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Building Transparency

Project Phase	Sub-Phase	Chapter	Owner	Construction Manager	Sustainability Consultant	Architect	Structural Engineer	General Contractor	A1-A3 Cradle to Gate	A4 Transportation	A5 Installation	B Use	C End of Life
First Steps	Pre-Design	Setting **embodied carbon benchmarks and targets**	●	○	○	○	○	○	■	■	■	■	■
		Demonstrating **market demand for low carbon materials**	●	○	○	○	○	○	■				
Preconstruction	Concept/ Schematic Design	Requiring **embodied carbon accounting for projects**	●	○	○				■	■	■	■	■
		Using **embodied carbon data to inform systems level design**	○	○	○	●	●		■	■	■	■	■
	Design Development	Setting **a bill of materials for embodied carbon tracking**	○	○	○	●	●	○	■	■	■	■	■
		Creating **an upfront carbon estimate**	○	○	○	○	●	○	■				
		Creating **low carbon specifications**	○	○	○	●	●		■			■	■
	Construction Documents	Refining **the upfront carbon estimate**	○	○	○	○	●	○	■				
		Refining **low carbon specifications**	○	○	○	●	●		■			■	■
Construction	Procurement	Creating **low carbon bid documents**	○	○	○			●	■	■	■		■
		Including **embodied carbon data in bid leveling**	○	○	○			●	■				
	Construction	Tracking **realized embodied carbon of materials in construction**	○	○	○			●	■				
		Minimizing **transportation carbon emissions**	○	○	○			●		■			
		Minimizing **construction site carbon emissions**	○	○	○			●			■		
		Minimizing **construction waste**	○	○	○			●					■
Operations	Use/Replacement	Minimizing **replacement of materials**	●	○	○	○	○					■	
Deconstruction	Demolition/Disposal	Promoting **a circular economy**	○	○	○		○	●	■				■

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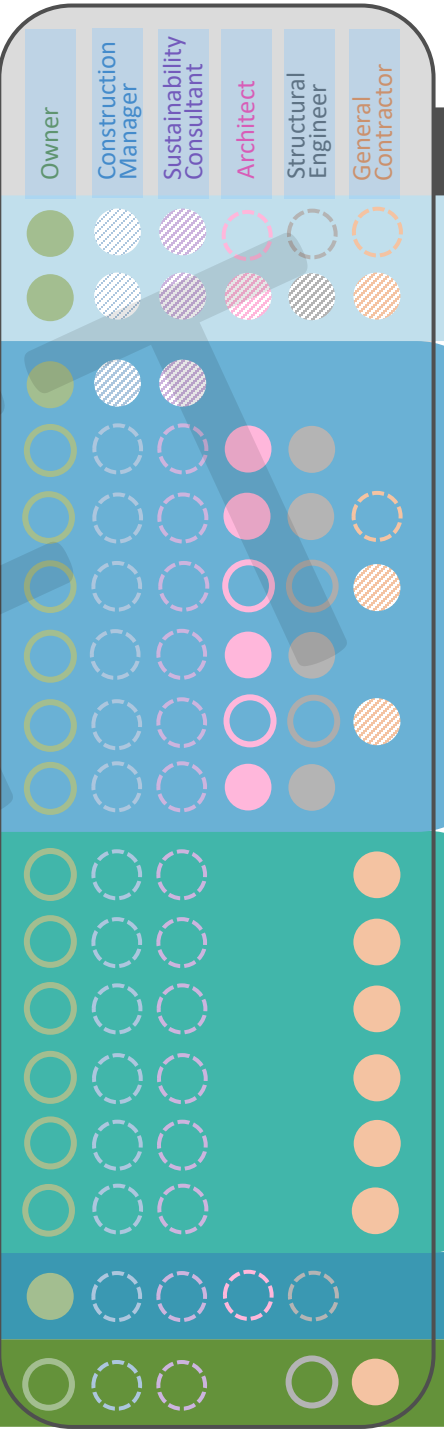
Building Transparency

Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***
		Demonstrating ***market demand for low carbon materials***
Preconstruction	Concept/ Schematic Design	*Requiring* ***embodied carbon accounting for projects***
		Using ***embodied carbon data to inform systems level design***
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***
		Creating ***an upfront carbon estimate***
		Creating ***low carbon specifications***
	Construction Documents	*Refining* ***the upfront carbon estimate***
		Refining ***low carbon specifications***
Construction	Procurement	*Creating* ***low carbon bid documents***
		Including ***embodied carbon data in bid leveling***
	Construction	*Tracking* ***realized embodied carbon of materials in construction***
		Minimizing ***transportation carbon emissions***
		Minimizing ***construction site carbon emissions***
		Minimizing ***construction waste***
Operations	Use/Replacement	*Minimizing* ***replacement of materials***
Deconstruction	Demolition/Disposal	*Promoting* ***a circular economy***



Who does what?

Reducing embodied carbon spans all phases of a building, from pre-design to its end of life.

It also requires engagement from all stakeholders, from the Owner's Team to the Design Team and General Contractor.

This plan outlines where each key stakeholder has some responsibility or role in implementing embodied carbon reduction on a building project.

- Leading Role
- Leading Role (if engaged on project)
- Supporting Role
- Supporting Role (if engaged on project)

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Building Transparency

Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***
		Demonstrating ***market demand for low carbon materials***
Preconstruction	Concept/ Schematic Design	*Requiring* ***embodied carbon accounting for projects***
		Using ***embodied carbon data to inform systems level design***
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***
		Creating ***an upfront carbon estimate***
		Creating ***low carbon specifications***
	Construction Documents	*Refining* ***the upfront carbon estimate***
		Refining ***low carbon specifications***
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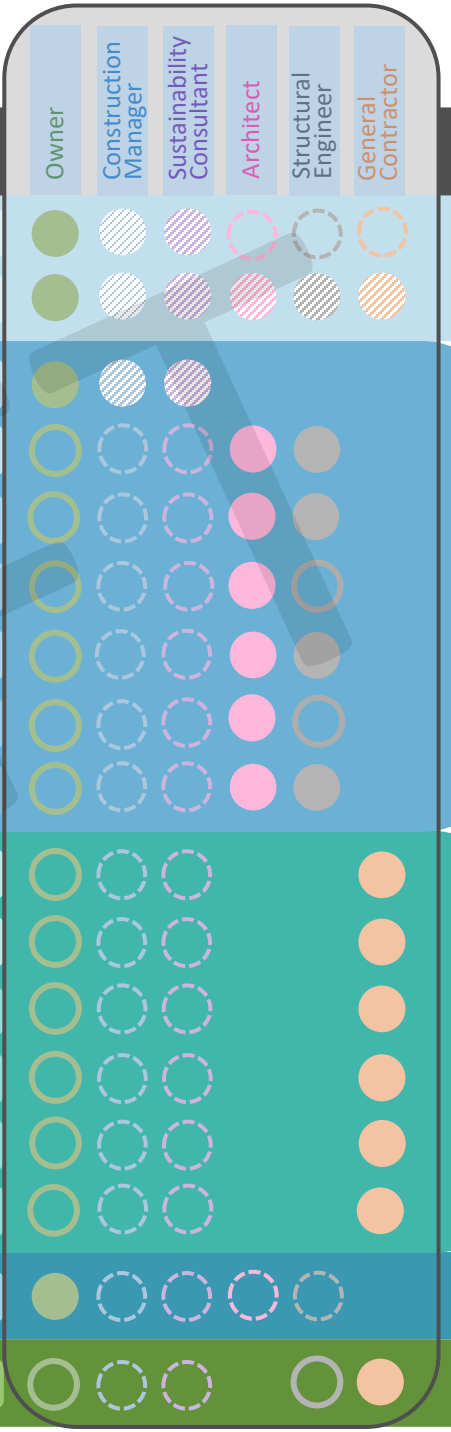
	Construction	*Tracking* ***realized embodied carbon of materials in construction***
		Minimizing ***transportation carbon emissions***
		Minimizing ***construction site carbon emissions***
		Minimizing ***construction waste***
Operations	Use/Replacement	*Minimizing* ***replacement of materials***
Deconstruction	Demolition/Disposal	*Promoting* ***a circular economy***



Who does what?

Design-Bid-Build Model
In a design/bid/build model, the General Contractor is not engaged during the preconstruction phase.

This puts more of the responsibility on the Sustainability Consultant (if engaged), Architect and Structural Engineer to complete the important scope of preparing an upfront carbon estimate during Design Development and Construction Documents.

- Leading Role
- Leading Role (if engaged on project)
- Supporting Role
- Supporting Role (if engaged on project)

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Building Transparency

Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***
		Demonstrating ***market demand for low carbon materials***
Preconstruction	Concept/ Schematic Design	*Requiring* ***embodied carbon accounting for projects***
		Using ***embodied carbon data to inform systems level design***
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***
		Creating ***an upfront carbon estimate***
		Creating ***low carbon specifications***
	Construction Documents	*Refining* ***the upfront carbon estimate***
		Refining ***low carbon specifications***
Construction	Procurement	*Creating* ***low carbon bid documents***
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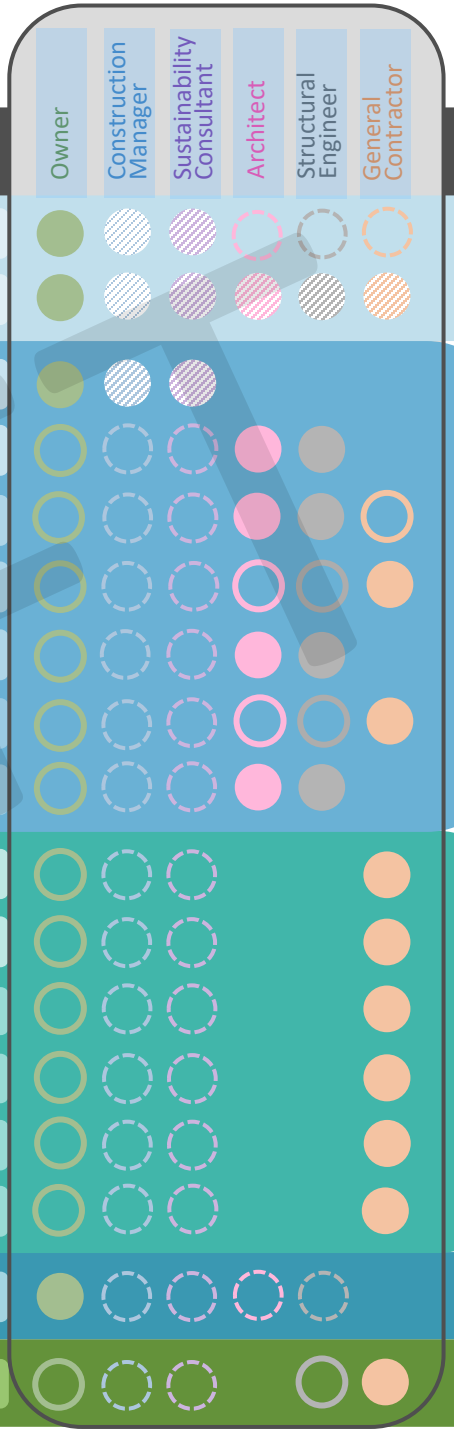
		Minimizing ***transportation carbon emissions***
		Minimizing ***construction site carbon emissions***
		Minimizing ***construction waste***
Operations	Use/Replacement	*Minimizing* ***replacement of materials***
Deconstruction	Demolition/Disposal	*Promoting* ***a circular economy***



Who does what?

Design-Build and General Contractor/ Construction Manager (GCCM) Models

When the General Contractor is engaged during Preconstruction, they can work with the design team to prepare cost for design options and take the lead on preparing upfront carbon estimates, alongside cost estimates, during the Design Development and Construction Documents phase.

- Leading Role
- Leading Role (if engaged on project)
- Supporting Role
- Supporting Role (if engaged on project)

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Building Transparency

Project Phase	Sub-Phase	Chapter	Owner	Construction Manager
First Steps	Pre-Design	*Setting **embodied carbon benchmarks and targets***	●	◐
		*Demonstrating **market demand for low carbon materials***	●	◐
Preconstruction	Concept/ Schematic Design	*Requiring **embodied carbon accounting for projects***	●	◐
		*Using **embodied carbon data to inform systems level design***	○	○
	Design Development	*Setting **a bill of materials for embodied carbon tracking***	○	○
		*Creating **an upfront carbon estimate***	○	○
		*Creating **low carbon specifications***	○	○
	Construction Documents	*Refining **an upfront carbon estimate***	○	○
		*Refining **low carbon specifications***	○	○
Construction	Procurement	*Creating **low carbon bid documents***	○	○
		*Including **embodied carbon data in bid leveling***	○	○
	Construction	*Tracking **realized embodied carbon of materials in construction***	○	○
		*Minimizing **transportation carbon emissions***	○	○
		*Minimizing **construction site carbon emissions***	○	○
		*Minimizing **construction waste***	○	○
Operations	Use/Replacement	*Minimizing **replacement of materials***	●	○
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***	◐	○

Who does what?

The Owner and their Construction Manager (if engaged on project) play an integral role throughout every phase and chapter of embodied carbon reduction.

Owners first need to understand the full process of embodied carbon accounting and reduction, as well as the key stakeholders they should lean on to create and provide the information they need to take action.

With the appropriate embodied carbon data provided to them at the various phases of their project, Owners can make informed low carbon decisions.

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Building Transparency

Project Phase	Sub-Phase	Chapter	Sustainability Consultant
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***	●
		Demonstrating ***market demand for low carbon materials***	●
Preconstruction	Concept/ Schematic Design	*Requiring* ***embodied carbon accounting for projects***	●
		Using ***embodied carbon data to inform systems level design***	○
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***	○
		Creating ***an upfront carbon estimate***	○
		Creating ***low carbon specifications***	○
	Construction Documents	*Refining* ***an upfront carbon estimate***	○
		Refining ***low carbon specifications***	○
Construction	Procurement	*Creating* ***low carbon bid documents***	○
		Including ***embodied carbon data in bid leveling***	○
	Construction	*Tracking* ***realized embodied carbon of materials in construction***	○
		Minimizing ***transportation carbon emissions***	○
		Minimizing ***construction site carbon emissions***	○
		Minimizing ***construction waste***	○
Operations	Use/Replacement	*Minimizing* ***replacement of materials***	○
Deconstruction	Demolition/Disposal	*Promoting* ***a circular economy***	○

Who does what?

The Sustainability Consultant can be the Owner's right hand person when it comes leading the work necessary to first set benchmarks and targets, then supporting the process of accounting for and reducing embodied carbon, through all phases of a building's life.

If engaging a sustainability consultant on a project, finding someone with knowledge of whole building life cycle assessment (WBLCA) and low carbon specification and procurement can be an asset.

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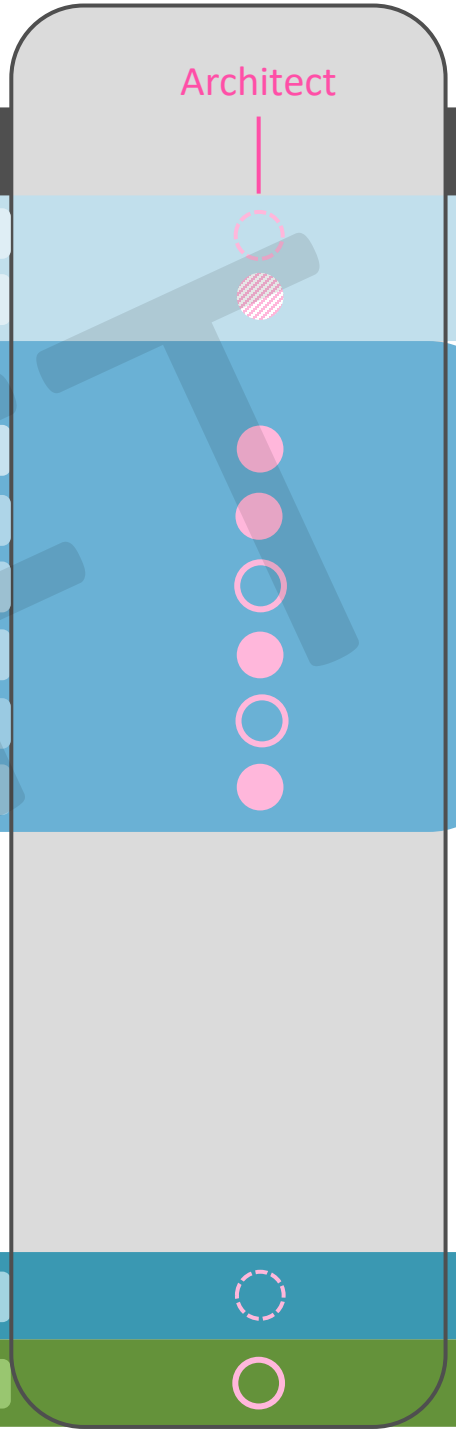
Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***
		Demonstrating ***market demand for low carbon materials***
Preconstruction	Concept/ Schematic Design	*Using* ***embodied carbon data to inform systems level design***
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***
		Creating ***an upfront carbon estimate***
		Creating ***low carbon specifications***
	Construction Documents	*Refining* ***the upfront carbon estimate***
		Refining ***low carbon specifications***
Operations	Use/Replacement	*Minimizing* ***replacement of materials***
Deconstruction	Demolition/Disposal	*Promoting* ***a circular economy***



Who does what?

The Architect plays a key role in the embodied carbon assessment of design and material choices. They are the conduit between an Owner's embodied carbon commitments and targets and the low carbon building systems and material selections that meet all of the design, program and performance requirements that an Owner specifies.

It is helpful to select an architect with expertise in using WBLCA tools early in design, as well as implementing low carbon specifications and materials selections in the later stages.

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Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***
		Demonstrating ***market demand for low carbon materials***
Preconstruction	Concept/ Schematic Design	*Using* ***embodied carbon data to inform systems level design***
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***
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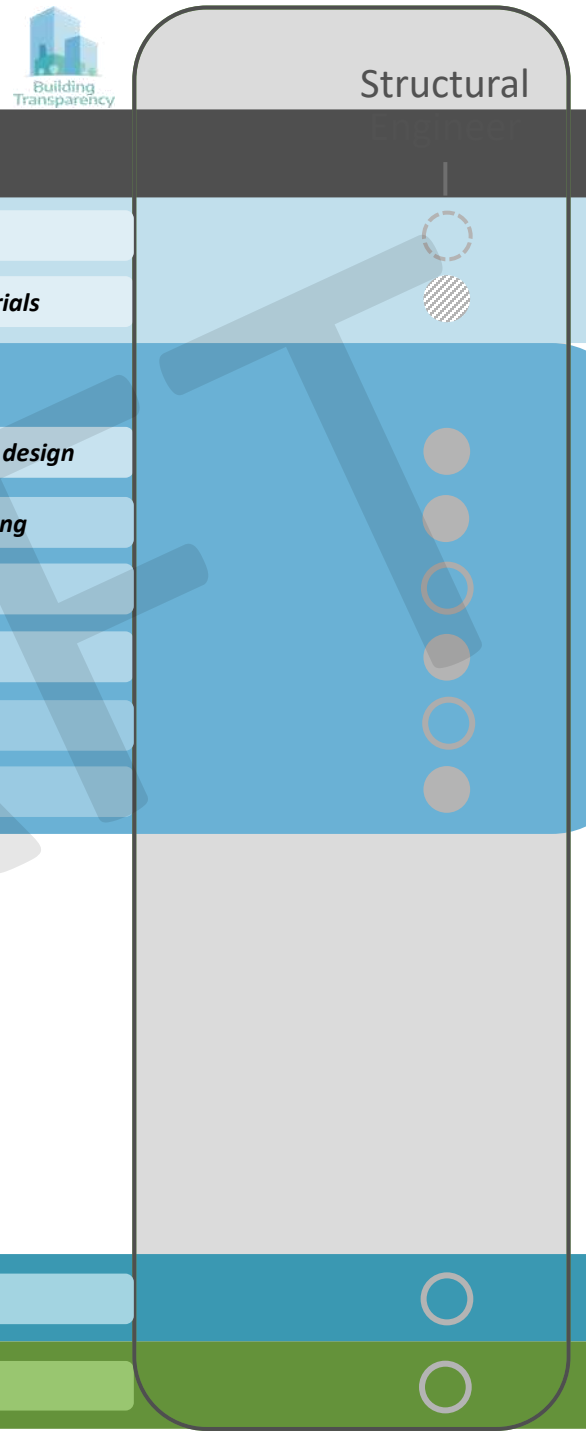
		Refining ***low carbon specifications***
Operations	Use/Replacement	*Minimizing* ***replacement of materials***
Deconstruction	Demolition/Disposal	*Promoting* ***a circular economy***



Who does what?

The Structural Engineer plays a vital role in understanding and reducing the embodied carbon impacts of some of the highest emissions building materials.

They can provide embodied carbon reduction strategies and options to optimize structural materials systems in early design phases, and inform low carbon structural material specifications in the later stages.

Selecting a structural engineer with expertise in building WBLCA and low carbon material specifications can be a key step in reducing embodied carbon.

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Project Phase	Sub-Phase	Chapter	General Contractor
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***	○
		Demonstrating ***market demand for low carbon materials***	◔
Preconstruction	Concept/ Schematic Design		
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***	○
		Creating ***an upfront carbon estimate***	◔
	Construction Documents	*Refining* ***the upfront carbon estimate***	●
Construction	Procurement	*Creating* ***low carbon bid documents***	●
		Including ***embodied carbon data in bid leveling***	●
	Construction	*Tracking* ***realized embodied carbon of materials in construction***	●
		Minimizing ***transportation carbon emissions***	●
		Minimizing ***construction site carbon emissions***	●
		Minimizing ***construction waste***	●
Deconstruction	Demolition/Disposal	*Promoting* ***a circular economy***	●

Who does what?

The General Contractor, if engaged during the design phase, can play a key role in supporting design team partners by providing material carbon data alongside cost data in estimates at key milestones.

During procurement, the GC can ensure that the necessary carbon disclosure is provided at time of bid, and track realized embodied carbon impacts of products during construction.

This enables Owners to make fully informed material choices and understand realized embodied carbon impacts and reductions at project completion.

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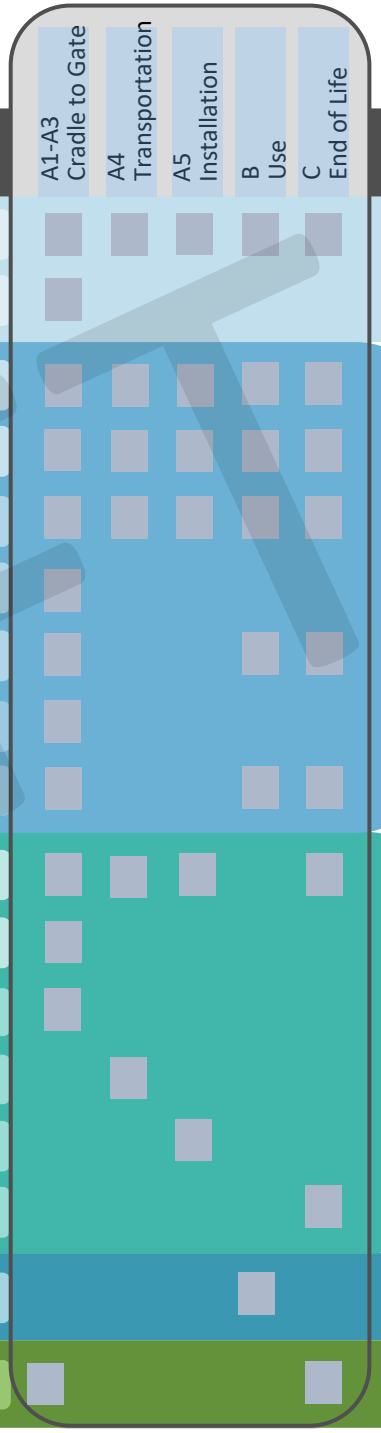
Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***
		Demonstrating ***market demand for low carbon materials***
Preconstruction	Concept/ Schematic Design	*Requiring* ***embodied carbon accounting for projects***
		Using ***embodied carbon data to inform systems level design***
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***
		Creating ***an upfront carbon estimate***
		Creating ***low carbon specifications***
	Construction Documents	*Refining* ***the upfront carbon estimate***
		Refining ***low carbon specifications***
Construction	Procurement	*Creating* ***low carbon bid documents***
		Including ***embodied carbon data in bid leveling***
	Construction	*Tracking* ***realized embodied carbon of materials in construction***
		Minimizing ***transportation carbon emissions***
		Minimizing ***construction site carbon emissions***
		Minimizing ***construction waste***
Operations	Use/Replacement	*Minimizing* ***replacement of materials***
Deconstruction	Demolition/Disposal	*Promoting* ***a circular economy***



What stages, when?

Embodied carbon is comprised of multiple stages of emissions impacts.

All of these stages are important to consider when looking at embodied carbon reduction across a building's life.

Each stage comprises a different percentage of total impacts and is informed and reduced by various Chapters included in this plan.

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Project Phase	Sub-Phase	*Chapter*	A1-A3 Cradle to Gate
First Steps	Pre-Design	*Setting **embodied carbon benchmarks and targets***	
		*Demonstrating **market demand for low carbon materials***	
Preconstruction	Concept/ Schematic Design	*Requiring **embodied carbon accounting for projects***	
		*Using **embodied carbon data to inform systems level design***	
	Design Development	*Setting **a bill of materials for embodied carbon tracking***	
		*Creating **an upfront carbon estimate***	
		*Creating **low carbon specifications***	
	Construction Documents	*Refining **the upfront carbon estimate***	
		*Refining **low carbon specifications***	
Construction	Procurement	*Creating **low carbon bid documents***	
		*Including **embodied carbon data in bid leveling***	
	Construction	*Tracking **realized embodied carbon of materials in construction***	
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***	

What stages, when?

A1-A3 are the emissions associated with the cradle to gate manufacturing of a product, and comprise the largest percentage of emissions impacts for major building materials.

Including reduction of A1-A3 emissions in an embodied carbon reduction plan is critical to encourage the manufacture of low carbon building materials, as well as enable tracking of realized embodied carbon emissions at the product level.

By specifying and procuring materials that report lower A1-A3 impacts, it also incentivizes manufacturers to understand their supply chain emissions and include material reuse, reducing their product emissions.

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Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting **embodied carbon benchmarks and targets***
Preconstruction	Concept/ Schematic Design	*Requiring **embodied carbon accounting for projects***
		*Using **embodied carbon data to inform systems level design***
	Design Development	*Setting **a bill of materials for embodied carbon tracking***
	Construction Documents	
Construction	Procurement	*Creating **low carbon bid documents***
	Construction	*Minimizing **transportation carbon emissions***

A4 Transportation

What stages, when?

A4 includes the emissions contributed by transportation of materials from the manufacturer to the project site.

These emissions can be a relatively small percentage of impact for materials with high A1-A3 manufacturing emissions, but grow for materials with low A1-A3 emissions contributions so should be studied.

Transport emissions are typically averaged in WBLCA, but can become very specific to a project during late design and construction, when manufacturer plant locations are known, and material deliveries, including mode of transportation and fuel use can be tracked.

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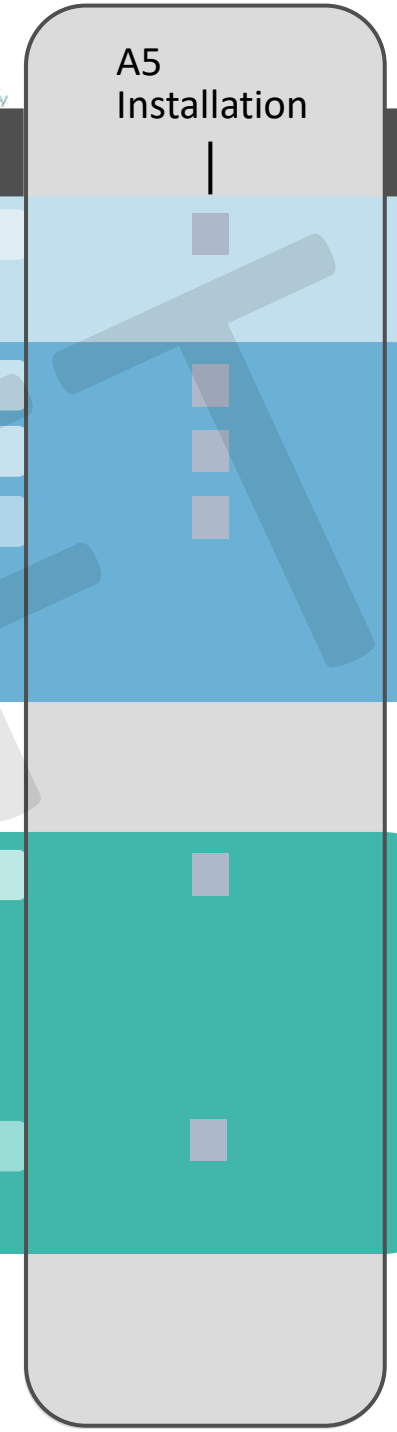
Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***
Preconstruction	Concept/ Schematic Design	*Requiring* ***embodied carbon accounting for projects***
		Using ***embodied carbon data to inform systems level design***
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***
Construction	Procurement	*Creating* ***low carbon bid documents***
	Construction	*Minimizing* ***construction site carbon emissions***



What stages, when?

A5 includes the emissions contributed by equipment and electricity use on a project's construction site.

These emissions are typically a small impact compared to other stages, but are important when thinking about pollution and emissions impacts to workers on the site and the community surrounding the project.

Construction site emissions are typically averaged in WBLCA assessments, but can become very specific to a project during construction, when the General Contractor can track real equipment fuel use and site electrical consumption.

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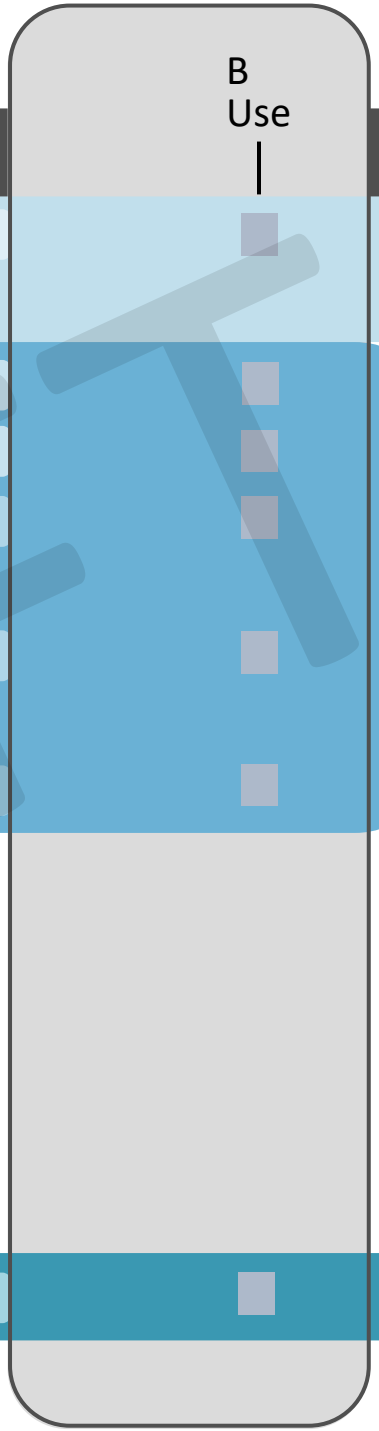
Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting* ***embodied carbon benchmarks and targets***
Preconstruction	Concept/ Schematic Design	*Requiring* ***embodied carbon accounting for projects***
		Using ***embodied carbon data to inform systems level design***
	Design Development	*Setting* ***a bill of materials for embodied carbon tracking***
		Creating ***low carbon specifications***
	Construction Documents	*Refining* ***low carbon specifications***
Operations	Use/Replacement	*Minimizing* ***replacement of materials***



What stages, when?

B includes the emissions contributed by material replacements during a building's use phase.

These emissions can become a substantial amount of the total emissions impact depending on performance and service life of the materials installed, and the Owner's typical replacement cycles for materials like interior finishes.

Use emissions are typically averaged in WBLCA assessments, but can be calculated more specifically when product options are known and product specific emissions factors can be used to multiply by the anticipated number of replacements.

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Project Phase	Sub-Phase	Chapter
First Steps	Pre-Design	*Setting **embodied carbon benchmarks and targets***
Preconstruction	Concept/ Schematic Design	*Requiring **embodied carbon accounting for projects***
		*Using **embodied carbon data to inform systems level design***
	Design Development	*Setting **a bill of materials for embodied carbon tracking***
		*Creating **low carbon specifications***
	Construction Documents	*Refining **low carbon specifications***
Construction	Procurement	*Creating **low carbon bid documents***
	Construction	*Minimizing **construction waste***
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***

C
End of Life

What stages, when?

C includes the emissions contributed by the deconstruction and disposal of building materials at the end of a building's life.

These emissions can vary based on the end of life scenario for each material, and the type of disposal or reuse.

End of life emissions are typically averaged in WBLCA assessments, but can become very specific to a project, particular to buildings that are being demolished as part of the project scope.

Care should be taken to think through the deconstruction and disposal of any building being demolished as part of a new build.

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Building Transparency

Project Phase	Sub-Phase	Chapter	Owner	Construction Manager	Sustainability Consultant	Architect	Structural Engineer	General Contractor	A1-A3 Cradle to Gate	A4 Transportation	A5 Installation	B Use	C End of Life
First Steps	Pre-Design	Setting **embodied carbon benchmarks and targets**	●	○	○	○	○	○	■	■	■	■	■
		Demonstrating **market demand for low carbon materials**	●	○	○	○	○	○	■				
Preconstruction	Concept/ Schematic Design	Requiring **embodied carbon accounting for projects**	●	○	○				■	■	■	■	■
		Using **embodied carbon data to inform systems level design**	○	○	○	●	●		■	■	■	■	■
	Design Development	Setting **a bill of materials for embodied carbon tracking**	○	○	○	●	●	○	■	■	■	■	■
		Creating **an upfront carbon estimate**	○	○	○	○	●	○	■				
		Creating **low carbon specifications**	○	○	○	●	●		■			■	■
	Construction Documents	Refining **the upfront carbon estimate**	○	○	○	○	●	○	■				
		Refining **low carbon specifications**	○	○	○	●	●		■			■	■
Construction	Procurement	Creating **low carbon bid documents**	○	○	○			●	■	■	■		■
		Including **embodied carbon data in bid leveling**	○	○	○			●	■				
	Construction	Tracking **realized embodied carbon of materials in construction**	○	○	○			●	■				
		Minimizing **transportation carbon emissions**	○	○	○			●		■			
		Minimizing **construction site carbon emissions**	○	○	○			●			■		
		Minimizing **construction waste**	○	○	○			●					■
Operations	Use/Replacement	Minimizing **replacement of materials**	●	○	○	○	○					■	
Deconstruction	Demolition/Disposal	Promoting **a circular economy**	○	○	○		○	●	■				■

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Project Phase	Sub-Phase	*Chapter*
First Steps	Pre-Design	*Setting **embodied carbon benchmarks and targets***
		*Demonstrating **market demand for low carbon materials***
Preconstruction		
Construction		
Operations		
Deconstruction		

Main Request

Establish an embodied carbon benchmark and scope.

Main Request

Request that suppliers provide product-specific, facility-specific EPDs

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Concept/ Schematic Design	*Requiring* ***embodied carbon accounting for projects***
		Using ***embodied carbon data to inform systems level design***
Construction		
Operations		
Deconstruction		

Main Request

Describe intent to minimize embodied carbon in project.

Main Request

Include tracking and reducing embodied carbon in project team requirements.

Main Request

Conduct a whole-building life cycle analysis (WBLCA) to optimize design and materials

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Design Development	*Setting **a bill of materials for embodied carbon tracking***
		*Creating **an upfront carbon estimate***
		*Creating **low carbon specifications***
Construction		
Operations		
Deconstruction		

Main Request

Utilize WBCLA tool results (alongside cost) to inform selection of systems and materials.

Main Request

Create a product stage (A1-A3) emissions carbon estimate.

Main Request

Set a specific list of materials to include in low carbon specifications.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
	Construction Documents	*Refining **the upfront carbon estimate***
		*Refining **low carbon specifications***
Construction		
Operations		
Deconstruction		

Main Request

Create a product stage (A1-A3) emissions carbon estimate.

Refine low carbon specifications based on final material and product selection.

Main Request

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Procurement	*Creating **low carbon bid documents***
		*Including **embodied carbon data in bid leveling***
Operations		
Deconstruction		

Main Request

Create standard embodied carbon bid language for included material categories.

Main Request

Utilize embodied carbon data, alongside cost data, to inform selection of bidders.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	*Tracking* ***realized embodied carbon of materials in construction***
		Minimizing ***transportation carbon emissions***
		Minimizing ***construction site carbon emissions***
		Minimizing ***construction waste***
Operations		
Deconstruction		

Main Request → **Create an as-built project to report realized embodied carbon.**

Main Request → **Implement a materials sourcing and fuel plan with suppliers of major materials.**

Main Request → **Implement a site emissions reduction plan.**

Main Request → **Implement a construction waste diversion plan to reduce materials to landfill.**

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations	Use/Replacement	*Minimizing **replacement of materials***
Deconstruction		

Main Request

During Design Phase, include analysis of durability and performance of materials in selection process.

Main Request

During Use Phase, promote longer replacement cycles of materials.

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations		
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***

Main Request

During Design Phase, promote materials salvage, reuse and deconstruction for new and existing buildings included in scope.

Main Request

During construction phase, require high percentage diversion from landfill.

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Project Phase	Sub-Phase	*Chapter*
First Steps	Pre-Design	*Setting **embodied carbon benchmarks and targets*** ⚠

Preconstruction

Construction

Operations

Deconstruction

Main Request

Establish an embodied carbon benchmark and scope.

Key Action(s)

Utilize completed projects with material quantity and material data to backcast projects into a selected embodied carbon analysis tool, or group of tools.

Key Step(s)

1. Select the embodied carbon analysis tool(s) you will use as a standard accounting method, for both benchmarking and project specific work.
2. Create a list of materials to include in embodied carbon accounting scope.
3. Locate project data (material quantities and selected materials data) to create representative projects.
4. Utilize reported embodied carbon kgCO2e/sf for backcasted projects to set project benchmarks.
5. Utilize outputs from selected tools (if possible) to inform embodied carbon reduction targets and material optimization.

Resource(s)

Whole building life cycle assessment tools:
Tally: https://www.choosetally.com/
One Click: https://www.oneclicklca.com/
Athena: https://calculatelca.com/
Supply Chain Low Carbon Specification and Procurement/Carbon Estimating Tools:
EC3: www.buildingtransparency.org/en
CLF Embodied Carbon Benchmark Study:
https://carbonleadershipforum.org/embodied-carbon-benchmark-study-data-visualization/
Case Studies:
Hudson Pacific Approach to Embodied Carbon

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Project Phase	Sub-Phase	*Chapter*
First Steps	Pre-Design	*Setting **embodied carbon benchmarks and targets*** ⚠
Preconstruction		
Construction		
Operations		
Deconstruction		

Common Roadblocks:

1. Lack of knowledge/expertise in embodied carbon accounting tools.
2. Access to embodied carbon accounting tools (many have license fees or require user training/expertise)
3. Access to historical building data (material quantities/procured materials)

Suggestions:

1. It's ok to start with imperfect data, or start with limited scope of buildings and/or materials. The key is to simply start!

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Project Phase	Sub-Phase	*Chapter*
First Steps	Pre-Design	*Demonstrating* ***market demand for low carbon materials*** ⚠
Preconstruction		
Construction		
Operations		
Deconstruction		

Main Request

Request that suppliers provide product-specific, facility-specific EPDs

Key Action(s)

Letter to suppliers from all key project/organizational stakeholders requesting suppliers begin producing product specific, facility specific Type III, third party verified EPDs, *with the ultimate goal of EPDs demonstrating "optimization".*

Key Step(s)

1. Create list of suppliers you typically specify/procure/purchase from.
2. Use the EC3 tool to determine if they have product specific EPDs in place.
3. Set up calls or meetings with suppliers who do not have product specific EPDs to educate them on embodied carbon and request EPDs.
4. Send official EPD request letter to suppliers to formalize ask and build the business case for invesment in EPDs.

Resource(s)

Template EPD request letter:
https://drive.google.com/file/d/1yowdbzau3IF1y93Rw9-dBgSk10xVTMwF/view?usp=sharing
Video on how to use EC3 tool to find EPDs:
https://www.youtube.com/watch?v=8epWK74-guQ&t=171s

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Project Phase	Sub-Phase	*Chapter*
First Steps	Pre-Design	*Demonstrating **market demand for low carbon materials*** ⚠
Preconstruction		
Construction		
Operations		
Deconstruction		

Typical Roadblocks:

1. Lack of knowledge of embodied carbon/EPDs by suppliers.
2. Cost of EPD production/verification.
3. Historic lack of digital standardization of EPD format.

Suggestions:

1. Use resources like BT's "how to get an EPD" to educate manufacturers and suppliers.
2. Use BT's "Template EPD request letter" to standardize the ask.
3. Request EPDs be in openEPD format to enable quick and accurate translation of EPDs into the EC3 (and other tools) database.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Concept/Schematic Design	*Requiring **embodied carbon accounting for projects*** ⚠
Construction		
Operations		
Deconstruction		

Describe intent to minimize embodied carbon in project.

Main Request

Key Action(s)

In Basis of Design document, include intent to minimize embodied carbon

Key Step(s)

1. Set company level strategy for embodied carbon reporting and reduction targets based on completion and analysis of backcasting exercise.

Resource(s)

Template Basis of Design/Contract Language: https://docs.google.com/document/d/1RrGjVsqoOuK9xZt0Tqxii3PWLbL_1x2EyvX0OndVpKo/edit
Case Studies:
Hudson Pacific Approach to Embodied Carbon

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Concept/Schematic Design	*Requiring **embodied carbon accounting for projects***
Construction		
Operations		
Deconstruction		

Typical Roadblocks:
1. Lack of Owner knowledge or experience with embodied carbon accounting.

Suggestions:
1. Use the ownersCAN Embodied Carbon Action Plan (ECAP) to align on embodied carbon requirements.
2. Request to join ownersCAN biweekly calls to learn from and share with a consortium of Owners at various stages of their embodied carbon journey.
3. Sharing is caring!

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Concept/ Schematic Design	*Requiring **embodied carbon accounting for projects***
Construction		
Operations		
Deconstruction		

Main Request

Include tracking and reducing embodied carbon in project team requirements.

Key Action(s)

Include requirements for tracking and reducing embodied carbon in RFPs and contract language for project partners (AEC, etc).

Key Step(s)

1. Include questions around experience in completing Whole Building Life Cycle Assessment (WBLCA) and Low Embodied Carbon Specification and Procurement in RFP requirements and scoring.
2. Include requirements for completing WBLCA and Low Embodied Carbon Specification and Procurement in contracts with project partners (AEC, etc).

Resource(s)

Template RFP Language: *ownersCAN to finalize*
Template AEC Contract Language: *ownersCAN to finalize*
Case Studies:
Hudson Pacific Approach to Embodied Carbon

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Concept/Schematic Design	*Requiring **embodied carbon accounting for projects***
Construction		
Operations		
Deconstruction		

Typical Roadblocks:
1. Lack of Owner knowledge or experience with embodied carbon accounting.

Suggestions:
1. Use the ownersCAN Embodied Carbon Action Plan (ECAP) to align on embodied carbon requirements.
2. Request to join ownersCAN biweekly calls to learn from and share with a consortium of Owners at various stages of their embodied carbon journey.
3. Sharing is caring!

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Concept/ Schematic Design	*Using **embodied carbon data to inform systems level design*** ⚠
Construction		
Operations		
Deconstruction		

Main Request

Conduct a whole-building life cycle analysis (WBLCA) to optimize design and materials

Key Action(s)

Include completion of WBLCA in project team scope and deliverables.

Key Step(s)

1. Assign a team member to manage the WBLCA
2. Complete a WBLCA at conceptual and schematic design milestones.
3. Study material systems using WBLCA tools and optimize choices based on results.

Resource(s)

ownersCAN to share case study(s) of use of WBLCA tool in early design to optimize design and materials

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Concept/ Schematic Design	*Using **embodied carbon data to inform systems level design*** ⚠
Construction		
Operations		
Deconstruction		

Typical Roadblocks:

1. Lack of Owner knowledge or experience with embodied carbon accounting.
2. Lack of AEC partner knowledge with embodied carbon accounting.

Suggestions:

1. Use the ownersCAN Embodied Carbon Action Plan (ECAP) to align on embodied carbon requirements and link to resources/tools/case studies.
2. Join the Carbon Leadership Forum online community to access consortium of building industry professionals working on embodied carbon.

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Design Development	*Setting* ***a bill of materials for embodied carbon tracking*** ⚠
Construction		
Operations		
Deconstruction		

Main Request

Utilize WBCLA tool results (alongside cost) to inform selection of systems and materials.

Key Action(s)

Incorporate reporting of WBLCA analysis on carbon impacts of system and materials options in decision making.

Key Step(s)

1. Run systems and materials level options through WBLCA tool to provide embodied carbon emissions data on options.
2. Present embodied carbon emissions data alongside cost to inform decision making on systems and materials to be used.
3. Make decisions on materials and systems to be used, using cost and carbon data.

Resource(s)

ownersCAN to share case study of use of WBLCA tool in early design to optimize design and materials

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Design Development	*Setting **a bill of materials for embodied carbon tracking*** ⚠
Construction		
Operations		
Deconstruction		

Typical Roadblocks:

1. It's easy to become overwhelmed with the number of materials and options.
2. Different tools use different databases and may return different results.

Suggestions:

1. It's ok to start with imperfect data, or start with limited scope of buildings and/or materials. The key is to start!
2. Differences in underlying databases will create different totals, but directionally the data is fairly consistent.
3. Choosing one tool or suite of tools and sticking with them for your portfolio of buildings and embodied carbon accounting can be helpful.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Design Development	*Creating* ***a carbon estimate alongside DD cost estimates*** ⚠
Construction		
Operations		
Deconstruction		

Main Request

Create a product stage (A1-A3) emissions carbon estimate.

Key Action(s)

Create an EC3 project for selected materials.

Key Step(s)

1. Utilize Construction Estimate or BIM produced materials quanities for inputs into EC3 project.
2. Assign collections of EPDs per material category to create a conservative estimate and an achievable target per material category for the project's product stage emissions.

Resource(s)

Video on how to create a project in the EC3 tool: https://www.youtube.com/watch?v=y49z7l6kco8

Case Studies:

Microsoft Whitepaper: "Reducing Embodied Carbon in Construction"

Interface/JLL Case Study: "Embodied Carbon: Interface Basecamp"

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Design Development	*Creating **a carbon estimate alongside DD cost estimates*** ⚠
Construction		
Operations		
Deconstruction		

Typical Roadblocks:

1. Unclear scope.
2. Access to material quantities at this stage of design.
3. Access of regional EPD data depending on where you are.

Suggestions:

1. If the Owner, use Building Transparency's template Basis of Design/Contract language to set bill of materials to include for your AEC team.
2. If using Autodesk software, utilize *EC3's Revit plugin* to import material quantities.
3. If Tally was used for WBLCA work, utilize *Tally's export to EC3 function* to import material quantities.
4. If the General Contractor or Construction Estimator is engaged at this stage, ask them for their detailed cost estimate (or give them a list of materials that you want quantities for) for hand entry into EC3.
5. It's ok to start with a broader geographic collection of EPDs if needed at this stage, and refine over time.
6. If EPD data is missing or light, utilize BT's EPD request letter to request EPDs from typical material suppliers used in that region.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Design Development	*Creating **low carbon specifications*** ⚠
Construction		
Operations		
Deconstruction		

Main Request

Set a specific list of materials to include in low carbon specifications.

Key Action(s)

Utilize the EC3 tool to inform materials to include and language to use in specifications.

Key Step(s)

1. Utilize EC3 project Sankey diagram to inform high impact material categories, and available emissions reductions.
2. Utilize the EC3 find & compare materials feature to source EPDs for products within material categories that meet performance/design requirements.
3. If products have EPDs already, require them in the specifications.
4. If products don't have EPDs already, request them from suppliers.

Resource(s)

Template Specification Language & Matrix: https://app.box.com/s/ipnh3qnnsyxus4507kswctabxnyt9hwl

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Design Development	*Creating **low carbon specifications*** ⚠
Construction		
Operations		
Deconstruction		

Typical Roadblocks:

1. Unclear scope
2. Lack of embodied carbon knowledge by specifier.
3. Lack of EPDs for the materials included.

Suggestions:

1. If the Owner, use Building Transparency's template Basis of Design/Contract language to set bill of materials to include for your AEC team.
2. If EPDs are not yet available, request (but don't require) them in the specifications, to spur market demand and send Building Transparency's template "EPD Request Letter" to manufacturers.
3. Utilize Building Transparency's template specification language to standardize the ask to manufacturers for EPD data

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
	Construction Documents	*Refining* ***a carbon estimate alongside CD cost estimates*** ⚠
Construction		
Operations		
Deconstruction		

Main Request

Create a product stage (A1-A3) emissions carbon estimate.

Key Action(s)

Create an EC3 project for selected materials.

Key Step(s)

1. Utilize Construction Estimate or BIM produced materials quanities for inputs into EC3 project.
2. Assign collections of EPDs per material category to create a conservative estimate and an achievable target per material category for the project's product stage emissions.

Resource(s)

Video on how to create a project in the EC3 tool: https://www.youtube.com/watch?v=y49z7l6kco8
Case Studies:
Microsoft Whitepaper: "Reducing Embodied Carbon in Construction"
Interface/JLL Case Study: "Embodied Carbon: Interface Basecamp"

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
	Construction Documents	*Refining **a carbon estimate alongside CD cost estimates*** ⚠
Construction		
Operations		
Deconstruction		

Typical Roadblocks:

1. Unclear scope.
2. Access to material quantities at this stage of design.
3. Access of regional EPD data depending on where you are.

Suggestions:

1. If the Owner, use Building Transparency's template Basis of Design/Contract language to set bill of materials to include for your AEC team.
2. If using Autodesk software, utilize *EC3's Revit plugin* to import material quantities.
3. If Tally was used for WBLCA work, utilize *Tally's export to EC3 function* to import material quantities.
4. If the General Contractor or Construction Estimator is engaged at this stage, ask them for their detailed cost estimate (or give them a list of materials that you want quantities for) for hand entry into EC3.
5. It's ok to start with a broader geographic collection of EPDs if needed at this stage, and refine over time.
6. If EPD data is missing or light, utilize BT's EPD request letter to request EPDs from typical material suppliers used in that region.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction	Construction Documents	*Refining **low carbon specifications***
Construction		
Operations		
Deconstruction		

Main Request

Refine low carbon specifications based on final material and product selection.

Key Action(s)

Utilize the EC3 tool to inform materials to include and language to use in specifications.

Key Step(s)

1. Utilize EC3 project Sankey diagram to inform high impact material categories, and available emissions reductions.
2. Utilize the EC3 find & compare materials feature to source EPDs for products within material categories that meet performance/design requirements.
3. If products have EPDs already, require them in the specifications.
4. If products don't have EPDs already, request them from suppliers.

Resource(s)

Template Specification Language & Matrix: https://app.box.com/s/ipnh3qnnsyxus4507kswctabxnyt9hwl

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
	Construction Documents	*Refining **low carbon specifications***
Construction		
Operations		
Deconstruction		

Typical Roadblocks:

1. Unclear scope
2. Lack of embodied carbon knowledge by specifier.
3. Lack of EPDs for the materials included.

Suggestions:

1. If the Owner, use Building Transparency's template Basis of Design/Contract language to set bill of materials to include for your AEC team.
2. If EPDs are not yet available, request (but don't require) them in the specifications, to spur market demand and send Building Transparency's template "EPD Request Letter" to manufacturers.
3. Utilize Building Transparency's template specification language to standardize the ask to manufacturers for EPD data

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Procurement	*Creating **low carbon bid documents*** ⚠
Operations		
Deconstruction		

Main Request

Create standard embodied carbon bid language for included material categories.

Key Action(s)

Utilize bid language to inform suppliers of request for or requirement of EPDs.

Key Step(s)

1. Utilize the EC3 tool to understand the supplier market and will or won't have EPDs available at time of bid.
2. Do early outreach with suppliers that EPDs will be requested at time of bid, to enable supplier to engage in EPD process early if they choose to.
3. Craft language to meet the current supplier market, either requesting or requiring EPDs alongside cost at time of bidding.

Resource(s)

Template Bid Language: https://app.box.com/folder/110203883630?s=mama6l86etdmqevits98w8ijggtv168o

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Procurement	*Creating **low carbon bid documents*** ⚠
Operations		
Deconstruction		

Typical Roadblocks:

1. Lack of Contractor Knowledge of embodied carbon/EPDs
2. Access of regional EPD data depending on where you are.

Suggestions:

1. Provide Contractor training on embodied carbon and the EC3 tool.
2. Utilize Building Transparency's "template Bid Leveling Language" to collect available EPD data at time of bid, and incentivize suppliers to invest in and provide EPDs for project materials.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Procurement	*Including **embodied carbon data in bid leveling*** ⚠
Operations		
Deconstruction		

Main Request

Utilize embodied carbon data, alongside cost data, to inform selection of bidders.

Key Action(s)

Create standard bid leveling sheet/analysis spreadsheet that includes embodied carbon data.

Key Step(s)

1. Include fields for: if bidder provided EPDs; if bidder would commit to providing EPD by end of construction; if bidder would charge the project for EPD cost; GWP/unit of material if EPD provided.

Resource(s)

EC3 to include bid leveling sheet by September 2021.
Case Studies
Microsoft Whitepaper: "Reducing Embodied Carbon in Construction"

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Procurement	*Including **embodied carbon data in bid leveling*** ⚠
Operations		
Deconstruction		

Typical Roadblocks:

1. Lack of Contractor Knowledge of embodied carbon/EPDs
2. Access of regional EPD data depending on where you are.

Suggestions:

1. Provide Contractor training on embodied carbon and the EC3 tool.
2. Utilize the EC3 tool's bid leveling sheet *(available September 2021)* to provide cost and carbon data from bidders, for bid selection.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	
Operations		
Deconstruction		

Tracking ***realized embodied carbon of materials in construction*** ⚠

Main Request

Create an as-built project to report realized embodied carbon.

Key Action(s)

Collect as built quantities and embodied carbon data for included materials and input them into the EC3 tool.

Key Step(s)

1. Track as built quantities and EPDs as part of the submittal process.
2. Create an as built project in the EC3 tool, input as built quantity data and select EPDs for products installed.

Resource(s)

Case Studies: Microsoft Whitepaper: "Reducing Embodied Carbon in Construction"

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	*Tracking **realized embodied carbon of materials in construction*** ⚠
Operations		
Deconstruction		

Typical Roadblocks:

1. Lack of Contractor Knowledge of embodied carbon/EPDs
2. Access of regional EPD data depending on where you are.

Suggestions:

1. Provide Contractor training on embodied carbon and the EC3 tool.
2. It's ok to use conservative or average placeholders for materials without product specific EPDs if needed, but be sure to request them so manufacturers have the market incentive to invest in EPDs for your next project.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	*Minimizing **transportation carbon emissions***
Operations		
Deconstruction		

Main Request

Implement a materials sourcing and fuel plan with suppliers of major materials.

Key Action(s)

Create standard supplier bid language and reporting forms.

Key Step(s)

1. Track material manufacturing location, distance travelled to site, mode of transportation and fuel type.
2. Identify and implement strategies to reduce material transport emissions (ie. alternative modes of transport, alternative fuels, transportation electrification).
3. Create summary sheet of transport emissions and report monthly to Project Team and Owner.

Resource(s)

EC3 to include bid leveling sheet by September 2021.
Case Studies: Microsoft Whitepaper: "Reducing Embodied Carbon in Construction"

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	*Minimizing **transportation carbon emissions*** ⚠
Operations		
Deconstruction		

Typical Roadblocks:

1. Lack of Contractor Knowledge of embodied carbon and construction emissions.
2. Resistance by Contractor/Subcontractors to track or supply information needed.

Suggestions:

1. Provide Contractor training on embodied carbon and construction emissions.
2. Start with a limited scope to manage resources and encourage engagement and implementation.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	*Minimizing **construction site carbon emissions***
Operations		
Deconstruction		

Main Request

Implement a site emissions reduction plan.

Key Action(s)

Create standard supplier bid language and reporting forms.

Key Step(s)

1. Track construction equipment fuel consumption per activity and material scope.
2. Identify and implement strategies to reduce equipment fuel emissions (ie. renewable diesel, alternative fuels, equipment electrification).
3. Create summary sheet of construction equipment emissions and report monthly to Project Team and Owner.

Resource(s)

Building Transparency to provide template bid language and reporting forms. Building Transparency to work with GC partners to provide case studies of site emissions reductions.

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	*Minimizing **construction site carbon emissions*** ⚠
Operations		
Deconstruction		

Typical Roadblocks:

1. Lack of Contractor Knowledge of embodied carbon and construction emissions.
2. Resistance by Contractor/Subcontractors to track or supply information needed.

Suggestions:

1. Provide Contractor training on embodied carbon and construction emissions.
2. Start with a limited scope to manage resources and encourage engagement and implementation.

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	
Operations		
Deconstruction		

*Minimizing **construction waste***

Main Request

Implement a construction waste diversion plan to reduce materials to landfill.

Key Action(s)

Create standard supplier bid language and reporting forms.

Key Step(s)

1. Track construction waste, including diversion rate.
2. Source separate waste for major material streams to enable higher recycling rate.
3. When creating a demolition plan, look for opportunities for deconstruction and salvage of materials to promote circular economy.

Resource(s)

Building Transparency to provide template bid language and reporting forms.
Case Studies: Microsoft Whitepaper: "Reducing Embodied Carbon in Construction"

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction	Construction	*Minimizing **construction waste***
Operations		
Deconstruction		

Typical Roadblocks:
1. ...

Suggestions:
1. ...

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations	Use/Replacement	*Minimizing **replacement of materials***
Deconstruction		

Main Request

During Design Phase, include analysis of durability and performance of materials in selection process.

Key Action(s)

Assess reference service life and durability of major materials to account for replacement cycles during the building use phase.

Key Step(s)

1. Identify key materials that are typically replaced during a building's life cycle. (ex. Roofing, Cladding, Flooring, Paint, etc)
2. Include the number of projected replacements and associated embodied carbon in analysis of proposed materials and products.
3. Prioritize use of materials with longer use cycles/fewer replacements during materials and product selection.

Resource(s)

....

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations	Use/Replacement	*Minimizing **replacement of materials*** ⚠
Deconstruction		

Typical Roadblocks:
1. …

Suggestions:
1. …

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations	Use/Replacement	*Minimizing **replacement of materials***
Deconstruction		

Main Request

During Use Phase, promote longer replacement cycles of materials.

Key Action(s)

Create standards around replacement cycles for key materials.

Key Step(s)

1. Assess current standards and practices for determining material replacement during a building's use phase.
2. Commit to replacement cycles based on material or product performance vs a desired change in aesthetic/etc. and build this into building standards.

Resource(s)

...

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations	Use/Replacement	*Minimizing **replacement of materials*** ⚠
Deconstruction		

Typical Roadblocks:
1. …

Suggestions:
1. …

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations		
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***

Main Request

During Design Phase, include analysis of materials salvage, reuse and deconstruction for new and existing buildings included in scope.

Key Action(s)

Include materials reuse and design for disassembly when deciding on major structural and envelope systems, and prioritize materials with high recycled content during product selection and specification.

Key Step(s)

1. Look for opportunities for materials reuse for components of new building, and potential to design for disassembly.
2. If demolishiing an existing building, study opportunities for materials salvage and manufacturer take back programs.
3. Require high recycled content in specified and procured materials.

Resource(s)

...

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Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations		
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***

Typical Roadblocks:
1. …

Suggestions:
1. …

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations		
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***

Main Request

During construction phase, require high percentage diversion from landfill.

Key Action(s)

Create standards for construction waste diversion.

Key Step(s)

1. Include a high percentage construction waste diversion requirement in project requirements and contracts.
2. Include desire or requirement for a certain percentage of material salvage for reuse and/or commit to manufacturer material take back programs, if demolishing an existing building.

Resource(s)

ownersCAN *embodied carbon action plan*

Building Transparency

Project Phase	Sub-Phase	*Chapter*
First Steps		
Preconstruction		
Construction		
Operations		
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***

Typical Roadblocks:
1. …

Suggestions:
1. …

ownersCAN *embodied carbon action plan*

Project Phase	Sub-Phase	*Chapter*
First Steps	Pre-Design	*Setting **embodied carbon benchmarks and targets***
		*Demonstrating **market demand for low carbon materials***
Preconstruction	Concept/ Schematic Design	*Requiring **embodied carbon accounting for projects***
		*Using **embodied carbon data to inform systems level design***
	Design Development	*Setting **a bill of materials for embodied carbon tracking***
		*Creating **an upfront carbon estimate***
		*Creating **low carbon specifications***
	Construction Documents	*Refining **the upfront carbon estimate***
		*Refining **low carbon specifications***
Construction	Procurement	*Creating **low carbon bid documents***
		*Including **embodied carbon data in bid leveling***
	Construction	*Tracking **realized embodied carbon of materials in construction***
		*Minimizing **transportation carbon emissions***
		*Minimizing **construction site carbon emissions***
		*Minimizing **construction waste***
Operations	Use/Replacement	*Minimizing **replacement of materials***
Deconstruction	Demolition/Disposal	*Promoting **a circular economy***

Currently in *draft form*, this plan outlines the key steps and actions necessary to *reduce embodied carbon* of the buildings we design, construct and operate.

It has been informed by a working group of engaged building owners, developers and operators who are *committed to taking action.*

This is intended to be a *constantly improving resource.*

We welcome feedback and input. Please go to our ownersCAN website and fill out the contact form to submit comments and get on the list for updates related to this plan and other ownersCAN initiatives. Let us know if you are an Owner interested in joining the movement!

Building Transparency