



Energy Efficiency - Continuous Commissioning - Building Optimization

FLEXIM Sustainability

Precision Ultrasonic Flow and Thermal Energy Meters

Chiller Plants

Heating Plants

HVAC

District Energy

Submetering

Energy Optimization

Energy Audits

Metering & Verification

Retrofits

Billing

Water Control / Leak Detection

Demand Response

Combined Heat and Power /
Cogeneration Plants

FLEXIM
when measuring matters



FLUXUS® Energy

Non-intrusive Thermal Energy Metering

Energy Optimization

The controlling, balancing, and monitoring of thermal energy flows is of utmost importance in times of rising energy prices, environmental regulations and financial benefits of energy efficient buildings.

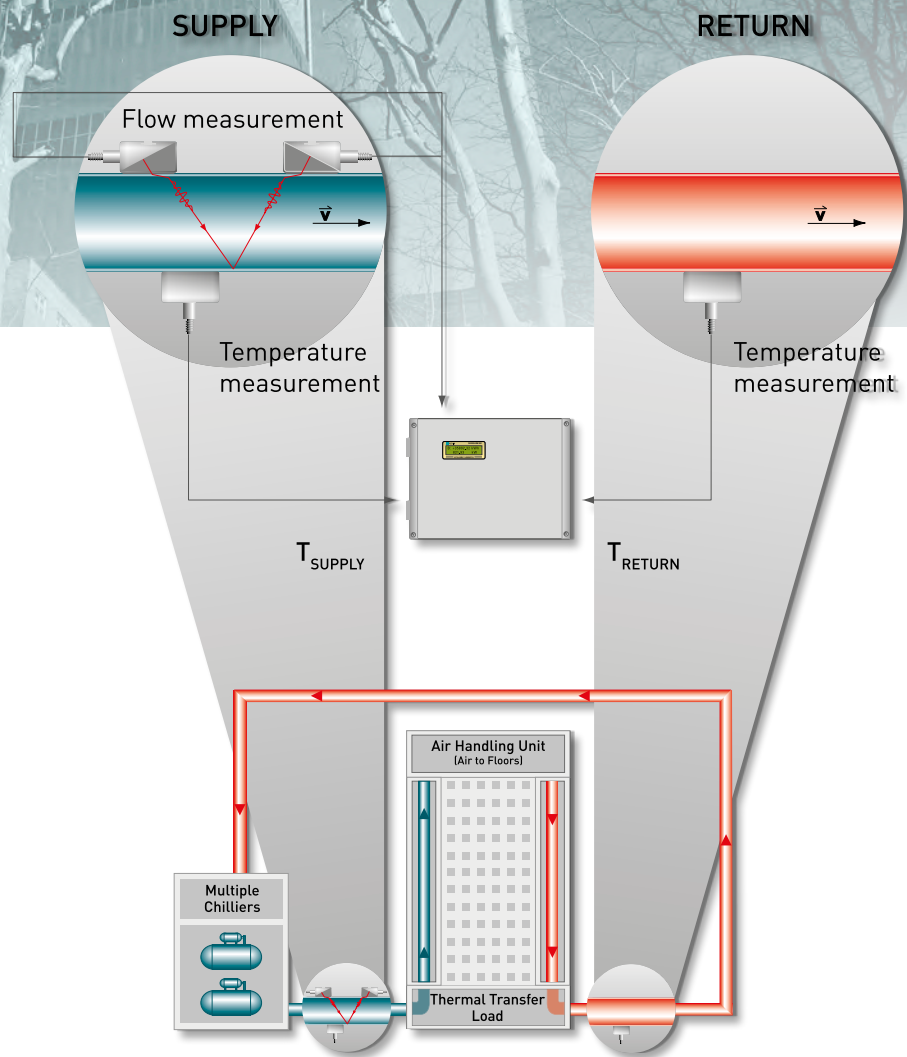
FLEXIM's thermal energy meter FLUXUS® BTU is up to the task.

Integrated System

FLEXIM's energy meters combine the attributes of non-intrusive ultrasonic flow measurement with superior temperature monitoring into an integrated energy computer.

All flow transducers and temperature sensors are connected to one unit.

This eliminates errors associated with multiple devices and provides for a complete turn-key solution for your energy metering needs.



FLEXIM's thermal energy meters support your efforts towards more energy efficient buildings and facilities:

- FLEXIM offers portable meters for temporary measurements as well as permanent meters for long term flow and energy monitoring.
- With accuracy of 1% on the flow rate and 0.03° F temperature differential, they are the perfect instrument for:
 - Verification of built-in meters,
 - Measurement of chilled and hot water supply,
 - Measurement of domestic water
 - Measurement of condenser water
 - Measurement of condensate (steam return)
- If it is a LEED that you are pursuing, FLEXIM's thermal energy meters are the ideal tool.
- Being non-intrusive, FLEXIM's thermal energy meters are free of wear. In addition, FLEXIM's permanent transducer coupling makes the meter maintenance free.

FLUXUS[®] Energy

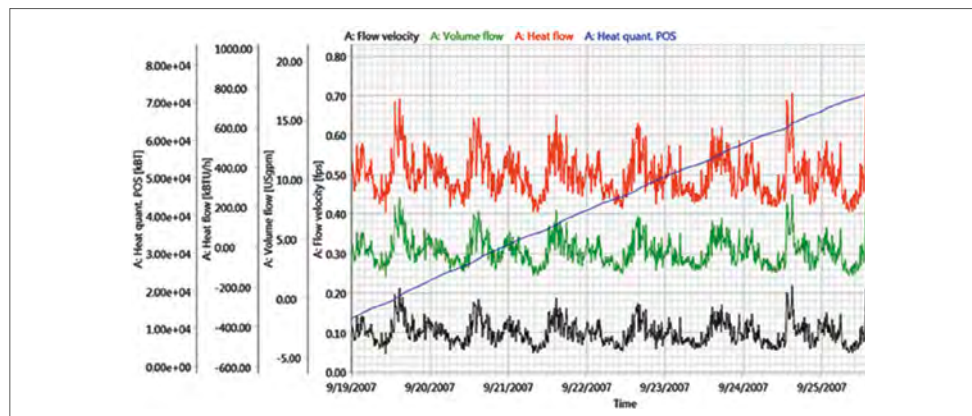
Unparalleled measurement of low flow rates

Typical HVAC applications run less than 8 hours of peak flow while the remaining 16 hours are usually off-peak low flow rates below the threshold of other metering technologies. Below is a data set from a campus building at a large University. A small amount of chilled water is supplied during off-peak months. FLEXIM's energy meters are capable to record even extremely low flow velocities. The January usage totaled 26 Ton-Days. At the Universities \$11 per Ton-Day rate this amounts to \$286 for the month and \$1144 for 4 months of off-peak (Nov-Feb). The ROI over a 10 year period is \$11,440. Most meters will not measure these low velocities; this amounts to lost revenue generation or lost accounting for the utilities operating costs. FLEXIM's unparalleled flow range and zero sensitivity allow the system to accurately measure the extremely low flow rates associated with trickle or low flow intervals. This high accuracy is reached by a sophisticated process of matching and pairing the ultrasonic transducers with temperature compensation to rule out drift.

Cost of Not Metering the low Velocities

Jan 1 to Feb 5	Chilled Water Energy Flow Tons	Chilled Water Energy Flow Ton - Day	CHW Flow Accumulator kgal (1000)	Chilled Water Delta Temp -Deg F	Chilled Return Temp - Deg F	Chilled Supply Temp - Deg F	Chilled Water Flow Rate - gpm	Chilled Water Flow Velocity ft/sec
2/4/2010 03:00:00 PM	2.49	37.87	91.35	14.93	59.84	44.90	4.01	0.03
2/4/2010 04:00:00 PM	2.60	37.96	91.55	14.95	59.95	44.97	4.17	0.03
2/4/2010 05:00:00 PM	2.66	38.06	91.79	15.29	60.24	44.93	4.17	0.03
2/4/2010 06:00:00 PM	2.71	38.17	92.03	15.61	60.36	44.80	4.17	0.03
2/4/2010 07:00:00 PM	2.97	38.27	92.27	15.09	59.89	44.80	4.71	0.03
2/4/2010 08:00:00 PM	2.15	38.38	92.52	13.98	59.81	45.82	3.66	0.02
2/4/2010 09:00:00 PM	2.34	38.48	92.76	15.37	60.02	44.69	3.71	0.02
2/4/2010 10:00:00 PM	2.87	38.59	93.00	15.30	60.06	44.84	4.50	0.03
2/4/2010 11:00:00 PM	3.37	38.70	93.24	14.73	59.61	44.87	5.50	0.04
2/5/2010 12:00:00 AM	1.76	38.77	93.42	14.16	59.04	44.89	3.02	0.02
2/5/2010 01:00:00 AM	0.98	38.80	93.49	14.49	59.41	44.90	1.70	0.01
2/5/2010 02:00:00 AM	0.84	38.84	93.57	14.44	59.84	45.36	1.43	0.01

This graph below shows a 7 day trend of energy usage at another campus building. This is a 370 °F hot water supply to the building. In the off-peak summer months the flow velocities only range from .08 -.2 ft./sec. These are very low velocities but not uncommon in district energy submetering loops. The previous meter at this building was unable to measure this. The amount of thermal energy used in the 7 day period is 64 MBTU. FLEXIM meters now pick up this energy usage for the University.





Improve the energy efficiency of your building with FLUXUS® Energy

FLEXIM Permanent Meters are completely Maintenance Free!

Clamp-on ultrasonic meters have no moving parts and are not in contact with the liquid. There used to be a maintenance requirement associated with the coupling grease in between the transducers and pipe. Since 2006 FLEXIM has been using a patented non-grease permanent coupling pad rated to 380 °F. Today FLEXIM has thousands of meters in operation that have never required any maintenance. FLEXIM also has eliminated the need for a zero check and zero calibration resulting from long term meter drift associated with some clamp-on meters. FLEXIM has unmatched zero stability which is made possible by the diligence that is put into the transducer and DSP signal processing. FLEXIM may be the only clamp-on meter that has embedded RTD's in the transducers, which makes it possible to have a "drift free" clamp-on meter.

Condensate Metering

FLEXIM also utilizes the built in RTD for condensate metering. Condensate is often metered in mass units, like pounds. This makes it easy to equate steam consumption as 1 pound of condensate = 1 pound of steam. Like most flowmeters FLEXIM measures velocity and converts velocity to volume. Volume can be converted to Mass if the density of the liquid is known. FLEXIM has built in density tables for many liquids and with the addition of temperature measurement the meter can provide a Mass measurement; pounds of condensate. With the RTD in the transducers, we provide a Mass measurement without the need for an additional temperature measurement; less components means lower cost and higher reliability.

Calibration Requirements

BTU meters often have calibration requirements. These can still be attended to even though the meters have no drift and require no maintenance. FLEXIM offers many types of calibration services, all ISO 17025 certified (pending); we have an in-house calibration laboratory and offer field calibration services. We can also train your staff to perform calibrations on FLEXIM meters.

FLEXIM meets the requirements set by accreditors in terms of accurate and reliable monitoring and control of HVAC installations. Flexim BTU calculations and temperature measurement meet EN 1434 BTU meter standards.

Tasks of FLUXUS® Energy

District Energy, Operations,
Distribution and Building Loads

Monitor usage for billing

Metering and Verification for
"Green Building" certification

Building Oversight
Management Systems

Load Balancing

Submetering

Energy Optimization

Energy Audits

Metering & Verification

Retrofit

Billing

Water Control /
Leak Detection

Demand Response

Combined Heat and Power /
Cogeneration Plants

Application fields for FLUXUS® Energy

HVAC tasks

District Energy

Chilled and hot water plants in:

- Universities
 - Corporate and governmental complexes
 - Shopping malls
 - Hospitals
 - Sport arenas
 - Airports and more
-

Industrial cooling and heating

Industrial processes

Benefiting from Governmental Programs

Governmental initiatives, certifications and programs, such as LEED, Energy Star, AASHE STARS, Local Law 87, Executive Order 88 and many others are often linked to monetary incentives like tax exemptions or subsidies.

For a list of federal and state incentive programs that you can take advantage of in your area, visit www.dsire.org.

Besides these direct savings or incomes, accredited buildings also prove to be more attractive to tenants in their pursuit of savings variable costs associated with energy usage.

University Gains Total Control Over Chiller

The Nova Southeastern University in Florida, home to 28,000 students, boasts the fourth largest ice conversion chiller facility in the US. Ice conversion saves power, as ice is built up at night when power costs less and then “melts” during the day to cool the water flows. A superior flow monitoring capability to run these chillers at peak efficiency is a must. Previously used Differential Pressure flow meters could not meet these requirements in terms of accuracy, especially at low flows, thus giving away free energy. Together with a Green Star certified contractor, the HVAC managers at Nova identified FLEXIM’s flow meters as the ideal solution for the task. Not only can they be retrofitted to existing pipe works, they also feature an accuracy within 1% of the flow rate. Moreover, due to their high turndown range and fast response to changing flow rates, the ultrasonic meters are used for controlling the frequency driven pumps, saving energy and considerable wear and tear on the pumps.

Advantages:

- High accuracy on low and high flow rates
- Easy retrofitting on existing pipes without any pipe work
- High turndown and quick response rate for total flow control

Features and Advantages:

Certified traceable accuracy of both flow and temperature measurements

Extremely high turndown range, ability to measure low flow rates

High accuracy of temperature measurements (4-wire clamp-on RTDs, 0.03 °F with matched RTDs)

Drift-free

No wear mechanism

Permanent coupling pads (no grease) requiring zero maintenance

Strong technical support and know-how

High temperature “maintenance free” measurement capability for hot water lines with optional Wavelnjector® mounting fixture

Large internal data logger; failsafe data retrieval in case of communication failure



Empire State Building Goes Green

The Empire State Building is the first pre-built commercial building in New York City to achieve LEED Gold certification. A few years ago, the owners of the building saw the need for a complete environmental renovation, calling together a team of private companies and public organizations to establish eight initiatives on how to increase the energy efficiency of the building and optimally balance financial and environmental returns on the investment. In addition to improved windows, insulation, and lighting, the HVAC retrofits and their monitoring were the biggest points in the building's renovation.

For performance monitoring of the chillers, pumps and water distribution system, Johnson Controls, being responsible for the Metasys Building Management System, selected FLEXIM's BTU meters due to their high accuracy under very tight piping spaces as well as the fact that they are non-intrusive and eliminate the need to cut into piping for installation.

Advantages:

- High accurate BTU measurement in areas with restricted pipe space
- Data transfer via BACnet to the BMS, also enabling submetering tasks throughout the building
- No need for pipe work during installation - virtually maintenance free metering system

Metering CHP Systems

Combined Heat and Power (CHP), or cogeneration, is gaining a newfound popularity in a variety of industries because of its ability to reduce costs, increase efficiency, and provide power independence.

The CHP system uses the excess heat given off while generating electricity allowing it to be over 85% efficient. Additionally, CHP systems can be used as a back-up generator allowing buildings to operate independently from the power grid. It is especially crucial for critical infrastructures like hospitals and places of refuge, and it is growing into commercial buildings. The allure is cheaper electricity, independence from the grid, and captured heat used to heat domestic hot water. In addition to reducing energy consumption, CHPs greatly reduce the amount of harmful emissions released into the atmosphere. Perhaps one of the main reasons for its growing popularity is that the cost of natural gas used in CHP systems has decreased, making CHPs more economically viable.

To promote the use of CHPs, state and federal governments are providing numerous financial incentives. Many of these incentives require metering and verification take place before and after a CHP is installed. Metering is needed prior to a CHP installation to establish a baseline, determine peak demand, and properly size the CHP, ensuring that it will run at its greatest efficiency. Furthermore, metering is essential after the CHP system is installed to verify accurate savings. Since precise measurements are needed to ensure the most efficient system and exact savings, the accuracy and reliability of a FLEXIM meter is essential.



FLEXIM is an approved member of the US Environmental Protection Agency's CHP Partnership. This partnership recognizes efforts to improve the environmental performance of the US energy supply system by supporting combined heat and power.



Benefits of CHP

Lowers costs - natural gas costs are low, coal plants are shutting down and becoming scarce

Reduces water consumption

Government funding and laws promote the use of CHPs

Reduces energy consumption

Serves as an additional back-up generator

Creates power independence

Increases facility safety

Reduces emissions

Acts as a reliable power source

Why Choose FLEXIM?

Precise metering is needed for correct CHP sizing

Government financial incentives require accurate metering to ensure efficiency

FLEXIM's built-in RTDs ensure highest reliability



FLEXIM Rental & Leasing Options Available

Program Features & Advantages:

- Flexibility in purchase size
- Terms that meet specific business needs
- Renting includes 1 week - 1 month options
- Leasing includes 3, 4, & 5 year options
- Easy monthly payments for a fraction of equipment costs
- End of rental term options available
- FLEXSource and Equipment Warranty provided with all plans

FLEXSource Includes:

- Walk-through
- Site Survey
- Commissioning
- On-Site Training
- Yearly Calibrations

Leasing & Renting Benefits:

- Allows for 100% Financing
- Prevents Technological Obsolescence
- Budget Saving Payment Plans
- Preserves Cash Flow and Credit Lines
- Tax Advantages through Leasing – receive tax write-offs via Section 179 Deduction
- Simple Application Process

FLUXUS[®] Energy



Technical Data

FLUXUS[®] Energy / BTU:	Fully integrated permanent or portable thermal energy metering system. BTU Calculation per EN1434 (ultrasonic clamp-on transit-time flow measurement, temperature measurement with clamp-on or insert temperature sensors)
Quantities of measurement:	Instantaneous thermal power output (BTU Calculation as per EN1434), totalized thermal energy, volume and mass flow, temperature T_s , T_r , ΔT , flow velocity, liquid's sound speed, signal strength
Units:	BTU, Tons, J, Wh, etc.
Flow velocity:	0.01 to 80 ft/s
Resolution:	0.0008 ft/s
Repeatability:	0.15% of reading \pm 0.03 ft/s
Accuracy, volume flow*:	Standard 5 point NIST traceable wet flow calibration: sub 1% of reading with process calibration: 0.5% of reading**
Temperature measurement:	Calibrated accuracy: \pm 0.03 °F with matched RTDs (EN1434 compliant with NIST Certification) Types: 100 Ohm / 1000 Ohm clamp-on and insert sensors, Construction: 4-wire Platinum RTD
Integrated data logger:	typically stores 2 months data at 15 min storage rate
Outputs types:	Analog: 4-20 mA, 0-10 V, pulse, frequency
Communication:	RS485 (RS232 - USB for portable unit), Modbus RTU/485, Modbus/TCP, BACnet/IP, MSTP, HART (other protocols available on request)

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www.flexim.com

or call us at:

1-888-852-PIPE

* under reference conditions and with $v > 0.45$ ft/s
 ** if reference uncertainty better than 0.2%
 For more information, see the corresponding technical specifications.

