



Introducción y formación básica

Julio 2023

Preparado para los usuarios de
BETTER V.1.4

Contenido

- **Visión general de la herramienta**
- **Metodología del análisis**
- **Cómo usar BETTER**
 - Introducir Datos
 - Ejecutar el análisis
 - Utilizar los resultados

Agradecimientos

- BETTER es posible gracias al apoyo de la Oficina de Eficiencia Energética y Energías Renovables (EERE) del Departamento de Energía de Estados Unidos (Building Technologies Office, BTO).
- BETTER se desarrolla en el marco del Acuerdo de Investigación y Desarrollo Cooperativo (CRADA) n° FP00007338 entre los Regentes de la Universidad de California Ernest Orlando Lawrence Berkeley National Laboratory, en virtud de su contrato con el DOE de EE.UU. n° DE-AC02-05CH11231, y Johnson Controls, con el apoyo de ICF.

Visión general de la herramienta

¿Qué es BETTER?

- BETTER (**B**uilding **E**fficiency **T**argeting **T**ool for **E**nergy **R**etrofits) ofrece información práctica para mejorar la energía, las emisiones y el rendimiento financiero de los edificios y las carteras sin necesidad de realizar visitas a las instalaciones o modelado de edificios.
- La aplicación web BETTER está disponible en línea en <https://better.lbl.gov>
- El motor analítico de BETTER es de código abierto y está disponible en GitHub en <https://github.com/LBNL-JCI-ICF/better>

¿Qué es BETTER?

- BETTER requiere una entrada de datos mínima y un tiempo de ejecución corto para:
 - Comparar el uso de energía (eléctrica y fósil) de un edificio con el de otros.
 - Cuantificar los potenciales de reducción de energía, costes y gases de efecto invernadero (GEI) a nivel de edificio y de cartera de edificios.
 - Recomendar medidas de eficiencia energética (EE) para descarbonizar y electrificar los edificios y las carteras.

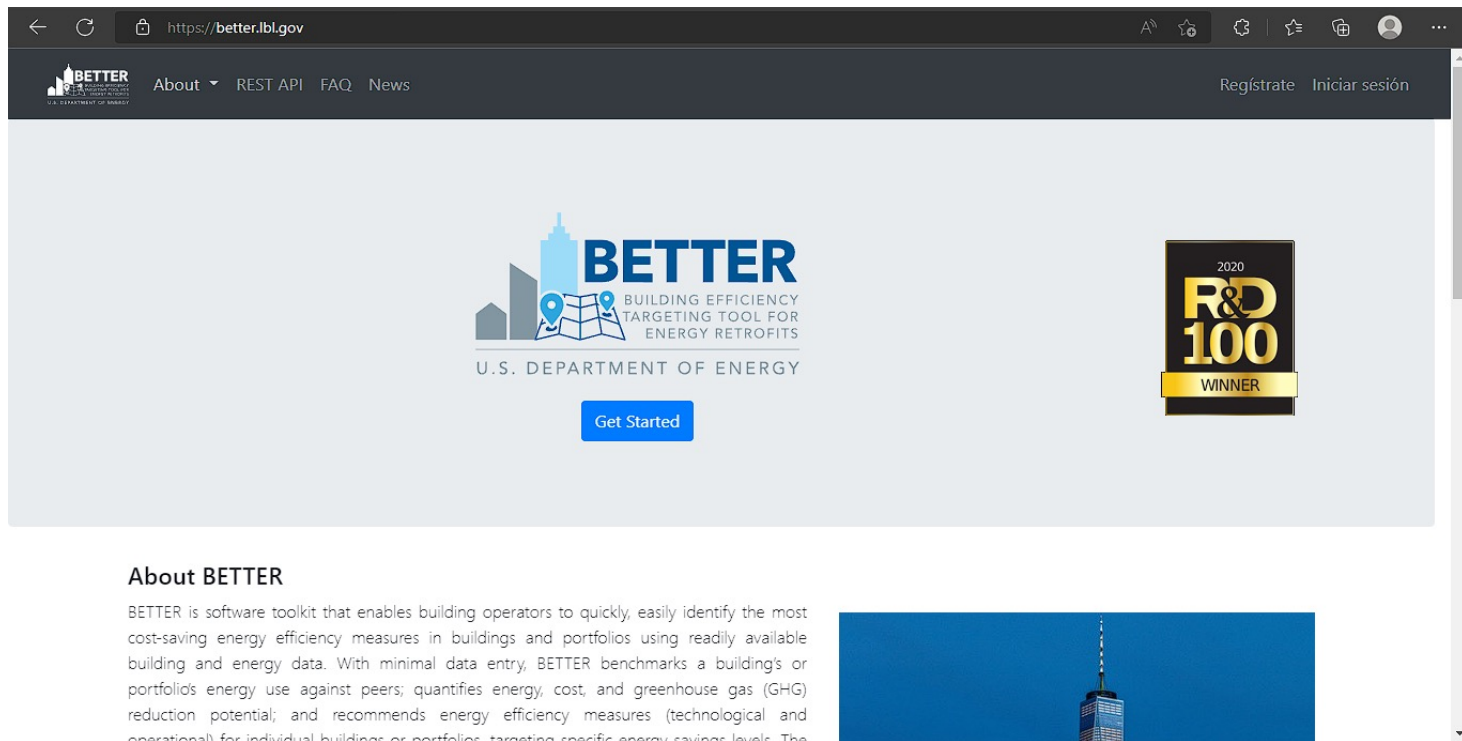
Valor para los usuarios:

- BETTER identifica mejoras operativas y tecnológicas inmediatas para reducir el uso de la energía y las emisiones de gases de efecto invernadero, a la vez que prioriza los edificios para realizar diagnósticos y análisis más exhaustivos. BETTER:
 - Sustituye los diagnósticos energéticos de Nivel 1.
 - Agiliza los diagnósticos energéticos de Nivel 2.
 - Descubre medidas sencillas de bajo o nulo coste para reducir inmediatamente los costes energéticos en un 5-10% en toda la cartera de edificios.

Resumen

Cómo funciona BETTER:

- BETTER utiliza un motor analítico de código abierto basado en datos y una interfaz web fácil de usar para analizar automáticamente el uso mensual de energía de un edificio en respuesta a las condiciones meteorológicas.



Resumen

Portfolio Summary

Number of Buildings:
32

Annual Cost Savings (USD / \$):
1,291,265
11.1 %

Electricity Energy/Cost Savings:
11.3%

Total Floor Area (m²):
820,835

Annual Energy Savings (kWh):
13,905,685
10.6 %

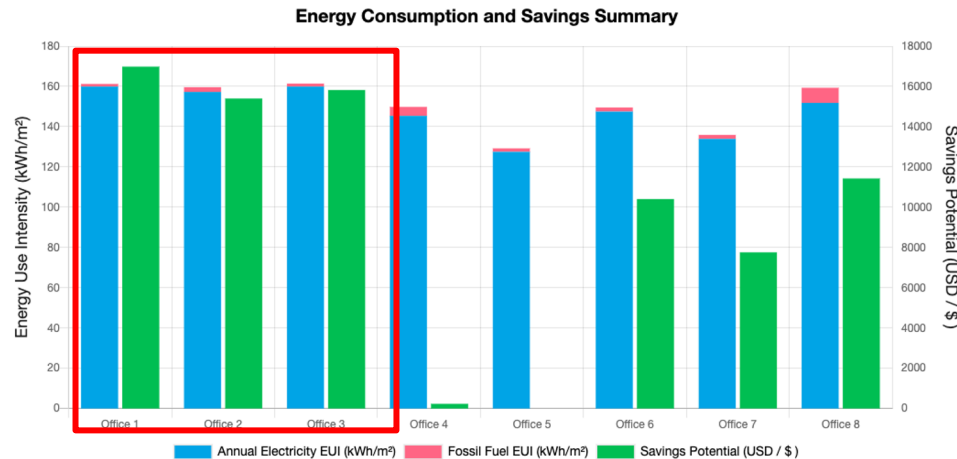
Fossil Fuel Energy/Cost Savings:
6.7%

Top Energy Efficiency Recommendations

The energy efficiency recommendations most frequently recommended :

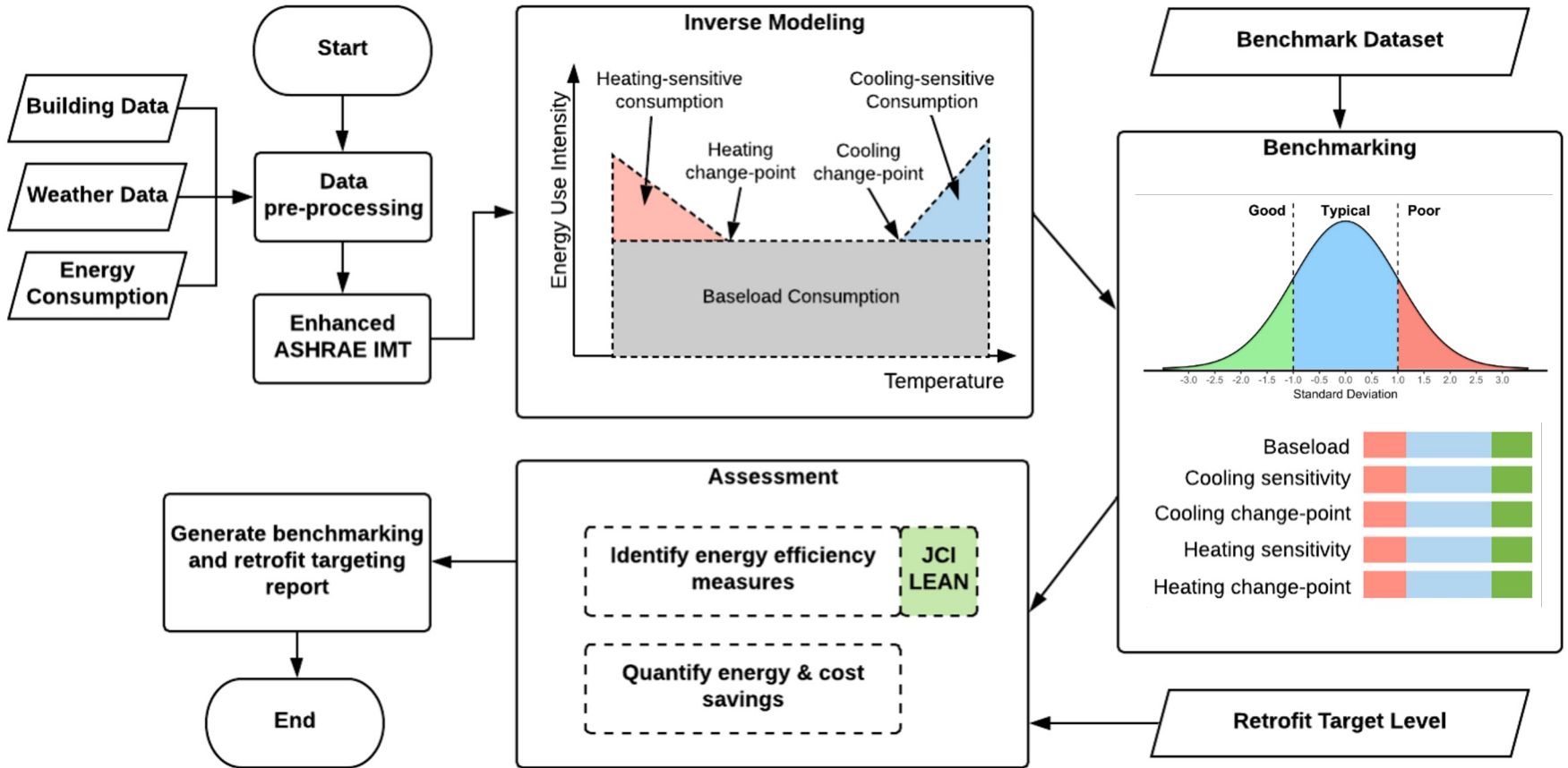
- [Reduce Equipment Schedules](#)
- [Decrease Heating Setpoints](#)
- [Reduce Lighting Load](#)
- [Reduce Plug Loads](#)
- [Increase Cooling Setpoints](#)

Análisis del Catálogo de Edificios



Métodología del análisis

Flujo de funcionamiento general



Plantilla para la carga de datos

The screenshot shows an Excel spreadsheet with the following content:

BETTER

Building Efficiency Targeting Tool for Energy Retrofits

Instructions for Use

This workbook is the BETTER Data Entry Template. To obtain a new copy of this template, follow these steps:

- 1 Access BETTER at the link below:
<https://better.lbl.gov/>
It is recommended that you read the How It Works page to familiarize yourself with the tool.
- 2 Access the tool by clicking "Run BETTER" at the top of the page, or by clicking "Get Started" on the Home page or the How It Works page.
- 3 Download the Data Entry Template

If you're ready to get started with this template, follow these steps:

- 1 Access the Property Information tab and select your Unit System at the top of the page, above the Gross Floor Area column, in the orange box.

The Unit System will determine the units in which you enter your buildings' Gross Floor Area (see below), outdoor air temperature (optional), as well as the energy unit and temperature units on your Output Reports. Note that you may still enter your utility data in whatever units are provided on your energy bills. For example,

Navigation tabs: Instructions (selected), Property Information, Utility Data, Glossary of Terms

Información sobre el inmueble

1

SI Units (meters, kWh, °C)

Gross Floor Area Unit: sq. meters

5

Select Currency * : US dollar (USD / \$)

Building ID*	Building Name*	Location*	Gross Floor Area (Excluding Parking)*	Primary Building Space Type*
1	Office 1	Miami, FL	4982	Office
2	Office 2	Houston, TX	4982	Office
3	Office 3	Atlanta, GA	4982	Office
4	Office 4	Los Angeles, CA	4982	Office
5	Office 5	Las Vegas, NV	4982	Office

1. Sistema de Unidades

- Selecione entre el Sistema Imperial de Unidades (pies, kBtu, °F) o el Sistema Internacional de Unidades (metros, kWh, °C)

2. Ubicación del edificio (Ciudad, Estado/Provincia, Código postal, País)

- Se utiliza para encontrar datos meteorológicos

3. Superficie bruta (excluido el estacionamiento)

- Se utiliza para normalizar el consumo

4. Uso principal del edificio (lista desplegable)

- Utilizado para la evaluación comparativa

5. Moneda (lista desplegable)

- Se utiliza para informar sobre el ahorro económico

Datos mensuales de consumo y costo de la energía

- Se requiere un mínimo de 12 meses consecutivos de datos de consumo de energía.
- Recolectar los datos de consumo de electricidad y combustibles fósiles de las facturas de los servicios públicos para cada período de facturación.
- El costo de la energía es opcional. Si no se introduce el coste de la energía, BETTER utilizará un coste por unidad por defecto.
- La temperatura media del aire exterior es opcional. Si no se introducen los datos meteorológicos, BETTER utilizará los datos de la Administración Nacional Oceánica y Atmosférica (NOAA).*

Building ID*	Billing Start Dates*	Billing End Dates*	Energy Type*	Energy Unit*	Energy Consumption*	Energy Cost	Average Outdoor Air Temperature
1	1/1/2017	1/31/2017	Electric - Grid	kWh (thousand Watt-hours)	66338		
1	2/1/2017	2/28/2017	Electric - Grid	kWh (thousand Watt-hours)	55528		
1	3/1/2017	3/31/2017	Electric - Grid	kWh (thousand Watt-hours)	64180		
1	4/1/2017	4/30/2017	Electric - Grid	kWh (thousand Watt-hours)	62067		
1	5/1/2017	5/31/2017	Electric - Grid	kWh (thousand Watt-hours)	69730		

* Los datos meteorológicos de la NOAA pueden no estar disponibles para todas las localidades. Se mostrará un mensaje de error en los informes de análisis de BETTER para solicitar al usuario que introduzca los datos de la temperatura media del aire exterior para una determinada ubicación y/o periodo de facturación, según corresponda. .

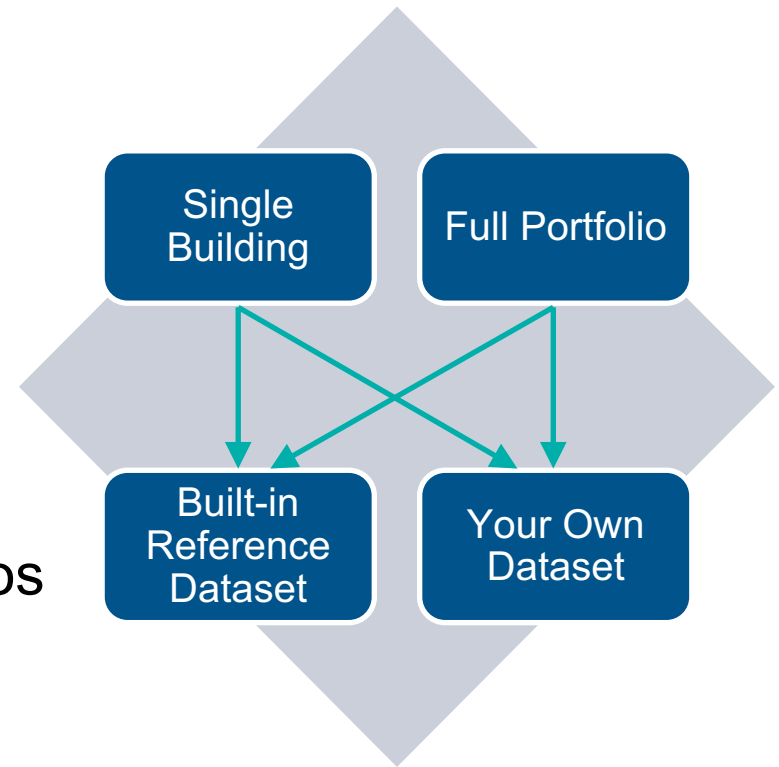
Datos meteorológicos

- **Fuente de datos:** Administración Nacional Oceánica y Atmosférica (NOAA)
- **Intervalo de tiempo:** Subhorario
- **Entrada:** Dirección, fechas de inicio y fin de los períodos de facturación

USAF	WBAN	StationID	STATIONNAME	CTRY	STATE	ICAO	LAT	LON	ELEV_M	BEGIN	END	EndYear
450320	99999	450320-99999	TA KWU LING	CH			22.533	114.15	13	19921204	20171117	2017
450350	99999	450350-99999	LAU FAU SHAN	CH			22.467	113.983	35	20040713	20171117	2017
450390	99999	450390-99999	SHA TIN	CH			22.4	114.2	8	20040713	20171117	2017
450440	99999	450440-99999	CHEUNG CHAU	CH			22.2	114.017	79	20020313	20171117	2017
450450	99999	450450-99999	WAGLAN ISLAND	CH			22.183	114.3	60	20040122	20171117	2017
470311	99999	470311-99999	MEILAN	CH		ZJHK	19.935	110.459	22.9	20040706	20171117	2017
470312	99999	470312-99999	ZHENG DING	CH		ZBSJ	38.281	114.697	71	20040706	20171117	2017
501360	99999	501360-99999	MOHE	CH			52.967	122.533	438	19730101	20171117	2017
503530	99999	503530-99999	HUMA	CH			51.733	126.633	175.6	19560820	20171117	2017
504340	99999	504340-99999	TULIHE	CH			50.45	121.7	733	19570531	20171117	2017
504680	99999	504680-99999	AIHUI	CH			50.25	127.45	166	19610801	20171117	2017
505270	99999	505270-99999	HAILAR	CH			49.25	119.7	650	19560820	20171117	2017
505480	99999	505480-99999	XIAO'ERGOU	CH			49.2	123.717	288	19570531	20171117	2017
505570	99999	505570-99999	NENJIANG	CH			49.167	125.233	243	19560820	20171117	2017
505640	99999	505640-99999	SUNWU	CH			49.433	127.35	235	19560820	20171117	2017
506030	99999	506030-99999	XIN BARAG YOUQI	CH			48.683	116.817	556.7	19600101	20171117	2017
506320	99999	506320-99999	BUGT	CH			48.767	121.917	739	19560820	20171117	2017
506560	99999	506560-99999	LONG-ZHEN	CH			48.65	126.667	305	19610801	20130120	2013
506580	99999	506580-99999	KESHAN	CH			48.05	125.883	237	19570601	20171117	2017
507270	99999	507270-99999	ARXAN	CH			47.167	119.933	997	19560820	20171117	2017
507450	99999	507450-99999	SANJIAZI	CH		ZYQQ	47.24	123.918	145.4	19560820	20171117	2017
507560	99999	507560-99999	HAILUN	CH			47.45	126.867	248	19560820	20171117	2017
507740	99999	507740-99999	YICHUN	CH			47.7	128.833	259.1	19570601	20171117	2017
507880	99999	507880-99999	FUJIN	CH			47.233	131.983	65	19560820	20171117	2017
508440	99999	508440-99999	TAILAI	CH			46.4	123.45	150	19610801	20171117	2017
508540	99999	508540-99999	ANDA	CH			46.383	125.317	150	19560820	20171117	2017
508880	99999	508880-99999	BAOQING	CH			46.317	132.183	83	19570602	20171117	2017

Tipos de datos y propiedades

- Evalúe un solo edificio o toda su cartera.
- Dos modos de uso :
 - Comparación con un conjunto de datos de referencia incorporado.
 - Comparación con su propia cartera.
- Los conjuntos de datos de evaluación comparativa incorporados son para :
 - Oficinas, edificios multifamiliares, y escuelas K-12 de Estados Unidos
 - Oficinas en México*
 - Hoteles an Túnez



**Note: At this time, the “reference” benchmark statistics for Mexico offices are not perfectly representative of the Mexico stock because the statistics were developed from a training datasets developed based on voluntary contributions from Mexico government and industry that may not fully representative of the municipal stock. We are working to expand these training datasets, and hence improve associated “reference” benchmark statistics, so they are more representative of the Mexican national stock. This includes expanding the training data sets to include: at least 30 data points for each of the 10 BETTER model coefficients for each of the climate zones in Mexico. Learn more at [FAQ](#). To contribute anonymous data to this effort, please email support@better.lbl.gov.*

Preprocesamiento automático de datos

- Lee la información del edificio (dirección, tipo de espacio, superficie bruta, etc.) y los datos mensuales de uso y coste de la energía



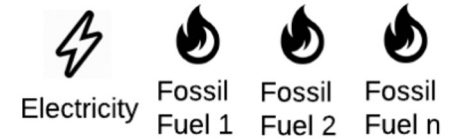
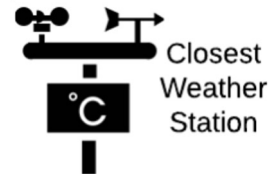
- Buscar la estación meteorológica más cercana.
- Combina diferentes tipos de consumo de combustibles fósiles y convertir la unidad de consumo de energía en kWh.*



- Descarga el archivo meteorológico subhorario del ftp de la NOAA.
- Normalizar el consumo de energía para mostrar la media de kWh/(día*m2) por mes durante al menos 12 meses.



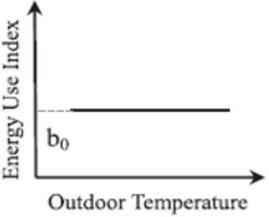
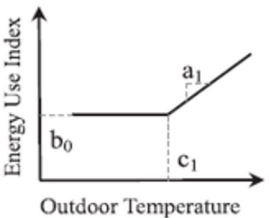
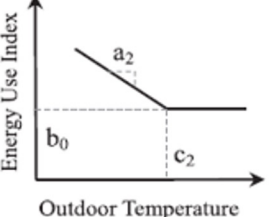
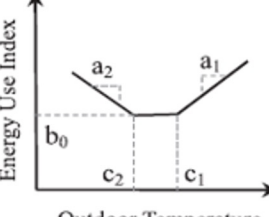
- Alinea y agrega los datos meteorológicos con los datos de consumo de energía (períodos de facturación arbitrarios).



Promedio de kWh/(día*m2) por mes durante al menos 12 meses



Modelado inverso

Model Type	Schematic Plot	Model Coefficient					Interpretation
		Baseload (b ₀)	Cooling Sensitivity (a ₁)	Cooling Change-point (c ₁)	Heating Sensitivity (a ₂)	Heating Change-point (c ₂)	
1P Model		X					(1). The building is not heated or cooled. (2). The heating and cooling system of the building only consumes a very small amount of the total energy.
3P Cooling Model		X	X	X			(1). The cooling system of the building starts to operate when the outdoor air temperature goes beyond the change-point. (2). The steeper the slope, the higher energy consumption growth as outdoor air temperature rises.
3P Heating Model		X			X	X	(1). The heating system of the building starts to operate when the outdoor air temperature drops below the change-point. (2). The steeper the slope, the higher energy consumption growth as outdoor air temperature drops.
5P Model		X	X	X	X	X	The building's cooling and heating systems are driven by the same fuel type. As the outdoor air temperature drops below a certain point, the heating system starts to operate. As the outdoor air temperature rises above a certain point, the cooling system starts to operate.

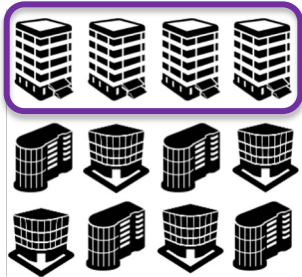
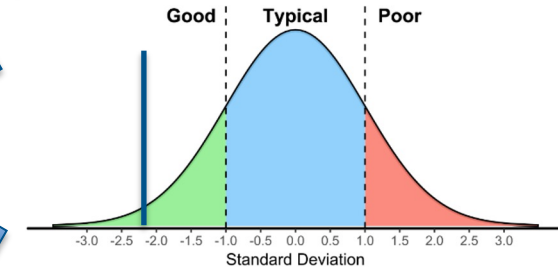
Coeficientes de referencia



Coeficientes del modelo



Electricidad Carga base



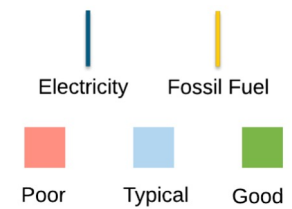
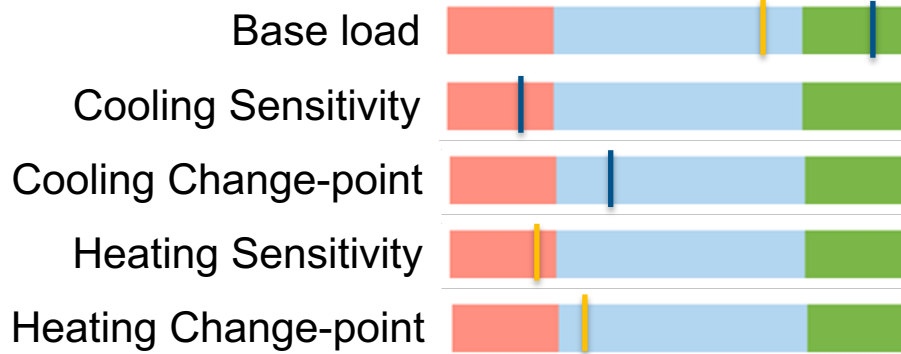
Estadísticas de referencia



Distribución de la Carga base



- Mediana
- Desviación estándar

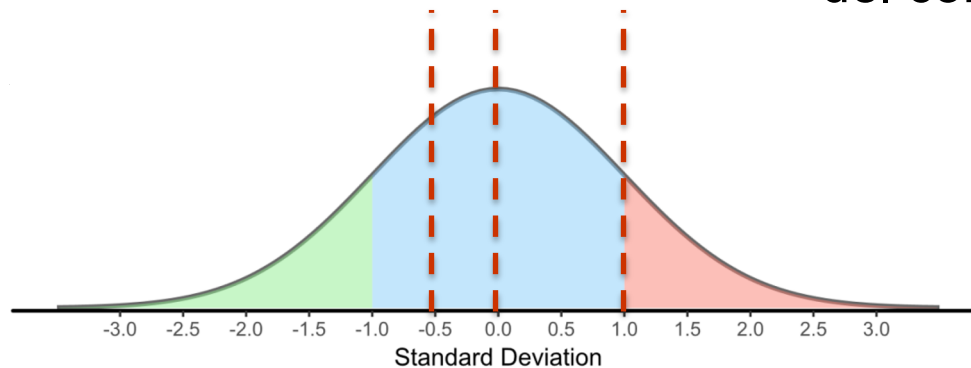


Metas de eficiencia energética

Paso 1. Especificar la meta de eficiencia energética

Agresivo ($\frac{1}{2}$ desviación estándar mejor que la mediana del conjunto de datos)

Conservador (1 desviación estándar peor que la mediana del conjunto de datos)

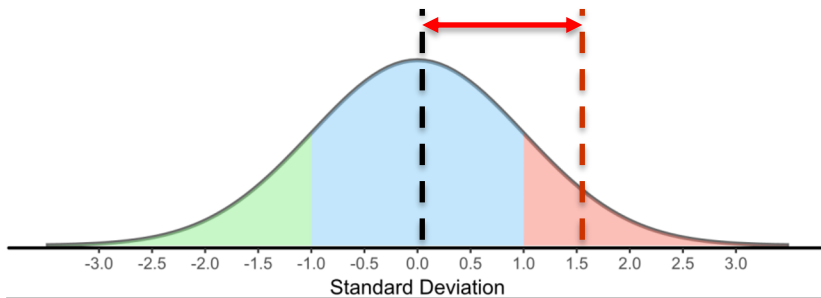


Nominal
(igual a la mediana del conjunto de datos)

Metas de eficiencia energética

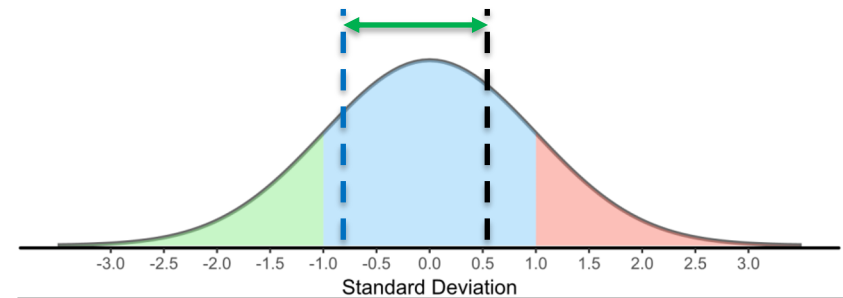
Paso 2. Determinar las medidas de mejora de las instalaciones (FIM)

Ejemplo A.



- Current model coefficient: **Poor**
- Target : **Nominal**
- Target is better than current, need to pick FIMs

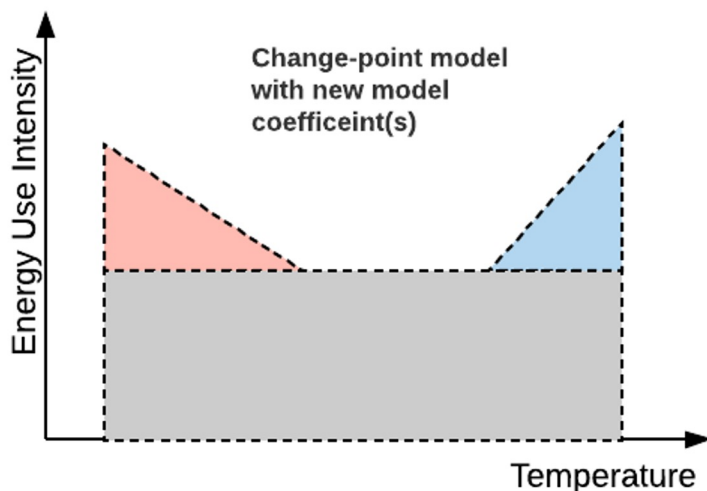
Ejemplo B.



- Current model coefficient: **Typical**
- Target : **Conservative**
- Target is worse than current, no need to pick FIMs

Estimación del ahorro de energía

Paso 3. Calcular el ahorro potencial de energía y de costes



Vuelva a ejecutar el modelo para obtener:



Consumo de energía actual



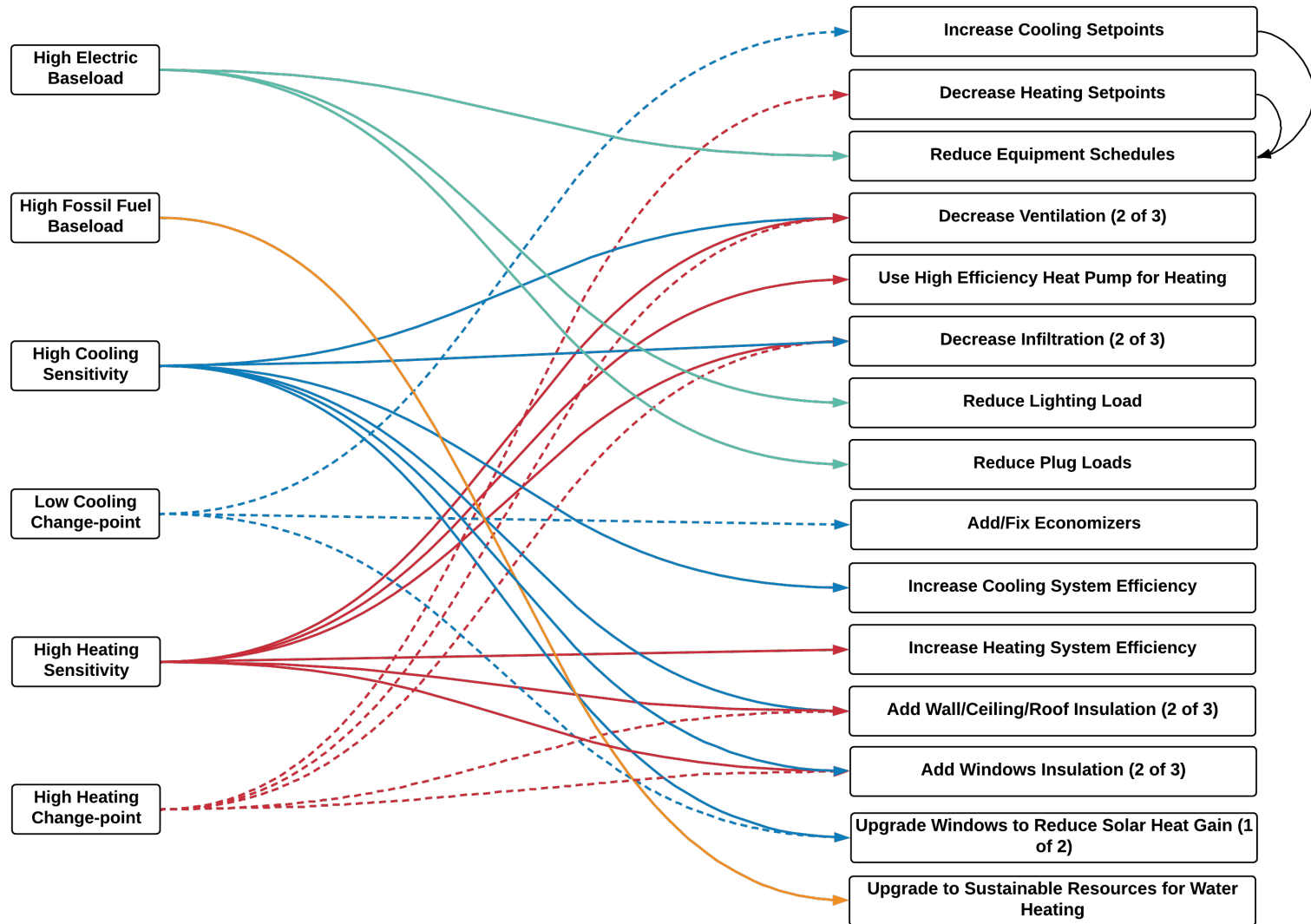
Consumo de energía estimado con los FIM sugeridos



Ahorro de energía estimado

Calcular el coste asociado

Medidas de eficiencia energética de BETTER



Inter-operabilidad de BETTER

Interoperabilidad de BETTER

- BETTER puede crear/analizar edificios o carteras a través de informes personalizados de ENERGY STAR® Portfolio Manager® Excel y proporcionar informes analíticos BETTER como archivos HTML autocontenidos.
- BETTER puede crear/analizar edificios o carteras a través de archivos XML de BuildingSync® y proporcionar informes analíticos BETTER como archivos HTML autocontenidos.¹
- Los desarrolladores de software pueden acceder a BETTER a través de la API RESTful de BETTER para: (1) crear y analizar un edificio / cartera en BETTER; y (2) recuperar informes analíticos (en JSON y/o archivos HTML autocontenidos).
- Puede realizar análisis usando BETTER desde la plataforma Standard Energy Efficiency Data™ (SEED). Contacte a Carolyn Szum CCSzum@lbl.gov para mayor información sobre cómo acceder a BETTER desde la plataforma SEED.

Soporte para ENERGY STAR® Portfolio Manager®

Objetivo: Permitir que un usuario importe los datos de varios edificios almacenados en ENERGY STAR® Portfolio Manager® para el análisis con BETTER.

Step 1 - Log in to Energy Star® Portfolio Manager®

Step 2 - On the lower left corner, click on the "custom download" link

Step 3 - Select "Multiple Properties", then select the buildings you want to download data from. Note that portfolio that contains multiple buildings

Step 4 - Select the data to download. Choose "Basic Property Information", "Meter Entries", then enter the start and end dates of the meter data. Then click on the "Submit" button

Step 5 - Shortly after the following steps, you should be able to see a new notification indicating your data is ready to download. You can download this XLSX file and upload it to BETTER.

1. Upload Data

Data Entry Template BETTER ENERGY STAR® Portfolio Manager®

Choose file

Type	Notification	Date
Success	The download you requested on September 18, 2019 is ready. Custom_Download.xlsx	9/18/2019

Want to see your ENERGY STAR Notifications? View all of the historical ENERGY STAR Notifications [here](#).

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Target and Baseline
Download energy target and energy, water and waste baselines for each property.

Soporte para BuildingSync® XML

BuildingSync® es un esquema común para los datos de las auditorías energéticas que puede ser utilizado por diferentes programas informáticos y bases de datos que participan en el proceso de auditoría energética. Permite que los datos se agreguen, se comparen y se intercambien más fácilmente entre diferentes bases de datos y herramientas de software..

Objetivo: Permitir que un usuario cargue datos en BETTER para su análisis mediante un archivo XML de BuildingSync®.

From Scratch With BuildingSync® XML

i The "With BuildingSync® XML" approach allows you to use a BuildingSync® XML file to create a building instance in BETTER. An example BuildingSync® XML file could be downloaded [here](#).

BuildingSync XML File*

--- Browse

This field is required.

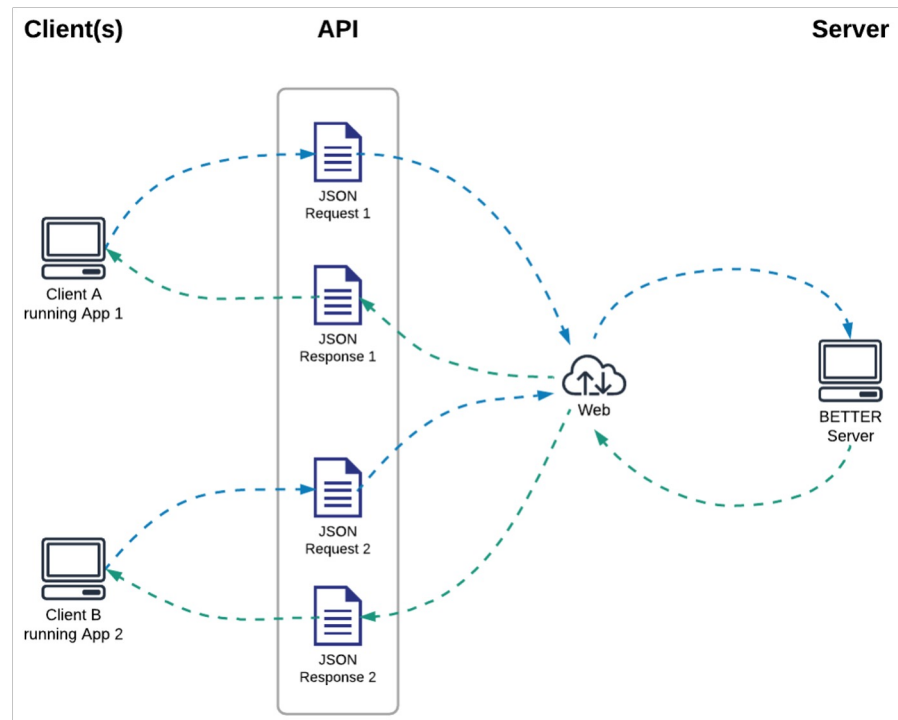
Upload Cancel

BETTER RESTful API

- **Acceda a :** <https://better.lbl.gov/docs/api/>
- **REST:** “Representational state transfer (REST) - un estilo arquitectónico de software que define un conjunto de restricciones que se utilizan para crear servicios web.”
- **API:** “Interfaz o protocolo de comunicación entre un cliente y un servidor destinado a simplificar la creación de software del lado del cliente.”

- Herramienta de análisis de retroalimentación del sector público o privado que quiera añadir el servicio de BETTER.

- Plataforma pública o privada de gestión de la energía que quiera añadir el servicio de BETTER.

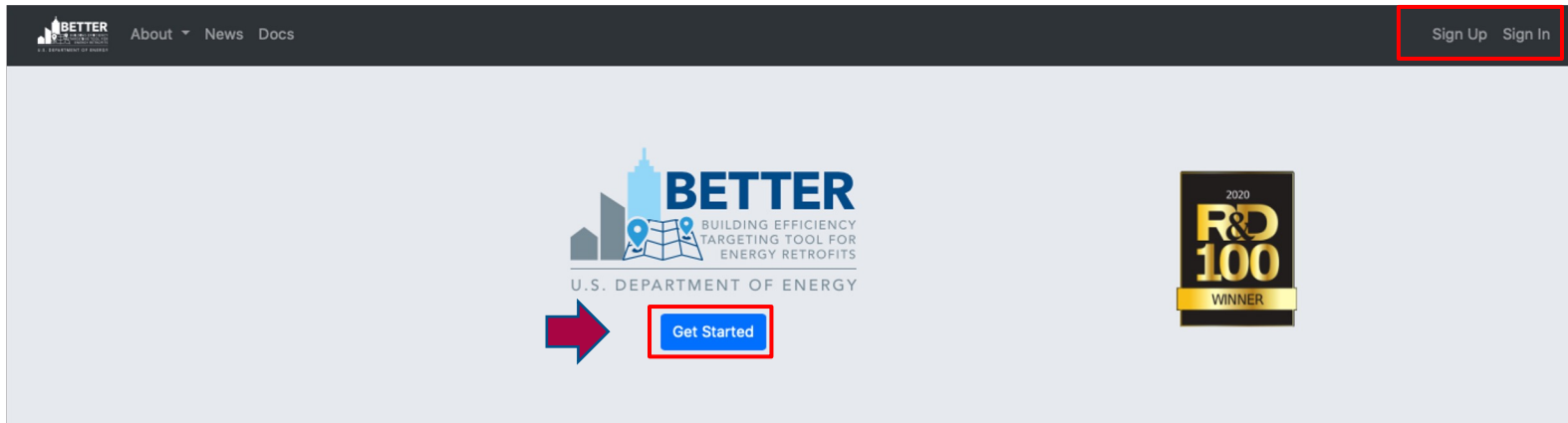


IIA. Ejecutar BETTER usando la aplicación Web

1. Acceda a BETTER en: <https://better.lbl.gov/>.

Si ya tiene una cuenta, haga clic en **Get Started** o **Sign In** para acceder a BETTER.

Si aún no tiene una cuenta, haga clic en **Sign Up** para registrarse y crear una cuenta.



About BETTER

BETTER is a free web application that enables building operators to quickly, easily identify the most cost-saving energy efficiency measures in buildings and portfolios using readily available building and energy data. With minimal data entry, BETTER benchmarks a building's or portfolio's energy use against peers; quantifies energy, cost, and greenhouse gas (GHG) reduction potential; and recommends energy efficiency measures (technological and operational) for individual buildings or portfolios, targeting specific energy savings levels. The source code of its modular, cross-platform analytical engine is available on GitHub and can be adopted, redeveloped, and redistributed freely under an open-source license, allowing users to incorporate BETTER's analytical capabilities into their own software platforms and tools.



IIA. Ejecutar BETTER usando la aplicación Web

2. Sign In o Sign Up

Los usuarios registrados deberán introducir su nombre de usuario y contraseña para acceder a BETTER.

Los nuevos usuarios tendrán que registrarse y crear una cuenta a la que sólo ellos podrán acceder proporcionando la siguiente información:

Please sign in

Username*

Password*

Remember Me

[Sign In](#)

Forgot your password? [Reset it.](#)

Don't have an account? [Create one.](#)

- Nombre
- Apellido
- Dirección de correo electrónico
- País
- Organización
- Industria
- Nombre de usuario
- Contraseña

IIA. Ejecutar BETTER usando la aplicación Web

3. Visite la página del panel de control de BETTER

Dashboard es la página principal de BETTER. Aquí es donde puedes empezar a [Create New Portfolios](#) y [Create New Buildings](#) para el análisis con BETTER. Aquí también puede ver las cinco carteras y los 10 edificios añadidos más recientemente o navegar por las páginas para [View All Portfolios](#) y [View All Buildings](#) en su cuenta.

The screenshot shows the BETTER Dashboard interface. At the top, there is a navigation bar with 'About', 'News', and 'Docs' links, and a 'Units System' dropdown set to 'SI'. The main content area is divided into two sections: 'Recent Portfolios' and 'Recent Buildings'. In the 'Recent Portfolios' section, a card for 'Sample Portfolio - BET...' is displayed with statistics: 33 buildings, 1,140,268 m² total floor area, and a last update on June 29, 2021. A 'Create New Portfolio' button is highlighted with a red box and a red arrow. The 'Recent Buildings' section contains a table of buildings with columns for ID, Building Name, Space Type, Location, Floor Area, Portfolio Name, Date Updated, View, and Delete. A 'Create New Building' button is also highlighted with a red box and a red arrow.

ID	Building Name	Space Type	Location	Floor Area (m ²)	Portfolio Name	Date Updated	View	Delete
424	1525 Wilson	Office	Arlington, VA	319,423.0	Sample Portfolio - BETTER Template Test - 6.28.21	06/29/2021	View	Delete
392	Office 3	Office	Atlanta, GA	4,992.2	Sample Portfolio - BETTER Template Test - 6.28.21	06/28/2021	View	Delete
421	Office 32	Office	Miami, FL	46,320.0	Sample Portfolio - BETTER Template Test - 6.28.21	06/28/2021	View	Delete
420	Office 31	Office	Fairbanks, AK	46,320.0	Sample Portfolio - BETTER Template Test - 6.28.21	06/28/2021	View	Delete
419	Office 30	Office	Duluth, MN	46,320.0	Sample Portfolio - BETTER Template Test - 6.28.21	06/28/2021	View	Delete

IIA. Ejecutar BETTER usando la aplicación Web

4. Seleccione el sistema de unidades en la página del panel de control

En la página del Tablero de instrumentos, vaya a la esquina superior derecha de la barra de navegación superior para seleccionar el **unit system** en el que desea introducir/visualizar los datos en BETTER. Para ver/introducir datos en el sistema internacional de unidades (kWh, metros cuadrados, °C), seleccione **SI**. Para ver/introducir datos en el sistema imperial de unidades (kBtu, pies cuadrados, °F), seleccione **IP**. Puede cambiar el sistema en el que visualiza/introduce los datos en BETTER en cualquier momento cambiando el sistema de unidades.*



BETTER Dashboard

Units System: SI

App ccszum@lbl.gov

Recent Portfolios ⓘ

View All Portfolios Create New Portfolio

Sample Portfolio - BET...

Buildings

Crear un nuevo portafolio de edificios

IIA. Ejecutar BETTER usando la aplicación Web

5. Crear una nueva cartera en la página del panel de control

Para los usuarios que tengan carteras que quieran analizar con BETTER, haciendo clic en **Create New Portfolio** en la página del Tablero de mandos le dirigirá al página **Create a New Portfolio**. Allí, los usuarios tienen tres opciones para crear una nueva cartera :

- Opción a: With BETTER Template** permite a los usuarios utilizar una plantilla de Excel personalizada para cargar por lotes los datos de varios edificios y una cartera.
- Opción b: With Portfolio Manager® Template** permite a los usuarios importar los datos de varios edificios almacenados en ENERGY STAR® Portfolio Manager®.
- Opción c: From Scratch** le permite crear una cartera vacía a la que puede añadir edificios a través de la interfaz web o desde un archivo XML de BuildingSync® posteriormente.



i The "With BETTER Template" approach allows you to use a customized Excel template to batch-upload multiple buildings' data and a portfolio. Download [this BETTER template](#) and follow the instructions to enter your building data on the Property Information and Utility Data tabs, making sure to follow the formatting requirements in the template. Once your information has been entered into the template, save the file to your computer, and upload it below.

Visite el apéndice de esta presentación para ver un resumen de los campos de entrada de datos en las plantillas BETTER y ENERGY STAR®.

IIA. Acceda a la página de inicio de la aplicación web para crear una nueva cartera

5a. Opción a: Crear una nueva cartera con la plantilla de BETTER

En la página **Create a New Portfolio**, haga clic en la pestaña **With BETTER Template** y después en el enlace **BETTER Template** para descargar plantilla de Excel personalizada para cargar por lotes las características y los datos energéticos de varios edificios. Las instrucciones para introducir los datos se incluyen en la propia plantilla de Excel.

Building ID*	Building Name*	Location*	Gross Floor Area (m ²)*	Primary Building Space Type*	Currency*
1	Office 1	Miami, FL	5789	Office	US Dollar
2	Office 2	Houston, TX	4982	Office	US Dollar
3	Office 3	Chicago, IL	5227	Office	US Dollar

Building ID*	Billing Start Dates*	Billing End Dates*	Energy Type*	Energy Unit*	Energy Consumption*	Cost
1	1/1/2016	1/31/2016	Electricity - Grid Purchased	kWh	124760	12456
1	2/1/2016	2/29/2016	Electricity - Grid Purchased	kWh	149320	14985
1	3/1/2016	3/31/2016	Electricity - Grid Purchased	kWh	127920	13021

Visite el apéndice de esta presentación para ver un resumen de los campos de entrada de datos de la plantilla BETTER.



With BETTER Template With Portfolio Manager® Template From Scratch

i The "With BETTER Template" approach allows you to use a customized Excel template to batch-upload multiple buildings' data and a portfolio. Download [this BETTER template](#) and follow the instructions to enter your building data on the Property Information and Utility Data tabs, making sure to follow the formatting requirements in the template. Once your information has been entered into the template, save the file to your computer, and upload it below.

Una vez que se haya introducido toda la información necesaria en la Plantilla MEJOR, guárdela y, a continuación, utilice los botones **Browse** y **Upload** para seleccionar y cargar el archivo Excel en BETTER.

Choose file Browse Upload

IIA. Acceda a la página de inicio de la aplicación web para crear una nueva cartera

5b. Opción b: Cargar datos con la plantilla de Portfolio Manager®

En la página Crear una nueva cartera, haga clic en el botón **With Portfolio Manager® Template** y después en el enlace **instructions** para acceder a una guía paso-a-paso sobre cómo autogenerar un libro de Excel personalizado desde ENERGY STAR® Portfolio Manager® que está precargado con los datos de varios edificios para que pueda ser cargado por lotes a BETTER.

From Scratch

With BETTER Template

With Portfolio Manager® Template

The "With Portfolio Manager® Template" approach allows you to import multiple buildings' data stored in ENERGY STAR® Portfolio Manager®. Follow the **instructions** to auto-generate an Excel workbook from within Portfolio Manager® that is pre-populated with multiple buildings' data so that it can be batch-uploaded and analyzed by BETTER. Once the Excel workbook has been generated, save the file to your computer, and upload it below.



Una vez generado el libro de Excel, guárdelo en su ordenador y utilice la función **Browse** y **Upload** para seleccionar y cargar el archivo en BETTER.

Visite el apéndice de esta presentación para ver un resumen de los campos de entrada de datos de la plantilla de ENERGY STAR® Portfolio Manager®.

Choose file

IIA. Acceda a la página de inicio de la aplicación web para crear una nueva cartera

5c. Opción c: Cargar datos usando **From Scratch**

En la página Crear una nueva cartera, haga clic en el botón **From Scratch** y, a continuación, introduzca el nombre de la cartera y haga clic en **Save**. Se le dirigirá a la página del tablero de mandos. Allí, haga clic en **Details** de la cartera que acaba de crear para llegar a la página de información de la cartera. A continuación, haga clic en Crear un nuevo edificio para crear una cartera paso a paso añadiendo edificios individuales **From Scratch** o mediante **With BuildingSync® XML**

The "From Scratch" approach allows you to create an empty portfolio. You can add buildings to the portfolio later.

Portfolio Name*

All fields marked with * are required

Save Cancel

Recent Portfolios ⓘ

Test 2
Buildings 0
Total Floor Area (m ²) 0
Currency USD
Date Updated July 16, 2021, 9:59 p.m.
Delete Details

From Scratch With BuildingSync® XML

ⓘ The "From Scratch" approach allows you to create a building with the web-interface. Fill in the basic information below to create a blank building, then go to the building detail page to add utility bills.

Building Name*

Enter a building name.

Space Type*

Office

Primary building space type is the space type that accounts for more than 50% of the building.
 ⓘ more info...

Gross Floor Area (m²)*

This is the gross floor area of the building as measured between principal exterior surfaces. It should exclude area for parking.

Location*

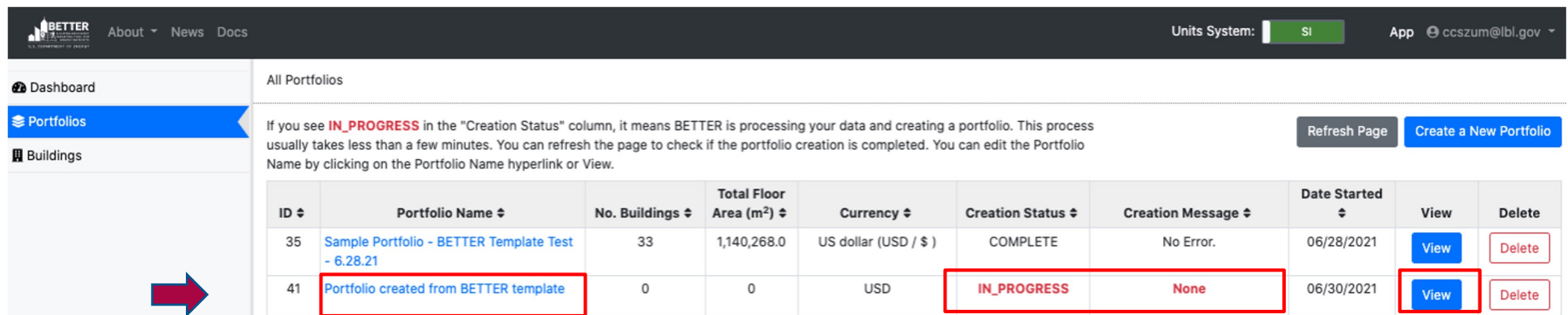
For buildings located in the United States, please enter state, city or ZIP code. For buildings located outside of the United States, please enter the country and city. This information will be used to find corresponding weather data, fuel prices, and GHG emission factors.

All fields marked with * are required

IIA. Ejecutar BETTER utilizando la aplicación web

6. Visite la página de presentación de la cartera

Después de cargar los datos de la cartera en BETTER, los usuarios serán dirigidos automáticamente a la página de presentación de la cartera. En esta página, verá una tabla que enumera cualquier cartera anterior que haya creado junto con la cartera que acaba de cargar.



The screenshot shows the BETTER web application interface. The top navigation bar includes 'About', 'News', and 'Docs'. The main content area is titled 'All Portfolios' and contains a table with the following data:

ID	Portfolio Name	No. Buildings	Total Floor Area (m ²)	Currency	Creation Status	Creation Message	Date Started	View	Delete
35	Sample Portfolio - BETTER Template Test - 6.28.21	33	1,140,268.0	US dollar (USD / \$)	COMPLETE	No Error.	06/28/2021	View	Delete
41	Portfolio created from BETTER template	0	0	USD	IN_PROGRESS	None	06/30/2021	View	Delete

A red arrow points to the 'View' button for the portfolio with ID 41, which is in the 'IN_PROGRESS' status.

IIA. Ejecutar BETTER utilizando la aplicación web

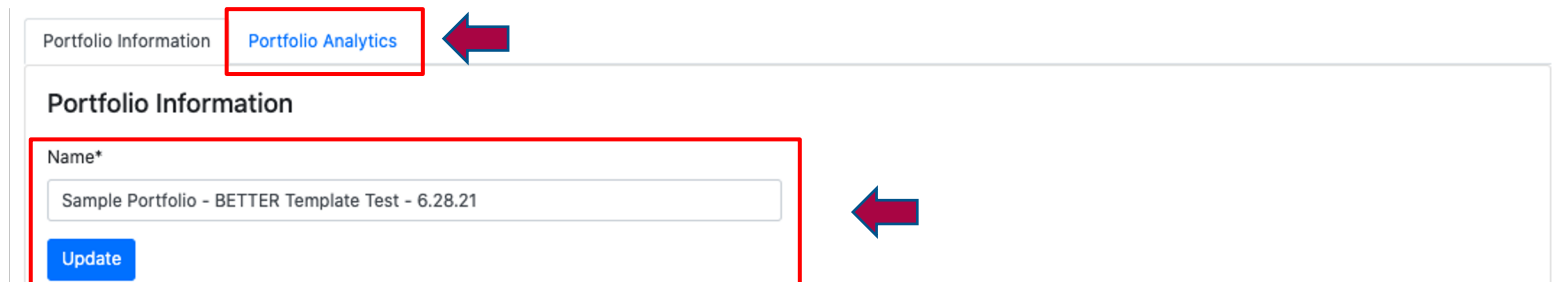
En el caso de la cartera que acaba de cargar, el estado de creación probablemente dirá **IN_PROGRESS** y el Creation Message dirá **None**. Espere uno o dos minutos y luego haga clic en **Refresh Page**.^{*} Después de eso, el Creation Status debe cambiar a **COMPLETE** y el Creation Message a **No Error**, lo que significa que todos los datos sobre edificios y energía de la cartera se han cargado. Haga clic en **View** o en **Portfolio Name** para ir a la página de información de la cartera para ver todos los edificios de la cartera y personalizar el nombre de la misma.

^{*} NOTA: En función del tamaño de la cartera, es posible que tenga que hacer clic en **Refresh Page** unas cuantas veces hasta que el **Creation Status** cambie a **COMPLETE** y el **Creation Message** a **No Error**.

IIA. Ejecutar BETTER utilizando la aplicación web


7. Visite la página de información sobre la cartera

Después de crear una nueva cartera y hacer clic en **View** o en el **Portfolio Name**, los usuarios serán dirigidos automáticamente a la página de información de la cartera. Comience por ir al campo **Name*** y personalizar el nombre de la cartera que acaba de crear. A continuación, haga clic en **Update**. A continuación, haga clic en el botón **Portfolio Analytics** para empezar a crear informes de análisis.



The screenshot shows a web interface with a top navigation bar containing two tabs: "Portfolio Information" and "Portfolio Analytics". The "Portfolio Analytics" tab is highlighted with a red box and a red arrow pointing left. Below the navigation bar is a section titled "Portfolio Information". Inside this section, there is a form with a "Name*" label and a text input field containing the text "Sample Portfolio - BETTER Template Test - 6.28.21". This input field is also highlighted with a red box and a red arrow pointing left. Below the input field is a blue "Update" button.

IIA. Ejecutar BETTER utilizando la aplicación web

Antes de crear informes analíticos, también puede revisar la tabla resumen de los edificios de la cartera. Hacer clic en  le permitirá ordenar los edificios de la tabla (alfabética o numéricamente) por características (es decir, nombre del edificio, tipo de espacio, ubicación y superficie). Haciendo clic en **Building Name** o **View** le permitirá ver y editar las características del edificio y los detalles de la factura de servicios públicos de cada edificio. **Add New Building** le permitirá añadir nuevos edificios a la cartera.

Buildings in the Portfolio

[Add New Building](#)

Below is a summary table of buildings in the portfolio. Click on the building name link or the view button to go to the building information page.

Building Name ↕	Space Type ↕	Location ↕	Floor Area (m ²) ↕	View	Delete
Office 3	Office	Atlanta, GA	4,992.2	View	Delete



IIA. Ejecutar BETTER utilizando la aplicación web

8. Visite la página de análisis de la cartera y cree un informe de resumen de la cartera

En la página **Portfolio Analytics**, los usuarios pueden hacer clic en **Add New Analytics** para crear un informe analítico único para la cartera.

Portfolio Information | **Portfolio Analytics**

Portfolio Analytics

Analytics ID ↕	Time Generated ↕	Savings Target ↕	Benchmark Statistics ↕	Model R ² ↕	Number of Buildings ↕	Energy Savings Potential (kWh) ↕	Cost Savings Potential [US dollar (USD / \$)]	GHG Emission Reduction Potential (MTCO ₂ e) ↕	Status ↕	View	Action	Delete
14	None	Nominal	Default	0.6	32	20,154,954	1,799,431	8,131.5	COMPLETE	Details	Rerun	Delete

Click the button below to add a new analytics.

Add New Analytics ←

↑

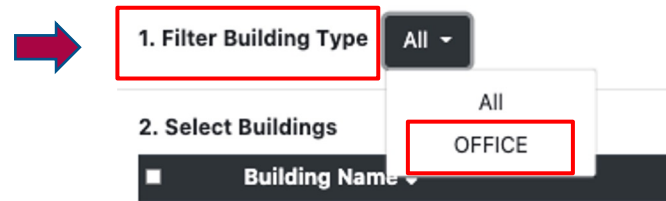
Any reports created for the portfolio are also stored in a table on this page. Al hacer clic en **Details** le dirigirá al informe analítico para su revisión y descarga.

IIA. Ejecutar BETTER utilizando la aplicación web

9. Seleccione el tipo de edificio y los edificios de la cartera para el análisis

Después de hacer clic en [Add New Analytics](#) en la página de análisis de la cartera, los usuarios serán dirigidos a una página para seleccionar los parámetros del informe analítico.

Paso 1: Seleccione el tipo de espacio del edificio para el análisis. *NOTA: en este momento, los usuarios no pueden seleccionar la opción "Todos" y deben seleccionar un solo tipo de espacio por ejecución analítica (por ejemplo, oficina).



Paso 2: Después de seleccionar el tipo de espacio, seleccione los edificios específicos para el análisis. Utilice las casillas de verificación para seleccionar cualquier número de edificios a analizar, desde un solo edificio hasta la lista completa. Al hacer clic en la casilla de verificación de la fila de la cabecera se seleccionarán todos los edificios de la lista.

<input checked="" type="checkbox"/>	Building Name ↕	Location ↕	Floor Area (m ²) ↕
<input checked="" type="checkbox"/>	Office 3	Atlanta, GA	4,992.2
<input checked="" type="checkbox"/>	Office 10	Chicago, IL	4,982.2

IIA. Ejecutar BETTER utilizando la aplicación web

10. Seleccione el objetivo de ahorro para la cartera

Paso 3: Seleccione el objetivo de ahorro para la cartera entre las opciones mostradas.

- **Conservador:** El objetivo de ahorro será una desviación estándar peor que la mediana de los resultados del grupo de referencia.
- **Nominal:** El objetivo de ahorro será igual a la mediana del ahorro del grupo de referencia.
- **Agresivo:** El objetivo de ahorro será media desviación estándar mejor que el rendimiento medio del grupo de referencia.

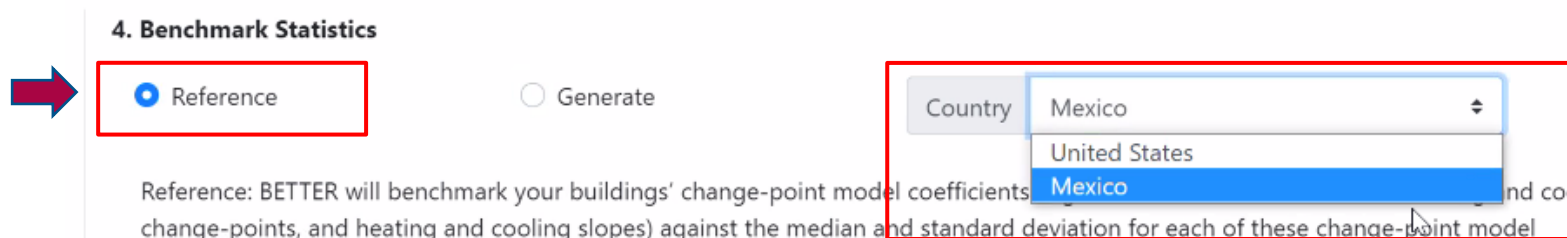


IIA. Ejecutar BETTER utilizando la aplicación web

11. Seleccione las estadísticas de referencia para la cartera

Step 4: Seleccione las estadísticas de referencia entre las opciones mostradas.

Reference:* BETTER comparará automáticamente los edificios de la cartera con las estadísticas de referencia desarrolladas por el Lawrence Berkeley National Laboratory (LBNL) que coincidan con el tipo o los tipos de inmuebles seleccionados en el paso 1. Las estadísticas de referencia para cada tipo de espacio se derivan de una muestra de edificios de oficinas de México e incluyen la mediana y la desviación estándar de los coeficientes del modelo inverso de electricidad y combustibles fósiles para la muestra (es decir, carga base de calefacción y refrigeración, puntos de cambio de calefacción y refrigeración, y consumo sensible de calefacción y refrigeración).



4. Benchmark Statistics

Reference Generate

Country: Mexico (dropdown menu open, showing United States and Mexico)

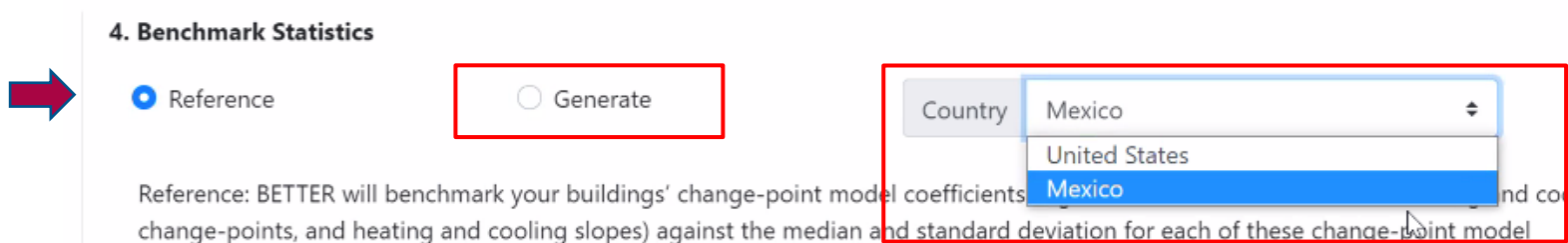
Reference: BETTER will benchmark your buildings' change-point model coefficients (and change-points, and heating and cooling slopes) against the median and standard deviation for each of these change-point model

**Note: At this time, the "reference" benchmark statistics for Mexico offices are not perfectly representative of the Mexico stock because the statistics were developed from a training datasets developed based on voluntary contributions from Mexico government and industry that may not fully representative of the municipal stock. We are working to expand these training datasets, and hence improve associated "reference" benchmark statistics, so they are more representative of the Mexican national stock. This includes expanding the training data sets to include: at least 30 data points for each of the 10 BETTER model coefficients for each of the climate zones in Mexico. Learn more at [FAQ](#). To contribute anonymous data to this effort, please email support@better.lbl.gov.*

IIA. Ejecutar BETTER utilizando la aplicación web

Generate: BETTER generará estadísticas de referencia basadas únicamente en los edificios seleccionados para el análisis en el Paso 2, por lo que sus edificios se compararán con otros de su propia cartera. Esta opción proporcionará estadísticas más precisas si ha seleccionado al menos 30 edificios para el análisis en el Paso 2.

Nota: La generación de estadísticas de referencia puede tardar varios minutos.



4. Benchmark Statistics

Reference Generate

Country: Mexico
United States
Mexico

Reference: BETTER will benchmark your buildings' change-point model coefficients (change-points, and heating and cooling slopes) against the median and standard deviation for each of these change-point model

Para obtener información sobre las definiciones de los coeficientes del modelo de regresión, visite : https://better.lbl.gov/how_it_works/.

Para obtener información sobre cómo se han elaborado las estadísticas de referencia, visite la página de preguntas frecuentes sobre el tema de la configuración del análisis.

IIA. Ejecutar BETTER utilizando la aplicación web

12. Seleccione el valor mínimo de R^2 para el catálogo de edificios

Step 5: Seleccione el valor mínimo de R^2 y haga clic en **Create and Run**.

La R-cuadrado (R^2) es una medida estadística que representa la proporción de la varianza de una variable dependiente que se explica por una variable o variables independientes en un modelo de regresión. En el caso de BETTER, R^2 indica hasta qué punto las variaciones de la temperatura del aire exterior explican las variaciones de la intensidad del uso de la energía en los edificios. Un R^2 de 1 significa que todo el movimiento en la intensidad del uso de la energía se explica completamente por los movimientos en la temperatura del aire exterior. En general, recomendamos a los usuarios que seleccionen un R^2 de 0,6 o superior para una cartera o edificio. Si el R^2 de un modelo es 0,6, entonces aproximadamente el 60% de la variación observada en la intensidad del uso de la energía puede explicarse por la variación de la temperatura del aire exterior.

R^2 is the proportion of the variance in the dependent variable (energy use) that is predictable from the independent variable (outdoor air temperature).

IIA. Ejecutar BETTER utilizando la aplicación web

Al analizar una cartera, la selección de un nivel de R2 más alto puede significar que se ajusten menos modelos de regresión. Como resultado, BETTER puede estimar un menor ahorro de energía/coste y recomendar menos mejoras de eficiencia energética para la cartera, pero estas recomendaciones de ahorro/mejora serán muy fiables.

Cuando se selecciona un R2 más bajo, BETTER puede estimar mayores ahorros de energía/coste y recomendar más mejoras de eficiencia energética para una cartera, pero estas recomendaciones de ahorro/mejoras pueden ser menos fiables que si se selecciona un R2 más alto.

En general, recomendamos a los usuarios que seleccionen un R2 de 0,6 o superior para una cartera.

5. Minimum Model R²



IIA. Run BETTER Using the Web App

13. Visit the Portfolio Analytics Staging page

After setting the analyses parameters for the portfolios, users will automatically be directed to the **Portfolio Analytics Staging** page.

Portfolio Analytics Staging Page

You can only generate portfolio analytics after generating analytics for each building in the portfolio. Below is a list of buildings in this portfolio and the analytics status for each. If any building still need to have its analytics generated, please click the "Generate All Uncompleted Building Analytics." Otherwise, if some analytics are still being run, please simply refresh this page until the system reports that all building analytics are finished. You may then run the portfolio analytics.

Refresh Page

Generate Portfolio Analytics

Building Analytics for Selected Buildings in this Portfolio:

Remove All Failed Building Analytics

Generate All Uncompleted Building Analytics

Building Name	Location	Space Type	Building Analytics	Status	Status Message	Remove
Office 16	Miami, FL	Office	Building Analytics (ID: 384)	IN_PROGRESS	None	Remove
Office 17	Houston, TX	Office	Building Analytics (ID: 385)	IN_PROGRESS	None	Remove

On this page, you will see a list of buildings in the portfolio and the analytics status for each. If any building still needs to have its analytics generated, click the **Generate All Uncompleted Building Analytics**. Continue to periodically click **Generate All Uncompleted Building Analytics** and **Refresh** until the system reports that all building analytics are finished. You will see Status **COMPLETE** and Status Message **No Errors: Duration** for each building when this process is complete. If BETTER cannot generate analytics for a given building, click **Remove All Failed Building Analytics**. Clicking this will not remove the building from the portfolio, just the analysis report. Once all building analytics are completed, click **Generate Portfolio Analytics** to view the **Portfolio Summary Report**.

Ready to generate Portfolio Analytics

Generate Portfolio Analytics

Building Analytics for Selected Buildings in this Portfolio:

Generate All Uncompleted Building Analytics

Building Name	Location	Space Type	Building Analytics	Status	Status Message	Remove
Office 4	Los Angeles, CA	Office	Building Analytics (ID: 405)	COMPLETE	No errors. Duration : 0.6008 seconds.	Remove

IIA. Run BETTER Using the Web App

14. View and Download the Portfolio Summary Report

After clicking [Generate Portfolio Analytics](#), BETTER will direct you to an interactive **Portfolio Summary Report**. Scroll through the report to view interactive charts and graphs that provide the following information on the portfolio:

- Annual energy, cost, and GHG emissions reduction potential.
- Top 5 energy efficiency recommendations and guidance for implementation.
- Electricity and fossil energy use intensity (EUI) and cost savings comparisons by building.
- Tables and graphs to sort, rank, and prioritize buildings for upgrades.

Click the [Download](#) button on the upper right hand corner of the report to download an HTML version of the report which can be stored on your computer or emailed to stakeholders. Opening the HTML report in a web browser from an email or a computer by double-clicking renders it most effectively.

Overview	
Number of Buildings	Total Gross Floor Area (m ²):
32	820,835.0
Cost Savings (US dollar (USD / \$)):	Energy Savings (kWh):
1,900,242	20,548,658
20.2%	19.6%

Go to the Utilize Results section (slide 61) for more information on how to use the Portfolio Summary Report to improve portfolio energy, emissions, and financial performance.

Users can also scroll down to the **Building Analytics List** and click on the names of individual buildings to view **Building Summary Reports** which provide a building's annual energy, cost, and GHG emissions reduction potential, energy efficiency recommendations and implementation guidance, annual utility cost and savings breakdowns by load type, etc. This **Buildings Summary Report** can also be downloaded as an HTML file for storage and sharing.

Building Name	Building Location	Building Area (m ²)	Annual Electricity Consumption (kWh)	Annual Fossil Fuel Consumption (kWh)	Annual Electricity Cost (US dollar (USD / \$))	Annual Fossil Fuel Cost (US dollar (USD / \$))	Annual Electricity EUI (kWh/m ²)	Annual Fossil Fuel EUI (kWh/m ²)	Annual Cost Savings Potential (US dollar (USD / \$))	Annual Energy Savings (%)
Office 26	Chicago, IL	46,320.0	5,494,875	937,856	474,207.7	24,000.9	118.6	20.2	48,161	9.3 %



Crear un nuevo edificio

IIA. Run BETTER Using the Web App

15. Create a New Building on the Dashboard page

For users with individual buildings they want to analyze with BETTER, clicking **Create New Building** on the **Dashboard** page will direct you to the **Add a New Building** page. There, users have two options to create a new portfolio:

- a. **Option a:** The **From Scratch** approach allows users to create a building on the web-interface.
- b. **Option b:** The **With BuildingSync® XML** approach allows you to use a BuildingSync® XML file to create a building in BETTER. Visit <https://buildingsync.net/> to learn more about BuildingSync®.

From Scratch	With BuildingSync® XML
--------------	------------------------



i The "From Scratch" approach allows you to create a building with the web-interface. Fill in the basic information below to create a blank building, then go to the building detail page to add utility bills.

Building Name*

Space Type*

Primary building space type is the space type that accounts for more than 50% of the building.
[more info...](#)

Gross Floor Area (m2)*

This is the gross floor area of the building as measured between principal exterior surfaces. It should exclude area for parking.

Location*

For buildings located in the United States, please enter state, city or ZIP code. For buildings located outside of the United States, please enter the country and city. This information will be used to find corresponding weather data, fuel prices, and GHG emission factors.

IIA. Access the Web App Home to Create New Portfolio

15a. Option a: Create a New Building from Scratch

On the **Create a New Building** page, click the **From Scratch** tab and then fill in the fields on the web interface as follows:

- **Building Name:** Enter any building name.
- **Space Type:** Select the primary building space type from the drop-down menu. This is the space type that accounts for more than 50% of the building. For example, if the building has offices that account for 60% of the gross floor area (excluding parking) and retail stores that account for 40%, then the primary space type should be "office." If no space type accounts for more than 50%, then the building is mixed use. To evaluate mixed use spaces, determine the size and monthly energy consumption for each space in the building and analyze each of these spaces separately in BETTER.
- **Gross Floor Area:** This is the gross floor area of the building as measured between principal exterior surfaces. It should exclude area for parking. *NOTE: Currently, gross floor area needs be entered in m² regardless of the unit system selected on the upper right navigation bar.
- **Location:** For buildings located in the United States, please enter city, state (e.g., Cambridge, MA) or ZIP code. For buildings located outside of the United States, please enter the country and city (e.g., Mexico City, Mexico).

Then click **Save**.

Add a New Building

There are two ways to create a new building. Click on the tab below for more details.

From Scratch With BuildingSync® XML

The "From Scratch" approach allows you to create a building with the web-interface. Fill in the basic information below to create a blank building, then go to the building detail page to add utility bills.

Building Name*

Sample Office 1

Space Type*

Office

Gross Floor Area (m²)*

12000

Location*

Washington, DC

All fields marked with * are required

Save Cancel

IIA. Access the Web App Home to Create New Portfolio

15b. Option b: Create a New Building **With BuildingSync® XML**

On the **Create a New Building** page, click the **With BuildingSync® XML** tab and then choose the BuildingSync® XML file you want to upload from your computer and click **Upload**.

From Scratch With BuildingSync® XML

i The "With BuildingSync® XML" approach allows you to use a BuildingSync® XML file to create a building instance in BETTER. An example BuildingSync® XML file could be downloaded [here](#).

BuildingSync XML File*


This field is required.

Browse



Upload Cancel

IIA. Run BETTER Using the Web App

16. Visit the All Buildings page

After creating a new building [From Scratch](#) or [With Building Sync® XML](#), users will automatically be directed to the **All Buildings** page. On this page, you will see a table listing any prior buildings you created along with the building you just created. Clicking on  will allow you to sort the buildings in the table (alphabetically or numerically) by characteristic (i.e., ID, building name, space type, location, floor area, portfolio name, and date updated). If a new building was created independent of a portfolio [From Scratch](#) or [With BuildingSync® XML](#) it will not have a Portfolio Name assigned.* Click the [Building Name](#) or [View](#) to add utility bill information to the building.

All Buildings



ID ↕	Building Name ↕	Space Type ↕	Location ↕	Floor Area (m ²) ↕	Portfolio Name ↕	Date Updated ↕	View	Delete
562	Sample Office 1	Office	Miami, FL	4,982.0	(none)	07/05/2021	View	Delete
392	Office 3	Office	Atlanta, GA	4,992.2	Sample Portfolio - BETTER Template Test - 6.28.21	06/28/2021	View	Delete

[Create New Building](#)


* NOTE: You cannot assign a building to an existing portfolio after creating it independently of a portfolio. The only way to add a new building to an existing portfolio is to first click on the [Portfolio Name](#) hyperlink, or [View](#) associated with the portfolio, to arrive at the **Portfolio Information** tab. Then, click on [Add New Building](#) to see options to add a new building to the existing portfolio.


IIA. Run BETTER Using the Web App

17. Visit the Building Information page

After clicking [View](#) or the [Building Name](#) on the **All Buildings** page for the building you just created, you will arrive at the **Building Information** page. Here you will see the information you just entered on the building. To make changes to this information, click [Edit Building](#) and replace the information in the fields and click [Save Building Info](#). To add 12 consecutive months of utility bill information needed for analysis using BETTER, click [Add a Utility Bill](#).

Building Information [Building Analytics](#)

	Name	Office 32
	Space Type	Office
	Floor Area (m ²)	46,320.0
	Location	Miami, FL

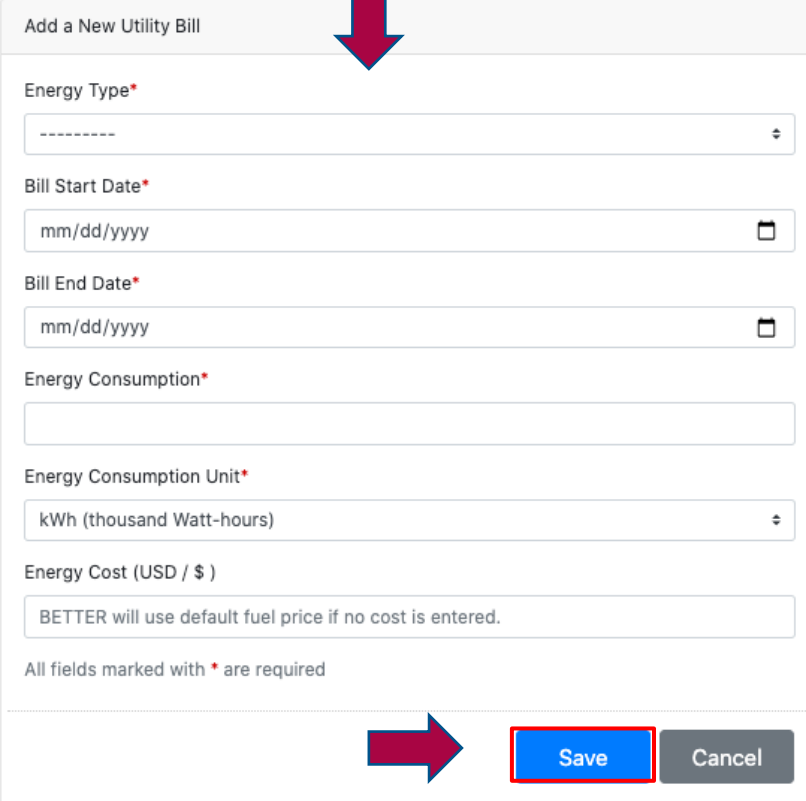
 [Edit Building](#)

IIA. Run BETTER Using the Web App

18. Visit Add a New Utility Bill page and Add a Utility Bill

After clicking [Add a Utility Bill](#), users will be directed to the **Add a New Utility Bill** page. Enter the required data as follows and then click [Save](#). Repeat this process until at least 12 consecutive months of data for each fuel used in the building are entered.

- **Energy Type:** Select the fuel type for which you are entering utility bill information (i.e., consumption and cost) from the drop-down menu.
- **Bill Start Date:** This is the start date for the utility bill for the fuel type selected. Enter in the format mm/dd/yyyy.
- **Bill End Date:** This is the end date for the utility bill for the fuel type selected. Enter in the format mm/dd/yyyy.
- **Energy Consumption:** This is the numerical consumption value for the date range and energy type you've entered.
- **Energy Consumption Unit:** Select the energy unit associated with the energy consumption from the drop-down menu. The units shown will correspond to the unit system selected in the upper right navigation bar. Check your utility bill carefully to make sure you are entering the correct unit.
- **Energy Cost (USD / \$):** This is the numerical cost value in U.S. dollars (USD) for the date range and energy type you've entered. ***NOTE: At this time, energy cost must be entered in USD. In the future, users can select to input and display cost savings in alternative currencies.**




The screenshot shows the 'Add a New Utility Bill' form. A red arrow points to the 'Energy Type' dropdown menu. Below it are fields for 'Bill Start Date' and 'Bill End Date', both with calendar icons. The 'Energy Consumption' field is empty. The 'Energy Consumption Unit' dropdown is set to 'kWh (thousand Watt-hours)'. The 'Energy Cost (USD / \$)' field contains the text 'BETTER will use default fuel price if no cost is entered.' At the bottom, a red arrow points to the 'Save' button, which is highlighted with a red border. A 'Cancel' button is also visible.

IIA. Run BETTER Using the Web App

19. Visit the Building Analytics page and Add a Building Analytics Report

After 12 consecutive months of data for each fuel used in the building has been entered into BETTER (see example below) click on the **Building Analytics** tab to select the parameters for analysis of the building.

Building Information **Building Analytics** ←

	Name	Office 32
	Space Type	Office
	Floor Area (m ²)	46,320.0
	Location	Miami, FL


[Edit Building](#)

Utility Consumption [Add a Utility Bill](#)

Energy Type ↕	Bill Start Date ↕	Bill End Date ↕	Consumption ↕	Cost (\$) ↕	Edit	Delete
Electric - Grid	Jan. 1, 2018	Jan. 31, 2018	417711.0 kWh (thousand Watt-hours)	39,849.63	Details	Delete
Electric - Grid	Feb. 1, 2018	Feb. 28, 2018	375908.0 kWh (thousand Watt-hours)	35,861.62	Details	Delete
Electric - Grid	March 1, 2018	March 31, 2018	425522.0 kWh (thousand Watt-hours)	40,594.8	Details	Delete

IIA. Run BETTER Using the Web App

20. Add Building Analytics

On the **Building Analytics** tab, you will see a table listing information on any prior analytical reports run for the building. Clicking on  will allow you to sort the buildings in the table (alphabetically or numerically) by characteristic (i.e., ID, savings target, benchmark statistics, model R² threshold, energy savings potential, cost savings potential, GHG emissions reduction potential, and status (i.e., whether the analysis report is completed or not)). Click **Add New Analytics** to run an analytical report on the building.



Building Information | Building Analytics

List of Building Analytics [Add New Analytics](#)

ID 	Savings Target 	Benchmark Statistics 	Model R ² Threshold 	Energy Savings Potential (kWh) 	Cost Savings Potential [US dollar (USD / \$)] 	GHG Emission Reduction Potential (MTCO _{2e}) 	Status 	View	Download	Action	Delete
602	Nominal	Default	0.6	3,967	203	0.7	COMPLETE	Details	Download	Rerun	Delete

IIA. Run BETTER Using the Web App

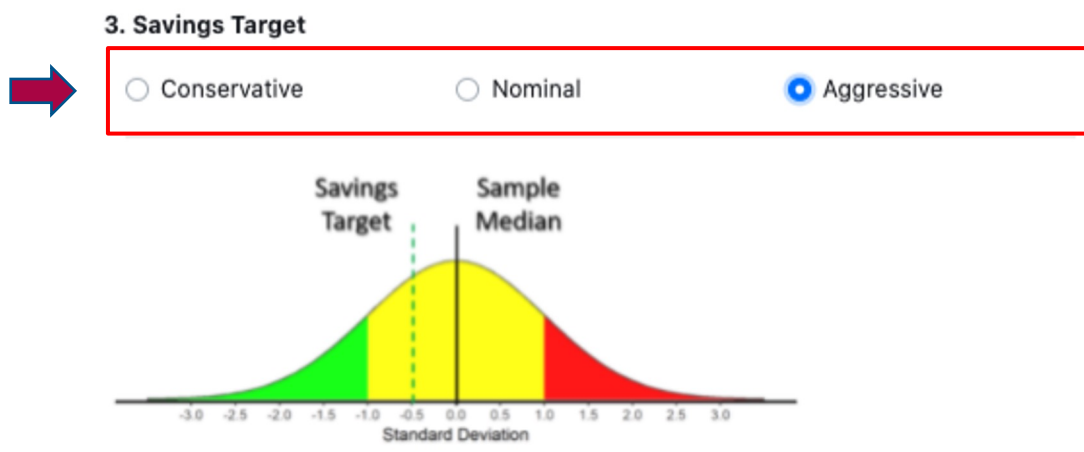
21. Select the Savings Target for the Building

Step 1: Select the savings target for the building from the options shown.

Conservative: The savings goal will be one standard deviation worse than the median performance of the benchmarking peer group.

Nominal: The savings goal will be equal to the median savings of the benchmarking peer group.

Aggressive: The savings goal will be one half standard deviation better than the median performance of the benchmarking peer group



IIA. Run BETTER Using the Web App

22. Select Default Benchmark Statistics for the Building

Step 2: Select Benchmark Statistics.

Reference:* BETTER will automatically benchmark a building against reference benchmark statistics developed by Lawrence Berkeley National Laboratory (LBNL) that match the property type(s) selected. The reference benchmark statistics for each space type are derived from a sample of Mexico office buildings and include the median and standard deviation for the electricity and fossil fuel inverse model coefficients for the sample (i.e., heating and cooling baseload, heating and cooling change-points, and heating and cooling sensitive consumption). For information on the regression model coefficient definitions, visit: https://better.lbl.gov/how_it_works/. For information on how the reference statistics were developed visit the FAQ page Analysis Settings topic.

4. Benchmark Statistics

Reference Generate

Country: Mexico (selected), United States, Mexico

Reference: BETTER will benchmark your buildings' change-point model coefficients (and change-points, and heating and cooling slopes) against the median and standard deviation for each of these change-point model

IIA. Run BETTER Using the Web App

R² is the proportion of the variance in the dependent variable (energy use) that is predictable from the independent variable (outdoor air temperature).

12. Select the Minimum R² Threshold for the Building

Step 5: Select the Minimum R² Threshold. Then click **Create and Run**.

R-squared (R²) is a statistical measure that represents the proportion of the variance for a dependent variable that's explained by an independent variable, or variables, in a regression model. In the case of BETTER, R² indicates to what extent variations in outdoor air temperature explain variations in building energy use intensity. An R² of 1 means that all movement in energy use intensity is completely explained by movements in outdoor air temperature. In general, we recommend users select an R² of 0.6 or higher for a portfolio or building. If the R² of a model is 0.6, then approximately 60% of the observed variation in energy use intensity can be explained by variation in outdoor air temperature.

When analyzing a portfolio, selecting a higher R² level may mean that fewer regression models are fit. As a result, BETTER may estimate lower energy/cost savings and recommend fewer energy efficiency improvements for the portfolio, but these savings/improvement recommendations will be very reliable.

When a lower R² is selected, BETTER may estimate higher energy/cost savings and recommend more energy efficiency improvements for a portfolio, but these savings/improvement recommendations may be less reliable than if a higher R² is selected.

In general, we recommend users select an R² of 0.6 or higher for a portfolio.

5. Minimum Model R²



IIA. Run BETTER Using the Web App

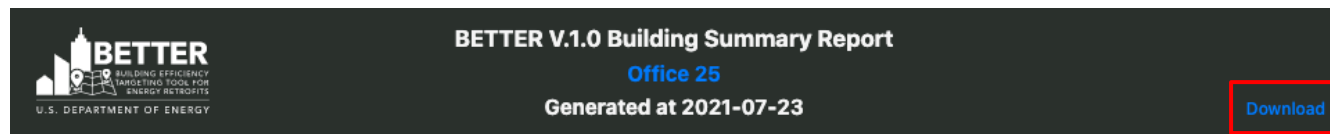
Go to the Utilize Results section (slide 61) for more information on how to use the Building Summary Report to improve building energy, emissions, and financial performance.

24. View and Download the Building Summary Report

After clicking **Create and Run**, BETTER will direct you to an interactive **Building Summary Report**. Scroll through the report to view interactive charts and graphs that provide the following information on the building:

- Annual energy, cost, and emissions reduction potential.
- Energy efficiency recommendations and implementation guidance.
- Annual utility cost and savings breakdowns by load type.
- Monthly electric and fossil energy use trends.
- Electricity and fossil fuel change-point models and benchmarks.

Click the **Download** button on the upper right hand corner of the report to download an HTML version of the report which can be stored on your computer or emailed to stakeholders. Opening the HTML report in a web browser from an email or a computer by double-clicking renders it most effectively.



Overview

Building Type:

Office

Gross Floor Area (m²):

46,320.0

Building Location:

Seattle, WA

Closest Weather Station:

Station: 727934-94248 : Renton Municipal Airport

Potential Cost Savings (US dollar (USD / \$)):

86,903

16.3%

Potential Energy Savings (kWh):

978,638

15.4%

Usar los resultados

Carolyn

III. Usar los resultados

Los informes analíticos HTML autónomos de BETTER incluyen la siguiente información :

A nivel de cartera:

1. Potencial de reducción de energía, costes y emisiones anuales.
2. Las 5 principales recomendaciones de eficiencia energética.
3. Comparación de la intensidad del uso de la electricidad y la energía fósil (EUI) y del ahorro de costes por edificio.
4. Posibilidad de clasificar, ordenar y priorizar los edificios para su mejora.

A nivel de edificio:

5. Potencial de reducción de energía, costes y emisiones anuales.
6. Recomendaciones de eficiencia energética y orientaciones para su aplicación.
7. Desglose de los costes y ahorros anuales de los servicios públicos por tipo de carga.
8. Evolución mensual del consumo de energía eléctrica y fósil.
9. Modelos y puntos de referencia para la electricidad y los combustibles fósiles.

III. Utilizar los resultados

Gráfico 1. Potencial de reducción de energía, costes y emisiones anuales de la cartera

Overview

Number of Buildings
32

Total Gross Floor Area (m²):
820,845.0

Cost Savings (US dollar (USD / \$)):
20.4%

Energy Savings (kWh):
20,154,954

Electricity Energy/Cost Savings:
21.1%

Fossil Fuel Energy/Cost Savings:
16.9%

GHG Emissions Reduction (MTCO₂e):
8,131.5
20.6%

GHG Emissions Intensity Reduction (MTCO₂e/m²)
0.043

[More energy and cost details](#)



Clic en **More Energy and Cost Details** para un análisis más profundo.

Energy Type	Energy	
	Electricity	Fossil Fuel
Annual Energy Consumption (kWh)	83,289,199	15,239,777
Annual Site Energy Use Intensity (kWh/m ²)	136.4	20.1
Annual Energy Saving (kWh)	17,583,942	2,571,011
Annual Energy Saving Percentage (%)	21.1	16.9
Combined Annual Energy Consumption (kWh)	98,528,977	
Combined Annual Energy Use Intensity (kWh/m ²)	128.0	
Combined Annual Energy Saving (kWh)	20,154,954	
Combined Annual Energy Saving Percentage (%)	20.5	

III. Utilizar los resultados

Gráfico 2 : Las 5 principales recomendaciones de eficiencia energética de

The energy efficiency recommendations most frequently recommended across your portfolio are:

- Reduce Equipment Schedules
- Reduce Plug Loads
- Reduce Lighting Load
- Increase Cooling Setpoints
- Increase Cooling System Efficiency



Haga clic en cada uno de las **recommendation** para la lista de edificios de la cartera a los que se aplica la medida de eficiencia energética y los recursos para ayudar a aplicar la medida.

- Increase Cooling Setpoints

(12 out of 32 buildings)

Building(s):

Office 26; Office 29; Office 9; Office 19; Office 12; Office 24; Office 13; Office 31; Office 28; Office 30; Office 23; Office 25;

Description:

Your building starts cooling at a lower temperature than a typical building. Check the occupied and unoccupied cooling setpoint during the cooling season. Cooling system and auxiliary systems' energy consumption will be reduced by increasing the cooling setpoint.

Resources:

- US Department of Energy: [US DOE Energy Asset Score Recommendations Guide, pp. 17-20](#)

Best candidates for audits are highlighted in red.

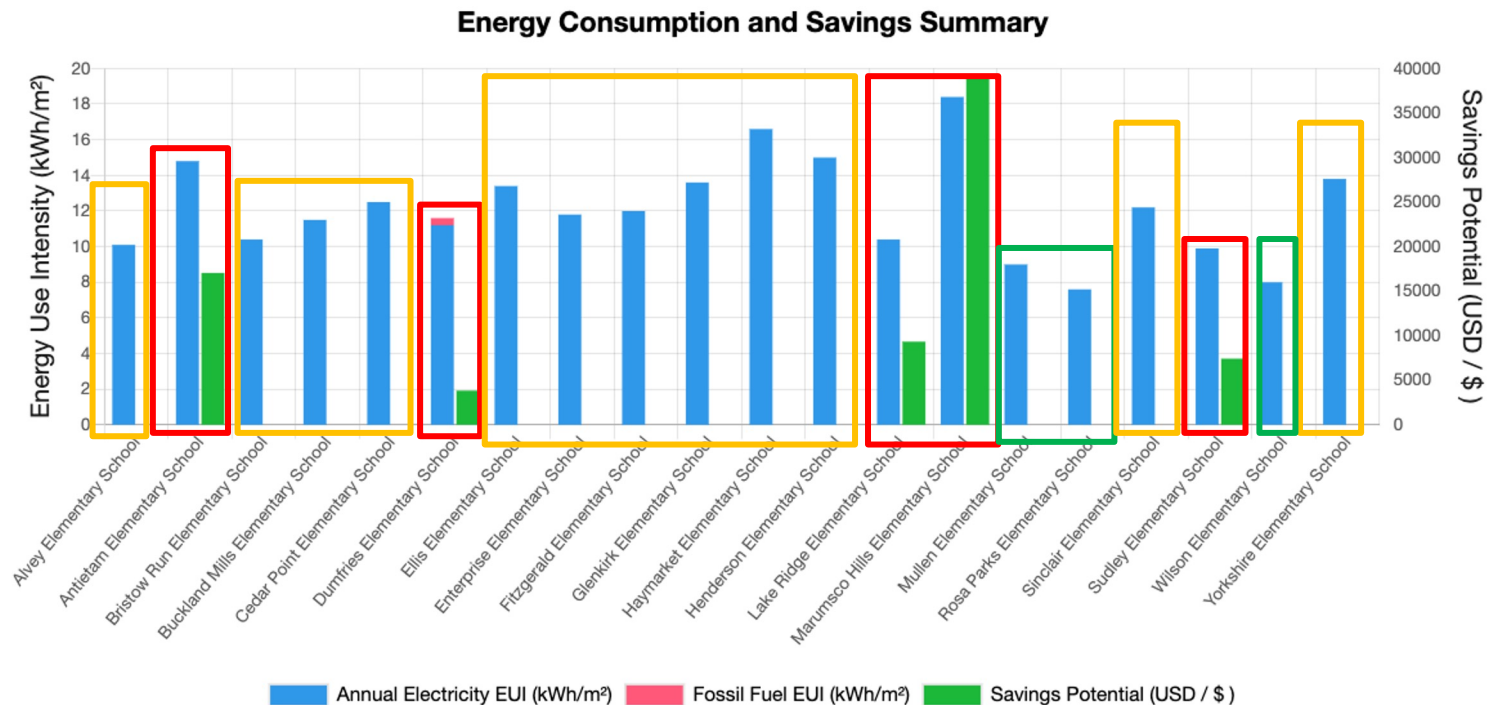
Buildings for no-/low-cost O&M tune ups are highlighted in yellow.

Buildings to assess for best practices are highlighted in green.

III. Utilizar los resultados


Gráfico 3. Comparación de la intensidad del uso de la electricidad y la energía fósil (EUI) y el ahorro de costes por edificio

- Comparar y clasificar los edificios de una cartera según el EUI anual de electricidad y combustibles y el potencial de ahorro de costes anual.
- Los edificios con un alto potencial de ahorro de costes son buenos candidatos para las auditorías y el análisis posterior.
- Los edificios con un elevado EUI fósil representan oportunidades de electrificación y descarbonización.














III. Utilizar los resultados

Gráfico 4. Ordenar, clasificar y priorizar los edificios de una cartera para su mejora

- Use  para clasificar los edificios de una cartera en función del EUI anual de la electricidad y los combustibles fósiles, el potencial de ahorro anual, etc.
- Los edificios con un alto potencial de ahorro de costes son buenos candidatos para las auditorías y el análisis posterior.
- Los edificios con un elevado EUI fósil representan oportunidades de electrificación y descarbonización.
- Haga clic en cualquier **Building Name** para ver un informe de análisis de ese edificio en particular.

Building Analytics List

Building Name 	Building Location 	Building Area (m ²) 	Annual Electricity Consumption (kWh) 	Annual Fossil Fuel Consumption (kWh) 	Annual Electricity Cost (US dollar (USD / \$)) 	Annual Fossil Fuel Cost (US dollar (USD / \$)) 	Annual Electricity EUI (kWh/m ²) 	Annual Fossil Fuel EUI (kWh/m ²) 	Annual Cost Savings Potential (US dollar (USD / \$)) 	Annual Energy Savings (%) 
Office 17	Houston, TX	46,320.0	8,076,233	81,067	638,022.5	1,933.1	174.4	1.8	243,188	38.1 %
Office 18	Phoenix, AZ	46,320.0	7,486,566	531,708	708,229.2	16,356.5	161.6	11.5	223,769	33.3 %
Office 19	Atlanta, GA	46,320.0	7,346,394	369,461	714,804.1	11,231.6	158.6	8.0	166,351	22.3 %

III. Utilizar los resultados

Gráfico 5. Potencial de reducción de energía, costos y emisiones anuales

Overview

Building Type:
Office

Gross Floor Area (m²):
46,320.0

Building Location:
Albuquerque, NM

Closest Weather Station:
Station: 723650-23050 : Albuquerque Intl Sunport Airport

Potential Cost Savings (US dollar (USD / \$)):
139,198
20.8%

Potential Energy Savings (kWh):
1,515,023
20.0%

Electricity Energy/Cost Savings:
21.1%

Fossil Fuel Energy/Cost Savings:
12.9%

GHG Emissions Reduction (MTCO₂e):
669.4
20.6 %

GHG Emissions Intensity Reduction (MTCO₂e/m²):
0.014

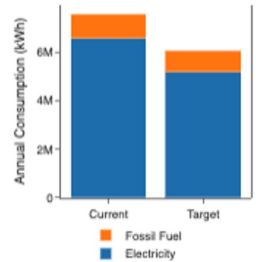
Note: The annual estimates are based on the most recent 12 months of data input into BETTER.

[More energy and cost details](#)



Clic en **More Energy and Cost Details** para un análisis más profundo..

Energy Type	Electricity	Fossil Fuel
Annual Energy Consumption (kWh)	6,579,014	1,000,397
Annual Site Energy Use Intensity (kWh/m ²)	142.0	21.6
Annual Energy Saving (kWh)	1,386,043	128,980
Annual Energy Saving Percentage (%)	21.1	12.9
Combined Annual Energy Consumption (kWh)	7,579,412	
Combined Annual Energy Use Intensity (kWh/m ²)	163.6	
Combined Annual Energy Saving (kWh)	1,515,023	
Combined Annual Energy Saving Percentage (%)	20.0	

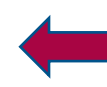
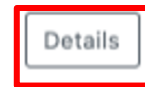


III. Utilizar los resultados

Gráfico 6: Recomendaciones sobre la eficiencia energética

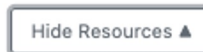
Energy Efficiency Recommendations

- Reduce Plug Loads
- Reduce Lighting Load
- Decrease Heating Setpoints
- Increase Cooling Setpoints
- Reduce Equipment Schedules



Clic en **Details** para ver las descripciones de cada medida y las orientaciones de aplicación.

Energy Efficiency Measures



Reduce Plug Loads

Your building plug load is higher than that of a typical building. Anything that is plugged into standard electric receptacles or outlets falls under the "plug load" category. Personal computers, monitors, printers, coffeemakers, and other office/lab/lighting equipment are examples of plug loads. Consider upgrading your equipment to more efficient models (e.g., ENERGY STAR certified) and operate on a schedule where possible. Advanced power strips and other monitoring devices can help you target your most energy-intensive devices.

Resources:

- US Department of Energy: [Assessing and Reducing Plug and Process Loads in Office Buildings](#), Better Buildings Solutions Center
- US Department of Energy: [Decision Guides for Plug and Process Load Controls](#), Better Buildings Solutions Center
- US Department of Energy: [Energy-Efficient Products List](#)
- US Department of Energy: [Lessons Learned and the Future of Plug Load Controls](#), Better Buildings Solutions Center
- US Department of Energy: [Leveraging the Advanced Power Strips \(APS\) Technical Specification for Commercial Buildings](#), Better Buildings Solutions Center
- US Environmental Protection Agency: [ENERGY STAR Building Upgrade Manual Chapter 7: Supplemental Load Reduction](#)
- US Environmental Protection Agency: [ENERGY STAR Certified Products](#)
- Lawrence Berkeley National Laboratory: [Energy Efficiency Standards Group: Products](#)

Reduce Lighting Load

Your building lighting load is higher than that of a typical building. Lighting load is a significant portion of any building's energy consumption, but lighting efficiency and controls have a big impact on lighting system performance. Consider upgrading bulbs and fixtures to improve efficiency and check existing (or upgrade to) controls that dim and turn off the lights appropriately. Take advantage of natural daylighting whenever possible. Lights near existing windows or skylights can be controlled to dim or turn off for maximum daylight utilization. Renovations to the building envelope and internal space configurations are good opportunities to improve lighting system performance.

Resources:

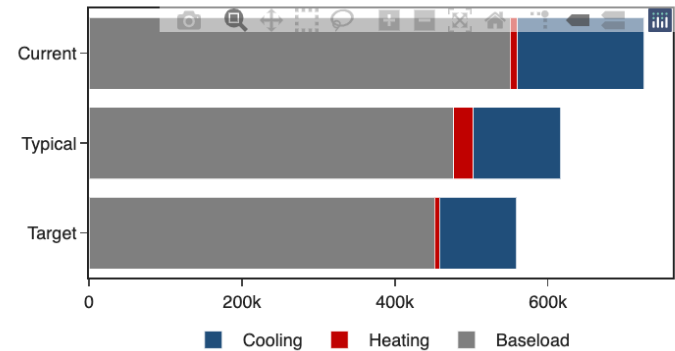
- US Department of Energy: [US DOE Energy Asset Score Recommendations Guide](#), pp. 8-11
- US Environmental Protection Agency: [ENERGY STAR Building Upgrade Manual Chapter 6: Lighting](#)
- Lawrence Berkeley National Laboratory: [Lighting and Electronics](#)
- National Institute of Building Sciences: [Advanced Lighting Systems: An Overview](#), Federal Energy Management Program (FEMP) course offered through Whole Building Design Guide

III. Utilizar los resultados

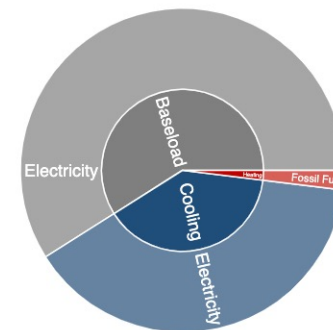
Gráfico 7. Desglose de los costos y ahorros anuales por tipo de carga

- Evalua los costes anuales de la utility y el ahorro potencial por tipo de carga (refrigeración, carga base y calefacción).
- **Carga base:** uso constante de energía que no depende de la temperatura exterior. Asociado a equipos de uso constante como la iluminación, la ventilación y otros equipos.
- **Calefacción:** el aumento del uso de energía observado en las temperaturas exteriores más frías debido al funcionamiento de los equipos de calefacción.
- **Enfriamiento:** el aumento del uso de energía observado en temperaturas exteriores más cálidas debido al funcionamiento de los equipos de enfriamiento de espacios.

Cost Breakdown [US dollar (USD / \$)]



Cost Savings Breakdown [US dollar (USD / \$)]

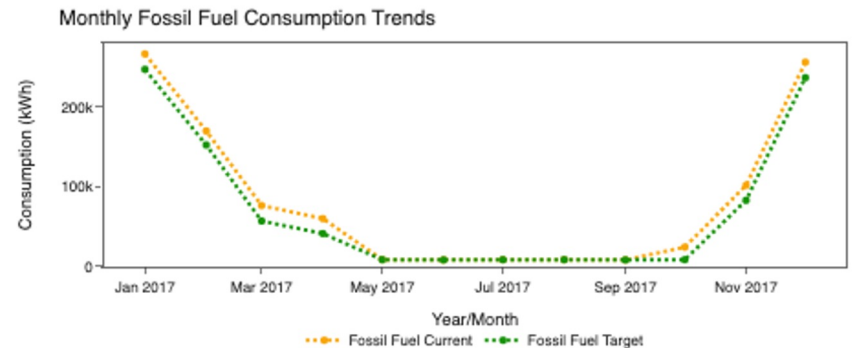
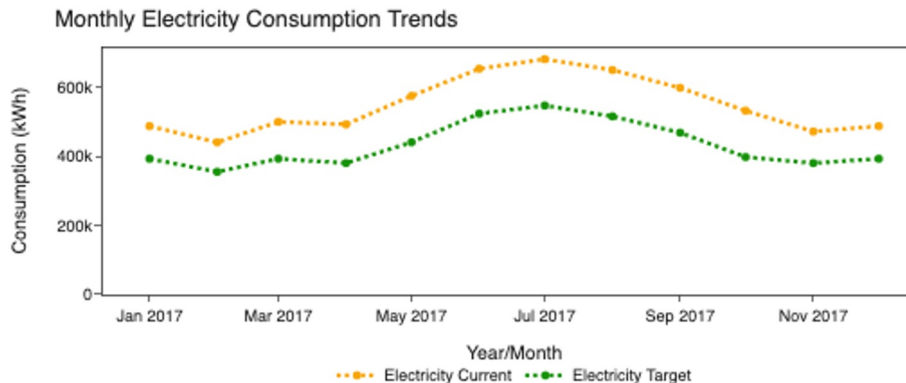


III. Utilizar los resultados

Gráfico 8. Tendencias del uso mensual de energía eléctrica y fósil en los edificios.

Seguimiento a la efectividad de las medidas de eficiencia energética:

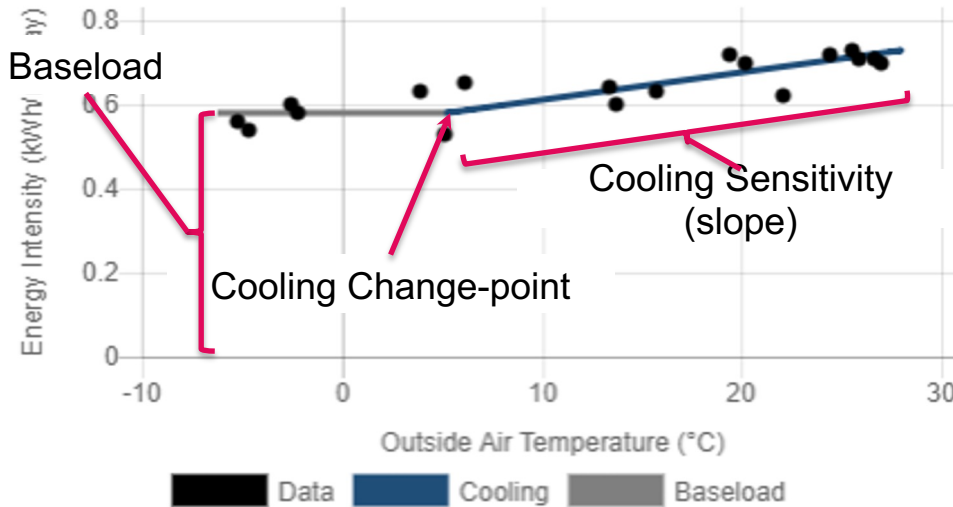
- Continue ingresando datos y corriendo la herramienta.
- Monitoree el desempeño respecto a la energía consumida.
- Genere recomendaciones actualizadas.



III. Utilizar los resultados

Gráfico 9. Modelos de punto de cambio y benchmark en el consumo de electricidad y de combustibles fósiles

Electricity Change-point Model



- Los datos de uso de energía normalizados se ajustan a modelos de punto de cambio para caracterizar la respuesta del edificio a la temperatura exterior.
- Los parámetros del modelo de puntos de cambio (normalizados por la superficie bruta del edificio) se comparan con la distribución de los edificios en el conjunto de datos.
- Los parámetros que se encuentren en la parte inferior de la distribución activarán determinadas recomendaciones preestablecidas (por ejemplo, un mal rendimiento de la carga base dará lugar a recomendaciones para reducir el uso de la iluminación y la carga de enchufes).

Electricity Consumption Benchmarking

Baseload
(Typical)



Cooling Change-point
(Poor)



Cooling Sensitivity
(Typical)



Note: % indicate the percentage of buildings your building is superior to.

Para mayor información, por favor contacte a:

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- Marcos Villalobos, LBNL, mwillalobos.lbnl@gmail.com
- Alberto Diaz-Gonzalez, LBNL, adiazg@lbl.gov

Recursos adicionales:

- BETTER URL: <https://better.lbl.gov/>
- Analytical engine source code: [github.com/LBNL-ETA/BETTER analytical engine](https://github.com/LBNL-ETA/BETTER_analytical_engine)
- Articles, reports, and training videos: <https://better.lbl.gov/news/> and [https://better.lbl.gov/how it works/](https://better.lbl.gov/how_it_works/)

Anexos

BETTER Template Building Information Inputs

SI Units (meters, kWh, °C)

Select Currency * : US dollar (USD / \$)

Gross Floor Area Unit: sq. meters

Building ID*	Building Name*	Location*	Gross Floor Area (Excluding Parking)*	Primary Building Space Type*
1	Office 1	Miami, FL	4982	Office
2	Office 2	Houston, TX	4982	Office
3	Office 3	Atlanta, GA	4982	Office
4	Office 4	Los Angeles, CA	4982	Office
5	Office 5	Las Vegas, NV	4982	Office
6	Office 6	San Francisco, CA	4982	Office
7	Office 7	Baltimore, MD	4982	Office

1. Unit System

- Select Imperial Units (feet, kBtu, °F) or SI Units (meters, kWh, °C)

2. Building Location (City, State/Province, Zip, Country)

- Used to find weather data

3. Gross Floor Area (Exclude Parking)

- Used to normalize consumption

4. Primary Building Space Type

- Used for benchmarking

5. Currency

- Used for cost savings reporting

BETTER Template Energy Consumption and Cost Inputs

- Minimum of 12 consecutive months of energy consumption data is required.
- Gather all electricity and fossil fuel consumption data from utility bills for each billing period.
- Energy cost is optional. If no energy cost is entered, BETTER will use a default cost per unit.
- Average outdoor air temperature is optional. If no weather data is entered, BETTER will use National Oceanic and Atmospheric Administration (NOAA) data.*

Building ID*	Billing Start Dates*	Billing End Dates*	Energy Type*	Energy Unit*	Energy Consumption*	Energy Cost	Average Outdoor Air Temperature
1	1/1/2017	1/31/2017	Electric - Grid	kWh (thousand Watt-hours)	66338		
1	2/1/2017	2/28/2017	Electric - Grid	kWh (thousand Watt-hours)	55528		
1	3/1/2017	3/31/2017	Electric - Grid	kWh (thousand Watt-hours)	64180		
1	4/1/2017	4/30/2017	Electric - Grid	kWh (thousand Watt-hours)	62067		
1	5/1/2017	5/31/2017	Electric - Grid	kWh (thousand Watt-hours)	69730		

* NOAA weather data may not be available for all locations. An error message will show on the BETTER analysis reports to prompt a user to enter average outdoor air temperature data for a given location and/or billing period as appropriate.

ENERGY STAR® Portfolio Manager® Template Inputs

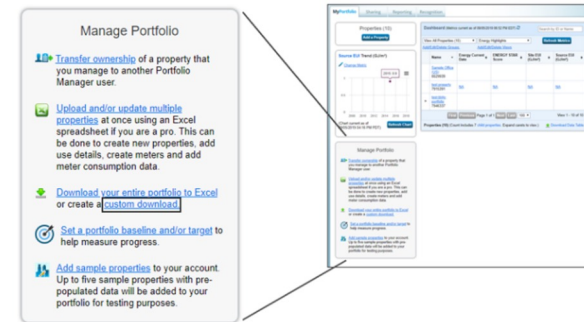
Property Information

- Portfolio Manager ID
- Street Address
- City
- State/Province
- Postal Code
- Country
- Year Built

Meter Entries

- Portfolio Manager Meter ID
- Meter Name
- Meter Type
- Meter Consumption ID
- Start Date
- End Date
- Delivery Date
- Usage/Quantity

Step-by-step guidance available on BETTER (https://better.lbl.gov/run_better/).



Property

Property Name	Portfolio Manager ID	Street Address	Street Address 2	City/Municipality	State/Province	Other State/Province	Postal Code	Country	Year Built
		1 Cyclotron Road	Not Available	Berkeley	California	Not Available	94720	United States	1994

Meter Entries

Property Name	Portfolio Manager ID	Portfolio Manager Meter ID	Meter Name	Meter Type	Meter Consumption ID	Start Date	End Date	Delivery Date	Usage/Quantity
b1	7946502	63303050	Natural Gas	Natural Gas	3180414283	1/1/2015	1/31/2015	Not Available	65338.33
b1	7946502	63303050	Natural Gas	Natural Gas	3180414284	2/1/2015	2/28/2015	Not Available	58134.72
b1	7946502	63303050	Natural Gas	Natural Gas	3180414285	3/1/2015	3/31/2015	Not Available	62858.33
b1	7946502	63303050	Natural Gas	Natural Gas	3180414286	4/1/2015	4/30/2015	Not Available	57974.17
b1	7946502	63303050	Natural Gas	Natural Gas	3180414287	5/1/2015	5/31/2015	Not Available	66433.33
b1	7946502	63303050	Natural Gas	Natural Gas	3180414288	6/1/2015	6/30/2015	Not Available	71758.61
b1	7946502	63303050	Natural Gas	Natural Gas	3180414289	7/1/2015	7/31/2015	Not Available	73295
b1	7946502	63303050	Natural Gas	Natural Gas	3180414290	8/1/2015	8/31/2015	Not Available	76405.28
b1	7946502	63303050	Natural Gas	Natural Gas	3180414291	9/1/2015	9/30/2015	Not Available	65691.39
b1	7946502	63303050	Natural Gas	Natural Gas	3180414292	10/1/2015	10/31/2015	Not Available	62875.28
b1	7946502	63303050	Natural Gas	Natural Gas	3180414293	11/1/2015	11/30/2015	Not Available	58813.89

