USAID
FROM THE AMERICAN PEOPLE

MODULE 1: GUIDELINES ON BEST PRACTICES IN REGULATORY ACCOUNTING

July 2023
This publication was produced for review by the United States Agency for International Development (USAID). It was prepared by the National Association of Regulatory Utility Commissioners (NARUC).

MODULE 1: GUIDELINES ON BEST PRACTICES IN REGULATORY ACCOUNTING

Project Title:	Technical Assistance on Cost of Service Regulation to Achieve Cost-Reflective Tariffs in Central Asian Countries
Sponsoring USAID Office:	Central Asia
Cooperative Agreement #:	AID-OAA-A-16-00042
Recipient:	National Association of Regulatory Utility Commissioners (NARUC)
Date of Publication:	July 2023

Author(s): KPMG Tax and Advisory LLC:
Timur Akhmetov, Director
Valeriy Popov, Associate Director
Daniyar Primbet, Manager

National Association of Regulatory Utility Commissioners

This publication is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the National Association of Regulatory Utility Commissioners (NARUC) and do not necessarily reflect the views of USAID or the United States Government.

Cover Photo: ©thodonal / Adobe Stock

Table of Contents

List of Figures

List of Acronyms or Abbreviations

AFUDC	Allowance for borrowed funds used during construction
AI	Artificial intelligence
CAPEX/ Capex	Capital expenditure
FERC	Federal Energy Regulatory Commission
GAAP	Generally accepted accounting principles
IASB	International Accounting Standards Board
IFRS	International Financial Reporting Standards
ISOs	Independent System Operator
ITSO	Independent Transmission and System Operator
kW	Kilowatts
kWh	Kilowatt hours
NARUC	National Association of Regulatory Utility Commissioners
OPEX/ Opex	Operating expenditure
RAB	Regulatory asset base
RAG	Regulatory accounting guidelines
SEC	Securities and Exchange Commission
UK	United Kingdom
U.S., USA	The United States of America
USOA	Uniform System of Accounts
VIU	Vertically integrated utility

1 Module I: Regulatory Accounting

1.1 Sound Utility Systems of Accounts

An accounting system is a set of accounting processes with integrated procedures and controls. The main aim of an accounting system is to record company operations, summarize those operations into a consolidated form, and provide reports for decision making purposes: to monitor, evaluate, and improve operations. There are several types of accounting systems, such as generally accepted accounting principles (GAAP), international financial reporting standards (IFRS), and regulatory accounting (i.e., USOA in the United States [U.S.], Canada, and other countries, regulatory accounting guidelines [RAG] in the United Kingdom [UK], etc.).

GAAP are a collection of standards that govern the accounting of revenues, expenses, and assets, and IFRS set financial reporting rules that allow for a fair comparison of investment options and protect investors and financial markets. Regulatory accounting is intended to identify and categorize the costs of providing service and allows users to calculate revenue levels required to cover utility costs, including a return on investment.

Having shared an accurate and detailed record and understanding of the utility's finances allows utilities and regulators to establish effective price regulation, which aims to identify how much revenue the utility should collect from customers and how that revenue requirement should be allocated among customer groups. The precise data available in a strong accounting system is especially useful for establishing which expenses relate to which consumers; matching costs with rates improves both actual and perceived fairness as well as economic efficiency. The use of a consistent accounting system will further provide the regulator with an essential tool for evaluating the performance of the utility.

This section is an overview of regulatory accounting and its objectives, key issues, and the scope of regulatory accounting system. In addition, it covers financial reporting standards in the power and utilities industry and considers regulatory accounting procedures, including the Uniform System of Accounts (USOA) and its difference from GAAP.

1.1.1 Regulatory Accounting

1.1.1.1 Regulatory Accounting and its Objectives

Regulatory accounting is a set of principles and rules used to present information about companies that are subject to government regulation. These rules help companies allocate costs, revenues, assets, and liabilities in a way that meets regulatory objectives. The main purpose of regulatory accounting is to provide financial information about regulated businesses for use by the regulator, industry, investors, consumers, and other stakeholders.[1] This would improve the information available within the sector, assist in evaluating the management's stewardship, and assist in guiding economic and financial decisions. Regulatory accounting for utilities aims to achieve following objectives:

- *Economic and financial viability* implies that tariffs and subsidies should cover the costs associated with the provision of services, including return on investment.
- *Allocative efficiency* requires that tariffs should account for marginal costs, particularly long-term marginal or prospective costs. Additionally, changes that are entirely out of the regulator's and licensees' control (e.g., inflation, fuel prices, exchange rate etc.) should be reflected in the tariff as well.

[1] "Accounting for Infrastructure Regulation: An Introduction." The World Bank. 2008. https://openknowledge.worldbank.org/bitstream/handle/10986/6426/439720PUB0Box310only109780821371794.pdf?sequence=1&isAllowed=y

- *Productive efficiency* relates to the regulatory strategy that aims to give utility operators an incentive to reduce costs and ensure that no ineffective costs are passed on to customers through prices. There is a trade-off here between distributive efficiency and productive efficiency – incentives can only be created by breaking the link between costs incurred and tariffs.
- *Distributive efficiency* requires access and affordability of services provided. Universal service access is a medium- or long-term objective of many regulatory frameworks. Tariff levels and structures for each customer class should be in line with end-user capacity to pay. It is widely acknowledged that for many crucial infrastructure services, rates must be based on the ability of the poorest consumers to pay.
- *Dynamic efficiency* relates to the regulatory strategy that aims to give utility operators an incentive to consider future consumers and invest accordingly in technological innovation. Therefore, it is crucial to factor in the cost of potential investments when determining the revenue requirements. Thus, dynamic efficiency ensures that there is a connection between the forecasted demand and the levels of present and future investment.[2]

In addition to the core objectives listed, many regulatory regimes, for instance, the Independent Pricing and Regulatory Tribunal of New South Wales, Australia, also highlights additional formal principles as simplicity (i.e., applying optimal and simple approach), certainty and consistency (i.e., consistency in decisions over time), and price stability (i.e., lower price fluctuations, more even allocation of common costs among customers).

Most regulatory framework-related legal documents or guidelines, including those developed by the Office of Gas and Electricity Markets in Great Britain,[3] describe the rationale for regulation and regulatory accounting in the following terms:

- Monitor performance in relation to the assumptions underlying current price controls
- Inform future regulatory decisions that require financial information (e.g., price setting processes)
- Assist in detecting anti-competitive behavior such as unfair cross-subsidization and undue discrimination in certain markets
- Assist in monitoring financial health
- Assist in benchmarking and comparative competition by encouraging companies to submit comparable information
- Improve transparency and reduce regulatory risk
- Ensure that regulated companies provide timely, consistent, structured, and accurate reports to the regulatory authority

Regulators need to make trade-offs among these objectives. They need to consider the fundamental features of the industry (e.g., the degree of competition and amount of investment needed, and the economic, social, and political context). Monitoring performance, setting fair prices and appropriate rates, and making sure that prices reflect efficiency costs are frequently the major priorities in network industries such as electricity and water.[4]

On the other hand, the main concern in the telecommunications industry is often identifying anti-competitive behavior, such as cross-subsidization and undue discrimination. Thus, the emphasis each regulator adopts will vary depending on the specific circumstances prevailing in the industry concerned.

[2] "Ethiopian Energy Authority - Cost of Service Study (COSS) Introduction Manual." USAID & NARUC. 2021.
[3] "The role of regulatory accounts in regulated industries." OFGEM. 2001. https://regulationbodyofknowledge.org/wp-content/uploads/2013/03/Ofgem_Role_of_Regulatory.pdf
[4] Ibid.

1.1.1.2 The Main Issues in Regulatory Accounting

The power and utilities industry is heavily regulated, with the government continuing to be involved in pricing, supply security, and pressure to minimize carbon emissions and other pollutants. A combination of regulation, increased competition, and a challenging financial environment result in significant regulatory accounting issues such as:

Separation of regulated and non-regulated activities
It is common for operators to provide non-regulated services along with regulated services. For instance, an operator may provide utility services in another country, provide deregulated utility services, or provide non-regulated, non-utility services. One of the main goals of regulatory accounting is to separate costs and revenues of regulated operations from non-regulated operations. This separation is necessary to facilitate control over regulatory objectives. Non-regulated activities should be treated in a way that meets broad regulatory goals, such as retaining incentives for productive efficiency, minimizing distortions in competitive markets, and ensuring that users benefit from improved efficiency.

Accounting separation rules set by a regulator often prescribe (1) accounts used to record only regulated activities, accounts used only for non-regulated activities, and accounts used for both types of activities; (2) how costs and revenues in accounts used for both regulated and non-regulated activities are to be divided between the two types of activities; (3) how the operator is to value transactions between the regulated and non-regulated parts of the firm (referred to as transfer pricing); and (4) reporting and auditing requirements. Using accounting separation, a national regulatory authority establishes a set of standards on how accounting information should be gathered and reported on the notified operator.

Regulatory asset base (RAB) determination
RAB is an essential metric used to determine allowed profit in utility regulation. In general, the RAB provides for both historic and new investment rewards, and generally consist of assets, assets under construction, working capital, contributions from third parties and leased assets, etc. However, the structure of RAB and valuation approach differs across countries. The RAB approaches to accounting and evaluation of its components are further discussed in Module II.

Depreciation policies of the RAB
Depreciation reduces asset value and shortens theoretical asset life, but it also allows a company to cover replacement investment expenditures within an asset's economic lifespan. Depreciation is a critical issue for the regulators for the following reasons: (1) regulated utilities are capital-intensive and depreciation accounts for a significant portion of the expenses, (2) the method for calculating depreciation is highly flexible, and the choice of depreciation approach can smooth pricing and cash flows while reducing risks for the investor, and (3) changes in depreciation profiles can result in windfall gains and losses if not managed appropriately. Depreciation and approaches to calculating and accounting for depreciation in the required revenue are discussed in Module II.

Related-party transactions and transfer pricing
Related-party transactions are becoming more prevalent as utilities adopt more complicated and efficient structures in response to increased competition and constraints on utilities' own operations. Regulators are challenged to identify when two firms are connected and what powers the regulator has regarding related-party transactions, as well as the acceptable basis for cost allocation and pricing.[5]

[5] "Accounting for infrastructure regulation: An Introduction." The World Bank. 2018.

1.1.1.3 The Scope of the Regulatory Accounting System

Contents of RAG

International best practice suggests that the regulator publishes RAG describing the regulator's requirements, motivations, legal background, principles, and procedures to promote clarity and transparency. RAG usually consist of the following sections:

- Purpose of the guidelines
- Legal foundation and authorities
- Definitions of terms
- General principles reflected in preparation of the guidelines
- Principles for preparing regulatory accounting statements
- Information reporting requirements

Purpose of RAG

RAG define principles and directives to be followed by the regulated operator in preparing regulatory accounting. The RAG define the regulatory body's requirements for the collection, allocation, and recording of business data by the regulated operator and the reporting of that data to the regulatory body.

Legal foundation and authorities

In this section, the regulator's rights and responsibilities as outlined by laws or decrees must be identified. This section usually contains:

- Disclosure and confidentiality rules
- Revision dates, and periods (i.e., effective date of RAG implementation, delivery dates and accounting periods to which the RAGs apply)
- Amendment rules (RAG should specify how amendments and changes take place, and what processes and procedures they follow)

Definitions of terms

All terms used in RAG should be accurately defined. This gives users an understanding of the concepts or factors that will be discussed throughout the RAG.

General principles of preparation of the RAG

Several general principles apply in the preparation of RAG:

- General accounting and allocation principles (principles commonly listed in RAG are causality (i.e., allocation of cost, revenues and capital to activities that cause them), objectivity, transparency, consistency, and materiality
- Conformity of regulatory accounting with national accounting standards
- Substance to prevail over legal form (for example, according to UK and Australian RAG, regulatory accounting statements should disclose the commercial essence of transactions)
- Treatment of related-party transactions and third-party benefits
- Directors' responsibility
- Audit

Principles for preparing the regulatory accounting statements

- Cost and revenue allocation (costs and revenues should be allocated to the services that generate them)
- Revision of methodologies (the regulator should make clear its right to change an allocation methodology that it considers does not meet its information requirements)

- Qualification of costs. The regulator should base its decisions on an economic perspective and defend the interests of customers (i.e., the regulator would exclude inefficient, imprudent, and unnecessary costs from the calculation basis for future tariffs).
- RAB (the regulator must define the RAB) that includes all assets required for efficient service provision

Information reporting requirements
A RAG information requirements section indicates the accounting periods and delivery dates while defining the content and format of regulatory financial statements. RAG will require a particular reporting format. Ideally, the regulator will send an electronic worksheet to the operator every year outlining specific statements. The worksheet requests medium-term (often five-year) estimates of income, costs, capital expenditures (CAPEX), and other variables in addition to storing previous data.

Information exchange processes
The role, rights, and obligations of the regulatory body should be clearly defined and regulated by law. Along with this, setting clear and transparent methods of information exchange, information validation, and conflict resolution processes allow the regulator to be efficient and credible. Regarding the formal process of communicating and disseminating information, both the operator's and the regulator's obligations for the information exchange must be clearly specified in RAG. According to the type of information, specific deadlines should be set for the following actions:

- Formatted and scheduled information should be submitted (e.g., x days after the end of the month, quarter, or year)
- Providing responses to questions (e.g., x days after the question was raised)
- Publication of key decisions
- Responses to consultation materials or final decisions

During the consultation period, key stakeholders should have an opportunity to provide feedback and comments on the consultation document initiated by the regulator. Dispute resolution processes indicated in RAG should be well designed, clear, simple, transparent, and affordable for all parties.

The information collected by the regulator should be publicly available to all relevant stakeholders, including customers. Specific confidentiality regulations on commercially sensitive information or responsibilities deriving from national information acts should be the only restrictions imposed on availability. The regulator can disseminate and share information through the internet (i.e., publishing reports, laws, decisions, and resolutions on official websites), the open library, public audiences, and press conferences.[6]

1.1.2 Overview of Financial Reporting in the Power and Utilities Industry Under GAAP

GAAP are a shared set of recognized accounting principles, rules, and processes that determine accepted accounting practices. They are used globally with some regional modifications. Each country has developed their own more detailed norms and accounting policies. For example, statement of financial accounting standards in the United States and financial reporting standards in the UK.

GAAP define the rules for the presentation of financial information and the preparation of financial statements. They allow for the comparability of business financial statements, make changes in firm's financial situation visible, preclude various types of financial statement obfuscation, and serve as a conduit for regulated utilities to engage with financial markets.

[6] "Accounting for Infrastructure Regulation: An Introduction." The World Bank. 2008. https://openknowledge.worldbank.org/bitstream/handle/10986/6426/439720PUB0Box310only109780821371794.pdf?sequence=1&isAllowed=y

In the United States, when utilities report their financial position to the public, they are also obliged by the U.S. Securities and Exchange Commission's (SEC) rules, which have the authority to impose accounting standards and compel compliance with them. The SEC chose not to adopt its own accounting standards, instead allowing GAAP as defined by the professional accounting community to regulate reporting. Though the SEC does not define accounting standards, it does enforce conformity with those established by its designee and plays a key role in the development of accounting standards. All published financial statements of regulated public utilities must conform to GAAP.[7]

According to UK RAG, RAG should comply with UK GAAP. However, there may be justification for changes in some cases to ensure proper and relevant information is submitted to the regulator. Where RAG differs from UK GAAP, RAG will take precedence. UK GAAP is intended to apply to the accounts of all UK firms and is thus a generic framework of accounting rules, whereas RAG are intended to provide accounting information for regulated enterprises only.

This distinction allows RAG to be as detailed as required whereas UK GAAP has to be more broadly based. This means that by having detailed rules in certain specific areas, RAG will ensure that there is more consistency between the regulatory accounts of the companies concerned than would be achieved by just complying with UK GAAP.

It is recognized that GAAP is dynamic, and RAG will need to be reviewed and modified as GAAP changes. Freezing GAAP for the purposes of RAG is just not practical. Distribution companies operate in a dynamic context, and the regulator must evaluate and accept such changes in the RAG.[8] Differences between GAAP and regulatory accounting (e.g., RAG, USOA) can occur in the rate setting process usually because of the timing of cost recognition or a capital investment. This can include financial treatment for tax purposes and regulatory treatment for items such as depreciation.[9]

1.1.3 Overview of Financial Reporting in the Power and Utilities Industry Under IFRS

IFRS provide the basis for company reporting in an increasing number of countries around the world. IFRS reporting is either used or being adopted in more than 120 countries. The International Accounting Standards Board's (IASB) standard-setting pace has been intense in recent years, with a steady flow of revisions for end users to keep up with. IFRS have specific requirements for the depreciation of fixed assets and components, borrowing costs, decommissioning obligations and impairment, customer contributions, and regulatory assets and liabilities etc. However, it is worth noting that IFRS are short on industrial guidelines. Rate regulation, which is common in utilities and other industries, can have a considerable impact on a company's long-term financial performance. IFRS, unlike some national GAAP, do not provide detailed guidelines on the accounting implications of rate regulation.

To address this limitation related to rate regulation, in 2021 the IASB published a draft on regulatory assets and regulatory liabilities (the Exposure Draft [ED] or the proposals) that establishes a new accounting model. Under the proposals, a company subject to rate regulation that meets the scope of criteria would recognize regulatory assets and regulatory liabilities. This accounting approach would reconcile a firm's total income recognized in a period under IFRS with its 'total allowed compensation' – that is, the amount that a company is allowed to charge by the rate regulator. This would decrease the volatility of financial performance reported and is a significant step forward in the Board's long-running initiative to account for the consequences of rate control.[10]

[7] "Overview of Accounting Systems." NARUC. https://pubs.naruc.org/pub.cfm?id=538E66C7-2354-D714-51E9-23D0C31CD7BB

[8] "Regulatory Accounting Guidelines." OFGEM. 2001. https://www.ofgem.gov.uk/publications/regulatory-accounting-guidelines

[9] "Overview of Accounting Systems." NARUC.

[10] "Regulatory assets and regulatory liabilities – A proposed new IFRS Standard." KPMG, 2021

1.1.4 IFRS vs. GAAP Reporting

IFRS are primarily a principles-based set of accounting standards with few practical examples and limited interpretative guidance. They are developed for different countries with varying cultural, legal, and commercial norms, rather than operating as a tax standard or applicable to government agencies. Since the primary goal of IFRS is to be more open and flexible, the standard-setters leave interpretation to businesses and their auditors, resulting in greater flexibility. As a result, businesses and their auditors may interpret IFRS in a variety of ways. The importance of these discrepancies in interpretation will vary for every company based on factors such as the nature of the company's activities, the industry in which it operates, and the accounting practices it implements.

In contrast, U.S. GAAP are primarily a rules-based set of standards with considerable interpretation advice for specific businesses and specific examples for auditors and practitioners. They apply to entities located in the United States as well as international firms that operate in U.S. financial markets. Additionally, standard-setters actively interpret the standards. This active engagement frequently results in a proscriptive approach in U.S. GAAP, reflecting the country's robust regulatory framework.

Despite their differences, the general principles, conceptual framework, and accounting outcomes of U.S. GAAP and IFRS are frequently quite similar, if not identical, because the two standards are more similar than distinct for the majority of common transactions.

1.1.5 Federal Energy Regulatory Commission (FERC) USOA

In the United States, the need for consistency and comparability in utility financial accounting information was first recognized by regulators in the 1920s. As the electric utility business was founded with monopoly status for individual utilities, regulators were also established to regulate the electric utilities and ensure rates charged to customers are fair and reasonable. For regulatory agencies to achieve this goal, utilities under their jurisdiction were often required to have a chart of accounts.

In 1922, the National Association of Regulatory Utility Commissioners (NARUC) recommended a unified classification of regulatory commission accounts in different states. However, in most cases, the various state committees developed their own charts of accounts used by the regulators, and there was little consistency between the charts of accounts used by the different states up until the publication of the USOA in 1937.

FERC (Federal Energy Regulatory Commission) was established in 1977 and an originally issued USOA (Uniform System of Accounts) was continued under its authority. The FERC USOA is similar to most other prescribed systems of accounts and is the most widely used and referenced accounting system by the nation's electric utilities. For its jurisdictional companies in the electric, natural gas, and oil pipeline industries, FERC has developed regulatory accounting and financial reporting standards. These standards are essential to FERC's strategy of establishing fair and reasonable cost of service tariffs. The USOA, as specified in FERC's rules, serves as the cornerstone of its accounting program.

In addition to the USOA, through orders and Chief Accountant guidance letters, FERC makes accounting rules related to specific transactions and applications. Its accounting and financial reporting obligations are included in this set of accounting rules, orders, and guidance letters, which encourage uniform, transparent, and useful accounting information for FERC and other stakeholders. These accounting and financial reporting standards take FERC's ratemaking policies into account.

FERC and its Chief Accountant guide and respond to regulated companies on the application of Financial Accounting Standards Board standards and current or emergent industry-wide or entity-specific accounting matters within the context of the USOA. The advice offered in the Chief Accountant's guidance letters represents the accounting staff's opinions and serves as governing accounting guidance for regulated firms until superseded by a rehearing or other FERC action.

Changes to the USOA have been and will continue to be made. Each revision requires the issuance of a rule-making record, followed by a hearing and comment period. FERC must issue the accounting order for the revision to take effect. Each amendment necessitates the publication of a rulemaking docket, followed by public hearings and a comment period. FERC must then issue an accounting order to make the change effective.[11]

1.1.6 FERC vs. GAAP Reporting

The FERC USOA generally adheres to GAAP and methods commonly used elsewhere, but accounting specifications for certain matters are designed to meet the needs unique to regulated utilities. Differences typically result, either directly or indirectly, from the emphasis in regulation on ratemaking objectives, and their impact on financial statements can be significant.

Many energy and regulated utility companies follow the requirements set by the FERC and provide financial statements on FERC Form 1 and 2 or other applicable forms prepared in accordance with FERC. As most businesses initially keep their historical books and records in accordance with U.S. GAAP, the GAAP financial statements frequently serve as the foundation for these FERC financial statements. While there are many similarities between the FERC USOA and GAAP, there are also significant differences between them. Some of the most common differences between FERC and GAAP are as follows:

Capitalization policies
GAAP require utility companies to establish a capitalization policy (usually based on useful life and cost) and define capital assets, whereas FERC provides very detailed instructions on what costs should be included as part of the cost of construction of capital assets and requires certain equipment, such as meters and transformers, to be treated as a capital asset regardless of individual cost.

Contributions in aid of construction
According to FERC standards, contributions made in aid of construction are not considered as a distinct category in the plant accounting process, Instead, the value of these contributions is deducted from the gross plant accounts to arrive at the net plant value. The allowance for funds used during construction (AFUDC) provides for capitalizing the cost of financing electric plants while it is under construction. Generally accepted accounting principles dictate that all costs associated with creating and readying an asset for service are to be capitalized in the cost of that asset. Due to the complexity and magnitude of some electric plant facilities, the construction of these assets often requires extended periods of time. Contributions are credited to capital contributions under GAAP, resulting in an increase in equity and the assets recorded.

Payment in lieu of taxes
Non-exchange payments to local governments are treated as transfers under GAAP and are not included in operations, while FERC considers the payment in lieu of taxes to be an operational expenditure.

Loss on advance refunding amortization
Under FERC, utility companies are allowed to choose whether the loss should be expensed, amortized over the remaining life of the old debt, or amortized over the life of the new debt. According to GAAP, these sums must be amortized over the shorter of the previous or new debt's duration.

Bad debt expense
Revenues must be recorded net of sums written off as uncollectible under GAAP regulations, while according to FERC guidelines, bad debts are reported as an operational expenditure.

[11] "Public Utility Accounting: A Public Power System's Introduction to the Federal Energy Regulatory Commission Uniform System of Accounts." American Public Power Association. 2012.

Gain/loss on asset disposal
GAAP assume that the amount of accumulated depreciation for a given asset is known, so the gain or loss on disposal can be calculated and reported as a non-operating revenue/expense. Because FERC guidelines recognize that mass units of property are depreciated as a class, they assume that objects are completely depreciated when retired, resulting in no recognition of a gain or loss.

Equity reporting
While FERC classifies equity as retained earnings, contributed capital, and stock, GAAP require equity to be described as net investment in capital assets, restricted, and unrestricted.[12] Many of these differences can be addressed by classifying accounts differently for regulatory reporting vs. GAAP financial statement creation. However, there may be variations that are difficult to manage, in which case the utility must either keep two sets of records or examine its external reporting requirements to decide whether audited financial statements under GAAP and regulatory reporting are both necessary.

1.2 Accounting and Financial Data

The main use of accounting data is to produce financial reports, which serve as the key source of financial information. The accounting system plays a crucial role in the organization by utilizing both primary and secondary data for financial reporting. It greatly contributes to various aspects such as management decision making, internal controls, the quality of financial reports, and overall transaction facilitation. As technology continues to play an increasingly important role in the provision of electricity services, the implementation of accounting systems has become a crucial concern for policymakers, utilities, and other stakeholders.

In order to ensure the effective regulation and management of the sector, it is essential to establish clear rules, policies, and standards, as well as effective implementation strategies that can keep pace with rapid technological change.[13] The provision of accurate and complete financial data allows users not only to evaluate financial performance, but also to make comparisons with competitors, take action to innovate management/data systems, and make timely updates and improvements in the rules, policies, and standards. Therefore, financial analyses are only as useful as the data used to create them. This section is an overview of the following aspects regarding the electric utility sector:

- Key users and the value of the electric utility's financial and accounting information
- The importance of standardization of regulatory accounting
- The role of benchmarking data for the stakeholders of electric utilities
- The accounting separation of generation, transmission, and distribution
- The significance of using new technologies in the regulatory accounting process

1.2.1 Users of Electric Utility Accounting Information

Various parties are involved in the process of setting requirements for information to be provided by electric utilities. A utility has both internal and external information requirements it must meet. Utility managers and employees are internal users of financial accounting information. External users include different regulatory and government agencies, governing boards, national and state industry associations, customers, creditors, and bondholders. The following is an example of the regulatory and governmental bodies which are included in the process of regulation in the electric utility industry in the United States.

[12] "Advanced Public Utility Accounting Guidebook." American Public Power Association. 2019. https://www.publicpower.org/system/files/documents/AdvancedPUA_%20SuppManual.pdf
[13] "Assessment of Accounting System in Public Enterprises: A Case of Ethiopian Electric Utility." SMU. 2017.

Various utilities in the United States, including some public power systems as well as investor-owned and electric cooperative utilities, are regulated by federal, state, and local regulatory bodies, including:

- FERC
- State public service, commerce, or corporation commissions
- SEC
- Internal Revenue Service
- Nuclear Regulatory Commission
- Rural Development Utilities Program[14]

Each of the abovementioned organizations places information requirements on the electric utilities within its jurisdiction. For example, FERC and the state commissions primarily regulate the operations of an electric utility as they relate to the utility's general rate levels. Detailed accounting data is necessary for them to monitor the financial position, effectiveness, and performance of the utility, and to make decisions regarding the utility's rates.

Various public power utilities are not required to follow a prescribed accounting format for their operations as they are not rate regulated (except by local authorities). This is referred to as "home rule" regulation. In this case, local councils, boards, or commissions serve as the regulatory body.[15] Undeniably, the information required by electric utility customers is especially important. Financial information published by the utility is used by the public to evaluate benefits that municipal ownership of the utility provides. This information is also used to monitor the activities and performance (benchmark) of the utility and public officials with oversight responsibilities.

1.2.2 The Value of a Detailed Regulatory Accounting System for Data Analysis

The financial accounting system is the main information source for the utility's cost-of-service analyses. This settles what is referred to as "revenue requirements," which often provides the basis for establishing the retail rates charged to utility customers. Accurate and timely financial accounting information is crucial for the effective management of an electric utility to make decisions regarding the organization's activities. Management uses financial information to evaluate results and to make decisions regarding both immediate and long-term plans for the organization.

Thus, financial information that is accumulated on a detailed functional basis and by a certain organizational, business, or budget unit provides management with measures of actual performance when compared to budgets. This is the basis for budgets, resource requirements and commitments, strategic plans, goals, and objectives.

As stated earlier, creditors and bondholders are also important users of the financial information provided by electric utilities. Utilities' periodic reports to them provide a means for financiers and investment security rating agencies to assess the risk of investing in a particular electric utility, which is formulated based on the financial data available. The granular details available in a good system of accounts are extremely valuable when determining what costs are associated with which customers; aligning costs with rates enhances fairness and economic efficiency.

The use of a detailed system of accounts will further provide the regulator with an important tool when it evaluates the performance of the utility in at least two important respects:

- Is the utility investing at appropriate levels relative to maintenance and repair? Normally, utilities have an incentive to overinvest in capital and underspend for maintenance because

[14] "Public Utility Accounting: A Public Power System's Introduction to the Federal Energy Regulatory Commission Uniform System of Accounts." American Public Power Association. 2012.
[15] Ibid.

they earn a return on capital investment but not on expenses. Detailed charts of accounts and clear instructions can help ensure that capital and expense spending are properly separated.

- How does the utility's investment, expense, and revenue collection performance compare with that of similar utilities? The regulator can make a comparison between and among several utilities in the case when those utilities (in the same jurisdiction or region) use the same accounting system. This, in turn, allows it to identify and seek information concerning "outliers" in the data, and thus help to ensure that the utility is acting efficiently to the possible extent.[16]

Moreover, a good accounting system will assist both the utility and the regulator in identifying areas of excess or inadequate investment by, for example, tracking investment levels against service performance. Such a system will also help identify areas of "informal" economic activity by increasing the transparency of revenues and expenditures. Furthermore, a detailed accounting system will assist in the utility's and regulator's efforts to assign and allocate costs to appropriate customer groups and develop rate structures that recover fixed costs from fixed charges and variable costs from variable charges.

In summary, to accomplish positive results, an accounting system should be verifiable, sufficiently granular, and consistent across time, industries, and geographies. It is also important that an accounting system enables users to track spending and income from source documents to categories, and it must be comprehensive enough to capture all regulated activities and permit the separation of non-utility financial activities where those are permitted.

1.2.3 The Importance of Benchmarking Data Among Electricity Utilities

All parties involved in the evaluation process of an electric utility's financial performance are interested in receiving similar information from other electric utilities. As competition occurs in the generation sector, regulatory reform and incentive regulation of distribution utilities have become very common. Virtually most of the models used in practice are based on benchmarking, or the process of measuring a company's efficiency against a reference performance.[17]

Benchmarking can assist in the following aspects:

- Allow the regulator to compare similar data, information, and statistics among companies
- Allow an assessment of how well a utility is doing compared to other similarly situated utilities
- Assist in focusing questions on areas where the data show unexplained variations[18]

Transparent information on the costs and impacts of energy efficiency investments builds public understanding of energy and environmental issues and the fact that efficiency remains a plentiful resource with lower costs than supply-side investments. A straightforward, public comparison of efficiency programs allows electricity consumers to judge how well their utility uses ratepayer dollars to deploy energy efficiency relative to their competitors across the country, and the efficacy of the programs the utility uses. This knowledge allows consumers to hold companies accountable for decisions and activities that affect their electricity bills and rates, as well as the environment and public health.[19]

Moreover, benchmarking (i.e., comparative analysis) is the most effective and transparent method for setting standards, as it allows the regulator to establish similar operating conditions for regulated

[16] "Regulatory Accounting: A Primer for Utility Regulators." USAID & NARUC. 2019.
[17] "Benchmarking Analysis in Electricity Distribution." CEPE. 2005.
[18] "Regulatory Accounting: A Primer for Utility Regulators." USAID & NARUC.
[19] Benchmarking Electric Utility Energy Efficiency Portfolios in the U.S." American Council for an Energy-Efficient Economy (ACEEE). 2011

organizations comparable in size and structure of assets.[20] It is especially important in terms of information asymmetry, or cases where a regulated organization has different information than that of a regulator, since the regulator does not have a review mechanism.

Therefore, the benchmarking method allows the regulator to be less exposed to the risk of information asymmetry. Ideally, benchmarking should serve as a main component of the effort to increase the deployment of energy efficiency by broadly identifying the best-performing portfolios. Therefore, it could potentially lead to greater cooperation in the industry on successful program implementation and helping regulators set targets and appropriate budgets.

Although benchmarking is not perfect, it illustrates the relative magnitude of energy efficiency spending and energy savings. In other words, benchmarking allows for the selection of the most effective methods of evaluating, developing, and implementing new ideas in the field of energy efficiency. Benchmarking is used as part of the energy management system during the planning phase, and benchmarking results provide valuable information for energy saving opportunities and assistance to business entities in determining areas for the efficient use of energy resources to carry out an objective analysis of energy objectives and their formulation.[21]

1.2.4 Rules for the Standardization of Regulatory Accounting

Many regulators require submission of information by the utilities in standardized formats to minimize problems due to data errors and provide careful handling of data accuracy. As stated above, all parties with an interest in the financial performance of an electric utility assess its financial information by comparing it to the same information received from other electric utilities. That is why it is crucial to have as much standardization as possible in the collection, classification, summarization, and reporting of utility financial information.

In the United States, normally, the accounting principles promulgated by the accounting profession in the form of statements from the Financial Accounting Standards Board (FASB), statements from the Governmental Accounting Standards Board (GASB), and other accounting professional organizations provide rules and guidelines by which general accounting information is reported by business entities. Nonetheless, due to the monopolistic nature of the electric utility industry, further detailed guidelines are necessary to provide consistency in the financial accounting information reported by an electric utility.

Public power systems that do not follow the FERC USOA are often unable to satisfy the unique and varied information requirements. This is primarily because many public power utilities operate as a unit of a governmental (i.e., municipal, state, county) body. Rural electric cooperatives are required to keep their accounting records in accordance with the Rural Utility Services (RUS) USOA, which is similar to the one that is required by FERC. In fact, apart from some specific cases in which the RUS prescribes different accounting procedures, any changes in the FERC USOA are considered changes in the RUS system.[22]

Although the FERC USOA provides several benefits and principles to a public power utility (i.e., consistency, capitalization versus expense, recoverable costs, external information requirements, internal management information, etc.) the most often cited purpose for utilities to follow the FERC system is comparability. This can be explained by the utility's need to be able to compare its

[20] "Technical Assistance to Review Kazakhstan's Tariff Setting Methodology and Compare with Best Practices." NARUC. 2021.
[21] "The Concept of Benchmarking to Improve Energy Efficiency in the Republic of Kazakhstan." Bulletin of KazNU. 2015. https://articlekz.com/article/15308?ysclid=l6dipmnwfa411430881
[22] "Public Utility Accounting: A Public Power System's Introduction to the Federal Energy Regulatory Commission Uniform System of Accounts." American Public Power Association. 2012.

performance with that of its competitors. This, in turn, requires that the utility keep its accounting records on a basis comparable to the general standards in the industry.[23]

1.2.5 Accounting Rules for the Separation of Activities into Electricity Generation, Transmission, and Distribution

The electricity value chain consists of three key components: the organizational layer, which involves decision-making and the governance of the electricity system; the communications layer, which includes the infrastructure and processes for generating and manipulating data to inform decision-making; and the electrical layer, which is the physical grid that comprises the assets for generating, modifying, and using electricity. Electricity generation typically begins at a power plant, from which it is transmitted at high voltages over long distances via the transmission network. Eventually, the electricity enters the distribution system, which delivers power to consumers.

Unbundling refers to the functional, structural, and/or legal separation of various components of electricity production and supply (i.e., generation, transmission, distribution, and retail supply or sale) of electricity. A modest form unbundling may simply be functional and/or accounting unbundling (i.e., having a separate transmission division, or creating a separate transmission business unit, with its own accounts). The meaningful unbundling of a vertically integrated utility (VIU) to separate transmission/system operation from generation and distribution involves the establishment of a legally unbundled transmission and system operator, an independent transmission and system operator (ITSO), or an independent system operator (ISO) on its own.[24]

One of the key reasons for separating transmission from other components of the electricity supply industry is to remove conflicts of interest that may occur in state-owned VIUs, where it is generating its own power while also being a single buyer from independent power producers. In many cases, this has caused a departure from least-cost power planning and procurement. Establishing an independent transmission grid and system operator can facilitate competition by also allowing the entry of privately funded generators. This takes place when the incumbent VIU struggles to raise capital for new investments and alternative power generators could be cost competitive. Some countries have established combined ITSOs, and others have ISOs, also with independent transmission companies (ITOs).

Moreover, for competition to develop in electricity markets, monopolistic activities such as the operation of the transmission network need to be effectively separated from the potentially competitive activities (e.g., generation). The main objective of unbundling is to avoid discrimination in the competitive segments of the sector. Thus, some degree of separation is needed between transmission and generation, distribution and generation, and distribution and end user supply.[25]

Ownership separation requiring different owners for different activities has the greatest potential to eliminate discrimination, because it eliminates the incentive to discriminate. Functional separation and accounting separation have limited potential to prevent discrimination because the incentive to discriminate and some of the ability to discriminate remain. If applied, these forms of separation require significant regulatory oversight and vigorous enforcement of competition law.

Accounting separation means keeping separate accounts for generation and transmission activities within the same VIU. On this basis, a vertically integrated entity charges itself the same prices for transmission as it does others and offers separate prices for generation and transmission services. The unbundling of accounts within the utility requires the creation of separate financial accounts for each sector (at least generation, transmission, and distribution) to support its operations as an independent

[23] "Public Utility Accounting: A Public Power System's Introduction to the Federal Energy Regulatory Commission Uniform System of Accounts." American Public Power Association. 2012.
[24] Boulle, Michael. "Global Experience of Unbundling National Power Utilities." 2019.
[25] "Competition in Electricity Markets." OECD. 2001.

business, detailing costs that will form the basis of payments within the new market. Many vertically integrated utilities practice some level of accounting separation, such as allocating costs for staff, spare parts, and other expenses to individual business units such as generation or distribution services.

Nevertheless, there are frequently certain shared costs (e.g., for human resources, information technology services, debt service, etc.) that are aggregated for the company as a whole. Further, revenues may not be earmarked for specific business units and there may be limited internal pricing, masking the impact of revenue shortfalls. Accounting separation may support improved financial management and efficiency while creating the basis for a future unbundling process.[26] Thus, accounting separation of generation, transmission, and distribution makes costs more transparent and, therefore, makes utilities easier to regulate. Germany is one example where accounting separation within each utility has taken place, and it is generally permitted in the European Union.[27]

Functional and accounting separation, whenever adopted, needs to be complemented by strong regulatory oversight or vigorous antitrust enforcement (preferably both). These complementary measures are costly to administer and drain significant resources from the regulated parties. These costs need to be weighed against the benefits of a relatively simple and lower cost implementation. Additionally, it is unclear whether increased vigilance by regulatory and competition authorities would be enough to prevent discrimination.

1.2.6 Deploying Scalable Technology Solutions to Increase the Efficiency of Regulatory Accounting Processes

Future sustainable energy systems will be smart and integrated. They will include technologies currently under deployment, such as renewable sources, storage, and energy management and monitoring systems. In the United States, the electric utility industry is one of the more mature and stable industries in the economy. Within the last decades, however, the industry has seen massive changes regarding deregulation, distributed generation, and legislative and public pressures to incorporate renewable energy sources and improve energy efficiency and conservation. With these changes, to meet the growing requirements of demand, access, and reliability, it is crucial to continually update information technology systems.

The regulatory structure for electric utilities developed dramatically from the 1930s to 1970s, when monopoly profits and services were of great concern to policymakers and customers. Regulators try to ensure that the market is operating as efficiently as possible while still regulating the price of electricity and the structure of the market. Therefore, electricity producers are constrained in how much they can earn and, in turn, how much they re-invest in innovation and technological advancements. In a financialization era, where short-term financial returns are essential metrics for a company's performance, utilities must carefully weigh the costs of any investments or expenditures with the expected short- and long-term returns.

Moreover, deregulation has created an environment in which electric utilities must deal with low profit margins and the constant threat of lower cost alternatives. Thus, electric utilities have relatively low internal incentives for adoption of new technologies, particularly when the longer-term benefits accrue to other stakeholders. This is one of the main reasons why utilities are among the lowest investors in research, design, and innovation.[28] Nevertheless, technology can be a helpful resource to ensure utility compliance as well as position the utility for growth. Digital technologies will transform the operations of utilities across the value chain. Energy generation will be redefined by the use of decentralized networks of intelligent, agile, and self-serve units to ramp up, balance, and diagnose demand.

[26] "Strengthening Utilities and Promoting Energy Reform (Super), Utility Unbundling and Electricity Market Reform." USAID. 2014.
[27] "International Comparisons of Electricity Restructuring: Considerations for Japan." CIFE. 2004.
[28] "Big Data Issues and Opportunities for Electric Utilities." Renewable and Sustainable Energy Reviews. 2015.

Intelligent automation using the Internet of Things, artificial intelligence (AI), and robotic process automation will increase efficiencies for demand responsiveness and thus optimize costs. Analytical insights will be leveraged to improve customer service and relationships, which is an area of improvement for utility companies.

Moreover, digitization will also allow electricity asset owners, prosumers, and customers to price and trade energy in decentralized markets based on market value. Blockchain and smart contracts will bring transparency and trust in the distribution process. As stated above, rule-based technologies – information technology process automation and robotic process automation – are prominent in the energy and utilities sector. For instance, DF Energy (the UK-based utility), is using robotic process automation to automate manual journal entries that previously took 70 person-hours a month to complete. Automating eight processes delivered six times the return on investment.[29]

Regulated electric utilities and energy entities face some very unique accounting issues. Accounting and regulatory teams are always laser-focused on lowering regulatory risk and achieving the best rate case outcomes for their companies and other stakeholders. Thus, it is critical that rate case filing information is complete, consistent, accurate, and supported. The ability to audit and analyze data for these attributes is crucial, while errors or inaccuracies are unacceptable.

Moreover, reporting standards and transparency have become extremely important for firms to ensure their compliance. The emphasis of regulators on data and reporting led to a new breed of technology companies (e.g., Suptech).[30] Though similar to risk management companies, such companies are unique as they are using new technologies (AI and machine learning) to make the supervising process easy. The platforms of such companies are expected to solve the problems of complex regulatory reporting procedures. In other words, all the reporting can be done in real-time by using big data analytics.

Undeniably, electrical systems are extremely complex with an instantaneous need to match millions of demand requirements with supply. Big data analytics and advanced information technologies hold the promise of improved system reliability, greater energy efficiency, and lower costs for consumers. Big data analytics allow great amounts of data generated by electronic sensors, smart grid technologies, electricity supply, grid operations, and customer demands to be coordinated, analyzed, understood, and utilized in an effective way.

To summarize, for electric utilities, big data analytics can help guide smart grid deployment and calibrate models and tools for grid management and simulation. However, leveraging big data presents several technological and management challenges for electric utilities to integrate the new information into a complex existing system. As stated earlier, utilities are conservative organizations, and they are strictly regulated. Utilities are concerned more with system reliability and consistency than technology advancements. They need to ensure the security and reliability of the electrical system and the data. There is always a need to protect customer privacy while still capitalizing on data to improve their service and performance.[31]

1.3 Benefits and Challenges of USOA

This section is an overview of USOA and the benefits and challenges regulators and utility operators face during the implementation and adoption process of the USOA.

[29] "Intelligent Automation in Energy and Utilities Global Automation Research Series: Energy and Utilities." Capgemini. 2019.
[30] Suptech is a short form of Supervisory technology. It refers to the technology that supports supervisors. https://regtechtimes.com/regtech-vs-suptech-what-are-the-differences/
[31] "Big Data Issues and Opportunities for Electric Utilities." Renewable and Sustainable Energy Reviews. 2015.

1.3.1 Benefits of Using USOA

According to international best practices regulatory financial information must be relevant, reliable, comparable, verifiable, transparent, and complete. It is common practice in the United States, Canada, Asia, and some European Union countries to develop and implement regulatory accounting – a unified accounting system for rate-regulated entities to ensure data coherence, avoid double counting, and detect anti-competitive behavior. As mentioned in previous sections, one type of unified accounting system is known as the USOA issued by FERC. The most compelling reason for an electric utility to adopt the FERC USOA is to fulfill the requirements of the regulatory authorities under which the utility falls. Nevertheless, there are several other reasons for a power utility to use the FERC system.

Comparability is one motivation to use the FERC method for voluntary compliance. A utility accountant and management can successfully compare operational data with those of other utilities by adopting the USOA. These operational efficiency assessments can be particularly useful in spotting operational (financial) difficulties at an early stage.

Consistency. The FERC USOA establishes guidelines for accounting for public power organization operations. A clearly defined accounting system for various forms of financial transactions allows the utility to treat such activities consistently from one occurrence to the next and from one period to the next.

Expense vs. capitalization. The FERC USOA establishes criteria for the handling of specific expenditures such as capitalization or cost, which is crucial for electric utilities that have comparatively high CAPEX in plant and other infrastructure. The proper classification of expenditures as capital or expense items may also influence the rates that a utility charges its consumers. Expensed utility operating costs are normally recovered from ratepayers as part of the current revenue requirement. The utility recovers those expenditures that are capitalized as assets through its rates when the assets decay. The FERC USOA allows functional assessments of the link between plant investment and operation and maintenance costs.

Recoverable Costs. In general, the electric utility business follows the normal practice of including all expenditures incurred in the operation of a utility in the revenue requirement to be recovered through the company's rates. Expenses are frequently referred to as "above the line" and "below the line," with "line" referring to net income from utility operations. The revenue required includes items above the line. Items below the line are often non-operating revenue and costs that are not recovered via the rates charged to consumers. The FERC USOA defines the accounts and financial activities that comprise them in determining a utility's cost of service and revenue requirement.

External information requirements. The FERC USOA ensures consistency in the preparation and presentation of this information among utilities. Outside organizations and individuals use this information to evaluate a utility's operations, including regulatory bodies, rating agencies, investors, industry associations, and consumers. These organizations require the data to be comparable among utilities, whether public or investor owned. The American Public Power Association compiles such information in its annual selected financial and operating ratios of public power systems, which utilities use to evaluate their performance.

Internal management information. The FERC USOA provides for tracking a greater level of detail in the accounting records than many public power systems have available to them through their local government accounting systems. This added detail gives public utility managers more information regarding the costs of operations to support future decision-making. It also provides greater flexibility in reporting this information at varying levels of summarization. The FERC USOA functional account category provides a logical structure for operations budgeting and actual performance comparison.[32]

[32] "Public Utility Accounting: A Public Power System's Introduction to the Federal Energy Regulatory Commission Uniform System of Accounts." American Public Power Association. 2012.

1.3.2 Adoption of USOA

1.3.2.1 Process

The transition from one accounting system to another can be considerably more difficult if a utility has been subject to direct government control, as is frequently the case in developing countries, and the present system has not been designed or deployed to capture the necessary accounting information in a comprehensive or coherent manner. Public electric utilities' comprehensive accounting information is frequently documented on a divisional responsibility, incurred cost basis. Within each division or department of the utility, the same account numbers are applied to account for the same activities. These accounts are classified according to the type of resource or cost factor incurred. The FERC USOA, on the other hand, collects expenditure data on a functional, applied-cost basis, with individual accounts specified within functional categories. Each account indicates a distinct functional work area or activity for which the expense was incurred.

The discrepancies in detailed account definitions between a public power utility's present accounting system and the FERC USOA can make a precise conversion of accounts and balances from an existing system to the FERC system challenging. As expenses are typically not currently specified at the level of functional information available in the USOA, converting historical expenditure data to the whole FERC system may be impractical. As a result, converting to the FERC USOA is usually simplest when done prospectively, with no attempt to convert previous accounting data.

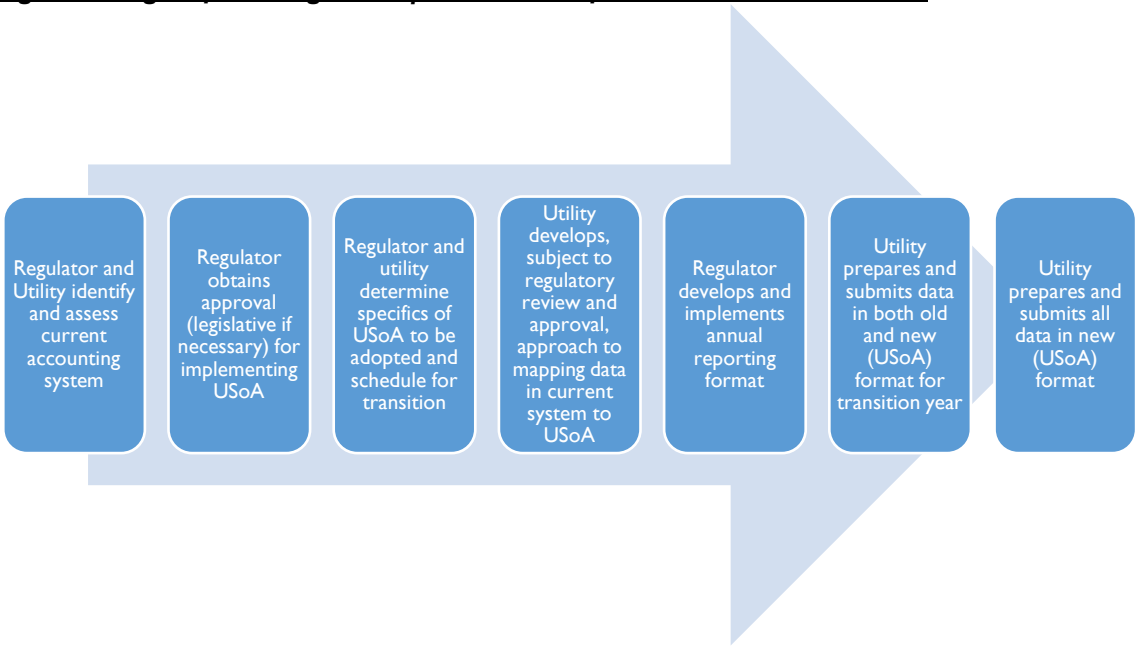
Due to the perpetual nature of balance sheets, some conversion of assets, liability, and equity accounts is required when establishing a new accounting system. The public power company must do an analysis of the balances in the different balance sheet accounts to segment existing account balances to the accounts specified in the USOA. Whenever a regulatory agency decides to transition to the USOA there are some critical stages that need to be planned and implemented (see Figure 1):

- Obtaining all necessary permissions and authority for the transition to the new regulatory accounting system. While regulatory bodies' powers are usually extensive and may include defining how utilities gather and present data, having clear authority is likely to assist minimize litigation that would delay implementation.
- Collecting and preserving all necessary underlining data. In some cases (e.g., records of the cost of a plant that was put into operation many years ago), it may be necessary to use estimates. If estimates are used, they should be documented in a transparent manner.
- Developing a transparent methodology and clear process of "mapping" the data in the existing system design to the USOA under the guidance of the regulator. The categories are unlikely to match exactly, and the amount of information will differ. The utility should, with guidance from the regulator, make reasonable decisions about how expenses and revenues recorded in the existing system should be reflected in the USOA. Records of how one set of accounts is mapped to the USOA should be preserved and available for regulatory review.
- Considering the use of both sets of accounts (the existing system and the USOA) during the first year of implementation. While logistically demanding, this strategy will assist in guiding the mapping process and allow the utility to fix errors and any "bugs" incurred during the transition to the new system.

Each stage in the process should be completed in a transparent manner that involves at the very least the regulator, the ministry (and other relevant government agencies, including the tax authorities), investors, and customers. The timeframe and "deliverables" at each stage should be determined from the start, with flexibility for changes as the situation changes. It is anticipated that engaging other

regulatory commissions and regional organizations throughout this process will be valuable in gaining the benefit of their expertise and improving the possibilities for regional uniformity.[33]

Figure 1: Stages of Planning and Implementation of the Transition to the USOA[34]



1.3.2.2 Challenges

During the transition process from the existing accounting system to the USOA, regulators may face the reluctance of providing information by utilities. Many utilities (as well as ministries or other government organizations that operate or control a utility) are usually unwilling to provide financial data as utilities are concerned that their own cost performance will not be compared favorably with other utilities. This reluctance may also extend to data collection and presentation methods. To overcome this reluctance, the regulator should engage actively with the utility (and/or the government) and exercise its power, as necessary.

It is crucial that the regulator has access to all necessary information about utilities' revenues, investments, and expenditures. Furthermore, it is critical that this information be made public and transparent. Another challenge can be the need for additional resources to transition for both regulators and utilities. Some additional accounting training or information systems may be required by the utility in order to properly integrate the USOA into the company's financial, budgetary, and regulatory processes.

The USOA has been adopted by South Africa's national energy regulator. The Uganda Electricity Regulatory Authority is now assessing the implementation of the USOA for its largest utility, Uganda Electricity Generation Company Limited. Ethiopia is likewise attempting to adopt the USOA. The utilities regulated by the Georgian National Energy and Water Supply Regulatory Commission must also follow a USOA. This requirement is based on Article 46 of Georgia's Electricity and Natural Gas Law.[35]

Adoption of the USOA for regulated utilities will assist the utility's capacity to analyze its business and, more importantly, the regulator's ability to carry out its responsibilities to guarantee that utility services are delivered at just and reasonable prices. Furthermore, the data acquired under the USOA

[33] "Advanced Public Utility Accounting Guidebook." American Public Power Association. 2019.
[34] "Regulatory Accounting: A Primer for Utility Regulators." USAID & NARUC. 2019.
[35] Ibid.

will allow for relevant comparisons over time and among utilities, increasing transparency, and indicating areas where additional utility and regulatory scrutiny is required. As economies grow more global, widespread adoption of the USOA will give a level of consistency among financial reporting systems, improving the confidence of prospective investors.

1.4 Accounting Adjustments

Transitioning from the statutory accounting data to that required for regulatory accounting implies adjustments for the differences arising between the RAB and the total fixed assets as reflected in the statutory accounts and the corresponding differences in depreciation between the two approaches.[36] In order to analyze and identify the adjustments that need to be made to the balance sheet and income statement accounts during the transition from statutory to regulatory values, this section would focus on generally accepted electric utility accounting practices within the FERC-prescribed USOA.

1.4.1 USOA: Balance Sheet Accounts

Under the USOA, FERC describes a detailed chart of accounts for such components of the balance sheet as assets, liabilities, and owners' equity of electric utilities. The balance sheet is a snapshot of a firm's financials at a certain date. The table in Appendix 1 compares the accounts established in the FERC USOA for the balance sheet classifications and balance sheet under statutory accounting. This suggests that the USOA allows for a far higher level of specificity when documenting a utility's financial activity.

1.4.1.1 Adjustments for assets

In the USOA,[37] the primary classifications of assets defined are utility plant, other property and investments, current and accrued assets, and deferred debits (Appendix 2). "Utility plant" is the major asset class identified by the USOA and is frequently the first item to appear on the utility's balance sheet. Assets such as property, plant, and equipment that are used in the utility's operations belong to the utility plant classification. "Electric plant" covers all assets that are used in the generation, transmission, and distribution of electricity.

Traditionally, utilities have only been permitted to add investments to their rate base when they commissioned an asset and are delivering service to customers. Utilities have been allowed to accumulate an allowance for funds used during the construction period, so that when the construction is completed and commissioned, they earn a return not only on the money invested, but also on the carrying costs incurred during the construction period.

Including construction work in progress in the rate base, on the other hand, allows utilities to produce a current return covering the capital's interest and dividends even before construction is done. Construction work in progress provides for a return on capital during construction, but allowance for funds used during construction defers this accumulated cost of invested capital until after the facility is operational. Third-party contributions, such as connection fees and contributions from public institutions, are frequently subtracted from the RAB. Most agencies will subtract any of these assets from the RAB since they were not partially or entirely financed by the regulated business and have no capital cost to the firm.

The next important component of the USOA is the provision for the depreciation and amortization of property, plant, and equipment. Depreciation and amortization are the systematic write-offs of the cost of utility plants throughout their useful lifetimes. Depreciation applies to tangible assets, whereas

[36] "ERRA tariff and pricing committee: procedures and rules for the examination of documents on tariff approvals." USAID. 2007. https://pdf.usaid.gov/pdf_docs/PNADS315.pdf
[37] "Subchapter C – Accounts, Federal Power Act." Authenticated U.S. Government Information. https://www.govinfo.gov/content/pkg/CFR-2021-title18-vol1/pdf/CFR-2021-title18-vol1-part101.pdf

amortization applies to intangible assets.[38] In the context of statutory accounting, depreciation refers to the expenditure that a company is permitted to record in its financial records for the purpose of calculating taxable income. Depreciation in the context of rate regulation refers to the expenditure that a regulated company is allowed to recover through service charges. Regulatory depreciation is an estimate of the annual cost spent by "using up" or "consuming" the value of certain assets for the supply of the regulated service.

Regulators set rates so that the regulated company can generate revenues that are near allowable costs. However, due to special regulatory accounting rules, some qualifying expenditures may be included in a period other than the period in which a non-regulated company would incur the costs. In countries where U.S. GAAP are used, regulators frequently mandate the capitalization or deferral of expenditures that an unregulated business would usually incur in the current period under GAAP. As a result, the accounting procedures enforced by the regulator frequently differ from GAAP, with most of the discrepancies owing to regulations specific to the rate-setting process.

GAAP assume that the amount of accumulated depreciation for a given asset is known, so the gain or loss on disposal may be calculated and reported as a non-operating revenue/expense. Because FERC advice recognizes that mass units of property are depreciated as a class, it assumes that objects are completely depreciated when retired, resulting in no recognition of a gain or loss.

Statutory accounting (U.S. GAAP)	Regulatory accounting (USOA)
• Depreciation rates typically calculated by using component rates based on useful life of specific asset	• Composite straight-line rates on "group plan of accounting;" generally, each FERC account is a group
• Component rate applied to net book value	• Composite rate applied to gross book value
• Companies revise depreciation rates if appropriate	• Rates require approval of FERC depreciation study
• Cease depreciation when asset is fully depreciated	• Cease depreciation when group is fully depreciated

For regulatory accounting purposes, depreciation of capital is calculated on the basis of useful lives, which do not always comply with statutory accounting standards. Depreciation is used to calculate allowable revenues in order to distribute the expenses of assets over their useful lives. An alternate option would be to enable the utility to completely recover the costs of its CAPEX in the year it occurs, but this would place the whole financial burden on customers in that year, while the investment is likely to benefit both current and future customers for many years to come. Economic asset lives,[39] rather just accounting asset lives,[40] are commonly employed since it is critical that depreciation represent the costs of assets over their useful lives.

The one important aspect that is described in the "utility plant" account is the requirement that all electric plants acquired as an operating unit or system need to be recorded at their original cost. This means that the plant is to be recorded at the cost to initially place it in service, even if by a different owner. If the operating unit or system was acquired from another utility, the new owner must record it at the original owner's cost and recognize the difference from the amount of the purchase as an acquisition adjustment.

FERC gives more information by indicating that within its structure, the USOA additionally provides subsidiary account breakdowns for certain accounts. Utility plant detail accounts are used to keep more detailed data on the various plant classes. The USOA, like other accounts, includes descriptive information on what should be included in each plant account, as well as lists of particular asset items and components under each account description.[41]

[38] "FERC: Public Utility Accounting Manual." American Public Power Association. 2018.
[39] Economic asset lives refer to the length of time an asset is expected to be useful to the owner. It is also called useful life.
[40] Accounting lives are typically determined for the purpose of establishing statutory financial accounts and for tax purposes and might be different than the actual useful lives of assets.
[41] "FERC: Public Utility Accounting Manual." American Public Power Association.

The next category of assets in an electric utility's balance sheet is "other property and investments." Other property and investments accounts often consist of long-term assets. Non-utility property accounts are given, along with the associated depreciation and amortization account. Assets that fall under the categories of property, plant, and equipment are considered non-utility property. These assets are frequently kept as investments. This category also covers equity in affiliated companies and long-term investments in other businesses.

On the utility balance sheet, current assets are listed after long-term assets. Cash and other liquid assets that can be expected to be converted into cash, sold, or used within a year or the typical operating cycle, whichever is longer, are considered current assets. Cash, short-term investments, receivables, inventories, and pre-paid expenses typically fall under this category. Due to the size of a utility's investment in plant, it has been previously stated that the utility plant classification comes before the current assets and other asset classifications. The fact that this is exclusive to the utilities sector was also emphasized. Fuel stock is a significant account in current and accrued assets. For the purpose of accounting for generation expenses, this inventory account is essential.

Deferred debit is the expenditure that has not yet been consumed, and therefore is temporarily classified as an asset. Deferred debits are the last category for assets on the balance sheet. Various costs that are accumulated for future accounting treatment are included in deferred debits. Clearing accounts, which are temporary accounts containing costs or amounts to be transferred to another account, are the best illustration of a deferred debit. To keep track of all expenses related to specific events or activities, specific clearing accounts can be created. The costs accumulated in each clearing account are then, at a later point (usually at month's end), transferred to a variety of other asset and expenditure accounts according to a predetermined allocation approach.

1.4.1.2 Adjustments for Liabilities and Equity

The capitalization of an entity to sustain its assets in the form of liabilities and the owners' equity is detailed in the other half of the balance sheet. The following categories are listed by the FERC USOA for this section of the balance sheet: proprietary capital, long-term debt, other non-current liabilities, current and accrued liabilities, and deferred credits (see Appendix 3). The entity's equity is referred to as proprietary capital. Most of the accounts concern common and preferred stocks.

The appropriate or unappropriated earnings are recorded as the accumulated earnings. The usage of the stock accounts would not be appropriate because public power utilities are not privately owned. Therefore, the retained earnings accounts would typically contain the sole proprietary money that most public power systems would possess.

According to U.S. statutory accounting, such as GAAP, equity is classified as net investment in capital assets, restricted, and unrestricted. Meanwhile, the USOA's classification of equity consists of retained earnings, contributed capital, and stock. The principal of the utility's bond indebtedness is recorded in long-term debt accounts. Bond issuance premiums and discounts are also included in this category. Although other types of long-term debt are permitted, revenue bonds or first mortgage bonds are the most used debt financing vehicle by public power systems.

GASB determined that supply contracts, such as purchased power contracts, convey access to the output of an asset rather than control of the right to use the asset. In that way, it would not be subject to the lease accounting standard. However, if a utility obtains 100 percent of the generating asset capacity and can control when it runs, how often it runs, etc., it would be evaluated as a potential lease.

On the utility balance sheet, current liabilities are listed after capitalization and long-term liabilities. Current liabilities are debts that can be expected to be paid off or transformed into additional current liabilities within a year or the typical operational cycle, whichever comes first. Accounts payable,

current debt instruments, or the current portion of long-term debt and liabilities for things like client deposits, interest expenses, and taxes are typically included in this. Deferred credits are the last category for liabilities on the balance sheet. They are a variety of debts that the utility owes but is not expected to pay back within a year.

Due to discrepancies in the timing of recognition of some items for income tax return presentation vs. financial statement presentation, the accounts in this categorization principally pertain to deferred tax obligations. Customer advances for construction is the account in this category that public electricity utilities are most likely to use. This is a liability for customer contributions that are fully or partially refundable (as a deposit for utility construction). Any non-refundable amount must be added to the account for the right plant, depending on the type of plant built. Larger utilities and some public power systems utilize this form of security on the investment in facilities as well.

1.4.2 USOA: Income Statement of Accounts

This section covers the income statement under the USOA and adjustments for operating income, other income, and deductions. The example for income statement under the USOA and a comparison of it to statutory accounts can be found in the Appendix 4.

1.4.2.1 Adjustments for Operating Income

The income statement is one of the mandatory financial statements that utilities are expected to release on a regular basis, just like the balance sheet. It presents the utility's net operating results for a given time period, typically as net income. Utility revenue and cost accounts are defined by the USOA. The utility's net income is calculated based on these factors and shown in the income statement. These key parts of the revenue statement are defined as follows:

- Increases in net assets brought on by the sale of goods or services are known as revenues
- Asset costs that expire in an effort to generate revenues are known as expenses
- Income is the amount that remains after expenses for a particular time period

According to the USOA, the following are the main categories of revenues and expenses on the income statement (see Appendix 5): utility operating income, other income and deductions, interest charges, and extraordinary items. In the USOA, the "utility operating income" section lists the revenue and expense accounts that are related to a utility's fundamental operations to deliver electric power to its consumers.

To determine the net operating income of the utility's operations, the utility operating income accounts are netted together on the income statement. For utilities that have controlled rates, the utility income statement's net operating income serves as a distinction between costs that can typically be recovered by the company through its retail rates and those that cannot. The ability of the utility to supply customers with electric utility service is the foundation for how these costs should be recovered.

The term "above- and below-the-line notion" is used to describe this. Expenses shown in the accounts classified as utility operating income are recognized as above-the-line. Below-the-line expenses are those that are recorded in accounts under the other income statement classifications. This idea is applied by numerous public electricity systems when setting the prices that they charge their users.
According to statutory accounting practice, operating expenditures (OPEX) are those required for the day-to-day functioning of the business, like wages, utilities, maintenance, and repairs. OPEX is the money the business spends in order to turn inventory into throughput. These also include the depreciation of plants and machinery that are used in the production process. OPEX, as opposed to CAPEX, can be fully deducted (i.e., subtracted from the revenue when calculating the profit/loss of the business).

Regulators often distinguish between OPEX incurred in regulated services and OPEX from unregulated activities. They do this to ensure that the regulated entity only recovers the cost of regulated services and/or does not use regulated revenues to cross-subsidize other competitive activities. For this purpose, the costs associated with unregulated activities are excluded from allowed revenues entirely if they are separately accounted for. Otherwise, revenues generated from unregulated activities are deducted from the regulated businesses' OPEX allowance or allowed revenues.

The latter is usually implemented when there is no reliable mechanism for allocating costs between the regulated and unregulated activities; and/or if there would not be significant distortionary impacts regarding both the electricity network tariffs and the markets for the unregulated services (assuming competition can be developed in those segments); or if the costs/revenues from the unregulated activities are immaterial. Taxes, fees, and levies are the most common type of OPEX to categorize as uncontrollable. Other types of OPEX classified as uncontrollable include salaries and wages; system losses; ancillary services; costs generated by force majeure; fuel costs; and connection charges.

Firms may have incentives to capitalize operating costs to beat the OPEX incentives during the current review period in the hope that they will be included in the regulatory asset value during the next review period. Incentives for OPEX reduction can be improved by allowing companies to retain OPEX underspent at their own discretion. Under GAAP rules, revenues are to be reported net of amounts written off as uncollectible. FERC guidance reports bad debts as an operating expense. For financial reporting purposes, while the FERC chart of accounts includes the expense portion of uncollectible accounts as an operating expense, GAAP require these expenses to be reported as a decrease in operating revenues. Because it is rare that uncollectible amounts are material to financial statements, the presentation of the amounts would be at the utility's discretion. However, if uncollectible amounts are material to the financial statements, the utility should follow GAAP requirements.[42]

Statutory accounting (U.S. GAAP)	Regulatory accounting (USOA)
• Revenues are to be reported net of amounts written off as uncollectible (i.e., the expense portion of uncollectible accounts to be reported as a decrease in operating revenues)	• FERC guidance reports bad debts as an operating expense. • If uncollectible amounts are material to the financial statements, the utility should follow GAAP requirements.

Estimated billing amounts that will not be collected should be recognized for each billing period. This is an application of the matching concept (i.e., matching amounts billed to the future uncollectibility of an estimable percentage of those amounts). Estimates of uncollectible amounts billed can be developed based on historical collections and adjusted for other known factors. The estimate is recorded as a counter-asset to customer accounts receivable, which would be a more accurate estimate of expected collections. The history of the write-off of customer accounts receivable balances is used to develop an ongoing estimate of future uncollectible amounts.

Bad debts force utilities to trade off profits for survival. When towing the line between bad debts, failed collections efforts and a stringent regulatory environment, utilities are forced to take the 'write-off' route even if it means giving up on the revenue they are rightly owed.[43] Operating revenue is the first account shown in the section on utility operating income. As its name suggests, this account is designed to accumulate the money made from providing regular electric utility services and carrying out related tasks. As was already established, this is a broad term that by itself offers no degree of specific details regarding the earnings of an electric company.

[42] "Advanced Public Utility Accounting Guidebook." American Public Power Association. 2019.
[43] "How a Predictive Analytics-based Framework Helps Reduce Bad Debts in Utilities." WNS.

Two types of revenues are: sales of electricity and other operating revenues. These accounts give a breakdown of the revenues according to the typical client types that utilities service, such as residential, business, etc. As a result, they must reflect the revenue obtained from the actual sale of electricity to the end user. The sum of the applicable utility rates per unit of electricity and the quantity of electricity units, either energy in kilowatt hours (kWh) or demand in kilowatts (kW), should be represented in these accounts.

When the amounts of customer service and facility charges are included in the rate schedules, they also include other amounts billed to the customer in relation to the recovery of the expenses of providing electric service. Other operating revenue accounts indicate numerous other revenue streams that an electric utility may experience throughout its operations that are unrelated to the direct selling of energy. Bill payment discounts that customers forget to use, utility property rental income, sales of water and waterpower, and payment for third parties' electrical transmission services are a few examples of products that fall under this category.

The two accounts operation expense and maintenance expense are reflected below operating revenues. Operation expenses are the continuing costs associated with supporting the utility's regular operational activities. The costs associated with maintaining the capital plant, property, and equipment to ensure that it can continue to serve its intended purpose in support of the utility's continuous operations. Due to the USOA's assumption that no utility plant is connected to the other power supply, customer accounts, customer service, and sales services, no maintenance accounts are associated with these operations. According to the general technologies for power generation, namely steam (fossil), nuclear, hydro, and other, expenses related with the electricity generation are divided into four categories. In each of these functional groupings, the accounts mentioned under operations and maintenance are comparable.

However, the USOA gives each a distinct account number to enable separate accounting for each technology area as well as to customize the account descriptions to contain the right language and distinctive characteristics for each. Because they purchase all of their system energy requirements, many small public power utilities will only need to use the last group of accounts when it comes to the accounts for power production. Utility companies that use units for peak-demand hours that are often fueled by natural gas or oil also use the accounts under the other power generation category. Although certain public power systems fall within the steam (fossil), nuclear, and hydro categories, smaller utilities are more likely to use the other power generation and other power supply expenses accounts.

The operation and maintenance accounts specified for transmission and those defined for distribution contain a substantial amount of duplicate information. This is so because numerous tasks performed by these two utility functions are interchangeable. For instance, the same types of activities are included in distribution operation accounts, transmission operation accounts, and overhead line expenses, although they apply to different utility tasks.

1.4.2.2 Adjustments for Other Income and Deductions

There are no extra subsidiary detailed accounts for the remaining accounts included in the USOA's classification of utility operating income, which also excludes operating income, operating expenses, and maintenance expenses. The various depreciation and amortization costs for the recurring write-offs of capital and various deferred assets related to utility property are also provided by FERC. The second classified category on the utility income statement is other income and deductions. Both income and expenses are included in this part, just like in the utility operating income section. However, this classification allows for the accounting of the utility's net profit or loss on activities that are not pursued as part of the routine activities of providing consumers with electric utility services.

Non-utility activities include things like executing contract services, selling goods like appliances and light bulbs, and earning rental revenue through nonutility property leases. The category of other income and deductions contains accounts for a variety of problems affecting public electricity systems. The accounting of numerous interdepartmental or interfund actions between the electric department and the other municipal departments is specifically covered by these accounts. The use of workers from the electrical department to complete tasks for the parks department is one example.

The previous explanation of the above- and below-the-line notion should be reviewed by public electricity companies before deciding how to use the accounts in this categorization. The expenses listed in the accounts falling under this category would be considered below-the-line according to the definition of that phrase and would not be counted toward the utility's required revenue.

Statutory accounting (U.S. GAAP)	Regulatory accounting (USOA)
• Under GAAP, there is no classification provided and the calculation of current income taxes is only briefly discussed in ASC 740, with the exception of particular factors such the accounting for income tax uncertainty that affects current taxes.	• For FERC reporting, income tax expense amounts are classified in a variety of above-the-line and below-the-line accounts.
• Under GAAP, the liability for uncertain tax benefits should not be combined with the deferred tax accounts.	• Uncertain tax positions related to temporary differences must continue to be classified within the deferred tax accounts under FERC reporting.
• For GAAP, the acceptable policy is to include interest and penalties in income tax expense.	• Interest must be charged to the *other interest expense* account.

Interest expenses are listed after the other income and deductions categorization area on the income statement. The following table is a list of the interest-related accounts as specified by the USOA. This part contains all interest expenses for debt issued to fund the utility's capital projects and ongoing operations, both long-term and short-term. It also covers various costs incurred in connection with debt financing as well as the amortization charges of gains and losses on reacquired debt.

Allowance for borrowed funds used during construction – credit, (AFUDC) is used to account for the offset of interest that is capitalized to construction projects. Any value credited to this account represents a reduction in the interest expense on long-term debt that is subtracted from current net income. AFUDC can become a sizable portion of the project's overall cost. However, many small public power utilities do not use this account because they are not frequently involved in long-term building projects.

"Extraordinary items" is the last USOA category listed for the income statement. According to the USOA, this classification solely consists of two accounts: one for income and one for expenses. The following is how an extraordinary item is defined in stator accounting – events and transactions classified as extraordinary items stand out for their unusualness and rarity of occurrence. To be considered an extraordinary item, an occurrence or transaction must satisfy both of the following criteria:

- Unusual nature – considering the environment in which the business works, the underlying occurrence or transaction should exhibit a high degree of abnormality and be of a type that is obviously unconnected to, or only tangentially related to, the entity's regular and typical operations.
- Infrequency of occurrence – considering the context in which the company works, the underlying event or transaction should be of a sort that would not reasonably be expected to recur in the near future.

According to the USOA, an extraordinary item is one that, if reported otherwise, would materially affect the current year's income computed before extraordinary items. According to the USOA, an item must be more than five percent of net revenue (before the item's effect) in value in order to be

considered unusual. Public power systems hardly ever classify an event as an unusual item as a result of these extremely tight parameters.

1.5 Recommended Approach for Kazakhstan and Uzbekistan

Introduce uniform RAG for entities of each regulated sector
Current regulatory accounting legislation in Kazakhstan, the Decree of the Minister of National Economy of the Republic of Kazakhstan "On Approval of the Rules for the Formation of Tariffs" dated November 19, 2019, No. 90, assumes that regulated companies adopt IFRS accounting principles. At the same time, it provides no details in terms of asset classification and proposed useful life, cost classification, and accounting (e.g., recommendation on unified chart of accounts) that would be helpful to gather information in a unified format for proper analysis and benchmarking of the regulated companies.[44]

In Uzbekistan, starting from January 2021, tariffs for the generation, distribution, and transmission of electricity are approved on the basis of the Decree of the Cabinet of Ministers of the Republic of Uzbekistan "On measures to further improve the tariff policy in the electric power industry" No. 310 dated April 13, 2019, using the "costs plus" approach. The current tariff methodology does not provide any incentives for regulated companies in terms of optimizing costs and consumption for their own needs. At the same time, the tariff for the end consumer is formed by summing up the weighted average costs for the production, transmission, distribution, and supply of electricity.[45]

To comply with international practice, it is necessary to consider the need to introduce uniform RAG for entities of each regulated sector. This measure will allow standardization of the received financial and production information from the subjects of the same industry and to conduct a full analysis and comparison of the subjects' indicators.

Use of benchmarking analysis in the electricity industry
Implementing a standardized regulatory accounting guideline will allow stakeholders to use comparative analysis or benchmarking. It could be used as an instrument for setting standards, as the practice of comparing business processes and performance metrics, and also as a tool for continuous improvement activities. For instance, benchmarking energy efficiency allows for setting the difference in specific energy consumption and assessing the gap between the company and the comparison company standard. Therefore, benchmarking allows for selecting the most effective methods of evaluating, developing, and implementing new ideas in the field of energy efficiency. Moreover, using the benchmarking method allows the regulator to be less exposed to the risk of information asymmetry.

Use of technological solutions
Regarding the tariff review and approval process in Uzbekistan, according to the Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Measures to Further Improve the Tariff Policy in the Electricity Sector No. 310 dated April 13, 2019, natural monopolies submit an application and all the supporting documents in a paper format with the provision of electronic versions of the documents.[46]

In Kazakhstan, the subject of a natural monopoly applies for tariff review and approval in electronic form through the Monopolist Base web portal, managed by the Committee for the Regulation of Natural Monopolies. To upload an application, the regulated entity must register at the web portal and enter a digital encryption key. Any application may be viewed by customers or any other interested

[44] Decree of the Minister of National Economy of the Republic of Kazakhstan "On Approval of the Rules for the Formation of Tariffs" dated November 19, 2019, No. 90, https://online.zakon.kz/Document/?doc_id=33980963.
"Technical Assistance to Review Kazakhstan's tariff setting methodology and compare with best practices." NARUC. 2021.
[42] "In-depth review of the policy of the Republic of Uzbekistan in the field of energy efficiency." International Energy Charter. 2022.
[46] "Republic of Uzbekistan, the Cabinet of Ministers, the Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Measures to Further Improve the Tariff Policy in the Electricity Sector." LexUZ Online. https://lex.uz/uz/docs/4289882

parties without registration. Supporting documents should be submitted on paper or via electronic scans of paper documents through the Monopolist Base website. Currently, the majority of supporting documents are submitted in electronic form.

Submitting an application in electronic form is a big advantage that reduces unnecessary workload and bureaucracy. However, it was noted that some tariff applications are voluminous (i.e., up to 30,000 pages in Kazakhstan). Therefore, the tariff approval process needs further development in terms of reducing the number of supporting documents to be submitted and simplification of supporting documentation requirements to minimize size.

Given all the aforementioned, one of the key recommendations for the regulators would be development of an information technology solution/improvement of the current web portal in terms of the ability to upload the data needed for submission of a tariff application in a digital format (e.g., Excel tables, Word files, etc.). Natural monopolies, in turn, would need to configure mapping tables between accounting and tariff estimate formats to upload the data to the Monopolist Base or a similar database without much workload. It is also recommended that the regulator set up a system of flexible reports for a comparative analysis/benchmarking among the natural monopolies to identify "outliers."

2 Appendices

Appendix 1
Balance sheet trial balance account conversion: sample public power utility

Non-Uniform System		FERC Uniform System of Accounts		
Account	Existing Description	Account	FERC Description	Amount
Assets				
10100	Invest Pool – Operating	13600	Temporary Cash Investments	$1,880,000
10102	Invest Pod - Bond Sinking Fund	13400	Other Special Deposits	37,000
10303	Petty Cash	13500	Working Funds	1,000
11120	Allowance for Doubtful Accounts	14400	Accumulated Provision for Uncollectible Accounts – Credit	(5,000)
11190	Accounts Receivable - Customer Sales	14200	Customer Accounts Receivable	900,000
11191	Accounts Receivable – Other	14300	Other Accounts Receivable	125,000
11300	Interest Receivable	17100	Interest and Dividends Receivable	429,000
11700	Unbilled Utility Accounts Receivable	17300	Accrued Utility Revenues	755,000
13000	Due from Other City Funds	14610	Accounts Receivable from Associated	0
13500	Fuel Stock – Coal	15100	Fuel Stock	173,000
13601	Stores Expense Undistributed	16300	Stores Expense Undistributed	831,000
14310	Prepaids	16500	Prepayments	6,000
15100	Electric Plant in Service	10100	Electric Plant in Service	23,845,000
15200	Advances to Other Funds	14500	Notes Receivable from Associated Companies	44,000
15600	Completed Construction Not Classified	10600	Completed Construction Not Classified -	0
15900	Construction Work in Progress	10700	Construction Work in Progress - Electric	0
16000	Accumulated Depreciation	10800	Accumulated Provision for Depreciation of Electric Plant	(12,377,000)
			Total Assets	$16,644,000
Liabilities				
20200	Accounts Payable	23200	Accounts Payable	$191,000
20205	Withholdings Payable	24200	Miscellaneous Current and Accrued Liabilities	20,000
20250	Sales Tax Payable – Utilities	24100	Tax Collections Payable	40,000
20435	Accrued Interest Expense	23700	Interest Accrued	11,000
20800	Due to City Funds	23400	Accounts Payable to Other City Funds	83,000
22400	Accrued Vacation Payable	24200	Miscellaneous Current and Accrued Liabilities	90,000
23500	Bonds Payable	22100	Bonds	2,200,000
			Total Liabilities	$2,635,000
Fund Equity				
25100	Reserve for Sinking Fund	25300	Other Deferred Credits	$400,000
24200	Contributed Capital	20700	Premium on Capital Stock	45,000
27000	Unappropriated Retained Earnings	21600	Unappropriated Retained Earnings	13.089,000
27030	Current Net Income	21600	Current Net Income	475,000
			Total Fund Equity	$14,039,000
			Total Liabilities and Fund Equity	$16,644,000

Source: "FERC: Public Utility Accounting Manual." American Public Power Association. 2018, https://www.publicpower.org/system/files/documents/Public%20Utility%20Accounting%20Manual%202018.pdf

Appendix 2
Assets

Uniform System of Accounts

1. Utility Plant

101 Electric plant in service (Major only)
101.1 Property under capital leases
102 Electric plant purchased or sold
103 Experimental electric plant unclassified (Major only)
103.1 Electric plant in process of reclassification (Nonmajor only)
104 Electric plant leased to others
105 Electric plant held for future use
106 Completed construction not classified—Electric (Major only)
107 Construction work in progress—Electric
108 Accumulated provision for depreciation of electric utility plant (Major only)
109 Reserved
110 Accumulated provision for depreciation and amortization of electric utility plant (Nonmajor only)
111 Accumulated provision for amortization of electric utility plant (Major only)
112 Reserved
113 Reserved
114 Electric plant acquisition adjustments
115 Accumulated provision for amortization electric plant acquisition adjustments (Major only)
116 Other electric plant adjustments
118 Other utility plant
119 Accumulated provision for depreciation and amortization of other utility plant
120.1 Nuclear fuel in process of refinement, conversion, enrichment, and fabrication (Major only)
120.2 Nuclear fuel materials and assemblies—Stock account (Major only)
120.3 Nuclear fuel assemblies in reactor (Major only)
120.4 Spent nuclear fuel (Major only)
120.5 Accumulated provision for amortization of nuclear fuel assemblies (Major only
120.6 Nuclear fuel under capital leases (Major only)

2. Other Property and Investments

121 Nonutility property.
122 Accumulated provision for depreciation and amortization of nonutility property.
123 Investment in associated companies (Major only).
123.1 Investment in subsidiary companies (Major only).
124 Other investments.
125 Sinking funds (Major only).
126 Depreciation fund (Major only).
127 Amortization fund – Federal (Major only).
128 Other special funds (Major only).
129 Special funds (Nonmajor only).

3. Current and Accrued Assets

130 Cash and working funds (Nonmajor only).
131 Cash (Major only).
132 Interest special deposits (Major only).
133 Dividend special deposits (Major only).
134 Other special deposits (Major only).
135 Working funds (Major only).
136 Temporary cash investments.
141 Notes receivable.
142 Customer accounts receivable.
143 Other accounts receivable.
144 Accumulated provision for uncollectible accounts - credit.
145 Notes receivable from associated companies.
146 Accounts receivable from associated companies
151 Fuel stock (Major only).
152 Fuel stock expenses undistributed (Major only).
153 Residuals (Major only).
154 Plant materials and operating supplies.
155 Merchandise (Major only).
156 Other materials and supplies (Major only).
157 Nuclear materials held for sale (Major only).
158.1 Allowance inventory.
158.2 Allowances withheld.
163 Stores expense undistributed (Major only).
165 Prepayments.
171 Interest and dividends receivable (Major only).
172 Rents receivable (Major only).
173 Accrued utility revenues (Major only).
174 Miscellaneous current and accrued assets.
175 Derivative instrument assets.
176 Derivative instrument asset - Hedges

4. Deferred Debits

181 Unamortized debt expense.

182.1 Extraordinary property losses.	186 Miscellaneous deferred debits.
182.2 Unrecovered plant and regulatory study costs.	187 Deferred losses from disposition of utility plant.
182.3 Other regulatory assets.	188 Research, development, and demonstration expenditures (Major only).
183 Preliminary survey and investigation charges (Major only).	189 Unamortized loss on reacquired debt.
184 Clearing accounts (Major only).	190 Accumulated deferred income taxes
185 Temporary facilities (Major only).	

Source: Subchapter C – Accounts, Federal Power Act, https://www.govinfo.gov/content/pkg/CFR-2021-title18-vol1/pdf/CFR-2021-title18-vol1-part101.pdf

Appendix 3
Liabilities and equity

Uniform System of Accounts

1. Proprietary Capital

201 Common stock issued	211 Miscellaneous paid-in capital.
202 Common stock subscribed (Major only).	212 Installments received on capital stock.
203 Common stock liability for conversion (Major only).	213 Discount on capital stock.
204 Preferred stock issued.	214 Capital stock expense.
205 Preferred stock subscribed (Major only).	215 Appropriated retained earnings.
206 Preferred stock liability for conversion (Major only).	215.1 Appropriated retained earnings– Amortization reserve, federal.
207 Premium on capital stock (Major only).	216 Unappropriated retained earnings.
208 Donations received from stockholders (Major only).	216.1 Unappropriated undistributed subsidiary earnings (Major only).
209 Reduction in par or stated value of capital stock (Major only).	217 Reacquired capital stock.
210 Gain on resale or cancellation or reacquired capital stock (Major only).	218 Noncorporate proprietorship (Nonmajor only).
	219 Accumulated other comprehensive income.

2. Liabilities and Other Credits

Long-term Debt	*Other Noncurrent Liabilities*
221 Bonds.	227 Obligations under capital lease-non-current.
222 Reacquired bonds (Major only).	228.1 Accumulated provision for property insurance.
223 Advances from associated companies.	228.2 Accumulated provision for injuries and damages.
224 Other long-term debt.	228.3 Accumulated provision for pensions and benefits.
225 Unamortized premium on long-term debt.	228.4 Accumulated misc. operating provisions.
226 Unamortized discount on long-term debt - debit	229 Accumulated prov. for rate refunds
	230 Asset retirement obligations.

3.. Current and Accrued Liabilities

231 Notes payable.	239 Matured long-term debt (Major only).
232 Accounts payable.	240 Matured interest (Major only).
233 Notes payable to associated companies.	241 Tax collections payable (Major only).
234 Accounts payable to associated companies.	242 Miscellaneous current and accrued liabilities.
235 Customer deposits.	243 Obligations under capital leases-current.
236 Taxes accrued.	244 Derivatives instrument liabilities.
237 Interest accrued.	245 Derivative instrument liabilities-Hedges.
238 Dividends declared (Major only).	

4. Deferred Credits

251 Reserved.	257 Unamortized gain on reacquired debt.
252 Customer advances for construction.	

253 Other deferred credits. 254 Other regulatory liabilities. 255 Accumulated deferred investment tax credits. 256 Deferred gains from disposition of utility plant.	281 Accumulated deferred income taxes-accelerated amortization property. 282 Accumulated deferred income taxes-other property. 283 Accumulated deferred income taxes-Other.

Source: Subchapter C – Accounts, Federal Power Act, https://www.govinfo.gov/content/pkg/CFR-2021-title18-vol1/pdf/CFR-2021-title18-vol1-part101.pdf

Appendix 4

Income statement trial balance - account conversion: Sample public power utility

Non-Uniform System		FERC Uniform System of Accounts		
Account	Existing Description	Account	FERC Description	Amount
Revenues				
35000	Residential Sales	44000	Residential Sales	$2,337,000
35001	Commercial Sales	44200	Commercial and Industrial Sales	2,931,000
35002	Industrial Sales	44200	Commercial and Industrial Sales	3,124,000
35009	City Department Sales	44500	Other Sales to Public Authorities	229,000
35010	Interdepartmental Sales	44800	Interdepartmental Sales	324,000
36210	Interest on Pooled Operating Cash	41900	Interest and Dividend Income	152,000
37000	Customer Forfeited Discounts	45000	Forfeited Discounts	25,000
37003	Sale of Assets	42110	Gains on Dispositions of Utility Plant	1,000
37050	Bad Debts Recoveries	90400	Uncollectible Accounts	1,000
37058	Misc. Sales - Other	42100	Miscellaneous Non-operating Income	150,000
37065	Reconnection Charges	45100	Miscellaneous Service Revenues	8,000
37090	Other Revenue	45600	Other Electric Revenue	2,000
			Total Revenues	$9,284,000
Expenses	Department 11 – Electric			
7008	Supervision and Engineering	50000	Operation Supervision and Engineering	$453,000
7100	Vehicle Expense	50600	Miscellaneous Steam Power Expense	2,000
7600	Fuel – Coal	50100	Fuel – Steam Generation	46,000
7601	Fuel – Gas	54700	Fuel – Other Generation	2,626,000
7620	Station Expenses – Boiler Plant	50200	Steam Expense	10,000
7625	Station Expenses – Cooling Tower	50500	Electric Expense	140,000
7655	Supplies	50600	Miscellaneous Steam Power Expense	1,000
7656	Plant – Water	50600	Miscellaneous Steam Power Expense	108,000
7657	Plant – Steam	50300	Steam from Other Sources	6,000
7659	Plant – Sewer	50600	Miscellaneous Steam Power Expense	26,000
7775	Coal Handling Costs	50100	Fuel – Steam Generation	2,000
8050	Buildings	55200	Maintenance of Structures	1,000
8101	Boiler Plant	51200	Maintenance of Boiler Plant	220,000
8102	Electric Plant	51300	Maintenance of Electric Plant	172,000
8640	Small Tools and Equipment	50600	Miscellaneous Steam Power Expense	4,000
8650	Supplies	51400	Maintenance of Miscellaneous Steam	1,000
8900	Maintenance – Miscellaneous	51400	Maintenance of Miscellaneous Steam	7,000
9000	Depreciation	40300	Depreciation Expense	325,000
9050	Purchased Power	55500	Purchased Power	2,183,000
			Total Department 11	$6,333,000
Expenses	Department 13 – Electric Distribution			
7008	Supervision and Engineering	58000	Operation Supervision and Engineering	$35,000
7100	Vehicle Expense	58800	Miscellaneous Distribution Expense	15,000
7640	Customer Service Expense	58700	Customer Installations Expense	11,000
7655	Supplies	58800	Miscellaneous Distribution Expense	1,000
7660	Safety Equipment	58300	Overhead Line Expense	5,000
7700	Miscellaneous Operation Costs	58800	Miscellaneous Distribution Expense	2,000
8000	Supervision and Engineering	59000	Operation Supervision and Engineering	35,000

8050	Buildings	59100	Maintenance of Structures	4,000
8620	Station Equipment	59200	Maintenance of Station Equipment	1,000
8621	Overhead Lines	59300	Maintenance of Overhead Lines	130,000
8622	Underground Lines	59400	Maintenance of Underground Lines	46,000
8630	Street Lighting and Signal	59600	Maintenance of Street Lights and Signal	36,000
8635	Meters	59700	Maintenance of Meters	32,000
8640	Line transformers	59500	Maintenance of Line Transformers	6,000
8645	Tools and Equipment	59800	Maintenance of General Distribution	16,000
8900	Miscellaneous	59800	Maintenance of General Distribution	2,000
8950	PCB Testing and Disposal	59800	Maintenance of General Distribution	17,000
9000	Depreciation	40300	Depreciation Expense	298,000
			Total Department 13	$692,000
Expenses	Department 14 – Customer			
7600	Customer Account Costs	90300	Customer Records and Collection	$64,000
7650	Uncollectible Accounts	90400	Uncollectible Accounts	3,000
			Total Department 14	$67,000
Expenses	Department 15 –Admin/General			
7005	PERA	92600	Employee Pensions and Benefits	$62,000
7006	Social Security	40810	Taxes Other Than Income Taxes	63,000
7007	Health and Life Insurance	92600	Employee Pensions and Benefits	117,000
7009	Medicare	40800	Taxes Other Than Income Taxes	15,000
7028	Administrative and General	93020	Miscellaneous General Expenses	285,000
7029	Data Processing	92300	Outside Services Employed	78,000
7030	Office Supplies and Expenses	92100	Office Supplies and Expenses	1,000
7033	Admin. – Subscriptions/Memberships	92100	Office supplies and Expenses	7,000
7034	Travel, Conferences and Schools	92100	Office Supplies and Expenses	2,000
7036	Fire and Extended Coverage	92400	Property Insurance	48,000
7037	Worker's Compensation	92600	Employee Pensions and Benefits	27,000
7038	Communications	93020	Miscellaneous General Expenses	5,000
Expenses	Department 15 – A&G continued			
7039	Legal Fees	92300	Outside Services Employed	$1,000
7040	Transfer to City	92700	Franchise Requirements	489,000
7041	General Liability Insurance	92400	Property Insurance	46,000
7042	Vehicle Insurance	92400	Property Insurance	4,000
7044	Boiler and Machinery Insurance	92400	Property Insurance	44,000
7050	Vacation, Sick and Other Pay	92000	Administrative and General Salaries	178,000
7055	Cost of Sales - Private Customer	42100	Miscellaneous Nonoperating Income	68,000
7058	Cost of Sales – Other	42100	Miscellaneous Nonoperating Income	1,000
7060	Miscellaneous General Expenses	93020	Miscellaneous General Expenses - Other	1,000
7080	Permits, Fees and Leases	93100	Rents – Administrative and General	9,000
7085	Obsolete/Surplus Inventory	42120	Loss on Disposition of Property	4,000
8450	Office Furniture and Equipment	93500	Maintenance of General Plant	1,000
8800	Building	93500	Maintenance of General Plant	1,000
9001	Interest Expense Bonds	42700	Interest on Long-term Debt	144,000
9005	Consultant Fees	92300	Outside Services Employed	14,000
9065	Bond Discount	42800	Amortization of Debt Discount and	2,000
			Total Department 15	$1,717,000
Expenses	Department 16 – Capital			
5005	Buildings	10700	CWIP	$5,000
5010	Machinery and Equipment	10700	CWIP	27,000
5015	Vehicles	10700	CWIP	16,000
5020	Tools and Work Equipment	10700	CWIP	22,000
5025	Office Furniture and Equipment	10700	CWIP	2,000
5050	Improvements – Computer	10700	CWIP	4,000
5100	Construction Work in Progress	10700	CWIP	28,000
5302	Meters and Regulators	10700	CWIP	30,000
5305	Overhead Conductors and	10700	CWIP	56,000

5306	Underground Conductors and	10700	CWIP	151,000
5307	Downtown Mall Project – PUC	10700	CWIP	15,000
5308	South Substation	10700	CWIP	146,000
5309	Boiler Plant Improvements	10700	CWIP	40,000
5350	Line Transformers and Switches	10700	CWIP	75,000
5355	69 KV Transmission Line (East)	10700	CWIP	5,000
5356	69 KV Transmission Line (West)	10700	CWIP	14,000
5360	Northside Substation	10700	CWIP	157,000
5391	Capitalization of Fixed Assets	10700	CWIP	(793,000)
			Total Department 16	$0
			Total Expenses	$8,809,000
			Net Income	$475,000

Source: "FERC: Public Utility Accounting Manual." American Public Power Association. 2018.

Appendix 5
Classifications of revenues and expenses

Uniform System of Accounts

1. Utility Operating Income

400 Operating revenues.	400 Operating revenues.
401 Operation expense.	401 Operation expense.
402 Maintenance expense.	402 Maintenance expense.
403 Depreciation expense.	403 Depreciation expense.
404 Amortization of limited-term electric plant.	404 Amortization of limited-term electric plant.
405 Amortization of other electric plant.	405 Amortization of other electric plant.
406 Amortization of electric plant acquisition adjustments.	406 Amortization of electric plant acquisition adjustments.
407 Amortization of property losses, unrecovered plant and regulatory study costs.	407 Amortization of property losses, unrecovered plant and regulatory study costs.
407.3 Regulatory debits.	407.3 Regulatory debits.
407.4 Regulatory credits.	407.4 Regulatory credits.
408 Reserved.	408 Reserved.
408.1 Taxes other than income taxes, utility operating income.	408.1 Taxes other than income taxes, utility operating income.
409 Reserved.	409 Reserved.
409.1 Income taxes, utility operating income.	409.1 Income taxes, utility operating income.
410 Reserved.	410 Reserved.
410.1 Provisions for deferred income taxes, utility operating income.	410.1 Provisions for deferred income taxes, utility operating income.
411 Reserved.	411 Reserved.
411.1 Provision for deferred income taxes- Credit, utility operating income.	411.1 Provision for deferred income taxes- Credit, utility operating income.
411.3 Reserved.	411.3 Reserved.
411.4 Investment tax credit adjustments, utility operations.	411.4 Investment tax credit adjustments, utility operations.
411.6 Gains from disposition of utility plant.	411.6 Gains from disposition of utility plant.
411.7 Losses from disposition of utility plant.	411.7 Losses from disposition of utility plant.
411.8 Gains from disposition of allowances.	411.8 Gains from disposition of allowances.
411.9 Losses from disposition of allowances.	411.9 Losses from disposition of allowances.
412 Revenues from electric plant leased to others.	412 Revenues from electric plant leased to others.
413 Expenses of electric plant leased to others.	413 Expenses of electric plant leased to others.
414 Other utility operating income.	414 Other utility operating income.

2. Operating Revenues

1. Sales of Electricity	1. Sales of Electricity
440 Residential sales.	440 Residential sales.
442 Commercial and industrial sales.	442 Commercial and industrial sales.
444 Public street and highway lighting.	444 Public street and highway lighting.
445 Other sales to public authorities (Major only).	445 Other sales to public authorities (Major only).
446 Sales to railroads and railways (Major only).	446 Sales to railroads and railways (Major only).

447 Sales for resale. 448 Interdepartmental sales. 449 Other sales (Nonmajor only). 449.1 Provisions for rate refunds. 2. Other Operating Revenues 450 Forfeited discounts. 451 Miscellaneous service revenues. 453 Sales of water and water power. 454 Rent from electric property. 455 Interdepartmental rents. 456 Other electric revenues. 456.1 Revenues from transmission of electricity. 457.1 Regional transmission service revenues. 457.2 Miscellaneous revenues	447 Sales for resale. 448 Interdepartmental sales. 449 Other sales (Nonmajor only). 449.1 Provisions for rate refunds. 2. Other Operating Revenues 450 Forfeited discounts. 451 Miscellaneous service revenues. 453 Sales of water and water power. 454 Rent from electric property. 455 Interdepartmental rents. 456 Other electric revenues. 456.1 Revenues from transmission of electricity. 457.1 Regional transmission service revenues. 457.2 Miscellaneous revenues

3. Other Income and Deductions

Other Income 415 Revenues from merchandising, jobbing, and contract work. 416 Costs and expenses of merchandising, jobbing, and contract work. 417 Revenues from nonutility operations. and related activities. 417.1 Expenses of nonutility operations. 418 Nonoperating rental income. 418.1 Equity in earnings of subsidiary companies (Major only). 419 Interest and dividend income. income and deductions. 419.1 Allowance for other funds used during construction 421 Miscellaneous nonoperating income. 409.3 Income taxes, extraordinary items. 421.1 Gain on disposition of property. *Other Income Deductions* 421.2 Loss on disposition of property. Credit, other income, and deductions. 425 Miscellaneous amortizations 411.2 Provision for deferred income taxes 411.5 Investment tax credit adjustments, non-utility operations. 420 Investment tax credits	426 Reserved. 426.1 Donations 426.2 Life insurance. 416 Costs and expenses of merchandising, 426.3 Penalties 426.4 Expenditures for certain civic, political, and related activities. 426.5 Other deductions. *Taxes Applicable to Other Income & Deductions* 408.2 Taxes other than income taxes, other income, and deductions. 409.2 Income tax, other income, and deductions. 409.3 Income taxes, extraordinary items. 410.2 Provision for deferred income taxes, other income, and deductions. 411.2 Provision for deferred income taxes- Credit, other income, and deductions. 411.5 Investment tax credit adjustments, non-utility operations. 420 Investment tax credits

4. Interest Charges

427 Interest on long-term debt. 428 Amortization of debt discount and expense. 428.1 Amortization of loss on reacquired debt. 429 Amortization of premium on debt-Cr. during construction – Credit. 429.1 Amortization of gain on reacquired debt-Cr	430 Interest on debt to associated 431 Other interest expense. 432 Allowance for borrowed funds used 429 Amortization of premium on debt-Cr. during construction – Credit.

5. Extraordinary Items

434 Extraordinary income.	435 Extraordinary deductions.

Source: "Subchapter C – Accounts, Federal Power Act." https://www.govinfo.gov/content/pkg/CFR-2021-title18-vol1/pdf/CFR-2021-title18-vol1-part101.pdf

3 Bibliography

1. "Accounting for Infrastructure Regulation: An Introduction." The World Bank. 2008. https://openknowledge.worldbank.org/bitstream/handle/10986/6426/439720PUB0Box310only109780821371794.pdf?sequence=1&isAllowed=y
2. "Advanced Public Utility Accounting Guidebook." American Public Power Association. 2019. https://www.publicpower.org/system/files/documents/AdvancedPUA_%20SuppManual.pdf
3. "Assessment of Accounting System in Public Enterprises: A Case of Ethiopian Electric Utility." SMU. 2017. https://scholar.smu.edu/cgi/viewcontent.cgi?article=1298&context=smujrnl
4. "Benchmarking Analysis in Electricity Distribution." CEPE. 2005. https://ec.europa.eu/energy/sites/default/files/documents/2005_benchmarking_analysis_electricity_distribution.pdf
5. "Benchmarking Electric Utility Energy Efficiency Portfolios in the U.S." American Council for an Energy-Efficient Economy (ACEEE). 2011. https://www.mjbradley.com/sites/default/files/M.J.%20Bradley%20%26%20Associates%20LLC%20-%20Benchmarking%20Electric%20Utility%20Energy%20Efficiency%20Portfolios%20in%20the%20U.S.%20%28September%202011%29.pdf
6. "Big Data Issues and Opportunities for Electric Utilities." Renewable and Sustainable Energy Reviews. 2015. https://www.sciencedirect.com/science/article/pii/S1364032114009375
7. "Competition in Electricity Markets." OECD. 2001. https://www.oecd-ilibrary.org/finance-and-investment/competition-in-electricity-markets_9789264183030-en
8. "Electricity Regulation In the U.S.: A Guide." RAP. 2011. https://www.raponline.org/wp-content/uploads/2016/04/Electricity-Regulation-in-the-US-A-Guide_RAP_2011.pdf
9. "ERRA tariff and pricing committee: procedures and rules for the examination of documents on tariff approvals." Kema International V.B. 2007. https://pdf.usaid.gov/pdf_docs/PNADS315.pdf
10. "Ethiopian Energy Authority - Cost of Service Study (COSS) Introduction Manual." USAID & NARUC. 2021. https://www.naruc.org/globalassets/global/usa/ethiopia/resources/ethiopian-energy-authority---cost-of-service-study-coss--introduction-manual.pdf
11. "FERC: Public Utility Accounting Manual." American Public Power Association. 2018. https://www.publicpower.org/system/files/documents/Public%20Utility%20Accounting%20Manual%202018.pdf
12. Boulle, Michael. "Global Experience of Unbundling National Power Utilities." 2019. https://www.researchgate.net/publication/332407850_Global_Experience_of_Unbundling_National_Power_Utilities
13. "How a Predictive Analytics-based Framework Helps Reduce Bad Debts in Utilities." WNS. https://www.wns.com/insights/articles/articledetail/283/how-a-predictive-analytics-based-framework-helps-reduce-bad-debts-in-utilities
14. "In-depth review of the policy of the Republic of Uzbekistan in the field of energy efficiency." International Energy Charter. 2022. https://www.energycharter.org/fileadmin/DocumentsMedia/Publications/Policies___Strategies/IEC-Uzbekistan_EE-Policy-Review_2022.pdf
15. "Intelligent Automation in Energy and Utilities Global Automation Research Series: Energy and Utilities." Capgemini. 2019. https://www.capgemini.com/us-en/wp-content/uploads/sites/4/2020/02/2019-Intelligent-Automation-in-Energy-and-Utilities.pdf
16. "International Comparisons of Electricity Restructuring: Considerations for Japan." CIFE. 2004. https://cife.stanford.edu/sites/g/files/sbiybj6146/f/international_comparison_of_electricity_restructuring.pdf
17. Legal Information Service. "On Natural Monopolies." Legal Information Service. "About the Electric Power Industry." http://www.legalinfo-service.uz/acts/on-natural-monopolies.html, http://www.legalinfo-service.uz/acts/about-electric-power-industry.html

18. "Overview of Accounting Systems." NARUC. https://pubs.naruc.org/pub.cfm?id=538E66C7-2354-D714-51E9-23D0C31CD7BB
19. "Public Utility Accounting: a Public Power System's Introduction to the Federal Energy Regulatory Commission Uniform System of Accounts." American Public Power Association. 2012. https://www.publicpower.org/system/files/documents/APPA-DEED-Public-Utility-Accounting.pdf
20. "The Cabinet of Ministers, the Decree of the Cabinet of Ministers of the Republic of Uzbekistan on Measures to Further Improve the Tariff Policy in the Electricity Sector." Republic of Uzbekistan. https://lex.uz/uz/docs/4289882
21. "Regulatory Accounting Guidelines." OFGEM. 2001. https://www.ofgem.gov.uk/publications/regulatory-accounting-guidelines
22. "Regulatory assets and regulatory liabilities – A proposed new IFRS Standard." KPMG. 2021. https://home.kpmg/content/dam/kpmg/xx/pdf/2021/05/regulatory-assets-and-liabilities-kpmg.pdf
23. "Regulatory Accounting: A Primer for Utility Regulators." USAID & NARUC. 2019. https://www.naruc.org/international/Documents/Regulatory%20Accounting%20Primer%20for%20Utility%20Regulators%20(USAID%20NARUC%202019).pdf
24. "Technical Assistance to Review Kazakhstan's Tariff Setting Methodology and Compare with Best Practices." NARUC. 2021. https://www.naruc.org/international/Documents/NARUC-Kazakhstan-Tariff-Report-2021.pdf
25. "Strengthening Utilities and Promoting Energy Reform (Super), Utility Unbundling and Electricity Market Reform." USAID. 2014. https://www.usaid.gov/sites/default/files/documents/1860/SUPER_Utility_Unbundling_and_Electricity_Market_Reform_Fact_Sheet_508.pdf
26. "Subchapter C – Accounts, Federal Power Act." U.S. Government. https://www.govinfo.gov/content/pkg/CFR-2021-title18-vol1/pdf/CFR-2021-title18-vol1-part101.pdf
27. "Technical Assistance to Review Kazakhstan's tariff setting methodology and compare with best practices." NARUC. 2021. https://www.naruc.org/international/our-work/eurasia-country-partnership/kazakhstan/technical-assistance-to-review-kazakhstan-s-tariff-setting-methodology-and-compare-with-best-practices/
28. Tleppaev A.M., Zeinolla S.Zh. "The Concept of Benchmarking to Improve Energy Efficiency in the Republic of Kazakhstan." Bulletin of KazNU. 2015. https://articlekz.com/article/15308?ysclid=l6dipmnwfa411430881
29. "The role of regulatory accounts in regulated industries." OFGEM. 2001. https://regulationbodyofknowledge.org/wp-content/uploads/2013/03/Ofgem_Role_of_Regulatory.pdf

For questions regarding this publication, please contact
Meghan Riley (mriley@naruc.org)
Erin Hammel (ehammel@naruc.org).

National Association of Regulatory Utility Commissioners (NARUC)
1101 Vermont Ave, NW, Suite 200
Washington, DC 20005 USA
Tel: +1-202-898-2210
www.naruc.org