

# GreenStep Cities Workshop: Benchmarking Wastewater Treatment Plants

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Cheri Schneider

**THE WEIDT GROUP®**



the energy practice of EYP Inc.



## B3 History:

- 2001 State legislation passed
- 2004 MNBenchmarking.com established for public buildings

## Today:

- B3 Benchmarking has more than 527 million square feet contained in over 12,000 buildings
- Benchmark 50+ building types containing 60+ space types

MINNESOTA



# BUILDINGS, BENCHMARKS & BEYOND

Tools and Programs for Sustainable Buildings in Minnesota

## Design of New Buildings and Renovations



Use **B3 Guidelines** on new buildings or renovations to meet sustainability goals for site, water, energy, indoor environment, materials and waste.



Use the **SB 2030 Energy Standard** to meet energy use goals only. If the B3 Guidelines are used, the SB 2030 Energy Standard is automatically included in the process.

## Operation of Existing Buildings



Use **B3 Benchmarking** to track and compare energy use on existing buildings. The B3 Guidelines and SB 2030 Energy Standard direct the user to the B3 Benchmarking tool.



Use **B3 Energy Efficient Operations** to minimize energy use during building operations. This program can be applied to any existing building.



Use **B3 Post Occupancy Evaluation (POE)** to determine occupants' perceptions of the buildings' indoor environmental quality. The POE survey is required for B3 buildings.



# MN.B3Benchmarking.com

## 1. Public Sections

- Home
- About
  - Webinars
  - Support Videos
- News
- Reports
  - Public summary of data

## 2. Secure Section

- Launch
  - Once signed in,  
button to launch application

The screenshot displays the MN.B3Benchmarking.com website. The header features the 'MINNESOTA B3 BENCHMARKING' logo, a 'Sign In' button, and navigation links for Home, About, News, Reports, and Launch. The main banner image shows the Minnesota State Capitol building with the text 'Advanced Metrics for Rating Buildings' and a 'Learn More' button. Below the banner are three columns: 'What is B3?' (funded by MN Departments of Commerce and Administration), 'Features & Benefits' (benchmark energy modeling, peer comparisons, ENERGY STAR scores), and 'Testimonials' (quote from Lisa Johnson, ISD 197 West St. Paul-Mendota Heights -Eagan). A 'Contact Us' section at the bottom left includes contact forms, email (support@b3benchmarking.com), and phone (952-939-1878). A 'Welcome to B3 Benchmarking' popup is overlaid on the right, stating the application is now HTML5 compatible and providing a 'Launch B3 Benchmarking Application' button. The popup also includes a compatibility table for various browsers.

| Browser           | Version            |
|-------------------|--------------------|
| Internet Explorer | v. 9, 10, 11, Edge |
| Google Chrome     | versions 25+       |
| Firefox           | versions 25+       |
| Opera             | versions 15+       |
| Safari            | versions 6+        |



MINNESOTA

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BENCHMARKING

Home

AboutNewsRep

Contact Us

Please select from the following options.

General Inquiries

For general comments, questions and support.

Talk to us

Request Access

Request access to the B3 Benchmarking application.

Request Access

Email

Email us directly with your questions or comments.

Email

Phone

Call us directly at 952-939-1878.

New Construction Questions? Contact B3 Guidelines at [guidelines@b3mn.org](mailto:guidelines@b3mn.org)

Need to request a new service provider user? [Click here](#)

Contact Us

Contact Forms

support@b3benchmarking.com

952-939-1878

Partners

B

BUILDINGS, BENCHMARKS & BEYOND

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MINNESOTA DEPARTMENT OF ADMINISTRATION

comm

COMMUNITY DEVELOPMENT

THE WEIDT GROUP

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Request Access

Please fill out the form below to request a user account to the B3 Benchmarking system. If you are not a member of the organization you are requesting access to or are requesting edit privileges, written permission from the organization's data owner will be required prior to access being granted. Required fields are indicated in red.

First Name:

Last Name:

Company:

Title:

Address:

City:

State:

Zip:

Office Phone:

Mobile:

E-mail:

Please provide a valid email address. A welcome email will be sent to this address as well as it being the account username.

ACCESS REQUESTED

Sector:

Organization:

If you don't see your organization listed, please call us at 952-939-1878.

Data Privileges:

If access is needed to additional organizations, please provide sector, organization and data privileges in the comments field below.

Comments:

☒ I would like to receive quarterly newsletter emails highlighting new features and functions of the B3 Benchmarking system

Submit

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## Day's Topics

### 1. Data Entry

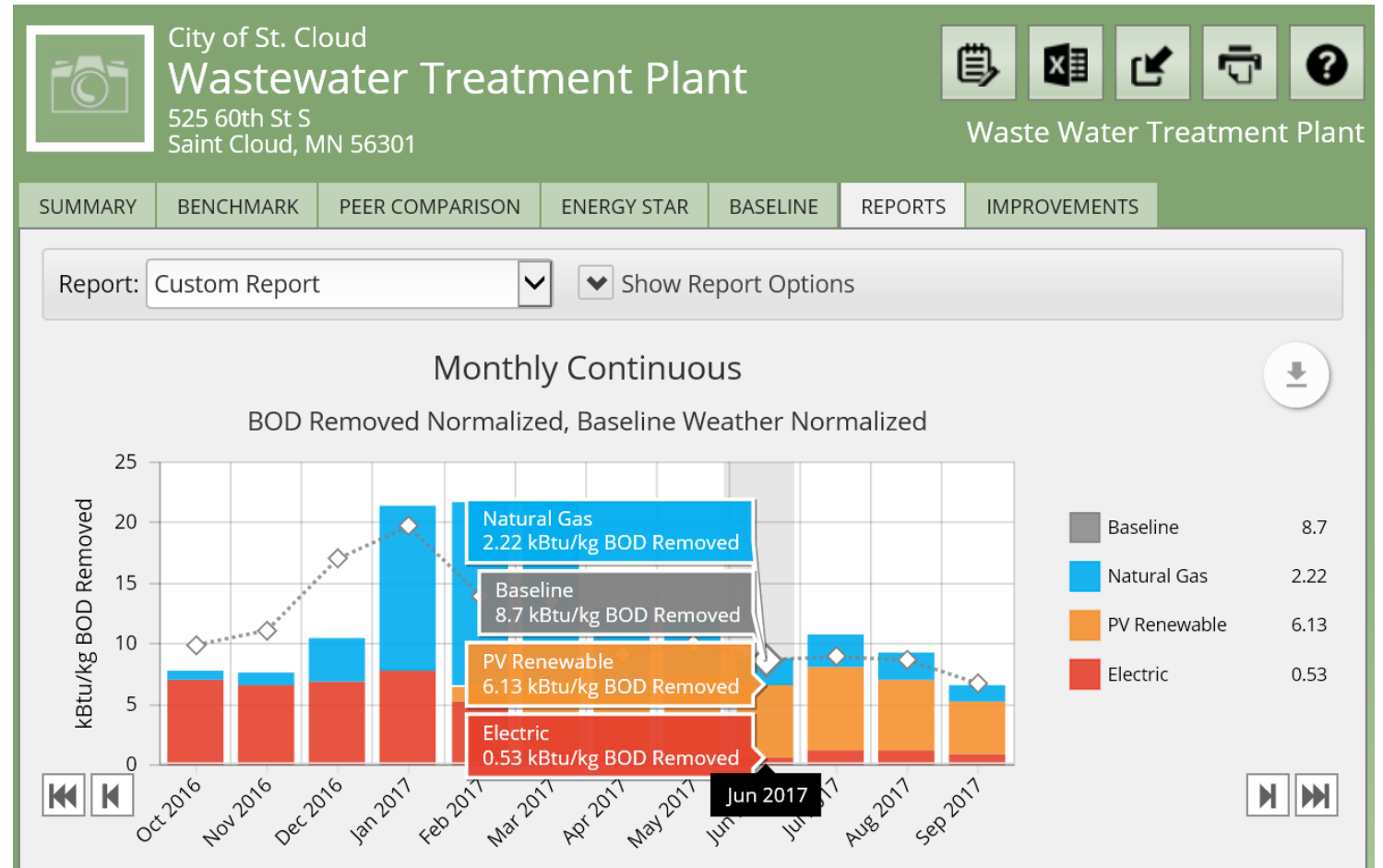
- DMR
  - Plant Attributes
  - Flow data
- Energy

### 2. WWTP Metrics

- ENERGY STAR
- Peer Rating
- Baseline

### 3. Reports

- Plant Flow Rate Normalize
- BOD Removed Normalize



<https://mn.b3benchmarking.com/WastewaterTreatmentPlants>

# Data Entry – DMR Import of Attributes and Flow Data

SUMMARY BENCHMARK PEER COMPARISON ENERGY STAR BASELINE REPORTS IMPROVEMENTS

## B3 ENERGY STAR Score

B3 Benchmarking creates an ENERGY STAR® Portfolio Manager property for each B3 site and automatically transfers building and meter information after every edit for the purpose of gathering an ENERGY STAR score. [Read about eligibility requirements.](#)

This site has received an ENERGY STAR score of 80.

ENERGY STAR Property Attributes

Site Editor

GENERAL ATTRIBUTES ENERGY STAR EVENTS NOTES

ENERGY STAR® includes a variety of additional property attributes to help refine a better score.

### WWTP

#### Wastewater Treatment Plant

Plant Design Flow Rate (MGD): 0.448

Average Influent Biological Oxygen Demand (BOD5): 40.83 ☐ Use Default Value

Average Effluent Biological Oxygen Demand (BOD5): 1.96 ☐ Use Default Value

Fixed Film Trickle Filtration Process: No ☐ Use Default Value

Nutrient Removal: No ☐ Use Default Value

Save & Close Cancel

Meter Editor

GENERAL CONNECTIONS ADMIN

Meter Name: Flow Meter

Account #: Meter #: Premise #:

Utility Company: (Unknown)

Date Connected: (optional) Comments:

Date Disconnected: (optional)

### Meter Readings (Utility Bills)

Units: MGal

| Start Date | End Date  | Flow (MGal) | Influent BOD mg/L | Effluent BOD mg/L | Flow |
|------------|-----------|-------------|-------------------|-------------------|------|
| 2/1/2013   | 3/1/2013  | 20.4288     | 0.00              | 0.00              |      |
| 3/1/2013   | 4/1/2013  | 19.1824     | 217.00            | 0.00              |      |
| 4/1/2013   | 5/1/2013  | 20.9152     | 0.00              | 0.00              |      |
| 5/1/2013   | 6/1/2013  | 24,076.8000 | 0.00              | 0.00              |      |
| 6/1/2013   | 7/1/2013  | 28.4240     | 162.00            | 0.00              |      |
| 7/1/2013   | 8/1/2013  | 22.7392     | 0.00              | 0.00              |      |
| 8/1/2013   | 9/1/2013  | 19.8512     | 0.00              | 0.00              |      |
| 9/1/2013   | 10/1/2013 | 18.6352     | 162.00            | 0.00              |      |

Add a New Reading

Save & Close Cancel

- DMR data imported in B3 quarterly
  - Plant Attributes
  - Flow Data
- Review data and check for errors
- Corrections submitted via DMR updates







## Data Entry – Energy Data





- Respective energy data needs to be entered
- All WWTP sites have default electric meter
  - Contact us if your plant does not utilize any energy sources
- *Add A Meter* for additional energy sources plant uses
  - E.g. natural gas, PV, wind
  - Currently no biofuel meter
- Must have at least 12 months of complete data to calculate metrics

Buildings (This site contains one building) + Add a Site/Building

 WWTP Waste Water Treatment Plant  
Plant Design Flow Rate: 0.448 MGD











 Site has insufficient meter data to calculate a continuous twelve month consumption period.

Meters (2 meters) Current To 10/1/2017 + Add a Meter

| Meter Name ↑   | Status  | Type        | Utility   | Meter # | Acct # | First Read... | Last Read... | Conn |
|--|---|-------------|-----------|---------|--------|---------------|--------------|------|
|  Electric   |  | Electric... | (Unknown) |         |        |               |              | 1 ↓  |
|  Flow Meter |  | Flow Meter  | (Unknown) |         |        | 12/1/2009     | 10/1/2017    | 1 ↓  |

**Add a New Meter**

Specify the fuel source:

-  Electric
-  PV Renewable
-  Wind Renewable
-  Natural Gas
-  Steam/Hot Water
-  Thermal Renewable
-  Chilled Water
-  Propane
-  Fuel Oil
-  Wood

Cancel




## Data Entry – Energy Data

- Manually enter data via Meter Editor
  - Utilize *Add a New Reading* to add subsequent rows
  - Save & Close when complete

Meter Editor

GENERAL SUBMETER CONNECTIONS ADMIN

 Meter Name:  X Account Number:   
Utility Company:  Meter Number:   
Comments:  Premise Number:   
Date Connected:   
Date Disconnected:

Meter Readings (Utility Bills) ☒ Demand Columns ☐ Transport Charge Columns Units: kWh

| Start Date | End Date   | Consumption (kWh) | Peak Demand (KW) | Demand Charge | Total \$    | \$ Per Unit | Consumption |  |
|------------|------------|-------------------|------------------|---------------|-------------|-------------|-------------|--|
| 4/28/2016  | 5/25/2016  | 388,800.00        | 0.00             | \$0.00        | \$28,151.99 | \$0.072     | <div></div> |  |
| 5/25/2016  | 6/26/2016  | 435,200.00        | 0.00             | \$0.00        | \$29,000.70 | \$0.067     | <div></div> |  |
| 6/26/2016  | 7/26/2016  | 416,000.00        | 0.00             | \$0.00        | \$30,223.18 | \$0.073     | <div></div> |  |
| 7/26/2016  | 8/24/2016  | 412,800.00        | 0.00             | \$0.00        | \$30,515.59 | \$0.074     | <div></div> |  |
| 8/24/2016  | 9/25/2016  | 459,200.00        | 0.00             | \$0.00        | \$32,625.65 | \$0.071     | <div></div> |  |
| 9/25/2016  | 10/24/2016 | 408,000.00        | 0.00             | \$0.00        | \$29,517.78 | \$0.072     | <div></div> |  |
| 10/24/2016 | 11/22/2016 | 387,200.00        | 0.00             | \$0.00        | \$29,258.65 | \$0.076     | <div></div> |  |
| 11/22/2016 | 12/27/2016 | 515,200.00        | 767.00           | \$5,083.50    | \$34,135.17 | \$0.066     | <div></div> |  |

Add a New Reading Save & Close Cancel





## Data Entry – Energy Data

- Utilize Import Wizard to generate spreadsheet template via Excel
  - A worksheet tab will be created for each meter

The B3 Import Wizard lets you enter consumption data in a Microsoft Excel® spreadsheet and upload it to the B3 Benchmarking application.

Start by generating a spreadsheet template which has been prepopulated with your existing readings. Every meter in your selection will be available in its own worksheet within the template. Enter new consumption data, and then, when you are ready, import the completed spreadsheet.

Note: You will only be able to import data for which you have add/edit rights.

What would you like to do?

☒ **Generate a spreadsheet template**  
Template will be in Microsoft Excel xlsx format.

☐ **Import a completed spreadsheet**  
Import a completed B3 meter reading template or supported custom import format.

Click 'Next' to continue.

Buttons: Cancel, << Prev, Next >>, Finish



# Data Entry – Energy Data

- Utilize Import Wizard to generate spreadsheet template via Excel
  - A worksheet tab will be created for each meter
- Enter or copy/paste readings in appropriate meter tab and save workbook



## Data Entry – Energy Data

- Utilize Import Wizard to generate spreadsheet template via Excel
  - A worksheet tab will be created for each meter
- Enter or copy/paste readings in appropriate meter tab and save workbook
- Reinitiate Import Wizard to import the completed spreadsheet
- Step through wizard to complete import process

The B3 Import Wizard lets you enter consumption data in a Microsoft Excel® spreadsheet and upload it to the B3 Benchmarking application.

Start by generating a spreadsheet template which has been prepopulated with your existing readings. Every meter in your selection will be available in its own worksheet within the template. Enter new consumption data, and then, when you are ready, import the completed spreadsheet.

Note: You will only be able to import data for which you have add/edit rights.

What would you like to do?

☐ **Generate a spreadsheet template**  
Template will be in Microsoft Excel xlsx format.

☒ **Import a completed spreadsheet**  
Import a completed B3 meter reading template or supported custom import format.

Click 'Next' to continue.

Buttons: Cancel, << Prev, Next >>, Finish



## B3 Benchmarking WWTP Metrics

### B3 Peer Rating

95

This site is ranked in the 95th percentile amongst 22 similar sites.

### ENERGY STAR® Score

☆ 80

This site has received an ENERGY STAR score of 80.

### Baseline

↓ -19.47%

This site is operating below the baseline period.

Eligible plants receive 1-100 scores directly from ESPM

### ESPM Criteria:

- Plants operating above 0.6 MGD
- Average influent BOD levels > 30 and < 1,000
- Average effluent BOD levels > 0





## B3 Benchmarking WWTP Metrics

### B3 Peer Rating

95

This site is ranked in the 95th percentile amongst 22 similar sites.

### Percentile Score

72

This site has received a score of 72.

### Baseline

↓ -19.47%

This site is operating below the baseline period.

Smaller plants receive calculated 1-100 scores



NOTE: This score has been manually calculated using ENERGY STAR's formula outside of their recommended filters. For plants operating outside these criteria the score remains a useful gauge of energy intensity, but shouldn't be viewed as a precise percentile ranking of energy performance. ENERGY STAR's score for wastewater treatment plants are limited to:

- Plants operating above 0.6 MGD
- Average influent BOD levels > 30 and < 1,000
- Average effluent BOD levels > 0



## B3 Benchmarking WWTP Metrics

### B3 Peer Rating

95

This site is ranked in the 95th percentile amongst 22 similar sites.

### ENERGY STAR® Score

N/A

This site is not eligible to receive an ENERGY STAR score.

### Baseline

↓ -19.47%

This site is operating below the baseline period.

Three plant types are not eligible for either score:

- Aerated Ponds
- Non-aerated Ponds
- Other Treatment – Low Energy



Plants of type 'Aerated Pond' are not eligible to receive an ENERGY STAR score.





# B3 Benchmarking WWTP Metrics

## B3 Peer Rating

95

This site is ranked in the 95th percentile amongst 22 similar sites.

## ENERGY STAR® Score

☆ 80

This site has received an ENERGY STAR score of 80.

## Baseline

↓ -19.47%

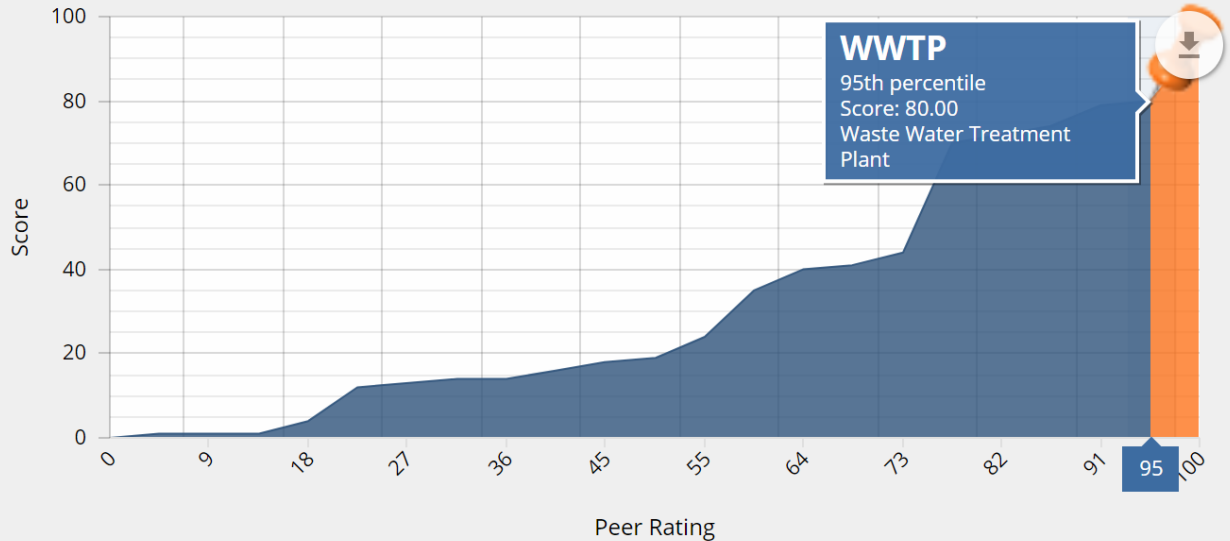
This site is operating below the baseline period.

B3 Peer Rating: ranking of site as compared to other sites in B3 of same space usage

For WWTPs, peer rating utilizes ENERGY STAR (or calculated) score to rank site

95th percentile

This site is ranked in the 95th percentile amongst 22 similar sites. Compared to other sites comprised of similar space usage: 100% Waste Water Treatment Plant.







## B3 Benchmarking WWTP Metrics

### B3 Peer Rating

95

This site is ranked in the 95th percentile amongst 22 similar sites.

### ENERGY STAR® Score

☆ 80

This site has received an ENERGY STAR score of 80.

### Baseline

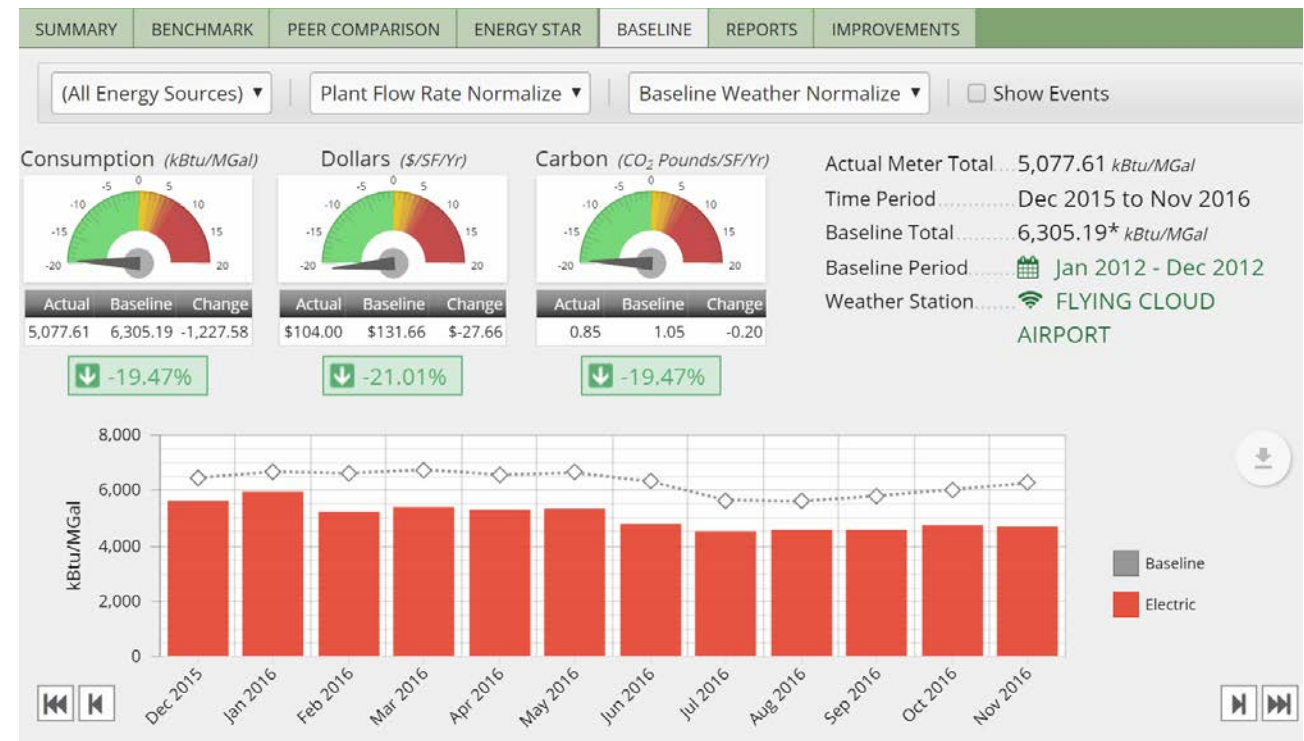
↓ -19.47%

This site is operating below the baseline period.

Baseline: score or no score, can compare site to itself using a defined 12 month baseline period

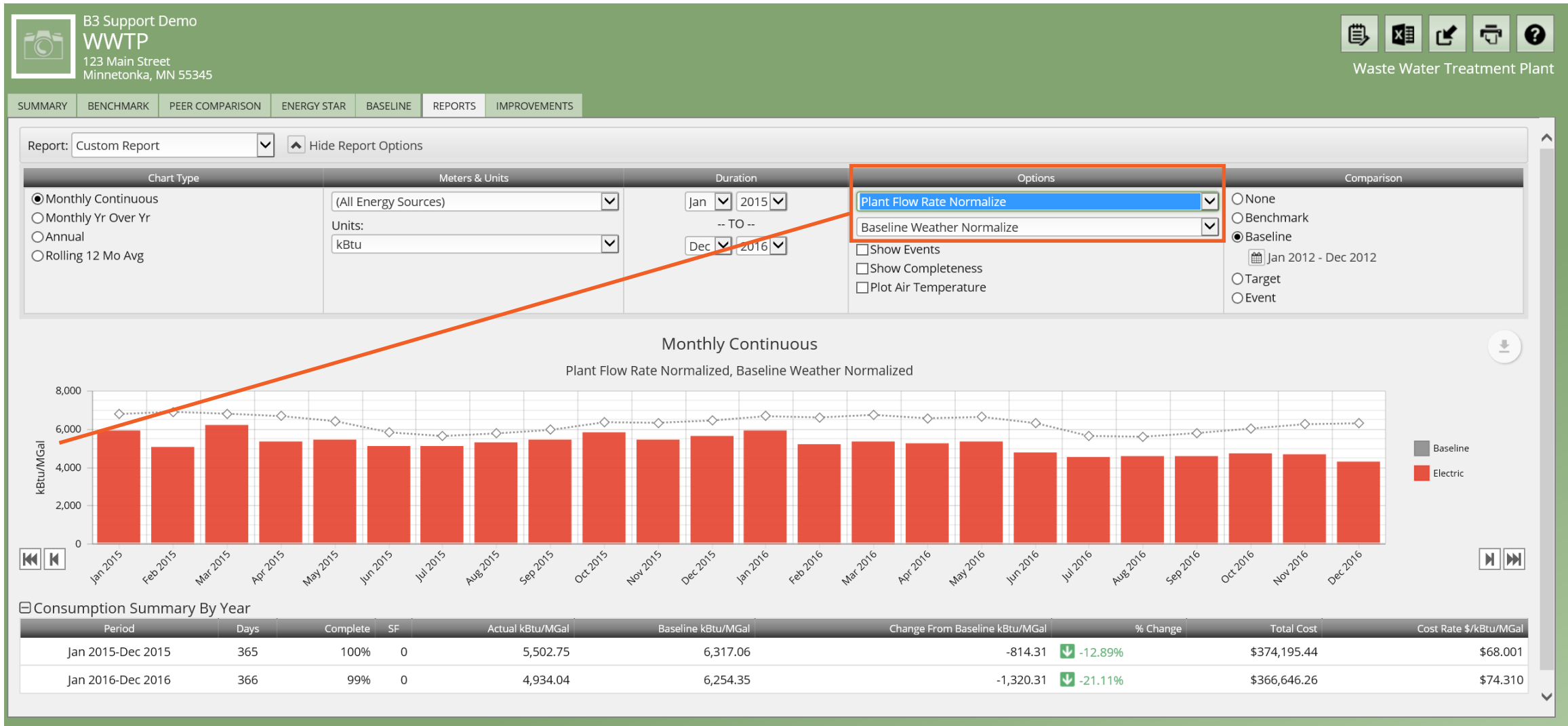
### Normalization Options:

- Weather
  - Actual or Baseline
- Flow Rate
  - kBtu/MGal
- BOD Removed
  - kBtu/kg BOD Removed



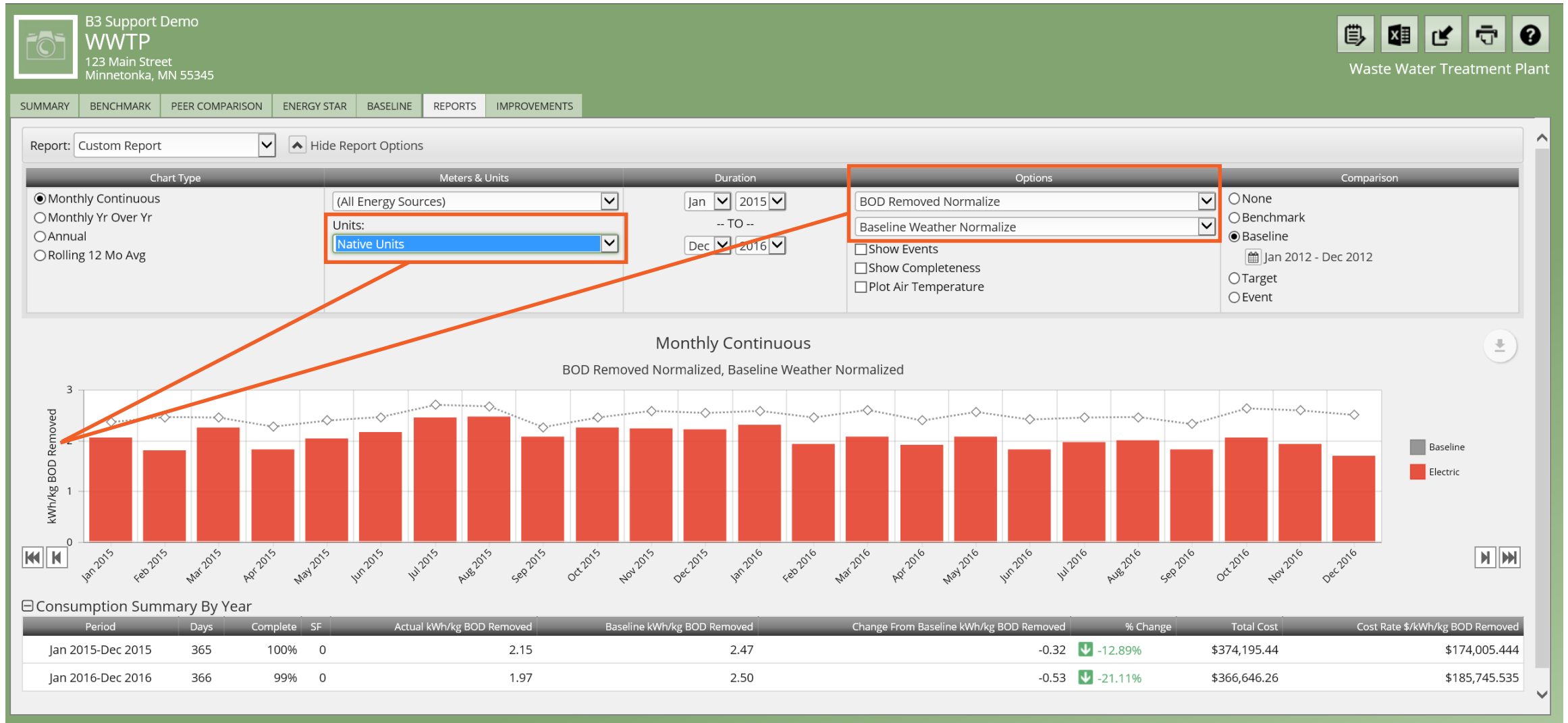


# B3 Benchmarking WWTP Reports





# B3 Benchmarking WWTP Reports



# Thank You

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the energy practice of EYP Inc.

Cheri Schneider

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