Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Data

A RESOURCE OF THE NATIONAL ACTION PLAN FOR ENERGY EFFICIENCY

NOVEMBER 2008

About This Document

This document, *Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Data,* presents the major findings of an important year three activity of the National Action Plan for Energy Efficiency. The Action Plan Sector Collaborative identified the need for this guidance during a June 2007 workshop that included representatives from commercial real estate, grocery, hospitality, retail, and municipal sectors. An Action Plan Work Group helped define the vision for this report and guided its development.

This document outlines the need to align utility practices for providing customers with energy use and cost data with both increasing customer needs and state and local government policy initiatives. In doing so, utilities can meet customers' requirements on a consistent basis nationwide. Gas and electric utilities and utility regulators can use this guidance to understand the benefits and challenges of increasing customer access to their energy consumption and cost data in a standardized format. This guidance summarizes current data practices, outlines the business and policy cases for action, and presents both basic and advanced approaches for providing consistent, standardized electronic energy consumption and cost data to business customers, as well as the key considerations when implementing these approaches.

The primary intended audiences for this report are gas and electric utilities and utility regulators.

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The Leadership Group of the National Action Plan for Energy Efficiency is committed to taking action to increase investment in cost-effective energy efficiency. *Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Data* was developed under the guidance of and with input from the Leadership Group. The document does not necessarily represent a consensus view and does not represent an endorsement by the organizations of Leadership Group members.

Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Data is a product of the National Action Plan for Energy Efficiency and does not reflect the views, policies, or otherwise of the federal government. The role of the U.S. Department of Energy and U.S. Environmental Protection Agency is limited to facilitation of the Action Plan.

If this document is referenced, it should be cited as:

National Action Plan for Energy Efficiency (2008). *Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Data*. ICF International. <www.epa.gov/eeactionplan>

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Table of Contents

List of Figures

List of Tables

List of Abbreviations and Acronyms

AMI	advanced metering infrastructure
ANSI	American National Standards Institute
CIS	customer information system
ComEd	Commonwealth Edison
DOE	U.S. Department of Energy
EDI	Electronic Data Interchange
EM&V	evaluation, measurement, and verification
EPA	U.S. Environmental Protection Agency
FERC	Federal Energy Regulatory Commission
HVAC	heating, ventilation, and air conditioning
IOU	investor-owned utility
NAESB	North American Energy Standards Board
PG&E	Pacific Gas and Electric
SDG&E	San Diego Gas and Electric

Acknowledgements

This guidance document is a resource of the National Action Plan for Energy Efficiency. In addition to review and comment by industry participants and experts, this report was prepared with the valuable input of an Action Plan Work Group. Work Group members include:

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- Steve Kiesner and Seda Atam, Edison Electric Institute
- Ed Schlect, Advantage IQ
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Bill Prindle and Peter Flippen of ICF International served as the primary authors of the report, under contract to the U.S. Environmental Protection Agency (EPA). Jennifer Peyser and Dana Goodson of RESOLVE provided facilitation for the Work Group. Alison Silverstein of Alison Silverstein Consulting provided her expertise during review and editing of the report.

EPA and the U.S. Department of Energy (DOE) facilitate the National Action Plan for Energy Efficiency. Key staff include Larry Mansueti (DOE Office of Electricity Delivery and Energy Reliability), Dan Beckley (DOE Office of Energy Efficiency and Renewable Energy), and Kathleen Hogan, Cindy Jacobs, Tracy Narel, and Stacy Angel (EPA Climate Protection Partnerships Division).

Eastern Research Group, Inc., provided technical review, copyediting, graphics, and production services for this report.

Executive Summary

This paper, Utility Best Practices Guidance for Providing Business Customers with Energy Use and Cost Data, informs utility efforts to improve availability of consistent, standardized energy consumption and cost data to remove a key barrier to new gains in energy efficiency in commercial and institutional buildings. This barrier was identified by the Sector Collaborative on Energy Efficiency participants, including representatives from the commercial real estate, hospitality, grocery, retail, and municipal sectors. The document is provided to assist organizations in meeting the 10 implementation goals of the National Action Plan for Energy Efficiency's Vision to achieve all cost-effective energy efficiency by 2025

Improving energy efficiency in our homes, businesses, schools, governments, and industries—which consume more than 70 percent of the natural gas and electricity used in the country—is one of the most constructive, cost-effective ways to address the challenges of high energy prices, energy security and independence, air pollution, and global climate change. Despite these benefits and the success of energy efficiency programs in some regions of the country, energy efficiency remains critically underutilized in the nation's energy portfolio. It is time to take advantage of more than two decades of experience with successful energy efficiency programs, broaden and expand these efforts, and capture the savings that energy efficiency offers. Providing customers with consistent energy use and cost information is key to establishing the policy and program framework to capture these benefits.

This paper has been developed to help parties pursue the key policy recommendations and implementation goals of the National Action Plan for Energy Efficiency. The Action Plan was released in July 2006 as a call to action to bring diverse stakeholders together at the national, regional, state, or utility level, as appropriate, and foster the discussions, decision-making, and commitments necessary to take investment in energy efficiency to a new level. This paper directly supports the National Action Plan's Vision for 2025 implementation goal eight, which encourages utilities to establish state of the art billing systems. This goal highlights the need for utilities to work with customers to develop methods of supplying consistent energy use and cost information across states, service territories, and the nation.

Both utility customers and government bodies have identified enhanced, consistent access to energy data as a critical component of improved energy management. Commercial and institutional organizations incorporating these data into their energy management strategies are reducing their energy use cost-effectively by as much as 30 percent or more. Improved data practices can drive a new wave of commercial building energy benchmarking and subsequent investments in energy efficiency and demand reduction. Commercial building owners need access to energy data to set sound energy management goals, identify cost-effective energy efficiency measures, target investments, and generally improve overall operations. While these utility customers have expressed interest in better data access for some time, today's converging trends of rising energy prices, the rollout of "smart grid" technologies, and the proliferation of benchmarking and related energy management initiatives make this guidance particularly timely.

This best practices guidance document summarizes the context, current state of utility practices, and the business and policy cases for action, listed in Table ES-1. Drawing upon utility experiences, interviews, and literature research, this document presents a specific set of best

practice recommendations and implementation considerations, as well as a review of recommended practices and standards for electronic billing transactions from the North American Energy Standards Board (NAESB).

Table ES-1. The Business and Policy Case for Enhanced Data Access

The Business Case for Customers
▪ Empowers the customer to benchmark and analyze data, set improvement goals for energy efficiency and demand reduction, and reduce energy use. ▪ Reduced staff hours dedicated to data collection. ▪ Reduced fees for obtaining required data. ▪ Increased information transparency.
The Business Case for Utilities
▪ Improved customer relations and satisfaction. ▪ Demand reductions from better customer energy management. ▪ Lower costs for customer efficiency programs. ▪ Better basis for measurement and verification for efficiency programs. ▪ Better baseline data sources for demand response.
The Policy Case for Regulators
▪ Improved basis for measuring progress toward efficiency goals. ▪ Reduced utility program costs and rate impacts. ▪ Expanded public benefits of advanced metering and smart grid investments.

The review of current practices uncovered limitations that business customers experience in seeking access to energy data. Utilities and regulators must address these limitations in order to facilitate greater investment in cost-effective energy efficiency:

- Utility fees for data provision.
- Cumbersome utility data release processes.
- Lack of consolidated account access across a utility's service territory.
- Varied standards for electronic billing and payment across states and utility service areas.
- Varied access to historical and downloadable data.

This document presents two tiers of best practices guidance to address these issues. These tiers emerged from an assessment of the range of practices and capabilities in place today and available in the near future. Tier 1 seeks to establish a minimum threshold that most utilities can implement today; Tier 2 comprises a more advanced set of practices that most utilities could implement in the near future. More specifically:

- **Tier 1** describes practices that the large majority of utilities could reasonably implement. Access to twelve months of historical and ongoing monthly electronic data without explicit fees is the main focus of Tier 1.

- **Tier 2** describes practices for those utilities in a position to make additional investments in the necessary information technology and support systems to provide additional data and services. Tier 2 stipulates adoption of the NAESB standard for electronic billing transactions and covers access to interval data.

Table ES-2 outlines the recommended data elements for each tier. The table also lists options for making data available to business customers and examples of utilities that implement these practices today.

Utilities and regulators will need to address a number of issues as they proceed to implement the best practices presented in this guidance. These issues include customer information system functionality, customer privacy and security issues, cost recovery policies, smart meter deployment, and standardization of electronic transmissions. This guidance also summarizes and provides recommendations for addressing these implementation issues.

Utilities, commissions, customers, and other stakeholders are encouraged to implement or otherwise advance these best practice tiers to expand energy efficiency opportunities. Specifically:

- Utilities can invest in the development of best practice data access, including the software and other resources needed to enable these practices in the most cost-effective manner possible.

- Regulators can use the policy and business cases that accompany the guidance to review and approve utilities' cost-effective investments in best practices.

- Customers can commit to using enhanced data for energy management, and support the approval of cost-effective utility programs containing these features.

- Standards development organizations can develop protocols for data uploads to benchmarking and other energy management software tools.

Widespread implementation of the best practices summarized in Table ES-2 would allow business customers to better target their investments and tap into more of the cost-effective, commercial sector energy efficiency resources. Reinforcing the need for such practices, several state and local governments have recently enacted or are considering requirements for building owner disclosure of energy information that will increase demand for greater data access. In some cases, the mandates have required advancements in how utilities provide data to customers.

Table ES-2. Best Practices Guidance Summary

		Data Elements/Availability Practices	Utility Examples
Tier 1	Data elements	▪ Most recent 12 months of cost, consumption, and demand data with ongoing monthly access	Ameren, National Grid, NSTAR, Pacific Gas and Electric (PG&E), San Diego Gas and Electric (SDG&E)
	Data availability practices	▪ Providing electronic access to Tier 1 data as comma-separated values or spreadsheet files	NSTAR
		▪ Providing access to data without explicit customer fees	SDG&E
		▪ Addressing data security concerns	50 percent of utilities provide secure access to bills online
		▪ Offering data electronically, even if customers do not pay bills electronically	Ameren, ComEd, National Grid, PG&E
Tier 2	Data elements	▪ Tier 1 data, interval meter data, and electronic billing in accordance with the North American Energy Standards Board's (NAESB's) R05016 final action	Xcel Energy, PacifiCorp
	Data availability practices	▪ Automatic distribution of or access to monthly data	All California investor-owned utilities (IOUs)
		▪ Developing consolidated electronic billing and account access for multi-site customers	Santee Cooper, Southern Company
		▪ Providing automated electronic access to data by the customer's billing or benchmarking system	One-third of large utilities provide Electronic Data Interchange services
		▪ Developing streamlined security processes	All California IOUs
		▪ Provision of energy management software with interval data and load profiles	Commonwealth Edison, SDG&E, Southern Company
		▪ Encouraging customer use of data for benchmarking and tracking	MidAmerican, National Grid, NSTAR, We Energies, Xcel Energy
		▪ Supporting standards development processes for electronic billing and payment	NAESB members

1: Introduction

Improving the energy efficiency of homes, businesses, schools, governments, and industries—which consume more than 70 percent of the natural gas and electricity used in the United States—is one of the most constructive, cost-effective ways to address the challenges of high energy prices, energy security and independence, air pollution, and global climate change. Mining this efficiency could help us meet on the order of 50 percent or more of the expected growth in U.S. consumption of electricity and natural gas in the coming decades, yielding many billions of dollars in saved energy bills and avoiding significant emissions of greenhouse gases and other air pollutants.[1]

Recognizing this large opportunity, more than 60 leading organizations representing diverse stakeholders from across the country joined together to develop the National Action Plan for Energy Efficiency. The Action Plan identifies many of the key barriers contributing to underinvestment in energy efficiency; outlines five policy recommendations for achieving all cost-effective energy efficiency; and offers a wealth of resources and tools for parties to advance these recommendations, including a Vision for 2025. As of November 2008, over 120 organizations have endorsed the Action Plan recommendations and made public commitments to implement them in their areas. Supplying energy use and cost information to customers is key to making the Action Plan a reality.

1.1 About this Document

This guidance provides an overview of current utility data practices, makes the case for increasing customer access to energy and cost data, and offers guidance for providing these data. The guidance is defined in two tiers to best serve the needs of the utility industry because utility operations vary depending upon their size, regulatory environment, and customer needs.

- **Tier 1** is aimed at providing access to 12 months of historical energy data, with ongoing monthly updates, in a standard electronic format.

- **Tier 2** expands these practices to include a more complete set of data used in billing, interval data, additional electronic transfer methods, and other customer-friendly practices.

In providing access to 12 months of customer data, Tier 1 practices will benefit all customers from the smallest to the largest through the standardization of formats and data practices. Tier 2 practices will provide additional benefits to customers with more demanding data needs, as well as larger customers that operate multiple facilities across utility service territories. Table 1-1 provides a summary of these two tiers of guidance, along with examples of utilities that are already implementing some of the best practices.

Table 1-1. Best Practices Guidance Summary

		Data Elements/Availability Practices	Utility Examples
Tier 1	Data elements	▪ Most recent 12 months of cost, consumption, and demand data with ongoing monthly access	Ameren, National Grid, NSTAR, Pacific Gas and Electric (PG&E), San Diego Gas and Electric (SDG&E)
	Data availability practices	▪ Providing electronic access to Tier 1 data as comma-separated values or spreadsheet files	NSTAR
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		▪ Addressing data security concerns	50 percent of utilities provide secure access to bills online
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Tier 2	Data elements	▪ Tier 1 data, interval meter data, and electronic billing in accordance with the North American Energy Standards Board's (NAESB's) R05016 final action	Xcel Energy, PacifiCorp
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		▪ Provision of energy management software with interval data and load profiles	Commonwealth Edison, SDG&E, Southern Company
		▪ Encouraging customer use of data for benchmarking and tracking	MidAmerican, National Grid, NSTAR, We Energies, Xcel Energy
		▪ Supporting standards development processes for electronic billing and payment	NAESB members

At the Action Plan Sector Collaborative Workshop in June 2007, energy management experts from commercial real estate, hospitality, grocery, retail, and municipalities identified current limits to data access as a key barrier to increasing building energy efficiency. Participants agreed that greater access to more consistent historical and ongoing data will better enable business customers to set and track energy management goals, benchmark building energy performance, and choose effective investments for lower-performing buildings.

Based upon this input, the Action Plan Leadership Group (see Appendix A) approved a project to develop best practices guidance for customer access to energy data across utility service territories on a consistent, standardized basis. This effort supports the *National Action Plan for Energy Efficiency Vision for 2025: A Framework for Change*. This Vision establishes a long-term aspirational goal to achieve all cost-effective energy efficiency by 2025 and outlines 10 goals for implementing the Leadership Group's recommendations (see Figure 1-1). This document directly supports the Vision's eighth implementation goal which encourages states and key stakeholders to establish state of the art billing systems. This goal encourages utilities to work with customers to develop methods of supplying consistent energy use and cost information across states, service territories, and the nation.

Figure 1-1. Ten Implementation Goals of the *National Action Plan for Energy Efficiency Vision for 2025: A Framework for Change*

Goal One:	Establishing Cost-Effective Energy Efficiency as a High-Priority
Goal Two:	Developing Processes to Align Utility and Other Program Administrator Incentives Such That Efficiency and Supply Resources Are on a Level Playing Field
Goal Three:	Establishing Cost-Effectiveness Tests
Goal Four:	Establishing Evaluation, Measurement, and Verification Mechanisms
Goal Five:	Establishing Effective Energy Efficiency Delivery Mechanisms
Goal Six:	Developing State Policies to Ensure Robust Energy Efficiency Practices
Goal Seven:	Aligning Customer Pricing and Incentives to Encourage Investment in Energy Efficiency
Goal Eight:	Establishing State of the Art Billing Systems
Goal Nine:	Implementing State of the Art Efficiency Information Sharing and Delivery Systems
Goal Ten:	Implementing Advanced Technologies

1.2 Structure of this Document

This guidance document is organized in three main sections:

- **Chapter 2: Overview of Current Utility Data Practices.** This section provides background on existing data practices and efforts to define standards for electronic utility billing transactions.

- **Chapter 3: The Case for Increasing Customer Access to Energy Use and Cost Data.** This section summarizes the value of data as a driver for energy efficiency improvements in commercial buildings and the "bottom line" business and policy cases for moving forward in this area.

- **Chapter 4: Best Practices Guidance.** This section lays out guidance for best practices for providing customers with enhanced access to their energy use and cost data. It proposes and details two tiers of data availability to help utilities clarify the data formats and other issues involved in meeting basic and advanced customer needs. The section closes with a review of key considerations when implementing the best practices.

1.3 Development of this Document

This document is a product of the Year Three Work Plan of the National Action Plan for Energy Efficiency. In addition to direction and comment by the Action Plan Leadership Group (see Appendix A for a list of group members), the document was developed under the guidance of a Work Group composed of several organizations, representing various stakeholder perspectives. The group discussed the initial outline and approach, offered content in their areas of expertise, and provided feedback on drafts of the report. Bill Prindle and Peter Flippen of ICF International served as the primary authors of the report, under contract to the U.S. Environmental Protection Agency (EPA).

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1.4 Notes

[1] See the *National Action Plan for Energy Efficiency Vision for 2025: A Framework for Change* (National Action Plan for Energy Efficiency, 2008a).

2: Overview of Current Utility Data Practices

This section provides background on utility practices used in the marketplace today and current North American Energy Standards Board (NAESB) efforts to create standards for electronic billing transactions. This section draws on interviews with utilities, end-users, software providers, meter manufacturers, regulators, and energy service companies, supplemented with document and Internet reviews.

2.1 Current Utility Practices

Many utilities offer improved access to energy data. This is happening in a number of ways. In some cases it is through a move to electronic billing practices. In other cases, it is through a move to offer services that enhance energy management and benchmark the efficiency of commercial buildings. Each of these cases is discussed below.

2.1.1 Billing Practices

Utility billing departments' main purpose is to process data to calculate monthly charges. One fast-growing practice is to allow customers access to billing data through online customer accounts. After setting up an account with the utility, the customer can view and pay bills online. Data provided from online accounts focus on the current month, with some provisions made for historical data; best practice is to provide the previous 12 months of consumption and cost data. If historical data are provided, they are sometimes provided as viewable on a Web page or downloadable as a spreadsheet.

While these billing practices are gaining currency among utilities, there continue to be important limitations on customers' access to their data:

- Only 50 percent of utilities provide customers with online bill presentment and payment. Larger utilities are more likely to offer the service: 81 percent of utilities with over 100,000 customers offer online bill payment (Perdue, 2008).

- Even if data are viewable online, manual transfer may be necessary to convert the data to an electronic format for customer use.

- A customer with multiple facilities in a single utility service area may have to set up separate account logins to access data for each individual facility.

- A customer may still find it difficult to access data from an earlier payment period and easily create an historical picture of their energy use.

Best practice billing options include consolidated online accounts, summary billing, and access to data, including at least 12 prior months, in downloadable formats:

- **Pacific Gas and Electric (PG&E), Ameren, Santee Cooper, NSTAR, and National Grid** provide good examples of consolidated online account access. Business customers with online access to their billing can view two or more accounts together under one username and password for free (Ameren, 2008; National Grid, 2008; NSTAR, 2007; PG&E, 2008; Santee Cooper, 2008).

- **Southern Company** provides a summary billing program, allowing any business customer with 10 or more accounts to receive an electronic summary bill for all their accounts across all of Southern Company's five operating companies: **Alabama Power, Georgia Power, Gulf Power, Mississippi Power, and Savannah Electric.** The program is free and provides historical data that can be downloaded and viewed in Excel.

Electronic Data Interchange (EDI) is an automated electronic billing option that is viewed as a best practice for utilities. About a third of the larger utilities use this process to enable automated electronic bills for customers and electronic payments from customers (Schlect, 2007). EDI can be used as another form of summary billing, since customers are able to receive bills for multiple accounts in this format. Because utility use of EDI has focused on bill presentment and payment transactions, typically only 1 month of data is provided. Over time a customer using EDI will accumulate 12 months of data, but generally EDI is not used to provide historical data. It is also widely recognized that EDI is best suited for situations involving a large number of recurring transactions. The costs of implementing EDI for data transfer limit its use for business customers with limited data transaction needs. Unfortunately, even for those customers with sufficient data requirements, a lack of standardization hinders its use. EDI formats are not uniform, forcing end-users who operate across multiple utility territories to adjust their EDI systems to interface with different utilities. This creates a costly and complex electronic bill processing software and management effort for large companies, which represents the main barrier to wider adoption of EDI. It is expected that more widespread adoption of NAESB's *Retail Final Action R05016—Customer Billing and Payment Notification via Uniform Electronic Transactions Model Business Practices* (reviewed in Section 2.2) will result in further standardization. **Xcel Energy** and **PacifiCorp** are examples of utilities that have implemented the NAESB business practices.

2.1.2 Energy Efficiency Practices

Some utilities provide customers with electronic data in software programs used to promote the use of energy data for energy management. These software packages typically allow customers to download historical data, analyze interval data, create load profiles, and produce reports. The two main limitations for access to data through utility software programs are that (1) utilities have tended to make them available only to larger customers and (2) utilities providing this service have often provided it at an added cost to the customer.

As a best practice example, **San Diego Gas and Electric (SDG&E)** offers its online Energy Waves software to all customers with an optional time of use meter for free. All customers can view up to 17 months of historical consumption, graph their usage, and download data for further analysis. Additionally, customers with a time of use meter can view historical 15-minute interval data. Customers can also consolidate access to multiple accounts with one username and password. While many software programs offer these features, SDG&E offers Energy Waves at no explicit cost to all customers. SDG&E goes one step further for customers with smart meters that enable more immediate availability of data for analysis. SDG&E offers these customers its kWickview software. kWickview is available for free, has all the same features as Energy Waves, and also allows customers to download 15-minute interval data the next morning (SDG&E, 2008).

Southern Company and **Commonwealth Edison (ComEd)** also exemplify best practices for energy management software. Southern Company offers the EnergyDirect.com energy management package to business customers. This Internet-based software has several levels

of subscription. The first level—which is free—offers customers basic and detailed billing information, usage graphs, real-time pricing information with pricing alerts, and the ability to download information. As a part of its recent demand-side management filing, ComEd moved from charging customers for its Energy Insights Online software to offering it to all customers with an interval meter for free. The software provides access to interval data at half-hour increments, advanced graphing features including load profiling, and the ability to download daily and monthly usage reports.

2.1.3 Benchmarking Practices

A newer practice for utilities is providing data with the express purpose of enabling customer benchmarking. A key barrier to widespread use of energy benchmarking programs is manual data entry. Building owners often enter utility data manually into their own accounting or energy management databases and may be reluctant to re-enter this data in another system. Utilities are reducing this barrier by providing the energy data required by their customers for benchmarking. EPA's Portfolio Manager is the most widely used tool; a number of utilities have programs to provide 12 months of data to help customers use this tool. Those utilities include **ComEd, MidAmerican, National Grid, NSTAR, PG&E, SDG&E, Sacramento Municipal Utility District**, **Southern California Edison, We Energies,** and **Xcel Energy.**

One best practice example of reducing the data entry burden on customers is **ComEd's Energy Usage Data Tool,** which allows a customer to query ComEd's customer information system based on a building address and data ranges in order to receive electronic historical energy data for an entire building. ComEd developed this tool in response to demand from customer facility managers wanting to use EPA's Portfolio Manager.[1] The tool is designed to give facility managers access to data for benchmarking buildings that have multiple tenants with their own individual ComEd accounts.

An advanced best practice solution to the manual data entry barrier is the automated transfer of data directly into the benchmarking system. Many California utilities are taking this approach in response to executive and legislative mandates to facilitate customer benchmarking through EPA's Portfolio Manager tool. To meet these mandates efficiently, many utilities are choosing to enable the direct electronic transfer of 12 months of historical consumption data into EPA's Portfolio Manager benchmarking tool. **PG&E, Southern California Edison, Southern California Gas, SDG&E, and Sacramento Municipal Utility District** have already successfully transmitted data to Portfolio Manager. With an eye toward adapting the California approach, ComEd's near-term goal is to upgrade its data retrieval tool to automatically import data for benchmarking directly into EPA's Portfolio Manager.

Table 2-1 summarizes the practices, barriers, and best practice examples outlined in this section.

Table 2-1. Current Utility Data Availability Practices Summary

Category	Current Practices	Best Practices	Best Practice Examples
Billing	Online bill payment	▪ Online account access ▪ Data download functionality ▪ Consolidated account log-ins	▪ PG&E, Ameren, Santee Cooper, NSTAR, and National Grid online account access ▪ Southern Company summary billing
	Electronic Data Interchange (EDI)	▪ EDI capabilities	▪ NAESB's R05016 Model Business Practices
Energy efficiency	Energy software	▪ Available to all customers ▪ Provided for free or at subsidized cost	▪ SDG&E's Energy Waves and kWickview Software ▪ Southern Company's EnergyDirect.com ▪ ComEd's Energy Insights Online
Benchmarking	Data provided for benchmarking	▪ Electronic data provision for benchmarking	▪ ComEd data retrieval ▪ California IOUs automated benchmarking

2.2 North America Energy Standards Board Efforts as Foundation for Data Practices

NAESB has begun to address the issues of data consistency and format, and has developed recommended model business practices for utilities with respect to electronic billing transactions. The specific NAESB Retail Final Action addressing this issue is *R05016—Customer Billing and Payment Notification via Uniform Electronic Transactions Model Business Practices*. Although NAESB traditionally produces standards for market participants in competitive markets, the board developed this standard for customer data transactions as the result of a specific request from Wal-Mart. In June of 2005, Wal-Mart requested the development of what would become R05016 to provide greater standardization of EDI billing transactions.

The model practices in R05016 provide needed improvements to standardization for electronic billing transactions. The Action Plan best practices guidance builds upon this standard, with specific recommendations that facilitate energy benchmarking and other energy management practices by:

- Stipulating access to at least 12 months of historical consumption, demand, and cost (R05016 focuses on single-month data transfer).

- Emphasizing national industry standard format for electronic access to data for the large number of customers who do not pay bills electronically.
- Laying out the elements of the business/policy case for both utilities and regulators.

2.3 Notes

[1] EPA's Portfolio Manager benchmarking tool provides energy performance ratings for various types of commercial buildings. See <http://www.energystar.gov/benchmark> for more information.

3: The Case for Increasing Customer Access to Energy Use and Cost Data

This section provides background on the need for this guidance, the benefits for commercial building customers, the business and policy case for utilities and regulators, and a review of state and local initiatives related to increasing data access.

3.1 Enabling Energy Management in Commercial Buildings

The need for this guidance evolved primarily out of customer requests; their case for improved data access is driven by growing interest in the cost savings and environmental benefits of energy efficiency in commercial buildings. Case studies from Action Plan's Sector Collaborative on Energy Efficiency participants underscore the need for best practice guidance.[1]

3.1.1 Data as a Driver for Energy Efficiency

Providing greater access to consistent energy consumption and cost data will enable key energy management actions identified by Sector Collaborative participants as critical to guiding cost-effective improvements in commercial and institutional buildings. By adopting energy management best practices, businesses can reduce their energy use significantly, by up to 30 percent or more. These practices include assessing energy performance, setting energy savings goals, and regularly evaluating progress, all of which require ongoing access to consistent data. Use of continuous energy benchmarking is growing among commercial and industrial building owners and managers, and the results experienced by companies such as USAA Real Estate are compelling:

> "The experiences of USAA Real Estate Co., an organization with buildings across the country, illustrate how benchmarking can inform the whole energy management process: Until USAA Real Estate benchmarked its holdings, the company's management believed its portfolio of buildings to be highly energy-efficient. However, initial results indicated that there was room for improvement. The company went on to benchmark 100 percent of its space. That effort, in turn, led to changes in energy management practices and building upgrades that resulted in more than $10 million in energy savings over a five-year period through 2007. USAA Real Estate was named an EPA ENERGY STAR® Partner of the Year every year from 2003 through 2007." (EPA, 2007a)

Dozens of additional organizations have earned EPA recognition as ENERGY STAR Leaders by benchmarking all of their buildings and demonstrating efficiency gains of 10, 20, and 30 percent across their portfolios. Examples include Gresham-Barlow School District in Oregon, which improved the efficiency of its 19 K–12 schools by 30 percent, and New York Presbyterian Hospital, which achieved a 10 percent portfolio-wide improvement across its four hospital campuses, including the university hospitals of Columbia and Cornell.[2] Easier access to consistent energy data for business customers builds an important foundation for successes like this to become widespread.

The opportunity to reduce energy costs, demand, and air pollutant and greenhouse gas emissions through cost-effective energy efficiency measures in the commercial sectors is

significant across the country. Commercial and industrial building owners spend $200 billion on facility energy consumption each year (EIA, 2008), and this total continues to rise in today's constrained energy markets. The energy used in these facilities currently contributes nearly 45 percent of U.S. carbon dioxide emissions (EPA, 2007b), and commercial buildings are currently the end-use sector with the fastest-growing emissions of greenhouse gases—increasing at a rate of 1.8 percent annually. Further, energy efficiency potential studies estimate that some 30 percent of energy consumed in commercial buildings is wasted and could be reduced at low costs (IPCC, 2007). Recent work by McKinsey (2007) also highlights the tremendous potential for capturing this wasted energy, with low-cost efficiency improvements in the commercial sector representing the greatest opportunity to reduce greenhouse gas emissions.

3.1.2 Data Availability Case Studies

Energy managers at Costco, Whole Foods, and King County, Washington, have experienced obstacles when collecting energy data. Their experiences demonstrate the gap between the data that are needed and the data that are available.

- In 2003, **Costco** initiated a project to establish a utility consumption and cost database with two years of historical data for energy management purposes. Two significant issues made this a difficult process: lack of access to electronic data and poor data quality. In cases where Costco could not download electronic data from a Web site, they requested data directly from utilities. In a number of cases, utilities responded by sending paper copies of the bills. Data quality was also insufficient in that many historical data sets were incomplete or inaccurate. Prior period usage corrections would be reported under the current bill date rather than with the actual usage dates. The company also found that cost data could be inaccurate or incomplete, at times missing costs for taxes or special adjustments.

- In 2006, **Whole Foods Market, Inc.,** joined EPA's ENERGY STAR and Climate Leaders programs with the intent of establishing baseline energy usage, a greenhouse gas emissions inventory, and benchmarking to set goals for reductions. The company needed two years of historical data to establish a baseline. In addition to many of the same challenges Costco experienced, Whole Foods was sometimes unable to obtain its historical data by contacting utilities directly. The company operates stores across the country but does not always have more than five or 10 stores in a particular utility's service territory; in such a case, a utility might not provide a dedicated account manager to help with specific needs such as data requests. Whole Foods is often required to use utilities' business services departments and has found that these departments typically cannot provide historical information in a consistent format. After 2 years of effort, Whole Foods has only partial data and no easy way to capture and track ongoing usage. The company has to incur significant costs to have a third party provide utility metering and tracking for interval data, and this approach still does not provide the monthly utility bill data. As a result, Whole Foods does not have the information necessary to help identify energy efficiency upgrades and cost saving opportunities.

- **King County, Washington,** is the 14th largest county in the U.S. by population, surrounding the Seattle area. As a part of an aggressive renewable energy and conservation plan the county implemented in 2006, the county Executive set the expectation that regular tracking and reporting on energy use in government would be provided enterprise-wide. With over 1,000 utility accounts from three utilities, the county faced a significant data collection, entry, and management challenge. Manual bill entry

was not a viable option at this scale, and even single-account electronic downloads would have required substantial county resources. In search of a practical way to collect and analyze the data, King County approached its local utilities to discuss options for obtaining automated billing data downloads. The county was eventually able to negotiate data download approaches with two of its three local utilities, Puget Sound Energy and Seattle City Light. Since the download processes were new and no standards existed at the time, implementing them effectively has taken additional time and effort, and the processes are still being improved.

These examples highlight the need for improvement in data access for the range of national and local business customers.

3.2 The Business Case for Utilities

Utilities adopting this Action Plan guidance can expect to see a number of positive impacts on their business. Increased access to data benefits customers of all sizes, leading to improved customer relations; it also helps utilities accomplish goals for demand reduction and energy efficiency.

3.2.1 Improved Customer Relations and Satisfaction

Utilities' business (including government and institutional) customers have a growing number of choices in the electronic transfer of key data across their supply chains. It is increasingly commonplace for U.S. businesses to handle shipping, inventory, and other functions, as well as many financial transactions, through electronic databases, and on software platforms that seamlessly integrate in-house and Web-based applications. Yet energy consumption and cost data, which allow customers to track what is often their largest operating expense, typically are not manageable at the same level of IT sophistication. This is especially frustrating for customers that operate across multiple utility service areas, facing inconsistent and incompatible utility billing data. Customers in such a position face costs and management difficulties, particularly if they have hundreds or thousands of facilities. Utility practices that place the management of energy and cost data on the same footing as other key cost factors create substantial customer value and increase customer satisfaction.

3.2.2 Energy Savings from Better Customer Energy Management

"You can't manage what you don't measure" is an old business aphorism that is particularly apt in connection to energy and cost data and improved energy management. Many business customers do not know how they are doing in their energy management efforts, either in comparing their own facilities to each other or in comparing their overall energy performance with their peers' performance. Absent the metrics and benchmarking methods that improved customer access to energy data would support, some business customers have difficulty justifying and measuring aggressive, company-wide efficiency efforts. This situation could improve if utility data were more readily available electronically.

Chain-store customers make increasing use of remote data acquisition and control services, measuring everything from customer wait times to cash register receipts and equipment operating conditions, on a real-time basis. These data enable them to know what is going on in their facilities; if energy performance and cost data were made available on even a partially

comparable basis, customers would begin to manage energy use more aggressively, and uncover cost-effective investments in energy efficiency.

A utility demand management program that demonstrates the effectiveness of this approach is NSTAR's ENERGY STAR Benchmarking Initiative. NSTAR uses benchmarking to educate customers on their whole-building energy performance. NSTAR couples this with an energy efficiency opportunity assessment to inform customers of cost-effective energy efficiency measures. Approximately 100 customers, representing over 18 million square feet of floor area, have participated in the program. The results are impressive:

- 60 percent of customers took actions to investigate efficiency upgrades.
- 45 percent of customers benchmarked completed the implementation of one energy efficiency upgrade.
- 17 percent of customers implemented comprehensive improvements.
- 21 percent of customers received NSTAR incentives.

3.2.3 Lower Costs for Customer Efficiency Programs

Customer efficiency investments are driven primarily by individual transactions, based on utility incentives for specific technologies. Customers are offered *x* dollars for lighting improvements, *y* dollars for HVAC improvements, etc. This measure-by-measure approach could shift if increased data availability were to enable energy performance benchmarking and tracking of improvement; this would allow a utility to develop a fuller business case for a suite of efficiency investments and operating/maintenance practices. And, to the extent that the benchmarking results would reach senior management within the organization, it could drive increased customer investment in efficiency, with or without utility incentive dollars for a given technology. Over time, this approach could lead to a utility program portfolio in which customer investments are driven more from the top, using benchmarking and other energy management methods, rather than from the bottom, by incentives for individual technologies and transactions. Such a program design approach could reduce reliance on incentives, reducing overall program costs and overall rate impacts from efficiency programs.

3.2.4 Improved Basis for Measurement and Verification of Efficiency Programs

Evaluation for utility efficiency programs can be costly. Documenting the specific impact of a set of measures in a single customer facility can entail extensive work assembling, digitizing, and analyzing utility billing data. Often, third party service providers perform this work for utilities or program administrators, relying on a customer's data as the basis for their analyses. To the extent that energy use data can be made available electronically, in a consistent format, doing so creates a simplified, lower-cost basis for evaluation, measurement, and verification (EM&V) analyses. If energy data can be made available for hourly intervals, this adds precision to EM&V analysis by helping to determine on-peak energy and capacity impacts with greater precision. These improvements could reduce the cost and improve the accuracy of EM&V for utility efficiency programs.

3.2.5 Better Baseline Data Sources for Demand Response

In demand response programs, customers invest considerable effort in establishing demand baselines, against which demand decrements are calculated. For the larger (1-megawatt-plus) customers that typically participate in wholesale market demand response programs, advanced metering is typically in place and/or the customer has or hires its own data analysis experts. But

as demand response programs proliferate with smaller customers, and as distribution utilities expand their load management and other demand response programs, the availability of hourly (or more frequent) usage and demand data—as outlined in Tier 2—will help them plan, implement, and monitor these efforts.

3.2.6 Enhanced Ability to Target Programs and Services

Developing better defined, more consistent formats for customer information, and entering a two-way communications relationship with customers, can create opportunities for utilities to develop new products and services. To the extent that data access protocols, software, and other practices become more widely used and more universal, utilities can better understand customer usage patterns, for both individual customers and market segments. This opportunity could be especially large with medium and smaller customers that have not in the past had access to technologies, such as advanced meters, or done much in the way of practices, such as benchmarking or energy management.

3.3 The Policy Case for Regulators

Regulators should also consider the importance of this guidance as the benefits extend to measuring efficiency goals, program cost reductions, and justifying investments in metering technology.

3.3.1 Improved Basis for Measuring Progress Toward Efficiency Goals

Because of the cost of collecting, digitizing, and analyzing billing data for individual customers, most commissions rely on “deemed savings” methods for estimating the impact of many efficiency measures. These approaches use sampling methods or indirect participant and trade ally reports to evaluate the net impacts of programs. While current evaluation practices may be adequate as a check on pre-program impact estimates, data issues continue to limit the evaluation profession in its efforts to improve precision and reduce costs. Evaluators concede that better quality, more consistent data, available at lower cost, would enable them to provide evaluation results with higher confidence, at lower cost, and on a timelier basis. Establishing the best practices recommended in this report can thus improve the quality and reduce the cost of program evaluation.

3.3.2 Reduced Utility Program Costs

As previously described, utility efficiency programs for business customers have in the past relied on a transactional approach to program design, seeking to influence specific decisions on individual technologies through various market interventions. But utilities have an opportunity to further engage customers by providing them with increased access to energy data, along with metrics and benchmarking services. This would help customers see the business case for energy efficiency investment, and utility programs could drive greater program results per program dollar. Thus, it could increase cost-effectiveness for the overall program portfolio, which can help sustain support for program budgets over time.

3.3.3 Expanding the Public Benefits of Advanced Metering and Smart Grid Investments

Commissions across the country are grappling with the cost implications of advanced metering/smart grid technologies. While few disagree that these technologies are beneficial, their costs remain substantial. To review and approve such investments and the attendant rate impacts, commissions need to understand the tangible benefits of these technologies. Being able to better document the connections between advanced metering, data availability, facility benchmarking, and reduced energy costs could help support utility commission actions on advanced metering and related technology investments. Developing utility best practice approaches is one key link in this chain.

Table 3-1 provides a summary of the business case and policy case for enhanced energy data access.

Table 3-1. The Business and Policy Case for Enhanced Data Access

The Business Case for Customers
▪ Empowers the customer to benchmark and analyze data, set improvement goals for energy efficiency and demand reduction, and reduce energy use.
▪ Reduced staff hours dedicated to data collection.
▪ Reduced fees for obtaining needed data.
▪ Increased information transparency.
The Business Case for Utilities
▪ Improved customer relations and satisfaction.
▪ Demand reductions from better customer energy management.
▪ Lower costs for customer efficiency programs.
▪ Better basis for measurement and verification for efficiency programs.
▪ Better baseline data sources for demand response.
The Policy Case for Regulators
▪ Improved basis for measuring progress toward efficiency goals.
▪ Reduced utility program costs and rate impacts.
▪ Expanded public benefits of advanced metering and smart grid investments.

3.4 State and Local Policy Initiatives

This guidance is especially timely in that one state, California, has recently passed legislation requiring that utilities provide customers with historical consumption data to support their energy management efforts.[3] The legislation further requires that a commercial building's energy performance be benchmarked and that the results of the benchmarking be disclosed at the time of sale, lease, or financing transactions. This mandate specifies that buildings must use EPA's Portfolio Manager for benchmarking, which requires 12 months of historical energy consumption data. The core data elements proposed in Tier 1 are consistent with the requirements of the California legislation.

The California legislation is the broadest mandate at the state level, but similar action has been taken across the country at the state and local levels:

- The District of Columbia passed legislation in 2008 stipulating annual benchmarking using EPA's Portfolio Manager and public disclosure of the results, starting with government buildings and then moving to large commercial buildings (District of Columbia, 2007).
- The Borough of West Chester, Pennsylvania, requires new commercial construction to benchmark energy performance annually in EPA's Portfolio Manager (Pennsylvania Department of Environmental Protection, 2008).
- The City of Denver, Colorado, mandates that existing and future city-owned and operated buildings benchmark their energy performance (City of Denver, 2007).
- State of Ohio Executive Order 2007-02 establishes that all state-owned buildings benchmark using EPA's Portfolio Manager; additional benchmarking requirements for utilities have been proposed by the public utilities commission (Ohio Public Service Commission, 2007).
- The City of New York is considering legislation to require building energy benchmarking.

State and local governments see benchmarking legislation as a way to stimulate investment in energy efficiency and engage business owners and managers in reducing emissions that contribute to global warming and diminish local air quality. As more governments consider these options, this guidance can help provide needed direction on the data utilities will be expected to provide.

3.5 Notes

[1] See *Sector Collaborative on Energy Efficiency Accomplishments and Next Steps* (National Action Plan for Energy Efficiency, 2008b) for more information.

[2] For more information on ENERGY STAR Leaders, see <http://www.energystar.gov/leaders>.

[3] State of California Assembly Bill No. 1103, approved by the Governor October 12, 2007.

4: Best Practices Guidance

To provide guidance that the wide range of utilities can use, this document offers two tiers of guidance. Tier 1 describes practices that the large majority of utilities could reasonably implement which would provide the most important benefits outlined previously. Tier 2 describes practices for those utilities in a position to make additional investments in the information technology and support systems necessary to provide additional data through a variety of means. Each tier describes the recommended data elements and options for making energy use and cost data accessible to customers.

4.1 Tier 1 Best Practices

Tier 1 forms the foundation of this guidance. Electronic access to 12 months of energy consumption and cost data benefits all customers, from the smallest to the largest. All utilities can strive to offer this level of data to all customers.

4.1.1 Tier 1 Data Elements

These elements provide the minimum information required to determine an energy consumption baseline, support basic energy management activities, and allow energy performance benchmarking. They are accompanied by practices needed to support data accessibility. Many utilities are already achieving these practices; others should be able to accomplish them with minimal required investment.

- Monthly meter readings covering at least the previous 12 months, with multiple years preferred to enable at least one year-to-year monthly comparison. Customers with new accounts with less 12 months of service would receive monthly meter readings covering their complete history.
- Unique meter identifiers.
- Meter reading start and end dates.
- Fuel type (electric, gas, etc.).
- Unit of measure (kilowatt-hours, thousand cubic feet, etc.).
- Total monthly use.
- Peak demand (kilowatts or megawatts).
- Cost: total monthly charges.
- Customer/facility identifier.
- Utility identifier.

4.1.2 Tier 1 Practices for Data Accessibility

Tier 1 guidance on practices for making data accessible to utility customers revolves around four key elements:

- Providing electronic access to Tier 1 data as comma-separated values (.csv files) or spreadsheet files. Files must contain labeled columns and rows including accurate labels for breakdowns of consumption, demand, or cost data.

- Providing access to data without added explicit costs to the customer.

- Permitting customers to receive the data electronically, even if they do not pay bills electronically.

- Offering access to data while addressing data security and proprietary concerns.

The definition of Tier 1 recommended practices can be further clarified by identifying two approaches that would *not* be considered Tier 1 best practices:

- Online bill presentation or payment that presents historical data only as a viewable table or graph.

- EDI services alone, as EDI is a method that many customers cannot use due to their limited transaction needs and integration costs.

4.1.3 Recommendations for Achieving Tier 1 Best Practices

To give utilities more flexibility, this best practices guidance does not come with a single recommended process. The following recommendations are provided only as examples of practices that would achieve Tier 1:

- Provide online account access with data download capabilities.
- Provide online request forms, through which customers can receive files by e-mail or mail or view directions for downloading the data they request.
- Provide energy management software with data download functionality.
- Provide data in a format compatible with uploading into EPA's Portfolio Manager tool (a proven approach to meeting elements of Tier 1 guidance).

4.2 Tier 2 Best Practices

The second tier is for utilities able to extend beyond Tier 1 practices, in terms of both the scope of data provided and the means for making data accessible to customers. One important extension is providing customers with access to more extensive billing information, as well as interval demand data and load profiles to time of use metered customers. Tier 2 practices build upon Tier 1 practices for those utilities in a position to make additional investments in the necessary information technology and support systems.

4.2.1 Tier 2 Data Elements

Apart from billing transactions, under Tier 2 utilities could provide data ranging from a set of elements similar to those outlined in Tier 1 to far more detailed interval energy data. For purposes of automated electronic billing transactions, under Tier 2 a wider scope of energy and business information would be provided in accordance with the NAESB Model Business Practices addressing such electronic transactions. The data stipulated in the NAESB model practices fall into five broad categories:

- Detailed invoicing information.
- Energy consumption.
- Details of charges.
- Billing and non-billing party contact information.
- Customer contact information.

A listing of specific data in each of these categories is included in Appendix C.

4.2.2 Tier 2 Practices for Data Accessibility

The additional best practices to extend accessibility under Tier 2 include:

- Automatically distributing or providing access to monthly consumption and cost data upon customer request, without the need for ongoing customer intervention or request.
- Developing electronic billing processes that enable consolidated account billing, resulting in single data transmissions across customer-selectable multiple accounts and facilities.
- Enabling consolidated account access, resulting in single data downloads across customer-selectable multiple accounts and facilities even if those accounts fall into different rate classes.
- Providing automated electronic access to consumption and cost data by the customer's (or a designated third party's) billing, benchmarking, or data collection system.
- Developing security processes that allow customers' corporate-level staff (as distinguished from facility-level personnel) to authorize consolidation of accounts where regulations allow it. Alternatively, where regulatory policies prevent corporate-level authorization, utilities could develop paperless online authorization to be completed by facility-level personnel.
- Developing processes that, while taking advantage of technological developments, lend themselves to integration with a wide variety of legacy systems and potential migration to future technology platforms.
- Providing energy management software with real-time or next-day hourly, half-hourly, or 15-minute-interval data and load profiles for time-of-use metered customers, at a cost that recognizes the efficiencies associated with timely access to data and the possibility for induced energy efficiency actions.
- Actively encouraging customers to use the data and software for benchmarking and tracking.
- Supporting adoption of improved electronic billing and payment process, such as an EDI standard or a compatible Web services and XML approach, through participation in standards development processes.

4.2.3 Recommendations for Achieving Tier 2 Best Practices

As with Tier 1, this guidance seeks to allow flexibility by not recommending a specific process. The following recommendations are provided as examples of practices that achieve Tier 2:

- Implement account consolidation and security procedures to streamline customer access to consolidated billing and historical data.

- Implement electronic data release authorization and automated XML transfer of benchmarking data into EPA's Portfolio Manager—a proven approach to meeting elements of Tier 2 guidance.

- Evaluate EDI and other automated electronic billing options to automate billing and payment, and adopt NAESB standards to ensure greater consistency across utilities.

- Determine if barriers to customer data are caused by customer information systems (CIS). If CIS is preventing adherence to Tier 2 best practices, emphasize data availability as a key issue for consideration when assessing CIS investments, citing inability of the utility to achieve Action Plan customer data availability best practice status.

- Adopt advanced metering infrastructure (AMI) providing for improved electronic transfer of customer usage data from utility systems to customer-based applications.

4.3 Utility Implementation Considerations

While more and more utilities are moving forward in the data access areas outlined in the two tiers of guidance, many have not yet taken the steps necessary to resolve the implementation issues that have inhibited these efforts in the past. Drawing from stakeholder interviews and a literature search, this section identifies these considerations, and their potential solutions, to help define paths by which best practices can move forward in the current industry environment.

4.3.1 Customer Information System Capabilities

Among the first things a utility needs to evaluate as it considers options for improving customer data availability are the capabilities and limitations of its customer information system (CIS). The review of current practices indicates that while utilities will need to evaluate their systems individually, most will likely be able to provide Tier 1 data electronically from their current CIS with little additional investment in the CIS itself. In particular, a utility that has already built the functionality to provide data to a Web interface for bill payment or customer viewing has already addressed the largest hurdle to providing 12 months of data in a spreadsheet or .csv format. Many utilities currently make current and historical data available in bills or viewable online, but they often fall short of Tier 1 best practices by not making the data accessible electronically. The changes needed to provide electronic data typically involve improvements to existing processes, without changing the core CIS functionality.

While utilities could face more substantial costs to achieve advanced or Tier 2 best practices, advanced best practices implementation may not go beyond the scope of many common CIS projects. Most utilities will be able to add advanced practices with incremental investments in CIS functionality. Consolidated account access, or billing and automated data transfers, may require enhancements to CIS functionality, but this kind of modification is not new to most utilities. Utilities commonly enhance CIS functions by building on existing software and hardware systems. In an article for *EnergyBiz,* Warren Causey points out that a typical utility has 25 to over 100 other systems linked to its CIS (Causey, 2005b). He interviewed Dominion Virginia Power's C.I.O., Margaret McDermid, who articulated a common approach to utility CIS: "We don't plan on replacing them [gas and electric CIS] anytime soon. However, we are building things around them to optimize the situation, such as Web front ends, call centers, certainly the whole business intelligence initiative, and getting customer information out of those systems and into places where people can use it" (Causey, 2005a). For example, PG&E has created a data warehousing system outside its enterprise CIS to support a number of energy efficiency needs

(see text box). It is expected these types of incremental efforts, building upon existing systems, can achieve most if not all of the Action Plan's best practices.

> Several years ago, PG&E created a localized data warehouse outside its enterprise CIS to support the numerous and evolving needs of its energy efficiency programs. This warehouse helps PG&E quickly add products and services to its program portfolio without having to wait for resources and development windows in the scheduled release cycles of their enterprise CIS. This dedicated data management environment does incur separate ongoing operation and maintenance costs, but those costs are minimal compared to the costs of continually altering the enterprise-level system to meet new program requirements. Creation of such a data warehouse outside the enterprise CIS can be viewed as a best practice in itself in terms of overall customer data management.

Finally, a cost-effective alternative to customized software development for those utilities that license commercial software products could be the addition of incremental functionality to existing services to achieve best practice.

4.3.2 Customer Privacy/Release Policies

Most states maintain rigorous privacy policies for utility customers' consumption and cost data. For business customers, the data can raise competitive concerns, such that if they were made public, competitors and other parties could gain new insights into their operating costs and performance. Because of these concerns, customer-signed releases are typically required before utilities are allowed to release customer data to any third party providing building owners with bill-paying services, benchmarking, or energy management services. For customers and utilities operating across multiple service areas and state jurisdictions, variations in the release processes can impede the availability of data. This is particularly true for customers wishing to consolidate data for multiple facilities into one bill or account. Utilities, commissions, and customers will have to address this set of issues consistently to make energy data sharing as cost-effective and practicable on a national basis.

Allowing customers to authorize data release electronically is part of the solution. For example, to help California utilities meet their legislative mandate to provide data for EPA's Portfolio Manager benchmarking, EPA improved existing software and developed an electronic data release process that can be customized. Once a customer completes the form in their Portfolio Manager account, the utility's information system is notified so that it can begin to establish automated transfer of data. This approach could easily be adopted more widely by utilities and regulatory commissions in other states.

A specific privacy concern arises in multi-tenant buildings in which individual tenants receive utility bills directly. This complicates a building owner's efforts to measure and track the energy consumption of the entire building. Utilities provide a customer data release process to address such situations, but these processes typically are cumbersome for the building owner. One way to address this situation is to provide a building owner with a single, total energy consumption figure for the entire building. This approach protects the privacy of a tenant's specific bill information. ComEd designed their Energy Usage Data Tool to implement this approach. In some jurisdictions, regulatory or legislative action may be needed to facilitate transfer of tenant data to the building owner.

4.3.3 Electronic Data Interchange Standards

Another potential challenge to utility implementation of best practices is the lack of an industry standard for EDI transactions. EDI is the main format and process for automated electronic payment in the industry, but only about one-third of medium and large utilities currently use EDI. Furthermore, even when EDI is available, the lack of a standard can make it costly for large customers to adopt EDI across multiple utilities with varying requirements, as well as for utilities implementing EDI. At the Action Plan Sector Collaborative Workshop in June 2007, end-users expressed an interest in seeing utilities adopt electronic transfer methods that are less costly and burdensome than those used for bill payment and other commercial financial transactions using EDI. Despite these limitations, EDI continues to be the primary automated option for electronic billing and payment.

The long-term solution to the EDI issue is the adoption of automated electronic utility bill and data provision standards—whether by EDI or Web services with XML. NAESB's previous efforts to define elements for electronic transactions were an important step. For utilities that already provide EDI services, providing the data elements outlined in NAESB's standard can be done at low relative incremental costs. Utilities with no current EDI services will incur significant upfront costs for EDI infrastructure. The effectiveness of the NAESB effort in bringing down the cost of EDI for bill payment for customers is still unclear, since adoption of the standards has been limited. More widespread adoption of NAESB standards may result in the desired cost savings.

Also, while EDI is currently the preferred option for electronic commerce, the electronic transfer of data for purposes other than billing can be achieved through flexible and lower-cost alternatives. For example, the initial experience of EPA's ENERGY STAR automated benchmarking initiative shows promise for the less costly alternative of Web services with XML. This approach to automated benchmarking has processed over 250,000 monthly energy performance ratings and is used by California utilities to meet state benchmarking mandates.

4.3.4 Cost Recovery

The business and policy cases presented earlier in this guidance outline the demand and cost reduction benefits available through increased data availability. While the potential benefits from such enhanced services are clearly substantial, there will be costs for many utilities to upgrade their practices in this area. This raises the question of how best to recover such costs so that the services can be provided to all customers or the large majority of customers on a permanent basis. In the context of the total energy efficiency investment states and utilities are contemplating, the costs for enhanced data services can be expected to be very limited relative to overall demand-side budgets, and less than the potential benefits they could provide. (The costs for a specific utility will depend on its size, software and hardware issues, previous investments in this area, and other factors.)

Because this guidance considers increased data availability in an energy efficiency context, one might assume that any costs should be recovered as part of efficiency program costs. However, there are multiple ways to recover the IT, administration, and other costs associated with these services, and the choice of method can affect outcomes over the long term. It is therefore important to identify the most appropriate cost recovery methods, so that the chosen approach does not result in barriers to the implementation and use of enhanced data practices. The cost of data practices presented in this paper could be recovered either through utility energy efficiency program costs, customer service budgets, or in limited cases through direct fees for services.

Recovery through program costs. This can be structured in at least two primary ways.

- Data services and benchmarking costs could be part of cross-program delivery costs that support implementation of a utility's portfolio of programs, in the same way that marketing costs would be represented. Given the expected magnitude of such costs, they are likely to have minimal impact on the cost-effectiveness of individual programs or the utility's program portfolio.

- Another approach would be to represent enhanced data services as a stand-alone energy efficiency program offering. However, since data transfer and related benchmarking activities are sometimes viewed as not directly saving energy, it may be difficult and/or viewed as inappropriate in some jurisdictions to represent such activities as stand-alone offerings within the scope of energy efficiency programs.

For both of these energy efficiency program approaches, utilities need to consider ultimately that program budgets have had a cyclical history, raising the possibility that funding for data best practices might not be steady and continuous—which could hamper the fundamental intent of improved data access.

Recovery through base rates/customer charges. The other principal cost recovery option is to classify enhanced data services as part of the basic service offerings for certain customer classes. If added costs are incurred to provide this level of service, utility commissions would need to approve them based on the policy case for these enhanced practices. Building enhanced data practices into basic tariff services would provide sustained funding for data services.

Recovery through customer fees. A third option for utilities is to charge customers explicit fees for enhanced access to billing data. Certain fees may be appropriate for customized or more complex services that serve the specific needs of a limited class of customers. Where providing basic data access is concerned, though, fees can be a barrier to achieving the widest use of enhanced data services by customers. This is particularly true for the provision of a basic, Tier 1 level of data and accessibility as defined in this guidance.

Considering the issues outlined in this section, utilities and regulatory commissions will need to select the appropriate cost recovery option for their market that supports the central themes of this guidance, such as ongoing access to data and the expansion of data services to all business customers. Traditionally, utilities use efficiency program costs as the principal cost recovery option for services designed to directly contribute to energy management. However, the potentially universal benefits of increased customer access to energy use and cost data can make it appropriate to recover costs through a utility's rate base. This approach logically funds data services for all business customers in a given rate class from all business customers in that class. Furthermore, the more permanent nature of a rate base approach supports the goal of providing customers with ongoing access to data for continuous benchmarking and other energy management activities. Utilities seeking to justify a rate base approach can build upon the business and policy cases presented in this guidance.

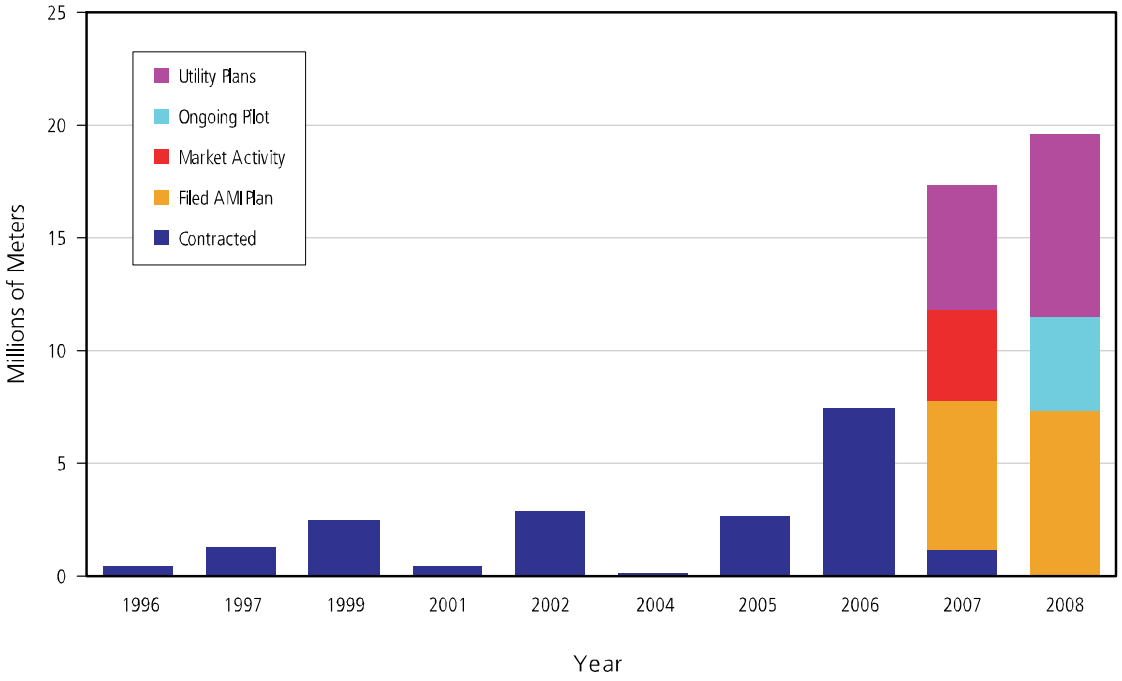
4.3.5 Metering

The deployment of AMI is underway, along with the deployment of related "smart grid" technologies. This wave of new technology creates both opportunities and challenges for utilities in electronic data acquisition, management, and distribution to customers. On balance,

the spread of AMI and related smart grid technology should support the objective of making energy data more accessible to customers. However, because the data standards built around these technologies will strongly affect their ability to support data transfer practices, utilities, regulators, and other stakeholders will need to bring the consideration of customer needs into the discussion as they monitor and participate in ANSI and other standards activities.

A 2007 Federal Energy Regulatory Commission (FERC) staff report on demand response and advanced metering (FERC, 2007) documents substantial growth in AMI activity: Figure 4-1, taken from the FERC report, shows that some 20 million advanced meters have been installed or contracted as of 2007, and that almost 35 million are "in the pipeline." With over 100 million electric customer accounts in the U.S., these data suggest that the majority of U.S. electric meters could be using AMI technology by sometime in the next decade, although factors such as regulatory approval and meter availability could delay the installation rate.

Figure 4-1. Historical and Projected AMI Installations



Source: Data from Federal Energy Regulatory Commission (2007).

Advanced metering typically includes digital electronic and fixed-network communications technologies. These technologies enable AMI to drive utility operational efficiencies, support demand response and energy efficiency programs, and enable a range of customer-side smart technologies. AMI's key enabling functions with respect to this guidance include recording customer usage at hourly (or shorter) intervals, then processing the metering data through a CIS and forwarding some elements of that information for use by customers and customer-based systems, and grid operators.

The metering industry has been working to establish ANSI standards for consistency and interoperability of data sets and software. Major states like Texas are already citing the substance of ANSI standards in their metering procurement regulations. The hope and

expectation is that AMI-generated customer usage data will be easily transferred from utility systems to customer-based applications on an electronic basis.

4.4 Putting Best Practices into Action

This guidance supports progress toward the Action Plan Vision Implementation Goal Eight to establish state of the art billing systems. Utilities, commissions, customers, and other stakeholders are encouraged to implement and otherwise advance the best practice tiers and thereby facilitate improved energy management practices such as benchmarking, setting goals for improvement, and recognizing excellence. Specifically:

- Regulators can encourage benchmarking and related information-based practices that increase customer and utility interest in improved data access. This includes developing ways to give program impact credit to benchmarking-driven energy efficiency programs, as well as approving utility costs for such initiatives.

- Customers can commit to using enhanced data access services for benchmarking and other energy management purposes, and should support the approval of utility programs containing these features at the state commission level.

- Utilities can support the development of best practice data access, including the software and other costs needed to enable these practices. They can also promote benchmarking and related energy efficiency practices as a core program element in future energy efficiency plans.

- Metering, CIS software, and other stakeholders in this discussion can actively participate in the development and deployment of data best practices, so that their technologies are as supportive and interoperable as possible with respect to utility data transfer for customer energy management purposes.

- Standards development organizations, such as NAESB, ANSI, and others, can develop one or more protocols for data uploads to benchmarking software tools, including Portfolio Manager and other platforms.

Widespread implementation of the best practices outlined in this guidance would allow business customers to better target their energy efficiency investments and tap into more of the cost-effective, commercial sector energy efficiency resource. Even with greater implementation, however, significant barriers may remain for some customers, particularly those with buildings that span multiple utility service territories. Obtaining their consumption and cost data electronically will certainly help these customers make progress toward meeting their energy efficiency goals. However, unless the data are provided in the same format in each jurisdiction in which they operate, these customers will still face substantial challenges in using the data to manage energy in a comprehensive way. To help overcome this barrier and further reduce the costs associated with providing greater access to data, the National Action Plan Leadership Group could explore the options for a national standards-setting organization to establish additional, standardized data formats and transmission protocols.

Appendix A: National Action Plan for Energy Efficiency Leadership Group

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Appendix B: Glossary

Advanced metering infrastructure (AMI): Metering systems incorporating two-way communication capabilities which measure and record usage data at a minimum in hourly intervals and provide usage data at least once daily. Data can be used for billing and other purposes, including outage management, demand response, time-differentiated pricing, and energy efficiency programs.

Baseline: Conditions, including energy consumption and related emissions, that would have occurred without implementation of the subject project or program. Baseline conditions are sometimes referred to as "business-as-usual" conditions. Baselines are defined as either project-specific baselines or performance standard baselines.

Baseline period: The period of time selected as representative of facility operations before the energy efficiency activity takes place.

Cost-effectiveness: A measure of the relevant economic effects resulting from the implementation of an energy efficiency measure. If the benefits outweigh the cost, the measure is said to be cost-effective.

Cost recovery: Recovery of the direct costs associated with utility program administration (including evaluation), implementation, and incentives to program participants.

Data warehouse: A system for storing, retrieving, and managing large amounts of any type of data that enables fast searches and complex queries.

Demand: The time rate of energy flow. Demand usually refers to electric power measured in kW (equals kWh/h) but can also refer to natural gas, usually as Btu/hr, kBtu/hr, therms/day, etc.

Electronic Data Interchange (EDI): A set of standards for structuring standardized document forms for exchange between computer systems for business use. Utilities typically use EDI for electronic billing transactions.

Energy efficiency: The use of less energy to provide the same or an improved level of service to the energy consumer in an economically efficient way.

EPA's ENERGY STAR Portfolio Manager: An interactive energy management tool that allows building owners and managers to track and assess energy and water consumption across an entire portfolio of buildings in a secure online environment.

Evaluation: The performance of studies and activities aimed at determining the effects of a program; any of a wide range of assessment activities associated with understanding or documenting program performance, assessing program or program-related markets and market operations; any of a wide range of evaluative efforts including assessing program-induced changes in energy efficiency markets, levels of demand or energy savings, and program cost-

effectiveness. Measurement and verification is a subset of evaluation that includes activities undertaken in the calculation of energy and demand savings from individual sites or projects. The acronym EM&V is commonly used to refer to evaluation, measurement, and verification.

Interval utility data: Energy consumption measurements at regular time increments such as 15-minute, 30-minute, or 1-hour. These consumption data are captured to thoroughly analyze energy demand and are often used to create load profiles.

Load profiles: Representations such as graphs, tables, and databases that describe energy consumption rates as a function of another variable such as time or outdoor air temperature.

Peak demand: The maximum level of metered demand during a specified period, such as a billing month or a peak demand period.

Potential study: A quantitative analysis of the amount of energy savings that either exists, is cost-effective, or could potentially be realized through the implementation of energy-efficient programs and policies.

Program: A group of projects with similar characteristics and installed in similar applications.

Program potential: The efficiency savings that can be realistically realized from the achievable potential, given the budget, staffing, and time constraints for the efficiency program. Program potential establishes the total, or gross, savings expected from a program.

Retrofit: Refers to an efficiency measure or efficiency program that seeks to encourage the replacement of functional equipment before the end of its operating life with higher efficiency units (also called “early-retirement”) or the installation of additional controls, equipment, or materials in existing facilities for purposes of reducing energy consumption (e.g., increased insulation, lighting occupancy controls, economizer ventilation systems).

XML (eXtensible Markup Language): A computer language that can be used to create a tagging scheme that allows elements of a document to be marked according to their content rather than their format, allowing for the easy interchange of documents on the World Wide Web.

Web Services: A software system designed to support machine-to-machine communication over a network that commonly uses standardized XML to transmit messages.

Appendix C: Related NAESB Model Business Practices

In its work to advance the availability of consistent invoice data to utility customers, the North American Energy Standards Board (NAESB) has developed Model Business Practices (NAESB, 2007). Among other things, these Model Business Practices contain a list of recommended information for customer bills issued via uniform electronic transaction data. These recommended data are listed below. The Model Business Practices are protected by copyright; any party wishing to use them must contact the NAESB office at (713) 356-0060 or naesb@naesb.org.

Detailed Invoicing Information:

- Invoice number (unique number associated with this individual invoice)
- Date of invoice
- Invoice due date
- Type of invoice (original, cancel, or final)
- Type of meter reading (actual or estimated)
- Billing type indicator (e.g., distribution company standard offer billing, dual billing, consolidated billing)
- Billing party account number
- Service delivery point identifier, if applicable
- Non-billing party account number where available

Energy Consumption:

- Product code (electric or gas)
- Meter reading start date
- Meter reading end date
- Quantity used
- Unit of measure (kilowatt-hours, hundred cubic feet, thousand cubic feet, etc.)

Details of Charges:

- Rate code
- Total amount of previous bill
- Total payments received since last bill
- Outstanding balance prior to current period charges
- Current period charges and adjustments, at the appropriate level of detail
- Taxes on current period charges where required
- Tax type code (e.g., state, local, gross receipts)
- Total amount due

Billing and Non-Billing Party Information:

- Billing party name (sender)
- Billing party contact name

- Billing party contact phone number
- Non-billing party name
- Non-billing party contact name
- Non-billing party contact phone number
- Non-billing party type (e.g., distribution company, supplier)

Customer Information:

- Customer name (receiver)
- Customer service address
- Customer contact name
- Customer contact phone number

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Funding and printing for this report was provided by the U.S. Department of Energy and U.S. Environmental Protection Agency in their capacity as co-sponsors for the National Action Plan for Energy Efficiency.