



EC3 Tips for General Contractors

This document should be used in conjunction with EC3's other training materials including:

- The [EC3 User Guide](#)
- [EC3 FAQ](#)
- Various training resources located on Building Transparency's website including [documents](#), [videos](#), and [case studies](#).

Embodied Carbon 101

- Embodied carbon emissions are generated by the manufacturing, transportation, installation, use, and disposal of construction materials used in buildings, roads, and other infrastructure throughout their lifecycle. "Upfront" embodied carbon is a term used to describe upstream carbon emissions from the initial material extraction, transportation, and manufacture of these materials.
- Type III Environmental Product Declarations (EPDs) are third-party verified documents that communicate, at a minimum, the upfront environmental impact of materials. Think of these as nutrition labels for materials. The EPD will tell us the global warming potential (GWP) of a material or product.
- The unit of measure used to quantify embodied carbon/ GWP is kg CO₂e, pronounced "kilograms of carbon dioxide equivalent." This metric communicates the impacts of all greenhouse gases, not just carbon dioxide, in a single number.
- To calculate the embodied carbon of individual projects in EC3, you will need material quantities and a GWP value for each material or product for which you want to quantify the embodied carbon.
- For more on what embodied carbon is and why it is critical to reduce it in the built environment, check out [Carbon Leadership Forum's "Introduction to Embodied Carbon"](#) and other resources.

Calculating Embodied Carbon using EC3

- The formula for calculating embodied carbon is material quantity multiplied by GWP. This is the basic formula that is built into the EC3 tool.
- Check out our [EC3 Product Brief](#) for an introduction to the EC3 tool.
- Check out our [EC3 User Guide](#) for detailed information on how to use the tool and how it works.
- Users have multiple options to add material quantities to a project in EC3:
 - Import from tallyLCA.
 - Import directly from Revit using tallyCAT.
 - Manually enter quantities from your project's estimate (quantity takeoff, subcontractor quantities, etc.).
 - There are pros and cons to each method. Talk to a staff member from Building Transparency if you are unsure which method will be best for your project.
- Users have multiple options to assign GWP values to each material or product in EC3:
 - Collection - users may search the EC3 database using key design criteria and use the Conservative average (or 80th percentile) of the resulting data as an initial placeholder.
 - Industry-Wide (IW) EPD - users may select a relevant IW EPD, which aggregates data from multiple manufacturers and facilities as a placeholder.
 - Product-Specific (PS) EPD - The most accurate GWP value will be the PS EPD relevant to the material or product that will be used on the project.



Integrating EC3 and Embodied Carbon Reduction into Preconstruction and Procurement

- Confirm the scope and requirements related to embodied carbon for your project.
 - Are there any policy requirements in your region (local, state, federal, country, sub-regional)?
 - Are there specification/RFP language or drawing notes related to embodied carbon?
 - Does your developer or design team have specific goals or interests related to embodied carbon?
 - Are you pursuing a third-party certification with embodied carbon requirements, such as ZCC, LBC, LEED, BREEAM?
- Determine how many EC3 models you will generate and at what stages.
 - As a best practice, target completing at least one EC3 model with construction documents/ at time of bid and a final EC3 model using as-built quantities at the end of construction.
- Determine team roles and responsibilities.
 - Will one person on the estimating, VDC, or construction team be completing the EC3 model, or will multiple people?
- Include embodied carbon and EC3 requirements in project kick-off meetings.
- Make sure everyone on the project team (owner, design team, GC project team, consultants, bidders, material suppliers) is aware of the project's goals and/or requirements.
- Include specific instructions for bidders in Invitations to Bid (ITB).
 - Consider hosting a pre-bid meeting for bidders who may have questions or need clarity on the requirements.
- Determine which subcontractors will be purchasing materials in the material categories included in the EC3 scope. Consider adding line items to relevant bid forms such as:
 - Request detailed material quantity breakouts as needed to complete EC3 analysis. For example, you will need to know the CY or m3 of each concrete mix design rather than total CY or m3 of concrete for a given project.
 - EC3 accepts certain units of measure that subs may not be used to reporting.
 - Check out our cheat sheet [here](#) to determine what UOM EC3 will accept for each material category.
 - Request a Type III Product Specific EPD to be submitted at time of bid for each material that will be included in the EC3 analysis.
 - Request low-carbon alternatives, especially in high-impact material categories such as concrete, steel, insulation, and aluminum. Subcontractors and material suppliers are experts in their particular field. Ask them:
 - To bring their ideas to the table for strategies that can reduce embodied carbon that would be appropriate for your specific project.
 - For the cost add or savings, schedule impact, and EPD for each alternate. Think of this as “carbon value engineering.”
- Add language related to embodied carbon and EC3 requirements to subcontracts. Check out our templates [here](#).

There is no one-size-fits-all approach to integrating embodied carbon tracking and reduction into construction projects. For more guidance, reach out to a Building Transparency staff member.