ABB Swirl flowmeters
Metering heat from steam

The challenge
Many companies, particularly those based in industrial parks, have centralized or outsourced their power supply and now obtain their heat energy in the form of steam.

The steam is generated centrally in a power plant on or near the site. It is then distributed to subscribers via insulated pipelines. For consumption to be billed accurately, energy quantities (steam quantities) must be recorded by taking a variety of individual measurements. In order to ensure reliable metering of the quantities consumed, which fluctuate significantly, two flow measurements with different nominal diameters are often required. Even when consumption is low (during summer operation, for example), energy flows must be recorded and billed accurately.

The solution
Swirl flowmeters, which benefit from high measuring range dynamics because of their design, can be used in many cases where two metering systems with different nominal diameters were previously installed.

This approach reduces installation and equipment costs. Installing two metering systems would require two sets of equipment to meter not only steam quantity, but also temperature and pressure. Two measurement computers would also be required. Compared with differential pressure metering procedures, the accuracy achieved with Swirl flowmeters is constant across the entire range. Higher inaccuracies when metering at low range are rare.

The installation of two devices with graded nominal diameters is recommended for measuring points where fluctuations in consumption are so great that the measurement dynamics of one device are no longer sufficient.

Switchover from summer to winter operation can be done manually or automatically. The valves are controlled by a small PLC which evaluates the operating flow of the Swirl flowmeters. ABB is a one-stop shop for all components required for balancing heat quantities (temperature and pressure meters and measurement computers, for example).
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<th>List of example devices for individual measurements</th>
<th>List of example devices for split-range measurements</th>
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| 1  FSS450 SwirlMaster with integrated flow computer, DN100 (4")  
Range, e.g.,  
- 120 ... 5,600 kg/h (260 ... 12,600 lbs/h) saturated steam at 160 °C (320 °F)  
- or 185 ... 11,000 kg/h (420 ... 24,000 lbs/h) saturated steam at 190 °C (375 °F) | 1  FSS450 SwirlMaster with integrated flow computer, DN100 (4")  
Range, e.g.,  
- 120 ... 5,600 kg/h (260 ... 12,000 lbs/h) saturated steam at 160 °C (320 °F)  
- or 220 ... 9,600 kg/h (480 ... 21,000 lb/h) saturated steam at 190 °C (375 °F) |
| 1  Optionally: ABB PAS100 absolute pressure transmitter for accurate mass computation for superheated steam. | 1  FSS450 SwirlMaster with integrated flow computer, DN40 (1 ½")  
Range, e.g.,  
- 26 ... 960 kg/h (56 ... 2,100 lbs/h) saturated steam at 160 °C (320 °F)  
- or 36 ... 1,900 kg/h (80 ... 4,200 lbs/h) saturated steam at 190 °C (375 °F) |
| 2  Optionally: ABB PAS100 absolute pressure transmitters for accurate mass computation for superheated steam. | 2  Optionally: ABB PAS100 absolute pressure transmitters for accurate mass computation for superheated steam. |

Recommended switching points from 1 ½" to 4" (DN 40 to DN 100):  
480 kg/h at 160 °C (1,000 lb/h at 320 °F) or 660 kg/h at 190 °C (1,500 lb/h at 375 °F)  
Pressure loss approx. 100 mbar (1.5 psi)