EZMT | Energy Zones Mapping Tool

A map-based tool for identifying areas within the United States that may be suitable for clean power generation.
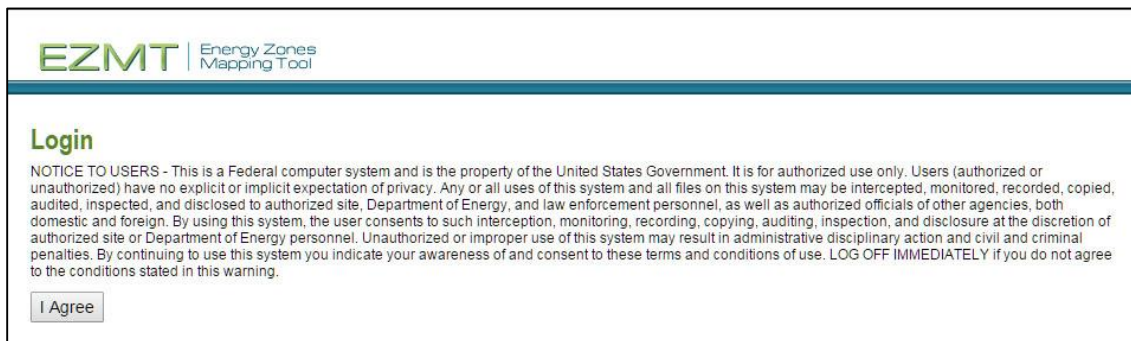
Energy Zones Mapping Tool
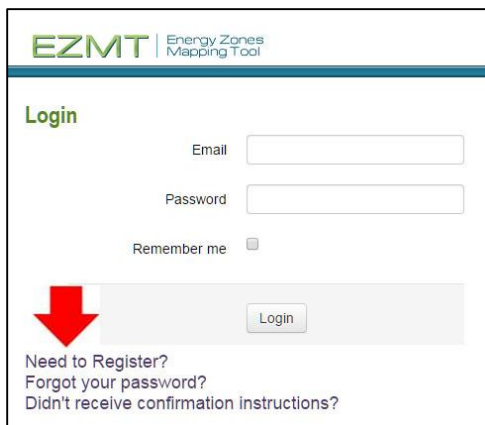# Help Manual

Energy Zones Mapping Tool Manual

Registering for, and Launching the Mapping Tool

1) In order to use the Energy Zones Mapping Tool, you must create a login, which uses your email address and a password. Your activities within the mapping tool will be saved to your account so that your work can continue from one session to the next. From the Home Page, clicking on **Login** or the Launch Tool icon ( ) will bring you to a banner containing the Department of Energy terms and conditions notice. After you have read and agreed to the terms and conditions, click on the *I Agree* button to continue.
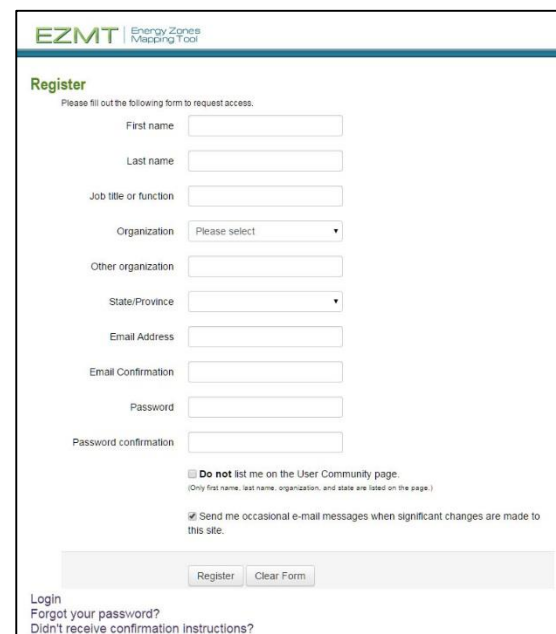

2) Clicking the *I Agree* button will lead you to the Login page. To register for the tool, click on the Register link in the bottom left-hand corner of the screen.

3) On the Registration page, fill out the information pertaining to your name, organization, and state. Your e-mail address and password will be used as your login information. There are two options at the bottom of the page. By leaving the box next to the User Community page option unchecked, you agree to have your first name, last name, organization, and state listed on the User Community page. If your organization is not already in the Organization list, choose "Other (Enter below)" from the bottom of the drop-down list, and enter your organization in the Other organization box. By leaving the box checked next to the e-mail notification option,

you agree that you would like to be e-mailed occasionally when significant changes are made to the site. After you have completed the registration information, click on **Register** at the bottom of the page. ==You will receive an e-mail confirmation message. Use the link in that message to confirm your e-mail address, and you will receive a second e-mail when your registration is complete.==

4) When your registration is complete, return to the Login page, enter your e-mail and password, and click **Login**. This will lead you to the "Terms and Conditions" page of the mapping tool.

5) Either accept the terms by clicking **Accept Terms** or reject the terms by clicking **Reject terms and log out**. Clicking on **Accept Terms** will either launch the mapping Tool (if you originally clicked the Launch Tool icon) or will take you back to the home page (if you originally clicked **Login**) where you can now click the Launch Tool icon ( ).

6) When the mapping tool launches, a splash screen appears with links to training videos and a link to this document. The check box in the lower left corner controls whether the splash screen will be displayed in later sessions, and it can be accessed at any time by clicking **Help** at the top right of the page.
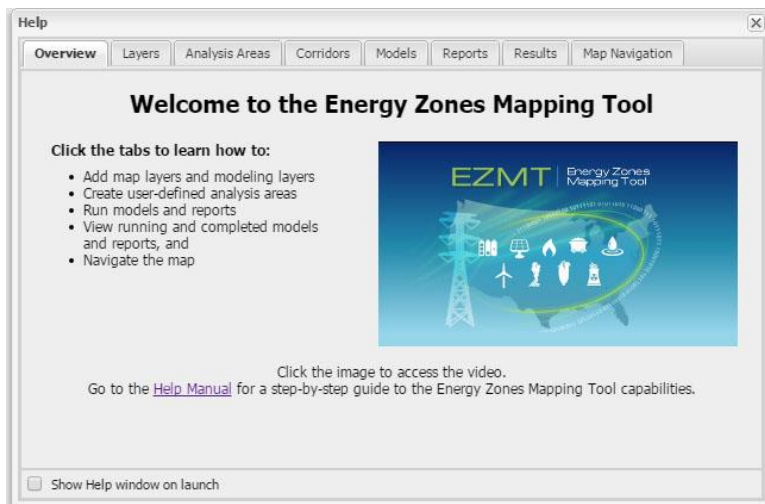
Understanding the Default Layout

Launching the mapping tool will open a new tab or browser window with the default layout of the mapping tool.

- The panel on the left side of the screen contains the *Main Menu* and *Map Contents.*
- The *Main Menu* contains the Library, Areas, Corridors, Analyze, and Results icons.

    - The Library icon (Library) is used to add new map layers or model layers to the map Contents dialog (see Adding Map Layers, and Adding Model Layers)

    - The Areas icon (Areas) is used to create analysis areas (see Creating an Analysis Area).

    - The Corridors icon (Corridors) is used to run corridor suitability models and generate corridors (see Creating a Corridor, and Generating Corridor Routes)

    - The Analyze icon (Analyze) is used to run models or reports (see Running a Model or Running a Report)

    - The Results icon (Results) is used to view model and report results (see Running a Model or Running a Report)

- The *Map Contents* panel controls the layers displayed on the map.
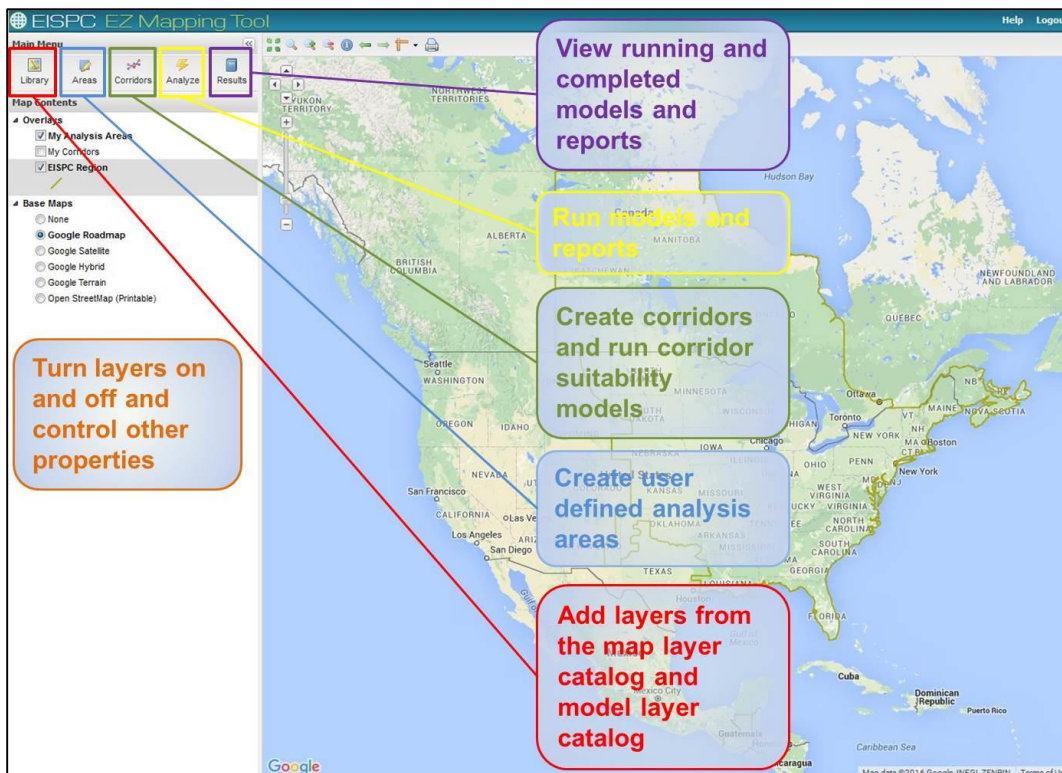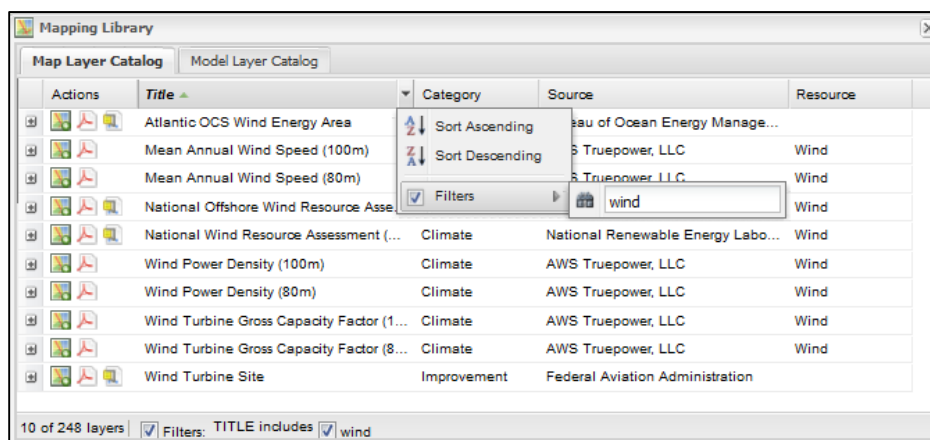
Layers

The default map only shows analysis area and corridor overlays and base map choices, but over 270 mapping layers are available in the tool. All other layers are added by using the icons in the *Main Menu* panel.

Adding Map Layers

1) Click the Library icon ( ) in the upper left corner of the *Main Menu*.

2) A dialog opens, displaying all of the layers contained in the *Map Layer Catalog*. Click on the plus (+) next to a layer name to display the abstract, publication date, and last date the layer was updated.
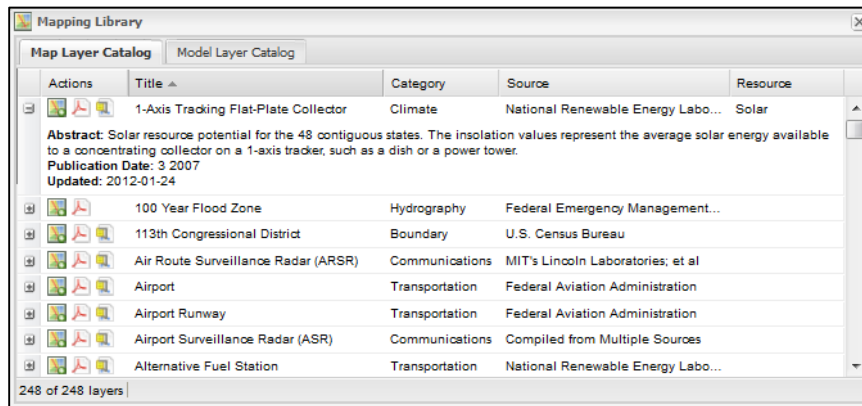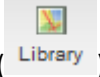
3) Place the cursor over a heading (*Title*, *Category*, *Source*, or *Resource*) and a down arrow appears to the right of the heading name. Click the down arrow to sort or filter the list. The *Category* and *Resource* columns list all possible options to sort by. Click the filters that you wish to use. The *Title* and *Source* columns allow you to choose a filter term. Place the cursor over *Filters* and type a word in the box that appears. You can remove the filters by unchecking the boxes at the bottom of the dialog.


4) Click the Map icon ( ) to add a layer to the map. It will also be listed in the *Overlays* section of the *Map Contents* dialog.

5) If you would like to see the metadata for a particular layer, click on the PDF icon (📄) next to the layer name. A PDF will open containing the metadata for that layer.

6) If you would like to download the layer for local use, click on the Download data icon (🖥️). A zip file with the GIS files for that layer will be downloaded.

Adding Model Layers

1) If you are interested in viewing the screening layers for a particular model, click the Library icon (Library) in the upper left corner of the *Main Menu*.

2) In the Mapping Library dialog, click the *Model Layer Catalog* tab. Click on the plus (+) next to a layer name to display the abstract, publication date, and last date the layer was updated.
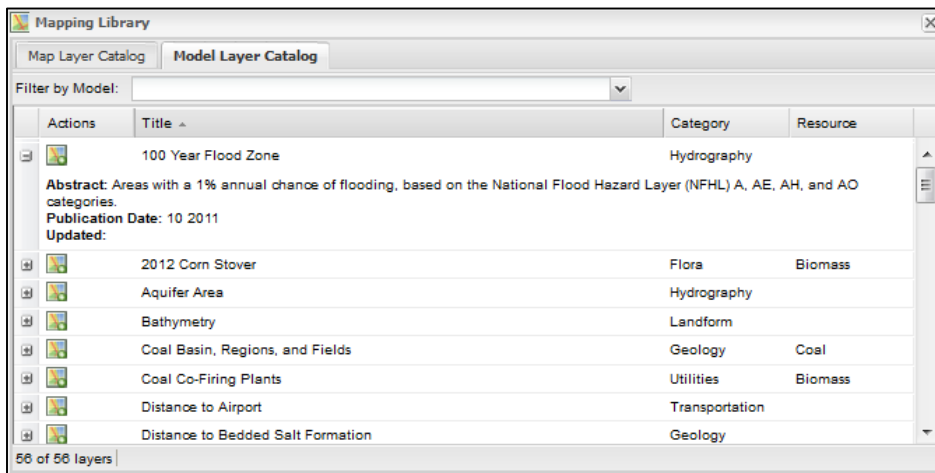
3) There are two ways to filter the modeling layers in the Model Layer Catalog. The *Filter by Model* dropdown displays only the modeling layers for the selected model. You can also place the cursor over a heading (*Title*, *Category*, or *Resource*) and a down arrow appears to the right of the heading name. Click the down arrow to sort or filter the list. The *Category* and *Resource* columns list all possible options to sort by. Click the filters that you wish to use. The *Title* column allows you to choose a filter term. Place the cursor over *Filters* and type a word in the box that appears. You can remove the filters by unchecking the boxes at the bottom of the dialog.
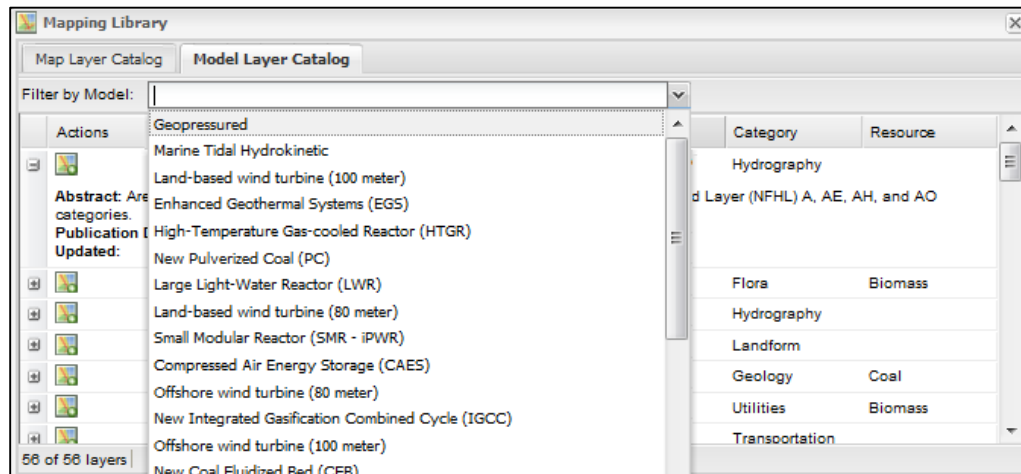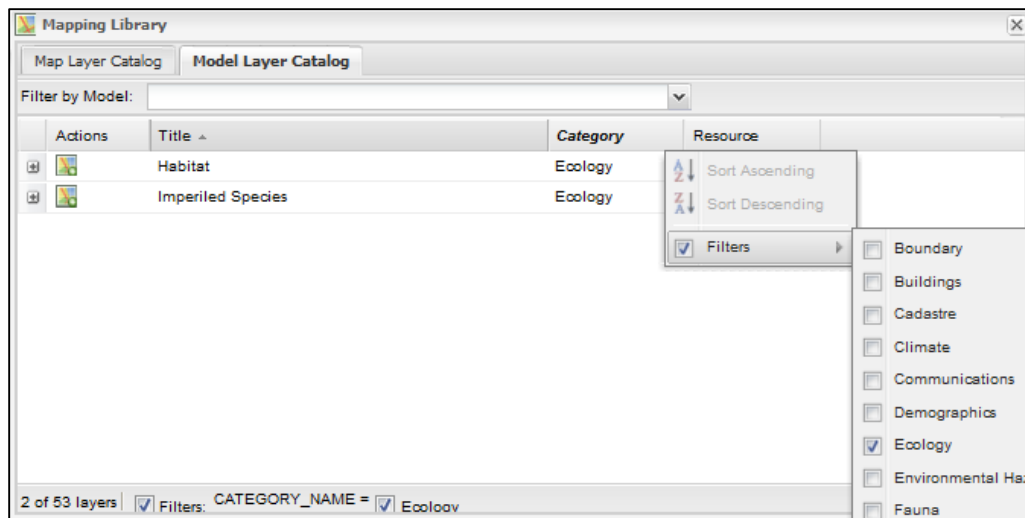
4) Click the Map icon ( ) to add the layer to the map.

5) The selected layer is added to the *Map Contents* panel.
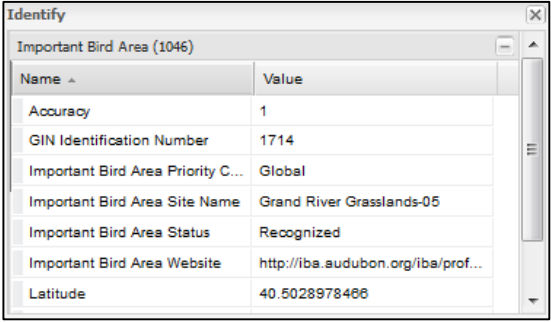
Removing Layers

- To remove a layer from the map but keep it in the *Map Contents* panel, uncheck its box.
- To remove a layer from the map <u>and</u> the *Map Contents* panel, right-click the layer name and then click Remove layer (⊖ red circle with white minus sign). This does not permanently remove the layer from the application, but only from your *Map Contents* panel. To add the layer again at a later time, repeat the steps listed in the Adding Map Layers and Adding Model Layers sections above.

Using the Map Tools

The map tools are located at the top of the map and allow you to navigate the map.

	Zoom to Max Extent	Click to display the map at its maximum extent (i.e., zoom out as far as possible).
	Zoom by Dragging	When active, click or click-and-drag on the map to zoom to the selected area. Click the icon again to stop zooming.
	Zoom In	Click to zoom in one level on the map.
	Zoom Out	Click to zoom out one level on the map.
	Identify	When active, click a feature on the map to retrieve more information about that specific feature. If there is more than one layer or feature at the click point, the information for each one will be listed in the results. Click the *Identify* tool icon again to stop using it.
	Zoom to Previous Extent	Return to the previous zoom level/view.
	Zoom to Next Extent	Go to the next zoom level/view (after going to Previous Extent).
	Measure	Click the black down arrow, choose Length or Area, then click the map to draw a polygon to measure. Click once to draw each point on the line (Length) or polygon (Area). To complete the polygon, double click. Click the Measure tool again to stop measuring.
	Print	Click the print icon to create a PDF file of the layers currently displayed on the map. (Note: Only the Open StreetMap base map option will include the base map in the PDF file.)

Map Navigation

▲ ◄ ► ▼	*Pan Controls*	Use the pan controls to pan the map up and down, left and right.
⊞	*Zoom In*	Click to zoom in one level.
⊟	*Zoom Out*	Click to zoom out one level.
(slider)	*Zoom Slider*	Click and drag the slider to zoom in (up) and out (down).

Creating an Analysis Area

1) Click the Areas icon (Areas) in the *Main Menu* panel. The *Analysis Areas* dialog opens.

2) Click the New Analysis Area icon
   (New Analysis Area)

3) Add an analysis area to the map by clicking the mouse once for each point and double-clicking to complete the analysis area. Then the *Analysis Area* dialog will open to assign a name and notes for the analysis area.
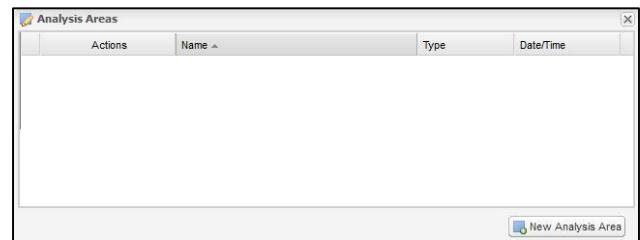
4) Click **Save**. The analysis area will be listed in the *Analysis Areas* dialog. To display the analysis area on the map, click the box next to *My Analysis Areas* in the *Overlays* section of the *Map Contents* panel. A shaded region will then appear on your map. The analysis area can now be chosen in the *Choose Region* drop down when you run a report (See Running a Report for instructions).
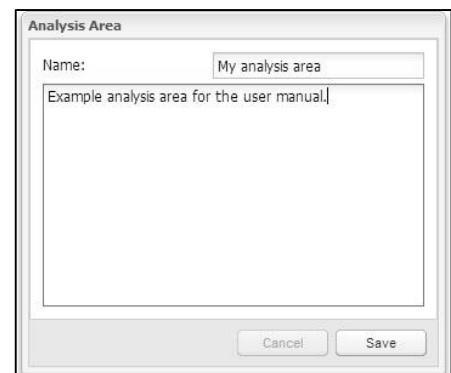
5) There are several actions to choose in the *Actions* column of the *Analysis Area* dialog.

   - The Show/Hide Area icon ( ) controls whether individual analysis areas are shown on the map.
   - The Magnifying Glass icon ( ) zooms the map to the analysis area.
   - The Report icon ( ) runs a report on that analysis area (see Running a Report).

- The Edit icon ( ) allows the name and notes for analysis areas to be edited, and also copy and revise the copies on the map.

- The Delete icon ( ) permanently deletes the analysis area.

Corridor Routing

1) Click the Corridors icon (Corridors) in the *Main Menu* panel. The *Corridor Tools* dialog opens.

2) Click on the Suitability Models tab. Corridor suitability models are used to score how suitable each location on the map is for a corridor, based on many siting factors. Each available siting factor is represented by a screening layer in the models. You can choose an existing corridor suitability model, create one from scratch, or modify an existing model.

3) Click on the run model icon ( ) to carefully inspect the default suitability models. These default models are just starting points and it's very important to tailor the siting factors to your unique situation. Model parameters can be adjusted using the steps in the [Running a Model](#) section.

4) To create your corridor, click on the New Corridor icon (New Corridor). Select *Draw* to draw a corridor with multiple segments or *Generate from end points* to create a corridor in one segment.

5) Add a corridor centerline to the map by clicking the mouse once for each point and double-clicking the last point to complete the centerline. Then the *New Corridor* dialog will open to assign a width, name, suitability surface, quality, and notes for the corridor. The quality can either be Draft (low resolution, faster) or Final (high resolution, slower).

6) Click **Save**. View the status of your corridor run by clicking on the Results icon. The new corridor will be added to the My Corridors tab of the *Corridor Tools* dialog when complete. From this window, you can run reports if you're interested in more detailed information about the corridor.

7) You can repeat this same process to analyze different routing strategies by using different corridor suitability model settings. The result of this process is macro corridors which are the first step in a more detailed study of potential corridor routes.

8) There are several actions to choose in the *Actions* column of the *Corridor Tool* dialog.

- The Show/Hide Area icon ( ) controls whether individual corridors are shown on the map.
- The Magnifying Glass icon ( ) zooms the map to the corridor.
- The Report icon ( ) runs a report on that corridor (see [Running a Report](#)).
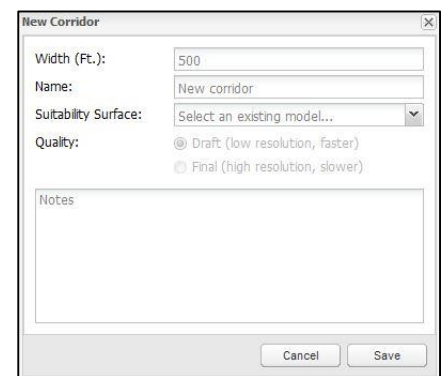
- The Edit icon ( ) allows the name and notes for corridors to be edited, and also copy and revise the copies on the map (see Copying and Revising Corridors).
- The Delete icon ( ) permanently deletes the corridor.

Copying and Revising Analysis Areas

In some cases it is useful to copy and revise an analysis area to investigate alternate extents. For example, if a potential issue is found within an analysis area, an adjustment might avoid the issue.

1) Click the Areas icon ( ) in the *Main Menu* panel. The *Analysis Areas* dialog opens.

2) Click the Edit icon ( ) for the analysis area to be copied and revised.

3) The *Analysis Area* dialog will open, with **Copy** button added.
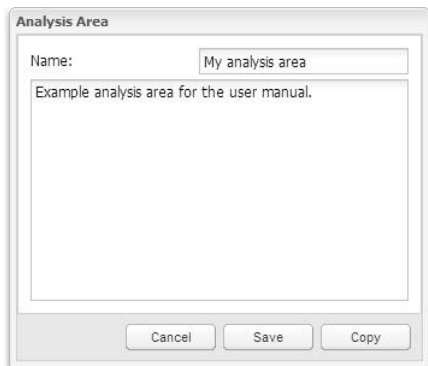
4) Clicking **Copy** displays the instructional dialog shown below. Click **OK**.
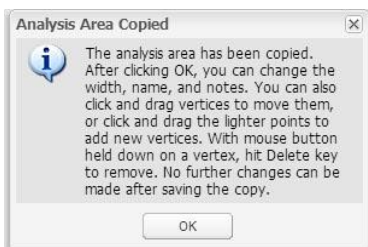
5) Until you click **Save** in the main dialog, you can change the name and notes and edit the analysis area boundary on the map. On the map, edit handles are shown at each point making up the analysis area. Click and drag these handles to move them. Midway between each point are lighter handles. Clicking and dragging these handles adds a new point to the shape. To delete a point, hold down the mouse button over a handle and hit the Delete key. Click **Save** when you are finished making changes.

The image below shows an example of an analysis area being revised.

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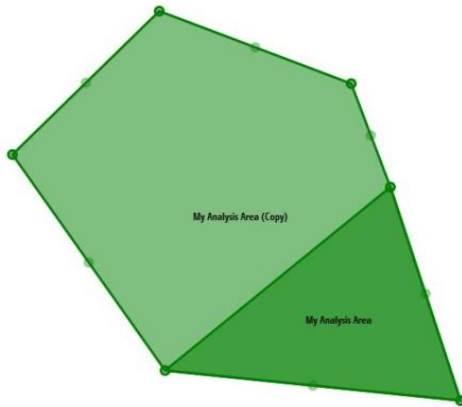
Copying and Revising Corridors

In some cases it is useful to copy and revise a corridor to investigate alternate extents. For example, if a potential issue is found along a corridor route, an adjustment to the centerline or width might avoid the issue.

1) Click the Corridors icon (Corridors) in the *Main Menu* panel. The *Corridor Tools* dialog opens.

2) Click the Copy and Modify icon (✏) for the corridor to be copied and revised. The instructional dialog shown below will appear. Click **OK**.
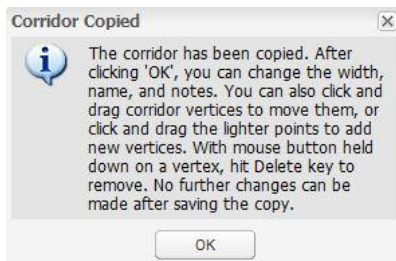
3) The *New Corridor* dialog will open.
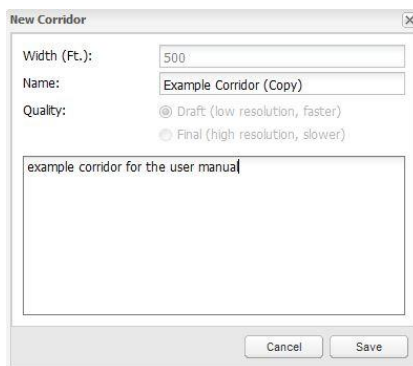
4) Until you click *Save* in the main dialog, you can change the name and notes, change the width of the corridor, and edit corridor centerline on the map. On the map, edit handles are shown at each point making up the corridor centerline. Click and drag these handles to move them. Midway between each point are lighter

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handles. Clicking and dragging these handles adds a new point to the shape. To delete a point, hold down the mouse button over a handle and hit the Delete key. Click **Save** when you are finished making changes.

The image below shows an example of a corridor being revised.
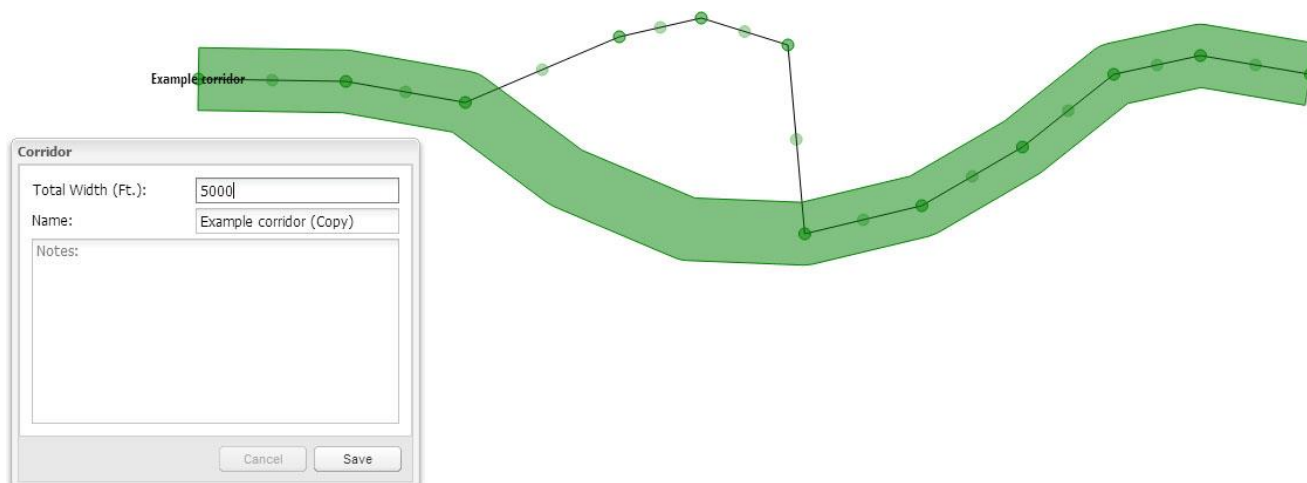
Running a Model
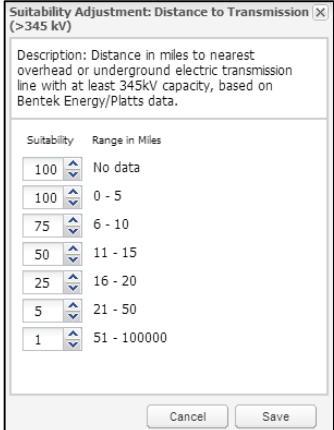
1) Click the Analyze icon () in the *Main Menu* panel to open the *Analyze – Run Models and Reports* dialog. All of the available models are listed in the *Models* section of the dialog. Click on the plus (+) next to a model name to display a description of that model.
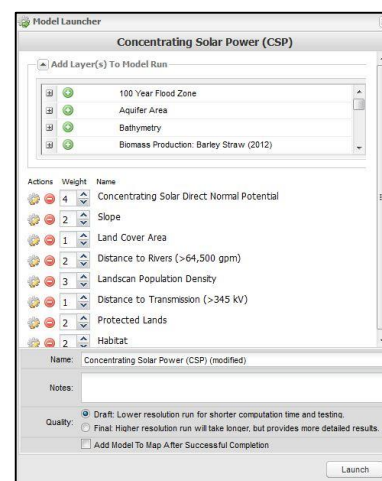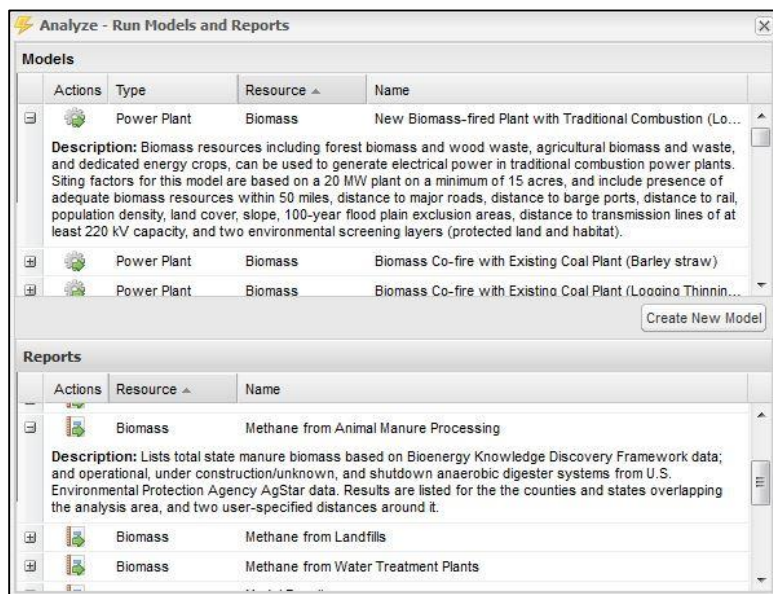
2) Click on the Run Model icon ( ) to the left of a model name to open the *Model Launcher*.

3) The default screening layers and weights are displayed in the *Model Launcher* dialog. These settings are based on the recommendations of subject-matter experts familiar with the technology being modeled, but should be reviewed and revised by individual users to meet their analysis goals and assumptions. If desired, adjust the

relative weights given to each screening layer by increasing or decreasing the numbers to the left of the layer names from 1 to 10, with 1 meaning that the layer should be given the smallest possible influence on the model and 10 meaning that the layer should be given the highest possible influence on the model. You can also remove a screening layer from the model run by clicking the Remove Layer icon ( ).

4) Additional screening layers can be added to the model run by clicking the down arrow next to *Add Layers(s) To Model Run* and clicking the Add layer icon ( ) next to the layer name.

5) To inspect or adjust the suitability values within a screening layer, click on the Edit Suitability Settings icon ( ) to the left of the layer name. The *Suitability Adjustment* dialog opens. To adjust suitability values for one of the ranges in a screening layer, type a value or use the arrows. Suitability values range from 0 (unsuitable) to 100 (most suitable). Click **Save** if you have made changes you want to keep, or **Cancel**, to return to the *Model Launcher* dialog.

6) If you would like to view a screening layer listed in the *Model Launcher* dialog on the map, you can add it using the *Model Layer Catalog* (see [Adding Model Layers](#)).

7) Change the default name of the model and add any notes about the model run by typing in the boxes at the bottom of the *Model Launcher* dialog.

8) Choose to either run a draft model or a final model by selecting the quality at the bottom of the window. Draft models are run at a lower resolution and will not take as long to run. This can be used to test different models before a final, more detailed model is run.

9) Check the box at the bottom of the dialog to add the model to the map after the model run has completed.

10) When you have finished customizing the model run, click **Launch**. You can view the status of your model run by clicking on the Results icon (Results). The *Analysis Results* dialog will open. The status will be displayed as an hourglass while the model is running and a check mark when the model is complete.

The A*nalysis Results* dialog also lists default versions of each model as System runs. You can add these model results to the map and view them without having to run the model.

	Actions					Type	Owner	Status	Name	Extent	Created ▲
⊞					⊖	Model	Me	✔	Concentrating Solar Pow...	EISPC Region	7/17/2013 1:20 PM
⊞						Model	System	✔	Geopressured (default)	EISPC Region	11/14/2013 11:35 AM
⊞						Model	System	✔	Marine Tidal Hydrokinetic...	EISPC Region	11/14/2013 11:35 AM
⊞						Model	System	✔	Land-based wind turbin...	EISPC Region	11/14/2013 11:35 AM
⊞						Model	System	✔	Enhanced Geothermal S...	EISPC Region	11/14/2013 11:35 AM
⊞						Model	System	✔	High-Temperature Gas-c...	EISPC Region	11/14/2013 11:35 AM
⊞						Model	System	✔	New Pulverized Coal (PC...	EISPC Region	11/14/2013 11:35 AM
⊞						Model	System	✔	Large Light-Water React...	EISPC Region	11/14/2013 11:36 AM
⊞						Model	System	✔	Land-based wind turbin...	EISPC Region	11/14/2013 11:36 AM
⊞						Model	System	✔	Small Modular Reactor (...	EISPC Region	11/14/2013 11:36 AM
⊞						Model	System	✔	Compressed Air Energy ...	EISPC Region	11/14/2013 11:36 AM
⊞						Model	System	✔	Offshore wind turbine (8...	EISPC Region	11/14/2013 11:37 AM
⊞						Model	System	✔	New Integrated Gasificat...	EISPC Region	11/14/2013 11:38 AM

Refresh

11) There are several actions to choose in the *Actions* column of the *Analysis Results* dialog.

- The Add Results icon ( ) allows you to add model results to the *Map Contents* panel, and the map.

- The Report icon ( ) runs a model results report on that model. See the example report below.

- The Modify Model icon ( ) opens up the *Model Launcher* dialog with the model settings saved. The settings can be revised and run as a new model.

- The Edit icon ( ) allows you to edit the name and notes for personal model runs.

- The Delete icon ( ) allows you to permanently delete personal model runs.

EZMT | Energy Zones Mapping Tool

Model Results Report

Location Analyzed: Analysis Area1

The area of interest is located at 36° 20′ 2.468″ N , 91° 15′ 34.317″ W .
It covers some or all of **Baxter, Clay, Craighead, Fulton, Greene, Independence, Izard, Jackson, Lawrence, Marion, Mississippi, Poinsett, Randolph, Sharp, Stone,** and **Woodruff** in **Arkansas** and **Butler, Carter, Douglas, Dunklin, Howell, Oregon, Ozark, Reynolds, Ripley, Shannon, Texas,** and **Wayne** in **Missouri.**
It has an area of **11061.155 square miles** .

Report Parameters

Region Type:	Analysis Area
Region:	Analysis Area1
Model:	Land-based wind turbine (80 meter) (modified)

Suitability Range With Average (Mean)
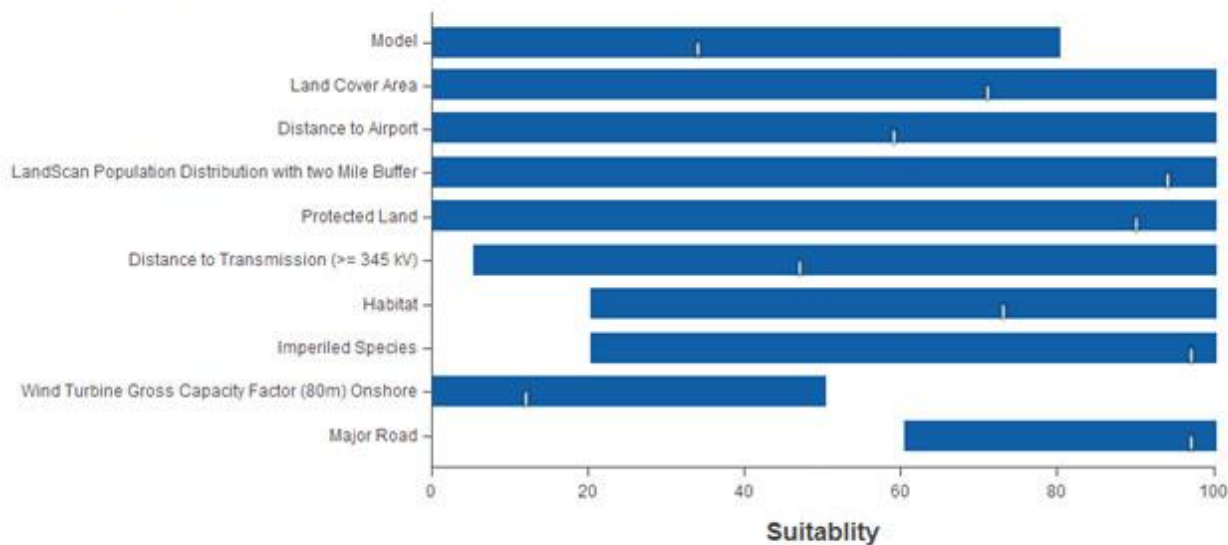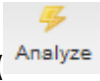
Model Suitability

The Model Results Report is very useful for understanding the results of any suitability model for an analysis area and documenting the specific layers and settings that were used in the model. It displays results for the composite model output and each model input layer. The first graph shows the mean and total range of suitability values in the model output and each input layer for the analysis extent for which it was run. In this example, the overall output in the analysis area was not very suitable (mean of approximately 35) and ranged from unsuitable (0) to about 80. Contributions to the score of each input can be rapidly assessed. Those with higher means were generally more favorable (such as population density), and those with lower means (such as transmission proximity and wind turbine gross capacity factor) were generally less favorable. With one of the most important factors of wind turbine gross capacity factor being unsuitable to marginally suitable for this location, it is doubtful that this region would be advantageous for siting wind turbines.

Advanced Modeling Features

Designing a Model from Scratch

1) Click the Analyze icon ( ) in the *Main Menu* panel. The *Analyze – Run Models and Reports* dialog opens.
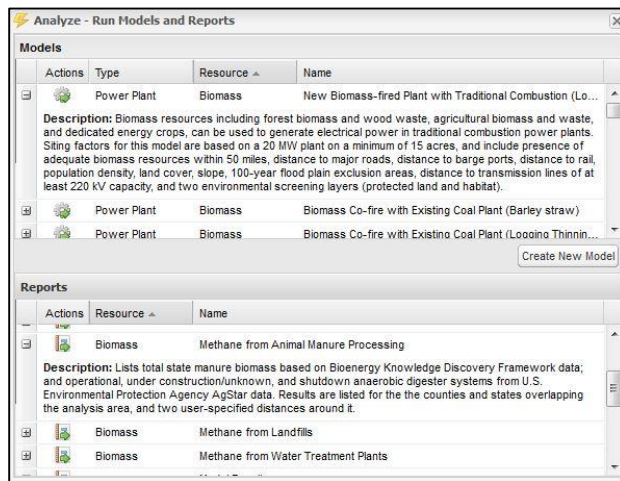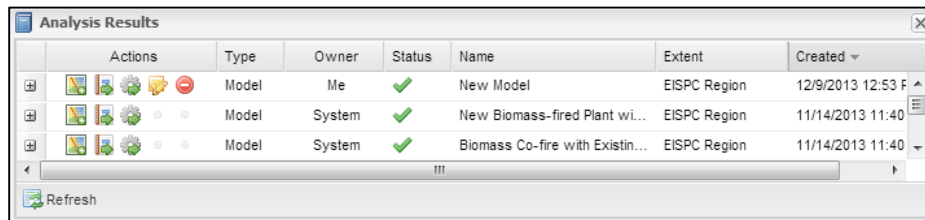

2) Click on *Create New Model* underneath the models section. The Model Launcher dialog opens.
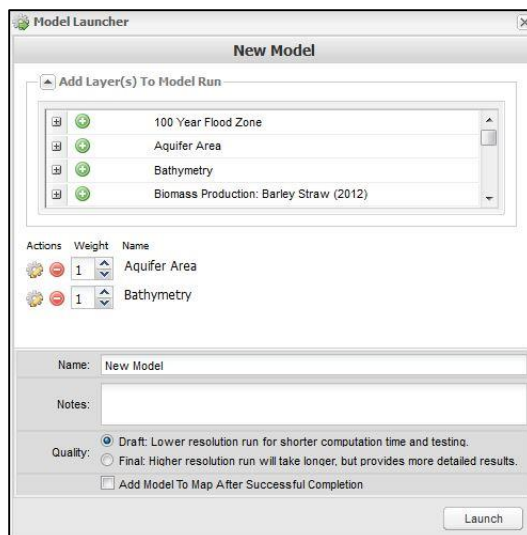
3) Screening layers can be added to the model by clicking the down arrow next to *Add Layers(s) To Model Run* and clicking the Add layer icon ( ) next to the layer name.

4) If desired, adjust the relative weights given to each screening layer by increasing or decreasing the numbers to the left of the layer names from 1 to 10, with 1 meaning that the layer should be given the smallest possible influence on the model and 10 meaning that the layer should be given the highest possible influence on the model. You can also remove a screening layer from the model run by clicking the Remove Layer icon ( ).

5) Change the default name of the model and add any notes about the model run by typing in the boxes at the bottom of the Model Launcher dialog.

6) Choose to either run a draft model or a final model by selecting the quality at the bottom of the window. Draft models are run at a lower resolution and will not take as long to run. This can be used to test different models before a final, more detailed model is run.

7) Check the box at the bottom of the dialog to add the model to the map after the model run has completed. Click **Launch**. You can view the status of your model run by clicking on the Results icon (Results). The *Analysis Results* dialog will open. The status will be displayed as an hourglass while the model is running and a check mark when the model is complete.

8) There are several actions to choose in the Actions column of the Analysis Results dialog.

- The Add Results icon (   ) allows you to add model results to the Map Contents panel, and the map.

- The Report icon (   ) runs a model results report on that model.

- The Modify Model icon (   ) opens up the Model Launcher dialog with the model settings saved. The settings can be revised and run as a new model.

- The Edit icon (   ) allows you to edit the name and notes for model runs.

- The Delete icon (   ) allows you to permanently delete model runs.
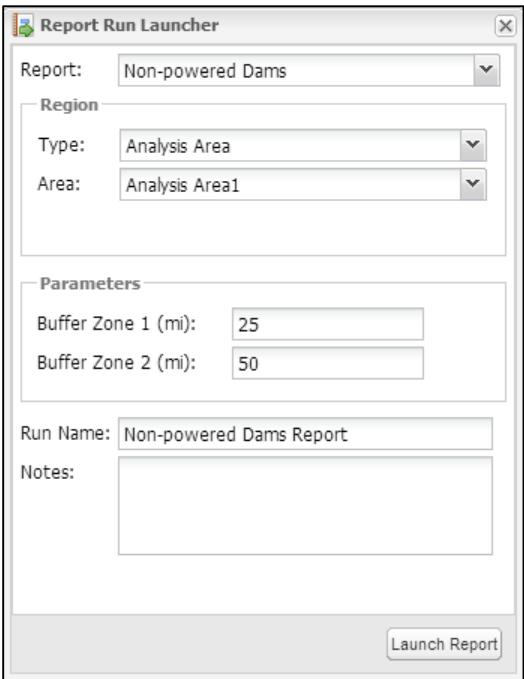
Running a Report

1) Click the Analyze icon ( ) in the *Main Menu* panel. The *Analyze – Run Models and Reports* dialog opens. All of the available reports are listed in the *Reports* section of the dialog. Click on the plus (+) next to a report name to display a description of that report.
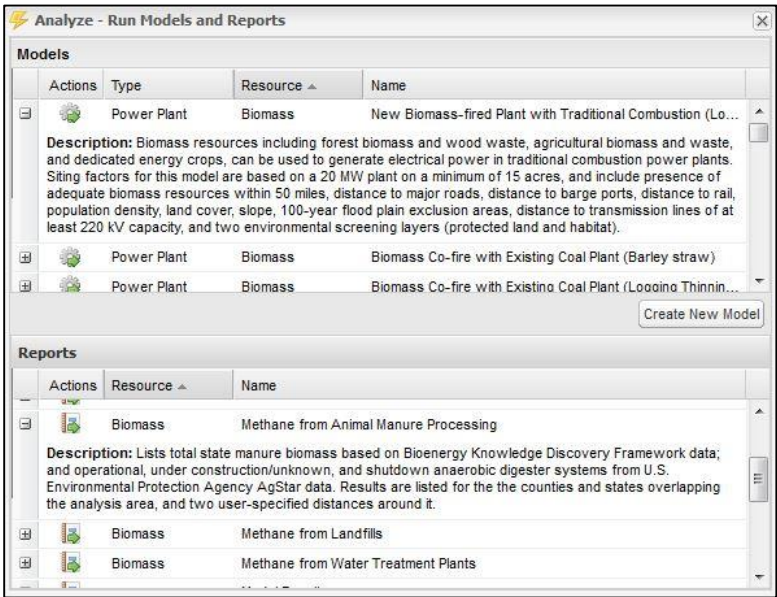
2) Select a report by clicking on the Run Report icon ( ) to the left of the report name. The *Report Run Launcher* dialog opens.
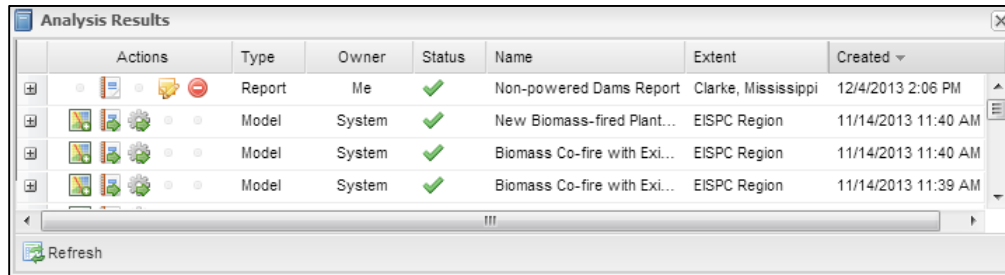
   Note: The Corridor report can only be run for corridors.

3) In the *Region* section of the *Report Run Launcher* dialog, use the *Type* drop-down menu to choose whether to run a report on an analysis area, corridor, state, or county. Then use the subsequent drop-down menu to select the specific choice within that group that you would like to run your report on.

4) Contents of the *Parameters* section vary, depending on the report. For the report shown, two buffer distances can be specified around the analysis area.

5) You can change the default name of the report and add any notes about the report by typing in the boxes at the bottom of the *Report Run Launcher* dialog.

6) When you have finished customizing your report run, click **Launch Report**. You can view the status of your report run by clicking on the Results icon ( ). The *Analysis Results* dialog will open. The status will be displayed as an hourglass while the report is running, and a check mark when the report is complete.

7) There are several actions to choose in the *Actions* column of the *Analysis Results* dialog.

- The Display Report icon ( ) allows you to view your report in a new browser tab. See the example Electrical Transmission Report below. The report can be saved or printed using standard browser functions.

- The Edit icon ( ) allows you to edit the name and notes for your report.

- The Delete icon ( ) allows you to permanently delete your report.

Exiting the Mapping Tool

To exit the mapping tool, simply close the browser window or tab, or click **Logout** in the upper right hand corner of the screen. Your layers in your *Map Contents* panel as well as your model runs and reports are saved as you work and can be accessed the next time you log in to the mapping tool.