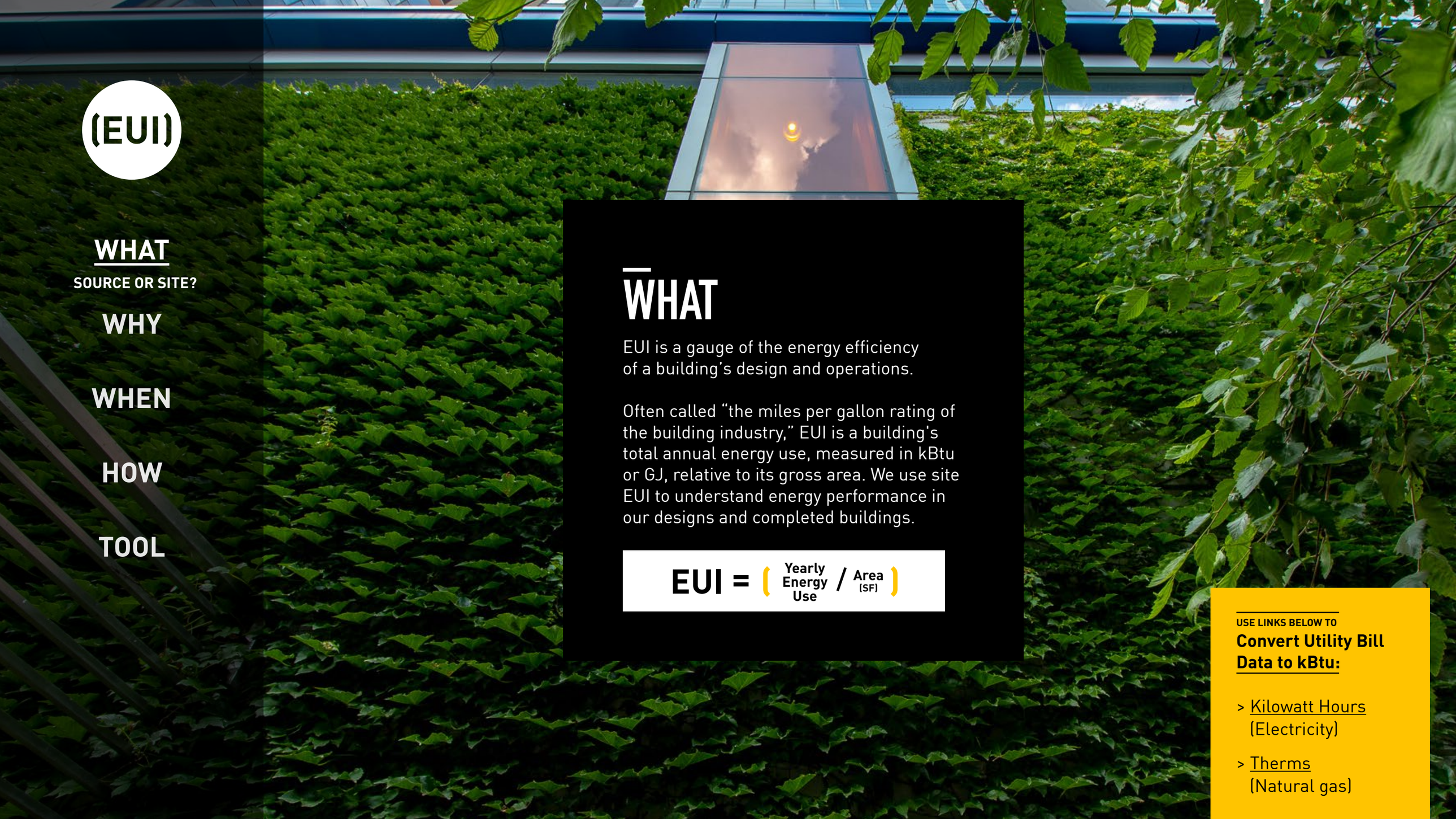
ENERGY USE INTENSITY

(EUI)

WHAT WHY WHEN HOW TOOL



(EUI)

WHAT

EUI is a gauge of the energy efficiency of a building's design and operations.

Often called "the miles per gallon rating of the building industry," EUI is a building's total annual energy use, measured in kBtu or GJ, relative to its gross area. We use site EUI to understand energy performance in our designs and completed buildings.

$$EUI = \left(\frac{\text{Yearly Energy Use}}{\text{Area (SF)}} \right)$$

USE LINKS BELOW TO

Convert Utility Bill Data to kBtu:

> Kilowatt Hours (Electricity)

> Therms (Natural gas)

SOURCE OR SITE?

EUI is expressed relative to its site or source energy.

Source EUI

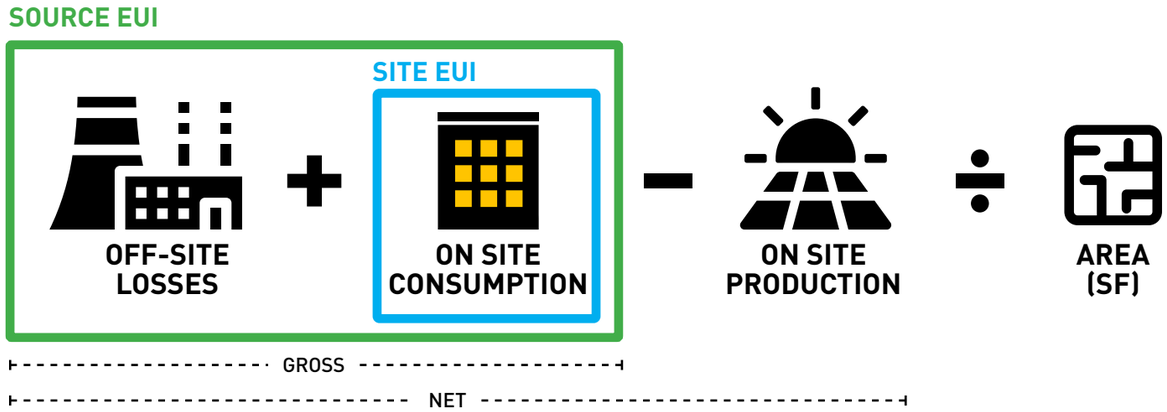
Includes all heat and electricity use back to the original source and any energy losses from production, transmission, and delivery to the site.

Seen as a more complete measurement of a building's energy use.

Site EUI

The amount of energy consumed at the building site, as reflected in utility bills.

This is often referenced by designers, where the design scope is limited to a specific building and site, exclusive of the original off site energy source.



Predicted Energy Use Intensity (pEUI)

The modeled site EUI using energy modeling simulation software.

Differences between Building Energy Modeling and Building Operation Modeling may cause pEUI to differ from actual building operations.

(EUI)

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WHY

1. **We can measure** an existing building's actual, metered energy consumption.
2. **We can compare** average annual energy use of similar building types and locations based on collected EUI data
   See CBECS for more --->
3. **We can predict** energy use for a specific project, based on EUI data for similar projects or by generating pEUI (predicted EUI) via energy modelling.

Commercial Building Energy Consumption Survey (CBECS)

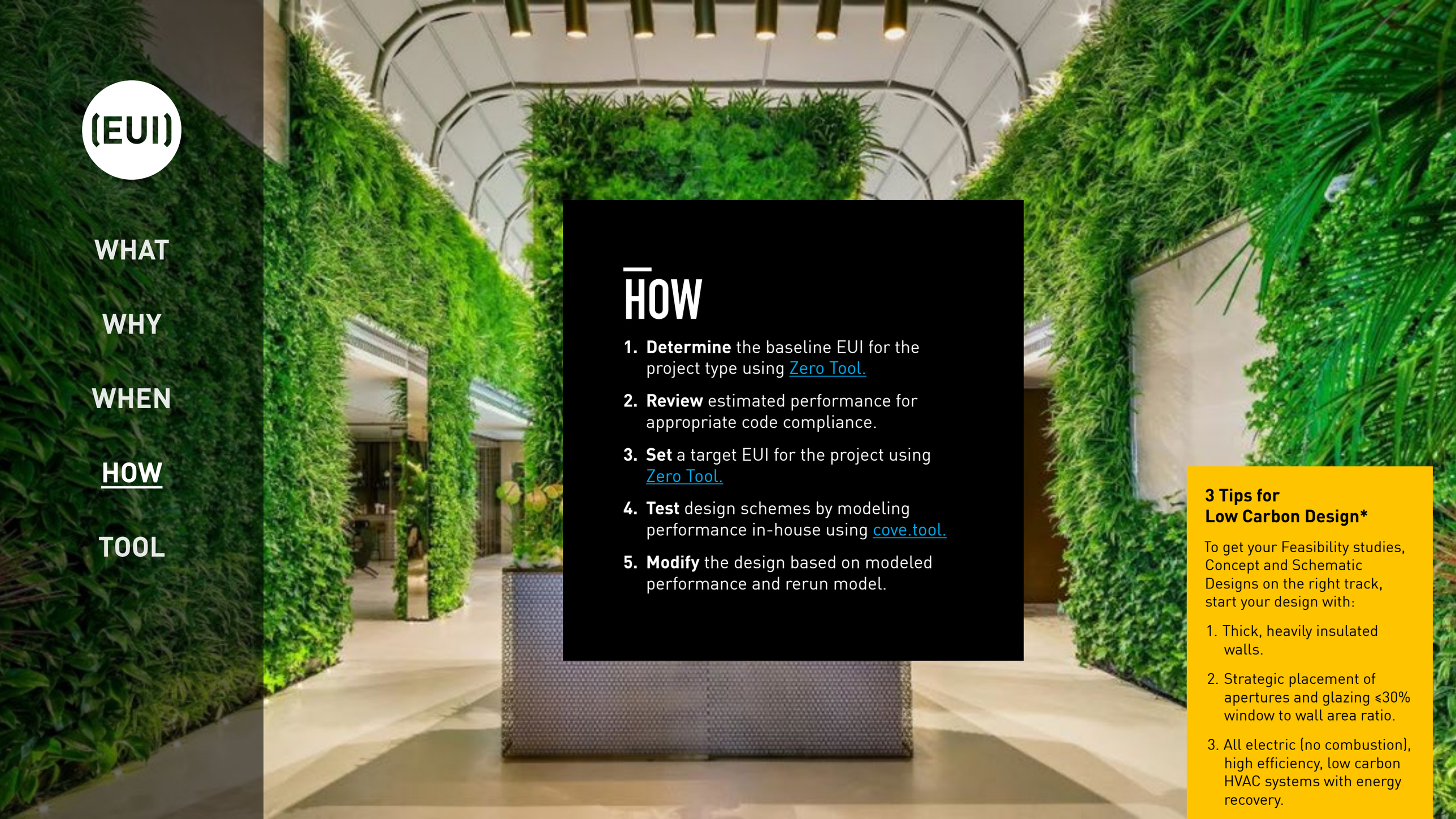
A national sample survey that collects information on the stock of U.S. commercial buildings, including their energy-related building characteristics and energy consumption data in EUI.

(EUI)

WHEN

When should I use EUI on my project?

1. **Compare** performance or “benchmark” to other similar buildings
2. **Estimate** performance for compliance with energy code
3. **Set** a target for energy performance before design starts
4. **Collect** actual energy use data from owner once the building is in operation.



(EUI)

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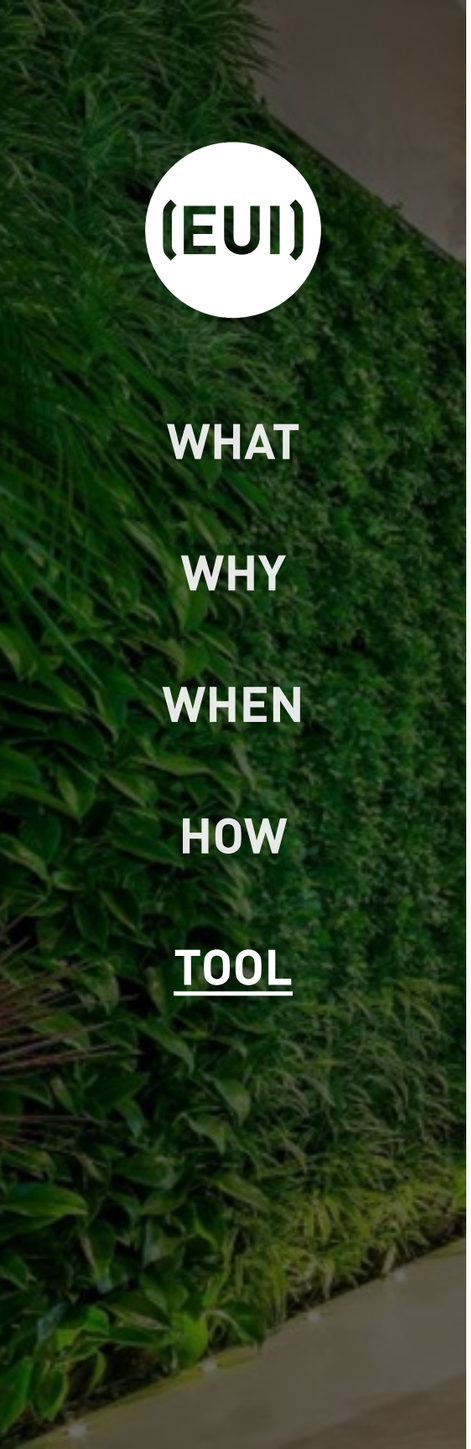
1. **Determine** the baseline EUI for the project type using Zero Tool.
2. **Review** estimated performance for appropriate code compliance.
3. **Set** a target EUI for the project using Zero Tool.
4. **Test** design schemes by modeling performance in-house using cove.tool.
5. **Modify** the design based on modeled performance and rerun model.

3 Tips for Low Carbon Design*

To get your Feasibility studies, Concept and Schematic Designs on the right track, start your design with:

1. Thick, heavily insulated walls.
2. Strategic placement of apertures and glazing ≤30% window to wall area ratio.
3. All electric (no combustion), high efficiency, low carbon HVAC systems with energy recovery.



(EUI)

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ZERO TOOL

An Architecture 2030 project, Zero Tool was developed to set energy reduction baselines and targets, compare a building's energy performance with similar buildings and codes, and learn how a building achieved its current energy performance.

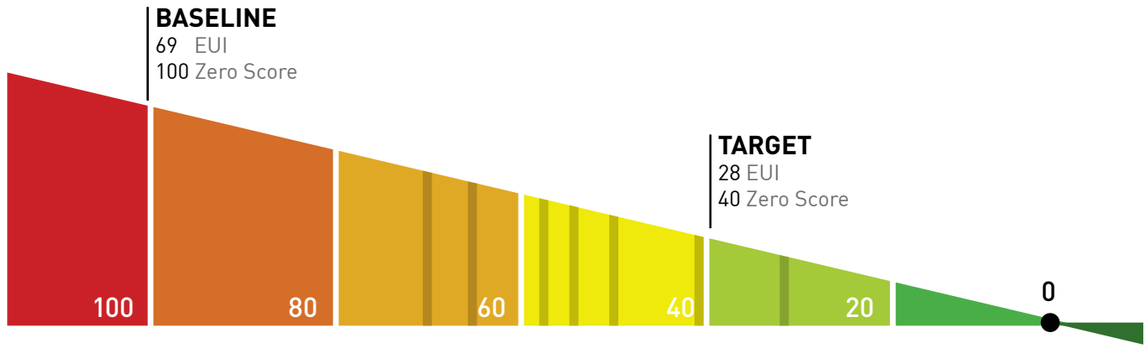
The "Zero Scale" (below) illustrates baselines, building design targets, and existing building performance.

Using Zero Tool (link)

Enter general building information

- Zip Code
- Use Type
- Area
- Energy Reduction Target (80-90%)

This will generate a project specific Baseline and Target EUI (example below)



Hover over dark bands to see various targets.

The Zero Score

A Zero Score allows properties and building codes to be compared based on their relative "percent from zero", creating normalized property and code comparisons across different locations, space use types, and building characteristics.