Xylem VSD Payback Tool

xylem
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

Pump Size	LNE 40-125 / 2900 RPM / 50Hz
Motor Efficiency	85%

Duty Point

Flow	25 m^3/h
Head	18 m
Max Head of Pump	23 m
Rating Efficiency	62%
Power at Rating	2 kW
Motor Power	2.2 kW

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).

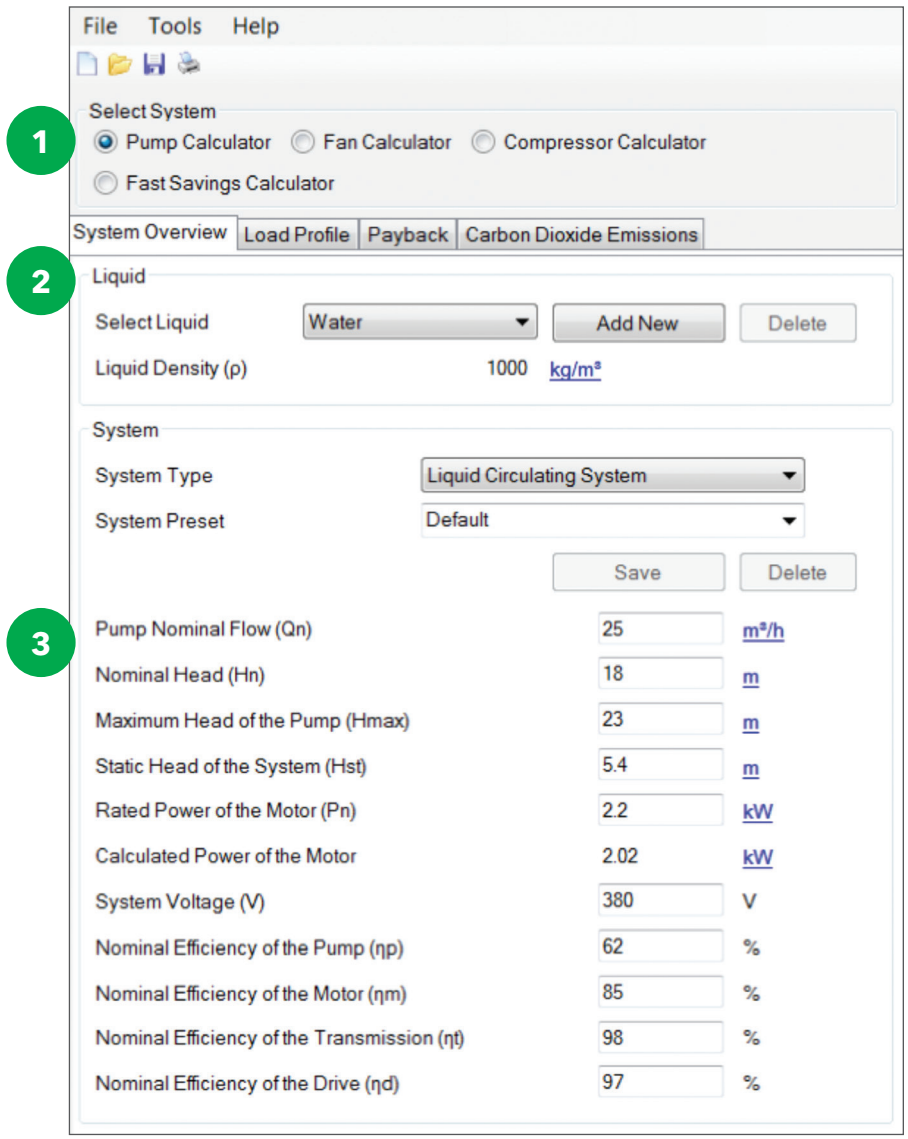
Select **System Type**: Liquid Circulating System or Lifting System can be chosen.

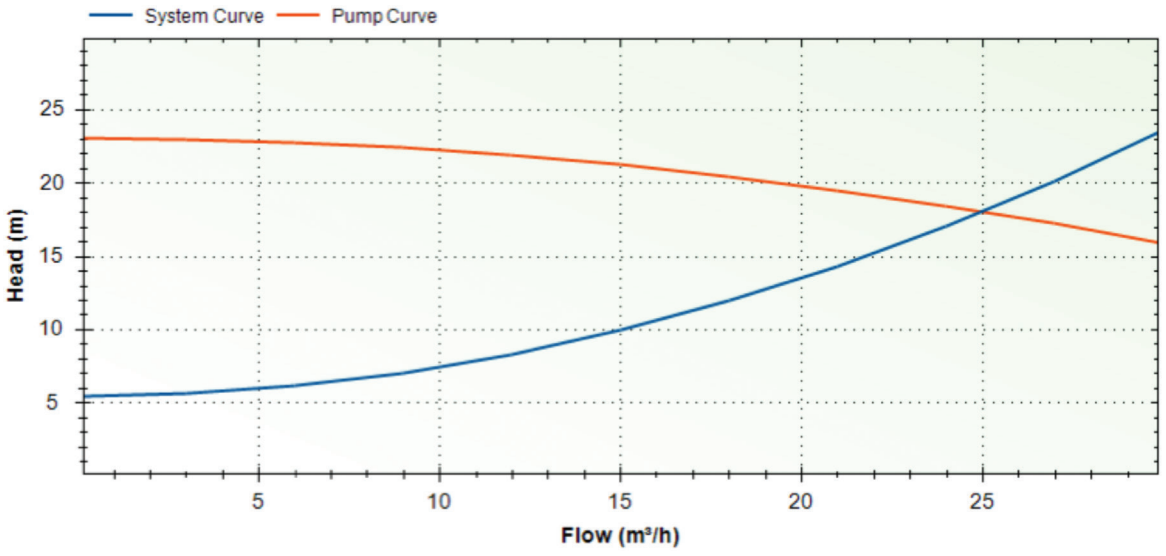
Step 3

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.

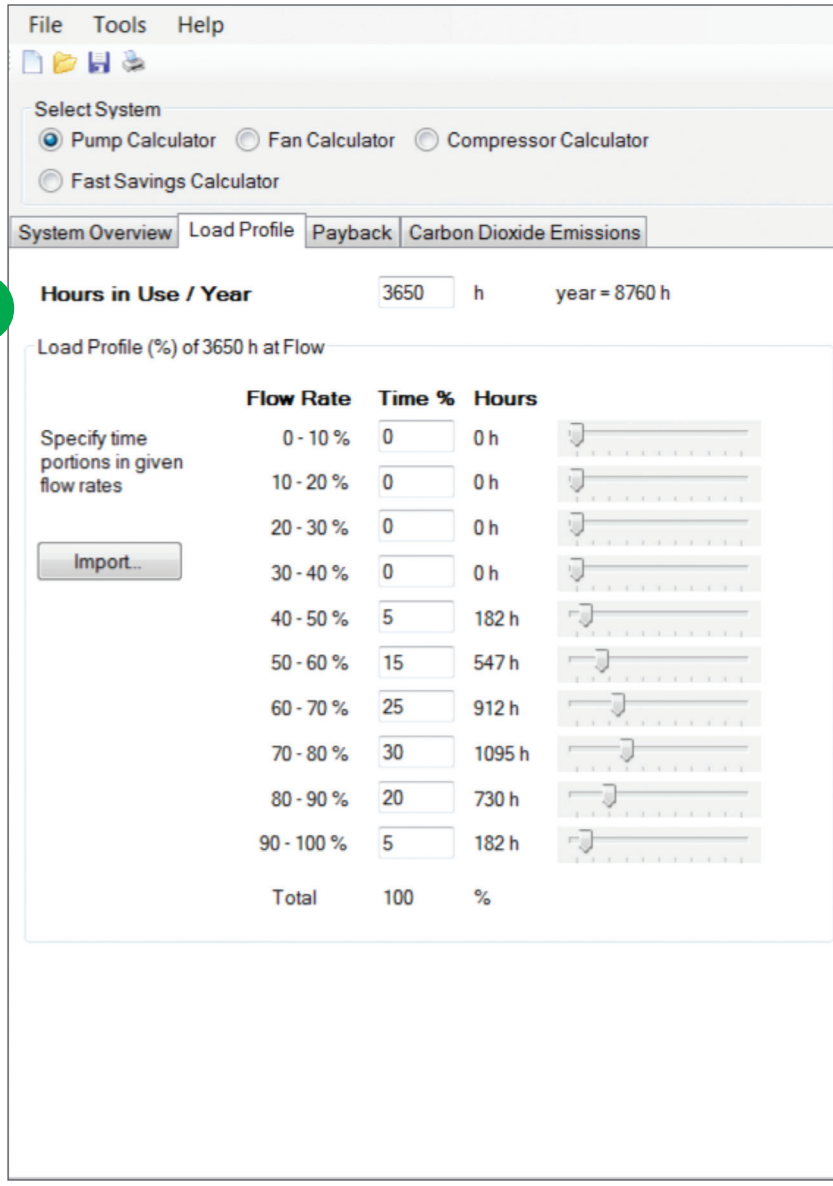
Next, **Load Profile %** can be adjusted. Almost always there will be variation of flow rate demand when using a variable speed drive. The load profile can be adjusted by using slider bars or input into **Time %** column.

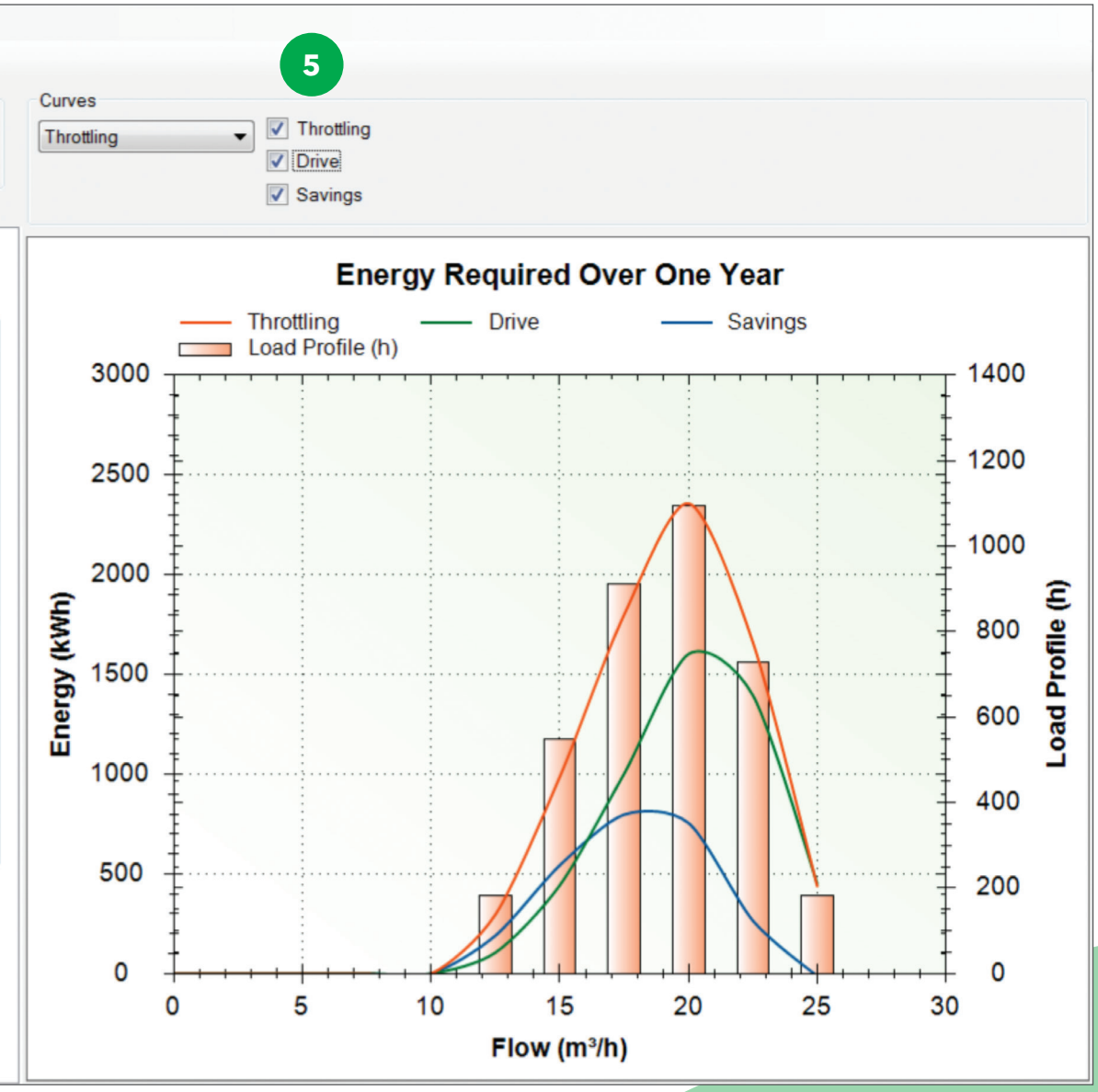
Step 5
SELECT RELATIVE ENERGY USE – THROTTLE VALVE VS. VSD

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.

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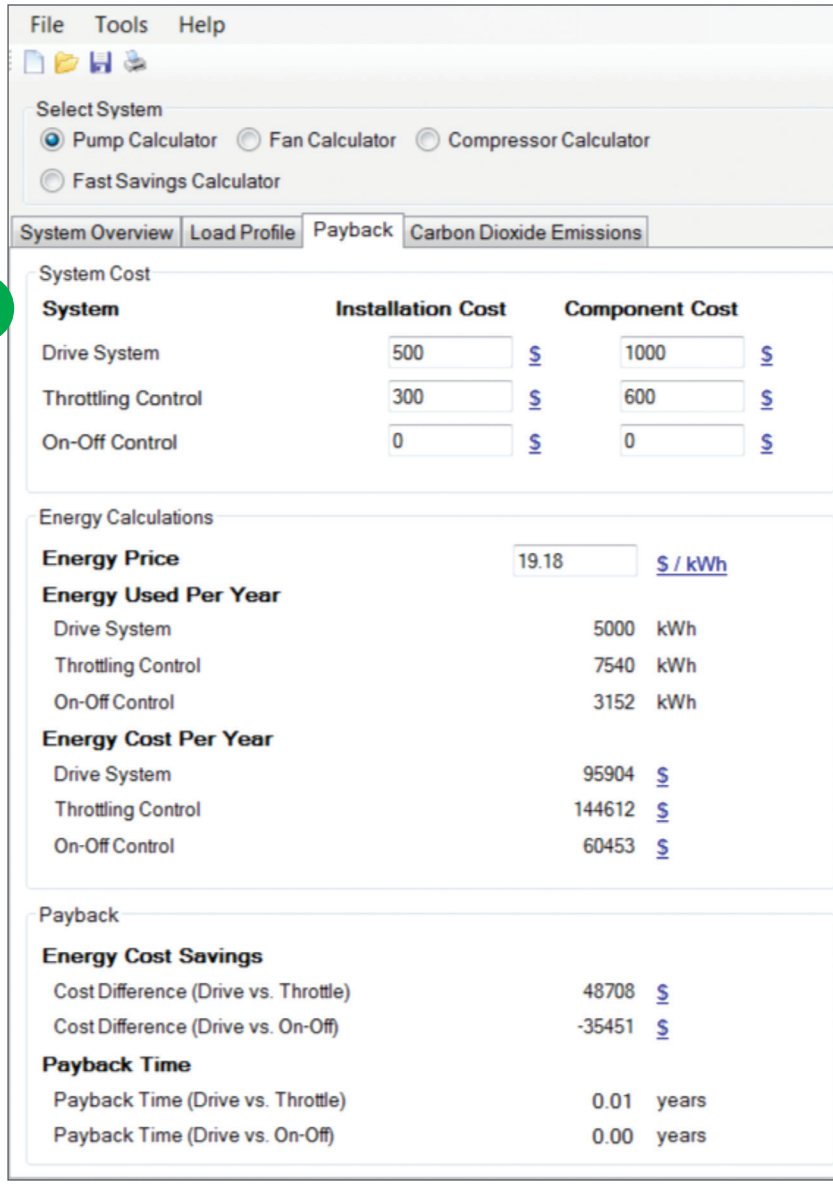
Curves
Throttling
Throttling
Drive
Savings
Energy Required Over One Year
Throttling
Drive
Savings
Load Profile (h)
Energy (kWh)
Load Profile (h)
Flow (m³/h)
3000
2500
2000
1500
1000
500
0
1400
1200
1000
800
600
400
200
0
0
5
10
15
20
25
30

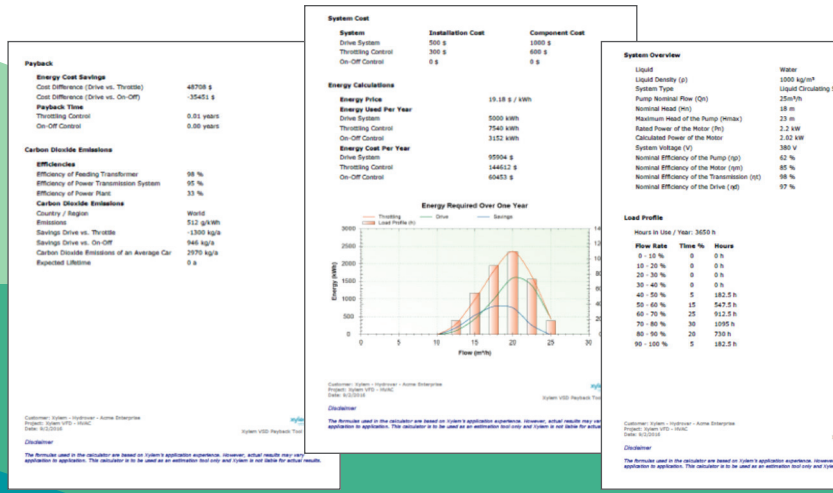
Step 6
DETERMINE PAYBACK

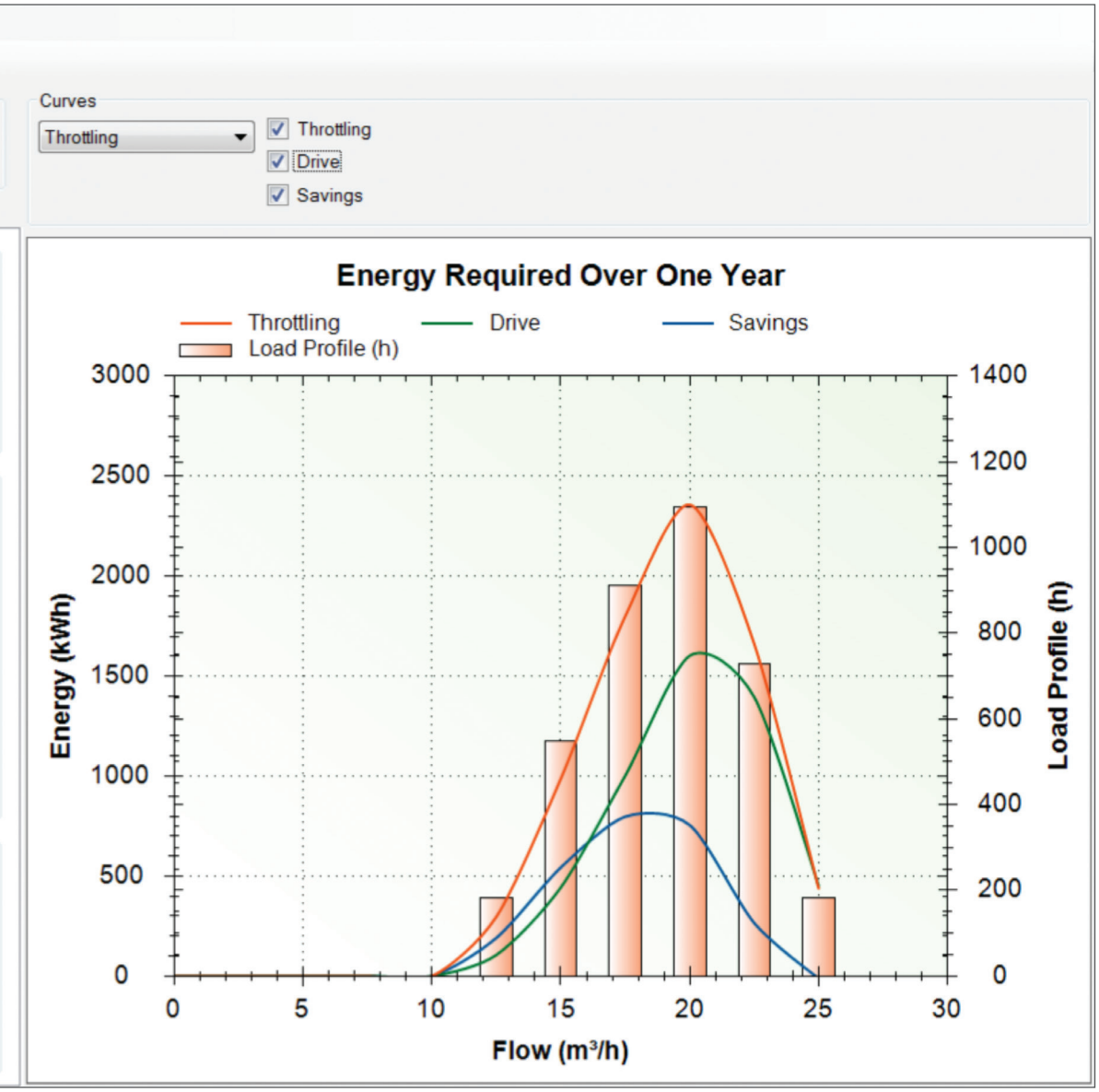
Input **Installation Costs** and **Component Costs** for both the **Drive System** and **Throttling Control**. Ignore **On-Off Control** inputs and results as variable demand requirements will not suit this solution.

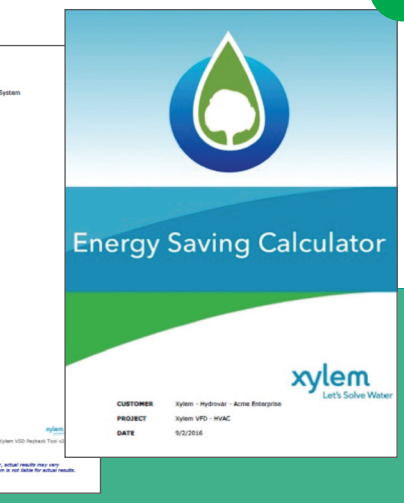
Input **Energy Price**. For this example, energy costs of 19.18 $/kWh is input to simulate the energy costs of Great Britain.

The output with the Xylem VSD Payback tool shows substantial savings using VSD as opposed to throttling control valve.









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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

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