



Pump Assessment User Manual

Created By: Oak Ridge National Laboratory

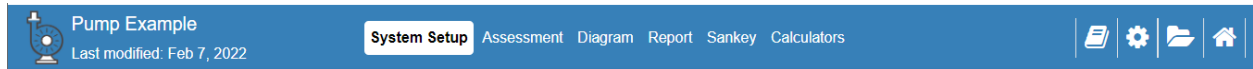
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Module Navigation

Use the top banner to navigate around the module. A footer bar with “Next” and “Back” button can also be used to move through the System Setup to the Report.



Main Tabs

System Setup – Establish your baseline by entering the existing data for your pump system.

Assessment – Modify system scenarios to find potential savings opportunities.

Diagram – Graphical visualization of the existing pump system and the savings scenarios explored.

Report – Full printable breakdown of the system and potential saving scenarios.

Sankey – Visual representation of the energy consumption and production of the scenarios.

Calculators – Stand alone calculators for pump and motor properties.

*Some of the tabs will be disabled until the System Setup is completed.

Additional Buttons

Book – The book will open a new window with the Pump User Manual you are reading.

Gear – The gear wheel will navigate you to MEASUR’s global settings page.

Folder – The folder will navigate you to the assessment dashboard folder this assessment is in..

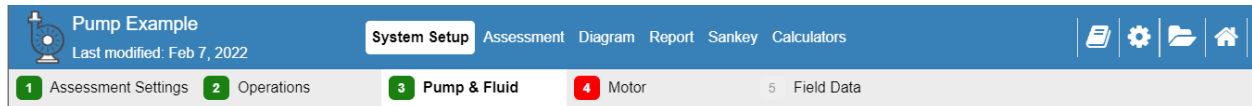
Home – The house will bring you to MEASUR’s home page.

System Setup

The system setup is where you enter the baseline data for your pump system. The system setup is broken up into five tabs, each with a related set of input fields to be filled out. Field by field help text is provided for each input field, it will appear in the help panel when an input field is clicked on.

Navigation

Use the second bar to navigate to different sections of the Setup. The tabs will be color coded to indicate the state of the corresponding tab data. Tabs will be disabled in the previous steps have errors in their data.



Assessment Settings – Select the units for the assessment.

Operations – Data entry relating to cost and operation.

Pump & Fluid – Data entry relating to pump and fluid specifics.

Motor – Data entry relating to motor specifics for the pump.

Field Data - Data entry relating to system operations.

Tab colors:

Green - Valid data entered for tab.

Red – Invalid or missing data entered for tab.

Yellow – Data entered outside of expected range.

Gray – Disabled tab, previous tab's are incomplete.

Data Entry

The screenshots below show how to enter data for the System Setup. Input fields will highlight red and an error message will appear if the data that is entered is invalid. Links underneath input labels can be used to calculate the values of the corresponding input field.

PUMP

Pump Type: End Suction ANSI/API
Pump Speed: 2000 rpm
Drive: V-Belt Drive

FLUID

Fluid Type: Water
Fluid Temperature: 68 °F
Specific Gravity: 1.002
Kinematic Viscosity: 1.107 cSt
Stages: 1

HELP

Pump & Fluid Help
Enter measured data to calculate your system's annual savings potential.

Pump Type
Pump Type represents what style of pump is being used based off of the listings in the standard ANSI/HI 1.3-2000. This value will be used to estimate achievable pump efficiencies based on pump style and operating conditions.

Overhung Impeller

End Suction Slurry
End Suction Sewage (and Submersible)
End Suction Stock
End Suction ANSI/API
Large End Suction

Slurry pumps, end suction
Solids-handling, end suction (Submersible)
Stock, end suction
End suction - small, API end suction, ASME B73
End suction - large (>5000 gpm)

Between Bearings Impeller

Multistage Boiler Feed
API Double Suction
Double Suction

Horizontal multistage pumps; axially split, segmented ring diffuser barrel
API Double suction
Double suction

Use the left panels in the System Setup to enter the data for your existing pump system.

The right sides of the panel contain help text. The panel will show help relating to the field you are currently focused on.

HELP

Pump & Fluid Help
Enter measured data to calculate your system's annual savings potential.

Pump Type
Pump Type represents what style of pump is being used based off of the listings in the standard ANSI/HI 1.3-2000. This value will be used to estimate achievable pump efficiencies based on pump style and operating conditions.

Overhung Impeller

End Suction Slurry	Slurry pumps, end suction
End Suction Sewage (and Submersible)	Solids-handling, end suction (Submersible)
End Suction Stock	Stock, end suction
End Suction ANSI/API	End suction - small, API end suction, ASME B73
Large End Suction	End suction - large (>5000 gpm)

Between Bearings Impeller

Multistage Boiler Feed	Horizontal multistage pumps; axially split, segmented ring diffuser barrel
API Double Suction	API Double suction
Double Suction	Double suction

In the "Field Data" tab, once your system setup is completed, the "Results" tab will give you the calculated results for your Baseline.

RESULTS

	Baseline
Percent Savings (%)	—
Pump efficiency (%)	81.2
Motor rated power (hp)	350
Motor shaft power (hp)	332.5
Pump shaft power (hp)	319.2
Motor efficiency (%)	94.3
Motor power factor (%)	89.2
Percent Loaded (%)	95
Drive efficiency (%)	96
Motor current (A)	370
Motor power (kW)	263
Annual CO2 Emissions (tonne CO ₂)	992.6
Annual CO2 Emissions Savings (tonne CO ₂)	—
Annual Energy (MWh)	2,304
Annual Energy Savings (MWh)	—
Annual Cost (\$)	162,077
Annual Savings (\$)	—

Assessment

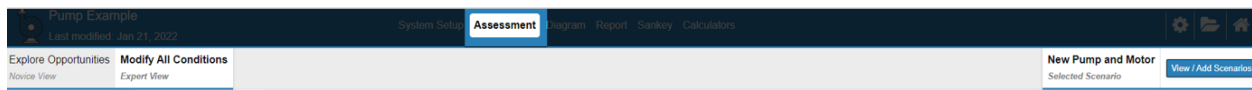
The assessment section of the module allows you to explore how modification scenarios for your system may provide cost, energy and emissions savings. Your baseline must be setup completely prior to making modifications.

There are two ways to conduct assessments which will be explained in further detail later in this section.

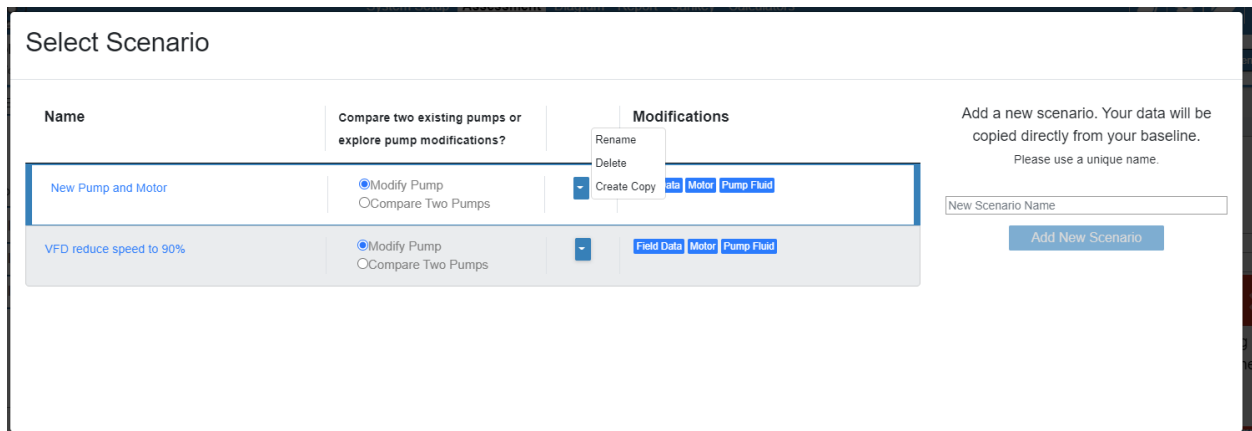
- Explore Opportunities (Novice View)
- Modify All Conditions (Expert View)

Navigation

As with the System Setup, there is a secondary set of tabs to navigate between the two assessment options.



Multiple scenarios can be created, the current “Selected Scenario” will be displayed on the right hand side of this bar. The “View / Add Scenarios” button opens up a modal used to manage your scenarios:



The modal can be used to:

- Create new scenarios
- Create copies of existing scenarios
- Choose if the scenarios compare two pumps or modify and existing pump
- Delete or rename scenarios
- Selecting scenarios for viewing and modifying

Explore Opportunities (Novice View)

In “Explore Opportunities” there are fewer data entry fields to find savings opportunities. The page is split into two sections. The left hand side has a checklist of likely modifications to improve your system. The right hand side provides results, a sankey diagram and field by field help text.

Explore Opportunities Modify All Conditions
Novice View Expert View

SELECT POTENTIAL ADJUSTMENT PROJECTS

Select potential adjustment projects to explore opportunities to increase efficiency and the effectiveness of your system.

Add New Scenario

Modification Name New Pump and Motor

☐ Install VFD

☐ Install More Efficient Drive

☒ Install More Efficient Pump

Baseline Pump Type End Suction ANSI/API

Modification Pump Type End Suction ANSI/API

Modification Pump Efficiency 87.52 %
Known Efficiency

Each checklist item will provide input fields to modify the scenario. The data for your baseline is also displayed on the left.

The “Results” tab will show the calculated results and savings of the modified scenario.

The “Sankey” tab will display a sankey diagram for either the baseline or selected modification scenario.

Field by field help text will display in the “Help” panel as input fields are clicked on.

