**Date last modified/updated:** Click here to enter a date. **Internal audit:** Click here to enter a date.

**Who last modified/updated:** Click here to enter text. **Management review:** Click here to enter a date.

**This part of the Navigator Playbook is completed when you have:**

1. **Developed one or more energy performance indicators (EnPIs) for your organization. If relevant variables significantly affect energy consumption, normalized EnPIs.**
2. **Developed an energy baseline (EnB) for EnPIs in order to later determine energy performance improvement.**
3. **Communicated proposed EnPIs and EnBs to top management so they can ensure the EnPIs and EnBs are appropriate for the organization.**
4. **Recorded and regularly reviewed the method used to determine and update EnPIs and established the conditions under which adjustments to the baseline(s) will be made.**
5. **Compared EnPI values to their respective EnBs on a regular basis.**
6. **Implemented a process for ongoing monitoring, measurement and analysis of your EnPIs, EnBs, and energy performance improvement.**
* **If you are planning on seeking U.S. DOE 50001 Ready recognition for this project please refer to the, “Get Ready Recognized,” page of the 50001 Ready Navigator to ensure you select an EnPI, EnB, and method for demonstrating energy performance improvement allowed by the recognition program. To achieve Ready recognition energy performance improvement is demonstrated for the same scope and boundaries as your 50001 Ready EnMS.**

**This document is an example of how to complete Playbook Task 11. All blue text should be replaced with your organization’s information, assessments, and/or decisions.**

1. Develop energy performance indicators (EnPIs) for your organization including an EnPI for each SEU. If relevant variables significantly affect energy consumption, then normalize EnPIs.

☒ We have developed our energy performance indicators (EnPIs) using information from the energy review in the Energy Data Collection and Analysis task.

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| ☒ | We have assigned responsibilities of EnPI development at our organization.  | This responsibility lies with the Energy Team, and the Director of Engineering makes the final decisions. |

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| ☒ | Our **Energy Team** is responsible for developing our list of EnPIs. | List developed 9/1/23 |
| ☒ | **Top management** is responsible for ensuring EnPIs appropriately represent energy performance, which can be accomplished through the management review process detailed in the Management Review task.  | Confirmed acceptance of responsibility on 9/15/23 |

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| ☒ | We have assigned an EnPI for each significant energy use (SEU).  | 9/15/23 |
| ☒ | Each of the EnPI’s we have selected provide immediate value to key stakeholders.  | Confirmed |

*Note: For 50001 Ready recognition specific EnPIs and EnBs are required. See program requirements on the “Get Ready Recognized” page of the 50001 Ready Navigator for more information.*

☒ We have established criteria for identifying EnPIs, detailed below:

Our EnPIs provide site-level metrics on electricity and water consumption for the data center, along with visibility into the performance of our IT equipment and cooling system, two significant energy users (SEU).

☒ We have established methods for determining EnPIs, detailed below:

Our current EnPIs are based on site-level and equipment-level data where we have ready and reliable access. Site-level data will utilize monthly billing from our utility, which will be entered into the ENERGY STAR Portfolio Manager. Equipment-level data for IT equipment and HVAC systems will be based on the data currently available in our Data Center Infrastructure Management (DCIM) system.

☒ We have established a process for regularly recording and reviewing these methods.

We will use ENERGY STAR Portfolio Manager and our DCIM system to record our energy usage. We will normalize these values to the computational workload throughout the month to adjust for changing conditions. We’re also planning to include average outside air temperatures to more accurately represent the changing relevant variables that drive energy consumption for our data center.

☒ We have created a list of EnPI(s) for our facility, and have detailed below:

| **EnPI** | **Energy Input, units** | **Description of intended use of EnPI**  |
| --- | --- | --- |
| 1. ENERGY STAR Portfolio Manager score | kWh/square-foot then normalized within Portfolio Manager for a 1-100 score | Measurement of overall site energy performance compared to past periods and rated against other data centers within the Portfolio Manager. |
| 2. Annual electrical consumption for IT equipment (servers, storage, and network) | kWh, [Power Usage Effectiveness **(PUE)**](https://www.iso.org/standard/63450.html) | Track consumption and normalize for computational loads—overall PUE criteria: Less than 1.5. |
| 3. Annual electrical consumption for the HVAC system (chillers, AHUs, and pumps) | kWh, kWh/ton cooling, Power Usage Effectiveness **(**[**PUE**](https://www.iso.org/standard/63450.html)**)** | Track consumption and normalize for computational loads and weather conditions—overall PUE criteria: Less than 1.5. |
| 4. Annual electrical consumption for the electrical system (transformers, UPSs, and PDUs) | kWh, Power Usage Effectiveness **(**[**PUE**](https://www.iso.org/standard/63450.html)**)** | Track consumption and normalize for computational loads and weather conditions—overall PUE criteria: Less than 1.5. |
| 5. Annual water consumption for the cooling system | Gallons of water, [Water Usage Effectiveness **(WUE)**](https://www.iso.org/standard/63450.html) | Track consumption and normalize for computational loads and weather conditions. |
| 6. Annual carbon release from the data center | Lbs., [Carbon Usage Effectiveness **(CUE)**](https://www.iso.org/standard/63450.html) | Track carbon (CO2) release and normalize for computational loads. |
| 7. IT intake air temperature conformance. | [Rack Cooling Index **(RCI)**](http://ancis.us/images/RCI.pdf) | Help ensure that the thermal conditions for the IT equipment are not compromised (could result in downtime) when improving energy use—RCI criteria: greater than 95%. |

1. Develop an energy baseline (EnB) for EnPIs in order to later determine energy performance improvement.

Providing responses to the questions below can help in identifying the relevant EnBs for the established EnPIs:

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| ☒ | How will each EnPI be used for evaluating energy performance? Is there a logical EnB for each? | The energy performance will mainly be based on EnPIs #2, #3, and #4 in the table above. The remaining EnPIs will support this work by focusing on water, carbon, and thermal characteristics. The baselines will be taken from estimates of the EnPIs from earlier years. We will use existing meters. |
| ☒ | What are the historical changes to facilities, equipment, systems, processes, or organization that would change how energy performance is evaluated? | Data centers are constantly evolving. Over the past year, we have implemented several changes to our IT equipment and cooling system. However, we do not plan to change the way energy performance is evaluated. |
| ☒ | What stakeholder interests should be considered when establishing EnB for the EnPI? | Both the IT and facilities teams must be involved to avoid suboptimizations. |
| ☒ | Are there strategic initiatives that would be measured or influenced by one or more of the established EnPIs? Is there an EnB associated with these strategic initiatives? | The EnPIs and EnBs likely influence company energy, water, and carbon policies.  |
| ☒ | What are the historical periods that have reliable, consistent data for the established EnPIs? | We have reliable historical data dating back to 2010. However, we are unlikely to use the data from 2020 and 2021 due to the atypical energy consumption caused by the COVID-19 pandemic. |

1. Communicate proposed EnPIs and EnBs to top management so they can ensure the EnPIs and EnBs are appropriate for the organization.

☒ Identified EnPIs and EnBs have been approved by top management.

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| Who approved? | General Manager |
| When approved? | 9/15/23 |

1. Record and regularly review the method used to determine and update EnPIs and establish the conditions under which adjustments to the baseline(s) will be made.

☒ We maintain documented information on the methods we use to determine and update our organization’s EnPIs.

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| Who maintains the documented information? | Engineering Management |
| Where are these records maintained (e.g. energy manual or energy planning procedure)? | Energy Manuals |

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| ☒ | We evaluate any changes in facilities, equipment, systems, processes, operating procedures, materials, relevant variables, and many other factors. We adjust the EnPI as necessary. | This will be an ongoing process with frequent adjustments due to the character of data centers. |

1. Compare EnPI values to their respective EnBs on a regular basis.

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| ☒ | EnPI values are reviewed and compared to their respective EnBs, as appropriate. | The review process is on a semi-yearly schedule. |
| ☒ | Calculated EnPI values and their associated EnBs are retained as documented information and periodically reviewed to determine if adjustments are required.  | The review process is intended to ensure progress. All review material is retained to form the basis for potential adjustments. |
| ☒ | We have a process in place where we make adjustments to an EnB in the following instances:* When the EnPIs no longer accurately reflect the organization’s energy performance
* When there are major changes to static factors, the process, operational patterns, or energy systems
* According to a predetermined method
 | Again, data centers are in a constant state of flux. New IT equipment is introduced, often with significantly higher heat densities. This justifies adjustments to the EnB. Unforeseen business disruptions may also necessitate adjustments to the EnB. |
| ☒ | We maintain records of modifications and updates to EnBs to ensure energy performance measures remain relevant and meaningful. | We use our recorded data to cross-reference and make adjustments as necessary. |

1. Implement a process for ongoing monitoring, measurement and analysis of your EnPIs, EnBs, and energy performance improvement

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| ☒ | Calculated EnPI values and EnBs are recorded and reviewed on a regular basis. | The review process is scheduled semiannually, but our DCIM system enables more granular and frequent information collection. |
| ☒ | The components of EnPIs that are measured or calculated are managed for accuracy and repeatability in the energy data collection plan (as addressed in the Energy Data Collection and Analysis task).  | Engineering Department personnel regularly review data from the DCIM system and meters for accuracy and to identify any anomalies. |
| ☒ | Top management’s review of energy performance includes a review of performance as determined by the EnPIs and the related EnBs.  | Top management will always be involved in the review process and will have the final word on any changes in strategy. |
| ☒ | Top management ensures changes are made when the above-mentioned metrics are no longer appropriate. | Top management signs off on the completion of changes to ensure that the changes have been implemented. |

Top Management Approval

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| ☒  | Date approved: | 9/15/23 |
| ☒  | Who approved: | General Manager |

Comments

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