



Staff Report Item 10

TO: East Bay Community Energy Board of Directors

FROM: Nick Chaset, Chief Executive Officer
Supria Ranade, Director of Power Resources

SUBJECT: **Energy Risk Management Policies and Regulations**

DATE: February 7, 2018

Staff Recommendation

- A. Approve EBCE's Energy Risk Management Policies and Regulations, which include requirements related to:
 - a. Volume matching based on defined time-price matrices
 - b. Cost-at-Risk evaluation of energy portfolio
 - c. Stringent credit requirements for counter parties
 - d. Portfolio Diversification

- B. Delegate authority to CEO to form a Risk Oversight Committee to monitor EBCE adherence to Energy Risk Management Policies and Regulations

Background

Energy Risk Management Policy and Regulations

The primary purpose of the Energy Risk Management Policy and Regulations (ERM) is to identify risks associated with the procurement of the power supply, identify those responsible for administering the various elements of the risk management policy from procurement operations to oversight, and to set policy parameters for managing risk associated with procuring and hedging the power supply portfolio.

The Board will receive a presentation from EBCE's Director of Procurement regarding the development of EBCE's load profile and procurement recommendations based on projected needs for base load energy supply, shaped energy (off-peak, on-peak and super-peak energy), renewable

energy, carbon-free hydropower, and resource adequacy (including system, local and flex capacity). The procurement of power range from the hour-ahead market to multi-year power purchase agreements (PPAs).

The Scope of the Policy provides an overview of the types of risks managed through application of the Energy Risk Management Policy and also identifies types of risks which are not addressed by the Policy.

Scope of ERM

This Energy Risk Management Policy and Regulations (ERM) addresses risks arising from EBCE participation in the Western Interconnection energy markets and applies to all transactions into which EBCE enters. This ERM does not address the following types of general property and casualty business risk: fire, accident and casualty; health, safety, and workers' compensation; general liability; and other such typically insurable perils. The term "risk management," as used herein, is therefore understood to refer solely to risks related to participation in wholesale energy markets as herein defined.

EBCE is exposed to three quantifiable risks: load and resource variability (volumetric), cost variability (price), and counterparty credit risk. Additionally, for ECBE, demand variability is largely attributable to three factors: (1) changes in demand related to the weather, (2) changes in demand related to economic activity, and (3) changes in demand related to customers joining and exiting ECBE service. This third portion of demand uncertainty is unique to CCA's and the risks associated with it need to be carefully considered. From the perspective of risk mitigation, EBCE's primary objective is to cover load and optimize the value of assets. Taking risks in order to arbitrage market opportunities or risks unrelated to EBCE's normal power supply business activities is not permitted.

EBCE is also exposed to regulatory and operational risks. However, these exposures are not quantifiable as they affect structural change. As a result, these risk categories are managed as separate enterprise risk exposures and are not directly governed by this Energy Risk Management Policy, but are addressed in the Energy Risk Regulations.

This policy prescribes the management organization, authority and processes to monitor, measure and control the risks to which EBCE is exposed in the normal course of business. Specific methodologies used to measure, monitor and control these risks shall be established by the Executive Director's Risk Oversight Committee (ROC) in accordance with sound utility practices and included in the Energy Risk Management Regulations.

EBCE's wholesale electricity cost is expected to be over 90% of the CCA operating expenses. In the early years of its operation, EBCE will rely heavily on purchases from the power market which fluctuates on an hourly basis and will have a significant impact on wholesale electricity costs.

EBCE Staff will be working with NCPA to purchase power and enter into transactions to hedge electricity prices on an ongoing basis, as needed to fill load demand. Each of these transactions can be several million dollars and are typically transacted within 2 hours from the time prices are

offered by the supplier, to the time transaction confirmations are executed. This short time frame cannot accommodate the need to seek Board approval for each transaction and generally requires that oversight must be conducted using a different approach. The attached ERM Policy and Regulations provides for internal controls, a Risk Oversight Committee and other measures consistent with power industry standards and the majority of utilities and energy companies.

Attachments

- A. Energy Risk Management Policies
- B. Energy Risk Management Regulations



Energy Risk Management Policy

Version 1.0

Approved
DATE

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1. Philosophy, Objectives and Scope

This Energy Risk Management Policy (ERMP) outlines the philosophies and objectives of East Bay Community Energy (EBCE) Board of Directors (Board). The Energy Risk Management Regulations (ERMR) also adopted by EBCE expand on the roles, strategies, controls and authorities authorized in this policy to form a comprehensive energy risk management program. The ERMR shall be read in conjunction with this ERMP.

1.1. Risk Philosophy

The overall goal of this ERMP is to:

- Serve the participating jurisdictions' needs subject to Board approved risk tolerance limits;
- Provide as much energy supply (generation and capacity) cost certainty for EBCE's customers as possible while maintaining a least cost supply portfolio; and
- Enhance the value of EBCE's assets to meet the financial goals and requirements of the participating jurisdictions.

As a joint powers authority, EBCE is in the business of generation, transmission and procurement of energy for the benefit of its participating jurisdictions. EBCE's objective is to develop the least cost supply portfolio to meet load requirements of its customers, while maximizing revenues from sales of surplus energy, capacity and other wholesale energy and transmission services (e.g. resource optimization). However, unlike a private-sector entity, EBCE's primary purpose in the power supply business is to serve its customers. EBCE's goal is to be a cost hedger for its participating jurisdictions' load and, is therefore, precluded by this policy from engaging in speculative activities typical to many organizations orientated toward profit maximization.

EBCE management recognizes that certain risks are incidental to normal power supply operations and hedging activities. EBCE's goal is to avoid unnecessary risk and to limit, to the extent practicable, any risks associated with normal cost-hedging activities. This document serves as a vehicle to describe and define the limits for activities considered as appropriate for EBCE in a normal course of business.

1.2. Business Activities

A primary part of EBCE's main business is to procure or produce power supplies, capacity, and reserves to meet its customer load requirements. The resource (capacity/energy) supply portfolio may consist of physical assets, such as power plants and distributed energy resources, fixed and variable priced supply contracts of varying lengths, and agreements for other related supplies and services needed to ensure reliable delivery of electricity to EBCE's customers.

1.3. Transacting Objectives

EBCE's overall transacting objective is to meet the load requirements of its customers with an

optimized resource supply portfolio. EBCE's objectives when transacting on behalf of its customers for the procurement of energy and energy related supplies and services are as follows:

- Meet customer load requirements including energy, capacity and reserves;
- Provide stable rates for the participating jurisdictions;
- Obtain the best available price for power supply while complying with the requirements of this policy and other objectives established by the Board (e.g. renewable energy policy goals);
- Manage EBCE's assets to optimize value;
- Act to limit exposure to extreme market system changes;
- Follow effective wholesale counterparty credit management procedures; and
- Develop and maintain EBCE's investment grade credit rating.

1.4. Scope of Policy

This ERMP addresses risks arising from EBCE's participation in the wholesale energy markets, and applies to all energy and energy related transactions made by EBCE. This ERMP does not address the following types of general property and casualty business risk: fire, accident and casualty; health, safety, and workers' compensation; general liability; and other such typically insurable perils. The term "risk management," as used herein, is therefore understood to refer solely to risks related to participation in wholesale energy markets as herein defined.

EBCE is exposed to three quantifiable risks: load and resource variability (volumetric), cost variability (price), and counterparty credit risk. From the perspective of risk mitigation, EBCE's primary objective is to cover load and optimize the value of assets. Taking risks in order to arbitrage market opportunities, or risks unrelated to EBCE's normal power supply business activities, is not permitted.

EBCE is also exposed to regulatory and operational risks. However, these exposures are not quantifiable as they affect structural change. As a result, these risk categories are managed as separate enterprise risk exposures and are not directly governed by this ERMP.

This ERMP prescribes the management organization, authority and processes to monitor, measure and control the risks to which EBCE is exposed in the normal course of business. Specific methodologies used to measure, monitor and control these risks shall be established by the Executive Director's Risk Oversight Committee (ROC), in accordance with sound utility practices and included in the ERMR.

1.5. Applicability

This ERMP is effective immediately upon its adoption by the Board. It applies to EBCE's wholesale supply operations, long-term contracting for energy/capacity and services, acquisition of generation resources, credit risk management and other related ancillary activities undertaken by EBCE.

1.6. Policy Review and Amendments

Prudence is required in implementing any and all policies and procedures. Market and industry norms, technology and risk tolerances tend to change over time. Therefore, this policy should be reviewed as needed, in order to make adjustments in response to changes in business objectives and/or industry norms. Amendments to this ERMP shall be done only by approved Resolution of the Board.

2. Risk Strategy & Parameters

An important aspect of implementing an overall energy risk management policy is the development of related strategies to mitigate all of the related risks associated with energy transacting activities. The key strategies of EBCE are outlined below.

2.1. Counterparty Risk Management

Counterparty risk is defined as the exposure to economic loss resulting from default by a party to a contract (e.g., a *counterparty*). Counterparty risk affects both contracts requiring physical settlement and those specifying monetary settlement. For all fixed price energy transactions, the counterparty must possess at least a BBB- (or equivalent investment grade rating) by a nationally recognized statistical rating organization (NRSRO). EBCE staff may consider counterparties with a rating below investment grade, or a counterparty without a NRSRO rating on a case-by-case basis, with the approval of the ROC.

Effective wholesale counterparty management and credit analysis is essential to mitigate the counterparty risks associated with commodity transactions in the energy markets. The objective is to preserve EBCE's capital, liquidity, and supply reliability by limiting counterparty credit risk and supplier concentration to acceptable levels. Methodologies to achieve this objective are set forth in the ERMR.

2.2. Balanced Load

EBCE shall maintain an integrated and balanced portfolio of resources to cover its customer load within a dual volume and cost-at-risk framework.

2.3. Minimum Coverage Requirements

EBCE shall establish minimum coverage requirements, combined with defined cost-at-risk metrics, for capacity and energy as determined by the ROC and outlined in the ERMR.

2.4. Diversification of Portfolio

EBCE shall strive to develop a resource portfolio that includes diversification in fuel type, contract duration, geographic location, counterparty, pricing terms, cash reserves and types of products.

2.5. Purchase to Cover Load Serving Obligations - No Speculation

As discussed in Section 1.3, EBCE's overall objective for energy procurement activities is to cover the load serving obligations of its customers. In the course of performing these activities, EBCE shall not engage in activities that expose its participating jurisdictions to speculative transactional risks, and shall only utilize approved transaction parameters as determined by the ROC and outlined in the ERM.

2.6. Use of Derivatives and Financial Transactions

Use of financial derivatives or transactions (as opposed to physical or "embedded" options) is allowed in limited circumstances by EBCE. These include transactions used to set price caps and floors, or hedge against load/price volatility. Examples include:

- Exchange traded Puts and Calls;
- Electric Futures;
- Electric Options; and
- Weather Derivatives.

Use of certain types of financial derivatives is necessary in order to mitigate various risks outlined in this policy while optimizing the resource portfolio. Such types of allowable financial derivatives or transactions (but not individual transactions) must be approved by the ROC as outlined in the ERM as developed by the ROC in accordance with this policy.

3. Risk Controls

3.1. Control Principles

EBCE will strive to conduct its energy risk management activities in accordance with best practices of the energy industry, but implementing such practices must be cost justified and balanced between costs and benefits. Processes and control systems must be in place that allow EBCE to identify, measure, monitor, control and track its risk exposures. These processes and control systems shall include the following risk management control principles:

- Appropriate segregation of duties and internal controls will be used;
- Appropriate systems to ensure accurate and effective management reporting;
- Necessary resources in place to achieve management objectives;
- Attract and retain skilled and trained personnel;
- Cross-train and provide cross coverage;
- Employees conducting energy transactions are free of conflicts of interest;
- Authority and approval delegation is commensurate with accountability and capability;
- Performance measurement and reporting incorporate risk and return measures; and
- Ongoing monitoring of control effectiveness.

3.2. Internal Controls

Internal controls shall be based on proven principles that meet the stringent requirements of generally accepted auditing standards (GAAS), financial institutions and credit rating agencies. The required controls shall include all customary and usual business practices designed to 1) prevent errors and improprieties, 2) ensure accurate and timely reporting of results of operations and other information pertinent to management, and 3) facilitate attainment of business objectives.

3.3. Segregation of Duties

Responsibilities related to energy transacting shall be segregated in a manner consistent with the control principles listed above by means of clearly defined roles and responsibilities for the Front Office, Middle Office and Back Office operations. Such roles and responsibilities can also be provided by a qualified third party services provider. Specific roles, responsibilities and organizational structure of these functions are outlined in Section 4 of the ERMP.

These controls shall be fully integrated into all business activities of EBCE, and there shall be active participation by senior management in risk management processes.

3.4. Conflicts of Interest

All EBCE employees who are engaged in energy supply resource transactions, counterparty credit evaluation, or oversight of the foregoing and are employed in any job classification listed in the EBCE Conflict of Interest Code are required to complete annual conflict of interest filings on FPPC Form 700 and disclose investments as required by that code.

In addition to the foregoing disclosure requirement, EBCE employees engaged in energy supply resource transactions, counterparty credit evaluation or oversight of the foregoing, are barred from investing in any company with whom EBCE has consummated energy or related purchases or sales within the last two years.

Such employees must divest existing direct holdings in energy counterparties prior to engaging in any negotiating, evaluating, transacting or oversight functions. The ban on investment and requirement for divestment applies regardless of whether or not the investment would be of sufficient size (\$2,000) to require disclosure on FPPC Form 700.

EBCE employees supervising staff who are subject to this policy are responsible for routinely reviewing Form 700 of each such staff member for the purpose of identifying potential financial conflicts of interest. General Counsel will assist in reviewing these forms and providing legal advice in connection with such reviews upon request.

4. Roles, Responsibilities, & Organization

This section of the ERMP defines the overall roles and responsibilities for implementation of this ERMP. The coordinated efforts of personnel across several divisions are required to successfully

implement EBCE's risk management program. Section 4 of the ERMP outlines the basic roles and responsibilities of each organizational function. Specific details and the specific roles and responsibilities of the oversight and operational divisions within the energy risk management program structure at EBCE are outlined in the ERMR, as developed by the ROC and revised from time to time.

4.1. EBCE Board of Directors

The Board has the ultimate oversight over EBCE operations and is responsible for establishing an organizational-wide framework for risk management and ensuring that risk management results are achieved as planned. The Board shall approve and establish organizational policies for risk management and delegate to the Executive Director the responsibility for implementing the ERMP. With responsibility for the ultimate oversight over EBCE operations, the Board shall be responsible to insure the risk management results are achieved in accordance with the ERMP.

4.2. Executive Director

The Executive Director has overall responsibility for implementing the ERMP and for communicating risk management issues to the Board. The Executive Director shall be responsible for delegating specific duties for carrying out the policy and insuring compliance with it by all affected EBCE employees or contractors. The Board acknowledges that the Executive Director shall established the ROC as a member/staff function and may delegated certain functions to the ROC, which delegation is ratified by this ERMP.

4.3. Risk Oversight Committee

The Risk Oversight Committee (ROC) is responsible for overseeing compliance with risk management policies within EBCE. The ROC serves as the highest level of organizational risk management reporting to the Executive Director. The ROC shall consist of EBCE Management, participating jurisdictional representatives and EBCE's legal counsel, as designated by the Executive Director from time to time. A quorum for the ROC to do business shall be not less than three Committee members (including not less than one participating jurisdictional representative) or their designees.

The two participating jurisdictional representatives shall be appointed to the ROC by the Executive Director. These participating jurisdictional representatives shall reflect the diversity of EBCE's customers (including larger and smaller jurisdictions). The participating jurisdictions may nominate potential ROC members. The Executive Director shall select ROC representatives based on those recommendations.

Each ROC member shall have one vote, and may appoint a voting alternate with the approval of the Executive Director. Participating jurisdictions not represented on the ROC may send representatives to attend ROC meetings and participate in ROC discussions; however, these non-ROC participants will have no voting rights.

The ROC will meet at least quarterly, to act on the responsibilities mentioned above. Individual

participating jurisdictions may request the ROC to convene in a timely fashion if ROC approval is required for any transaction affecting EBCE. Minutes to each meeting will be maintained according to EBCE policy.

The ROC shall make regular reports to the Board regarding business transacted by the ROC at such intervals as the Board shall direct.

The ROC shall have the responsibility for ensuring that business is conducted in accordance with the ERMP. The ROC shall adopt and keep current “Energy Risk Management Regulations,” which shall define in detail the internal controls, strategies and processes for managing risks covered under the ERMP. Specific ROC responsibilities are outlined in detail in the ERM.

4.4. Front Office (Planning and Procurement)

The Front Office is responsible for resource planning and procuring resources to meet the physical, financial and contractual requirements of EBCE, with load/resource balancing provisions and such other arrangements as may be approved by the Board in the future. The function includes contract administration, managing the risk assumptions for electricity transactions, including physical and financial needs analyses, energy purchases and sales, procurements of capacity, ancillary services and coordinating energy delivery scheduling. The Front Office is responsible to ensure that the procedures and processes needed to transact business within the ERMP are in place and they perform all duties related to actual transacting in the wholesale energy markets. The Front Office is the primary interface with potential wholesale transacting counterparties. The Executive Director and Director of Power Resources are responsible for managing the Front Office, and can be supported by qualified third party suppliers. Front Office activities and detailed responsibilities are outlined in the ERM.

4.5. Middle Office Controls and Reporting

The duties of the Middle Office will be conducted by the Finance and Administrative Services Department, and/or are supported by a qualified third party supplier. Its primary purpose is to manage risk oversight and controls. The Middle Office provides independent oversight of the risks assumed by the Front Office in the course of transacting energy products and services. The Middle Office must be independent from the Front Office functions. The Director of Finance and Administrative Services is responsible for managing the Middle Office. Detailed responsibilities of the Middle Office are described in the ERM.

4.6. Back Office (Settlements and Recording)

The Back Office is primarily responsible for settlement of bills, recording transactions, bookkeeping and accounting, and contract compliance. It is responsible for providing assurance of accurate transaction records and settlements. Back Office functions are conducted by personnel in the Finance and Administrative Services Department, and/or are supported by a qualified third party supplier. Detailed responsibilities of the Back Office are described in the ERM.

4.7. Auxiliary Functions

Additional issues impacting the overall power supply and risk management program include establishment of financial reserve requirements, which are generated by auxiliary support functions in the Finance and Administrative Services Department.

The Finance and Administrative Services Department is responsible for preparation of the budget and the calculation of rates used to bill customers for their related power supply usage. In addition, the Finance and Administrative Department is responsible for establishment of necessary reserve levels for the various projects owned by EBCE, if any, and for the EBCE in general. The Finance and Administrative Services Department is also responsible for establishment of reserves necessary for credit risks related to counterparty credit as mentioned in the ERMP, but as more clearly defined in the ERMR.

4.8. Authorities, Delegations, Limits and Prohibitions

All executed transactions shall conform to the policies set forth herein. It shall be the responsibility of the ROC, with approval of the Executive Director, to establish appropriate individual transacting authority limits for the various personnel involved in the Front Office function. All staff with designated responsibility for Middle Office or Back Office functions are strictly prohibited from executing any wholesale transactions. The Middle Office shall be responsible for informing counterparties of such approved authorizations, including transacting authority and restrictions, along with product types and/or term and dollar limits.

5. Policy Compliance

5.1. Compliance Exceptions

Compliance exceptions are actions which violate the authority limits or directives set forth herein or in the ERMR as developed and adopted pursuant hereto by the ROC.

5.2. Reporting of Exceptions

The Executive Director shall notify the ROC of exceptions to mandated policies, procedures and regulations within 48 hours after they are identified, and ensure Front Office prepare a full report for review and discussion at the next ROC meeting.

5.3. Audit

Compliance with this ERMP and with the specific ERMR requirements instituted pursuant to this ERMP, shall be subject to examination by EBCE's independent auditors or by such other reviewers that EBCE or ROC may appoint to evaluate the effectiveness of mandated controls.

5.4. Reserves

The ROC and the Executive Director, or his/her designee, are responsible for ensuring adequate

reserves for energy price exposure and credit losses are maintained by EBCE. The reserve estimate methodology, as established by the Finance and Administrative Services Department, shall be reviewed and approved as needed to ensure appropriate reserve levels are maintained and funded.

5.5. Systems, Tools and Training

EBCE employees who are authorized to perform energy risk management functions on behalf of EBCE shall be provided with the necessary systems and tools to support all risk management processes.

Provision shall be made in the budgets submitted for each division which performs market risk management functions on behalf of EBCE for the acquisition and maintenance of computer systems, software, communications equipment, data services and other analytical, measurement and reporting tools.

Provision shall also be made in the budgets submitted for each EBCE division/department which performs market risk management functions on behalf of EBCE for managers and staff to attend seminars and courses in risk management on a regular basis.



ENERGY RISK MANAGEMENT REGULATIONS

Version 1.0

Effective:
DATE

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Objective of the Energy Risk Management Regulations

East Bay Community Energy (EBCE) provides a variety of wholesale and retail energy services to customers within the service areas of its participating jurisdictions (Participating Members). EBCE's goals regarding the provision of such services include, but are not limited to: (i) optimizing the value of EBCE's generation assets, (ii) providing its Participating Members with the lowest cost supply portfolio based on certain policies that may be adopted by the Board from time to time (e.g., renewable energy policy goals), and (iii) maintaining reliable electric service to its Participating Members' customers. Inherent in these goals is the need to manage risks related to transacting in various Energy markets, and providing other wholesale Energy and transmission services on behalf of the Participating Members (e.g., resource optimization).

The purpose of these Energy Risk Management Regulations (Regulations) is to utilize the philosophies and objectives specified in the Energy Risk Management Policy, and document and describe the roles, strategies, controls and authorities that will govern EBCE's comprehensive energy risk management program.

Part I: Energy Risk Management

1. Scope of Regulations and Procedures

1.1. Overview

The EBCE Board will adopt an Energy Risk Management Policy (ERMP) which addresses risks faced by EBCE arising from EBCE's procurement activities on behalf of Participating Members in Energy and related markets. EBCE will develop two-pronged set of metrics that guide procurement decisions that include a rigorous analysis of net open position limits by month (discussed further in Appendix 9) and a cost-at-risk which may include but not limited to total portfolio cost at risk, rate at risk, and cost per wholesale MWh at risk. The ERMP provides for oversight by the Risk Oversight Committee (ROC) and mandates adoption of these Regulations by the ROC to address specific risk management issues. Controls, strategies and processes for managing risks outlined in the ERMP are documented in these Regulations.

1.2. Applicability, Amendments and Updates

These Regulations are initially made effective upon the Board's adoption of the ERMP, and shall subsequently be amended and/or restated from time to time by action of the ROC, when deemed necessary, by the ROC.

2. Definitions of Risk

The term "risks," as used herein, refers specifically to those categories of risk which relate to EBCE's participation in wholesale Energy markets for the purchase and sale of Approved Products, as further described in these Regulations. These risks include, but are not limited to, volumetric, price, counterparty, regulatory and political, and operational risks.

2.1. Volumetric Risk

Volumetric risk is the risk that fluctuations in supply or demand will adversely affect net revenues. Thus, if actual load demands are higher than anticipated, and market prices have increased beyond expectations, the costs to serve such load will be greater than expected. Alternately, if load demands are less than expected, then surplus supply may be sold back into the market. If market prices have declined since the Energy was originally purchased, the ability to serve load at least cost may be impacted. For ECBE, demand variability is largely attributable to three factors: (1) changes in demand related to the weather, (2) changes in demand related to economic activity, and (3) changes in demand related to customers joining and exiting ECBE service. This third portion of demand uncertainty is unique to CCA's and the risks associated with it need to be carefully considered. If supply availability is uncertain, such as when hydroelectric generation capacity is impacted by uncertain rainfall patterns, a resulting shortfall in generation may necessitate the purchase of alternative supply through the wholesale market when prices may be rising, which may also result in increased costs. Volumetric risk also covers the possibility of the unplanned loss of generation resources, transmission curtailments, and extreme weather events that can result in insufficient resources to meet load demands.

Volumetric risk is managed by maintaining financial reserves, diversifying the resource portfolio and developing a regular update of load and resource forecasts.

2.2. Price Risk

Price risk is the risk associated with changes in the market prices of Energy and Energy related products. Price risk is the possibility that the absolute price of a given Energy related product will fluctuate in an unfavorable manner, thereby exposing EBCE to potential cost increases or loss in value to its Participating Members. ECBE will be exposed to price risk any time its fixed-price supply does not perfectly match demand. There are a number of ways that supply and demand may be mismatched. In its simplest form, demand may exceed supply, and any unhedged demand is exposed to changes in prices. With renewable supply, it is common that the production profile of the supply resource does not match the consumption profile of customers. Since hourly prices for electricity vary greatly within the day, this creates risk. This is referred to as “shape” risk. Another mismatch results from locational differences – an entity with generation in one region serving load in another region is exposed to price differences between the two regions. This is referred to as “basis” risk. These risks can manifest themselves over different time periods ranging from sub-hourly mismatches to long term mismatches.

Price risk is managed by closely monitoring and measuring the supply portfolio against estimated demand. The supply portfolio should be constructed to match resources against load obligations taking into account the various risks. Supply portfolios can benefit from resource and fuel source diversification, start dates, duration, pricing terms, types of products, geographic location, and by actively managing portfolios and assets.

Example of Price Risk

ECBE will focus on the price risk of its entire portfolio which is comprised of many individual transactions. When managing risk, ECBE will care about the impact of all of the transactions in the portfolio rather than a single transaction. That said, the portfolio is comprised of a series of individual transactions, and the examples below illustrate how the value of an individual transaction can be impacted by changes in prices.

For example, assume EBCE needs to buy 10,000 MWh of electric power for the last quarter of the coming year (October through December). On January 15th, the market price for that power was \$28.90/MWh, for a total cost of \$289,000. On March 15th, the market value was \$39.00/MWh, or \$390,000. If the budget was set as of the January 15th market price, but the product was not purchased until March 15th, then the cost would be \$101,000 more than budgeted.

Price risk can be viewed as the possibility of a change in the MTM value of a transaction. To illustrate this definition, assume as above that the 10,000 MWh for October – December was purchased on March 15 for \$390,000. If the price for that product drops to \$25/MWh or \$250,000 on September 15th, the MTM of the transaction is negative \$140,000 as of September 15th.

2.3. Counterparty Credit Risk

Counterparty credit risk means risks which EBCE incurs as the result of transacting Approved Products with other entities. It must be understood that in the context of wholesale electric utility operations, both buyers and sellers may be exposed to counterparty credit risks. These risks are of five general types:

- Transacting counterparties may fail to render payment for Energy related products delivered, or otherwise default under the terms of the transaction;
- Transacting counterparties may fail to deliver Energy related products;
- Transacting counterparties may fail to take delivery of Energy related products sold to them, necessitating a resale elsewhere (potentially at a loss) of the Energy related products;
- Counterparties may refuse to extend credit to EBCE; and
- A counterparty or its guarantor may seek bankruptcy protection.

Counterparty credit risk can be mitigated through counterparty diversification, credit risk premium, covenants, credit derivatives (credit default swaps) and insurance.

2.4. Regulatory and Political Risk

Regulatory and political risks are the risks that regulatory agencies, courts and legislatures may take actions or adopt measures which:

- Result in fines, assessments or other unrecoverable costs;
- Make a transaction unlawful or adversely change the its economic benefit;
- Adversely affect market prices or liquidity, leading to trading losses and stranded asset costs;
- Impair the capability or willingness of EBCE's trading counterparties and wholesale suppliers to perform;
- Prevent EBCE from performing to its own contractual obligations;
- Interfere with operation of EBCE's generation or related assets; or
- Negatively impact EBCE's ability to finance capital projects.

Regulatory and political risks are difficult to measure and manage. EBCE has an active legislative and regulatory strategy which monitors and influences the outcome of legislative and regulatory actions for the benefit of EBCE and its Participating Members.

2.5. Operational Risk

Operational risk consists of the potential failure to act effectively to plan, execute and control business activities. Operational risk includes the potential for:

- An organizational structure that is ineffective in addressing risk (i.e., the lack of sufficient authority to make and execute decisions, inadequate supervision, no internal controls, incomplete and untimely reporting, failure to separate incompatible functions, etc.);
- Absence, shortage or loss of key personnel;
- Lack or failure of facilities, equipment, systems and tools such as computers, software, communications links and data services;

- Inability to finance capital projects or meet financial obligations incurred in the course of wholesale operations;
- Exposure to litigation or sanctions as a result of violating laws and regulations, not meeting contractual obligations, failure to address legal issues and/or receive competent legal advice, not drafting and analyzing contracts effectively, etc.; and
- Errors or omissions in the conduct of business, including failure to execute transactions, violation of guidelines and directives, etc.

Operational risk can be managed by adequate oversight and the existence of and adherence to contracts, policies, regulations, and procedures. Operational risk is reduced by streamlined and well defined simple processes managed by skilled and competent staff with appropriate supporting physical and technological resources and appropriate oversight.

2.6. Market Risk

Market risk is manifested by the interdependencies of a market where the failure of a single entity or cluster of entities that may or may not be counterparties can cause a cascading failure which could affect an entire market.

2.7. Legal Risk

Legal risk arises when a counterparty or a Participating Member is not capable of entering into, or has procedurally failed to obtain appropriate approvals to enter into, a contract. Legal risk is managed externally by ensuring counterparty representatives are authorized by the counterparty. Regarding long-term contracts, EBCE will manage legal risk by rigorously vetting and reviewing wholesale electricity contracts with appropriate legal and market experts.

2.8. Concentration Risk

Concentration risk denotes the overall spread of exposures over the number or variety of counterparties. Concentration risk is calculated using the percentage of outstanding exposures each counterparty represents. Concentration risks may result from an uneven distribution of exposures to an individual counterparty, or an uneven distribution of exposures to particular sectors or regions.

Concentration Risk is managed pursuant to Section 18.3 of Part II of these Regulations which requires staff to document the business reasons for awarding Energy contracts to counterparties to whom EBCE has high concentrations of credit exposure.

2.9. Liquidity Risk

Liquidity risk is financial risk due to uncertain liquidity. Liquidity risk may include the risk of insufficient net cash flows on a short term basis, lack of access to credit facilities, the inability to liquidate an asset or position on short notice, and the risk of maintaining explicit liquidity reserves.

EBCE mitigates counterparty liquidity risk with regular, up-to-date credit evaluations; mitigates internal liquidity risks with adequate deposits from Participating Members (if required); and mitigates asset

liquidity risk by utilizing contractual instruments (e.g., approved enabling agreements).

2.10. Custodial Credit Risk

Custodial credit risk is the risk that, in the event of the failure of a custodial asset holder, an entity would not be able to recover the value of its deposits, investments or collateral securities that are in the possession of the custodian.

Custodial credit risk is mitigated by keeping deposits at FDIC insured institutions below insurance thresholds and actively monitoring the creditworthiness of the custodian.

2.11. Business Risk

Business risks are the risks inherent in EBCE's operations and environment that may impair its financial sustainability. These risks include the risks listed in this Section 2, in addition to the risks of creating and maintaining production and administrative facilities.

Business risks are mitigated by adequate planning and budgeting, training of staff and maintaining appropriate insurance coverage.

3. Risk Management Strategies

An important aspect of implementing an overall energy risk management program is the development of related strategies to mitigate all of the related risks associated with Energy product trading activities. The key strategies used by EBCE are outlined below.

3.1. Balanced Portfolio

EBCE shall strive to maintain an integrated and balanced portfolio of resources to cover its Participating Members' load serving obligations, and maintain the value of EBCE's assets, and manage resources within EBCE's financial requirements and within a dual volume and cost-at-risk framework, integral to EBCE's risk management strategy. The "cost at risk" will be designed to capture all of the volume mismatches, basis risk, shape risk, and other balancing risks associated with a given wholesale electricity contract.

3.2. Minimum Coverage Requirements

3.2.1. Minimum Coverage Requirements for Energy

EBCE shall strive to manage price and volatility risk by implementing a diversified procurement strategy that involves purchasing energy products to hedge costs for serving load. EBCE shall strive to purchase amounts of energy based on defined minimum coverage thresholds as set forth in the Time-Price Coverage Matrix combined with a cost-at-risk metric contained in Appendix 9 (Recommended Coverages) of these Regulations. The Time-Price Coverage Matrix, along with the cost-at-risk metric will be used as a guide for EBCE's short term and long-term procurement strategies. The objective of the dual framework is to develop a procurement strategy focused on hedging against the risk of open load positions, as measured over time, and to mitigate EBCE's exposure to market price volatility and

other pricing risk. The actual covered positions taken by EBCE, reflected as a percentage of forecasted load, may deviate from the recommended coverages contained in the dual framework based upon EBCE's staff evaluation of current market conditions and other applicable requirements (e.g., regulatory requirements).

3.2.2. Minimum Coverage Requirements for Capacity

EBCE is required to acquire certain types and amounts of Resource Adequacy capacity, as further set forth in applicable requirements. Such rules, including the CPUC Decisions, establish minimum Resource Adequacy requirements in accordance with policies adopted by EBCE's respective Local Regulatory Authority. Pioneer shall acquire the types and amounts of capacity required to comply with the Resource Adequacy requirements established by its respective Local Regulatory Authority.

3.3. Diversification of Portfolio

EBCE shall strive to develop an integrated resource portfolio that includes a minimum level of diversification in fuel type, contract duration, geographic location, counterparties, pricing terms, cash reserves and types of products.

3.4. Purchases to Cover Load Serving Obligations (No Speculation)

EBCE's primary objective for energy product procurement activities is to cover the load serving obligations of its Participating Members. In the course of performing these activities, EBCE shall not engage in activities that expose EBCE to speculative trading risks, and shall only utilize approved products and transaction parameters as approved by the ROC, and defined in these Regulations.

3.5. Authority to Transact Approved Products

The type of Energy related products EBCE may transact will have a direct impact on the amount of risk EBCE assumes as a result of such activities. The types of Energy related products that EBCE is authorized to transact (herein after referred to as "Approved Products") are specifically identified in Appendix 6 of these Regulations.

4. Roles and Responsibility for Energy Risk Management

4.1. Board of Directors

The Board has the ultimate responsibility for oversight of EBCE's operations, and is responsible for establishing an organizational framework for risk management and for ensuring that risk management results are achieved as planned. The Board has approved and established organizational policies for risk management, and has delegated to the Executive Director the responsibility for implementing the ERMP. The Board is responsible for ensuring appropriate results are achieved in accordance with the ERMP. The Board shall perform an annual review of the ERMP and modify the policies, as needed.

4.2. Executive Director

The Executive Director has day-to-day responsibility for executing and ensuring compliance with the ERMP, and for communicating risk management issues to the Board. The Executive Director shall ensure clear lines of authority and responsibility for assessing, measuring, and managing the risks of EBCE, and for monitoring the functionality of all components of the risk management system. The Executive Director may delegate specific duties for carrying out the policy and insuring compliance by all affected EBCE employees or contractors.

4.3. Risk Oversight Committee

The ROC is responsible for overseeing EBCE's compliance with the ERMP. The ROC serves as the highest level of organizational risk management reporting to the Executive Director. The members of the ROC consist of the Executive Director, Director of Finance and Administrative Services, Director of Power Resources, and two (2) Participating Member representatives. EBCE's legal counsel shall serve as legal advisor to the ROC. The ROC may seek the advice of other advisors at its discretion, including EBCE's Wholesale Energy Services Provider. A quorum of the ROC consists of not less than three ROC members, or their designees, including at least one Participating Member representative. A quorum of the ROC shall be required for the ROC to conduct business.

The two (2) Participating Member representatives shall be appointed to the ROC by the Executive Director. These Participating Member representatives shall reflect the diversity of EBCE's participating jurisdictions (e.g., both larger and smaller Participating Member representation). EBCE's Participating Members may also nominate potential ROC members. The Executive Director shall select Participating Member representatives based on these recommendations. Participating Member representatives shall be appointed for a term of two (2) years.

Each ROC member shall have the right to cast one (1) vote per issue, and may appoint a voting alternate with the approval of the Executive Director. Participating Members that are not represented on the ROC may attend ROC meetings and participate in ROC discussions; provided, however, non-ROC Participating Members will have no voting rights.

The ROC will meet at least quarterly, or as needed, to carry out the responsibilities described in these Regulations. Individual Participating Members may request the ROC to convene at any time, in a timely fashion. Minutes of each meeting will be maintained by EBCE staff.

The ROC shall provide a report to the Board at least annually, regarding the business activities of the ROC, or at such other interval as directed by the Board.

The ROC is responsible for ensuring that EBCE's risk management practices are conducted in accordance with the ERMP and these Regulations. The ROC shall adopt and keep current these Regulations, which shall define in detail the internal controls, strategies and processes for managing risks covered under the ERMP.

ROC responsibilities and delegated authorities are:

- Establishing overall risk tolerances related to Approved Product transactions and counterparty credit risk;

- Reviewing and approving Exception Reports to the ERMP and these Regulations;
- Setting, changing and approving the design of all internal control processes related to energy risk management and Approved Product transactions;
- Assessing the adequacy and functioning of the system of controls over volumetric, price and counterparty credit risks;
- Reviewing all statistical modeling parameters, risk tolerances, risk factors and/or risk weights associated with all Approved Product transaction strategies;
- Reviewing and recommending changes to ERMP policies, the types of Approved Product transactions and controls (e.g., limits, risk/performance methodology, etc.), including the addition of new products and instruments as described in these Regulations;
- Recommending appropriate cash reserve levels to support EBCE's Approved Product transaction activities;
- Reviewing the ERMP, and recommending any amendments to the Board;
- Reviewing and assessing the adequacy of the risk reports generated by the risk management function;
- Ensuring that the results of risk management activities are reported to the Board, and all risk management reports are provided to the Board in accordance with Appendix 7 of these Regulations, or as necessary;
- Reviewing and recommending appropriate transaction authority levels and delegation of authority to EBCE personnel, related to Approved Product transactions; and
- Reviewing, recommending and approving changes to these Regulations, as needed.

Specific responsibilities of the ROC members and advisors are described in Appendix 2 of these Regulations.

4.4. Front Office

The Front Office staff is responsible for the provision of wholesale energy services, which include, but are not limited to, planning and portfolio management, Approved Product transacting, contract origination, schedule coordination and real-time dispatch operations. The Front Office provides recommendations for load and resource balances, and portfolio optimization. These activities are conducted in order to meet the physical, financial and contractual requirements of EBCE. As part of these functions, the Front Office is responsible for transacting Approved Products on behalf of EBCE, in accordance with certain transactional limits, as further defined in these Regulations. All Approved Products that the Front Office is authorized to transact are identified in Appendix 6 of these Regulations. The Front Office is responsible for ensuring that the procedures and processes needed to transact business within the requirements and guidelines of the ERMP and these Regulations are fully implemented, and shall perform all duties related to actual transacting in the wholesale Energy markets. The Front Office is the primary interface with potential wholesale transacting counterparties. The Director of Power Resources is responsible for managing the Front Office. The Front Office may also utilize support from EBCE's Wholesale Energy Services Provider to carry out the duties described herein.

The Front Office is primarily responsible for:

- Day-to-day purchases and sales of Approved Products for EBCE;

- Developing transaction strategies that are consistent with EBCE's ERMP and established risk tolerances;
- Ensuring infrastructure (hardware/software) is in place to support accurate and timely measurement and reporting of risk;
- Ensuring that procedures and systems can effectively and efficiently support the Front Office activities;
- Ensuring training is completed by Front Office staff, as required by CAISO, to comply with minimum participation requirements for participation in CAISO markets;
- Conducting needs analysis for meeting load forecasts, optimizing the value of resources, and satisfying regulatory and/or compliance requirements;
- Recommending transactions for authorization and approval;
- Proposing modifications to commercial provisions of Board approved contracts to the Executive Director for consideration and approval;
- Purchasing and/or selling Approved Products and services based on meeting the load forecast, optimizing the value of EBCE assets, and satisfying regulatory and/or compliance requirements;
- Conducting sales transactions for surplus resources;
- Nominating and managing CRRs in the annual and monthly allocation processes;
- Preparing and submitting bids in the CRR annual and monthly auction processes;
- Transacting Approved Products to satisfy applicable regulatory and compliance requirements (e.g., renewable Energy requirements, emission compliance obligations, etc.);
- Development and maintenance of Renewable Energy Products tracking and allocation;
- Competitively shopping and negotiating transactions in accordance with the ERMP;
- Generating trade confirmations (as needed);
- Ensure transactions are recorded timely and accurately, and that valuation and risk measurement are performed according to approved methodologies;
- Working with the Middle Office to develop and implement risk measurement methodologies and quantitative applications, where appropriate;
- Identifying new products and markets that may add value to EBCE;
- Prepare reports as outlined in Appendix 7 of these Regulation;
- Initiate requests for new counterparty reviews; and
- Prepare and maintain written Front Office procedures.

4.5. Middle Office

The duties of the Middle Office staff are conducted by the Finance and Administrative Services Department. Its primary purpose is to manage risk oversight and controls. The Middle Office provides independent oversight of the risks assumed by the Front Office in the course of transacting Approved Products and services. The Middle Office must be independent from the Front Office functions. The Director of Finance and Administrative Services is responsible for managing the Middle Office. The Middle Office may also utilize support from EBCE's Wholesale Energy Services Provider to carry out the duties described herein.

The Middle Office is responsible for oversight, reporting and training; including:

- Managing and overseeing risk, including reviewing controls and reviewing valuation and risk management methodologies;
- Developing and implementing counterparty credit risk policies, procedures and limits as approved by the ROC;
- Reviewing and approving changes and provisions to enabling agreements (including all credit terms);
- Monitoring EBCE's current and potential risk exposures and ensuring compliance with the ERMP and these Regulations;
- Ensuring Middle Office training is completed;
- Verifying that Approved Product transactions are authorized and executed based on the requirements of the ERMP and these Regulations, and are properly recorded in the deal capture systems;
- Monitoring the effectiveness of the internal control structure, including the segregation of duties and independence of oversight;
- Maintaining a list of individuals who are authorized to approve and execute Approved Product transactions;
- Ensuring timely and accurate collection of market data for risk measurement and reporting;
- Conducting necessary stress test on portfolio exposure and CVaR models;
- Preparing, reviewing and distributing all risk management reports;
- Processing and verifying market data provided by the Front Office;
- Maintaining independent market forward price data;
- Evaluating performance of Approved Product procurement and hedging transactions relative to market indices and approved budget;
- Notifying the ROC of credit limit exceptions;
- Working with the Front Office to develop and implement risk measurement methodologies and quantitative applications;
- Serving as secretary of the ROC, developing ROC agendas, taking and compiling meeting minutes, and distributing meeting materials;
- Maintaining archives of risk management program documents;
- Monitoring and ensuring compliance with the Commercial Compliance Policy;
- Coordinating risk management education and training;
- Various credit management duties as outlined in these Regulations; and
- Prepare and maintain written Middle Office procedures.

4.6. Back Office

The Back Office staff is primarily responsible for settlement of invoices, verifying transactions, bookkeeping and accounting, and ensuring Approved Product transactional activities are consistent with contract authorities and requirements. The Back Office is responsible for providing assurance of accurate transaction records and settlements. The Director of Finance and Administrative Services is responsible for managing the Back Office. The Back Office may also utilize support from EBCE's Wholesale Energy Services Provider to carry out the duties described herein.

The Back Office is responsible for the following duties:

- Crosschecking counterparties confirmation documents for individual trade transactions to EBCE's own records of those transactions, and investigating and resolving exceptions;
- Ensuring settlements are made timely and in accordance with contract terms;
- Verifying and reporting compliance with procedures as reflected in the transaction tracking documentation;
- Ensuring that operations and systems can effectively and efficiently support the processing of approved transactions;
- Performing and supporting transaction allocations, invoicing and settlements;
- Development and maintenance of GHG Compliance Instrument tracking and allocation;
- Monitoring accounts receivable and payable;
- Verification of transaction data entry; and
- Preparing and maintaining written Back Office procedures.
- Disputing any charges from the ISO.

4.7. Auxiliary Functions

Other functions in support of and relevant to risk management are conducted by EBCE staff who are not directly including within the Front Office, Middle Office and Back Office functions. These include some contract administration functions, load forecasting and managing financial reserves.

Long term planning and forecasting of Energy supply requirements (long term supply plans) are developed by EBCE analytical support personnel who are not part of the Front Office transacting function.

The Finance and Administrative Services Department is responsible for preparation of the budget, and amounts billed for Approved Product transactions. Finance and Administrative Services Department staff also establish necessary financial reserve levels related to counterparty credit requirements for EBCE in general. These auxiliary functions may also be supplied to EBCE by EBCE's Wholesale Energy Services Provider.

5. Authorities, Limits and Prohibitions

5.1. Individual Trading Authority and Transaction Limits

All executed transactions shall conform to the policies set forth in the ERMP and these Regulations. It shall be the responsibility of the ROC, with approval of the Executive Director, to establish appropriate individual trading authority limits for the various staff involved in the Front Office function. All Middle Office and Back Office staff are strictly prohibited from executing any Approved Product transactions. The Middle Office shall confirm that the Front Office has informed EBCE's counterparties of changes in Front Office staff authorized to trade within seven (7) business days. Unless or except as recommended by the ROC from time to time, and approved by the Executive Director, trading authority limits for individual transactions shall be as outlined in Appendix 4 of these Regulations.

5.2. Permitted Transactions and Approved Products

The ROC is responsible for authorizing and approving all Approved Products that may be transacted by EBCE. Transacting Energy related products that are not authorized as Approved Products by the ROC is strictly prohibited, unless the ROC grants an exception in advance.

All transactions shall conform to the following general principles:

- Be for an Approved Product;
- Be duly authorized and within risk limits, and shall not cause either aggregate or individual counterparty credit limits to be exceeded;
- Be executed with a counterparty with an approved credit limit;
- Shall utilize contract terms intended to minimize the risk of loss if a counterparty fails to deliver, take delivery or pay for transactions provided;
- Be executed and documented following standardized procedures; and
- Be in compliance with applicable laws, regulations and court orders.

Approved Products that have been authorized by the ROC are listed in Appendix 6 of these Regulations. Appendix 6 also contains certain limitations for each authorized Approved Product.

5.3. Unauthorized Transactions

Any member of staff who enters into an unauthorized transaction may be subject to disciplinary action up to and including termination of employment.

The following provides the minimum procedures for managing unauthorized transactions:

- If a transaction is unauthorized, the Executive Director shall determine the course of action. If the transaction involves market risk, the Executive Director may elect to either enter into a risk neutralizing transaction, or attempt to unwind the transaction with the original counterparty. However, the first alternative (offsetting transaction) only offsets market price; operational and credit risk may still exist. Unwinding the transaction would likely remove all risk from the trade.
- Once the corrective steps have been taken, the Executive Director shall review the transaction to ensure all risks have been offset and report the results in the Exception Report.

5.4. Process for Adding New Approved Products

All requests to add a new Approved Product to Appendix 6 must be analyzed by the Front Office, Middle Office, Back Office staff, and EBCE's legal counsel to determine what risks such product may create for EBCE, and what business needs exist that provide the basis for adding the new product to the Approved Products list. All requests to add a new Approved Product to these Regulations must be presented to the ROC for consideration, and if approved by the ROC shall be added to Appendix 6 as an Approved Product. Any product not listed as an Approved Product in Appendix 6 of these Regulations is considered to be a new product.

A report to the ROC recommending approval of a new Approved Product shall address the issues described in the New Product Approval Checklist contained in Appendix 5 of these Regulations. The

New Product Approval Checklist is a guideline for activities that should be performed in evaluating and mitigating the market and credit risks associated with use and deployment of new products.

Front Office staff have primary responsibility for developing the report to identify the business needs for the new Approved Product being requested, and an assessment of risks that EBCE may be exposed to by transacting the new Approved Product. Front Office staff are responsible for presenting the report to the ROC for consideration and approval. Primary responsibility may be delegated by Front Office staff to those individuals having special knowledge or expertise of the activity or new product type.

6. Systems, Tools and Training

EBCE employees (or supporting suppliers) who are authorized to perform energy risk management functions on behalf of EBCE shall be provided the necessary systems and tools to support all risk management processes, including:

- Access in real time to market activity, prices and other data;
- Systematically evaluating the financial condition, credit standing and ability to perform of other entities with whom EBCE does business;
- Analyze the trends of supply, demand, market prices and costs of service;
- Record transactions accurately and completely;
- Measure key indicators and risk parameters; and
- Generate complete and accurate management and financial reports.

Provision of funding shall be requested and made in the budgets submitted for each division that performs market risk management functions on behalf of EBCE, for the acquisition and maintenance of computer systems, software, communications equipment, data services and other analytical, measurement and reporting tools. Provision of funding shall also be requested and made in the budgets submitted for each EBCE division, which performs market risk management functions on behalf of EBCE for managers and staff to attend seminars and courses in risk management as required to comply with the ERMP and these Regulations.

7. Compliance Exceptions and Reporting

7.1. Compliance Exceptions

Compliance exceptions are actions which violate the provisions and/or requirements as set forth in the ERMP and these Regulations, and/or the procedures developed and approved by the ROC.

The following types of occurrences shall not be considered compliance exceptions:

- Losses incurred on wholesale transactions which were undertaken in compliance with the ERMP and these Regulations;
- Adverse changes in credit standing, financial condition or ability to perform of a wholesale trading counterparty which occur subsequent to the execution of a transaction or contract;
- Adverse changes in capital asset valuations, MTM exposures, or CVaR resulting from fluctuations in prices subsequent to the execution of a transaction or contract; and

- Actions compelled by order of regulatory authorities or by legislation, which are otherwise in violation of the ERMP, these Regulations, and/or related Procedures.

7.2. Exception Reporting

In the event a compliance exception occurs, the Executive Director is responsible for notifying the ROC within 48 hours after it is identified and ensure that the Front Office prepare a report (Exception Report) for the ROC at its next meeting. The Report shall identify the issue or violation, and discuss the alternative remedial actions, document the action taken in response, and describe the steps that will be taken to prevent a reoccurrence of the event. A summary of all exceptions shall be reported at least annually to the Board by the Executive Director.

8. Risk Management Methodologies

8.1. Measurement of Risks

EBCE measures risk by estimating how high or low future supply costs and revenues could be, given a particular portfolio position and specific confidence level of market price movements. These estimates apprise management as to the risks inherent in a particular position and are used to make decisions to accept that risk or to reduce the risk by changing the position or the portfolio management strategy going forward.

Volumetric variability is estimated as part of the load and resource forecasting process. Normal, High and Low scenarios are provided as part of the annual budget process. An updated load and resource forecasted balance is provided each month. Volumetric uncertainty shall be incorporated in the quantitative risk measures that EBCE tracks and reports on a regular basis. The financial consequences of volumetric risk depend upon both how actual loads and supplies compare to forecasts, and on market price variations.

Market price risk is measured by calculating forward price volatility (either using recent historical data for forward prices or market prices for options), and applying that volatility to the future to see how costs and revenues could change if there were an adverse market price movement.

Counterparty credit risk measures are captured in reporting of counterparty exposure and transaction limits.

Appendix 8 of these Regulations provides a more detailed description of EBCE's risk measurement methodology. Risk management reports that are presented to management and the ROC are described in Appendix 7 of these Regulations.

9. Risk Limit Structure

EBCE sets risk limits in order to mitigate risk exposure within the broad objectives of optimizing the value of EBCE's assets, and serving Participating Member loads at cost effective and stable prices. Transaction limits authorized in Appendix 4 shall comply with the requirements described in this Section 9.

Portfolio risk limits are expressed based on volume, duration, dollar value, and CVaR. EBCE will develop a path towards setting (1) volume limits and (2) VAR limits. Risk limits include: (1) qualification criteria for counterparties, including creditworthiness and required contractual provisions, (2) counterparty credit limits, and (3) preferred contractual terms. Counterparty credit risk limits are intended to monitor and contain potential losses due to counterparty default. This Section 9 also includes a brief discussion of risk monitoring and reporting requirements.

Risk limits may be employed to indicate either:

- An exception, which requires an Exception Report to the ROC;
- A warning, which indicates that a risk measure is outside of an acceptable tolerance band, and should be reported to the ROC promptly; or
- A standard, such as minimum qualifications or contract provisions.

Risk limits are subject to regular review and adjustment by the ROC as market conditions change. Risk limit metric methodologies and limits are further explained in Part II of these Regulations.

9.1. Basic Principles for Setting Risk Limits

The following set of basic principles shall guide the general approach to setting risk limits (including but not limited to credit exposure limits, contract duration, volume, and transaction limits):

- Enable staff to conduct required business effectively
 - Volume and dollar limits adequate to reliably meet physical and financial requirements at prevailing prices
- Reflect the risk-reward tradeoffs consistent with EBCE's risk tolerance
 - Duration, volume, dollar and exposure limits appropriate for associated risks
- Favor strong counterparty attributes
 - Creditworthiness and financial strength
 - Favorable contractual terms
 - Demonstrated performance
- Promote fair and competitive transacting process
 - Should not narrow field to a single supplier or unduly favor any supplier
- Promote diversification
 - Avoid too great a concentration of supply or exposure with any single supplier
- Facilitate operational flexibility
 - Allow for load uncertainty, resource uncertainty, and other contingencies
- Facilitate conformance to the ERMP and Regulations
 - Clear, measurable, consistent and enforceable
- Balance burden of monitoring and enforcing limits with value
 - Not so complex and cumbersome that it takes too many resources to manage

9.2. Portfolio Risk Limit Guidelines

Portfolio limits facilitate: (1) adhering to policies and procedures, (2) quantifying risk tolerance levels for risk monitoring, reporting and control, and (3) reducing operational risks.

Portfolio limits must take into account:

- Load and resource balance variability – monthly and seasonal variation;
- Load and resource balance uncertainty – confidence intervals around expected values;
- Minimum feasible wholesale transaction size – Approved Products are traded in large discrete package sizes; and
- Operational flexibility and constraints – customer responsiveness, system reliability.

Risk limits shall be reviewed and updated by the Middle Office and Front Office in conjunction with development of the long-term power supply forecast, as part of the annual budget process, or more frequently as deemed necessary.

9.3. Net Position Guidelines

Purpose: Net position guidelines specify the physical load and resource balance tolerance levels within which EBCE staff shall recommend transactions to comply with these Regulations, and to ensure that Approved Products are transacted to meet physical and financial load and resource balance requirements.

Applicability: Net position guidelines apply to Approved Product transactions that are one month in duration or longer. These transactions include all must-take, fixed-priced contracts, index-priced contracts¹, fixed-priced Call Options, supply from generating resources, and the long-term contracts.

For all other transactions:

1. Option transactions shall be excluded from the Net Position guidelines until exercised, but shall be included in transaction reporting to the ROC. Options to transact Approved Products that have been exercised, or any other transaction that commits EBCE to take delivery or commit resources, shall be included in the Net Position guidelines.
2. Put options that have not been exercised are not included in the Net Position guidelines as they reflect a potential short position and would understate the Net Position. Put option transactions shall be included in transaction reporting to the ROC.
3. Within-the-month Approved Product transactions are operational in nature, and require flexibility to balance hourly, daily, and weekly, and balance-of-month load variations. Net Position Limits guidelines do not apply to within-the-month transactions, but they are included in transaction reporting and total deliveries reported to the ROC.
4. Resource Adequacy capacity, GHG Compliance Instruments, transmission,

¹ A transaction priced based on an index rate that is directly offset with a matching transaction priced at the same index rate (e.g., a sales transaction that is directly offset with a like purchase transaction) shall be excluded from the calculation of net position.

transportation, ancillary services, basis, and storage requirements are set by reliability based technical standards, regulatory requirements, or maximum potential usage in order to reliably meet real-time and peak demand. Net Position guidelines do not apply to these Approved Products, but staff shall inform the ROC of the criteria used for estimating EBCE's needs.

5. Transactions of surplus or excess Approved Products made available through existing physical assets or contracts (e.g. due to hydro conditions) shall not constitute Speculation, but shall be reported to the ROC.

The net changes in physical position due to buy-sell transactions executed to offset positions with a counterparty, effect transportation or transmission transactions, or other approved purpose shall be included in the Net Position guidelines.

10.Risk Control Structure

10.1. Control Principles

EBCE will strive to conduct its energy risk management activities in accordance with best practices of the wholesale electric industry, but implementing such practices must be justified and balanced as to their costs and benefits. Processes and control systems must be in place that allow EBCE to identify, measure, monitor, control and track its risk exposures. These processes and control systems shall be consistent with the following risk management control principles:

- Appropriate segregation of duties and internal controls;
- Appropriate systems to ensure accurate and effective management reporting;
- Necessary resources in place to achieve management objectives;
- Attract and retain skilled and trained personnel;
- Cross-train and provide cross-coverage;
- Employees conducting Energy transactions who are free of conflicts of interest;
- Authority and approval delegation that is commensurate with accountability and capability;
- Performance measurement and reporting incorporate risk and return measures; and
- Ongoing monitoring of control effectiveness.

10.2. Functional Responsibilities

EBCE has integrated but segregated responsibilities to control risks in a manner consistent with the above control principles by means of clearly defined roles and responsibilities for the Front Office, Middle Office, and Back Office. Oversight functions are performed at an operational level by these offices, and managed at an executive level by the Board, Executive Director, and ROC. These functional responsibilities are described in detail in Section 4 of these Regulations. EBCE may utilize the services of its Wholesale Energy Services Provider for performing such functions.

10.3. Transaction Capture Process

All transactions² of Approved Products must be formally and officially documented by EBCE. Transaction capture procedures shall address all of the following elements:

- Authorization/Approval (e.g., participant authorization form as used in the market purchase program agreement);
- Competitive bidding;
- Commitment to the transaction;
- Recording the transaction;
- Confirming the validity of the transaction with the counterparty;
- Inputting the transaction into the deal capture system;
- Actual product delivery; and
- Billing and settlement.

10.3.1. Authorization/Approval

The appropriate authorizations and approvals must be obtained by Front Office staff prior to transacting Approved Products. Such authorizations may be in the form of predefined contractual authorizations, or as defined in the ERMP or these Regulations. EBCE shall develop protocols to address when the volume and/or VAR limits are not in compliance. If the limits are violated by a certain to-be-determined amount EBCE shall assemble the ROC for an emergency meeting. The ROC can choose to be flexible on the limits (within certain parameters) or require action. If it exceeds a certain amount it goes higher in the organization and to EBCE's board. Front Office staff shall obtain approval from duly authorized personnel (supervisor or higher) with specified *dollar and volume* limits as specified in Appendices 3, 4 and 5 before consummating any transactions for Approved Products.

10.3.2. Competitive Bidding

For Approved Product transactions scheduled for delivery further than one (1) week in advance, quotes for forward commitments, with the exception of exchange traded transactions, must be obtained competitively from available and approved counterparties, consistent with the size and type of transaction and counterparty. Alternatives are to be evaluated on an equivalent basis (similar quality, volume, duration and options), adjusted for such factors as transmission, losses, etc. Front Office staff must obtain quotes from at least two (2) qualified suppliers, if two (2) approved counterparties are available. Alternatives are to be evaluated on an equivalent basis (similar quality, volume, duration and options), adjusted for such factors as transmission, losses, etc.

Transactions occurring for delivery of product within one week or less, or exchange traded (e.g. NYMEX, ISO, ICE, etc.) transactions, do not require formal written documentation that two (2) quotes were obtained beyond what is entered in the deal capture system.

10.3.3. Commitment to the Transaction

A commitment is a legally binding contract between EBCE and a counterparty. The Front Office must

² Transaction for a term of balance-of-month or shorter are not subject to certain elements of the transaction capture process, as further described in the respective transaction procedures.

be the point of commitment for all Approved Product transactions. Final price commitments may only be made by authorized EBCE transacting personnel. Commitments shall be made verbally or electronically in the case of an electronic exchange. Transacting personnel shall only transact with counterparties who are listed on the Approved Counterparties List.

10.3.4. Recording the Transaction

All transactions must be recorded.³ Verbal commitments must be executed on a recorded telephone line when available, and shall be stored and maintained in accordance with EBCE's records retention policy. Electronic commitments must have an electronic audit trail. All transactions must be evidenced by a deal control system entry prepared in a timely manner. All transaction information shall be time and date stamped at the time of commitment.

10.3.5. Confirmation

A confirmation is a written document evidencing a verbal or electronic commitment made by EBCE transaction personnel. All confirmations must agree with the transacting person's commitments, as evidenced by phone records, deal capture system entries or other supporting documentation. All confirmations must be reviewed and confirmed by Back Office personnel for accuracy. The Front Office shall generate a written confirmation, when required, in any case where the counterparty does not provide or require a written confirmation. Any transaction that is not confirmed by the counterparty and approved by authorized personnel within five (5) business days after the transaction has been executed will be subjected to review and identification by the Middle Office. Using the confirmation, the Back Office staff shall review and confirm the consistency and accuracy of the deal capture system entry made by the Front Office staff. All written transaction confirmation shall be stored by EBCE consistent with EBCE's records retention policies. Written confirmations are not required for any transaction with a duration of less than seven (7) calendar days.

10.3.6. System Input

All transactions must be entered into the deal capture system, and the transaction information shall be maintained in accordance with EBCE's record retention policy. All transactions shall be entered into the deal capture system by Front Office personnel. Deal capture system input shall be performed no later than the first business day after the deal was confirmed. Once a transaction is entered into the deal capture system, Back Office staff shall review the deal entry to confirm that the information entered into the deal capture system is consistent with the transaction confirmation, if required. If the data entry is found to be correct by Back Office staff, the deal shall be approved for accuracy. If the data entry is found to be inconsistent with the deal confirmation, Back Office staff shall notify Front Office staff to make the necessary corrections to the data entry stored in the deal capture system.

10.3.7. Billing and Settlement

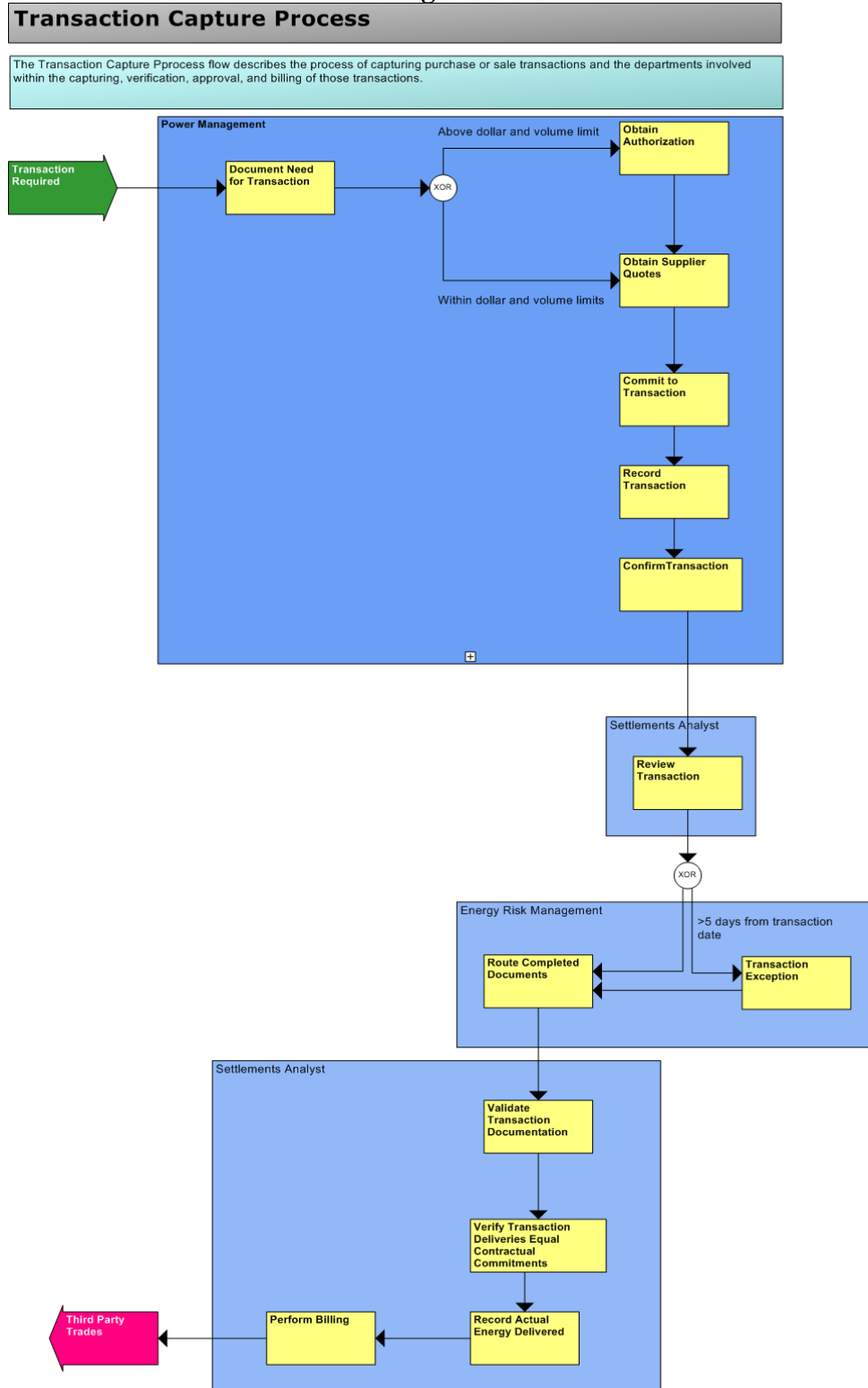
Back Office staff ensures that bills are issued to counterparties with outstanding accounts receivable,

³ Real-time verbal and electronic commitment dates and times are recorded in the dispatch log. GHG Compliance Instruments are recorded in the CITS system maintained by the California Air Resources Board.

and reviews bills for transactions to verify that the bills match the terms of the contract and the amount of product actually delivered (this process is generally referred to as the “checkout process”).

Diagram 1 below is a representation of the transaction capture process:

Diagram 1



10.4. Management Reporting Framework

The key to energy risk management is monitoring of risks. Accurate and timely information must be provided to all parties involved in any aspect of energy risk management, to allow them to perform their functions appropriately. Reports can be categorized into three main areas:

1. Risk Monitoring – illustrate risks that are faced ahead;
2. Oversight – show compliance with policies, authorities or risk limits; and
3. Performance – compares actual past and present performance of the portfolios to appropriate budget and market benchmarks.

A complete list of management reports for each level of oversight is provided in Appendix 7 of these Regulations. These reports shall be prepared on a frequency as indicated in Appendix 7. New reports, or changes to existing report formats, may be recommended and approved by the ROC.

10.5. Internal Controls

Internal controls shall be based on proven principles that meet the stringent requirements of generally accepted auditing standards (GAAS), financial institutions and credit rating agencies. The required controls shall include all customary and usual business practices designed to prevent errors and improprieties, ensure accurate and timely reporting of results of operations, provide information pertinent to management and facilitate attainment of business objectives.

The required controls shall include the following:

- Segregation of duties between initiation, confirmation, monitoring and settlement transactions;
- Delegation of authority that is commensurate with responsibility and capability;
- Complete and precise capture of transaction and other data, with standardization of electronic and hard copy documentation;
- Meaningful summarization and accurate reporting of transactions and other activity at regular intervals;
- Regular independent compliance review to ensure that the ERMP and these Regulations are adhered to; and
- Active participation of senior management in the risk management process.

11. Conflict of Interest

All EBCE employees who are engaged in Approved Product transactions, counterparty credit evaluation, or oversight of the foregoing and are employed in any job classification listed in the EBCE Conflict of Interest Code are required to complete annual conflict of interest filings on FPPC Form 700, and disclose investments as required by that Code. They are required by that Code to abstain from participating in or attempting to influence any decisions that foreseeably would have a material financial effect on any such investment.

In addition to the foregoing disclosure requirement, EBCE employees engaged in Approved Product

transactions, counterparty credit evaluation, or oversight of the foregoing are barred from direct investment in any company with whom EBCE has consummated any Approved Product transaction within the last two (2) years. Further, such employees must divest existing direct investments in Approved Product counterparties prior to engaging in any negotiating, evaluating, transacting or oversight functions. The ban on investment and requirement for divestment applies regardless of whether or not the investment would be of sufficient size (\$2,000) to require disclosure on FPPC Form 700. As used in this section, a “direct” investment means an investment which, if of sufficient size, is of a nature that would constitute an “investment” pursuant to the California Political Reform Act.

EBCE employees supervising staff who are subject to this policy are responsible for routinely reviewing the most recent Form 700 of each such staff member for the purpose of identifying potential financial conflicts of interest. Updated copies of Form 700 shall be given to the supervisor/manager by the EBCE Conflict of Interest Filing Officer designated in the EBCE Conflict of Interest Code. The EBCE legal counsel will assist in reviewing these forms and providing legal advice in connection with such reviews on request.⁴

12. Policy Review

Prudence is required in implementing any and all policies and procedures. Market and industry conditions, technology and risk tolerances tend to change over time. Therefore, the ERMP and these Regulations should be reviewed annually, or as necessary, in order to make adjustments in response to changes in business objectives and/or industry conditions. All recommended amendments to the ERMP are to be reviewed by the ROC and presented to the Board for final review and approval. Changes to these Regulations shall be reviewed and approved by the ROC.

⁴ Non-staff ROC members shall not be subject to the requirements of Section 11 since their oversight functions are generally not transactional and company specific. Non-staff ROC members may be subject to conflict of interest compliance requirements at each of their own organizations.

Part II: Counterparty Risk Management

13. Organizational Philosophy Toward Counterparty Risk

13.1. Objective and General Risk Policy

EBCE's wholesale energy market activities are directed toward the goal of providing Energy, capacity, transmission and related services to its Participating Members at the lowest possible cost consistent with an acceptable level of risk. EBCE fulfills its supply obligations by using generating assets, or by contracting with counterparties for the purchase or sale of such assets on a long-term or short-term basis. Effective wholesale counterparty management and credit analysis is essential to mitigate the counterparty risks associated with Approved Product transactions in the Energy wholesale markets. The objective of the wholesale counterparty risk policy is to preserve EBCE's capital, liquidity and supply reliability by limiting counterparty credit risk and counterparty concentration to acceptable levels.

13.2. Expectations of the EBCE Board

Analytical procedures for granting open lines of credit and managing counterparty exposures are required. However, EBCE recognizes that the models used in managing credit risk are not predictive; they are explanatory. Credit risk management models cannot predict individual credit events or collective credit events. The Finance and Administrative Services Department is expected to manage counterparty risks to acceptable levels established by the ROC and approved by the Board. The Board recognizes that EBCE is generally a net buyer of Energy. Exposure to wholesale counterparty credit risk will normally be greater in periods of rising market prices due to higher replacement costs in a rising market. On the other hand, in high hydrological conditions, where excess generation may be available for sale on the wholesale market, EBCE is exposed to greater counterparty credit risk if counterparties fail to take delivery, or if they fail to pay for power delivered.

14. Counterparty Risk Definitions

14.1. Counterparty Risk

Counterparty risk is defined as the exposure to economic loss resulting from default by another party to a contract. Such risk exists in all financial and commodity markets and can be distinguished from other financial risks such as market risk, operational risk and regulatory risk.

Counterparty risk affects both contracts requiring physical settlement and those specifying monetary settlement. Contractual payments can result from purchases or sales. Under a sale, the counterparty owes cash and a receivable is created. The holder of the receivable is at risk of financial loss if the receivable is ultimately uncollectible. Under a purchase, the counterparty is obligated to deliver a product. However, the counterparty may also be required to reimburse the purchasing party for financial loss in the event of delivery failure. Therefore, the purchasing party is at risk of financial loss if the counterparty is unwilling or unable to reimburse for financial losses.

The ERMP states that for all fixed price Approved Product transactions, the counterparty must possess a public credit rating of at least a BBB- (or equivalent investment grade rating) by a nationally recognized statistical rating organization (NRSRO). EBCE staff may consider counterparties with a rating below investment grade or counterparties with no NRSRO rating on a case-by-case basis with the approval of the ROC. If ratings differ between NRSRO's, the lowest available rating will be used for underwriting purposes.

14.2. Credit Risk

For the purchaser of an Energy related product, credit risk is defined as the difference between the contracted price and current market price of a contracted product. If the current market price is greater than the contracted price, a positive MTM exists, thus exposing the purchaser to credit risk in the event of supplier default.

If the current market price is less than the contracted price, a negative MTM exists. The purchaser has credit exposure with a negative MTM if the deal is subject to termination or MTM damages. There is no credit exposure with negative MTM if the deal is subject to one-way liquidating damages and the purchaser is not the defaulting party.

If the seller has a positive MTM position in a transaction, the seller is exposed to profit risk in the event the counterparty defaults, where the seller would lose its opportunity to above market revenue. In contrast, if the seller has a negative MTM position in a transaction, the seller is exposed to liquidity risk and may be subject to margin calls if the MTM exceeds established credit limits.

15.Underwriting Standards

All transacting counterparties shall be reviewed for creditworthiness. This review shall include:

- A search of public debt and implied unsecured credit ratings as published by a NRSRO such as Standard & Poor's, Moody's Investor Services and Fitch;
- Review of at least the two (2) most recent years audited financial statements receiving an unqualified opinion from a certified public accounting firm; and
- Other information, as available, from news services, trade publications, financial websites, etc.

For transacting counterparties without NRSRO ratings, EBCE credit staff shall determine an implied rating according to EBCE's internally-developed methodology and rating scale. Transacting for all counterparties shall require an implied "investment grade" rating of BBB- or its equivalent, at a minimum. EBCE credit staff may consider counterparties with a rating below BBB- or its equivalent on a case-by-case basis. All sub-investment grade rated counterparties require ROC approval before transacting and may require credit assurances or other consideration.

16.Credit Risk Measurement

Credit risk exposure should be measured as: (1) current exposure, and (2) potential exposure. Current credit risk exposure to a single counterparty is defined as the sum of: (1) the dollar value of all amounts

invoiced and unpaid, and (2) the dollar amount of all uninvoiced deliveries. Potential credit exposure is the MTM value of all forward contracts from today forward, as reported by the business unit.

Total credit risk exposure is the sum of the variables shown in the formula below, less all offsetting amounts that are supported by legally binding netting agreements or available collateral. EBCE's credit exposure measurement is defined by the following formula:

$$\text{Credit Exposure} = \text{Current and Prior Month Sales (Net Sales}^5) + \text{MTM} - \text{Credit Enhancements}$$

In addition, potential credit risk exposure is captured by the CVaR statistic. The CVaR statistic represents the maximum dollar loss at a 95% confidence level within a certain time, due to volatility in market prices if the counterparty defaults. CVaR is a dollar estimate of the risk that potential changes in market price would result in increased credit exposure for all forward contracts. CVaR shall be presented as supplementary information for credit benchmarking. EBCE's CVaR calculation methodologies are documented in Appendix 8 of these Regulations.

17.Credit Enhancements

Customers or counterparties that do not meet the minimum requirements for an extension of an open line of credit, as set forth in Section 15 of these Regulations, must post at least one (1) of the following types of security prior to the execution of transactions:

17.1. Guarantees and Surety Bonds

Counterparties may provide a guarantee from a third party, or parties, which meets the creditworthiness requirements set forth in Section 15 of these Regulations. If a counterparty provides a guarantee, the amount of any open line of credit will be determined through an analysis of the financial strength of the guarantor. The guarantor will be considered secondarily liable for the obligations of the counterparty. In the event a surety bond is provided, EBCE will consider the surety bond as primarily liable for the obligations of the counterparty. All guarantees must be approved as to content and form by EBCE's legal counsel.

Preferred terms for guarantees include, but are not limited to:

- A statement that the guarantee is one of payment and not of collection;
- A statement that the guarantor agrees to pay the guaranteed obligations on the date due;
- A statement that the guarantor's obligations under the guarantee rank pari passu with its senior unsecured debt obligations;
- A statement restricting the guarantor's right to terminate the guarantee, and any termination must still guarantee existing exposures as they may exist;
- A statement that the guaranteed obligations are unconditional, irrespective of value, genuineness, validity, waiver, release, alteration, amendment, and enforceability of the guaranteed obligations, and a statement that the guarantor waives the right of set-off, counterclaim, etc;

⁵ Provided there is a netting agreement with the counterparty. Otherwise, it will be the receivable portion only.

- A statement that the guarantee reinstates if any guaranteed payment made by the primary obligor is recaptured as a result of the primary obligor's bankruptcy or insolvency;
- A statement that the guarantor waives its right to subrogation until the guaranteed obligations are paid in full;
- A statement that the guarantee is binding on successors of the guarantor and a statement that EBCE is a beneficiary of the guarantee;
- A statement that the guarantee will be interpreted under either New York or California law; and
- A statement that the guarantor has subjected itself to jurisdiction and service of process in the jurisdiction in which the guarantee is to be performed (i.e., State of California).

Exceptions to the above concepts and/or acceptance of guarantees from entities domiciled outside the U.S. or Canada require ROC approval.

17.2. Letter of Credit

Counterparties may provide an irrevocable Letter of Credit in an amount sufficient to cover the amount in excess of the credit limit approved by EBCE at the date the transactions are entered into (e.g., MTM in excess of credit limit). Letters of Credit must have a term of at least 45 days past the term of the transactions. Letters of Credit must be issued by a domestic bank (or domestic branch of a foreign bank) that has a senior debt rating of at least "A" or its equivalent from a NRSRO. Approved Banks should be monitored for any potential Letter of Credit concentration between EBCE and various counterparties.

Exposure to any single institution will be limited to 20% of EBCE's total credit exposure, unless exposure is derived from a few transactions whereby demanding Letter of Credits from several institutions would be unreasonable for the counterparty. If credit risk exposure is derived over the entire portfolio of transactions, the 20% rule will apply. Any exposures greater than 20% must be approved by the ROC. All Letters of Credit must be approved as to content and form by EBCE's legal counsel.

17.3. Prepayments

Counterparties may provide a prepayment or cash margin deposit in an amount that is sufficient to cover the related transactions. Discounts for prepayment, consistent with industry standards, may be applied to the sum owed as authorized by the Executive Director.

18. Quality Assessment

18.1. Counterparty and Credit Analysis

Middle Office staff are responsible for ensuring a standardized credit screening process for all counterparties. All counterparties must be reviewed for financial creditworthiness according to these guidelines.

Middle Office staff will submit a credit review report to the appropriate approval authority, depending on the level of credit requested, for consideration and action. For agency-rated counterparties, Middle Office staff may elect a rating similar to one derived by a NRSRO, and waive initial review

requirements, if the counterparty is recognized and established in the industry. As a result, a more stringent review process should be followed for those entities that do not possess a NRSRO rating and/or have marginal financial capacity.

All counterparty credit lines and credit reviews will be submitted to the appropriate authority level as authorized in Section 19 of these Regulations. ROC actions can result in the approval or rejection of a proposed counterparty, or in an amendment to credit limits approved under delegated approval authorities. Approved counterparties will be grouped into three tiers. A counterparty's tier status will be based on the credit evaluation matrix found in Table 1. More frequent monitoring may be required if a counterparty is subject to the possibility of a credit event (e.g., if their credit rating falls one full letter grade or greater, or if their credit rating falls below investment grade), or if industry factors dictate.

**Table 1
Credit Evaluation Matrix**

	Tier 1	Tier 2	Tier 3
Criteria	Bilateral master agreement or transactions of one (1) month or longer within past two (2) years	No greater than prompt month transactions within past two (2) years	No transactions in past two (2) years
Type of Trading	All	Prompt month or less	Day-ahead (Prescheduling time frame)/Real-time
Credit Evaluation Requirement	At least annually	At least biennially, or as needed	None
External credit and EDF ratings checked	For RFPs and at least annually	Annually	Annually
Credit Limit	See Section 19	\$500,000	\$100,000
Event Monitoring	On-going	On-going	On-going

18.2. Credit Limits

Once a counterparty has been determined to be creditworthy, a credit limit will be proposed. An open

line of credit may be extended up to the lesser of 5% of the counterparty’s adjusted tangible net worth⁶ or EBCE’s maximum counterparty credit limits. In the case of municipal or public organizations, an open line of credit may be extended up to 10% of average free cash flow⁷ for the prior two (2) years not to exceed EBCE’s maximum counterparty credit limits.

<u>NRSRO/EBCE Internal Rating</u>	<u>Maximum Counterparty Credit Limits</u>
AA- and above	\$ 35 million
A+ to A-	\$ 25 million
BBB+	\$ 15 million
BBB	\$ 10 million
BBB-	\$ 5 million
BB+ and below	\$100,000 per Section 19.3

For example, if a municipal counterparty qualifies for a credit limit of \$10,000,000 based on the cash flow test (e.g., 10% of avg. free cash flow for past two (2) years), but only qualifies for an EBCE rating of BBB-, then the maximum policy limit allowed would be \$5,000,000.

Although a counterparty may qualify for a certain maximum credit limit, anticipated transaction volumes and other business factors may prompt the selection of a lower limit that is considered more appropriate. As a result, the credit limit methodology provides limit ceilings while allowing flexibility in response to normal business activities.

18.3. Concentration Limits

In addition to maintaining credit limits, EBCE staff shall strive to diversify transactions among counterparties. EBCE staff shall document the business reasons (e.g. differences in bid price, lack of other qualified suppliers, etc.) for awarding contracts to counterparties with high concentrations of credit exposure.

19. Approval Authorities

19.1. Credit Authorization

Approval authorities are based on the level of business experienced by EBCE on a historical and current basis within limits allowed under the Regulations. Authority to establish credit limits is segregated as follows:

Director of Procurement, Finance or Administrative Services:	Up to \$ 20Million
-----------------------------------------------------------------	--------------------

⁶ Tangible Net Worth (TNW) = shareholder equity – goodwill – intangible assets – receivables from officers – investments in other trading companies – off-balance sheet liabilities, etc.

⁷ Free Cash Flow = net income + non-cash charges such as depreciation + or - changes in accounts receivable, inventory, prepaid expenses, accounts payable, and accrued liabilities – cash dividends (general fund transfer) + net borrowing – capital expenditure.

Executive Director	Up to \$ 50 Million
ROC:	Up to \$ 60 Million
Board:	\$ 60 Million +

The maximum amount of any open line of credit to be extended to any customer or counterparty shall not exceed \$50 million unless authorized by the ROC. If credit lines exceeding \$60 million are anticipated, approval by the Board is required.

19.2. Increases to Wholesale Counterparty Limits

Any increase to an existing open line of credit must have the written approval of the Director of Finance and Administrative Services, the Executive Director or the ROC, within the authorized limits stated in Section 19.1. A sign off sheet shall be used to ensure written approval according to the limits authorized by this Regulations.

19.3. Credit Review Exceptions

Wholesale counterparties not subject to the above credit review criteria include those associated with day-ahead and current day purchases where risk associated with market movements is minimal. Sales transactions within the day-ahead and current day can be consummated with a counterparty that has not been assigned a pre-approved credit limit if the counterparty maintains at least a BBB-/Baa3/BBB-rating from an NRSRO. Such transactions may not exceed \$250,000 per counterparty.

If a counterparty or guarantor does not maintain any NRSRO rating, and if a counterparty credit review has not been performed in the past 24 months, a policy limit of \$100,000 in aggregate net receivables per counterparty may be authorized, with the approval of the Executive Director, until a formal review can be completed. These individual non-rated counterparty limits are subject to a total net receivable portfolio limit not to exceed \$1,000,000, in aggregate.

20. Wholesale Credit / Counterparty Management

20.1. Monitoring and Reporting Exposures

Middle Office staff are responsible for monitoring and reporting on the risk management program. A list of reports, which document trade positions, risk exposure, authorization and policy compliance, may be found in Appendix 7 of these Regulations. The credit exposure for each customer or counterparty described in these Regulations may be monitored according to concentration in the following areas: credit rating, counterparty, region, contract type, contract term and MTM exposure.

Middle Office staff are also responsible for communicating this information to management under the timelines outlined in Appendix 7 of these Regulations, and for establishing a violation reporting process to document exceptions to the ERMP or these Regulations. Exception Reports will document the nature of exception, and the actions taken to correct exceptions.

The credit risk reporting system should be integrated with the transaction processing system. This is generally an extension of the concept that credit risk assessment and reporting should be supported by

the normal transaction processing system. The credit system, should be integrated with the deal capture system and should not be a stand-alone system, or an add-on with manual interface.

20.2. Master Enabling Agreements

The use of master enabling agreements⁸ to document trading relationships with counterparties is considered to be the preferred practice and should be followed whenever reasonably possible. The general form of such master enabling agreements shall be approved by the Board upon recommendation of the ROC before any such master enabling agreement is used for any individual counterparty transaction. Transactions entered into under such contracts and agreements are subject to the requirements of these Regulations, and limited to Approved Products. The department managers are responsible for ensuring that master enabling agreements are developed in conjunction with legal counsel review, approved by the Board and used for the following transactions:

- The Western Systems Power Pool (“WSPP”) Agreement may be used as the master agreement for transacting Approved Products with WSPP members. The WSPP Agreement applies to all transactions between WSPP members unless the parties to a transaction expressly opt out of the WSPP Agreement.
- The Edison Electric Institute (“EEI”) Agreement, or its equivalent, as modified by a set of Board approved special provisions, may be used as the master agreement for transacting Approved Products. The EEI Agreement provides for an array of reciprocal credit and collateral requirements for each party, and includes negotiated provisions as specified on a “Cover Sheet”. The EEI Agreement can also be supplemented with specific annexes (e.g., Credit Annex, Collateral Annex, REC Annex).
- Transmission transactions shall be consummated under an Open Access Transmission Tariff or Board approved bilateral agreement.
- Master The International Swap Dealers Association (“ISDA”) Agreement, or its equivalent, may be used as the master agreement for transacting financial based Approved Products.

A master enabling agreement executed by EBCE and a counterparty provides the general terms and conditions for all transactions entered into with that counterparty. All master enabling agreements are to be executed and entered into in accordance with the ERMP and these Regulations, and with applicable EBCE policy and procedures.

Netting agreements should be incorporated into all counterparty agreements and transactions.

20.3. Premium Surcharge on Counterparties Without Master Enabling Agreement

Master enabling agreements require credit and performance assurances from a counterparty that provide protection against counterparty credit risk. In the event EBCE desires to transact with a counterparty without such assurances, a premium surcharge shall be imposed on the counterparty’s bid to compensate for its increased credit risk and allow for comparison of the relative prices, taking into account the varying credit risks which might be incurred. The following formula shall be used in calculating the surcharge:

⁸ The form and content of each master agreement must be approved by the Board.

$$\text{Premium Surcharge} = \text{Edf} * \text{Fwd} * 1.645 * \sigma$$

Where: (i) *Edf* is the expected default frequency of the counterparty, (ii) *Fwd* is the current forward price, (iii) σ is the market implied volatility (or standard deviation) of the commodity price, and (iv) 1.645 represents the number standard deviations where the price falls at a 95% confidence level.

Example of Premium Surcharge Calculation

A counterparty with a master enabling agreement where EBCE has accepted changes to its preferred terms, is bidding on EBCE's RFP for a NP-15 peak Energy product for the 3rd quarter. The current market forward price for the product is \$50/MWh, market implied volatility is 40%, and the expected default frequency for this counterparty is 0.55%. Therefore, a premium of \$0.18/MWh ($0.0055 * 50 * 1.645 * 0.4$) should be added to the counterparty's bid price for comparison with other bids.

20.4. Margin Calls

If a counterparty has exceeded a credit limit, the Middle Office is responsible for initiating a margin call if such action is authorized under the applicable master enabling agreement. Calling margin may include a request for cash collateral or other credit enhancement (i.e., letter of credit, etc.). A margin call is necessary when counterparty credit exposure exceeds an established credit limit. The appropriate timing of a margin call is not dictated by these Regulations. However, factors such as counterparty financial capacity, volume of business, overall portfolio concentration and market conditions should be considered. A margin call should be considered necessary if credit exposure exceeds the counterparty's limit by more than one ratings notch⁹. The same would apply if the counterparty suffers a ratings downgrade.

EBCE as a buyer or seller may be exposed to margin calls from counterparties. Middle Office staff must be aware of collateral thresholds assigned to EBCE by counterparties, and monitor these limits no less than monthly, and shall keep the Executive Director informed in the event of market volatility. EBCE may be exposed to margin calls if a significant level of purchases or sales is reached.

20.5. Transaction Authority

No new transactions are to be entered into with counterparties that have exceeded their credit limits unless: (1) the new transactions are used to mitigate (offset) existing exposure, and (2) if those transactions have prior approval of the Executive Director, or ROC within authorized limits as established in this Regulations.

21. Segregation of Duties

Controls over counterparty inputs and systems operations are of particular importance in ensuring the integrity of data used in counterparty risk control and management. In all cases the Middle Office will be responsible for managing the counterparty review and ratings process and all counterparty reporting. Front Office staff is responsible for recommending new counterparties to the Middle Office for review and approval

⁹ Notch as referenced by Nationally Recognized Statistical Rating Organization (e.g., from BBB to BBB+ represents one notch).

APPENDIX 1

DEFINITIONS

1. Definitions

Whenever used in these Regulations, the following terms shall have the following respective meanings, provided, capitalized terms used in these Regulations that are not defined in this Appendix 1 shall have the meaning indicated in Appendix A Master Definition Supplement of the CAISO Tariff:

- 1.1. “Approved Counterparty List” is a list of the active trading counterparties that have been authorized for trading, and that have been assigned an approved credit limit by the Middle Office or ROC.
- 1.2. “Approved Product” means transactions types or products that are authorized pursuant to these Regulations, as specifically identified in Appendix 6.
- 1.3. “Balance-of-Month Transaction” means a purchase or sale of electric Energy, capacity and/or other related attributes for a term not greater than one month to be performed or delivered within the current or next succeeding calendar month.
- 1.4. “California Independent System Operator Corporation” or “CAISO” means the non-profit public benefit corporation responsible for the provision of fair and open transmission access, and maintaining reliable and efficient operation of that portion of the electric grid contained within its defined balancing authority area, pursuant to the California Public Utilities Code, or its successor entity.
- 1.5. “CAISO Tariff” means the CAISO FERC Electric Tariff.
- 1.6. “Call Option” means an option that gives the buyer (holder) the right, but not the obligation, to buy a futures contract (enter into a long futures position) for a specified price within a specified period of time in exchange for a one-time premium payment. It obligates the seller (writer) of an option to sell the underlying futures contract (enter into a short futures position) at the designated price, should the option be exercised at that price.
- 1.7. “Cap and Trade Program” means CARB’s Regulation for the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms as set forth in title 17, California Code of Regulations, chapter 1, subchapter 10, article 5 (commencing with section 95800), as such may be amended from time to time, or
 - (ii) other GHG compliance obligations, including but not limited to, federal, regional, state, or local jurisdictions.
- 1.8. “CARB” means the California Air Resources Board, or its regulatory successor.

- 1.9. “CARB Offset Credit” means a tradable compliance instrument issued by CARB that represents a GHG reduction of GHG removal enhancement of one metric ton of carbon dioxide equivalent.
- 1.10. “Commercial Compliance Policy” means the Commercial Compliance Policy adopted by the Board, as such may be amended from time to time.
- 1.11. “Congestion Revenue Right” or “CRR” means a financial instruments made available through the CAISO’s CRR Allocations and Auctions. CRRs are acquired primarily for the purpose of offsetting integrated forward market transmission congestion costs that are incurred in the day-ahead market on CAISO managed transmission paths.
- 1.12. “Cost of Value at Risk” or “Cost VaR” means a calculation that summarizes the expected maximum “cost” exposure over a target horizon within a given confidence level.
- 1.13. “Counterparty” means a party on either side of a transaction (i.e., purchasing counterparty as opposed to a selling counterparty).
- 1.14. “CPUC Decisions” means, to the extent still applicable, CPUC Decisions 04-01-050, 04-10-035, 05-10-042, 06-06-064, 06-07-031, 07-06-029, 08-06-031, 09-06-028, 10-06-036, 11-06-022, 12-06-025, 13-06-024, 14-06-050 and subsequent decisions related to resource adequacy, as may be amended from time to time by the CPUC.
- 1.15. “CRR Allocation” means the process of allocating CRR source-to-sink combinations, both annually and monthly, based on nominations by registered Candidate CRR Holders.
- 1.16. “CRR Auction” means the awarding of bids for CRR source-to-sink combinations, by the CAISO, made by Candidate CRR Holders based on criteria established by the CAISO.
- 1.17. “CVaR” means credit value at risk.
- 1.18. “Board of Directors” of “Board” means the EBCE Board of Directors, which is made up of an elected official from each of the participating jurisdictions and one representative from the EBCE Community Advisory Committee.
- 1.19. “EBCE” means East Bay Community Energy.
- 1.20. “Emission Allowance” means a limited tradable authorization to emit up to one metric ton of carbon dioxide equivalent.
- 1.21. “Energy” means an electric charge that lets work be accomplished.
- 1.22. “ERMP” means the Energy Risk Management Policy.

- 1.23. "FERC" means the Federal Energy Regulatory Board, or its regulatory successor.
- 1.24. "Forward Power Transaction" means an Energy transaction that starts beyond the Balance-of-Month.
- 1.25. "Executive Director" means the Executive Director of EBCE.
- 1.26. "Greenhouse Gas" or "GHG" includes, but is not limited to, carbon dioxide ("CO₂"), methane ("CH₄"), nitrous oxide ("N₂O"), sulfur hexafluoride ("SF₆"), hydro fluorocarbons ("HFCs"), perfluorocarbons ("PFCs"), and other fluorinated gasses.
- 1.27. "GHG Compliance Instrument" means any instrument, including but not limited to, Emission Allowance, CARB Offset Credit, or Sector-Based Offset Credit that can be used to fulfill a GHG emissions compliance obligation.
- 1.28. "Letter of Credit" means a document, typically from a bank, assuring that a seller will receive payment up to the amount of the letter of credit, as long as certain documentary delivery conditions have been met.
- 1.29. "Long Term Transaction" means a purchase or sale of natural gas, electric power, capacity, transmission and/or other related attributes to be performed or delivered for a duration longer than a Balance of Month Transaction.
- 1.30. "MTM" means Mark-to-Market. MTM is a measure of the fair value of accounts that can change over time, such as assets and liabilities. MTM aims to provide a realistic appraisal of an institution's or company's current financial situation. The accounting act of recording the price or value of a security, portfolio or account to reflect its current market value rather than its book value.
- 1.31. "Natural Gas" means a flammable gas, consisting largely of methane and other hydrocarbons, occurring naturally underground (often in association with petroleum) and used as fuel.
- 1.32. "NRSRO" means nationally recognized statistical rating organization.
- 1.33. "Participating Member" means a participating jurisdiction within the East Bay Community Energy program, and which receives certain wholesale and retail services from EBCE.
- 1.34. "Prompt month" means the next full calendar month beyond the current month.
- 1.35. "Put Option" means an option that gives the buyer, or holder, the right, but not the obligation, to sell a futures contract at a specific price within a specific period of time in exchange for a one-time premium payment. It obligates the seller, or writer, of the option to buy the underlying futures contract at the designated price, should an option be exercised at that price.

- 1.36. "Regulations" means these Energy and Counterparty Risk Management Regulations.
- 1.37. "Renewable Energy Credit" or "REC" is the (i) right to the environmental benefits from generating electricity from renewable Energy sources that can be sold and traded and the owner of the REC can legally claim to have purchased renewable Energy, or (ii) as set forth in California Public Utilities Code §399.12, as such can be amended from time to time.
- 1.38. "Renewable Energy Products" means any combination of Energy, capacity, RECs, or other environmental attributes produced by a generation facility or resource that is eligible to satisfy applicable renewable Energy mandates as defined by federal, state, or local jurisdictions.
- 1.39. "Resource Adequacy" means the resource adequacy requirements established for load serving entities by the their respective governing body having jurisdiction.
- 1.40. "ROC" mean the Risk Oversight Committee.
- 1.41. "Sector-Based Offset Credit" means a credit issued from a sector-based crediting program once the crediting baseline for a sector has been reached.
- 1.42. "Speculation" means the practice of engaging in risky financial transactions in an attempt to profit from fluctuations in the market value of a tradable good such as a financial instrument. Speculation can in principle involve any tradable good or financial instrument.
- 1.43. "Transmission" means the bulk transfer of electrical Energy, from generating power plants to electrical substations located near demand centers. This is distinct from the local wiring between high-voltage substations and customers, which is typically referred to as electric power distribution.
- 1.44. "Wholesale Energy Services Provider" means the Northern California Power Agency ("NCPA").

APPENDIX 2

RISK OVERSIGHT COMMITTEE

1. Roles and Responsibilities

1.1. ROC Members

All members of the ROC have the following responsibilities:

- Oversee implementation of risk strategy of EBCE as such pertains to transaction activities;
- Advise the Executive Director on educational needs on risk management at all levels within EBCE;
- Review proposed changes to the ERMP and these Regulations by other ROC members;
- Attend all ROC meetings or ensure that fully-briefed alternates attend, including meetings requested by a member requiring ROC approval in a timely fashion; and
- Monitor key activities of the Front Office, Middle Office and Back Office as such pertain to transaction activities.

1.2. ROC Advisors

EBCE's legal counsel has the following responsibilities:

- Reviewing and approving all forms of contracts used by EBCE to consummate transactions of Approved Products;
- Determining what legal documentation is required, and proposing monitoring and review procedures to ensure legal and regulatory compliance with the ERMP and these Regulations; and
- Reviewing processes and procedures associated with transaction activities to ensure legal compliance with all local, state and federal laws and regulations.

ROC members' and all advisors' roles and responsibilities are detailed in the Table 2 below:

Table 2
Roles and Responsibilities

Responsibility	Executive Director	Director Admin. Services	Director Power Resources	Middle Office	Legal Counsel
Oversee implementation of EBCE's risk strategy.	✓	✓	✓	✓	
Verify to ROC that rules related to transacting authority and speculations are complied with by Front Office.				✓	
Verify to the ROC that all adopted Regulations are consistent with applicable law.					✓
Verify that Front Office and Back Office staff are in compliance with all policies and regulations.				✓	
Verify that the ROC is provided the most accurate forecast possible of market trends and a summary of stress testing and sensitivity analysis.				✓	
Ensure to the ROC that operational performance of the Front, Middle and Back Offices are in conformance with policies approved by the Board.	✓			✓	
Verify to the Executive Director that operational performance of the Front, Middle and Back Offices are in conformance with the ERMP and these Regulations.		✓	✓	✓	
Verify that the ROC is provided with an accurate report on Front Office operations.			✓	✓	
Ensure to the ROC that the Middle Office reporting is accurate and in compliance with Middle Office policies.		✓		✓	
Verify that the ROC is provided an accurate reporting of all transactions.				✓	
Ensure that the ROC is provided accurate reporting of risk measures and performance monitoring (including MTM, Cost VaR, CVaR) and compliance (limits, transaction authority, transaction type, instrument type).				✓	
Verify to the ROC that all approved contracts and enabling agreements have followed a process that is consistent with applicable law.					✓
Ensure that the ROC is provided with an accurate report on all Middle Office operations,		✓		✓	

especially with regard to market and credit exposure.					
Ensure that the ROC is provided with accurate reports on any transactions which exceeded limits, and proposed actions on strengthening compliance procedures and recommendations for corrective action.				✓	
Ensure that the ROC is provided with reporting that is consistent with the ERMP and these Regulations.	✓	✓	✓	✓	
Provide accurate reports to the ROC on any discrepancies between the Back Office settlement and reconciliation with the deal capture system.		✓			
Provide accurate reports on the risk management program to the Board.	✓	✓	✓	✓	
Provide timely support and legal advice to the Front, Middle and Back Office operations and to the ROC.					✓
Provide accurate reports on trading operations and all transactions carried out since last ROC meeting and summary of current and future transaction strategies.			✓		
Provide accurate reports on operational performance of Front and Back Offices with strategic objectives and provide solutions for violations.				✓	
Review proposed changes to ERMP by other ROC members.	✓	✓	✓	✓	✓
Advise ROC on analysis of potential enabling agreements with regard to Front and Back Office operations.	✓	✓	✓		
Advise ROC on consideration of pending enabling agreements and large contracts with regard to market and credit risk.			✓	✓	
Advise ROC on proposed portfolio and trader limits.	✓	✓	✓	✓	
Attend all ROC meetings or ensure that a fully briefed delegated representative is present.	✓	✓	✓	✓	✓
Advise ROC on proposed changes to Middle Office procedures.		✓		✓	
Provide ROC with “market view” of future market conditions and results of market models.			✓		
Provide ROC with “market view” of financial market conditions and implications on an as needed basis.		✓			

Monitor key activities of Front, Middle and Back Offices.		✓	✓	✓	
Present ROC-approved recommendations for changes to ERMP for consideration by the Board.	✓				
Brief the ROC on transaction operations with special regard to transacting authority and speculation issues.		✓	✓		
Advise ROC on education needs on risk management at all levels within EBCE.	✓	✓	✓	✓	✓
Serve as Chairperson for ROC.	✓				
Serve as official spokesperson for the ROC reports to the Board.	✓				
Determine documentation and legal review requirements to all processes are consistent with applicable law.					✓
Ensure Front and Middle Offices, and Legal Counsel participate on new product or transaction type development team.		✓	✓	✓	✓
Propose change to Front and Back Office Regulations.	✓	✓	✓	✓	✓

APPENDIX 3

AUTHORIZED CRR TRANSACTING GUIDELINES

1. Congestion Revenue Rights Transacting Guidelines

Congestion Revenue Rights are used by CAISO market participants to hedge against the cost of congestion associated with delivering resources to serve load obligations within a locational marginal price (LMP) market.

1.1. CRR Allocation Process

EBCE staff will participate in the CRR Allocation and Auction markets as follows:

EBCE staff nominates its CRRs during the allocation process in general conformance with the following methodology:

- CRR nominations are limited by the seasonal/monthly eligible quantities.
- CRR valuation of source/sink combinations are based upon the historical congestion component of the LMP. If access to an Integrated Forward Market (IFM) pricing model becomes available, simulated prices may be used in the CRR valuation process.

CRRs that have EBCE generation or scheduling points as sources, and the DLAP_PGAE-APND pricing node as the sink, are nominated first when the expected average congestion is statistically greater than zero, and no one historical period exhibited large negative congestion. Nominated amounts are equal to or less than expected generation in order to create a perfect or partial hedge. When expected congestion is low, nominated amounts are low and increase as expected congestion increases.

- After exhausting possible EBCE source/sink pairs, then nominations may be made from non-EBCE source/sink combinations that statistically have positive average congestion across historical periods with, no substantial negative congestion, as follows:
 - Rank the CRRs by congestion value.
 - Nominate the highest valued CRRs first, working down the possible Source-Sink combinations until the seasonal/month eligible quantities are exhausted.
 - Avoid large positions at any one non-EBCE sourced CRR.
 - Avoid clustered CRRs (e.g., source CRRs in the same geographic area that would expect to have the same or similar congestion component price).
- Avoid nominating both EBCE and non-EBCE sourced CRRs when data and experience shows that the CRR will not clear the allocation feasibility test.
- Once the above selection criteria results in a nomination portfolio, and prior to final submission, EBCE stress tests the portfolio on historical data for any large negative single period positions and if found removes that position prior to submission.

1.2. CRR Auction Process

EBCE staff bids into the CRR Auction in general conformance with the following methodology:

- Bids are made only to unwind CRRs obtained in the allocation process that are non-hedged, or are expected to have a negative value due to operational changes.
- Prices on the bid curves start at zero and go negative.
- Bids that clear in the auction result in revenue to EBCE and reduce overall risk by unwinding existing un-hedged allocation portfolio positions.
- Auction revenue is left in the EBCE CRR collateral account until the monthly/seasonal period is over.

APPENDIX 4

AUTHORIZED APPROVED PRODUCT TRANSACTION LIMITS

1. Approved Product Transaction Limits

1.1. Executive Director

The Executive Director is assigned the following primary responsibilities and transactions limits:

- Developing and approving all long-term supply strategies. Approval authority for long-term strategic plans and modeling parameters is not limited by fiscal constraints.
- Approval of financial authority limits associated with Approved Product transactions as recommended by the ROC.
- Authority for individual transactions as authorized under Board approved agreements or resolutions.
- Approval authority for Approved Product transactions up to, but not greater than, 115% of a Participating Member's annual load forecast, including executed fuel transactions that have been made to support generation operations up to 115% of load.
- All optimization strategies, statistical/procedural risk management methods (including risk tolerances), and resulting exposures.
- Approval of premiums and terms associated with the use of financial instruments on a case-by-case basis.

1.2. Director of Power Resources

The Director of Power Resources is assigned the following primary responsibilities and transaction limits:

- Approval authority for Approved Product transactions up to, but not greater than, 115% of a Participating Member's annual load forecast, including executed fuel transactions that have been made to support generation operations up to 115% of load.
- Authority to enter individual transactions with a term not to exceed 24 cumulative months, and not to extend past 60 consecutive months from the calendar month following the date of the transaction.

1.3. Scheduler and Planner (EBCE's Wholesale Energy Services Provider)

- Planning functions to determine the appropriate transactions necessary to maintain load/resource balance from day-ahead to Balance-of-Month in duration, and prompt month beginning 10 days prior to the conclusion of the current month.
- Approval authority for Approved Product transactions up to, but not greater than, the hourly peak load forecast, including executed fuel transactions that have been made to support generation operations, or to support economic optimization of generation assets.

- Authority to enter individual transactions with a term not to exceed balance-of-month, and prompt month beginning 10 days prior to the conclusion of the current month. Transacting is limited to variability between supply requirements and available resources.

Approved Product Transaction Limits Summary

	Executive Director	Director of Power Resources	Scheduler / Planner EBCE Wholesale Energy Services Provider
Transaction Term Limits:	As authorized under Board approved resolutions, programs or project agreements.	Transactions for a term up to 24 cumulative months, within the next 60 consecutive months.	Day-ahead to balance-of-month. Prompt month beginning 10 days prior to conclusion of current month.
Transaction Volume Limits:	Approved Product volume limits up to 115% of annual load forecast.	Approved Product volume limits up to 115% of annual load forecast.	<ol style="list-style-type: none"> 1. Approved Product volume limits up to Hourly peak load forecast. 2. Transacting limited to variability between load requirements and available resources. 3. Fuel transactions for power plant consumption limited to volumes necessary to support generation operations up to 115% of load.

APPENDIX 5

NEW PRODUCT DEVELOPMENT PROCEDURES

1. New Product Development

When the Front Office staff request to transact a new product type, instrument or strategy, several control processes must take place to ensure EBCE can identify, manage, control and report on the risks from the new transaction.

The process for submitting a request for a new Approved Product type is as follows:

1. The Front Office staff notifies Middle Office staff of his/her desire to enter into a new type of transaction. The Front Office staff are responsible for reviewing the transaction details, including all the key risk, pricing and operational elements of the transactions with Middle Office staff. Middle Office staff assume responsibility for undertaking all the risk and processing implications of the proposed transaction.
2. The Front Office staff is responsible for preparing a new product report for review and consideration by Middle Office staff. This report requires the Front Office staff to document all of the risk attributes of the transaction, and how they will be controlled (primarily focusing on market and credit risk).
3. Middle Office staff will review the new product report and begin the process of determining EBCE's ability to record, process and manage the transaction.
4. Middle Office staff first ascertains if the Front Office staff has the ability to accurately price the transaction. Secondly, Middle Office staff determines whether the risk of the transaction can be accurately measured. In either case, if the Front Office staff does not have the capability to price or measure the risk of the transaction, the Front Office staff is notified, and the Front Office staff must discuss the model development or purchase options with the Middle Office staff before the transaction can be authorized.
5. If the Front Office staff can price and model the risk of the new product, then the Middle Office staff will evaluate the Front Office's operational readiness to execute the transaction. The Middle Office staff will also evaluate the Middle Office's and Back Office's readiness to transact the new product. If any outstanding issues or concerns are identified by the Middle Office staff as part of the review, the issues or concerns identified must be resolved prior to transacting the new product.
6. The Middle Office staff then gathers all of the new product report summaries, and prepares a written recommendation to the ROC for consideration and approval. This written recommendation will consider whether or not the risks and potential control considerations, if any, warrant entering into the new product type.

New Product Approval Checklist

Risk/Task to be Completed During the Analysis	Primary Accountability
Business Strategy	
Sponsor new strategy	Front Office
Understand and document the economics of the new strategy	Front Office
Define the resource requirements for the new product	Front Office
Regulatory and Legal Risks	
Identify applicable California and local regulatory restrictions for product or business	Legal Counsel
Verify counterparty power and authority to enter into activity	Legal Counsel
Determine what legal documentation is required	Legal Counsel
Propose monitoring and review procedures to ensure legal/regulatory compliance	Legal Counsel
Designate the supervisor responsible to ensure that the product is sold only to counterparties for which it is suitable	Front Office
Determine if sufficient resources are available to support regulatory and legal requirements	Front Office
Market Risks	
Identify and analyze market risk	Front Office/Middle Office
Specify management's intention (Hold positions, actively trade or hedge)	Front Office
Propose fair market value and risk measurement methodology	Middle Office
Determine hedging approach	Front Office
Establish product trading limits	Middle Office
Determine impact on total position limits	Middle Office
Establish special interim limits on control the new product expansion in a measured, granular manner	Middle Office
Define and recommend management reporting requirements	Middle Office
Present report format for communication of positions on a timely basis	Front Office
Check if the new product involves commitments, guarantees, contingencies or any other off-balance sheet items	Middle Office
Credit Risks	
Identify and analyze credit risk of product	Middle Office
Develop methodology for capturing facilities and counterparties in the credit reporting system and measuring credit risk and concentration exposures	Middle Office
Define procedure for monitoring credit exposure	Middle Office
Identify target counterparties, determine suitability and request credit facilities	Middle Office
Determine proper procedure for perfecting collateral, netting agreements	Middle Office
Recommend maximum credit exposure limits for counterparties	Middle Office
Develop capability to report daily/weekly credit limit compliance	Middle Office
Check if the new product involves commitments, guarantees, contingencies or any other off-balance sheet items	Middle Office
Operational Risks	
Verify consistency with ERMP	Front Office/Middle Office
Define transaction tracking plan and procedures	Middle Office
Develop required deal sheet modifications	Front Office
Settlement procedures – how will transaction payment/billing be handled?	Back Office
Authorizations/approvals – what approval levels or delegation of authority is required?	Front Office/Middle Office
Develop procedure for transacting from start to finish	Front Office/Middle Office/Back Office

Note: Advice services in areas such as valuation, market/credit risk management, legal review, accounting/tax may also be sought and presented as part of this process.

APPENDIX 6 APPROVED PRODUCTS

1. Approved Products

The Energy and Energy related products that EBCE is authorized to transact are as follows:

Approved Products	Pre-Approved Examples	Authorization
1. Long Term Transactions for Energy	<ul style="list-style-type: none"> • Purchases of Energy to cover the forecasted supply shortage of the Participating Members • Sales of Energy amounts that are forecasted to be surplus to a Participating Member’s need • Liquidating “in the money” and “out of the money” transactions for optimization in accordance to a dual volume-VAR framework. 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.
2. Balance-of-Month Transaction for Energy	<ul style="list-style-type: none"> • Energy purchases/sales within defined term and volume limits • Loss of generation • Loss of transmission • Forecasting errors 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.
3. Day-Ahead and Real-Time Power Transactions Through a BAA (e.g., CAISO)	<ul style="list-style-type: none"> • Purchasing Energy from the CAISO day-ahead and/or real-time market to serve load • Selling Energy into the CAISO day-ahead and/or real-time market from generation resources 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.
4. Purchase/Sale of Capacity	<ul style="list-style-type: none"> • Short-term or forward purchases of capacity products (e.g., Ancillary Services and Resource Adequacy products) • Short-term or forward sales of capacity products (e.g., Ancillary Services and Resource Adequacy products) 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.
5. Purchase/Sale of Physical Call Options	<ul style="list-style-type: none"> • To cover potential supply deficiency due to unpredictable weather conditions (e.g., hydrological forecast error) • To balance load and resources in an illiquid market • To provide a hedge against a Participating Member’s net open position 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.

	<ul style="list-style-type: none"> • Sale of a hedged (with physical plant) call option 	
6. Purchase/Sale of Physical Put Options	<ul style="list-style-type: none"> • To hedge a surplus resource position • Sale of an option for the sole purpose of unwinding a purchase if economically advantageous 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.
7. Transmission	<ul style="list-style-type: none"> • Purchases/sales of firm and non-firm transmission capacity required for the delivery Energy 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.
8. GHG Compliance Instruments	<ul style="list-style-type: none"> • Purchases of Emission Allowances from bilateral trades, and from the CARB administered Cap and Trade Program auctions and reserve auctions to satisfy actual and/or forecasted GHG emissions compliance obligations attributed to EBCE generation and scheduling activities (e.g. imports) 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.
9. Renewable Energy Products	<ul style="list-style-type: none"> • Purchases of Renewable Energy Products to satisfy any requirement for such products under applicable law; Bilateral purchases are to be consummated under approved contract forms, follow approved credit risk limit procedures, and all other applicable risk management practices defined in this regulation • Sales of Renewable Energy Products for the sole purpose of eliminating a surplus 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations.
10. Congestion Revenue Rights	<ul style="list-style-type: none"> • Participation in the CRR Allocation and CRR Auction processes through the submission of nominations and/or bids in the Annual and/or Monthly Congestion Revenue Right Allocation and Auction processes administered by the CAISO 	<ul style="list-style-type: none"> • Authorized in accordance with the limits as set forth in these Regulations. • See Appendix 3 to these Regulations

APPENDIX 7 MANAGEMENT REPORTS

1. Management Reports

The following energy risk management reports shall be developed and presented as further described in the following table:

	Primary Responsibility			Report Frequency			
	Front	Middle	Back	Weekly	Monthly	Quarterly	Annual
Management Report							
Load and Resource Balance	X					X	
Portfolio Performance		X				X	
Portfolio Risk Exposure (Open Position Cost VaR)		X				X	
Exceptions Report		X				X	
Master Agreements	X						X
Policies Update		X					X
Transaction Position Detail		X			X		
MTM		X		X			
Credit Limit Status by Counterparty		X		X			
Trading Strategy	X				X		
Scenario Planning	X						X
Pending Agreements	X					X	
Energy Transaction Summary	X				X		
Non-Energy Transaction Summary	X				X		
Market Forecast	X				X		
Performance to Budget			X			X	
Procedure Exceptions			X		X		

1.1. Description of Management Reports

- Load and Resource Balance: Front Office report detailing total resources by source as compared to total load. Report shows supply surpluses and shortages. The Load Resource Balance report is developed weekly and presented to the ROC quarterly.
- Portfolio Performance: Middle Office report comparing the cost of the portfolio of contracts, to the market value of the portfolio (tracking what we paid for it to what it's worth now). This is the counterpart to the risk exposure report. The Portfolio Performance report is developed weekly and presented to the ROC quarterly.

- Portfolio Risk Exposure (Open Position Cost VaR): Middle Office report showing portfolio exposures by month due to price volatility. The Portfolio Risk Exposure report is developed weekly and presented to the ROC.
- Exception Report: Middle Office report summarizing current exception and violation reports. The Exception Report is developed quarterly presented to the ROC.
- Master Agreements: Front Office report summarizing the current set of approved master agreements by approved counterparty. The Master Agreements report is developed quarterly presented to the ROC.
- Policies Update: Middle Office report providing annual review of risk management policies and procedures and recommendations for updates. The Policies Update report is presented to the ROC.
- Transaction Position Detail: Middle Office report showing detail of Portfolio Performance report. Individual deal details showing MWh under contract and total dollars sorted by counterparty in support of the Portfolio Performance report are included in this report. The Transaction Position Detail report is presented to the ROC.
- MTM: Middle Office report showing MTM for life of deals by counterparty. The MTM report is developed weekly presented to Front Office and Back Office staff quarterly
- Credit Limit Status by Counterparty: Middle Office report showing counterparty credit limits, credit used and credit remaining. Special flagging of counterparties nearing their credit limits should also be shown. The Credit Limit Status by Counterparty report is presented to Front Office and Back Office staff weekly.
- Trading Strategy: Front Office report detailing trading strategies for various periods (e.g., daily, monthly, quarterly, future years). The Trading Strategy report is presented to the ROC quarterly.
- Scenario Planning: Front Office report detailing potential scenarios, expected result and probabilities. The Scenario Planning report is presented to the ROC quarterly.
- Pending Agreements: Front Office report detailing status of negotiations with potential counterparties on enabling agreements. The Pending Agreements report is developed weekly and presented to the ROC quarterly
- Energy Transaction Summary: Front Office report summarizing, by counterparty, Energy related transactions, both completed and contracted, involving Energy delivery. The Energy Transaction Summary report is developed weekly and presented to the ROC quarterly
- Non-Energy Transaction Summary: Front Office report summarizing, by counterparty, non-CAISO market Energy related transactions (puts, calls, options, RECs, GHG Compliance

Instruments and etc.) which do not involve (or are not specifically reliant on) Energy delivery. The Non-Energy Transaction Summary report is developed monthly presented to the ROC quarterly

- Market Forecast: Front Office report detailing forecast of market for periods (e.g. monthly, quarterly, future years). The Market Forecast report is presented to the ROC.
- Performance to Budget: Back Office report comparing incurred Energy costs to budgeted costs and existing contracts and uncovered exposure at market prices to remainder of budget. The Performance to Budget report is developed for EBCE staff weekly and presented to the ROC quarterly
- Procedures Exceptions: Back Office report noting any procedure exceptions. The Procedures Exceptions report is presented to the ROC quarterly

APPENDIX 8

RISK ASSESSMENT METHODOLOGIES

1. Risk Assessment Methodologies

1.1. CRR Valuation and Risk Assessment

CRR valuation is based upon historical data. EBCE values its CRR holdings individually and as a portfolio. Along with the average valuation, EBCE calculates the fifth (5th) percentile and 95th percentile position of each CRR Source/Sink combination.

EBCE performs a stress test on its CRR nominations. The stress test identifies the minimum, maximum and expected revenue for each available seasonal/monthly historical period.

The highest risk to EBCE's CRR allocation and auction portfolios is a collateral call. The CAISO does not net the portfolios, so the risk is a result of the separate collateral requirements for each portfolio. The expected value of EBCE's allocated CRR portfolio is positive. EBCE's auction portfolio consists only of unwound allocated CRR; as such, the expected value is negative. A collateral call could occur if an event increased the expected negative value of the auction portfolio even though the actual day-ahead market position would be offset by an increase in the expected value of the allocation portfolio.

EBCE mitigates this risk by leaving all its auction revenue in the CRR collateral account at the CAISO. EBCE's initial deposits of \$500,000 for the annual auction, and \$100,000 for the monthly also remain in the collateral account.

EBCE will only request a return of its auction revenue after the end of each monthly/ seasonal period, thereby maintaining usable secured available credit well in excess of its required collateral.

1.2. Mark-to-Market Methodology

The MTM calculation is a method to value future or forward open trading or hedge positions on an on-going basis to track market price changes. Once a position is taken in the market for some future delivery period, the value of that position must be monitored and managed on a routine basis. The volatility and volume of activity for a particular traded product will dictate how often it is necessary to update the MTM valuation of such product. EBCE will "mark" all open positions on no less than a MONTHLY basis, or as necessary, given market dynamics.

Long Term Transactions for future delivery or receipt of Energy. Several trading hubs host the majority of physically traded contracts such as Palo Verde (PV), California Oregon Border (COB), Mid-Columbia (Mid-C), California South (SP15), and California North (NP15). There are also several emerging hubs in the desert southwest and rocky-mountain areas. Publications such as *Megawatt Daily* and *Energy Market Report* list the daily prices traded at more heavily traded hubs. Information sources such as McGraw Hill publishing report broker trades for forward contracts at the most active trading

points. For illiquid products or trading points, the MTM may be applied less frequently than daily. In these circumstances a weekly or monthly mark may be appropriate. However, periodic market inquiries, as appropriate, should be made to capture any market movement.

The following information sources, or their equivalents as approved by the Middle Office and Front Office, are to be used to mark open positions for the traded products and hubs listed below:

- **WSPP Contracts for Liquid Products and Trading Hubs:** The standard forward traded electricity products as reported in the *Energy Market Report*, published by *Insight Research, Inc.*, or other relevant broker/trade reporting system. This source may be replaced at such time that EBCE has available an information service such as the Intercontinental Exchange (“ICE”), *Reuters North America Power* or other reliable source.
- **WSPP Illiquid Products and Trading Points:** these products are likely to change value less often than the more standard products. Periodic (weekly or bimonthly) probing of the market may be necessary to obtain current valuation. It may be possible to identify basis relationships between the liquid and illiquid trading points resulting in an approximate valuation.

1.3. Cost Value at Risk Calculation Methodology

In its most literal sense, Value at Risk (VaR) refers to a particular *amount of money*, the maximum amount likely to be spent or lost over some period, at some specific confidence level. EBCE has defined its supply management activity as a cost hedging activity. Therefore, for purposes of power resources management, Cost VaR is defined as a single, summary statistical measure of possible costs that are in excess of, expected costs.¹⁰

Traditional VaR methodology (as practiced in the financial sector) has two important characteristics. The first is that it provides a common consistent measure of risk across different positions and risk factors. The other characteristic of VaR is that it takes account of the correlations between different risk factors. If two risks offset each other, the VaR allows for this offset and tells us that the overall risk is fairly low. If the same two risks don't offset each other, the VaR takes this into account as well and gives us a higher risk estimate.

Since Cost VaR tells us about EBCE's maximum cost exposure, management can use it to determine internal capital allocation. Cost VaR can be used to determine capital requirements at the senior management level of the organization, and also down the line to the level of the individual transaction decision. The higher the risk associated with the transaction, the higher the VaR and the greater the capital requirement. Cost VaR can also be used to assess the risks associated with different transaction opportunities and the implications of various risk tolerance thresholds. Cost VaR can also be used to

¹⁰ Specifically, standard, or traditional, VaR is a measure of cash flow exposure due to “normal” market movements; traditional VaR would be used when monitoring hedge positions initiated with financial derivatives. Costs or losses greater than VaR estimates are suffered only with a specified small probability (e.g., 5% of the time, etc.). However, VaR is not a stress test – it will not indicate what a maximum loss may be 5% of the time.

evaluate the performance of divisions.

1. Methodology

The two (2) principal components of the traditional VaR calculation are the:

- Market
- Portfolio

The “Market” involves understanding and estimating how the particular market parameters behave over a specified holding period. This is captured by performing market parameter modeling. The “Portfolio” involves understanding and quantifying how the portfolio’s value varies according to estimated changes in market parameters. This is captured by revaluation. The standards applied to market parameter modeling and revaluations are described below. These two components are illustrated as follows:

Market > **Market Parameter Modeling** >

- Distribution assumptions
- Correlation assumptions
- Parameter assumptions

VaR Calculation

Portfolio > **Revaluation** >

- Historical Simulation
- Monte Carlo Simulation
- Full revaluation
- Analytic (Covariance/Variance Method)
- Sensitivities
or any reasonable
- Sensitivity Analysis
combination of these

2. Market Parameter Modeling

During market parameter modeling, various assumptions are made in relation to the distributions and correlations between assets, or products in the case of electricity, within the same risk category, or hub jurisdiction (i.e., SP15 vs. COB, etc.). In addition, various estimations are made with respect to the level of commodity prices and their implied volatilities.

Market parameters should be modeled on the basis of the following:

- Distribution assumptions for the market parameters are normal (this is a primary assumption for Cost VaR);

- Parameters are usually estimated on the following:
 - a one (1) month holding period, which is consistent with the frequency of revaluation of all financial trading positions.
 - the historic time period of one (1) calendar year or 252 days, unweighted, should be used to calculate historic volatilities and correlations.

Although distribution assumptions are assumed normal, management recognizes that actual power price distributions have displayed a skewed distribution. Traditional VaR methodology is not currently appropriate for the electric power industry. However, it may be appropriate for measuring positions in natural gas, whether physical or financial. Cost VaR, in the context of electricity portfolios, is not concerned with duration or term parameters (such as holding periods, etc.) since electricity products currently have predefined terms (e.g., hourly product, month product, quarterly product, etc.)

For modeling purposes, the Cost VaR is taken from the 95.0% quartile of the distribution of changes in the hourly chronological simulation of loads and resources (1.645 standard deviations).

3. Portfolio Revaluation

Revaluation is the calculation of the changes in portfolio costs resulting from a change in specific model assumptions (i.e., price, risk tolerance, volatility, etc.).

Two revaluation techniques are permitted:

- Full revaluation: Full revaluation occurs where the transactions in the portfolio, or positions, are all individually marked to market value for each market rate scenario generated. This is also true for Cost VaR applications.
- Delta approximation: Delta refers to the change in one variable given a change in another variable. A sensitivity analysis is an *approximation* of the change in net present value for various sensitivities of the portfolio. Sensitivity analysis may be used only for linear approximation. For linear approximation the sensitivity of the rate of change of the price of the transaction to a small change in the market rate is calculated. This is more applicable to traditional VaR where linear relationships and correlations may exist between financial instruments. On a more simplified level, Cost VaR considers delta approximation when adjustments are made to parameters such as risk tolerance, price, and volatility.

For purposes of traditional VaR, the range should cover at least 1.645 standard deviations in either full revaluation or delta approximation. Any reasonable combination of the above is also permitted. For example, a combination of the above might be used for large portfolios which contain both complex and simple instruments and for which different revaluation techniques are appropriate.

The risk measurement methodology must take the current mark-to-market value supplied and apply revaluation techniques to calculate the potential loss or VaR, which may arise from the future changes in market.

Note: Sensitivity analysis is appropriate for individually measuring risks which may not otherwise be measured on a full portfolio basis such as location or spread risks. Sensitivity analysis is not appropriate

for products with non-linear price behavior. In particular, option portfolios contain a high degree of non-linearity. This means that the change in the portfolio value has a non-linear relationship with changes in the underlying asset price. In this case, a sensitivity analysis is no longer valid.

4. VaR Calculation

Monte Carlo simulation is the preferred approach to VaR calculation for all portfolios. This is also true for Cost VaR when simulating loads and resources. However, the Analytic Method (Variance/Covariance) will be used if EBCE does not have the computing power necessary to generate a Monte Carlo simulation. EBCE recognizes that the Analytic Method is inappropriate for portfolios with non-linear characteristics (i.e., optionality) and will make the necessary adjustments when portfolio non-linearity becomes significant.

Monte Carlo Simulation Method:

Monte Carlo simulation estimates Cost VaR from a simulated distribution that is derived by assuming particular theoretical market processes and simulating large numbers of random paths that prices, or other parameters, could follow. The method proposes that if we take a sufficiently large number of simulations, they will produce a simulated distribution that will converge to the unknown true distribution of portfolio values. VaR and Cost VaR can be inferred from the simulated distribution. The steps required in a Monte Carlo simulation are as follows:

- Perform market parameter modeling by estimating the parameters of the distribution (e.g., volatilities and correlations) using a historical time series of market parameters;
- Generate an appropriate distribution of random variables;
- Perform the simulation by applying the covariance to the random numbers to generate a set of correlated market parameter scenarios; and
- Apply market parameter scenarios to the portfolio and, using revaluation method set, generate a distribution of portfolio values.

Analytic Method (Variance/Covariance):

The Analytic Method is based on the same distribution assumptions for market parameter modeling as the Monte Carlo method but restricts the portfolio to linear risk components only. This allows the analyst to assume that the portfolio changes are normally distributed.

The steps required in the analytic VaR calculation are:

- Perform market parameter modeling by estimating the parameters of the distribution (e.g., volatilities and correlations) using a historical time series of market parameters;
- Calculate the vector of sensitivities with respect to the underlying spot rates;
- A first order approximation is used to calculate changes in portfolio value. Given the normality assumption, the distribution parameters can then be calculated analytically using the sensitivities determined in step 2 above.

The VaR is defined as 1.645 the standard deviation of the change in portfolio value which equals –

under the assumption of zero mean – a confidence level of 95%.

1.4. Cost VaR Stress Testing Methodologies and Procedures

In broad terms, there are two (2) main approaches to Cost VaR stress testing. The first of these focuses on the impact of particular specified scenarios – typically a fairly limited number of such scenarios – that are fed into an analytical process. This approach to stress testing is usually known as scenario analysis. The term “stress testing” is used here to apply to any procedures that attempt to evaluate the impact of hypothetical future events on EBCE’s hedging and/or transacting portfolios.

The term “scenario analysis” is used to apply to that type of stress testing that focuses on particular specified *scenarios*, as distinct from the second type of stress testing that specifies classes of mathematical or *statistical possibilities* and then works through these possibilities in a mechanical way. Note that scenario analysis only indicates what EBCE stands to “spend” in a particular circumstance, and does not indicate (and is not designed to indicate) how likely any particular circumstance is to occur. Scenario analysis is therefore a natural complement to Cost VaR approaches that indicate something about the probability of a clearly defined event, but do not as such identify what EBCE would spend if the event actually occurred.

The Cost VaR stress testing methods approved for use by the ROC include 1) worst-case scenario analysis, and 2) extreme value analysis.

Worst-Case Scenario Analysis (WCSA):

WCSA allows an examination of the worst case that is *expected to occur* (Boudoukh, Richardson and Whitelaw, 1995). This approach is useful when there is concern about maximum possible costs over a particular horizon period (e.g., one month, one year, etc.) and an expectation of some savings or cost over each sub-period (e.g., each day or month). The worst-case scenario is the cost associated with the most adverse daily outcome. If each outcome is a random variable Z_i , and there are n sub-periods in our horizon, then the worst-case scenario is:

- $\text{Min}[Z_1, Z_2, \dots, Z_n]$

The actual worst-case scenario can now be estimated by running simulations of the random Z variables.

Extreme Value Analysis (EVA):

This approach starts from the premise that the extreme values of the cost distribution are what we are mostly concerned about, and then uses the statistical theory of extreme values to determine maximum extreme costs with a determined degree of confidence.

In practice the distribution of extreme values is not known, but the key insight of EVA theory is that this distribution converges in large samples to a limiting distribution of a particular known form. An analytic solution for the Cost VaR can then be found from this distribution once a desired confidence level is specified. The important parameter is the tail index, which gives the thickness of the tails (e.g., for a t -distribution, this is the number of degrees of freedom).

The Extreme Value Analysis approach has various attractions: (1) It deals directly with the extreme values typical of the electric Energy market. (2) It provides a firm methodological basis for the estimation of Cost VaR. (3) It does not impose any particular form on the underlying price distribution, but instead allows this distribution to take any well-behaved form, including an asymmetric (i.e., skewed) one. (4) It produces a simple analytical formula for Cost VaR. (5) The approach is robust, flexible and easy to use.

Note: Standard VaR methodology will be used to evaluate exposures resulting from activity in financial instruments. Currently, the electric power industry has not developed a highly liquid market in financial instruments. However, the natural gas market is relatively mature and offers opportunities in the use of financial instruments for the purpose of cost hedging. Standard VaR methods can be utilized more appropriately with natural gas as market performance generally follows a normal distribution.

Backtesting:

The purpose of a backtest is to compare the expected cost (at the then forward price) with actual cost (at the spot price), and implied volatility with actual volatilities, to determine if EBCE's cost VaR is adequate (conservative enough) to capture the potential market exposure.

To serve such purpose, staff may use the same open position number forecast 12 months ago and apply the DA spot market price in the past 12 months. This number would be the "actual cost" of the open position had it stayed unchanged and filled in the DA market. Comparing the difference between the two numbers will provide guidance as to whether the variance falls within the 95% cost VaR boundary and identify whether EBCE would have been better off leaving the position open or covering it 12 months ago.

EBCE has performed backtesting of the Cost VaR measures during the in-house model development and validation phase. The backtesting results revealed adequacies in the Cost VaR measures (given the statistical confidence intervals used or various parameters).

APPENDIX 9

Recommended Coverage

The following Time-Price Coverage Matrix will be used as a guide for EBCE’s short term and long term procurement strategies. The objective of the Time-Price Coverage Matrix is to develop a procurement strategy focused on hedging against the risk of open load positions, as measured over time, and to mitigate EBCE’s exposure to market price volatility and other pricing risk. EBCE will strive to further develop this matrix based on (1) EBCE’s wholesale price risk and (2) appropriate limits for these risks. The actual covered positions taken by EBCE, reflected as a percentage of forecasted load, may deviate from the following Time-Price Coverage Matrix based upon EBCE’s staff evaluation of current market conditions and other applicable requirements (e.g., regulatory requirements).

Months to Delivery		Price Matrix Percentile						
		>60%	60%	50%	40%	25%	10%	<10%
		Covered Position as a % of Forecasted Load						
0+	3	80%	80%	85%	85%	90%	90%	100%
3+	6	70%	70%	75%	80%	80%	90%	100%
6+	9	70%	70%	75%	80%	80%	80%	90%
9+	12	60%	60%	70%	80%	80%	80%	90%
12+		60%	60%	70%	80%	80%	80%	90%

Cost-at-Risk Metrics

RESERVED / TO BE DEVELOPED