Xylem VSD Payback Tool

Let's Solve Water
Significant opportunities exist to reduce pumping system energy consumption through smart hydraulic system design, retrofitting to variable speed performance and operating practices. Significant energy savings can be achieved in a pump system by reducing the pump rotational speed. Variable speed drives (VSD) are one of the primary devices used to control pump rotational speed.

This tool calculates the estimated energy and cost savings that would result from installing a VSD on a pump system. Required inputs include nameplate pump performance, efficiency, motor load, annual operating hours, pump system type and cost of electricity. Using these inputs and the duty cycle, the tool calculates the current energy use, potential energy use with a VSD, and potential cost savings.

### Pump Model: e-Line

<table>
<thead>
<tr>
<th>Pump Size</th>
<th>LNE 40-125 / 2900 RPM / 50Hz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Efficiency</td>
<td>85%</td>
</tr>
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</table>

### Duty Point

<table>
<thead>
<tr>
<th>Flow</th>
<th>25 m³/h</th>
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<tbody>
<tr>
<td>Head</td>
<td>18 m</td>
</tr>
<tr>
<td>Max Head of Pump</td>
<td>23 m</td>
</tr>
<tr>
<td>Rating Efficiency</td>
<td>62%</td>
</tr>
<tr>
<td>Power at Rating</td>
<td>2 kW</td>
</tr>
<tr>
<td>Motor Power</td>
<td>2.2 kW</td>
</tr>
</tbody>
</table>
Step 1
Select Pump Calculator

Step 2
Within the System Overview tab
Select Liquid (i.e. Water); units of measure can be adjusted by selecting units (kg/m³).
Select System Type: Liquid Circulating System or Lifting System can be chosen.

Step 3
Add pump performance, motor data and hydraulic duty point required.
Static Head of the System is dependent on system design; 30% of pump total design head (TDH) may be used if this information is unknown.

Once pump, motor and hydraulic performance, plus system characteristics are input, System Curve and Pump Curve are created (see below).
Step 4
DEFINE LOAD PROFILE

Select Load Profile tab

Within the Load Profile tab, define operation Hours in Use / Year. The example at right shows use of 10 hours per day for a full year. This demand rate can be adjusted for specific applications.

Next, Load Profile % can be adjusted. Almost always there will be variation of flow rate demand when using a variable speed drive. The load profile can be adjusted by using slider bars or input into Time % column.

Step 5
SELECT RELATIVE ENERGY USE – THROTTLE VALVE VS. VSD

Select Throttling, Drive and Savings

Within the graph, the load profile is shown (bar graph – secondary axis). The Throttling curve will follow the load profile.

The Throttle and Drive line curves show the energy (kW) demand as flow demand requirements vary. The Savings line curve graphically shows the energy savings at varying flow rates.
Energy Required Over One Year

- Throttling
- Drive
- Savings

Flow (m³/h)

Energy (KWh)

Load Profile (h)
Step 6
DETERMINE PAYBACK

Input **Installation Costs** and **Component Costs** for both the **Drive System** and **Throttling Control**. Ignore **On-Off Control** inputs and results as variable demand requirements will not suit this solution.

Input **Energy Price**. For this example, energy costs of 19.18 $/kWh is input to simulate the energy costs of Great Britain.

The output with the Xylem VSD Payback tool shows substantial savings using VSD as opposed to throttling control valve.
Step 7
SAVE AND CREATE CUSTOMER SUBMITTAL

Select File, select Save As and define appropriate file name. File can be edited at later date if needed.

Select File, select Export - as PDF. PDF file will be created and can be used as part of project submittal for end-user.
Xylem |'zīləm|

1) The tissue in plants that brings water upward from the roots;
2) a leading global water technology company.

We’re a global team unified in a common purpose: creating innovative solutions to meet our world’s water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

For more information on how Xylem can help you, go to www.xyleminc.com