**Example 1 — Operations reporting**

**Summary**

This example looks at cost savings from optimizing production line operation in a manufacturing facility. CircuitMeter provided the energy metering and analytics that identified an opportunity to reduce the time required to assemble data and report on analytics for each production line, reflected in labour cost savings. The analysis finds that $3,250 of annual savings for all production lines correspond to 108 hours of labour, resulting in a payback period of less than one year in this example.

- **Type:** Optimization / O&M
- **Sector:** Industry / Manufacturing

**Background**

A manufacturing facility runs several production lines, each with different energy use profiles. Understanding their energy consumption on an hourly basis helps facility managers understand and optimize their operation. In this example, CircuitMeter’s energy analytics software reduced the time required to assemble data and carry out various efficiency and operational analyses that included energy consumption.

The CircuitMeter system was used to log motor power factors and power drawn per (AC) phase to create standard energy footprints for a particular production line. In addition to operating hours, this information may also be used to monitor performance, and further optimize maintenance, enabling a shift from predictive to precision.

**Methodology and assumptions**

A technical and financial model was developed that used empirical data collected via WebMeters for all the facility's production lines. The data offers insights into hourly energy consumption per production line.

The example used daily reduction in labour (effort) based on the time saved (estimated at 30 minutes per day for one person). This saving was extrapolated to a 52-week operating year yielding approximately 100 hours of labour annually. Given a $30/hour cost of labour, this equates to $3,250 in cost savings annually.
The economic model calculates the payback period (how long an investment in the CircuitMeter system takes to pay off through labour cost savings), a net-present value (NPV) of cash flows over the lifetime of the investment, and an internal rate of return (IRR) — an equivalent return calculated by devaluing future cash flows at which the NPV is zero. Key assumptions are summarized in Table 1.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Assumption</th>
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<tbody>
<tr>
<td>Depreciation</td>
<td>5%</td>
</tr>
<tr>
<td>Cost of labour</td>
<td>$30/hour*</td>
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<tr>
<td>Project lifetime</td>
<td>N/A¹</td>
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</tbody>
</table>

* Cost of labour is given in case study dataset

Results

Labour cost savings from improved utilization of office staff has a value of $3,250, resulting in higher productivity as opposed to a pure cost saving in this case. The resulting project NPV is $34,742 per production line. Payback of investment occurs in less than one year. Net and cumulative cash flows are summarized in Figure 1.

![Cash flows (per system)](image)

**Figure 1: Net and cumulative cash flow of optimizing production line operations**

¹ Lifetime of a production line is not applicable. The lifetime of CircuitMeter equipment may be used, because this functionality is essential to the predictive maintenance program.