### Sustainable Real Estate Roundtable

**Member Briefing**

## Submetering

**WHY AND HOW ARE COMPANIES DEPLOYING SUBMETERS PORTFOLIO-WIDE TO MONITOR AND REDUCE RESOURCE CONSUMPTION?**

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Submetering

WHY AND HOW ARE COMPANIES DEPLOYING SUBMETERS PORTFOLIO-WIDE TO MONITOR AND REDUCE RESOURCE CONSUMPTION?

KEY TAKEAWAYS

Leading companies:

- Deploy submeters to track resource use in real time to better manage consumption and respond effectively to performance anomalies.
- Deploy submeters to influence occupant behavior by raising awareness of opportunities for resource efficiency.
- Optimize value added by prioritizing submeter installation in building systems and areas that have high consumption, low efficiency, and low installation costs.
- Integrate submeters with building management systems (BMS) to ensure increasingly intelligent, adaptive, and efficient resource management solutions.
- Consider submetering an essential tool for advanced benchmarking of resource consumption.
**Introduction**

SRER Members are more comprehensively and accurately managing resource consumption in their buildings through implementation of submeters. Sub-metered buildings are more likely than others to have lower utility consumption and costs, which translate into increased property values and lower total cost of operation. Based on SRER Member interest in submetering, this briefing examines the context in which companies decide to submeter their properties, and provides strategies for deciding how to submeter most effectively.

Submeters provide more granular consumption data than do meters, as they can monitor resource consumption at equipment, building system, or other sub-building levels (floor, business unit, etc.) rather than merely the campus or building as a whole. Multi-tenant building owners often install submeters to allocate consumption-based utility costs to unit leaseholders; tenants use submeters to more precisely track resource consumption at points of use, which helps identify savings opportunities. Because submetering directly ties billing costs to actual consumption, submeter installation typically reduces consumption of each submetered utility 15% to 25% in commercial buildings, and by 18% to 39% in multi-tenant residential properties.¹

Electricity and gas submetering became a widespread practice in the US during the 1970’s energy crisis, though such metering and submetering services have long been provided by utility companies. Historically, electricity and gas metering and submetering have been more common than have water metering or submetering. Increasing interest in water submetering follows rising water costs, which are due to growing scarcity and stricter wastewater treatment requirements in the federal Clean Water Act², and as municipal water suppliers increasingly adopt full-cost pricing plans.³

Note: SR Inc has no business relationship with submetering service providers. SR Inc recommendations are strictly vendor and solution neutral.

**Definitions**

Utility **metering** is the process of monitoring and recording the flow of a resource such as electricity, water, or natural gas. Most utility providers install meters on sites to record consumption for billing purposes. These revenue-grade meters are typically located at primary utility distribution points within facilities. Automatic Meter Reading (AMR) devices report data automatically to the utility’s database for analysis and billing, while other models require in-person meter reading. A **smart meter** collects data more frequently than once an hour and typically has wireless reporting capabilities as well.

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A meter located downstream from the primary meter, intended to monitor secondary circuits or piping loops serving a building, floor, zone, or apparatus, is known as a **submeter**. Submeters range from stand-alone devices that store consumption data locally for manual download to modules integrated with building management systems (BMS) to upload consumption data automatically at user-defined intervals. In the latter case, data can be used to determine how a building system or region is performing in real time.

**Motivation**

Leading companies submeter their properties for the following key reasons:

- What gets measured gets managed.
- Tenants wish to modify their lease from full-service to triple-net (NNN) for greater control and resource management visibility.
- Disputes arise regarding accuracy of common area management (CAM) costs.
- The causes of large increases in resource consumption as reflected in bills cannot be identified.
- Minor equipment malfunctions go unnoticed or unreported, causing major equipment or system failure.
- Full-time technical staff dedicated to gathering resource consumption manually is not cost-effective; the quality of data they record is often not sufficiently accurate.
- Energy reduction Key Performance Indicators (KPIs) are tied to metrics that are not being recorded accurately.
- Effectiveness of implemented energy conservation measures (ECMs) cannot be evaluated.
- Submetering data provides additional confidence in data sources used to estimate the enterprise carbon footprint.
- Inability to check accuracy of utility bills.
- Lack of clarity and transparency on quantitative data for KPIs related to operational and capital investments to improve operations.

**Process**

Submetering devices track consumption of practically all resources, including electricity, gas, water, compressed air, steam, and even sewer. Leading companies submeter most resources, prioritizing submeter installation for those with high cost and consumption—usually electricity, followed by gas and water. Leading companies adopt a step-by-step process for the deployment of submeters, as described below.
Establish Cost-Effective Threshold

Executives construct models to determine effective benefit-cost threshold values for submeter installation. One simple model suggested by the US Department of Energy uses an annual utility bill as the threshold. Higher bills usually present greater savings opportunities. This formula computes a threshold bill as a function of desired payback timeframe, installation cost, maintenance cost, and anticipated savings rate. Buildings or units with bills exceeding this threshold value are candidates for cost-effective submetering within the payback, savings, and other parameters. Figure 1 below illustrates the application of the DOE formula and a sample calculation for an electric bill.4

![Figure 1. Calculation procedure to estimate the minimum annual electric bill for a cost-effective meter installation.](source: US Department of Energy Report Guidance for Electric Metering in Federal Buildings, 2006.)

**Formula and sample calculation:**

\[
\text{Minimum Annual Electric Bill} = \left( \frac{\text{Installed Cost}}{\text{Desired Simple Payback}} + \text{Annual Cost} \right) \times \% \text{Annual Savings}
\]

\[
\text{Minimum Annual Electric Bill} = \left( \frac{(5,000)}{10 \text{ years}} + (25 \text{ per month} \times 12 \text{ months per year}) \times (0.02) \right) = 40,000
\]

The validity of threshold values depends on the accuracy of annual savings estimates. Robust estimation can be difficult; commercial real estate submeters in particular often yield savings from detecting system anomalies, which vary widely in scale even within comparable properties. The Department of Energy provides savings estimates for electricity metering in government buildings, summarized in Table 1. Two percent is considered a standard savings value attributed to metering, though savings from submetering are usually more significant. Table 1 demonstrates how efficacy ultimately derives as much from occupant education and engagement as from better management after physical installation.5

Companies frequently develop more complex models that incorporate customized and highly-informed assumptions, use discounted cash flow (DCF) techniques, or quantify non-monetary decision factors.

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4 [http://www1.eere.energy.gov/femp/pdfs/adv_metering.pdf](http://www1.eere.energy.gov/femp/pdfs/adv_metering.pdf)
5 [ibid.](ibid.)
Determine Installation Scope

Companies compare the energy bill of each building or unit to the established threshold, as described above. Units may be prioritized based on the anticipated cost-effectiveness of submeter installation. If no energy bill is available for a building or unit space, building managers may estimate the appropriate energy use intensity (EUI) from CBECS data and multiply by cost and floor area to obtain an approximate bill.⁶

Real estate executives then leverage data available from revenue-grade utility meters to identify exceptional utility consumption factors. Companies analyze smart meter interval data to find load abnormalities, an analysis which in turn helps identify low-hanging fruit to be targeted for maximal savings opportunities.

Companies install submeters according to different scales and uses:

- Buildings
- Floors
- Zones
- Business function
- Tenant space
- Equipment
- End use

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Table 1. Savings contributions from metering practices.

<table>
<thead>
<tr>
<th>Action</th>
<th>Observed Savings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Installation of meters</td>
<td>0 to 2% (the “Hawthorne effect”)</td>
</tr>
<tr>
<td>Bill allocation only</td>
<td>2-1/2 to 5% (improved awareness)</td>
</tr>
<tr>
<td>Building tune-up</td>
<td>5 to 15% (improved awareness, and identification of simple O&amp;M improvement)</td>
</tr>
<tr>
<td>Continuous Commissioning</td>
<td>15 to 45% (improved awareness, ID simple O&amp;M improvements, project accomplishment, and continuing management attention)</td>
</tr>
</tbody>
</table>

⁶ For useful benchmarks, see SRER Report on Benchmarking Real Estate Portfolio Sustainability, 2011.
Per FEMP analysis, there is a logical order, or hierarchy, to consider that maximizes metering investment value. This does not mean companies must necessarily install meters in this order if there are other determining factors, such as pilot projects or readily-identified high-consumption end-uses.

The logical order is illustrated in Figure 2, as a function of level of effort and diagnostic capability; beginning with the whole-building meter. The second level is at the electrical panel/sub-panel. Examples of panel-level monitoring include lighting panels or motor panels, where hours of operation or ECM results are of interest. The third is the circuit-level. The focus is the monitoring of a specific circuit, such as computers or other equipment. The final level, end-use, has the finest data resolution. End-use monitoring serves to isolate a particular system or equipment type for detailed study, such as chillers, boilers, cooling towers, pumps and motors.

SRER Members ING Clarion and Equity Office install submeters on every floor of certain buildings for tenant billing purposes. Other SRER Members such as Brookfield Properties and Intuit have buildings with central plants where every chiller and boiler is individually submetered to determine equipment demand and consumption. Installation by space type or end use allows a clear picture of specific use patterns to drive consumption; installation by business activity invites comparison and encourages informal competition to minimize resource consumption.

At their San Jose, CA headquarters, SRER Member Adobe has hundreds of submeters connected to their Intelligent Building Interface System (iBiS) to report consumption and performance real-time. These submeters provide a highly

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Figure 2. Metering implementation order or hierarchy.
accurate and granular picture of exactly how Adobe uses energy and water in facilities and additional verification means for the calculated enterprise carbon footprint. Adobe also displays energy use data publicly in real time to educate occupants about consumption patterns and raise awareness of demand response or other energy reduction efforts. This is accomplished with the IBIS Green Awareness Dashboard Module.8

In multi-tenant office buildings, submetering by tenant space reduces operating costs and disputes over CAM charges. A San Francisco building management firm confirmed a payback of just over five months for such an installation in two buildings that SRER Member IBM occupies.

**Target Major Sources of Consumption**

Regardless of the primary scale or function selected for submetering, companies frequently submeter individual appliances responsible for high consumption. In some cases, these pieces of equipment may already have an integrated submetering capability that can be used to track consumption.

Table 2 lists some major sources of consumption for gas, electricity, steam, and water. These pieces of equipment are often resource-intensive and thus warrant particular attention.

<table>
<thead>
<tr>
<th>Gas</th>
<th>Electricity</th>
<th>Steam</th>
<th>Water</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boilers</td>
<td>Lighting, interior and exterior</td>
<td>Humidifiers</td>
<td>Cooling towers</td>
</tr>
<tr>
<td>Water heaters</td>
<td>Chillers</td>
<td>Heat exchangers</td>
<td>RO filters</td>
</tr>
<tr>
<td>Chillers</td>
<td>Pumps</td>
<td>Chillers</td>
<td>Domestic fixtures</td>
</tr>
<tr>
<td>AHUs</td>
<td>Refrigerators</td>
<td>Cogeneration turbines</td>
<td>Irrigation</td>
</tr>
<tr>
<td>Furnaces</td>
<td>Fans</td>
<td></td>
<td>Humidification</td>
</tr>
<tr>
<td>Cogeneration turbines</td>
<td>Compressors</td>
<td></td>
<td>Scrubbers</td>
</tr>
<tr>
<td>Generators</td>
<td>DX units</td>
<td></td>
<td>Food services (prep and clean)</td>
</tr>
<tr>
<td>Food services (ovens)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Appliances disproportionately responsible for resource consumption. Source: SR Inc analysis.

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Determine Which Submeter Device to Use

Companies select industry-standard submeter types that provide data at the desired level of granularity. Table 3 below provides examples of submeter devices for electricity, water, gas, oil, sewer, and other flows. While the relatively high conductivity and heat capacity of tap water make electromagnetic and calorimetric meters particularly appropriate for water and sewer meters, liquids and gases in general share many properties and accordingly are measured with a similar array of devices.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Device</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>Current transducer/transmitter</td>
<td>Measures electrical current and generates proportional signal</td>
</tr>
<tr>
<td></td>
<td>Plug load monitor</td>
<td>Plugs into appliance and monitors electrical load</td>
</tr>
<tr>
<td>Fluid (water, gas, oil, sewer)</td>
<td>Ultrasonic flow meter</td>
<td>Measures current velocity using ultrasound</td>
</tr>
<tr>
<td></td>
<td>Electromagnetic flow meter*</td>
<td>Measures induced potential difference proportional to flow in conductive fluid</td>
</tr>
<tr>
<td></td>
<td>Coriolis meter</td>
<td>Measures mass flow by phase difference in vibrating displaced pipe section</td>
</tr>
<tr>
<td></td>
<td>Orifice meter</td>
<td>Measures pressure differential from cross-section reduction</td>
</tr>
<tr>
<td></td>
<td>Turbine meter</td>
<td>Measures current velocity by turbine rotation</td>
</tr>
<tr>
<td></td>
<td>Calorimetric meter*</td>
<td>Measures current velocity by temperature flow in slow-moving fluid</td>
</tr>
<tr>
<td></td>
<td>Rotary meter</td>
<td>Measures discrete mechanical units of displacement flow</td>
</tr>
<tr>
<td></td>
<td>Diaphragm meter</td>
<td>Measures discrete mechanical units of displacement flow</td>
</tr>
</tbody>
</table>

*not used for gas

Companies select specific models of a submeter type according to desired technical parameters such as sampling frequency, on-board memory, communications channels, alarms, controls, and software and web package compatibility. Companies consider the scalability, reliability, and affordability of features to be paramount. Key submetering features used in energy allocation or tenant billing applications are listed in Table 4, below.
Select Vendors and Services

Companies select vendors that provide the desired range of services and sub-metering solutions. Vendors usually offer several related services to secure scale and knowledge-domain benefits from vertical integration as well as services for different utilities to secure similar benefits from horizontal integration. Table 5 below lists representative companies that manufacture, install, monitor, or service submeters.
Collect Data

For each submetering solution, companies ensure adequate data management and reporting systems to capture submeter data. Data should be available in real time. It should also be securely stored for subsequent review and analysis. Companies verify that responsible personnel are both qualified and trained to use submeter data to inform decision making, and that these operators are assisted by additional engineering experts or consultants as necessary.

Companies collect data differently depending on the scale and integration of their submetering systems. Some submeters, such as those equipped with AMR, communicate resource consumption data to a utility or internal data-bank automatically; others require in-person collection. Automatic systems are frequently networked to collect data from all submeters associated with a particular meter and deliver the data to the database in a unified packet. Networks vary by traffic flow configuration, either delivering data passively from submeters to the central database or submitting data requests to submeters.

Table 5. Submeter manufacturers and service providers.
Source: Company websites noted below.

<table>
<thead>
<tr>
<th>Company</th>
<th>Service</th>
<th>Resource</th>
<th>Website</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emon</td>
<td>Manufacturing</td>
<td>Electricity</td>
<td><a href="http://www.emon.com">http://www.emon.com</a></td>
</tr>
<tr>
<td>Quadlogic</td>
<td>Manufacturing</td>
<td>Electricity</td>
<td><a href="http://www.quadlogic.com">http://www.quadlogic.com</a></td>
</tr>
<tr>
<td>Guardian Water &amp; Power*</td>
<td>Installation, reading</td>
<td>Electricity, water, gas</td>
<td><a href="http://guardianwp.com">http://guardianwp.com</a></td>
</tr>
<tr>
<td>Elster Group</td>
<td>Manufacturing</td>
<td>Electricity, water, gas</td>
<td><a href="http://www.elster.com">http://www.elster.com</a></td>
</tr>
<tr>
<td>Inovonics Wireless Corp.</td>
<td>Manufacturing</td>
<td>Wireless systems</td>
<td><a href="http://www.inovonics.com">http://www.inovonics.com</a></td>
</tr>
<tr>
<td>Aclara Tech</td>
<td>Manufacturing</td>
<td>Electricity, wireless systems</td>
<td><a href="http://www.aclaratech.com">http://www.aclaratech.com</a></td>
</tr>
<tr>
<td>Sensus Technologies, Inc.</td>
<td>Manufacturing</td>
<td>Electricity, water, gas</td>
<td><a href="http://www.sensus.com">http://www.sensus.com</a></td>
</tr>
<tr>
<td>Multifamily Utility Company*</td>
<td>Installation, billing</td>
<td>Electricity, water, gas</td>
<td><a href="http://www.multifamilyutility.com">http://www.multifamilyutility.com</a></td>
</tr>
<tr>
<td>Submeter One, LLC*</td>
<td>Reading, billing</td>
<td>Electricity</td>
<td><a href="http://www.submeterone.com">http://www.submeterone.com</a></td>
</tr>
<tr>
<td>National Exemption Service*</td>
<td>Installation, billing</td>
<td>Electricity, water, gas, sewer</td>
<td><a href="https://www.submeter.com">https://www.submeter.com</a></td>
</tr>
<tr>
<td>Submeter Solutions, Inc.</td>
<td>Installation, billing</td>
<td>Electricity, water, gas</td>
<td><a href="http://www.submetersolutions.com">http://www.submetersolutions.com</a></td>
</tr>
<tr>
<td>Water Watch Corp.*</td>
<td>Installation, billing</td>
<td>Electricity, water, gas, sewer</td>
<td><a href="http://www.waterwatchcorp.com">http://www.waterwatchcorp.com</a></td>
</tr>
<tr>
<td>MeterNet*</td>
<td>Billing</td>
<td>Electricity, water, gas, sewer</td>
<td><a href="http://meternetusa.com">http://meternetusa.com</a></td>
</tr>
<tr>
<td>Siemens</td>
<td>Manufacturing</td>
<td>Electricity, water, gas</td>
<td><a href="http://www.siemens.com">http://www.siemens.com</a></td>
</tr>
</tbody>
</table>

*primarily US
and also serving their replies. Figure 3 below provides an example of a two-way wired network; information requests from the central databank are delivered to each submeter, which then responds via network data packet.9

Figure 3. Hardwired submeter data collection system. Source: Quadlogic website.

Table 6. Advantages and disadvantages of wired and wireless networks. Source: SR Inc analysis.

<table>
<thead>
<tr>
<th></th>
<th>Advantages</th>
<th>Disadvantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wired</td>
<td>Simple maintenance; extremely reliable; fairly inexpensive</td>
<td>More time-consuming and labor-intensive installation; labor-intensive to scale</td>
</tr>
<tr>
<td>Wireless</td>
<td>Rapid installation; easy to scale or adjust</td>
<td>Maintenance may be intensive if battery-powered; signal may require boosting with repeaters or may be affected by weather or new construction; more expensive</td>
</tr>
</tbody>
</table>

9 http://www.quadlogic.com/submetering.html
Integrate with Existing Enterprise Systems

Companies integrate submetering systems with building management systems (BMS) to implement certain grades of advanced energy management systems (AEMS). AEMS is a paradigm in progressively intelligent, adaptive energy management at an increasingly sensitive and granular scale. An Adaptive Control AEMS, for instance, monitors point energy uses across a building or campus automatically, adjusting loads and issuing work orders to address abnormal consumption patterns. AEMS rely on granular data from point consumption and supply sources, processing and analyzing this data for display or automated work order processing using a BMS. Submetering to gather data at increasingly granular levels beyond the primary meter is an effective first step to implementing an AEMS. Accordingly, companies consider successful submetering an initial scalable investment compatible with a range of intelligent building resource management systems, ultimately incorporating monitors and responsive software solutions in addition to the original submetering network. (Refer to SRER Member Report Advanced Energy Management Systems, 2010, for more information.)

Incorporate into Benchmarking Efforts

Companies consider effective submetering strategies central to a comprehensive benchmarking effort using ENERGY STAR, and other benchmarks. As executives assess performance and establish baselines at a portfolio level, they recognize the benefits of a data-driven approach that incorporates submetering. Conversely, companies that already submeter find that benchmarking enables them to define tangible goals across the entire portfolio. (Refer to SRER Member Report Benchmarking Real Estate Portfolio Sustainability, 2011, for more information.)

Case Studies

SRER Members are actively engaged in submetering their properties as part of comprehensive sustainability initiatives. SRER Member Adobe’s initiative is summarized in the case study below. Links to additional case studies are included as well.

Adobe Towers

Adobe Towers, Adobe’s San Jose headquarters, consists of three high-rise office buildings totaling almost 1 million square feet. The facilities have been managed by Cushman & Wakefield since 1999. Adobe installed used real-time electric submeters in June 2004 at a cost of $19,969. In July 2005, the com-
pany located and corrected a longstanding chilled-water pump programming issue using the graphic display of electricity consumption. Fixing this error cost $1,200 and saved $43,000 in electricity per year.

In April 2005, Adobe installed real-time digital pulse meters to track water evaporation in cooling towers. Installation cost $43,000, while reduced sewer treatment charges save $12,000 per year.

In 2006, the company installed real-time meters for their irrigation system, accessible through a web-based central monitoring system. The $65,000 cost was recovered through the discovery and repair of a leaking valve, saving $70,000 per year in water and sewer treatment charges.

Based on the experience of Adobe and other companies, real estate executives recognize that they should monitor submeter data continuously in real time, display data graphically for immediate analysis, focus on major consumption points such as irrigation, and automate response processing.

Additional Case Studies

• Emon Case Study *Phoenix Plaza*
  Installed submeters in two 21-story office buildings housing 34 offices, a retail center, and a parking garage in Phoenix, AZ. Installation cost $75,000 and is expected to reduce operating costs by $.25 per square foot for annual savings of about $200,000.

• Emon Case Study *Park Plaza Condominiums*
  Mixed-use Pittsburgh, PA property installed 124 submeters costing $113,000 to allocate consumption expenses accurately to commercial and residential tenants. Electrical costs have been reduced by about $170,000 per year as a direct result.

• Emon Case Study *Grubb & Ellis Management Services*
  Implemented a scalable AMR submetering system in Windsor, CT. Submeters ensure fairer energy bills and examine load profiles. Savings derive from changes to operating practices.

• Siemens Case Study *Canary Wharf Real Estate Services Company*
  End-to-end submetering solution sought to monitor 250 meter points in Poplar, UK commercial building. AMR coverage raises tenant awareness of electricity and water consumed.
• Siemens Case Study *UK Banks and Financial Institutions*

Highly accurate billing metrics required for banks. Submetering provides necessary granularity to break down consumption and cost data across branches and offices. Allows energy benchmarking at actionable level.  
http://www.siemensenergy.co.uk/pg.asp?p=finance

**Barriers to Adoption**

Real estate executives find several barriers to adopting submetering portfolio-wide. Common barriers and solutions are listed below for legal, technical, tenant-relations, and financial barriers.

**Legal**

There are no federal or state laws against submetering, but its legality varies among municipalities and regions. Some regions actively mandate the use of submetering for certain utilities or property types, while others require that property owners who institute submetering systems register as a utility provider, a costly and resource-intensive process.

**Solution**

Companies evaluate regional requirements, best-practices and optimal financing conditions.

**Financial**

Sometimes companies find full-scale submetering deployment not financially feasible, at least in the short-term. One less capital-intensive alternative to submetering, similarly deployed to encourage a greater awareness of resource consumption, is using some form of Ratio Utility Billing System (RUBS). RUBS partitions total metered consumption of a resource among tenants or subunits according to a pre-established ratio, taking into account quantified factors such as floor area, occupancy, outlets, or faucets. This helps to resolve common problems with inaccurate apportionment of CAM charges. However, RUBS may not always improve cost equity over an even distribution of utilities costs, and with a typical consumption decrease of 6-27%, it is not typically as successful as submetering.10

**Solution**

Companies deploy submetering and RUBS in parallel when a hybrid solution is most effective. Optimized strategies of this type rely on granular accounting methods for higher-consumption or higher-variation sources and extrapolation.

10 http://nreonline.com/property/multifamily/lowering_utility_costs/index.html
tive methods for lower-consumption sources. This hybrid strategy boosts overall precision of information from that of non-submetered property at a fraction of the comprehensive-submetering strategy cost.

Technical
In buildings predating the 1980s, it can be prohibitively difficult to install submeters due to circuit or plumbing design.

Solution
Companies prioritize submetering opportunities across their portfolio, targeting buildings and regions with high resource consumption and low installation costs. Older buildings frequently yield considerable savings opportunities via audits, retrocommissioning, and system upgrades at equipment end-of-life. Companies also include language in leases that provides for submeter installation during TI, as well as roles and responsibilities in regard to the data.

Tenant Relations
Tenants are sometimes initially less-receptive to a utility cost share based on submetered data than by simple even distribution or by RUBS; utility data from submetering are often more technical and complex, so tenants may be concerned that their costs do not reflect their actual consumption. This concern may arise even in cases where the tenants are different departments of the same company.

Tenants may also be concerned that their leased unit may have poor insulation or other inefficiencies falling under the building manager’s responsibility, resulting in submetered billing unjustly higher than that of their neighbors. Building managers should be prepared to address inefficiency concerns and in some cases share financial responsibility for submetered properties where structural inefficiency may be a significant factor.

Solution
Companies direct building managers to involve and educate tenants when adopting a submetering solution. They stress that the related behavior change is one of the most important components of a successful submetering project. Companies track both actual and modeled consumption to normalize against systemic structural deficiencies. Leases are written so that landlords must install submeters at a date certain where these are not already installed.
SR Inc recommends the following scalable strategies for creating a comprehensive submetering plan:

- Seek C-level support based on a robust business case in order to secure adequate resources.
- Tailor the business case for the audience, foregrounding different drivers and outcomes for the Chief Financial and Chief Sustainability Officers.
- Engage the local utility company early to secure free or low cost technical assistance, including audits, and financial incentives.
- Before installing submeters, use utility-grade smart meters to collect interval data. Perform detailed analytics on primary-meter demand to gauge consumption patterns and probe for system anomalies.
- Target buildings or regions that have high consumption, low efficiency, and low installation costs to maximize returns.
- Prioritize submeter deployment by (1) panel or sub-panel; (2) circuit, and (3) end use.
- Install submeter and publish consumption data based on business function to raise awareness and drive occupant conservation efforts.
- Ensure availability of robust data management, reporting, and analytical systems to inform decision-making.

### Resources

The following resources are suggested to assist SRER Members in crafting an effective submetering strategy in conjunction with broader sustainability and value creation goals.


SR Inc Authors: John Mussman (Sustainability Fellow), Irina Mladenova (VP Research & Consulting), Michael Gresty (VP Research & Consulting)

Members should contact SR Inc with any questions or comments. Members who have submetering best practices that they wish to share with others are encouraged to do so for inclusion in future updates of this briefing.