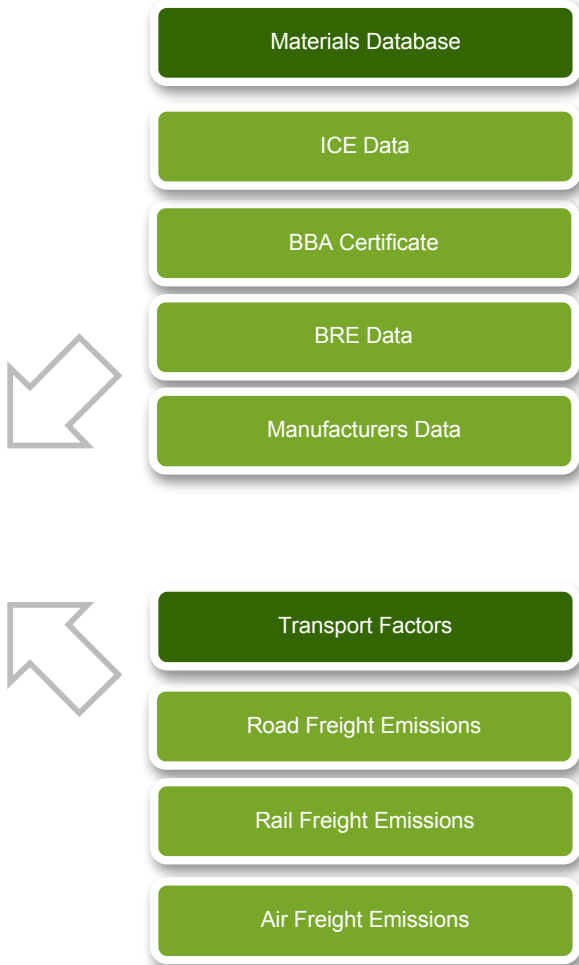


- Spreadsheet model developed by Architype to support in-house research and analysis of live projects





Embodied Carbon Data Library



Material Data (per m² of wall)

Material	Quantity	Unit	CO ₂ e (kg)
Concrete	0.15	m ³	15
Brickwork	0.10	m ²	10
Insulation	0.05	m ²	5
Plaster	0.02	m ²	2
Paint	0.01	m ²	1
Window	0.01	m ²	1
Door	0.01	m ²	1
Roof	0.01	m ²	1
Floor	0.01	m ²	1
Services	0.01	m ²	1
Other	0.01	m ²	1
Total			43

Building Element Information

1 m² of external wall comprising: Water Monocote's laminated medium density fibreboard wall, brickwork, insulation, plaster, brickwork, steel stud, cement mortar, plasterboard or gypsum, paint.

Building type: All **Exponent score:** 0.43 **Green Grade Rating:** A+


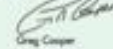
Environmental Profile – Cradle to Grave for the building element

The environmental profile relates to the above building element over a 60-year study period.

Identified environmental impact	Characterised data per m ²		Normalised value
	100%	100%	
Global warming (GWP)	kg CO ₂ eq	43	0.12
Depletion of the atmosphere (acid eq. CO ₂ e)	kg CO ₂ eq	0.000280	0.0001
Acidification of land/water (acid eq. SO ₂)	kg SO ₂ eq	0.071	0.00020
Respiration (GWP)	kg CO ₂ eq	0.0012	0.0004
Photochemical ozone creation (POCOP)	kg PO _x eq	0.0022	0.0004
Water depletion ⁽¹⁾	m ³	0.033	0.001
Soil toxicity (acid eq.)	kg eq	0.25	0.01
Soil acid depletion	kg eq	0.0001	0.0001
Water depletion	kg eq	0.0001	0.0001
Human health (toxic eq.)	kg 1,4-DB eq	0.00000004	0.0001
Human health (toxic eq. acid eq.)	kg 1,4-DB eq	0.0001	0.0001
Toxicity to fresh water	kg 1,4-DB eq	0.0001	0.0001
Toxicity to land	kg 1,4-DB eq	0.0001	0.0001

(1) Global warming and acid eq. are related to an 'Industrial sector' in 'Cradle to Grave'.

The BBA (British Board of Agreement) has issued this Environmental Profile Certificate to the company named above for the system described herein.

On behalf of the BBA:  
 Date of First Issue: 3 May 2010 **John Allan** Technical Manager **Greg Cooper** Chief Executive

Certificate awarded on 20 May 2010 to the company named in Table on pages 7 and 8.

Approved Environmental Profile

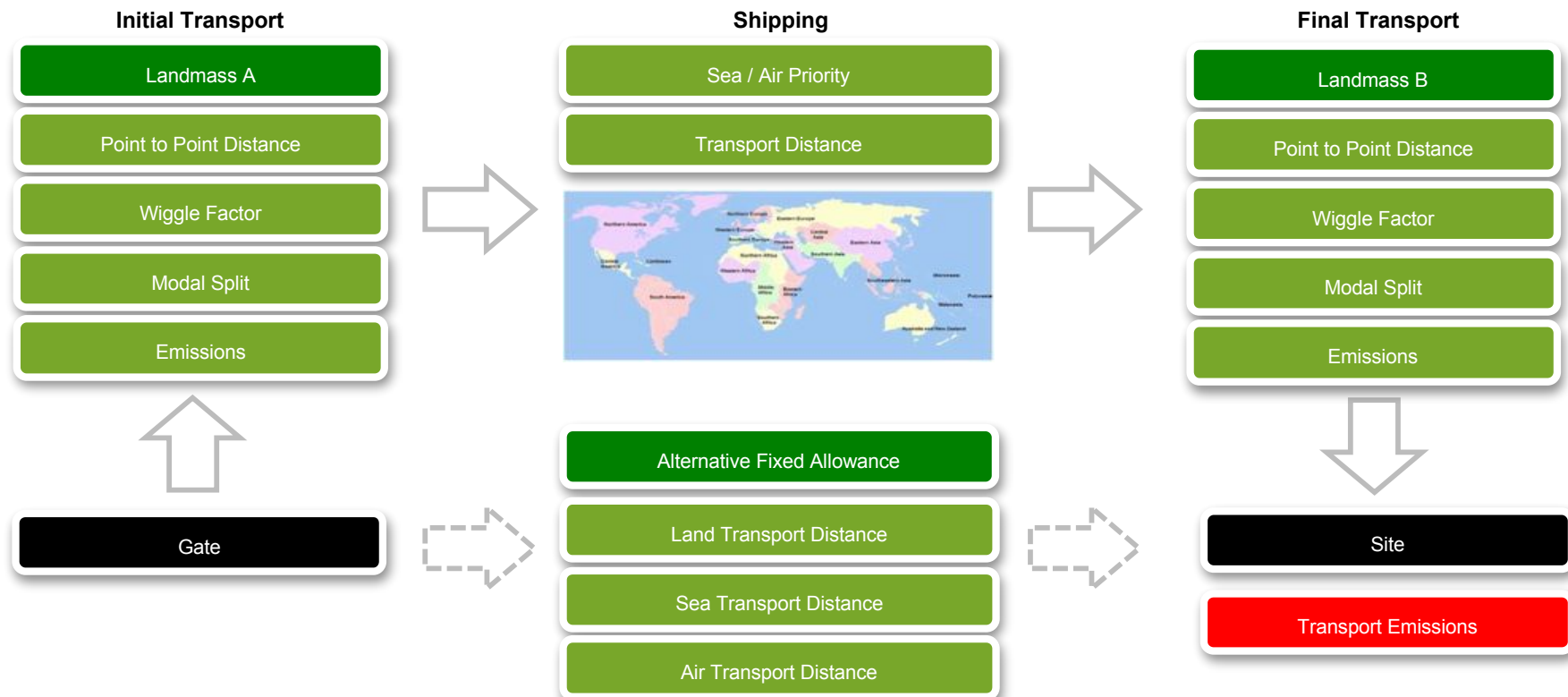
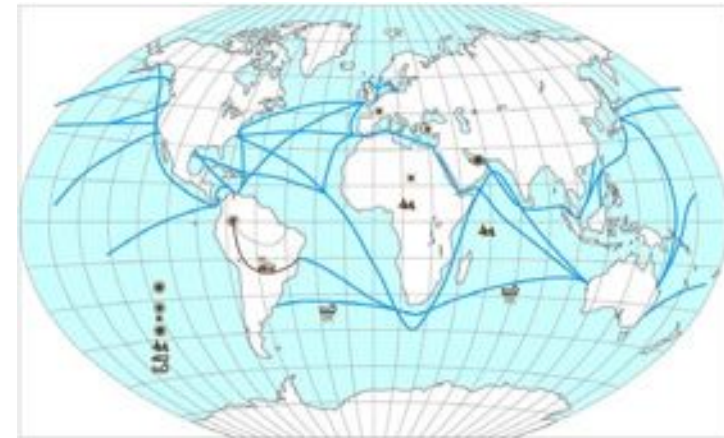
Characterised and Normalised Data for:
 1 square metre over 60 Year Study Period: Floor Finishes; Soft floor coverings; Senoquer Naturals, AWW, AWWP carpet tile, solution dyed nylon 66, 760 g/m², bitumen backed (per m²)

Quality of Data for Profiled Material (Data for other constituent materials are available from BRE Global)

Start Date:	01/01/2007	Source of Data:	Company records
End Date:	31/12/2007	Geography:	UK
Representativeness:	2 sites representing 100% of production		
LCA Methodology:	BRE Global Environmental Profiles Methodology (2008)		
Allocation:	100% to product		
Date of Data Entry:	19/08/2009		
Boundary:	Cradle to Grave over 60 Year Study Period		
Applicable Buildings:	Retail (replacement by fashion)		

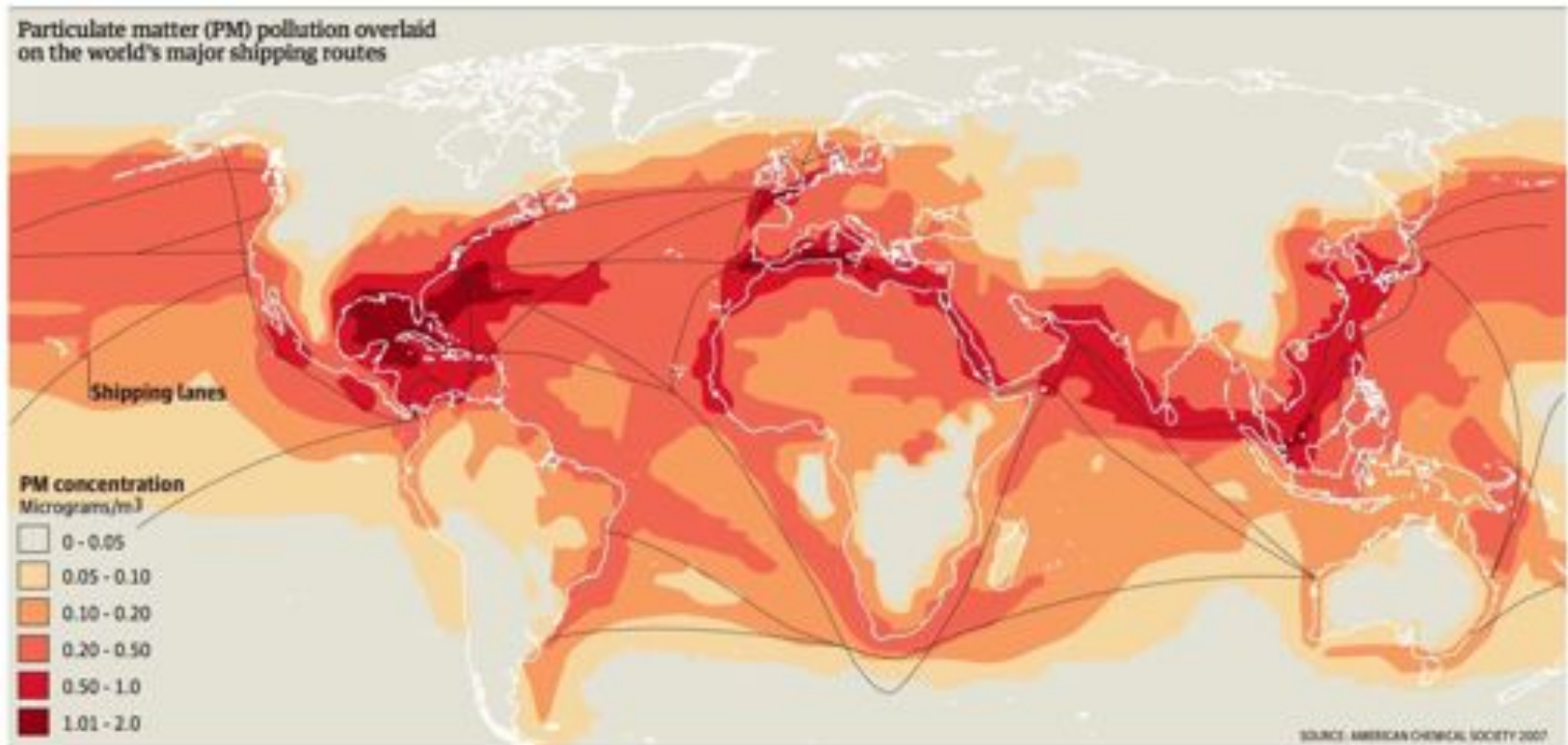
Issue	Characterised Data	Unit
Climate Change	160	kg CO ₂ eq. (100yr)

- Most efficient distribution assumed
- Geo-location of manufacture sites
- Air, sea and land based emissions split
- Port to port look-up tables and land based wiggle factors account for real world transport routes



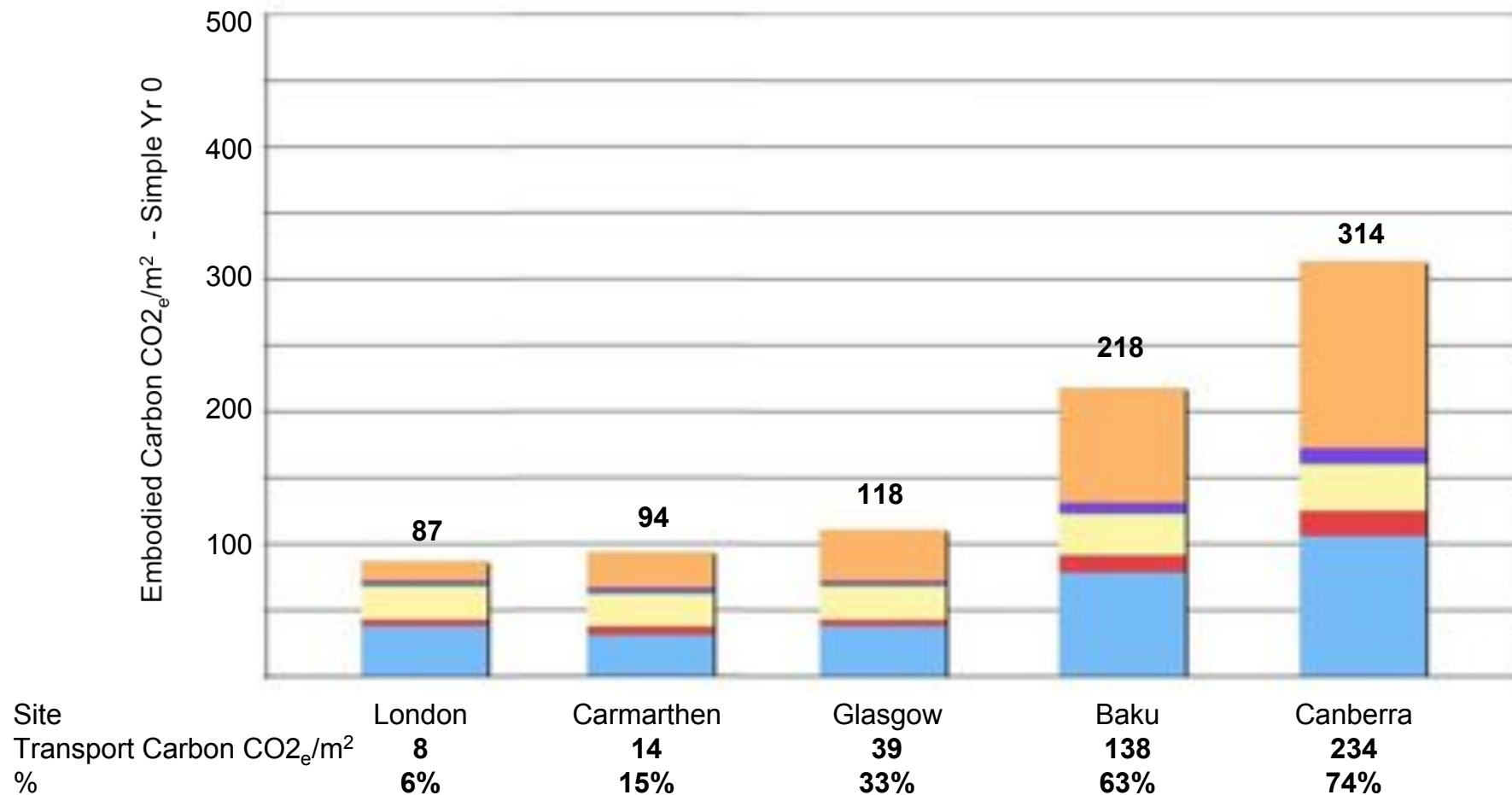
Shipping pollution

Particulate matter (PM) pollution overlaid on the world's major shipping routes



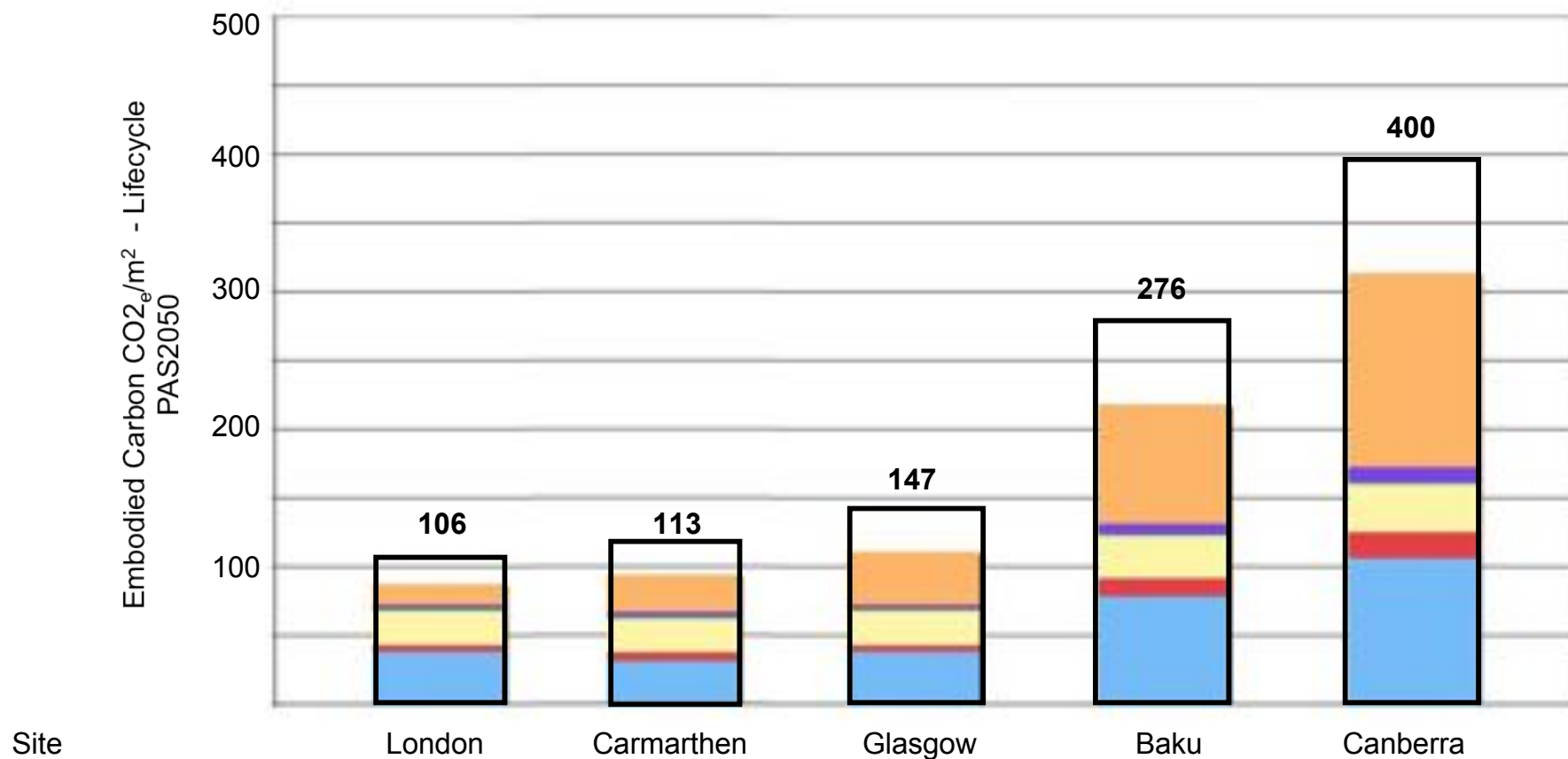
- Local sourcing can make a significant difference to impact, even within the UK
- Transport impacts probably higher in reality

453 kg/m² Brick / Block Wall – Materials from fixed UK manufacture locations



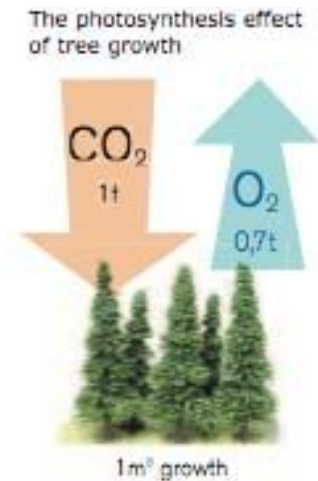
- Transport impacts are multiplied through the building lifecycle due to maintenance and replacements
- Ensure that heavy materials are sourced as locally as possible

453 kg/m² Brick / Block Wall - UK manufactured materials

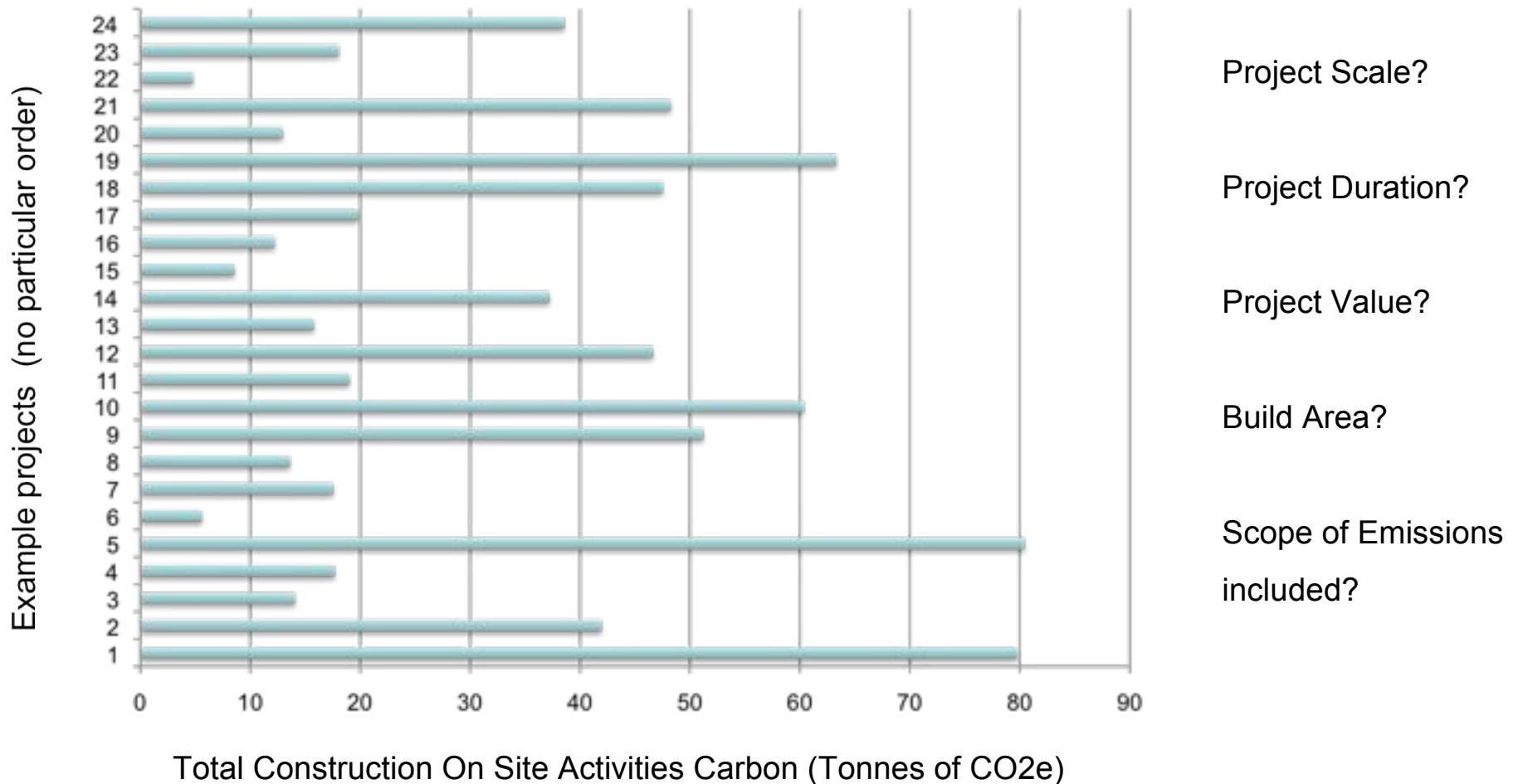


- English Oak carbon storage figures: -4.29 kg CO₂e/kg [TRADA]
- Swedish Redwood carbon storage figures: -4.20 kg CO₂e/kg [TRADA]
- Scottish Sitka carbon storage figures: -3.86 kg CO₂e/kg [TRADA]

- Generic wood carbon storage figures: -1.835 kg CO₂e/kg [American Hardwood Ass]
- Hemp carbon storage figures: -1.83 kg CO₂e/kg [CAT/UEL dissertation]
- Conifer Plywood sequestration figures: -1.71 kg CO₂e/kg [RT Environmental Label]
- Reed Grass carbon storage figures: -1.65 kg CO₂e/kg [DTI publication]
- Straw bales carbon storage figures: -1.47 kg CO₂e/kg [YASA]
- Birch Plywood carbon storage figures: -1.12 kg CO₂e/kg [RT Environmental Label]
- Hemcrete carbon storage figures: -0.73 kg CO₂/kg [manufacturer]
- Lime carbon storage figures: -0.24 kg CO₂/kg [CAT/UEL dissertation]

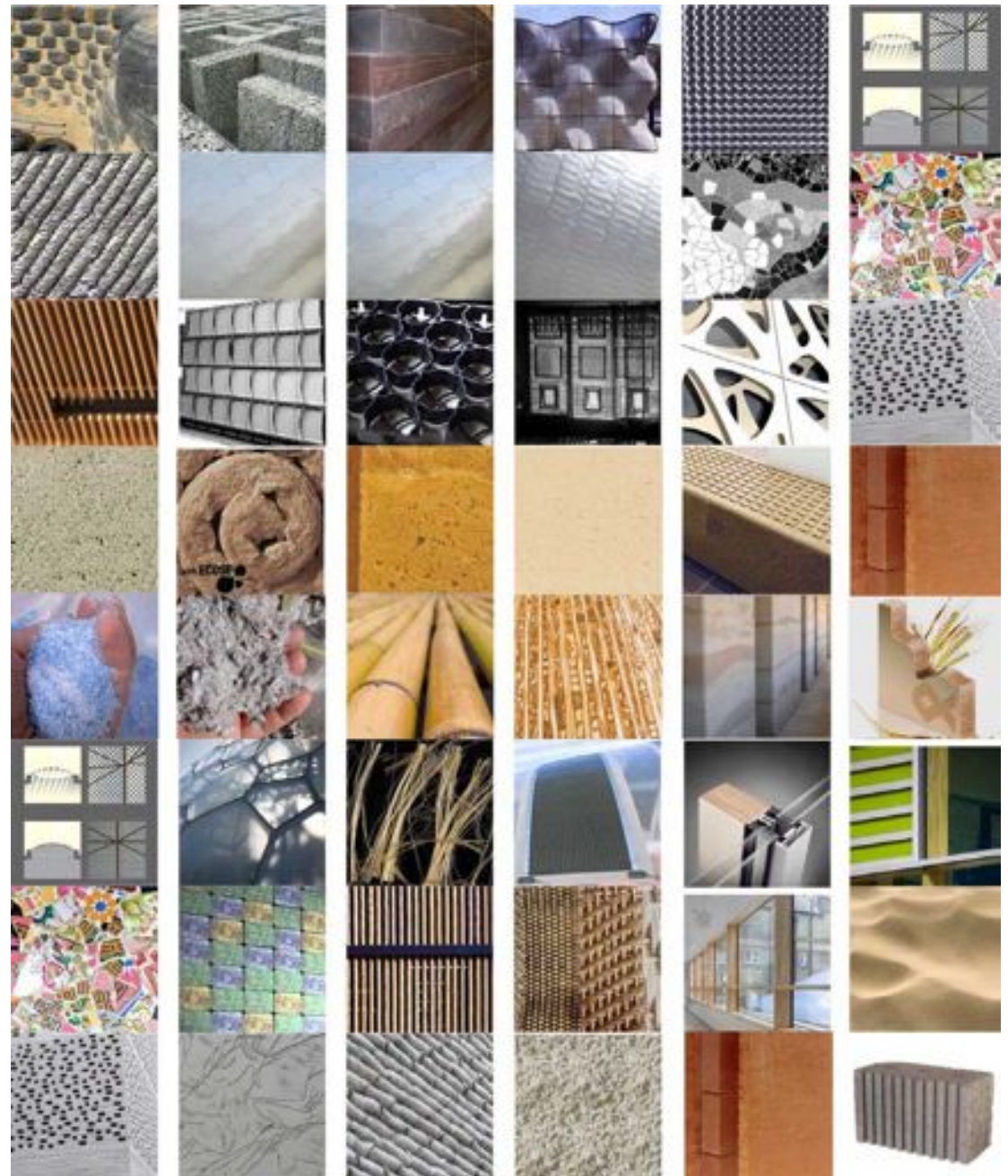


- Limited published data
- Evidence suggests that impact can be significant - inefficient site accommodation and power generation



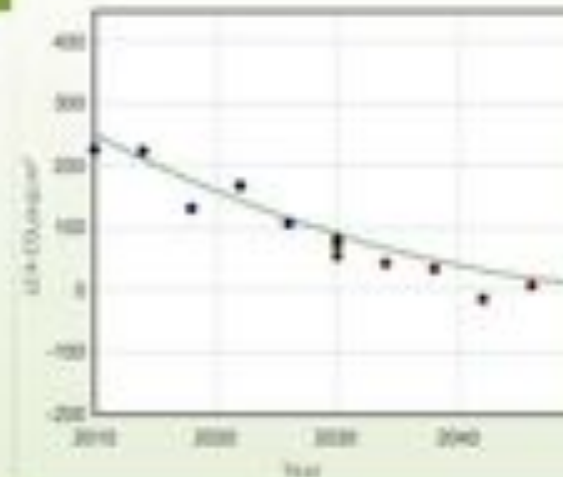
Intelligent Defaults

- Apply intelligent defaults to rapidly attribute a building geometry
- Support for mixed use buildings
- Customise defaults to let you make a fast start on your own projects e.g.
 - Passivhaus School
 - Supermarket
- Rich libraries of materials, constructions & strategies





TARGETS



- Key**
- Kyoto Trend
 - Completed
 - In Design
 - Current Target
 - Actual

Lock targets as project brief

required by

delivered by

Save

Project Targets

Sustainability Targets

Sustainability Impact	Target	Units
CO2e	78	kgCO2e/m ² /yr
WWh	28	kWh/m ² /yr
Life-cycle method	to PAS2050	

Operational Impact	Target	Units
Total CO2e	28	kgCO2e/m ² /yr
Total kWh Primary Energy	120	kWh/m ² /yr
Leaky Performance target		
Annual EPC Index (CO ₂)	8	
EPC CO ₂ index	30	against DBM Total
CO ₂ saving, against DBM	70%	against DBM Total

Energy	Target	Units
Heating Load	15	kWh/m ² /yr
Hot Water	25	kWh/m ² /yr
Cooling	15	kWh/m ² /yr
Lighting	20	kWh/m ² /yr
Smart Power	35	kWh/m ² /yr
TOTAL	120	kWh/m²/yr

Water	Target	Units
Arrangement	2	h-l Phosphorus
Wool	0.25	kg/m ² /a
Wool	0.35	kg/m ² /a
Flour	0.20	kg/m ² /a
Woolfleece	2.20	kg/m ² /a
Scourings	2.20	kg/m ² /a
Wool	3.50	kg/m ² /a

Embodied Impact	Target	Units
CO2e	88	kgCO2e/m ²
WWh	80	kWh/m ²

Compliance	Good Practice	Best Practice	Innovative	Zero Carbon	Typical Benchmarks	Actual
e.g. RFL 2018	e.g. ACDB Silver	e.g. Phoenix	e.g. ACDB Gold			
Yes	No	No	No	No	No	No
Yes	No	No	No	No	No	No

					DBM	Carbon Budget	Actual	
	48	32	28	4	5	50.5	25	58
	275		240			275		
	2	3	0	1	1	2	0	2
	75	48	40	5	5	100	50	108
	7	70%	80%	90%	100%	25	50	25

	80	80	15	10	100
			30		
			15		40
			N/A		100

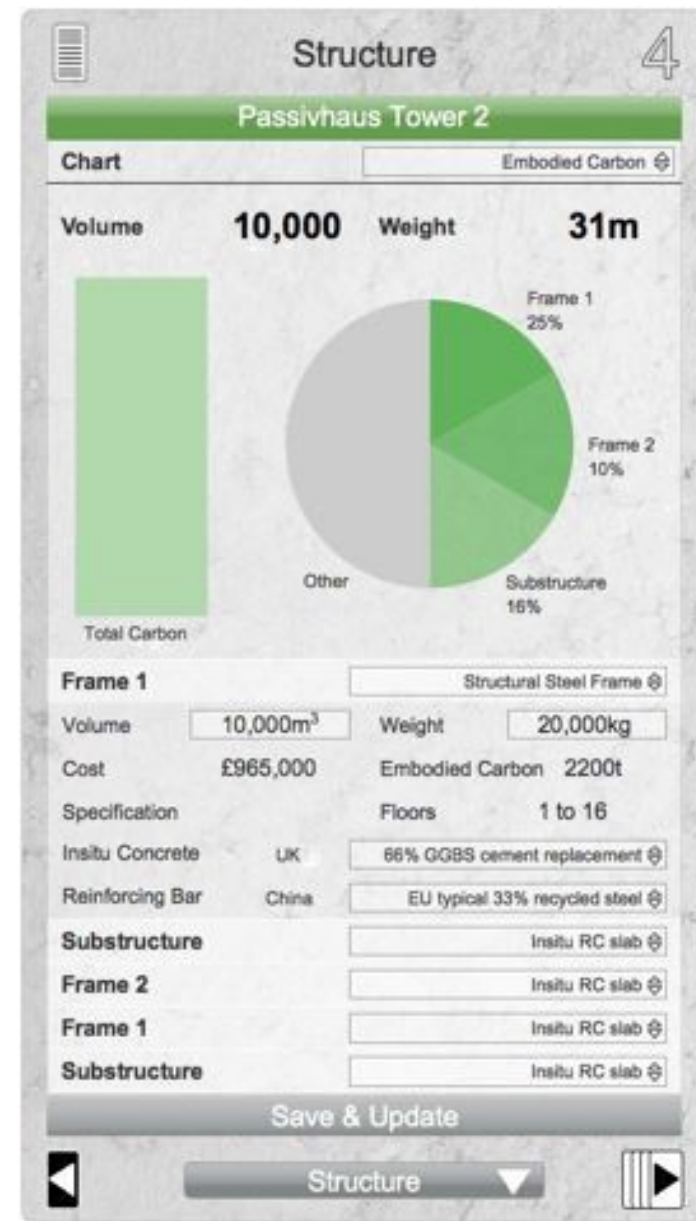
	£ 30 RFL	£ 1.5 / 2 RFL	£ 0.5	£ 0.5	£ 0.5
	£ 0.25	£ 0.15	£ 0.15	£ 0.15	£ 0.15
	£ 0.35	£ 0.25	£ 0.15	£ 0.15	£ 0.15
	£ 0.20	£ 0.20	£ 0.15	£ 0.15	£ 0.15
	£ 2.20	£ 1.40	£ 0.80	£ 0.80	£ 0.80
	£ 2.20	£ 1.70	£ 1.00	£ 1.00	£ 1.00
	£ 3.50	£ 1.50	£ 0.80	£ 0.80	£ 0.80

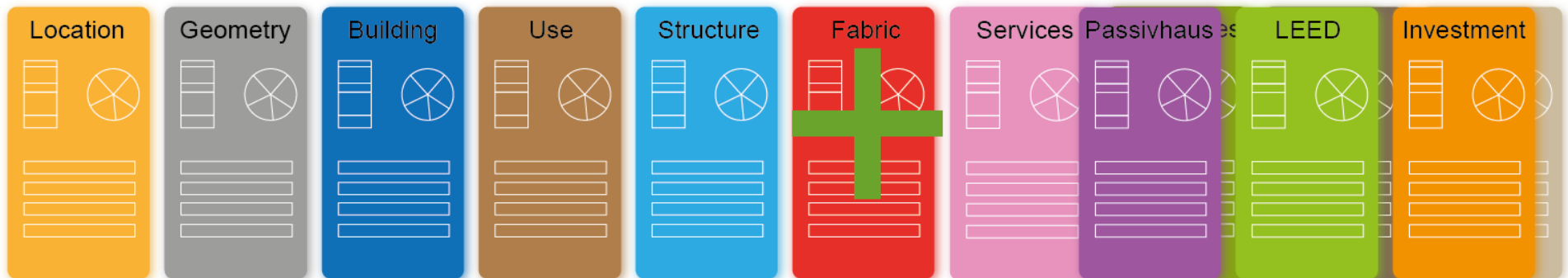
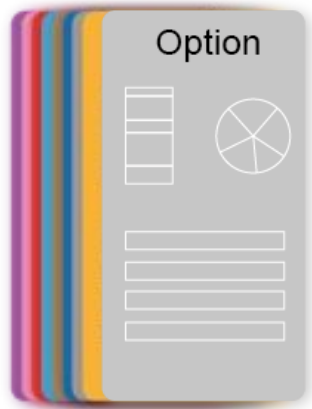
Environmental Assessment Method	
DBM	Very Good 20%
ACDB (Carbon)	Good 20%
Passive	Not Certified
Code	Code Level 2

Primary Compliance Methodology	
	DBM

Topic Cards

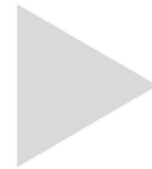
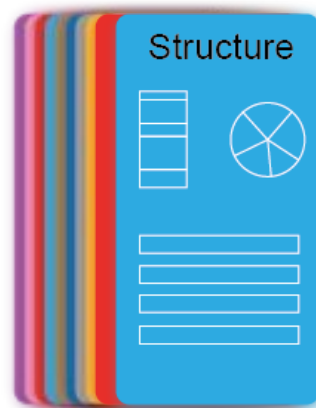
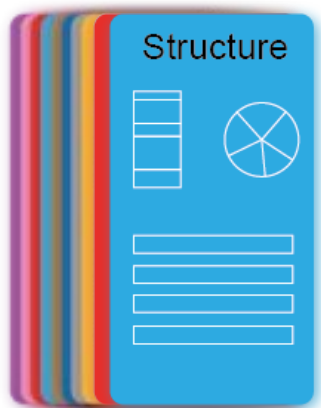
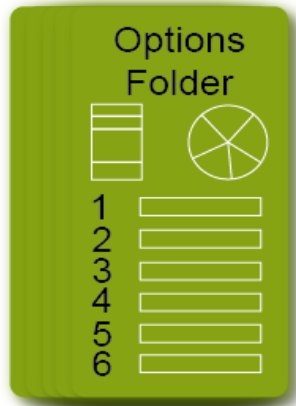
- Focused high level reporting
- Dynamically updating charts & metrics
- Critical Inputs
- A flexible intuitive workspace

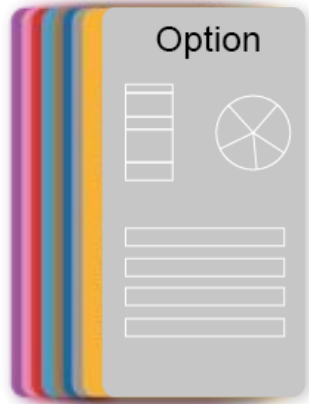




Dynamically customisable workspace

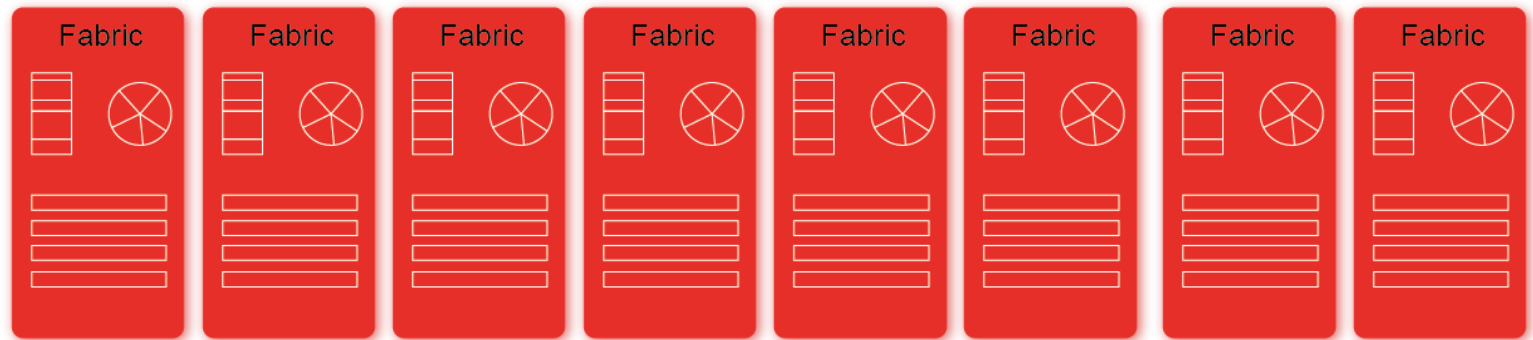
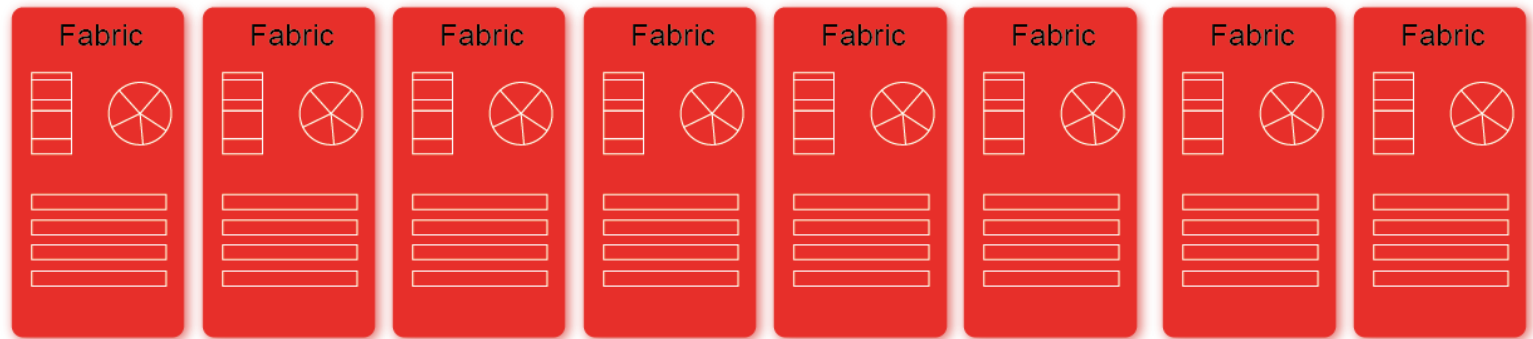
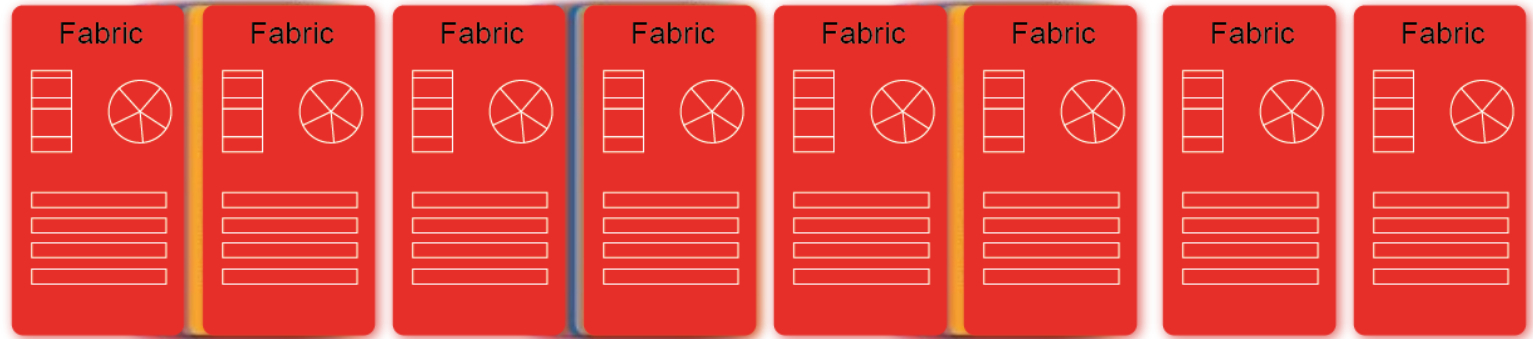
New cards extend functionality and meet specific user needs



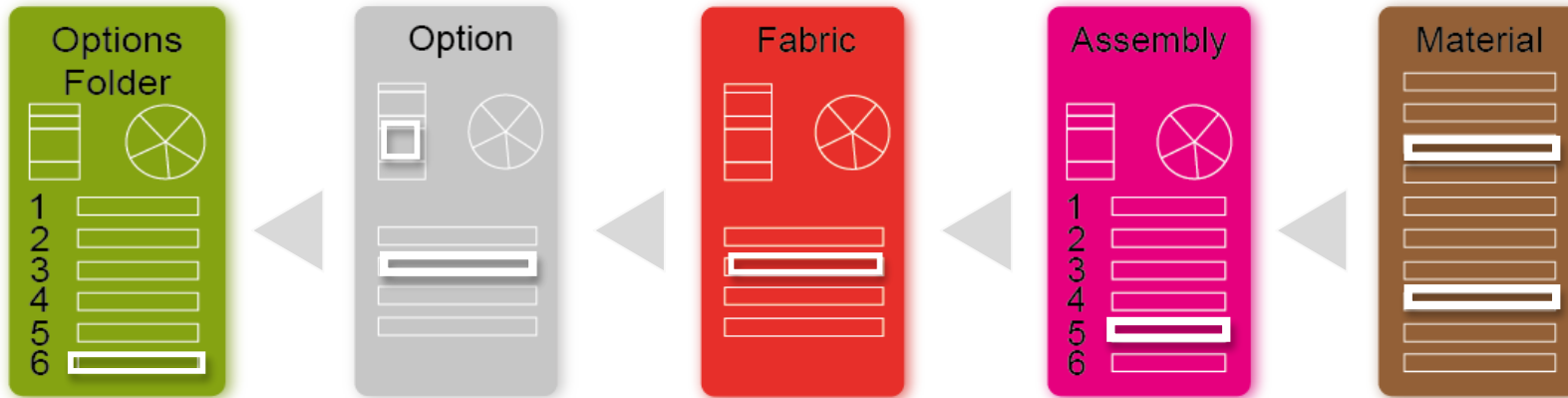


Auto-generate

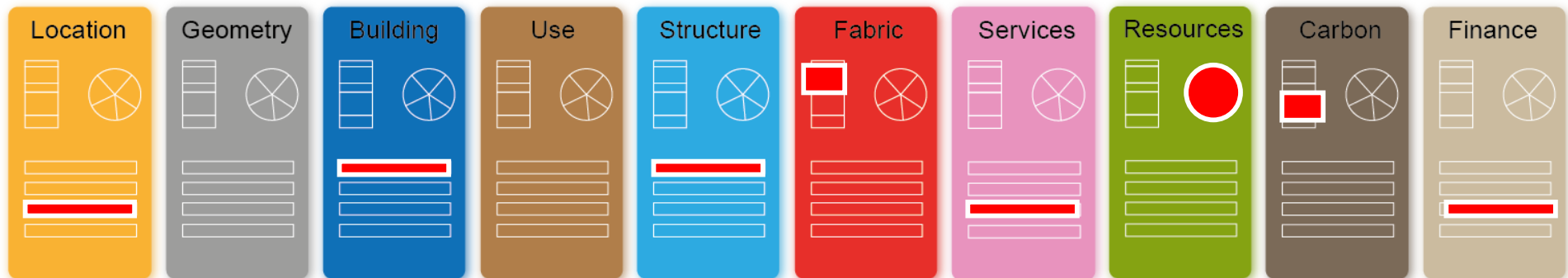
Auto-filter

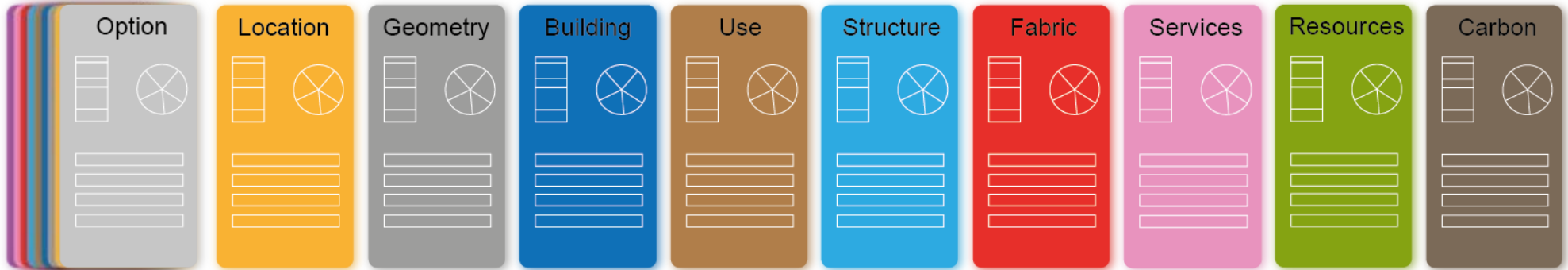


Make adjustments and see results in context

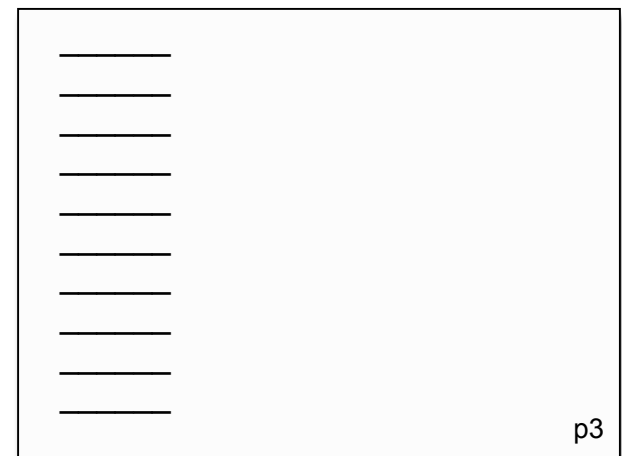
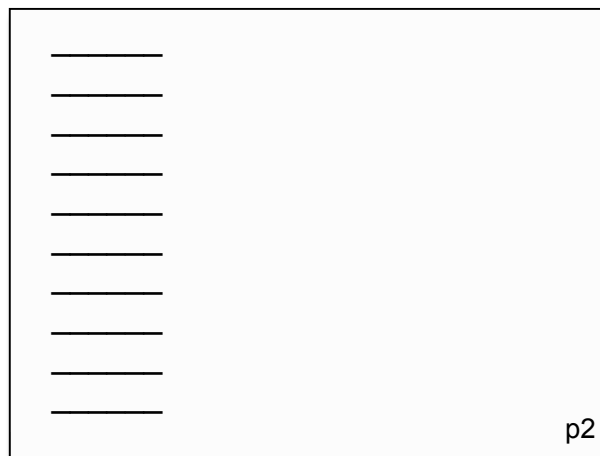
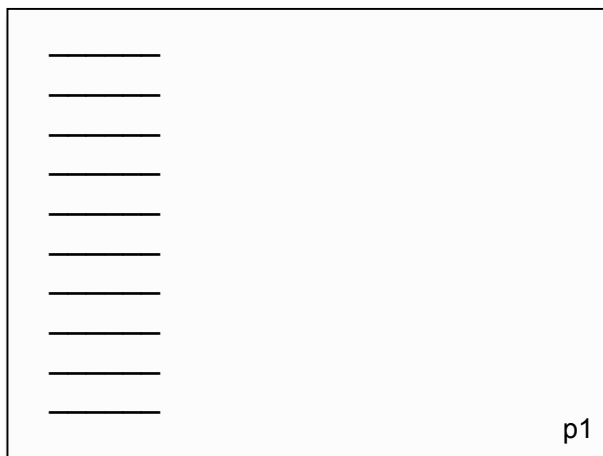


Compare against targets

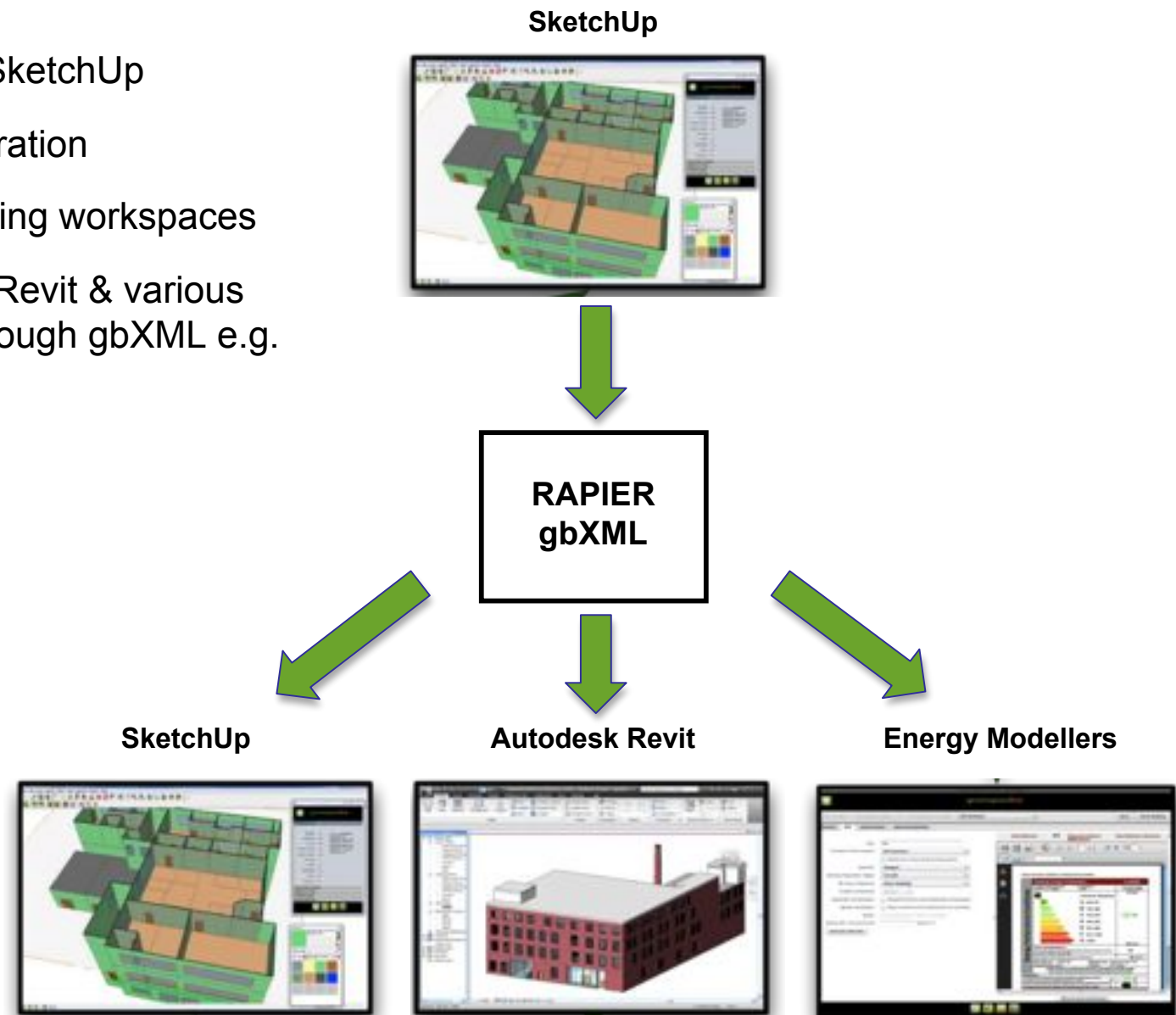




Produce customised reports that can be dynamically linked to the underlying models



- Import models from SketchUp
- Enhancing BIM integration
- Link with Green building workspaces
- Export to SketchUp, Revit & various Energy modellers through gbXML e.g. Energy Plus



Progress to Date...

- Robust web-based software platform in place
- Cost, Energy & Carbon Models fully implemented
- Support for mixed-use buildings – with Office use profiles defined
- Card based user interface
- Validation and testing ongoing
- Work in Progress...



- One meeting impact
- Insight
- Productivity
- Communication and collaboration
- Optioneering
- Optimising of cost, energy & carbon



Further development, including;

- Integration with SketchUp
- Collaboration
- Support for Compliance
- Retrofit
- Multi-building developments
- Internationalisation
- Future energy, regulatory and climate scenarios



- Alpha Testing & validation
- Beta Testing
- Full Release



<http://www.projectrapier.com>



ARCHITYPE

