# Automated Benchmarking System Design Overview
Version 3.4

The U.S. Environmental Protection Agency's (EPA) Automated Benchmarking System (ABS) is a framework for exchanging data between EPA's energy performance rating system and a third party Energy Service Provider's (ESP) systems. EPA has experience establishing data exchange with a variety of ESPs including energy software and bill payment companies, utilities, regional efficiency programs, and large multi-site organizations. One of the initial challenges for these organizations is understanding the eight ABS web services and how the web services should be organized and integrated with an ESP's system. This system design step is a critical aspect of a successful and efficient integration. The following overview of ABS is designed to help software product managers, utility program mangers, IT project managers, and software developers understand the ABS web services and the sequence of data transactions at a high level. A more in-depth description of ABS is provided in the User's Guide which can be accessed through the ABS web site. All ESPs should read the User's Guide for additional details on the web services which are only reviewed at a high level in this document.

Overview

EPA's ENERGY STAR Benchmarking System Web Service provides web access to EPA's rating system as outlined in the following graphic.

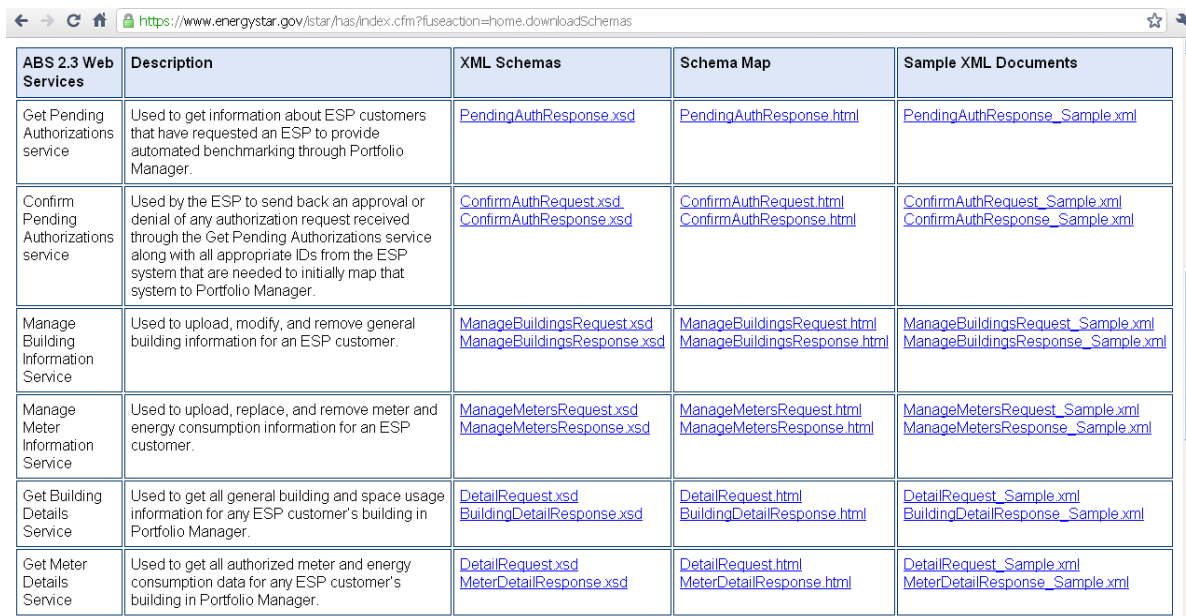**ENERGY STAR Benchmarking System Web Service**
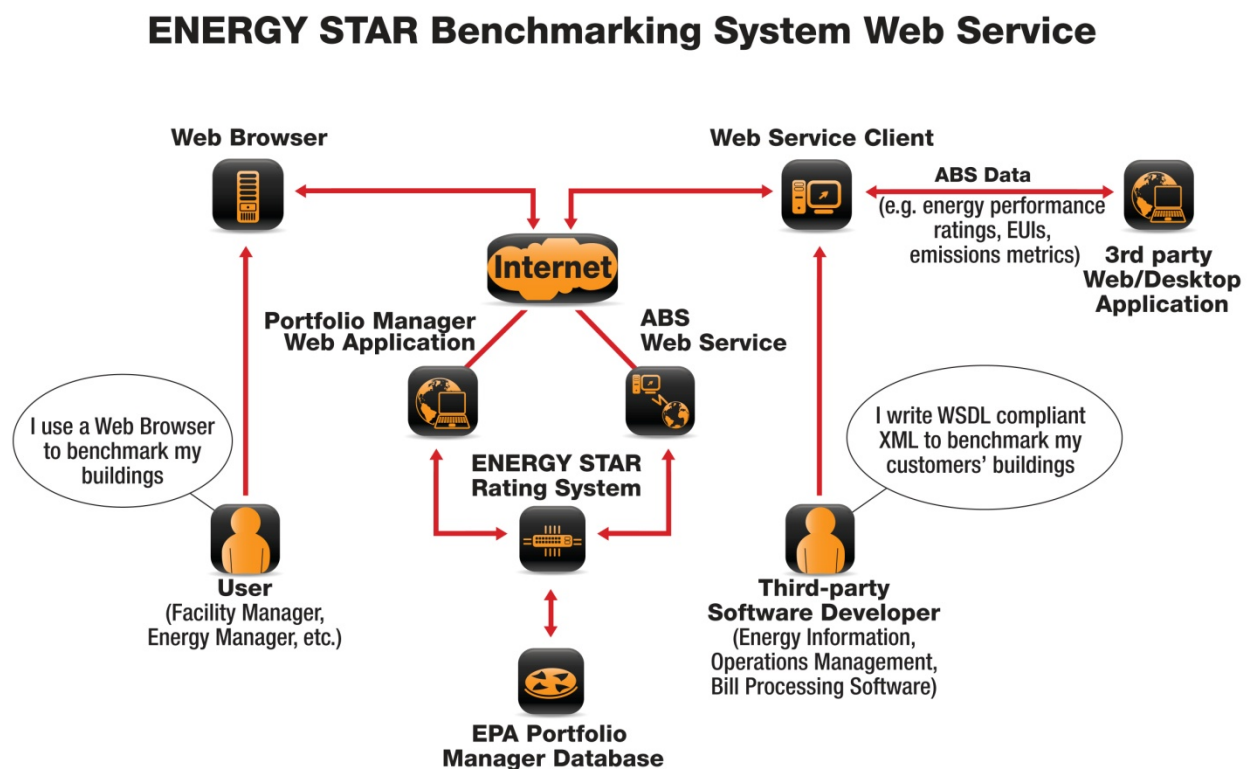
The ABS portion of the EPA ENERGY STAR Benchmarking System Web Service is made up of eight web services which ESPs use to exchange data with EPA. The web services include two services for authorizing/mapping data between EPA and ESPs, two services for managing data, two services for exporting data from the Portfolio Manager database, one service for reporting, and one service for terminating ABS authorization. The following steps describe establishing automated benchmarking service between EPA and an ESP. The specific ABS web services are in bold.

Account Setup

1) Energy Service Provider (ESP) creates an ABS account. ESPs can create an account at www.energystar.gov/istar/abs.

2) ESP reviews ABS Documentation. ESPs should review the *ABS Design Overview,* the *ABS User's Guide,* the Web Service Description Language (WSDL), and the XML schemas as seen below in Picture 1 to help determine an integration approach.

ABS 2.3 Web Services	Description	XML Schemas	Schema Map	Sample XML Documents
Get Pending Authorizations service	Used to get information about ESP customers that have requested an ESP to provide automated benchmarking through Portfolio Manager.	PendingAuthResponse.xsd	PendingAuthResponse.html	PendingAuthResponse_Sample.xml
Confirm Pending Authorizations service	Used by the ESP to send back an approval or denial of any authorization request received through the Get Pending Authorizations service along with all appropriate IDs from the ESP system that are needed to initially map that system to Portfolio Manager.	ConfirmAuthRequest.xsd ConfirmAuthResponse.xsd	ConfirmAuthRequest.html ConfirmAuthResponse.html	ConfirmAuthRequest_Sample.xml ConfirmAuthResponse_Sample.xml
Manage Building Information Service	Used to upload, modify, and remove general building information for an ESP customer.	ManageBuildingsRequest.xsd ManageBuildingsResponse.xsd	ManageBuildingsRequest.html ManageBuildingsResponse.html	ManageBuildingsRequest_Sample.xml ManageBuildingsResponse_Sample.xml
Manage Meter Information Service	Used to upload, replace, and remove meter and energy consumption information for an ESP customer.	ManageMetersRequest.xsd ManageMetersResponse.xsd	ManageMetersRequest.html ManageMetersResponse.html	ManageMetersRequest_Sample.xml ManageMetersResponse_Sample.xml
Get Building Details Service	Used to get all general building and space usage information for any ESP customer's building in Portfolio Manager.	DetailRequest.xsd BuildingDetailResponse.xsd	DetailRequest.html BuildingDetailResponse.html	DetailRequest_Sample.xml BuildingDetailResponse_Sample.xml
Get Meter Details Service	Used to get all authorized meter and energy consumption data for any ESP customer's building in Portfolio Manager.	DetailRequest.xsd MeterDetailResponse.xsd	DetailRequest.html MeterDetailResponse.html	DetailRequest_Sample.xml MeterDetailResponse_Sample.xml

Picture 1: ABS XML Schemas on the ABS web site

3) ESP designs ABS integration. Once an ESP understands the functionality of the ABS web services, the ESP can begin to design an integration that aligns with their objectives. There are a wide variety of implementation approaches and the following two basic integration approaches in sections 3a and 3b are provided as potential options. The additional steps outlined in this document will help ESPs understand the components of these integration approaches.

> 3a) Manage meter data only: This approach is used by ESPs that want to submit the customer meter data via the web services but do not want to manage space data through ABS. In this approach, the customer is responsible for adding and updating space data in Portfolio Manager. This approach can be initiated by the customer or the ESP. Customers can initiate this approach by setting up their buildings, spaces, and meters in Portfolio Manager. Then the customer can use the Portfolio Manager ABS Console to authorize a specific ESP to manage their meter data via ABS. ESPs can initiate this approach by sending basic building data (facility name and address) and meter data via ABS to set up the building and meters in Portfolio Manager. The ESP can then provide the customer with the credentials to access their data in Portfolio Manager. The customer can login to Portfolio Manager and add the space information required for benchmarking. The result of this approach is that customers set up and manage the space data via their Portfolio Manager account while the ESP updates the meter data on an ongoing basis via ABS.

> Utilities often use this approach since they focus on providing energy meter data for their customers. Other ESPs may also choose this approach to minimize their initial investment in ABS by leveraging the Portfolio Manager user interface as opposed to designing their own interface to manage space data. ESPs using this approach can use the web services to extract space data and benchmarking results from Portfolio Manager to present those results in their tool/product.

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3b) <u>Manage building, meter, and space data</u>: This approach is used by ESPs that, in addition to managing energy data, intend to submit building and space data for customers through ABS. The ESP may even build an Energy Star benchmarking interface as a part of their ABS integration. Building an Energy Star benchmarking interface enables customers to input and update building and space data in the ESP's proprietary product. Utilities can include the management of building and space data as a part of an energy efficiency software tool or the customer's online "my account" access web site. ESPs may also execute this approach without building a customer interface for building and space data. These ESPs would simple manage the data and any updates to the data in their database and submit updated data via ABS periodically.

ESPs choosing to manage space data need to provide customers with the functionality to properly submit this data via ABS. This includes allowing the configuration of multiple spaces within a building (e.g. a large complex commercial office space could be made up of many spaces such as office (general), office (vacant), office (overtime air tenant), retail (ground level space), data center, and parking) and the ability to edit space attribute value effective dates (e.g. the number of PCs changed from 80 to 90 on 1/15/2008 and then from 90 to 100 on 12/1/2009).

Since the management of building and space data can increase the level of complexity for an ABS integration, ESPs can consider a phased integration approach. In a phased approach, the ESP manages only meter data in phase one and then in phase two, the ESP begins to also manage space data.

4) ESP tests system in ABS test environment. ESPs can take advantage of the ABS test environment to test their integration. Additionally, the Authorization Testing Tool is available to help ESPs test the two authorization web services which are not available in the standard ABS test environment.

ESPs can test all of the web services in the ABS test environment except the authorization services. A **Get Pending Authorization** request XLM file is typically initiated in the live environment by an authorization request from a Portfolio Manager user. The user authorizes an ESP in the ABS Console within the live version of Portfolio Manager. Picture 2 shows the ABS Console within Portfolio Manager. Option 1 allows a user to select from a list of ESPs whose applications for access to the live environment have been approved. Since ESPs developing ABS integrations will not be listed in the ABS Console in Portfolio Manager, an Authorization Testing Tool is available to mimic an authorization from the live version of Portfolio Manager and produce a sample **Get Pending Authorization** request.
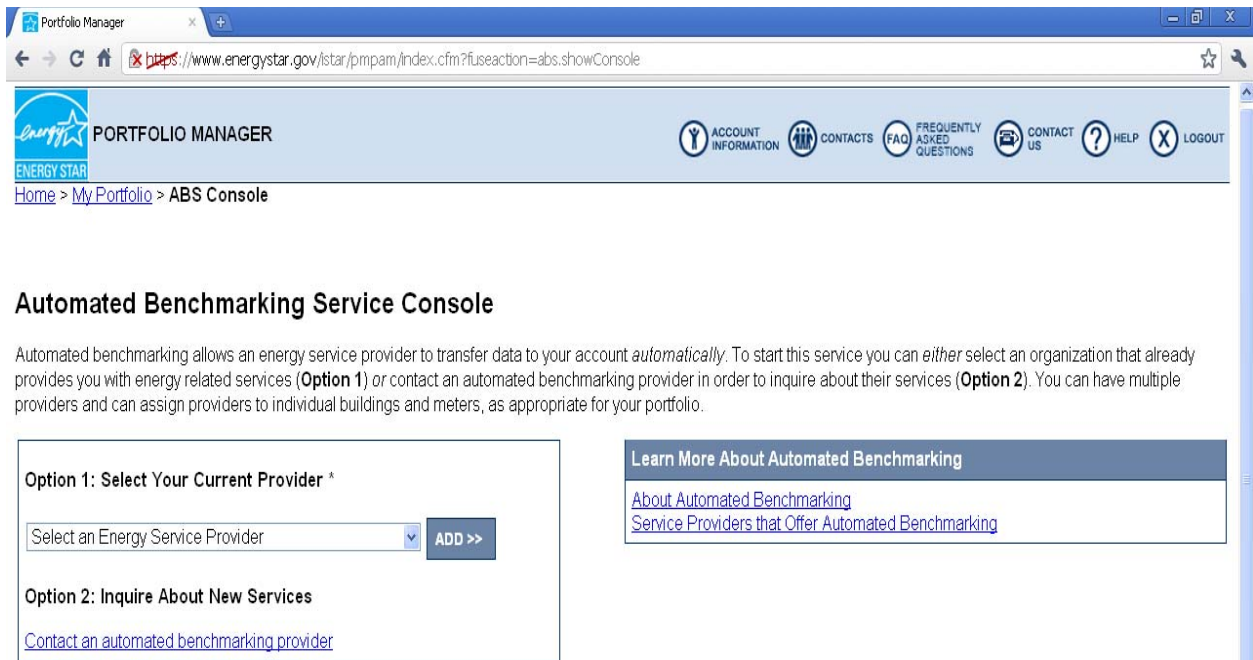
Picture 2: ABS Console with Portfolio Manager

Specifically, ESPs have two unique options for testing the authorization services.

1) ESPs can generate a sample pending authorization request using the Authorization Testing Tool within the ABS web site. The Authorization Testing tool is shown in picture 3 in the bottom right corner of the ABS web site home page. ESPs are encouraged to initially test the authorization services using the Authorization Testing Tool and only to apply for live environment access for testing purpose if absolutely necessary.
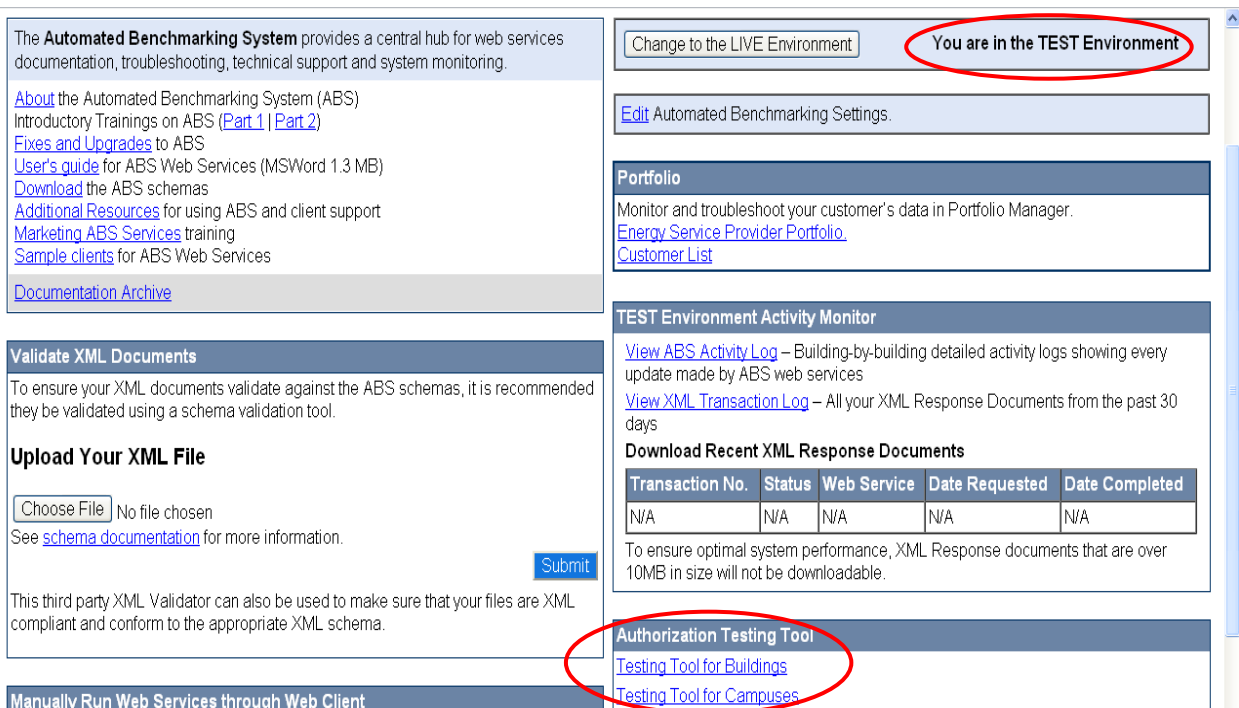
Picture 3: Authorization Testing Tool

2) ESPs can also perform "testing" of the authorization services in the live environment. There is a live account registration setting whereby an ESP can designate that their live account only be visible to one Portfolio Manager user name. During the live registration process, ESPs can specify ABS visibility to a single Portfolio Manager user name or all Portfolio Manager users. Making the ESP account visible to a single Portfolio Manager user allows the ESP to test the authorization and mapping process with that specific user account before being visible to all Portfolio Manager users within the ABS Console in Portfolio Manager. Once the authorization process has been tested and the ESP has provided a demo of their ABS integration to EPA, ESPs can change their ABS service visibility in the live account settings to make their ABS services available to all Portfolio Manager users.

5) ESP applies for live account through ABS Web site. ESPs should have scheduled or completed a demonstration of their integration for EPA before applying for a live account (unless, as outline in step 4, the ESP applied for a live account to complete testing). ESP live account applications are typically approved within one to two business days or the ESP is notified of an issue with their application within that timeframe.

ABS for Existing Buildings in Portfolio Manager

6) Determine approach to existing Portfolio Manager accounts. ESPs working with customers with existing Portfolio Manager accounts should consult with their customers on the merits of mapping to and updating the existing buildings in Portfolio Manager versus starting over with a new Portfolio Manager account created by the ESP via the web services. *For customers that elect to establish a new Portfolio Manager account via the web services, ESPs will not have to perform steps 5 through 7*. ESPs should advise customers to delete all the buildings in their old Portfolio Manager account once the new Portfolio Manager account has been established.

7) Customer authorizes ABS service. To begin servicing buildings already created in Portfolio Manager, an ESP customer logs into their Portfolio Manager account and uses the ABS Console in Portfolio Manager to authorize an ESP to begin ABS service. The selection of an ESP for authorization is shown in Picture 2. During authorization, the Portfolio Manager user agrees to terms and conditions, selects the specific buildings to receive automated data, and provides data for the ESP's custom fields if required. During the live registration process (step 3), the ESP had already defined any optional custom terms and conditions and custom data fields that are presented to the ESP customer within the ABS Console during the authorization process.
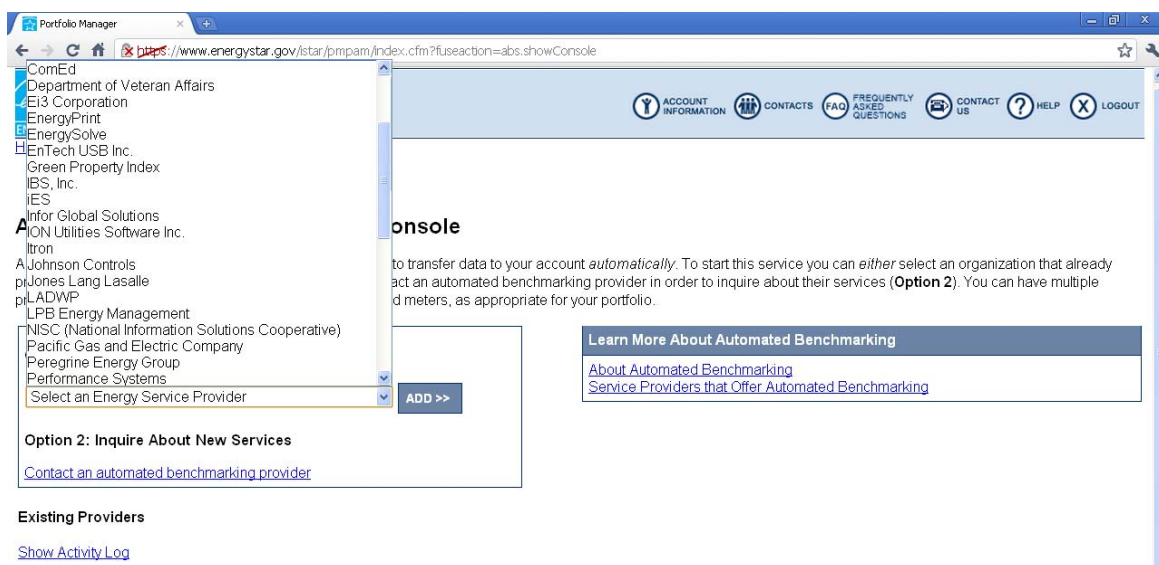
Picture 2: Portfolio Manager ABS Console screen shot

8) ESP receives authorization. Once the authorization is complete, the ESP's system calls the **Get Pending Authorizations** web service and receives a **Get Pending Authorizations** response XML file with information about customer's Portfolio Manager accounts, buildings, spaces, and meters. ESPs are not automatically notified of completed authorizations in Portfolio Manager and therefore, must set their system up to call the **Get Pending Authorizations** web service at a regular interval to capture any new pending authorizations. If an ESP has been authorized by multiple customers, the authorization web service provides the data for all of the customers in the same response file.

9) ESP completes authorization. The ESP completes the authorization by mapping the Portfolio Manager customer, building, space, and meter IDs received through the **Get Pending Authorizations** web service to their corresponding ESP internal IDs. The ESP internal IDs are inserted next to the corresponding Portfolio Manager IDs in the Get Pending Authorizations XML response file. This XML file with the ID mapping is then submitted through the **Confirm Pending Authorizations** web service to complete a mapping of the ESPs internal IDs to the existing Portfolio Manager customer's account, buildings, spaces, and meters.

10) ABS maps IDs and provides Portfolio Manager login information. ABS uses the ESP's IDs and Portfolio Manager IDs from the **Confirm Pending Authorization** request to map the existing buildings in the Portfolio Manager database with the corresponding buildings in the ESPs system. This mapping is facilitated in steps 7 through 9 by the authorization web services for ESPs working with customers with existing Portfolio Manager accounts. For ESPs creating new Portfolio Manager accounts, buildings, spaces, and meters through the web services, the ESP IDs are automatically mapped to the Portfolio Manager IDs as soon as the Portfolio Manager IDs are created. Therefore, mapping through the authorization services is not necessary for accounts, buildings, spaces, and meters created through the web services.

Once the ID mapping is complete, (either through the authorization services or automatically through the creation of new accounts, buildings, spaces, or meters) the ID mapping is saved in EPA's system and ESPs can begin submitting web service requests using ESP IDs. Since EPA has saved the mapping of the Portfolio Manager and ESP IDs, ABS knows which Portfolio Manager account, buildings, spaces, and meters correspond to the ESP IDs.

All data submitted by ESPs via ABS is saved in a Portfolio Manager account. When an ESP submits a **Manage Building Information** request that includes a "CustomerNewExisting" tag indicating a new customer, a Portfolio Manager account is created. ESPs can then choose to manually or automatically provide the customer with login information for their new Portfolio Manager account. ABS automatically sends a customer Portfolio Manager login information if the ESP includes a customer's email address in the **Manage Building Information** request file. The ESP also receives a copy of the email with the Portfolio Manager login information. Alternatively, an ESP can manually provide the customer with access to the Portfolio Manager account. The ESP can leave the email field in the **Manager Building Information** request blank and the ESP will receive the email with the Portfolio Manager login information but the customer will not receive the email. The ESP can then forward the customer the email if and when the customer needs access to their data in Portfolio Manager. If an ESP cannot locate the email with the customer login information, the ESP can use instructions in the User's Guide for providing customers with access to their Portfolio Manager account.

ESPs are not required to provide their customers with access to their data in Portfolio Manager as a standard practice but all ESPs should provide customers with access to their Portfolio Manager account if a customer requests access to their account. Providing a customer with access to their buildings in Portfolio Manager allows them to access the ENERGY STAR Label and Leaders recognition processes. The label and leader application processes are not supported through the web services.

Managing, Exporting, and Reporting Data

11) Manage data. EPA offers ESPs two web services to manage customer data. ESPs can begin managing data after a mapping has been established between their system and the Portfolio Manager database.

- **Manage Building Information:** This service can upload, modify, and delete general building information.
- **Manage Meter Information:** This service can upload, replace, and delete meter information.

Whenever an ESP makes a request to manage data, EPA provides a response with updated building energy performance metrics based on the most current 12-month period for which there is data to generate performance metrics. The performance metrics include a 1 to 100 energy performance rating, weather normalized energy use intensity (EUI), and greenhouse gas emissions.

12) Export data. EPA offers ESPs two web services for exporting customer data from Portfolio Manager.

- **Get Building Details:** This service can export all authorized general building and space usage information for a customer's buildings.
- **Get Meter Details:** This service can export all authorized meter data for a customer's buildings.

Prior to managing data for a customer's existing Portfolio Manager account, an ESP can use these web services to export all of the customer's building, space, and meter data in order to capture data the customer has stored in their Portfolio Manager account or simply to create a backup copy of the Portfolio Manager account data.

13) Report data. An ESP has the option of either reporting the results of data submissions in its own interface or using EPA's Portfolio Manager.

13a) The **Ratings Exchange Service** is used by ESPs that want to offer their own custom reporting services to customers. This service is can be used to retrieve the following data for a range of 12 month performance periods:

- 1 to 100 energy performance ratings;
- Weather normalized and non-weather normalized energy intensity values (kbtu/square foot) and annual energy consumption (kbtu);
- Direct, indirect, and total greenhouse gas emissions;
- Non-weather normalized site energy intensity for the particular facility for an Energy Star rating of 50 and for an Energy Star rating of a 75.

Once these data points are retrieved, an ESP can integrate this information into existing reports or create customer ENERGY STAR reports. ESPs may also choose to use the response files from the **Manage Building Information** and **Manage Meter Information** services to report ratings to customers but those response files only include benchmarking data based on the most current 12-month period of data.

13b) ESPs may also choose to direct customers to Portfolio Manager in addition to or instead of providing custom reporting. Portfolio Manager has standard and custom views or reports to see ratings, energy intensity, energy consumption, and emissions. The tool also has features for goal setting and recognition. This approach works well for ESPs that expect their customers to manage their space data in Portfolio Manager as outlined in step 6a.

Monitoring and Ending Service

14) Monitor transactions. EPA provides features to allow both ESPs and their customers to monitor web service transactions. Within the ABS web site, an ESP can see a log of transactions by customer. Within the Portfolio Manager, automated benchmarking customers can see a log of ABS transactions through the Automated Benchmarking Console.

15) End automated benchmarking. Automated benchmarking services can be terminated for a single building or meter or for an entire account. When a customer or ESP chooses to end service for the entire account the **End Automated Benchmarking** web service is invoked to end the relationship.