



## FACILITIES DIVISION

ERNEST ORLANDO LAWRENCE BERKELEY NATIONAL LABORATORY

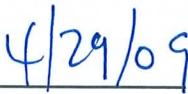
**FY 2009**

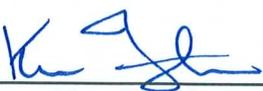
### **Advanced Natural Gas Metering Plan**

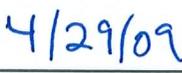
**April - 2009**

The following certify that this document is executed in good faith per the requirements of the DOE/UC contract.

  
\_\_\_\_\_  
Prepared by: Michael Dong, Utility Section Manager

  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Approved by: Ken Fletcher, Operations Manager,  
Facilities Division

  
\_\_\_\_\_  
Date

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# **LBNL Advanced Natural Gas Metering Plan FY 2009**

## **1. Purpose and Scope**

The Energy Independence and Security Act of 2007 (EISA), Section 434 requires advanced metering equivalent to that required for electric power, under the Energy Policy Act 2005 (EPAAct 2005), be provided for natural gas and steam. Metering, where life-cycle cost-effective, shall be completed by the end of FY 2015. This requirement is implemented in Department of Energy (DOE) Order 430.2B, Attachment 1 – Contractor Requirements Document (CRD). The DOE Order, CRD paragraph 6.d requires installation, to the maximum extent practicable, of devices that measure consumption of potable water, electricity, steam, and natural gas in each building and other facilities and grounds. DOE has provided guidance for the development of metering plans to meet these requirements. This document is, “*Metering Best Practices – A guide to Achieving Utility Resource Efficiency*”, dated October, by DOE – Energy Efficiency and Renewable Energy (DOE – EERE).

## **2. Responsibility**

LBNL Facilities Division – Operations is responsible for planning and executing the Advanced Natural Gas Metering Plan. Specific responsibilities and individual assignments are provided in Section 8 of this plan.

## **3.0 Existing Natural Gas Metering Infrastructure & Retrofit Plans**

A detailed survey of the building natural gas metering was conducted at the beginning of FY 2009. A tabulation of the buildings, building names, gross building floor area square footage (GSF), current natural gas metering status, FY 2008 consumption and scope of work for conversions to “advanced natural gas meters” is provided in Attachment 1. It was found that every building connected to the natural gas distribution system, with a few very small building exceptions, are metered. All existing meters are manual read types. They can be converted to “advanced” status by arranging to transmit the consumption signal to the FMCS. Conversion to “Advanced Meter” status assumes retrofitting of existing meters with electronic reader heads and connection of the reader head signal to LBNL’s Facility Management Control System (FMCS), a dedicated fiber optic communications system.

Planned advanced natural gas metering activities for FY 2009 through FY 2015 are also indicated on the tabulation in Attachment 1. It is noted that almost all LBNL buildings are fitted with standard displacement type revenue quality meters.

# LBNL Advanced Natural Gas Metering Plan FY 2009

## 3.1 Existing LBNL Natural Gas Meters & Screening for Advanced Metering

All LBNL buildings were screened for practicable, life-cycle cost-effective, advanced natural gas meter installations, per the above referenced guidance. Based on existing measured natural gas consumption, the resulting existing and planned natural gas metering conversions to “Advanced Meter” status include:

Existing Advanced Natural Gas Meters	61
<u>Buildings to be Demolished with Natural Gas Meters</u>	<u>17</u>
Candidate Natural Gas Advanced Meter Locations	44
Cost-Effective Meter Locations (>50,000 Therms / Year)	10
<u>Locations for Advanced Meters Identified for Other Reasons</u>	<u>8</u>
Total Advanced Natural Gas Meters in Metering Plan	18

## 3.2 Advanced Natural Gas Metering Status and Planned Installations

Advanced Natural Gas meters are planned to be installed primarily supported from internal funding. Several will be installed with approved American Recovery and Reinvestment Act of 2009 (ARRA) projects. Advanced natural gas meters are scheduled for installation as follows:

Planned for Installation in FY 2010	4	Internal Funding
Planned for Installation in FY 2011	2	Internal Funding
	1	ARRA Funding
Planned for Installation in FY 2012	1	Internal Funding
	2	ARRA Funding
Planned for Installation in FY 2013	3	Internal Funding
Planned for Installation in FY 2014	3	Internal Funding
<u>Planned for Installation in FY 2015</u>	<u>2</u>	<u>Internal Funding</u>
Total Advanced Natural Gas Meters	18	

## 4.0 Use of Metered Data

There are three (3) major uses for the metered data.

### 4.1 Data Collection and Analysis

The collected data are analyzed to help identify potential energy efficiency improvements. For example, actual energy use (Therms / GSF) was measured for a similar lab and used for the design of the Molecular Foundry, Building 67. As a result, the HVAC system for the Molecular Foundry was right sized. The building consequently was awarded LEED® Gold Certification by the U.S. Green Building Council.

### 4.2 Measurement and Verification of ESPC and In-House Project Savings

It was expected that a sitewide energy savings performance contract (ESPC) would be executed in CY 2008. The project was delayed, and ultimately cancelled in early 2009 due to poor economics. Advanced

## **LBNL Advanced Natural Gas Metering Plan FY 2009**

natural gas meters planned as part of the ESPC project would have facilitated development of baseline energy use data and measurement and verification of the energy savings to a higher degree of confidence. Data from existing and planned advanced natural gas meters, supported from other funding sources, will help LBNL to develop better in-house energy conservation measures and to verify their post-installation effectiveness.

### **4.5 Planning and Reporting**

Existing standard natural gas meters are read on a monthly basis. An electrician reads meters in restricted areas and a non-electrician reads those in unrestricted areas. As a result, the meters are not read at the same time. This results in inconsistent data because the data time span is not the same. Time spans range from 3 to 6 weeks instead of a consistent 1-month span. In addition, if the electrician is not available due to other competing priorities such as end of the year rush, the meters may not be read. Advanced metering will provide consistent data and will help to increase the overall productivity of the Laboratory.

### **5.0 Building Metering Screening**

All LBNL buildings are defined as laboratory / industrial building, thus, qualify for installation of advanced natural gas meters “to the maximum extent practicable” as DOE O 430.2B Attachment 1, paragraph 6d requires. LBNL interprets this requirement to mean that advanced natural gas meters shall be life-cycle cost-effective. All LBNL buildings are screened for life-cycle cost-effective advanced natural gas meters following “*Metering Best Practices – A guide to Achieving Utility Resource Efficiency*”, dated October, by DOE – EERE.

Potential natural gas cost savings resulting from energy management and energy awareness program actions facilitated by easily available natural gas consumption data from advanced metering systems are compared to installation costs. The reference cited above provides guidance concerning anticipated energy savings, stating:

DOE/EE-0312 stipulates a minimum cost savings realized of 2 percent. Because it is anticipated that sites will use the data for several purposes including cost allocation, time-of-use metering, and/or energy use diagnostics, energy savings exceeding 2.5 percent should be realized.

Building natural gas savings of 2.5% is assumed for analysis purposes. A higher savings number is not reasonable at LBNL as virtually all buildings are already fitted with natural gas meters and many of the advantages described above are already available.

Buildings are screened for life-cycle cost-effective advanced natural gas meter installations by determining potential natural gas cost savings based

## **LBNL Advanced Natural Gas Metering Plan FY 2009**

on FY 2008 consumption data. It was determined that minimum annual natural gas consumption of 50,000 Therms (\$50,000 annual natural gas cost) would justify an advanced meter. Detailed calculations are included as Attachment 2.

### **6.0 Site Metering Financing Plan**

6.1 ESPC Financing: It was previously decided by Laboratory management, with DOE - BSO acknowledgement, to defer major advanced natural gas meter installations to the ESPC contract. As is stated above, the ESPC was cancelled in February-2009 due to economic concerns. Should another ESPC project be developed at LBNL in the future, advanced metering will be considered. However, this plan does not rely on ESPC funding for implementation.

6.2 Institutional Funding: With cancellation of the ESPC project, revised planning has been developed, primarily employing institutional funding.

6.3 American Recovery and Reinvestment Act of 2009 (ARRA) Funding:

a. Approved ARRA Funding:

Installation of several advanced natural gas meters will be accommodated as part of projects with approved ARRA funding, including:

Building 66 General Purpose Laboratory Upgrades: Includes a replacement high efficiency boiler (an advanced natural gas meter will be specified for the "gas train.)

Building 71 BELLA Project Acceleration: Includes a replacement high efficiency boiler (an advanced natural gas meter will be specified for the "gas train.)

b. Proposed ARRA Funding:

Installations of several additional advanced electric meters could also be supported by ARRA funding, currently requested from DOE's Office of Energy Efficiency and Renewable Energy (EERE).

LBNL submitted a number of energy and water savings projects proposals to DOE-EERE through the Office of Science earlier in CY 2009. Final project selections and transfers of funds are pending, and due in July / August, and possibly as late as FY 2010. This plan does not consider proposed EERE – ARRA funded efforts.

### **7.0 Installation Schedule**

The installation schedule for advanced natural gas meters is provided in Attachment 1. A summary of the installation schedule is provided below. All advanced natural gas meters will be installed and commissioned as scheduled, by 30-September-2015, subject to actual availability of funding from the sources as indicated above:

## **LBNL Advanced Natural Gas Metering Plan FY 2009**

- 7.1 FY 2010: Secure internal, LBNL funding for advanced natural gas meter installations; install advanced natural gas meters at:  
B76 Facilities Div Shops & Offices  
B78 Storage & Assembly Building  
B86 Animal Care Facility  
B90 DOE, EE, EHS ES Offices – Building
- 7.2 FY 2011: Installation supported by ARRA funding:  
B66 Center for Scientific Catalysts B66
- 7.3 FY 2011: Installations supported by Internal LBNL funding:  
B6 Advanced Light Source (ALS) – Accelerator Building  
B67/67A Molecular Foundry
- 7.4 FY 2012: Installation supported by ARRA funding:  
B71 BELLA Project Acceleration (conversion of 2 existing meters)
- 7.5 FY 2012: Installations supported by Internal LBNL funding:  
B85 Hazardous Waste Handling Facility – Building
- 7.6 FY 2013: Installations supported by Internal LBNL funding:  
B50A Conversion of replacement high efficiency boiler meter to an advanced natural gas meter will be specified for the “gas train  
B50B Conversion of replacement high efficiency boiler meter to an advanced natural gas meter will be specified for the “gas train  
B B70 NS, EE Laboratory
- 7.7 FY 2014: Installations supported by Internal LBNL funding:  
B2 Advanced Materials Laboratory  
B62 MS, CH Laboratory – Building  
B84 Laboratories and Offices
- 7.8 FY 2015: Installations supported by Internal LBNL funding:  
B74 Laboratories and Offices  
B77 Engineering Shops – Plating Shop

### **8.0 Program Support Requirements**

- 8.1 Michael Dong, Utility Manager: Mr. Dong is responsible for the Advanced Electrical Metering Plan and the analysis of the metering system and its data.

## **LBNL Advanced Natural Gas Metering Plan FY 2009**

- 8.2 Larry Domansky, Electrical Power Engineer: Mr. Domansky is responsible for the design of the advanced meter.
- 8.3 Jim Murphy, Plant Operations Service Supervisor: Mr. Murphy is responsible for the installation and commissioning of the advanced meters.
- 8.4 Blair Horst, Sustainability Coordinator / Energy Manager: Mr. Horst is responsible for reporting advanced electric metering plans as assuring these plans are aligned with DOE requirements.

### **9.0 Site Staff Accountability**

- 9.1 Michael Dong, Utility Manager

Any questions about this Advanced Metering Plan should be directed to Michael Dong, 510-486-6458.

- 9.2 Jim Krupnick, LBNL Energy Champion

### **10.0 Annual Metering Program Progress**

Progress toward meter installation goals will be reviewed annually as LBNL reports progress toward meeting the various performance measures.

**Advanced Natural Gas Metering Activities Plan - FY 2009**

**Attachment 1**

<b>Building Number</b>	<b>Building Name</b>	<b>Building Gross SQFT</b>	<b>Meter Serial Number</b>	<b>Scope of Work All existing are standard displacement types</b>	<b>FY 2008 Natural Gas Therms</b>	<b>Advanced Metering FY Plan</b>	<b>Advanced Meters Operational</b>
002	Laboratories & Research Offices	85,506	LBL-NG-2	Install electronic head reader and extend signal to FMCS for trending	117,190	FY 2014	
006	Advanced Light Source (ALS)	118,573	LBL-NG-6	Install electronic head reader and extend signal to FMCS for trending	135,994	FY 2011	
007	Assembly, Offices & Labs (ALS Support)	21,435	LBL-NG-7	Install electronic head reader and extend signal to FMCS for trending	244	Not Economic	
025A	Shop, Assembly & Offices	7,514	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B25	Not Economic	
026	Medical Services, Labs & Offices	10,562	LBL-NG-26	Install electronic head reader and extend signal to FMCS for trending	5,017	Not Economic	
038	G38 EMER GEN	56	N/A	Install electronic head reader and extend signal to FMCS for trending	56	Not Economic	
041	FA offices and storage	995	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B48	Not Economic	
043	Standby Gen. Shelter (serves Fire House)	1,020	LBL-NG-43	Install electronic head reader and extend signal to FMCS for trending	45	Not Economic	
046	Laboratories, Shops & Offices	54,133	LBL-NG-46	Install electronic head reader and extend signal to FMCS for trending	1,912	Not Economic	
047	Offices	6,242	LBL-NG-47	Install electronic head reader and extend signal to FMCS for trending	3,669	Not Economic	
050	Labs, Shops & Offices	48,719	LBL-NG-50	Install electronic head reader and extend signal to FMCS for trending	25,545	Not Economic	
050A	Labs, Shops & Offices	66,628	LBL-NG-50A	Install electronic head reader and extend signal to FMCS for trending	121,156	FY 2013	
050B	Laboratories, Shops & Offices	63,695	LBL-NG-50B	Install electronic head reader and extend signal to FMCS for trending	4,738	FY 2013 Other Purpose Not Economic	
053	Laboratories, Shops & Offices	6,944	LBL-NG-53	Install electronic head reader and extend signal to FMCS for trending	4,296	Not Economic	
			N/A	Install electronic head reader and extend signal to FMCS for trending		Not Economic	
054	Cafeteria	15,451	LBL-NG-54	Install electronic head reader and extend signal to FMCS for trending	19,798	Not Economic	
058	Highbay Lab, Shops & Offices	10,279	LBL-NG-58	Install electronic head reader and extend signal to FMCS for trending	10,771	Not Economic	
			N/A	Install electronic head reader and extend signal to FMCS for trending		Not Economic	
062	Laboratories, Shops & Offices	55,904	LBL-NG-62	Install electronic head reader and extend signal to FMCS for trending	88,446	FY 2014	
065	Offices	3,423	LBL-NG-65	Install electronic head reader and extend signal to FMCS for trending	40	Not Economic	

**Advanced Natural Gas Metering Activities Plan - FY 2009**

**Attachment 1**

<b>Building Number</b>	<b>Building Name</b>	<b>Building Gross SQFT</b>	<b>Meter Serial Number</b>	<b>Scope of Work All existing are standard displacement types</b>	<b>FY 2008 Natural Gas Therms</b>	<b>Advanced Metering FY Plan</b>	<b>Advanced Meters Operational</b>
066	Laboratories & Offices	44,121	LBL-NG-66	Install electronic head reader and extend signal to FMCS for trending	71,123	FY 2011 ARRA Assited Project	
067/67A	Molecular Foundry (Labs-Shops-Offices)	97,155	LBL-NG-67	Install electronic head reader and extend signal to FMCS for trending	173,001	FY 2011	
070	Laboratories, Shops & Offices	63,441	LBL-NG-70	Install electronic head reader and extend signal to FMCS for trending	151,277	FY 2013	
070A	Laboratories, Shops & Offices	68,440	LBL-NG-70A	Install electronic head reader and extend signal to FMCS for trending	31	Not Economic	
071	Laboratories, Shops & Offices	54,427	LBL-NG-71	Install electronic head reader and extend signal to FMCS for trending	1,600	FY 2012 ARRA Assited BELLA Project	
			N/A	Install electronic head reader and extend signal to FMCS for trending			
071B	Shops & Offices	6,892	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B71	Not Economic	
072	Nat'l Ctr for Electron Microscopy (NCEM)	5,352	LBL-NG-72	Install electronic head reader and extend signal to FMCS for trending	5,708	Not Economic	
072C	Nat'l Ctr for Electron Microscopy (NCEM)	8,409	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B72	Not Economic	
073	Laboratories, Shops & Offices	4,228	LBL-NG-73	Install electronic head reader and extend signal to FMCS for trending	7,976	Not Economic	
073A	Utility Equipment Bldg. (red-tagged)	403	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B73	Not Economic	
074	Laboratories & Offices	45,382	LBL-NG-74	Install electronic head reader and extend signal to FMCS for trending	107,095	FY 2015	
075	Laboratories & Offices	8,499	LBL-NG-75	Install electronic head reader and extend signal to FMCS for trending	7,187	Not Economic	
076	Facilities Div Shops & Offices	31,698	LBL-NG-76	Install electronic head reader and extend signal to FMCS for trending	19,409	<b>FY 2010</b> Other Purpose Not Economic	
077	Central EG Shops, Assembly & Labs	68,937	LBL-NG-77	Install electronic head reader and extend signal to FMCS for trending	75,400	FY 2015	
077A	Composites Lab and Assembly Facility	12,118	LBL-NG-77A	Install electronic head reader and extend signal to FMCS for trending	162	Not Economic	
078	Storage & Assembly	5,391	LBL-NG-78	Install electronic head reader and extend signal to FMCS for trending	new meter	<b>FY 2010</b> Other Purpose Not Economic	
080	Laboratories, Shops & Offices	29,912	LBL-NG-80	Install electronic head reader and extend signal to FMCS for trending	0	Not Economic	
083	Laboratories & Offices	6,856	LBL-NG-83	Install electronic head reader and extend signal to FMCS for trending	7,177	Not Economic	

**Advanced Natural Gas Metering Activities Plan - FY 2009**

**Attachment 1**

<b>Building Number</b>	<b>Building Name</b>	<b>Building Gross SQFT</b>	<b>Meter Serial Number</b>	<b>Scope of Work All existing are standard displacement types</b>	<b>FY 2008 Natural Gas Therms</b>	<b>Advanced Metering FY Plan</b>	<b>Advanced Meters Operational</b>
084	Laboratories & Offices	55,031	LBL-NG-84	Install electronic head reader and extend signal to FMCS for trending	50,735	FY 2014	
085	Hazardous Waste Handling Facility (HWHF)	15,405	LBL-NG-85	Install electronic head reader and extend signal to FMCS for trending	12,065	FY 2012 Other Purpose Not Economic	
086	Animal Care Facility	5,006	LBL-NG-86	Install electronic head reader and extend signal to FMCS for trending	11,734	<b>FY 2010</b> Other Purpose Not Economic	
088	88 Cyclotron User Facility	54,428	LBL-NG-88	Install electronic head reader and extend signal to FMCS for trending	36,339	Not Economic	
090	Offices	89,509	LBL-NG-90	Install electronic head reader and extend signal to FMCS for trending	37,591	<b>FY 2010</b> Other Purpose Not Economic	

**Advanced Natural Gas Metering Activities Plan - FY 2009**

**Attachment 1**

**Buildings Scheduled for Demolition During or Before FY 2015**

<b>Building Number</b>	<b>Building Name</b>	<b>Building Gross SQFT</b>	<b>Meter Serial Number</b>	<b>Scope of Work All existing are standard displacement types</b>	<b>FY 2008 Natural Gas Therms</b>	<b>Advanced Metering FY Plan</b>	<b>Planned Demolition Year</b>
004	Offices	10,176	LBL-NG-4	Install electronic head reader and extend signal to FMCS for trending	4,419	Not Economic	FY 2013
005	Laboratories & Research Offices	7,176	LBL-NG-5	Install electronic head reader and extend signal to FMCS for trending	2,422	Not Economic	FY 2013
014	Laboratory and Offices	4,201	LBL-NG-14	Install electronic head reader and extend signal to FMCS for trending	620	Not Economic	FY 2013
016	Laboratories and Research Offices	11,808	LBL-NG-16	Install electronic head reader and extend signal to FMCS for trending	7,435	Not Economic	FY 2013
017	Shop, Assembly & Offices	2,222	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B7	Not Economic	FY 2013
025	Labs, Shops & Offc (red-tagged)	20,303	LBL-NG-25T	Install electronic head reader and extend signal to FMCS for trending	8,909	Not Economic	FY 2013
040	Dry Lab, Assembly & Storage	993	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B48	Not Economic	FY 2013
044	Dry Lab, Assembly & Storage	805	LBL-NG-44	Install electronic head reader and extend signal to FMCS for trending	1,074	Not Economic	FY 2015
045	Fire Apparatus	3,342	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B48	Not Economic	FY 2013
048	Fire Station, Emerg. Operations Ctr.	6,622	LBL-NG-48	Install electronic head reader and extend signal to FMCS for trending	3,250	Not Economic	FY 2013
051	Former Bevatron (Demo Project Underway)	96,562	LBL-NG-51	Install electronic head reader and extend signal to FMCS for trending	970	Not Economic	FY 2013
			LBL-NG-51B	Install electronic head reader and extend signal to FMCS for trending	0	Not Economic	
052	Dry Laboratory & Offices	6,425	N/A	Install electronic head reader and extend signal to FMCS for trending	NG from B16	Not Economic	FY 2013
055	Laboratories and Research Offices	19,048	N/A	Install electronic head reader and extend signal to FMCS for trending	914	Not Economic	FY 2013
			LBL-NG-55	Install electronic head reader and extend signal to FMCS for trending		Not Economic	
056	Accelerator & Research Office	1,782	LBL-NG-56	Install electronic head reader and extend signal to FMCS for trending	4,776	Not Economic	FY 2013
064	Laboratories, Shops, Assembly & Offices	29,357	LBL-NG-64	Install electronic head reader and extend signal to FMCS for trending	29,471	Not Economic	FY 2013



**Sustainability Coordination  
ENGINEERING NOTE**

**NAME** BI Horst

**DATE** 28-Apr-09

**SUBJECT** **Advanced Natural Gas Metering Cost Effectiveness**

**SHEET** 1 of 1

Buildings to receive advanced natural Gas metering per EISA / DOE O 430.2B requirements and DOE-FEMP guidance are selected using an approach based on records of building natural gas consumption.

Advance Meter Installations based on Existing Annual Building Natural Gas Use Record building area. Minimum Annual Natural Gas Cost = \$50,000 (see calculations, below)

**Energy Savings due to Advanced Metering**

Energy savings captured from an advanced natural gas meter installation: 2.5%

DOE/EE-0312 stipulates a minimum cost savings realized of 2 percent. Because it is anticipated that sites will use the data for several purposes including cost allocation, time-of-use metering, and/or energy use diagnostics, energy savings exceeding 2.5 percent should be realized. Reference: DOE Buildings Electric Metering Guidance 9/27/2006, FEMP Document # 2006.100 Rev 0

**LBNL Natural Gas Cost**

\$0.850 / Therm per recent trends in gas pricing; lower than was used for ESPC project (\$1.13 / Therm)

**Economic Viability**

Advanced Natural Gas Meter installations must pay back installation costs within ten (10) years.

**Advance Meter Operations & Maintenance Costs**

Advanced meter and system operation and maintenance costs \$25 per month.

**MINIMUM ANNUAL BUILDING NATURAL GAS CONSUMPTION**

A threshold annual natural gas cost is determined for a building below which advanced metering cannot capture enough natural gas cost savings to recover the investment. It is assumed that installation costs must be recovered, paid back, within 10-years. Additionally, a \$25 per month O&M cost is expensed.

Minimum Annual Building Natural Gas Cost =

$$\{ (\text{Meter Installation Cost } \$9,500 \div 10 \text{ years}) + (\$25 \text{ per month O\&M} \times 12) \} \div 2.5\%$$

Advanced Meter Installation Cost: \$9,500 Threshold Natural Gas Cost: \$50,000  
or 58,824 Therms / Year  
**Say 50,000 Therms / Year**

**Meter Installations Cost**

Description	Labor	Material	Total
Electronic Meter Reading Head	\$800	\$300	\$1,100
Installation of By-Pass Piping	\$3,200	\$150	\$3,350
Conduit, Cabling and IT Connect	\$3,200	\$250	\$3,450
Subtotal			\$7,900
Internal Loads 20%			\$1,580
Natural Gas Meter Installation Cost			\$9,480
	<b>Rounded</b>		<b>\$9,500</b>