

Final Report on PPA Auction Design

Prepared by: Charles River Associates Incorporated
Boston, MA

Market Design Inc.
Washington, D.C.

As Members of: Alberta Independent Assessment Team

Submitted to: Alberta Department of Resource
Development

CRA #1601-00

December 30, 1999



Table of Contents

	<u>Page</u>
TABLE OF CONTENTS	i
EXECUTIVE SUMMARY	1
1. INTRODUCTION	3
1.1. Background	3
1.2. The EUA and PPA Auction Design.....	4
1.3. Next Steps in the PPA Auction Process.....	6
1.4. Terminology in This Report	6
1.5. Organization of This Report	7
2. ISSUES IN PPA AUCTION DESIGN	9
2.1. PPA Auction Design Objectives	10
2.1.1. Objective: Mitigate Market Power	10
2.1.2. Objective: Optimize Auction Proceeds	11
2.1.3. Objective: Establish Market Values	11
2.1.4. Objective: Provide Transparent Assignment	11
2.1.5. Tradeoffs Among the Objectives	11
2.2. The Winner's Curse	12
2.3. Transparency	13
2.4. Need for Clear Definition of Items Being Auctioned	13
2.5. PPA Substitutes, Complements, and Bundling	14
2.5.1. Individual-PPA Bidding.....	15
2.5.2. Pre-Specified PPA Bundles	16
2.5.3. All Possible Bundles	17
2.5.4. Recommendation: Individual-PPA Bidding	18
2.6. PPA Resale.....	19
2.7. Full-Term PPAs and Term of the Auctioned Instrument	19
2.7.1. Many Generation Facilities Have Shorter-Term PPAs	20
2.7.2. Discounting Is Not an Argument in Favor of Shorter Terms.....	20
2.7.3. Experience and Evidence Suggest Sufficient Interest in the PPA Terms	22
2.7.4. Additional Costs Would Be Incurred in Multiple Auctions Over Time	23
2.7.5. Problems with a Single Auction of Shorter-Term Instruments.....	23
2.7.6. Recommendation: One-Time Auction of Full-Term PPAs.....	26
2.8. Bidder Participation.....	26
2.8.1. Recommendation: Allow Existing Owners to Bid on a Limited Basis	26
2.9. Bidder Qualification.....	27
2.9.1. Non-Binding Initial Bids for Screening	27
2.9.2. Deposits for Screening	28
2.9.3. Other Terms of Qualification.....	29
2.10. Collusion.....	29
3. ALTERNATIVE AUCTION FORMATS	30
3.1. Simultaneous Ascending Auction	30
3.2. One-Shot Sealed-Bids and Sequential Auctions	30
3.3. Two-Step Sealed-Bid Processes.....	31



Table of Contents

	<u>Page</u>
3.4. Evaluating Auction Formats.....	32
3.4.1. Mitigating Market Power and Promoting Competition.....	33
3.4.2. Revenue Optimization.....	34
3.4.3. Well-Informed Market Values.....	34
3.4.4. Transparency.....	35
4. MARKET POWER.....	36
4.1. Using Auction Design to Mitigate Market Power.....	36
4.2. Analysis of Market Power.....	36
4.2.1. How Market Power May Be Exercised.....	36
4.2.2. Types of PPA Holding Restrictions.....	37
4.2.3. Testing Alternative PPA Holding Restrictions.....	38
4.3. Recommendations on PPA Holding Restrictions.....	40
4.3.1. Existing Owner Precluded from Bidding on Own PPA.....	40
4.3.2. Total PPA Capacity Less than 20 Percent.....	41
4.3.3. Combination of Clover Bar and Rossdale Not Permitted.....	42
4.3.4. Combination of Clover Bar and Any Baseload Not Permitted.....	42
4.3.5. Combination of Rossdale and Two or More Baseloads Not Permitted.....	43
4.3.6. Hydro Owner Not Permitted to Bid on Clover Bar or Rossdale.....	43
4.3.7. Related Companies.....	43
4.4. Mitigating Market Power Post-Auction.....	44
4.4.1. Recommendation: Effective MSA.....	44
4.4.2. BC Tie-Line.....	44
5. RECOMMENDED AUCTION RULES.....	46
5.1. Specifying the Bid Items.....	46
5.1.1. The PPAs.....	46
5.1.2. The Auctioned Instruments.....	48
5.2. The Point System.....	48
5.3. Defining a Bid.....	49
5.3.1. Form of the Bid.....	49
5.3.2. Form of the Winning-Bid Payment.....	49
5.4. Pre-Auction Procedures.....	50
5.4.1. Bid Deposits.....	51
5.5. Bid Submission Procedure.....	51
5.6. Stage Transition Rule.....	53
5.7. Reserve Prices and Minimum Opening Bids.....	54
5.7.1. Reserve Prices.....	54
5.7.2. Minimum Opening Bids.....	55
5.8. Active Bids.....	56
5.9. Valid Bids.....	57
5.10. Minimum-Bid Increments.....	57
5.11. Activity, Eligibility, and Waivers.....	58
5.11.1. Activity.....	58
5.11.2. Eligibility.....	58
5.11.3. Activity Rule.....	58
5.11.4. Waivers.....	59
5.11.5. An Example of the Activity Rule.....	60



Table of Contents

	<u>Page</u>
5.12. Bid Withdrawals.....	61
5.12.1. Cancelled Bids	61
5.12.2. Bid Withdrawals.....	61
5.13. Tie Breaker Rule.....	61
5.14. Reporting Round Results	62
5.14.1. Recommendation: Anonymous Auction	63
5.15. Frequency of Rounds.....	63
5.16. End of the PPA Auction.....	64
5.17. No Post-Auction Negotiation.....	64
5.18. Minimum Generating Capacity and Auction Cancellation.....	64
6. CONCLUSION	66
APPENDIX A: SELECTED CHANGES FROM DRAFT REPORT	67
Single Auction of Less-Than-Full-Term-PPA Instruments	67
PPA Holding Restrictions	67
TAU's Hydro Capacity.....	68
BC Tie-Line	68
Affiliate and Associate.....	68
Minimum Generating Capacity.....	68
APPENDIX B: RESPONSES TO COMMENTS ON DRAFT REPORT	69
ENMAX (10/15/99).....	69
City of Calgary (10/20/99).....	70
Enron Capital & Trade Resources Canada Corp. (10/21/99).....	71
PICA (10/21/99).....	72
IPPSA and SPPA (10/22/99)	72
EPCOR (10/22/99).....	74
TransAlta Utilities (10/22/99).....	74
Industrial Power Consumers Association of Alberta (10/21/99)	75



Executive Summary

The following is a summary of the IAT's recommendations related to the PPA auction design based on the objectives for the PPA auction and on the information and comments we have received to date. This summary is not comprehensive and it does not list all of our recommendations. The reader is urged to review the full report for our complete set of recommendations and for more background and description of the recommendations.

1. The auction should be conducted using a Simultaneous Ascending Auction design with bids submitted remotely.
2. The auction should continue for all PPAs until there is no bidding activity on any PPA.
3. The thirteen thermal PPAs as approved by the Energy and Utilities Board, each one covering one or more thermal generating units, should constitute the items to be auctioned. The PPA documents describe the terms and conditions for the PPAs. The rights and obligations of the generator-owners and for the buyers of the PPAs (i.e., the winning bidders of the auction) are described in the PPA documents as approved by the EUB.
4. The Balancing Pool will be the PPA holder for the hydro PPA. The hydro PPA will not be auctioned.
5. A single, one-time auction should be held for full-term PPAs.
6. The ADRD should have sole right to determine if bids for PPAs are acceptable. It should have sole right to accept or reject any or all bids.
7. The ADRD should have discretion — but should not be required — to establish minimum acceptable bid levels (reserve prices) for some or all of the PPAs. The ADRD should not be required to reveal the amount of any such minimum bid levels either before or after the auction is completed.
8. Potential bidders should be required to demonstrate financial adequacy in order to participate in the auction. A bid deposit should be required prior to the auction from each qualified bidder that wishes to participate in the auction.
9. The amount of the bid deposit should be proportional to the “amount” of PPAs the bidder wishes to be eligible to bid on. The dollar amount of the deposit should be based on a point system.



Executive Summary

10. A point system should be used to assign an integer to each PPA. The point system will be used to determine the amount of the bid deposit and to determine eligibility to continue bidding during successive rounds of the auction.
11. Bidders should be required to participate actively in each round of the auction in order to maintain their eligibility to participate in subsequent rounds. There should be a limited provision to allow lapses in activity without losing eligibility.
12. Minimum opening bids should be announced prior to the auction.
13. Bidders should not be allowed to bid on thermal PPAs covering generating units for which they are the generator-owner.
14. Bidders should not be allowed to bid on thermal PPAs for which the sum of the capacities stated in these PPAs represents more than 20 percent of the total capacity stated in all the thermal PPAs plus 393 MW (from hydro units). For purposes of this PPA holding restriction, 393 MW of capacity from hydro units should be counted as part of TransAlta Utilities' PPA holdings against the 20-percent restriction.
15. There should be other PPA holding restrictions as recommended in this report.
16. Certain institutions such as the Market Surveillance Administrator (MSA) should be empowered to monitor electricity markets and to establish and enforce guidelines and rules to mitigate market power and promote competition as the markets evolve over time post-auction.



1. Introduction

1.1. BACKGROUND

The primary purpose of this final report on PPA auction design is to provide to the Alberta Department of Resource Development (ARD) the recommendations of the Independent Assessment Team (IAT) on the design and rules for the auction of power purchase arrangements (PPAs). This report will be posted on the website of ARD (<http://www.energy.gov.ab.ca>) and on the PPA auction website (<http://www.auctionppa.com>).

The previous draft version of this report, “Draft Report on PPA Auction Design,” dated September 10, 1999, was posted on the ARD and IAT websites, and is posted on the PPA auction website. The issues addressed in this final report on PPA auction design have been raised in a variety of forums since the fall of 1998. These include a pre-white paper and white paper on PPA auction design, a presentation at the IAT’s consultations in January 1998 in Calgary, presentations to the EUA Advisory Committee, other consultations, presentations at various industry conferences, and the “Draft Report on PPA Auction Design.” Beginning in the fall of 1998, ARD and the IAT asked for comments from stakeholders and other interested parties on our analyses and preliminary recommendations. We have considered these comments seriously and have taken them into account in our recommendations in this final report on PPA auction design. We address some of these comments specifically in an appendix to this final report on PPA auction design.

The report was developed by Charles River Associates Incorporated (CRA) and Market Design Inc. (MDI) as members of the IAT. The IAT was appointed by ARD in accordance with the Electric Utilities Act, 1995 as amended (EUA), which provides much of the framework for restructuring Alberta’s electric power industry.¹

As a member of the IAT, PricewaterhouseCoopers (PwC) primarily has been responsible for the PPA determinations which were delivered to the Alberta Energy and Utilities Board (EUB) and posted on the IAT’s website on July 9, 1999. An August 27 revision subsequently was delivered to the EUB and posted on the IAT’s website. The IAT’s report and PPA determinations, as well as many other documents relevant for PPA auction design, are available on the IAT’s website (<http://www.pwcstt.com>).

¹ The Electric Utilities Act, 1995 as amended also includes the Electric Utilities Amendment Act, 1998.



Introduction

As members of the IAT, CRA and MDI primarily have been responsible for the PPA auction design and rules. The EUA requires the IAT to recommend a PPA auction design to ADRD.

1.2. THE EUA AND PPA AUCTION DESIGN

Selected sections of the EUA providing context and guidelines for the PPA auction design are reproduced here.

Power purchase arrangement

[Sections 45.5(1)-45.5(5) are not reproduced here.]

45.5(6) In respect of each power purchase arrangement determined under this section, the independent assessment team may recommend that specified intervals be auctioned under section 45.93, and in that event the independent assessment team shall recommend the appropriate intervals to be auctioned.

Public auction

45.93(1) One or more auctions shall be held for the purpose of offering for sale to the public power purchase arrangements

- (a) that apply to generating units listed in Part 1 of the Schedule, and
- (b) that have been approved or varied by the Board.



Introduction

(2) The independent assessment team shall recommend to the Minister rules relating to the holding of an auction under this section, including

(a) the setting of limitations respecting

(i) the number of power purchase arrangements that may be purchased by one purchaser,

(ii) the types of power purchase arrangements that may be purchased by one purchaser, and

(iii) who is eligible to bid on power purchase arrangements,

(b) the setting of conditions and reserve prices, and

(c) the determination of any other matter relating to an auction.

(3) On receipt of recommendations from the independent assessment team, the Minister may by regulation establish the rules relating to the holding of an auction and to the auctioning of power purchase arrangements in the intervals recommended under section 45.5(6).

Minimum amount of generating capacity

45.94(1) On receipt of a recommendation from the independent assessment team, the Minister shall set the minimum amount of generating capacity in respect of which power purchase arrangements must be sold at the public auction.

(2) If acceptable bids are not received at the public auction for at least the minimum amount of generating capacity set under subsection (1),

(a) the public auction is cancelled, and

(b) the independent assessment team shall, in accordance with the regulations, convert the power purchase arrangements to financial instruments.

(3) If acceptable bids are received at the public auction for at least the minimum amount of generating capacity set under subsection (1) but in respect of a particular power purchase arrangement no acceptable bid has been received, the terms and conditions of the power



Introduction

purchase arrangement must form the basis of a financial settlement determined in accordance with section 45.96(2) and the regulations.

(4) In this section, “acceptable bid” means a bid that meets the conditions set out in the rules established under section 45.93(3).

1.3. NEXT STEPS IN THE PPA AUCTION PROCESS

This final report delivered to ADRD serves as the IAT’s final set of recommendations on the PPA auction design. As noted above, it reflects the comments from stakeholders and other interested parties that we have received to date on the PPA auction design.

The recommendations in this final report on PPA auction design reflect our current understanding of the objectives of the PPA auction and the status of the many activities relevant for our PPA auction design recommendations, including the PPA determinations, the Balancing Pool regulation and rules, and other key restructuring activities. Changes in status for these activities that occur after we provide our PPA auction design recommendations, including the review by the EUB of the IAT’s PPA determinations, should be taken into consideration by ADRD. This final report on PPA auction design is being prepared prior to the EUB’s decision on the IAT’s PPA determinations.

Some time after the IAT delivers to ADRD the final report on PPA auction design, the Minister of the Department of Resource Development will make a determination on auction design and rules. It is expected the Minister subsequently will pass a regulation with respect to the auction design. ADRD has retained CRA and MDI to implement the PPA auction. Updated information about the PPA auction process can be found at <http://www.auctionppa.com>. At present, it is expected that the auction will take place in the summer of 2000. In accordance with the EUA, the PPAs will take effect on January 1, 2001.

1.4. TERMINOLOGY IN THIS REPORT

As of the time of this report, the EUB is reviewing the IAT’s determinations on 13 PPAs for thermal (coal- and gas-fired) units and one PPA for hydro units. The IAT report and determinations submitted to the EUB characterize the 13 thermal PPAs as non-firm, physical arrangements with the generator-owner as one party to the PPA and the PPA holder (initially, the winning bidder for the PPA at auction) as the counterparty to the PPA. The single hydro PPA has been characterized as a firm, financial arrangement in which the generator-owner of the



Introduction

hydro units (TransAlta Utilities Corporation, or TAU) is one party and the Balancing Pool is the counterparty.

It is expected that all 13 thermal PPAs will be auctioned and that the hydro PPA will not be auctioned (given the latter already specifies the Balancing Pool as the PPA holder). Some consideration is being given by the government of Alberta to create financial derivatives based on the hydro PPA, and to auction these derivative instruments. At the time of this report, a decision has not been made whether to create these instruments, and if so, whether and when to auction them.

This report refers explicitly and implicitly to the items being auctioned as the thermal PPAs themselves. Our information to date suggests that the 13 thermal PPAs themselves can be auctioned more or less directly. That is, it is unlikely a separate instrument will need to be created because the thermal PPAs cannot be auctioned directly due to some legal or regulatory requirements. In any case, the instruments to be auctioned, if not the PPAs themselves, are assumed to be sufficiently similar to the underlying PPAs in economic characteristics that, from an auction design perspective, our recommendations do not depend on the precise form taken by the auctioned instruments. Thus, for ease of reference, this report generally refers to the items being auctioned as the PPAs.

As discussed later, it is possible that some bid amounts for some PPAs may be negative. References to bid amounts for a PPA or buying a PPA are intended to include negative bid amounts, in which the bidder is bidding an amount it would like to receive for holding the PPA. As necessary, a distinction is made in this report between negative and positive bid amounts but in general such a distinction is not necessary for the purposes of PPA auction design.

1.5. ORGANIZATION OF THIS REPORT

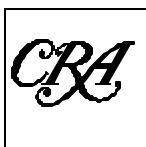
The report is organized as follows:

- Section 2 discusses important auction design issues for the PPA auction and provides a framework for analyzing alternative auction formats.
- Section 3 describes alternative auction formats and why we recommend the simultaneous ascending auction (SAA) for the PPA auction.
- Section 4 discusses market power and how the auction design can be used to mitigate market power and promote competition in electricity generation in Alberta.



Introduction

- Section 5 presents and explains the recommended PPA auction rules.
- Section 6 concludes the report.
- Appendix A highlights selected changes in this final report from the “Draft Report on PPA Auction Design” dated September 10, 1999.
- Appendix B provides responses to some specific comments provided previously by stakeholders and interested parties on PPA auction design issues.



2. Issues in PPA Auction Design

Experience shows that auction design matters. Design failures can result in distorted values, lost revenues, inefficient outcomes, other unsatisfied goals, and regulatory and public criticism. The rules of the auction must be complete, consistent, and without loopholes. Otherwise the objectives of the auction and the best intentions will not be realized.

Good auction design is a necessary but not sufficient condition for a successful auction. In addition to good auction design:

- The items being auctioned must be properly defined and characterized, and reflect the underlying values of the items within the context intended by the seller of the items. This also means the seller in the auction should identify other factors that may affect bidders' valuations of the items and, to the extent it can, minimize for bidders the uncertainty in how these factors may affect valuations of the items. For example, for the PPA auction, regulations that are contemplated should be completed and there should be restrictions on selling generation units prior to the auction.²
- The auction must be administered correctly. This means that the auction design is implemented faithfully, and the rules, rights, obligations, and other terms of participation in the auction are credible and enforced strictly. This also means bidders and their investors are provided sufficient information about the items and the auction process with sufficient lead time prior to the auction to evaluate properly their participation in the auction and the items being auctioned.

This report focuses on PPA auction design and not on characterizing the PPAs nor on auction implementation. Having said that, it is evident throughout the report that the characteristics of the PPAs are taken into account in our auction design recommendations, as they must be. For details on the PPAs themselves, the reader is directed to the IAT's report delivered to the EUB, the PPAs, and other related documents. Some or all of these documents can be found at the following websites:

² We recommend that units not be allowed to be sold later than three months prior to the expected start of the auction.



Issues in PPA Auction Design

- PPA auction website: <http://www.auctionppa.com>.
- ADRD website: <http://www.energy.gov.ab.ca>.
- IAT website: <http://www.pwcstt.com>.

Furthermore, auction implementation considerations are taken into account in our auction design recommendations in that, all else being equal in terms of meeting the objectives of the PPA auction, we recommend those design features that are easiest to implement.

The remainder of this section outlines the major objectives and several design issues for auctioning PPAs. A review of the requirements of the auction of PPAs in Alberta suggests the following guidelines.

2.1. PPA AUCTION DESIGN OBJECTIVES

If carefully designed, the PPA auction can address multiple objectives. We understand that there are four overriding objectives of the PPA auction process:

1. To facilitate mitigation of market power and promote competition in the generation of electricity.
2. To optimize auction revenues.
3. To establish market values.
4. To provide for transparency in the assignment of PPAs.

2.1.1. Objective: Mitigate Market Power

The auction process should mitigate market power and promote competition in the generation of electricity in Alberta. Among other benefits of competition, this will result in better price signals to electricity markets that accurately reflect real resource benefits and costs to the province. In turn, this will lead to market-driven decisions with regard to investment in new capacity, efficient use of existing capacity in the province, and well-informed energy consumption decisions by consumers. Promoting competition also will put downward pressure on electricity prices more so than without competition, while maintaining reliable electricity supply and



Issues in PPA Auction Design

providing consumers more choices from which to make their energy consumption decisions. Our recommended PPA auction design addresses the objective of mitigating market power and promoting competition by imposing restrictions on the amount and type of capacity associated with the PPAs that each bidder may hold. This is discussed in more detail in a separate section on market power in this report.

2.1.2. Objective: Optimize Auction Proceeds

The PPA auction process should optimize auction revenues, in that the proceeds for the Balancing Pool should be maximized subject to constraints imposed by the other objectives of the PPA auction. All else being equal, benefits to consumers increase the greater are the proceeds in the Balancing Pool. Positive proceeds would be transferred to consumers and negative proceeds would be recovered through levies on consumers.

2.1.3. Objective: Establish Market Values

The auction process should result in payments for the PPAs that reflect the true market values of the PPAs. These are prices that reflect arm's-length underlying valuations of the benefits, costs, and risks associated with the PPAs. Related to this is the notion of economic efficiency. Efficiency is established when PPAs are held by those who value them the most. The objective for the PPA auction of establishing market values also includes achieving an efficient outcome.

2.1.4. Objective: Provide Transparent Assignment

The determination of assigning PPAs to winning bidders should be conducted in an open and transparent process that assures all participants of equal treatment. Such a transparent process encourages participation by reducing bidders' uncertainty and simplifies regulatory oversight of the PPA assignment process.

2.1.5. Tradeoffs Among the Objectives

The PPA auction design problem is complicated somewhat because the objectives above are not perfectly consistent with one another. One objective may not be achieved fully without sacrificing the complete attainment of another objective. Two objectives that involve an explicit tradeoff are mitigating market power and optimizing the auction proceeds.



Issues in PPA Auction Design

Simply put, the value of holding a PPA is greater to a bidder if it expects to charge monopoly prices for electricity after the auction. Designing the auction to allow for this outcome would achieve greater auction revenue than if this outcome were precluded. Bidders would be willing to bid higher in the auction if they expected to earn monopoly profits than if they expected to earn competitive profits after the auction. Thus, the auction design could maximize the auction revenues if all the PPAs were bundled together and auctioned as a single item, giving the winning bidder the opportunity to be a near-monopoly supplier of electricity post-auction. While consumers may be better off in the short run as measured by the Balancing Pool proceeds, they will be worse off beyond the short run as reflected in higher prices paid for electricity and in prices that do not accurately reflect the benefits, costs, and risks of Alberta's resources.

At the other extreme, the auction could be designed to prevent bidders from bidding on more than a small, nominal amount of capacity under the PPAs. This may reduce interest in the auction, attract fewer competitive bidders, reduce the auction revenue, and fail to achieve the objective of establishing market values and achieving efficiency. One reason for this is that bidders may be precluded from forming their preferred combinations of PPAs that represent the greatest aggregate value for bidders.

While these are extreme examples, they illustrate the tradeoff between objectives of the auction. (This is why the second objective is characterized as optimizing, and not maximizing, the auction revenue.) The PPA auction design that we recommend is based on economic principles and analyses. Some of these principles and analyses are difficult (if not impossible) to quantify and conduct, such as an analysis of maximum consumer benefits that would account explicitly for the tradeoff between mitigating market power and optimizing auction revenue. Such analyses require heroic assumptions about social welfare, social discount rates, and so on, none of which are subject to unambiguous, objective resolution based on incontrovertible evidence. In these cases, we must rely on informed and sound judgment in consultation with ADRD.

2.2. THE WINNER'S CURSE

The winner's curse refers to the observation that the winning bidder in an auction often is the firm that has the most over-optimistic estimate of the value of the item being sold. Winning the bidding, in this sense, conveys the bad news to the winner that everyone else estimated the PPA's value to be less. Sophisticated bidders account for this effect by reducing their bids. The best auction designs increase the prices paid for PPAs by mitigating the impact of the winner's curse. The effect of the winner's curse can be reduced by minimizing those uncertainties in the value of the PPAs that are common among the bidders. Some auction designs are much better in this respect.



Issues in PPA Auction Design

2.3. TRANSPARENCY

In addition to an objective of the auction process itself, transparency is a means to achieve the other objectives. The rules in transparent auctions are both objective and stated in complete form in advance. This means the auctioneer fully describes in advance the items being auctioned, the rights and obligations of bidders, the qualification and eligibility requirements for participating in the auction, the bidding process and other rules for participating in the auction, and the terms of transferring the items to the winning bidders. Also in a transparent auction, the process of bidding provides a public record of the competition among competing buyers, a record that is open to inspection at each step of the auction process. Thus, a transparent auction provides for a natural auditing capability with which it can be confirmed that the auction rules were followed and no bidder was advantaged or disadvantaged under the rules and administration of the auction.

In a competitive, transparent auction, bidders have strong incentives to bid up to their own valuations of the PPAs. In a non-transparent PPA auction, bidders would be faced with a great deal of uncertainty as to what the criteria are for winning a PPA, how other bidders value the PPAs, and what bids to submit in order to maximize their chances of winning their preferred combination of PPAs while minimizing their chances of overpaying. This uncertainty is detrimental to the objectives of the PPA auction, is unnecessary, and easily is avoided in a properly designed transparent auction. In transparent auctions, bids simply reflect bidders' assessment of the benefits, costs, and risks underlying the PPAs. In a properly designed PPA auction, bidders have a consistent means to express their economic valuations and preferences for the PPAs being sold. And the auctioneer can compare these expressed commitments to award PPAs to winning bidders in a way that is predictable for bidders, regulators, and the public. In short, bidders win solely because they are willing to pay more for the PPAs than any other bidder, and participants' commitments to their bids are made credible by the substantial penalties that bidders face in the event of default.

2.4. NEED FOR CLEAR DEFINITION OF ITEMS BEING AUCTIONED

One of the necessary conditions for ensuring a successful PPA auction is that the items for sale be well defined. It must be clear and unambiguous to bidders what it is they are bidding on. The rights and obligations for each PPA being sold must be the same for all bidders. If there is uncertainty as to what the bidder is offering to purchase, or if bidders have different understandings as to the rights and obligations they would be taking on, it would be extremely difficult for bidders to value the PPAs and it would be equally difficult for the auctioneer to compare bids and determine which bids best satisfy the objectives of the auction.



Issues in PPA Auction Design

Given that one of the objectives of the PPA auction is to establish market values for the PPAs, the IAT recognizes that it is imperative that the PPAs be determined and defined so that the valuations placed on the rights and obligations of the parties involved reflect market values and market allocation of risks. Thus, more than just providing clear, unambiguous, consistent definitions of the PPAs being sold, a successful PPA auction process requires PPAs that accurately capture the efficient allocation of rights, obligations, and risks among the parties involved in the PPAs. It has been the intention of the IAT to follow these guidelines within the context of the EUA in determining the PPAs.

2.5. PPA SUBSTITUTES, COMPLEMENTS, AND BUNDLING

The extent to which bidders consider PPAs to be substitutes and/or complements for one another is an important consideration in determining the appropriate auction design. The particular combination of PPAs that a bidder desires depends on the bidder's unique characteristics as well as the relative and absolute values associated with the PPAs. The best auction designs give each bidder the flexibility to assemble its desired combination of PPAs as information about prices improves through the bidding process. A bidder is able to adjust its position as prices change, thereby ending up with its preferred winnings in response to the market-determined prices.

Two PPAs that are perfect *substitutes* for a bidder imply that the bidder is indifferent between one or the other. *PPAs in a group are substitutes for a bidder if raising the price of some PPAs would tend to make the bidder demand more of the others in the group.* Traditional auctions that price and sell items independently often fail to maximize revenue, promote efficient assignments, or achieve other objectives when items are substitutes because bidders in the auction have to guess early in the auction process which items are likely to be the best value. Among other attributes, this implies that the auction design should allow bidders to exercise arbitrage opportunities: as prices deviate between two PPAs that the bidder considers substitutes, the bidder should be able to bid on the lower-priced PPA.

Two PPAs that are *complements* for a bidder imply that the value to the bidder of owning the two PPAs together is greater than the sum of the values of owning the PPAs if each were owned without the other. Thus, a bidder would bid more for the two PPAs if it knew that by winning one PPA it would also win the other PPA. *PPAs in a group are complements if raising the price of some would make the bidder demand less of the others in the group.* As discussed below, complementary PPAs can arise when there are synergies underlying the PPAs.

An important design issue for a PPA auction is establishing how the PPAs are specified in the bids. Three possibilities are: (1) individual-PPA bids only (bids on bundles of PPAs are not



Issues in PPA Auction Design

allowed); (2) specific bundles only (only those bundles that are pre-specified by the auctioneer are allowed); or (3) all possible bundles (bidders can submit bids on any bundles they choose). The best approach depends on many factors including the type and extent of complementarities among the PPAs, whether these complementarities vary by bidder, the extent of competition, and market power issues.

For example, if no important synergies are anticipated and bidding competition is ample, then a simple auction for unbundled PPAs is best. However, synergies may be present that reflect marketing, administrative, or other scale economies.

Below we outline some of the arguments for and against different bundling alternatives. Some of these arguments apply only to certain auction formats. We also present our recommendation on PPA bundling.

2.5.1. Individual-PPA Bidding

Possible reasons in favor of individual-PPA bidding include the following.

- Individual-PPA bidding provides substantial flexibility for bidders. Bidders can assemble their own preferred combinations of PPAs and switch among PPA bundles according to their own valuations and the relative bid prices on the PPAs. Thus, the bidding process itself can determine what bundles, if any, achieve the objectives of the auction.
- Individual-PPA bidding is conducive to a transparent process, particularly with respect to price determinations on PPAs and alternative bundles.
- Bidding on individual PPAs does not preclude smaller bidders that are interested in only a few, smaller PPAs.
- Individual-PPA bidding can achieve the maximum possible auction revenue if competition is strong or there are many bidders favoring small PPAs.
- If economic efficiency is more of a goal than revenue maximization, then individual-PPA bidding may be better than any bundled bidding, even if there are conditions (such as weak competition) that would otherwise suggest pre-specified bundles best achieve the objectives of the auction.



Issues in PPA Auction Design

- Even if complementarities are strong among PPAs but these complementarities are similar across bidders, there is little need to allow bids on PPA bundles as the bidding will naturally form around the combinations of PPAs and bidders will naturally compete on these combinations.
- Individual-PPA bidding is perceived by bidders and regulators to be simpler than an auction with many possible bundles or with bundles that overlap (a particular PPA is included in two or more bundles).

Possible reasons against individual-PPA bidding include the following.

- Individual-PPA bidding may impose higher transaction costs because there may be more parties involved in closing the transactions. In general, this is particularly true if there is to be negotiation on the terms of the PPA (we recommend against these negotiations), or if special considerations are to be given to certain bidders (we recommend against special considerations).
- Some PPAs may not sell under individual-PPA bidding. For example, this may occur if a minimum opening bid (discussed below) is set for the PPA that is too high, or if budget-constrained or eligibility-constrained bidders that have positive valuations for the PPA are able to maximize their net valuations on other PPAs.
- If competition for PPAs is weak, the auction proceeds may be reduced under individual-PPA bidding. Bidders can assign the PPAs among themselves and not bid aggressively. Also, if the valuation of the bidder with the second highest valuation on a PPA is well below that of the valuation of the highest valuation bidder, the latter bidder has little incentive to overbid substantially the second-highest valuation bidder.
- In individual-PPA bidding it is more difficult to express preferences for certain complementarities. Without bidding on PPA bundles, bidders can attempt to form their preferred bundles by bidding on the individual PPAs, but they are exposed to the risk that other bidders may outbid them on one of the PPAs in its bundle. This exposure problem is less important if the complementarities are weak or if they are similar across bidders.

2.5.2. Pre-Specified PPA Bundles

Possible reasons in favor of pre-specified bundles of PPAs include the following.



Issues in PPA Auction Design

- If the complementarities among PPAs can be identified and are strong and vary little by bidder, pre-specifying the bundles can facilitate determining market values, establishing an efficient assignment of PPAs, and maximizing auction revenue.
- Transaction costs may be lower with pre-specified PPA bundling than with individual-PPA bidding, as there may be fewer parties to execute the transactions.
- If competition is expected to be weak for some PPAs, then pre-specified PPA bundling may increase prices bid for the PPAs.
- If one goal of the auction is to ensure that all PPAs are sold, then bundling less desirable PPAs with other, more desirable PPAs may ensure that the less desirable PPAs are assigned in the auction process rather than left unsold.

Possible reasons against pre-specified bundles of PPAs include the following.

- If the complementarities among PPAs are not identified appropriately, the auction may suffer in terms of achieving market values and efficiency, maximizing auction revenue, and benefiting from transparency.
- The pre-specified bundles may exclude small bidders or bidders preferring individual PPAs.

2.5.3. All Possible Bundles

Possible reasons in favor of allowing bidders to specify their own bundles during the auction include the following.

- Allowing bids on all possible bundles provides bidders with the maximum flexibility for expressing their preferences. This flexibility provides bidders the opportunity to submit contingent bids (a bid on PPA “A” is contingent on winning PPA “B”) to express their preferred combinations of PPAs.
- If complementarities are complex enough — for example, there are strong complementarities and the complementarities differ substantially across bidders (leading to overlapping bundles) — then auction revenue may be maximized by allowing bids on all possible bundles.



Issues in PPA Auction Design

Possible reasons against allowing bidders to specify their own bundles during the auction include the following.

- Large bidders and bidders wanting large bundles tend to be advantaged when all possible bundles are allowed. This “large bidder bias” is a result of a free-rider problem in that two small bidders could each submit bids that together would displace a large-bundle bidder, but each small bidder has an incentive to wait for the other bidder to submit a bid that it can combine with.
- Combinatorial bidding involving several PPAs and many possible PPA bundles can require significant computational resources. Allowing bids on all possible bundles may not be feasible if the number of possible combinations precludes determining winning bids in a reasonable time frame, or makes it difficult to verify that the objectives of the auction have been achieved (market values, efficiency, maximum revenue). Also, there may be a loss in transparency if it is difficult for bidders to determine why their bids are not winning bids.
- An auction that allows all possible bundles is generally the most complex auction. All else being equal, a simpler auction is preferred over a more complicated auction.

2.5.4. Recommendation: Individual-PPA Bidding

We recommend that individual-PPA bidding be used for the PPA auction. What complementarities there might be across PPAs do not appear to justify bundled bidding. There are no effective direct cost savings to a PPA holder for holding more than one PPA as the specified payments from the PPA holder to the generator-owner are independent of other PPAs. Moreover, there is no obvious reason to believe these complementarities would differ substantially across bidders. Advantages of individual-PPA bidding include: (1) it is conducive to achieving the objective of establishing market values and economic efficiency, (2) it can maximize auction revenue subject to other objectives when bidding is competitive, (3) it allows for maximum transparency in the auction process, and (4) it allows smaller bidders to participate in the auction. We believe the advantages of individual-PPA bidding outweigh its possible disadvantages and the possible advantages of bundled-PPA bidding. Moreover, individual-PPA bidding does not preclude bidders from attempting to win preferred combinations of PPAs. The inherent exposure problem can be addressed adequately by allowing bid withdrawals. This is discussed below in the section on recommended auction rules.



Issues in PPA Auction Design

2.6. PPA RESALE

The IAT's determination of the PPAs allows for the resale of PPAs. Allowing resale of the auctioned PPAs is likely to increase the value to purchasers of the PPAs at the auction, to increase the purchase prices of PPAs at the auction, and to facilitate changes in ownership to those valuing the PPAs the most. This is consistent with the auction design objectives of optimizing auction revenue, establishing market values, and achieving economic efficiency — all beneficial for consumers. The details of re-selling PPAs are beyond the scope of this report, but we assume the terms, rights, and obligations of secondary buyers of PPAs would be comparable to those for winning bidders in the PPA auction. We also assume secondary buyers of PPAs would be subject to satisfying qualification requirements and other conditions consistent with those reflected in the auction rules that are adopted. For example, PPA holding restrictions that are kept in force following the auction would continue to apply in the case of PPA resales.

Another important aspect of allowing PPA resale is that it reduces some of the risk PPA holders would otherwise face. Allowing PPA resale sends the signal that the marketplace will be allowed to work so that PPAs can be bought and sold (subject to certain conditions noted above) as market conditions change and as PPA holders' objectives and expectations change. This is relevant for concerns raised that auctioning full-term PPAs would prove unattractive compared to shorter-term instruments. Prior to the auction, those interested in the auction with different forecasts and discounting assumptions, or with different financial resources, can join together as a single bidding entity. Moreover, financial investors are likely to be more committed to the auction knowing that PPA resale is possible and contemplated. Bidders in the auction will know there will be a market for their PPAs post-auction and may even anticipate re-selling the PPAs after the auction.

2.7. FULL-TERM PPAS AND TERM OF THE AUCTIONED INSTRUMENT

Some interested parties have suggested that rather than a one-time auction of full-term PPAs, shorter-term instruments be auctioned — either all at once in a single auction or periodically over time. For example, it has been suggested that instruments of 5-year terms be auctioned every five years: instruments in effect for years 2001-2005 would be auctioned in 2000, instruments for years 2006-2010 would be auctioned in 2005, and so on.

The arguments in support of shorter-term instruments suggest either that long time frames for PPAs are risky and therefore are unattractive to many bidders, or that long-duration PPAs would be so costly as to exclude a significant number of serious bidders. By splitting up the PPAs into



Issues in PPA Auction Design

shorter time periods, risk is reduced for bidders, the value of the PPAs to the bidders (given the duration) is higher, and more bidders can afford to bid on the PPAs.

However, these arguments do not offer a compelling reason to auction less than full-term PPAs. We summarize our rationale as follows.

2.7.1. Many Generation Facilities Have Shorter-Term PPAs

There are several facilities with PPA terms that terminate in 2013 or sooner: Rossdale (2003), Wabamun (2003), Rainbow (2005), Clover Bar (2010), H.R. Milner (2012), and Battle River Units #3 and #4 (2013). All but five of the 13 thermal PPAs terminate in 2017 or sooner.³ Our recommended auction rules do not require bidders to be qualified for longer term or larger capacity PPAs. The auction rules require only that bidders establish an upper bound on the size of the PPAs they wish to bid on (as discussed in a later section) for the purpose of establishing their bid deposit and initial eligibility to bid on the PPAs. This encourages bidders interested in smaller and shorter-term PPAs to participate.

2.7.2. Discounting Is Not an Argument in Favor of Shorter Terms

Shorter-term instruments inherently are less risky than longer-term instruments. Markets are deregulated primarily because it is believed less regulated and more competitive markets achieve better outcomes (allocate scarce resources efficiently, provide reliable supply at the lowest prices to consumers, etc.) than markets that are regulated with even the best intentions. Underlying this is the recognition that the future is uncertain and that perfect information is unattainable. Moreover, policymakers and regulators have no better information than the marketplace. Indeed, market participants have the best information available, are able to obtain information at lowest cost, and are best able to manage the uncertainty and risk that are unavoidable. In competitive markets, this risk is priced competitively and the price accurately reflects the opportunities presented and the costs incurred by the presence of the unavoidable risk and the risk-reward tradeoffs relative to other economic activities in the economy.

Some have argued that insufficient revenue would be raised at a one-time auction of full-term PPAs. Or at least that more revenue could be raised by having one or more auctions of shorter-term instruments. The suggestion of a single auction of instruments with shorter terms than full-

³ In addition to the five thermal PPAs that terminate in 2020, Battle River Unit #5 terminates in 2020.



Issues in PPA Auction Design

term PPAs is addressed below. With respect to periodic auctions over time of shorter-term instruments, it is true that, *ex post*, more revenue *could* be raised by having periodic auctions of shorter-term instruments. As a general matter, however, it is at least as likely that more revenue could be raised by having a one-time auction of full-term PPAs. It is trivial to construct examples of both scenarios. If we had perfect foresight, we could determine with certainty which auction approach was best. (It could be argued that if we had perfect foresight there would be no need for any auctions.) These arguments alone are not compelling.

So why could there be a tendency for a one-time auction of full-term PPAs to yield lower auction revenue than periodic auctions of shorter-term instruments? The argument is that full-term PPAs would be discounted. But as is obvious, there *should* be discounting of full-term PPAs; indeed, there should be “greater discounting” of any economic relationship the longer the term of the relationship. So the argument implicitly must be that there would be “too much discounting” with a one-time auction of full-term PPAs compared to periodic auctions of shorter-term instruments. As this can never be proven even *ex post*, we have to rely on the analysis and assumptions underlying the arguments.

The argument for periodic auctions of shorter-term instruments ignores the important issue that by holding these auctions, the reason for discounting — risk — does not disappear. This risk is unavoidable and is present whether a one-time auction of full-term PPAs is held or whether one or more auctions of shorter-term instruments are held. So the question is not whether the risk is reduced by having one or more auctions of shorter-term instruments, but whether the risk is being borne, managed, and priced by those with the best information, experience, capabilities, and incentives to bear, manage, pool, mitigate, and price the risk. (For example, there is nothing preventing PPA holders from entering contract hedges such as contracts for differences. PPA holders will not be required to sell into the Power Pool and they will be allowed to engage in bilateral transactions. PPA holders also will be allowed to re-sell the PPAs as noted above.) If the competitive marketplace is not allowed to address the risk specific to that market, then it is being incurred indirectly in the economy and ultimately by consumers in a way that prevents the competitive marketplace from bearing, mitigating, pricing, and reducing the cost of the risk efficiently.

If the argument is that the competitive marketplace is not best able to address the inherent risk in full-term PPAs, then why is the competitive marketplace best able to address the inherent risk in 5-year instruments? Indeed, preventing the marketplace from addressing the risk in full-term PPAs may be seen as contradicting the motivation for restructuring the electricity industry in Alberta and for the PPA process: to move to a less regulated, more competitive marketplace

Issues in PPA Auction Design

where prices reflect the true benefits, costs, opportunities, and risks of Alberta's low-cost resources — for the benefit of consumers.

Thus, we have little reason, if any, to believe that a one-time auction of full-term PPAs would raise lower revenue than one or more auctions of shorter-term instruments because of discounting. We believe that a one-time auction of full-term PPAs would be best at allowing the competitive marketplace to address the unavoidable risk, to manage it efficiently, minimize its cost, and price it accordingly — all to the benefit of consumers. This is consistent with the PPA auction objectives of promoting competition, optimizing auction revenue, establishing market values (including market discounting and pricing of risk), and achieving economic efficiency. Moreover, we believe it is consistent with the motivation for restructuring, maximizing consumer benefits, and minimizing government's role in the marketplace.

The argument for one or more auctions of shorter-term instruments seems focused only on the objective of maximizing auction revenue; as discussed above we believe the argument fails on this ground, but it also ignores the other objectives of the PPA auction. Furthermore, the argument for one or more auctions of shorter-term instruments seems to ignore that this auction approach delays the transfer of the additional Balancing Pool proceeds to consumers that would be raised initially in a one-time auction of full-term PPAs. Consistent with the motivation behind restructuring and the objectives of the PPA process, and with providing consumers choices, it can be argued that consumers would be better off receiving those benefits now rather than waiting into the future.

2.7.3. Experience and Evidence Suggest Sufficient Interest in the PPA Terms

So far there is little evidence to suggest that, because of longer-term PPAs, the number of serious bidders would be reduced so much as to distort the outcome of the full-term PPA auction. It is not obvious that credit-worthy smaller entities are unable to obtain financing on their own or in partnership with other smaller entities. In spectrum auctions, for example, much of the technology and market prospects are unproven and unknown, certainly more so than in electric power markets, and the time frames are comparable to the PPAs if not longer; yet smaller entities have been quite successful in obtaining financing and winning large blocks of spectrum without guaranteed returns. Some smaller entities join together to participate in spectrum auctions. While the IAT has received comments from some interested parties expressing concern that full-term PPAs would be unattractive or the financing required would preclude many bidders from otherwise participating, the IAT also has received comments from interested parties from the electric utility industry and from the financial sector that they would prefer full-term PPAs. The longer-term PPAs are more amenable to satisfying their business and investment plans. They do



Issues in PPA Auction Design

not like the uncertainty of whether they will be able to hold on to the PPAs at, say, the end of each 5-year period. They prefer to hold the full-term PPA and then have the flexibility of hedging or re-selling the PPA at their choosing. Forcing these parties to transact only in shorter-term instruments increases the risks they face, and lowers the value of the PPAs to them.

Another argument in favor of a single, full-term PPA auction is more in the realm of political economy than economics: periodic auctions of shorter-term instruments would make it more likely for stakeholders and other interested parties to expend significant resources by lobbying the government, regulatory agencies, and court systems to re-open the PPAs and the PPA process for review.

2.7.4. Additional Costs Would Be Incurred in Multiple Auctions Over Time

In order to justify periodic auctions of shorter-term instruments rather than a one-time auction of full-term PPAs, apart from the arguments above, the benefits of the former approach must outweigh its additional costs. These additional costs include:

- Costs of implementing the multiple auctions.
- Administrative costs for generator-owners, PPA holders, financial investors, the Power Pool, the Balancing Pool, the Transmission Administrator, and other parties.
- Uncertainty for generator-owners and those wishing to purchase electricity from PPA holders.

All else being equal, rather than imposing arbitrary shorter durations on the longer-term PPAs, it is better to allow market participants to decide how long they would like to hold on to the PPAs, and to decide if and when they would like to re-sell the PPAs. This flexibility adds value to the PPAs in the one-time auction, increasing the bids for the PPAs and the auction revenue.

2.7.5. Problems with a Single Auction of Shorter-Term Instruments

The discussion above covered some of the reasons why there is not a compelling reason to recommend a single auction or periodic auctions of instruments with shorter terms than full-term PPAs. In addition to those reasons, the required auction design and rules would be significantly more complicated than for a single auction of full-term PPAs, and it is not obvious how such a



Issues in PPA Auction Design

single auction of instruments with shorter terms than full-term PPAs addresses the arguments that have been raised.

As a practical matter, increasing the number of instruments to be auctioned complicates the problem of considering reserve prices and setting minimum opening bids. From the perspective of auction design and achieving the stated objectives for the PPA auction, the arguments relevant for a single auction of full-term PPAs versus a single auction of shorter-term instruments are analogous to the tradeoffs for pre-specifying PPA bundles, which were discussed above and are restated here in the context of having a single auction of full-term PPAs rather than a single auction of shorter-term instruments.

Possible reasons in favor of a single auction of full-term PPAs include the following.

- If the complementarities among what would be shorter-term instruments than full-term PPAs can be identified and are strong and vary little by bidder, “aggregating the less-than-full-term-PPA instruments” (i.e., a single auction of full-term PPAs) can facilitate determining market values, establishing an efficient assignment of PPAs, and maximizing auction revenue.
- Transaction costs may be lower with a single auction of full-term PPAs than with a single auction of shorter-term instruments as there may be fewer parties to execute the transactions.
- If competition is expected to be weak for some of the less-than-full-term-PPA instruments, then aggregating the less-than-full-term-PPA instruments (i.e., a single auction of full-term PPAs) may increase prices bid for the PPAs.
- If one goal of the auction is to ensure that all PPAs are sold, then bundling less desirable less-than-full-term-PPA instruments with other, more desirable less-than-full-term-PPA instruments (i.e., a single auction of full-term PPAs) may ensure that the less desirable less-than-full-term-PPA instruments are assigned in the auction process rather than left unsold.

Possible reasons in favor of a single auction of less-than-full-term-PPA instruments include the following.

- If the complementarities among the less-than-full-term-PPA instruments are not identified appropriately, the auction may suffer in terms of achieving market values and efficiency, maximizing auction revenue, and benefiting from transparency.



Issues in PPA Auction Design

- The full-term PPAs may exclude small bidders or bidders preferring less-than-full-term-PPA instruments.

It is our assessment that:

- There would be strong complementarities across less-than-full-term-PPA instruments for any PPA, and that these complementarities would be very similar across bidders. These complementarities are easily identified and captured through full-term PPAs. For example, if actual electricity prices suggest a higher forecast for future electricity prices than previously thought, this will affect the estimated annual value of a PPA very similarly across the remaining years covered by the PPA. This supports a single auction of full-term PPAs.
- Transaction costs would be higher for a single auction of less-than-full-term-PPA instruments.
- There is some material risk that competition for some less-than-full-term-PPA instruments would be weak, thereby reducing the bids for them.
- There is a wide distribution of the terms of the PPAs. Many of the units are for terms well before 2020. We have seen little, if any, evidence that small bidders or bidders preferring less-than-full-term-PPA instruments would not be interested in participating in the auction, and that the competitiveness of the auction is at risk because several PPAs are for longer terms.

A final reason against a single auction of less-than-full-term-PPA instruments involves inherent conceptual and practical problems with combinatorial auctions.⁴ To make the auction of less-than-full-term-PPA instruments most effective, it would need to be a combinatorial auction. Such an auction design cannot be justified for the PPA auction on conceptual grounds.⁵ But even if it could be justified, the combinatorial auction would be very difficult to implement and very complicated for bidders to participate in. Among other implications, it would be much less transparent than a single auction of full-term PPAs.

⁴ CRA and MDI have advised the U.S. Federal Communications Commission on combinatorial auction designs and implementations, including circumstances in which these are appropriate. One of the design problems in combinatorial auctions is that there is a bias that favors large bidders or bidders that prefer large combinations of the items being auctioned. This bias may lead to inefficient auction outcomes.

⁵ Note that the strongest justification for combinatorial auctions — strong complementarities (and complex substitution and complementary relationships) among the less-than-full-term-PPA instruments that vary across bidders — does not exist for the PPA auction.



Issues in PPA Auction Design

2.7.6. Recommendation: One-Time Auction of Full-Term PPAs

We recommend that there be a one-time auction of full-term PPAs. We do not believe this would discourage participation by a sufficient number of bidders, or would lower the benefits to consumers or even the auction proceeds. Quite the contrary. There is little, if any, evidence to suggest insufficient interest in the PPAs because of their terms. There are several generating facilities covered by PPAs with relatively short terms for those bidders interested in shorter terms. If a PPA is unsold at auction, for any reason, it can be re-auctioned and/or converted into a financial instrument. There is little, if any, reason to suggest one or more auctions of less-than-full-term-PPA instruments could achieve the objectives of the PPA process and auction as well as a single auction of full-term PPAs.

2.8. BIDDER PARTICIPATION

To achieve the objectives of the PPA auction, the auction design should strive to:

- Encourage participation by serious bidders.
- Use bid deposits as a screen for serious interest and establishing initial eligibility to bid, but otherwise minimize the costs of participating in the auction.
- Release all relevant information in a useful and timely manner.
- Provide assurances to bidders of an above-board auction, where all are competing on an equal basis.

These in turn suggest certain procedures related to qualifying bidders, including non-binding initial bids for screening and deposits for screening as discussed below. First, we make a recommendation on the participation of existing generator-owners.

2.8.1. Recommendation: Allow Existing Owners to Bid on a Limited Basis

We recommend that all serious bidders be allowed to participate in the PPA auction subject to certain restrictions. This enhances the competitiveness of the auction and helps ensure the objectives of the auction are met (including promoting competition, optimizing auction revenue, and establishing market values and achieving economic efficiency). The restrictions include



Issues in PPA Auction Design

meeting the bidder qualification requirements set forth during the auction implementation phase, and satisfying other auction participation requirements.

Additional restrictions apply to existing generator-owners: a generator-owner and its related companies (as discussed below) should not be allowed to bid on the PPAs for the generator-owner's facilities. We believe they would enjoy sufficient informational advantages that would discourage interest in their PPAs — informational advantages that could not be overcome by reasonable due diligence efforts on the part of other bidders. Moreover, even the perception of informational advantages enjoyed by generator-owners for their own facilities likely would reduce interest by other bidders.⁶

2.9. BIDDER QUALIFICATION

The process of qualifying bidders for the PPA auction must ensure that only strong, committed bidders are allowed to bid in the auction — bidders that are capable with a high degree of certainty to close the PPA transaction and to carry out the terms of the PPA. The qualification process could usefully exclude obviously non-serious bidders, particularly those without the financial resources to acquire PPAs, in order to discourage bids that are merely speculative. At the same time, however, it is important that the qualification process avoids excluding desirable bidders. In any case, the criteria for qualifying bidders must be clearly spelled out and applied consistently across all potential bidders. All potential bidders must have an equal opportunity to demonstrate their capabilities for execution and performance under the terms of the PPAs.

2.9.1. Non-Binding Initial Bids for Screening

Initial bids are used often as a way to gauge bidder interest, particularly when large, “lumpy” assets (such as generating plants) are being sold. These initial bids are typically non-binding,

⁶ It might be argued that existing owners may know better than other bidders the operational characteristics of the other owners' facilities, and therefore have informational advantages in bidding on the PPAs of other owners. To mitigate the effects of this possibility in the auction, the auction should be as open and transparent as possible; provide information to all bidders on an equal-access basis; minimize the cost of participation and qualification of serious, desirable, qualified bidders; and provide for due diligence on a level playing field. Important documents and information about the generation facilities compiled during the PPA process are publicly available. We believe that allowing existing owners or their related companies to bid on other owners' PPAs in the auction would facilitate meeting the objectives of the auction, and that any risk of cross-owner informational advantages can be mitigated. We are less optimistic the informational advantages that an owner has about its own facilities can be mitigated, and we believe the objectives of the PPA auction can be achieved without allowing owners to bid on their own PPAs.



Issues in PPA Auction Design

since the bids are made before all the terms of the sales agreement are finalized and before extensive due diligence. These bids may be used to create a short list of bidders, which limits the number of firms that must conduct costly due diligence, and thus motivates the short-listed bidders to conduct due diligence. Ideally, the bidders submit sincere initial bids, so that the right set of bidders is short-listed. There may be some incentive for sincere bidding, since by bidding sincerely a bidder with a low chance of winning a PPA can avoid costly due diligence. However, bidders may have an incentive to bid cautiously in the first stage of the process, as they want to incur costs of entering the second stage only when they are sufficiently likely to win, meaning that their valuations are high compared to other bidders. Also, first-stage bids sometimes are used to set a lower bound for second-stage bids. There may be an incentive, however, to submit an inflated bid in an attempt to eliminate one or more serious bidders from the short list of bidders. Bidders have reported that coming up with an appropriate bid in the initial stage is difficult at best and involves substantial guesswork about what other bidders are doing.

We recommend against the use of non-binding initial bids for screening in the PPA auction. Our assessment is that the due diligence costs are not likely to be high enough in this PPA auction to justify using non-binding initial bids. Without significant cost savings, there is no reason to have a short list of bidders. This would weaken competition, and as a result reduce expected revenues and fail to establish market values.

It is better to forgo initial non-binding bids as screens and to let the bidders decide whether it is worthwhile participating. Some bidders may then decide to participate expecting that competition, and hence prices, will be weak. It is not necessary or helpful to take steps to exclude such bidders when others with stronger interest are present. These bidders can do low-cost due diligence and then bid sufficiently conservatively to avoid the winner's curse in a well designed auction. Their presence helps to ensure that there is sufficient competition in the auction.

2.9.2. Deposits for Screening

Bid deposits prior to the auction serve an important role to ensure, first, that bidders are able to execute the PPAs they acquire and, second, that penalties for default in the auction can be collected. The ability to enforce collection of default penalties serves to make defaults (failure by a winning bidder to execute the PPA) much less likely. Bid deposits are refundable so long as the bidder abides by the auction rules and protocols and is not liable for any bid withdrawal or default penalties.



Issues in PPA Auction Design

In addition to screening, bid deposits typically are used to establish a bidder's level of eligibility to bid in the auction. In the PPA auction, we recommend that a bidder's initial eligibility (and therefore its bid deposit) be related to the size of the PPAs the bidder would like to bid on. This is discussed in a later section.

2.9.3. Other Terms of Qualification

In addition to bid deposits used to screen bidders and to establish eligibility for bidders, it will be necessary to require bidders to satisfy other qualification requirements. The bidder will be required to describe its plans for financing its performance under the PPA, its experience in electric power or similar markets, and other indications of commitment and ability to carry out the terms of the PPA. The goal is to ensure execution of winning PPAs and the subsequent performance under PPAs, without imposing undue expense on serious bidders that would discourage their participation.

2.10. COLLUSION

Bidders in auctions can be quite imaginative in finding ways to reduce the bidding competition among themselves in an effort to keep auction prices low. There are three main approaches to limiting collusion.

- The first is to encourage wide participation in the auction and to prevent bidders from forming bidding consortia except with strong economic justification.
- The second key element is the auction rules themselves. Various auction rules affect the ability of bidders to communicate and to “retaliate” against those who are bidding aggressively. The rules should prevent communication that does not contribute to the effectiveness of the auction. Also, there should be a clear reminder that all bidders are prohibited from cooperating, collaborating, discussing, or disclosing in any manner their bidding strategies or the substance of their bids, including the price, terms, or conditions of their bids, or discussing or negotiating agreements with other participants in the auction until the auction has officially concluded.
- The third key element is antitrust law. Normally, federal and provincial or state laws make interfering with or conspiring to affect prices in an auction a crime subject to both civil and criminal penalties.



3. Alternative Auction Formats

The most common auction formats relevant for the PPA auction include a simultaneous ascending auction (which we recommend for the PPA auction), a one-shot sealed tender, sequential auctions, and two-step sealed-bid processes. These are summarized below.

3.1. SIMULTANEOUS ASCENDING AUCTION

In the simultaneous ascending auction (SAA), multiple PPAs are open for bidding at the same time and remain open as long as there is some bidding on any of the PPAs. Bidding occurs in a sequence of rounds, with the results of each round announced to the bidders before the start of the next round. Bidding activity rules ensure that the auction proceeds at a reasonable pace. Other auction rules define the size of round-to-round bid increments, proportionate bonds or deposits posted to establish initial eligibility to bid, the penalties for bid withdrawals, provisions for waivers from the activity rules, the length of time for a bidding round, and so on.

Both features of the auction design — simultaneous bids and ascending bids — aid price maximization and the determination of market values. Ascending bids let bidders see how their rivals value each PPA and which aggregations are likely to be most profitable. As the end of the auction approaches, each bidding firm knows whether it is likely to be able to construct its preferred aggregation, and roughly how much it will pay. With all PPAs open for bidding simultaneously, a bidder has flexibility to seek whatever PPA aggregation it wishes.

As well as facilitating PPA aggregation, the SAA diminishes the winner's curse by allowing bidders to observe and respond to each other's bids. Also, simultaneous ascending bidding makes it likely that substitute PPAs will fetch similar prices, because, in practice, bidders will switch among the substitutes if their bid prices differ significantly, bidding up any lower-priced PPAs and thereby exercising opportunities to arbitrage prices. In this way, market prices are established for each PPA.

3.2. ONE-SHOT SEALED-BIDS AND SEQUENTIAL AUCTIONS

A one-shot sealed tender and sequential sales of either the sealed tender or ascending bid varieties can be appropriate in some circumstances. One-shot sealed tenders and sequential sales are easy to administer, work reasonably well for selling certain kinds of items, and in some cases are appropriate if competition is limited.



Alternative Auction Formats

Sequential auctions and simultaneous sealed tenders may pose problems for bidders for PPAs, however. Both present the bidders with a large amount of risk and the prospect of regret, resulting in less aggressive bidding. In a sequential auction, the bidder must guess about PPA prices later in the sequence when deciding how much to bid for the early PPAs in the sequence. Later in the sequence, the bidders are likely to discover that they bid either too high or too low for the early PPAs. In a one-shot sealed-bid auction, the bidders must choose their bids for each PPA without knowing which other PPAs they are going to win, and without having any information about the strength of their competitors' interest in the PPAs.

3.3. TWO-STEP SEALED-BID PROCESSES

Many sales in the electric power industry have relied on a two-step sealed process. This process generally proceeds as follows.

- In the first step, the utility advertises the generating plants and qualifies bidders.
- A data room is made available to qualified bidders.
- Bidders submit indications of interest — non-binding initial bids.
- In the second step, the utility selects a short list of bidders and submits a request for proposals.
- The short-listed bidders conduct due diligence.
- Final bids are submitted, with the potential for further negotiation or additional bidding.

As with one-shot sealed-bids and sequential auctions, the two-step sealed-bid process can be appropriate in limited circumstances. An advantage of the process is that it recognizes that some divestitures involve high due diligence costs, which can discourage serious bidders from participating. By limiting the second step to a short list of bidders, these bidders are more willing to incur the high costs of due diligence because their odds of winning are higher with fewer competing bidders.

However, other auction formats including the SAA can also address the high costs of due diligence by limiting the bidding to certain bidders at some point in the process or through other means. In any case, the PPA auction is not expected to impose due diligence costs so high as to warrant a material restriction to a short list of bidders.



Alternative Auction Formats

Two-step sealed-bid processes suffer from a lack of transparency. If transparency and the ability to verify that market values, efficiency, and maximum revenues have been achieved are not important objectives of the auction process, then two-step sealed-bid processes may be a viable alternative for certain sale processes.

At one extreme implementation of the two-step process, bidders have only two opportunities to submit bids and only one opportunity to submit a binding bid. In this case, the process is much like the one-shot sealed-bid auction and suffers the same shortcomings, including: bidders face a great deal of risk, are exposed to the winner's curse, and find it difficult to assemble their preferred PPA bundles.

To the extent bidders are encouraged to negotiate their bid prices, presumably in an attempt to establish an ascending auction process, the two-step process does not provide revealing, objective, contemporaneous information to bidders about other bidders' valuations. Because negotiation is anticipated, bidders will be conservative in their bidding. Much of the bidding activity and effort is incurred by the auctioneer rather than letting bidders observe directly the objective, committed valuations of the PPAs. Bidding is inefficient as bidders make guesses about the other bidders and bids, not knowing for sure what information the other bid amounts (as reported by the auctioneer) reveal and not knowing for sure what they can accomplish by alternative bid amounts. Moreover, its bidding strategy is complicated, as is the negotiation and price determination itself, if bidders desire alternative combinations of PPAs.

Furthermore, to the extent bidders are encouraged to essentially negotiate on the terms of the sales agreements, bidders are faced with the uncertainty of what they are bidding on. Such multidimensional bidding makes it difficult to determine who the winning the bidders should be, and makes it difficult for auditors to verify that the rules of the process were followed appropriately and that the objectives of the auction were achieved.

Finally, the lack of transparency in the two-step sealed-bid process is problematic if an affiliate of the seller is allowed to bid in the process. It is difficult to assure other bidders and regulators that information will be made equally to all bidders and that no bidder is advantaged or disadvantaged if one of the bidders is also the seller.

3.4. EVALUATING AUCTION FORMATS

The various auction formats described above have been used in several industries including electric power markets. In weighing the advantages and disadvantages of the alternative auction



Alternative Auction Formats

formats, our assessment is that some form of the SAA best meets the objectives of the PPA auction.

First, the PPA auction process should allow bidders to form their preferred aggregations of PPAs. It is very difficult for one-shot sealed-bids, sequential auctions, and two-step processes to provide sufficient flexibility to bidders to accomplish this. Second, these auction formats generally do not address the winner's curse problem as well as alternative formats. There is little if any objective contemporaneous price revelation of bids for related items, much less little if any opportunity for bidders to respond. Third, bidders are unlikely to bid as aggressively in a PPA auction in these less transparent formats, and the outcome is likely to be characterized by distorted market values, reduced auction revenues, inefficient outcomes, and different winning prices for similar PPAs. Moreover, regulators and the public generally prefer more transparency rather than less transparency. In short, there are many shortcomings with these alternative auction formats with respect to the objectives for the PPA auction.

Below, we describe how the SAA design framework achieves the objectives of the PPA auction: mitigate market power and promote competition, optimize auction revenue, establish market values and achieve economic efficiency, and provide for a transparent assignment of PPAs.

3.4.1. Mitigating Market Power and Promoting Competition

As discussed below, market power is addressed in the auction design primarily in terms of PPA holding restrictions. The auction rules specify restrictions on which bidders can bid on which PPAs. The SAA is conducive to these types of restrictions while achieving the auction objectives because the complete rules are well-specified ahead of time. The SAA provides bidders maximum flexibility (subject to these restrictions) to acquire their desired PPAs as prices evolve through the auction, while at the same time the bidding and auction outcome can be audited.

Because we expect there will be secondary market trading of PPAs or related instruments, the PPA auction itself is limited to controlling market power in the initial assignment of PPAs to bidders. As discussed below, we recommend that the principles underlying our recommended PPA holding restrictions be followed after the auction in the course of normal market surveillance. Ongoing monitoring and federal and provincial antitrust laws and regulations are required to enforce market power restrictions after the PPA auction.

Alternative Auction Formats

3.4.2. Revenue Optimization

The SAA is designed to minimize the effects of the winner's curse. The open, transparent bidding process of the SAA provides valuable information to bidders, which provides them a level of confidence in their bidding not found in many other auction formats. The bidding information available to bidders in the SAA reduces the need for them to bid conservatively and shade their bids; that is, it mitigates the winner's curse problem. This leads to higher winning prices and greater auction revenue than other auction formats that lack the transparency and bidding information provided in the SAA.

In addition to the winner's curse problem, auction revenue can be reduced if bidding in the auction itself suffers from collusive behavior by bidders. The auction rules can affect the ability of bidders to act collusively to reduce prices in the auction itself. Our recommended rules, outlined below, are designed to avoid various pitfalls that have disrupted auctions in other countries and other applications. The specific rules that we recommend limit the bidders' ability to communicate, to form bidding consortia, and to retaliate in the auction against other bidders who violate collusive agreements, thereby promoting higher, more competitive prices for the PPAs sold in the auction.

3.4.3. Well-Informed Market Values

The SAA is the format most likely to result in PPA prices that reflect their fundamental market values and avoid the pricing errors associated with the winner's curse and with guesses that bidders must make in most other auction designs. As noted above, it avoids the winner's curse by allowing bidders to obtain information during the auction about other bidders' demands at the tentative prices. In addition, it allows bidders to observe and respond to prices as they emerge, which improves the accuracy of their forecasts and improves the efficiency of auction outcomes. Moreover, the rules of the SAA ensure that similar prices are established for similar PPAs. Theoretically, any auction that establishes a uniform price for each type of PPA allows large buyers to exercise some market power, possibly undermining the efficiency of the auction outcome. However, within the class of standard auctions that do set a uniform price, the SAA maximizes efficiency by minimizing bidder error. As described above, it does this by minimizing the winner's curse and by avoiding the guesswork that is common in alternative auction formats.

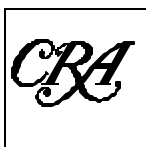


Alternative Auction Formats

3.4.4. Transparency

The SAA is open and transparent. Its rules are both objective and stated in advance. The PPAs will be fully described in advance of the PPA auction. The process of bidding provides a public record of the competition among competing buyers, a record that is open to inspection at each round of the auction. As noted above, bidders win solely because they are willing to pay more for the PPAs than any other bidder.

Regulators and other interested parties will insist that the auction allow all bidders to compete on an equal basis. The open and transparent competition of a simultaneous ascending auction would address regulators' and bidders' concerns.



4. Market Power

One of the objectives of the PPA auction is to mitigate market power and promote competition. For this purpose, we define market power as the ability of suppliers of electricity in Alberta to raise price above, and/or reduce supply below, competitive levels in order to realize a sustainable increase in profits. In principle, several factors can facilitate the exercise of market power. These include control of a large share of the market, barriers to entry of competitors, barriers to expansion by existing competitors, long lives of power plants (especially large coal plants that can invest in life extension), and regulations that favor incumbents and discourage entry and exit.

4.1. USING AUCTION DESIGN TO MITIGATE MARKET POWER

The PPA auction design can mitigate the exercise of market power and promote competition primarily through restrictions on the number and combination of PPAs that can be held by individual bidders. This is consistent with one of the primary motivations of the PPA process: to increase the number of suppliers of electricity in Alberta. All else being equal, the greater the number of suppliers, the more likely the market for electricity will be competitive.

4.2. ANALYSIS OF MARKET POWER

Our analysis of market power begins with an assessment of how market power is likely to be exercised in Alberta. Consideration is then given to alternative types of PPA holding restrictions and the possible extent to which they may mitigate the exercise of market power. These alternative PPA holding restrictions are then tested and compared with one another as a way to inform our judgment of which PPA holding restrictions seem most reasonable for accomplishing the objectives of the PPA auction design.

4.2.1. How Market Power May Be Exercised

Currently, Alberta is characterized by tight supply conditions, price-inelastic demand over certain ranges of price, and a large share of generating capacity held by three generator-owners. Given these characteristics, there may be opportunities to exercise market power at certain times by offering supply into the Power Pool of Alberta at prices and quantities different from those that would obtain under perfect competition in order to raise the market price. The exercise of market power can take the form of unilateral actions or cooperative behavior (including implicit or tacit collusion).



Market Power

In Alberta, the Power Pool price is determined at that level required to attract the marginal unit. The marginal generating unit is the last unit dispatched in merit order by the Pool. In principle, any generator-owner could offer supply into the Pool at a price well above marginal economic cost in an effort to set the Pool price. However, the owner that bids above marginal cost takes a risk that the unit will not be dispatched and the owner will lose profits as a result. The expected loss of profits from not operating could exceed the expected gain in profits from trying to raise the market price.

The exercise of market power is likely to be more successful if the owner can sacrifice output from a high-cost unit in order to raise the price received for operating a low-cost unit. For example, peaking units have high operating costs and will operate at the margin while baseload units have low operating costs and will operate most of the time. A profitable strategy may be to withhold supply from a peaking unit to raise the price received from sales of the baseload unit. The lost profits from not operating the peaking unit will be low, while the gain in profit earned on the baseload unit will be high. There may be more complicated strategies with tacit collusion.

4.2.2. Types of PPA Holding Restrictions

PPA holding restrictions for any one entity and its affiliates can be specified a variety of ways, such as:

- The number of PPAs held.
- Total capacity under the PPAs held.
- Total capacity under the PPAs held as a proportion of total capacity under all PPAs.
- Total capacity held — under PPAs as well as outside PPAs — as a proportion of total capacity available to Alberta.
- Total capacity held as measured by the Herfindahl-Hirschman index (HHI).⁷
- Specific PPAs, combinations of PPAs, or specific PPAs in combination with certain capacity outside PPAs cannot be held.

⁷ The HHI is measured by the sum of squared market shares of suppliers in the market. If there is only one supplier in the market, the HHI is equal to 10,000 (the square of 100 percent market share).



Market Power

We believe no one type of restriction is best. For example, PPA holding restrictions based solely on aggregate capacity shares or HHIs may ignore market power that could be exercised by certain generating units at certain times. A high market share does not necessarily convey market power in a situation where there is substantial excess capacity, and a low market share does not mean there is no market power in a situation where there is a shortage of capacity. A simple restriction that limits a PPA holder to a certain market share is quite appealing. But we recognize that this kind of limit must be buttressed with restrictions that limit the exercise of market power during peak load periods when capacity is short. The additional restrictions generally limit the ownership of marginal generating units.

4.2.3. Testing Alternative PPA Holding Restrictions

Given the many ways market power could be exercised in Alberta's electricity generation market, we approach the problem of mitigating market power while optimizing auction revenue by specifying alternative PPA holding restrictions. These alternative restrictions were tested by Henwood Energy Services, Inc. (HESI) as follows:

- The testing began with the least restrictive proposed set of PPA holding restrictions.
- Given the proposed set of PPA holding restrictions, HESI and the IAT developed a few alternative PPA portfolios by a single PPA holder, where each portfolio satisfied the set of proposed restrictions and were deemed likely to represent the worst-case scenario; i.e., the holder of the PPA portfolio would have the greatest incentive and ability to exercise market power among all combinations that satisfy the PPA holding restrictions.
- HESI used a simulation model to simulate market outcomes under two assumptions:
 - A base case in which electricity supply from thermal generation units is offered into the Alberta electricity market at prices set at incremental production cost.
 - A “pivotal player” case in which the holder of the specified worst-case PPA portfolio (the pivotal player) offers supply into the market so as to maximize profits, while other thermal generation units offer supply into the market at prices set at incremental production cost.
- The results of the two simulated cases were compared primarily with respect to the annual average increase in electricity price, duration curves showing the frequency and magnitude of



Market Power

price increases, reductions in electricity output, and increased net revenue for the pivotal player.

- Based on the difference in results between the pivotal player case and the base case:
 - If the proposed PPA holding restrictions were deemed inadequate, then the next, more restrictive set of PPA holding restrictions was considered (starting with the worst-case PPA portfolio for this new set of PPA holding restrictions) to repeat the process.
 - If the proposed PPA holding restrictions were adequate, then any other worst-case PPA portfolios satisfying the underlying proposed PPA holding restrictions were tested.
- This process was continued until it was judged that a sufficient number of alternative PPA holding restrictions had been considered and evaluated.

A description of HESI's modeling tests was produced as a report by HESI, "Simulations of Alternative PPA Holding Restrictions," which was made available soon after the draft report on PPA auction design. As the report points out, it is difficult to model market power and strategic behavior, particularly for a transition from one market and regulatory environment to another. Reliance on historical data and assumed underlying behavior may not provide reliable forecasts about future market conditions. Many factors that affect the potential exercise of market power are difficult to model and are subject to a great deal of uncertainty. These include assumptions about price-sensitivity of supply and demand in the short run and long run (e.g., the market is likely to be more price-sensitive beyond the short run than assumed in the model simulations), new entry, imports, and the ability to succeed at behaving strategically when faced with uncertainty. In addition, the simulation model tests do not take into account the supply of electricity that will be under contracts not directly tied to spot prices in the Power Pool. This further reduces the potential for the exercise of market power.

As the report explains, a number of simplifying assumptions are needed for this type of modeling exercise. Some of these may understate the effects of market power, but the majority overstate the effects of market power. In the judgment of HESI and the IAT, the modeling assumptions underlying the tests of alternative PPA holding restrictions overall tend to overstate the effects of strategic behavior and the exercise of market power. Thus, in making our recommendations on PPA holding restrictions, we focused on differences among the alternative PPA holding restrictions in the results of the simulation model.



Market Power

4.3. RECOMMENDATIONS ON PPA HOLDING RESTRICTIONS

Our recommendations on PPA holding restrictions are listed and explained below. Note that by “PPA holder” we include related companies of the PPA holder; “related companies” is discussed in a section below. Also, for the purpose of these PPA holding restrictions, the plant classifications (baseload, mid-merit, peaker) are identified in Table 1 in section 5 below.

1. A generator-owner and its related companies are not permitted to bid on the generator-owner’s own thermal PPA.
2. Total PPA capacity held by a PPA holder and its related companies is not permitted to exceed 20 percent of substantially all the capacity under the PPAs at the time of the auction. (The precise capacity to be included in this measure is discussed below.) Among other implications, given the PPA capacities, this restriction implies that a PPA holder is not permitted to hold more than two baseload PPAs, and is not permitted to hold two of the larger baseload PPAs.⁸
3. A PPA holder and its related companies are not permitted to hold both the Clover Bar PPA (peaker) and the Rossdale PPA (peaker).
4. A PPA holder and its related companies are not permitted to hold both the Clover Bar PPA and a baseload PPA.
5. A PPA holder and its related companies are not permitted to hold both the Rossdale PPA and two or more baseload PPAs.
6. The generator-owner of the hydro PPA (TAU) and its related companies are not permitted to bid on the Clover Bar PPA or the Rossdale PPA.

4.3.1. Existing Owner Precluded from Bidding on Own PPA

Restriction #1, as noted earlier in the report, addresses the concern that generator-owners would have informational advantages — real or perceived — regarding their own units that would discourage interest by other bidders in their PPAs.

⁸ Because of the range of sizes of the PPAs, this 20-percent PPA holding restriction ensures that five PPA holders would not hold all the PPAs among themselves.



Market Power

4.3.2. Total PPA Capacity Less than 20 Percent

Restriction #2 reflects the observation that model simulations of alternative PPA holding restrictions satisfying a more relaxed restriction (e.g., 25 percent rather than 20 percent) generated simulation results that suggested significant potential for the exercise of market power, even taking into account the assumptions of the modeling approach that tend to overstate the potential for market power.⁹ Restriction #2 also reflects, however, the observation that a more strict capacity limit (e.g., 15 percent) severely restricts the combination of PPAs that bidders might wish to acquire. It also requires that more bidders participate in the auction. Given the tradeoff in PPA auction design objectives — namely, mitigate market power and optimize auction revenue — it is our judgment that a 15-percent restriction on thermal PPA-only capacity is too strict and that a 25-percent restriction on thermal PPA-only capacity is too lenient.

We considered the appropriate measure of “PPA capacity” for this PPA holding restriction. In particular, we considered the extent to which, if any, the hydro owner’s (i.e., TAU’s) capacity under its hydro PPA with the Balancing Pool should be included in the measure of PPA capacity for the purpose of this PPA holding restriction. We recommend that 793 MW less 400 MW, or 393 MW, of the hydro owner’s hydro capacity be included in the measure of PPA capacity. That is, at the time of the PPA auction and for the purpose of this PPA holding restriction:

- For each thermal PPA holder (including the hydro owner if it holds thermal PPAs), the numerator defined below divided by the denominator defined below must not exceed 20 percent.
- For each thermal PPA holder, the numerator of the calculation includes all the capacity under thermal PPAs held by the PPA holder and its related companies.
- For the hydro owner, the numerator of the calculation includes all the capacity under thermal PPAs held by the hydro owner and its related companies plus 393 MW.
- The denominator of the calculation includes all the capacity under thermal PPAs plus 393 MW.

⁹ Model simulations were run with limitations of 15, 20, and 30 percent. The results for the 30-percent limitation were extreme enough that by interpolation, 20 percent was deemed to be more acceptable than a 25-percent limitation. Also, note that a 25-percent market share limit allows for as few as four equal-sized competitors. This configuration is not significantly different than the current structure, although the three primary suppliers are not equal-sized.



Market Power

The rationale for our recommendation on including 393 MW in the calculation of the PPA holding restrictions is as follows. We understand the capacity for the hydro facilities owned by the hydro owner is 793 MW¹⁰ and we understand from the Transmission Administrator (TA) of Alberta that up to 400 MW of this is reserved for system support services (SSS) under an agreement with the TA. The PPA that covers the hydro facilities is held by the Balancing Pool and leaves dispatch rights to the hydro owner. The hydro owner has the discretion to offer the additional hydro capacity not committed to the TA. The hydro owner could choose to withhold this capacity from the market depending on how this action will affect the market price and the profits from other generation assets.

We recommend that the entire 393 MW count toward the amount of capacity held by the hydro owner for the purpose of calculating the holding restrictions. We recognize that during some times of the year actual capacity will be less than maximum capacity because of intermittent stream flows. However, essentially all this capacity is available in the summer when the incentives to exercise market power by withholding peaking capacity are greatest.

4.3.3. Combination of Clover Bar and Rossdale Not Permitted

Restriction #3 precludes a PPA holder from holding the PPAs for both thermal peaking units — Clover Bar and Rossdale. In its July 2, 1999, report for the IAT, HESI's base case model results show that Clover Bar or Rossdale are at the margin about 40 percent of the time in 2001, while other units are at the margin a much lower proportion of the time. Given the frequency with which these units are at the margin, we recommend that a single entity not control both PPAs.

4.3.4. Combination of Clover Bar and Any Baseload Not Permitted

Restriction #4 precludes a PPA holder from holding the PPAs for Clover Bar and any baseload PPA. Clover Bar is at the margin sufficiently often that we recommend this restriction be adopted to avoid giving the Clover Bar PPA holder incentives to withhold supply and offer high prices to the Pool.

¹⁰ Values for committed capacity are not stated in the hydro PPA. The IAT Report includes HESI's July 2, 1999 report which shows the maximum capacity to be 793 MW. This figure was verified by ADRD.



Market Power

4.3.5. Combination of Rossdale and Two or More Baseloads Not Permitted

Restriction #5 is similar to Restriction #4 but applies to the PPAs for Rossdale and multiple baseload PPAs. The rationale for the restriction is the same as for Restriction #4, except that Rossdale is substantially smaller than Clover Bar so a single baseload PPA is allowed to be held with Rossdale.

4.3.6. Hydro Owner Not Permitted to Bid on Clover Bar or Rossdale

Restriction #6 applies only to the hydro owner (TAU). TAU has dispatch control of the hydro facilities, and the hydro facilities together with Clover Bar and Rossdale provide the bulk of peaking and system support services to the grid. We recommend that the hydro owner not be permitted to bid on Clover Bar or Rossdale in order to avoid a concentration of ownership of such facilities in the hands of a single owner.

4.3.7. Related Companies

For the purpose of the PPA holding restrictions, we recommend a stricter definition of “related companies” than the definition of “affiliate” as referenced in the PPAs. The definition of affiliate referenced in the PPAs is based on the notion of owning or controlling more than 50 percent of the shares of a company. It is our assessment that this would allow potential PPA holders the ability to render the recommended PPA holding restrictions ineffective. For example, under the 50 percent rule a PPA holder could buy up to 20 percent of all PPAs outright, and up to 40 percent of the remaining PPAs through affiliates.

In addition, the definition of affiliate in the PPAs is based on the concept of *de facto* control. Whether there is *de facto* control could require a detailed examination of the circumstances that exist and could require judicial interpretation to resolve. For purposes of applying the PPA holding restrictions, a clearer definition of related company is required.

We recommend that “related companies” include the notion of an “associate” company based on the Alberta Business Corporations Act. According to the Act, a person is an associate of a company if among other things that person beneficially owns or controls, directly or indirectly, 10 percent of the voting rights in the company. Accordingly, a PPA holder with an associate relationship to another company must combine its PPA holdings, as owned by a single entity, for the purpose of calculating the PPA holding restrictions.



Market Power

4.4. MITIGATING MARKET POWER POST-AUCTION

Our recommendations on PPA holding restrictions are targeted to mitigate market power and promote competition at the time of the PPA auction. Clearly, some mechanism needs to be in place to mitigate market power and promote competition over time after the auction ends. The PPA holding restrictions described above could be applied for a limited period after the auction.¹¹ Over time as market conditions change, as entry and exit occur, and as PPAs are re-sold, the holding restrictions in place at the time of the auction likely will no longer be optimal. For this reason, the holding restrictions should be replaced with more flexible approaches to the mitigation of market power. In particular, oversight, monitoring, and enforcement responsibilities must be assumed by designated authorities to ensure the mitigation of market power and promotion of competition. These responsibilities may be assumed by the Market Surveillance Administrator (MSA), ADRD, the Power Pool, the Transmission Administrator (TA), and the Canadian Competition Bureau (which enforces the Competition Act).

4.4.1. Recommendation: Effective MSA

In other jurisdictions where competitive electricity markets are being established, an entity is usually created with the responsibility of monitoring market power and making recommendations to the appropriate authority for addressing market power. We believe that an effective MSA is needed in Alberta to address market power issues after the PPA auction. Some have argued that the MSA as currently set up is not capable of assuming these responsibilities. We recommend strongly that the MSA be given the jurisdiction, authority, rules, and resources to carry out these responsibilities effectively. Moreover, it is important that at least a commitment in this direction be undertaken as soon as possible, well before the PPA auction.

4.4.2. BC Tie-Line

It has been suggested that special consideration be given to the British Columbia tie-line, the main source of imports into Alberta, for the purpose of establishing the PPA holding restrictions. The reason for concern is that BC Hydro, through its affiliate PowerEx, controls imports originating from generation in British Columbia or from other jurisdictions. If PowerEx owned

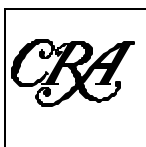
¹¹ In the absence of alternative holding restrictions developed and enforced by an appropriate institution such as the MSA, we would recommend the PPA holding restrictions in place at the time of the auction be enforced for three years following the auction.



Market Power

PPAs in Alberta, it may have an incentive to use its control of the tie-line to increase profits on its PPA holdings.

It is our assessment that the issue is sufficiently complex that it is best addressed by means other than the PPA holding restrictions. From discussions with ADRD and the Power Pool of Alberta we have concluded that alternative approaches exist to address this market power issue that clearly are superior to PPA holding restrictions. We recommend that the relevant regulatory and jurisdictional authorities, such as the Pool and the TA, take on the responsibility of ensuring that market power is not exercised through control of the tie-line.



5. Recommended Auction Rules

We recommend the SAA design for the PPA auction. This section makes recommendations on the auction rules to be used to implement this recommended auction design. A proper set of rules is critical to ensure that the intended process and objectives of the auction design are realized. The rules must be comprehensive and ensure that all loopholes are eliminated; bidders have much at stake and will take advantage of any weakness or incompleteness in the rules. And yet the rules also must be straightforward and understandable by participants and they must ensure transparency.

Our recommendations on the PPA auction rules follow.

5.1. SPECIFYING THE BID ITEMS

One of the first steps in auction design is defining the items to be auctioned. This section summarizes the PPAs in a table and describes the items bidders will be bidding on in the auction.

5.1.1. The PPAs

The PPAs to be auctioned are the thermal PPAs listed in Table 1. As discussed in the next section, we withhold specific recommendations on auctioning derivatives of the hydro PPA until more administrative decisions have been made about the derivatives, including the nature and the number of derivatives. The data in Table 1 are based on the financial model in the IAT's report of July 9, 1999. Year-by-year target availability is taken from that report and converted into a single GWh measure by applying a 10 percent discount rate to the yearly target availabilities.¹² Forecast output also is reported in the July 9 report, and as with target availability, forecast output was summed up over the years assuming a 10 percent discount rate. As noted below, an average of the two measures is used to construct the PPA point system for the auction. Merit order shown in Table 1 is included for the purpose of simplifying statements of PPA holding restrictions. The number of "points" indicated in the table is used to measure a bidder's eligibility and activity as explained below.

¹² Quantities are discounted over time to reflect the fact that a megawatt of capacity today is more valuable than a megawatt of capacity tomorrow.



Recommended Auction Rules

Table 1. Thermal PPAs and Hydro PPA

PPA	# Units	Owner [1]	Fuel	Summer-Winter Committed Capacity (MW)	% of "Restricted Capacity" [2]	Target Availability 2001 (%) [3]	PPA Term [4]	Merit Order	Points [5]
Battle River	3	ATCO	Coal	662.8	9.54%	83.8-86.6	2020	Baseload	8
Clover Bar	4	EPCOR	Gas	629.2	9.05%	83.5	2010	Peaker	4
Genessee	2	EPCOR	Coal	762	10.96%	90	2020	Baseload	10
H.R. Milner	1	ATCO	Coal	144.3	2.08%	77.4	2012	Mid-merit	1
Keephills	2	TAU	Coal	766	11.02%	89.5	2020	Baseload	10
Rainbow	3	ATCO	Gas	92.5	1.33%	90	2005	Peaker	1
Rossdale	3	EPCOR	Gas	198.0-208.1	2.92%	86	2003	Peaker	1
Sheerness	2	ATCO/TAU	Coal	756.2	10.88%	90	2020	Baseload	10
Sturgeon	2	ATCO	Gas	18	0.26%	90	2005	Not running	1
Sundance A	2	TAU	Coal	560	8.06%	84.6	2017	Baseload	8
Sundance B	2	TAU	Coal	706	10.16%	86.9	2020	Baseload	10
Sundance C	2	TAU	Coal	710	10.21%	86.9	2020	Baseload	10
Wabamun	4	TAU	Coal	547.9	7.88%	76.4-86.5	2003	Baseload	2
Total (Thermal)				6,553-6,563	94.35%				
Hydro PPA [6]		TAU	Hydro	793		N/A	2020	SSS/Peaker	

[1] ATCO = ATCO Electric Ltd., EPCOR = Edmonton Power Generation Inc., TAU = TransAlta Utilities Corporation.

[2] "Restricted Capacity" is the total committed capacity under the thermal PPAs plus 393 MW of the capacity from hydro units. For this purpose, Rossdale's capacity is taken to be the midpoint of its winter-summer capacity, or 203.05 MW, which may not necessarily equal its monthly weighted average capacity. Thus, for this purpose, the total committed capacity under the thermal PPAs is 6,557.95 MW and the "restricted capacity" is 6,950.95 MW.

[3] Target availability varies by generating unit.

[4] For Battle River, the PPA term for units 3 and 4 is through the year 2013, and the PPA term for unit 5 is through 2020. For the hydro PPA, the PPA term for all the units is through 2020 except for Pocaterra #1 and Ghost #1 (both through 2013).

[5] Points are based on a weighted average of discounted target availability and discounted forecast output for each unit (using a discount rate of 10%) as described in this report.

[6] The hydro PPA will not be auctioned. Values for committed capacity and target availability are not stated in the hydro PPA. The IAT Report includes HESI's July 2, 1999 report (see Sources below) which shows the maximum capacity to be 793 MW. "SSS" refers to system support services, also known as ancillary services in some jurisdictions.

Sources:

Schedules B and D for individual PPAs.

Financial Model, IAT Report, July 9, 1999, as revised August 27, 1999 (for target availability and forecast output).

HESI July 2, 1999 report, Appendix D (capacity factors for Rainbow and Sturgeon).



Recommended Auction Rules

5.1.2. The Auctioned Instruments

For reasons outlined above, we recommend individual-PPA bidding only and not package bidding.

Thermal PPAs

In the case of thermal PPAs, we recommend that the instruments to be auctioned be individual, full-term PPAs.

Hydro PPA

In the case of the single hydro PPA, the IAT has determined that the hydro PPA should be a firm, financial PPA between TAU (the existing generator-owner) and the Balancing Pool as the PPA holder. The financial arrangement is in the form of a contract-for-differences in which the PPA specifies on a monthly basis notional quantities for energy and reserves, and fixes the net dollar amount to be realized by the hydro owner. If the actual Pool prices for energy and reserves are high, the hydro owner pays to the Balancing Pool the resulting excess above the fixed dollar amount specified in the PPA. If the actual energy and reserve prices are low, the Balancing Pool pays to the hydro owner the resulting difference below the fixed dollar amount specified in the PPA. We understand that some consideration is being given by the government of Alberta to create financial derivatives based on the hydro PPA, and to auction these derivative instruments. At the time of this report, a decision has not been made whether to create these instruments, and if so, whether to auction them and when. As a first step, an assessment needs to be made whether the objectives of the PPA process and restructuring can best be achieved by making available financial derivatives of the hydro PPA.

5.2. THE POINT SYSTEM

A simple point system is used to measure a bidder's eligibility and activity (explained below) for each round of the PPA auction. We recommend that each PPA be assigned an integer number of points; Table 1 above shows an example of the system of points. The point system should be chosen to be a relatively small number of integers, so that different combinations of PPAs yield the same sum of points. This facilitates substitution possibilities among the PPAs for bidders. PPAs that are substitutes should have similar points. PPAs are likely to be substitutes if they have the same "size" and are similarly located on the industry cost curve. Note that PPAs could be substitutable and yet have very different values (e.g., positive versus negative).



Recommended Auction Rules

The point system in this report was derived by considering both target availability and forecast output for each PPA. We took a simple average of the two as a measure of the size of the PPA — to give consideration to capacity, an estimate of actual output, and the duration of the PPA, while applying a 10 percent discount rate to the annual quantities so as not to overweight the quantities in the later years relative to those in the earlier years.

In addition to measuring a bidder's eligibility and activity during the auction, the point system can be used in some circumstances to determine a bidder's bid deposit and initial eligibility, minimum-bid increments and minimum-required bid amounts, minimum opening bids, and stage transitions.

5.3. DEFINING A BID

A bid for a PPA is a commitment from a bidder to pay that price (if a positive bid) or to receive that price (if a negative bid) if the bid is declared to be the winning bid for the PPA. In each round of the auction, subject to the activity rule and the bidder's eligibility restrictions, a bidder can decide not to submit bids for the round, or to submit one or more bids during the round.

Bid cancellations and withdrawals will be allowed as discussed below. At the end of the auction, bidders with bid withdrawals and winning bidders that default will be subject to penalties as discussed below. These penalties help ensure that submitted bids represent sincere, serious commitments on the part of bidders.

5.3.1. Form of the Bid

Each bid on a PPA is a lump sum dollar amount specified in Canadian dollars. Subject to the minimum-required bid amount as specified in the auction rules, the lump sum bid may be negative, zero, or positive. The minimum-required bid amount will vary by PPA and by round. We recommend that the bid amounts be integers (whole dollars) and rounded (e.g., to the nearest \$1,000) so as to avoid unproductive signaling by bidders.

5.3.2. Form of the Winning-Bid Payment

If the winning bid for a PPA is positive, the winning bidder is responsible for paying this amount to the Balancing Pool account within a pre-specified time period following the close of the auction.



Recommended Auction Rules

If the winning bid is negative, the winning bidder receives the bid amount from the Balancing Pool account in the form of periodic payments (we recommend monthly or quarterly) over the term of the PPA according to a payment schedule. This is to ensure performance by the winning PPA holder. We recommend a payment schedule that divides the winning bid amount by the number of payments (i.e., the number of months or quarters) over the term of the PPA. We expect bidders will apply their own discount rate to convert between their lump sum bid amount and the resulting stream of income received from the Balancing Pool. However, it is not necessary that the structure of the winning bid payments as specified in the auction rules and as implemented by the Balancing Pool include discounting; only that the structure be applied the same to all bids and the structure be determined well before the auction begins. It also is helpful to have a simple payment schedule if possible. One downside to not applying a discount rate in the payment schedule is that bidders receiving payments according to the payment schedule of fixed nominal dollars receive a greater proportion of their real income early on in the term of the PPA, thereby increasing the risk of non-performance by the PPA holder later on. But we believe discounting the stream of payments to PPA holders with negative winning bids would not improve materially the performance of PPA holders.

5.4. PRE-AUCTION PROCEDURES

The key steps prior to the auction include:

- The auctioneer provides approved PPAs and final auction rules.
- The auctioneer qualifies bidders and bidders conduct due diligence. The qualification process should ensure that serious, committed bidders are attracted to the auction and that there is little cost to participating in the auction.
- The bidders provide bid deposits to establish each bidder's initial eligibility points — deposits that are returnable unless the bidder has withdrawal or default penalties at the end of the auction. Bid deposits are discussed below.
- The auctioneer holds a mock auction for qualified bidders.
- The auctioneer posts the auction schedule for the first several rounds showing the beginning and ending times of each round. (The schedule for subsequent rounds is posted as the auction proceeds.)
- The auction begins in stage 1, round 1.



Recommended Auction Rules

5.4.1. Bid Deposits

Bid deposits, which can be in the form of cash or acceptable letters of credit, are transferred by qualified bidders to the auctioneer prior to the start of the auction. The bid deposits are an indication of seriousness and commitment on the part of the bidders, and they are used to establish bidders' initial eligibility to bid on PPAs in the auction. Bid deposits are returnable so long as the bidder abides by the auction rules and protocols and is not liable for any default or bid withdrawal penalties at the end of the auction.

A bidder's bid deposit establishes its initial eligibility to bid on PPAs in the auction in accordance with the final auction rules, which will specify a required bid deposit amount per point of desired eligibility. As a numerical illustration only, if the bid deposit amount per point of eligibility is \$1 million and a bidder would like to have active bids on at most 30 points worth of PPAs, then its required bid deposit would be \$30 million. Eligibility and activity are explained in more detail below.

Our recommended points for the PPAs are shown in Table 1 and discussed above. At this time, the IAT is not making any specific recommendations on the bid deposits. It is premature to quantify bid deposits until closer to the auction, when many currently outstanding sources of uncertainty will be resolved. Thus, it is our recommendation that bid deposits not be determined at this time. Typically, bid deposits are specified no later than a few months before the start of the auction.

5.5. BID SUBMISSION PROCEDURE

The auction is organized into a finite number of discrete stages and rounds. We recommend three stages for the PPA auction. Each stage will have an unspecified number of rounds, but with a minimum of three rounds in stages 1 and 2. Each round takes place as follows. (Terminology introduced here will be explained later.)

- At the start of each round, each bidder is informed of:
 - The stage # and round # for the auction.
 - Its eligibility for submitting bids.
 - Any high bids it currently holds.



Recommended Auction Rules

- Its current activity and how much additional activity, if any, the bidder needs to establish from new bids this round (net of any new bid withdrawals this round) in order to maintain its eligibility for the next round.
- The number of waivers it has remaining.
- Any withdrawals it has made and potential withdrawal penalties for which it is liable.
- The current high bid for each PPA.
- The minimum-bid amount required for each PPA.
- In each round:
 - A bidder can submit new bids and withdrawals subject to the eligibility and activity rules of the auction.
 - Bidders will be notified of invalid submissions and will be given the opportunity to make revised submissions.
 - Bid and bid withdrawal submissions will be validated, time-stamped, and recorded. A bidder may make multiple bid and bid withdrawal submissions in a round. The submission with the last time-stamp before the round closes supersedes all prior submissions by the bidder during the round.
- After the end of each round, the end-of-round calculations are performed:
 - The stage transition rule is checked. If the criteria are satisfied, a stage transition takes place; that is, the stage number of the auction is advanced by one. This affects the activity rule and the determination of bid increments as discussed below.
 - The following is determined for each PPA: (1) current high bid and current high bidder, and (2) minimum-bid requirement for next round.
 - The following is determined for each bidder: (1) eligibility for submitting bids for next round, (2) current high bids it holds, (3) number of waivers remaining, and (4) potential withdrawal penalties.
 - The auction round number is incremented by one.



Recommended Auction Rules

At the end of each round, each PPA has at most one standing high bid. The minimum bid requirement for each PPA for the subsequent round is based on the minimum-bid increment as explained below. To prevent bidders from holding back and to encourage bidders to bid sincerely in the auction, the activity rule requires that a bidder's bidding activity in a round be sufficient in order to maintain its eligibility for the next round; this is explained in more detail below.

It is envisioned that bidders submit bids electronically to a secure website via the Internet, or by telephone if the submission of bids electronically is not feasible. Regardless of how a bid is transmitted, a bid submitted during the auction is a binding offer to purchase.

As outlined above, for each bidding round there are: (a) a bid submission period, and (b) a period during which the round results are announced. In each round, bids must be submitted before the conclusion of the bid submission period. Bidders submitting bids electronically may print a hardcopy confirmation to their local printer after electronic bid submission. Telephone bidders will be required to provide a fax number to the bid operator and will receive an automatic fax-back confirmation of their bid submission. All auction announcements will be available from the secure website, including the schedule for bid submissions. The auctioneer will make further announcements if it decides to extend a period.

To submit bids during a round (i.e., during the bid submission period of a round), a bidder submitting bids electronically will be required to access the auction website, using a login code and confidential password. To place a bid telephonically, a bidder must call the bid operator during the bid submission period. The bid operator will request the login code, confidential password, bidder identification number, authorized bidder name, and fax number.

In submitting bids, bidders submit a price for each PPA for which they wish to submit a bid. A submitted bid is valid and accepted only if the bidder's activity and PPA holding restrictions are satisfied, as explained below. Each valid bid is time-stamped upon submission to the auction computer system.

5.6. STAGE TRANSITION RULE

The activity rule and bid increments (explained below) depend on which stage the auction is in. The activity rule becomes more restrictive and the bid increments become smaller for later stages in the auction. The stage transition rule specifies when the auction proceeds from one stage to the next. A stage transition should take place when the bidding activity in rounds slows down sufficiently (fewer bidders are submitting new bids and fewer bids are being submitted). By



Recommended Auction Rules

imposing a more restrictive activity rule and smaller bid increments through advancing the stage of the auction, bidders have increased incentives to submit new bids. This maintains a sufficient pace for the auction and ensures the auction closes in a timely manner with winning bids reflecting market values for the items.

One common example of a stage transition rule is that a stage transition occurs automatically when the sum of new bids as measured in points on the PPAs falls below 10 percent of the total points for all PPAs in each of three consecutive rounds.

5.7. RESERVE PRICES AND MINIMUM OPENING BIDS

Reserve prices may be specified by the auctioneer. The reserve price is the price below which a bid or group of bids is considered unacceptable to the auctioneer. The reserve price could be for the aggregate, net amount raised at the auction, or there could be a separate reserve price for each item auctioned. Reserve prices may be part of the auctioneer's set of auction success criteria.

Minimum opening bids also are specified by the auctioneer. The first bid or bids submitted in the auction on a PPA must be at least as high as the minimum opening bid for the PPA. Attempts to submit bids falling below the minimum opening bids will be rejected.

At this time, the IAT is not making any specific recommendations on reserve prices or minimum opening bids to ADRD. It is premature to quantify reserve prices and minimum opening bids until closer to the auction when many currently outstanding sources of uncertainty (determinations of the PPAs, various regulations, market conditions, and so on) will be resolved. After reserve prices are determined, we recommend that they not be publicly revealed as discussed below. In contrast, minimum opening bids typically are specified and published no later than a few months before the start of the auction.

5.7.1. Reserve Prices

We do not recommend using reserve prices alone for determining the success of the PPA auction outcome. First, one of the main objectives of the PPA auction is to let the marketplace determine the market values of the PPAs. Second, there are several other factors that ADRD may wish to consider in determining whether the winning bids are acceptable, including the aggregate revenue raised at the auction.



Recommended Auction Rules

Setting reserve prices entails tradeoffs with respect to the objectives of the PPA auction. The higher the reserve price for a PPA, the more likely an otherwise winning bid for the PPA at the auction will be rejected. A lower reserve price for a PPA increases the likelihood that a winning bid will be accepted for the PPA that fails to achieve the auction objective of optimizing revenue. Recommendations on reserve prices should address such tradeoffs, which ultimately reflect policy considerations and decisions.

In some auctions, the auctioneer has a narrow performance objective and can commit to reserve prices. In auctions where the auctioneer has multiple objectives and multiple criteria for determining success, however, specific reserve prices are problematic. The PPA auction falls into the latter category. Success cannot be determined on the basis of a single dimension, such as a specific reserve price for each PPA.

In any case, virtually all auctioneers reserve the right to reject any and all bids for any reason. Recognizing that this introduces uncertainty into the auction process, it is prudent for the auctioneer to announce and to commit to a presumption that serious, competitive bidding will result in market valuations that are consistent with the objectives of the auction.

5.7.2. Minimum Opening Bids

Minimum opening bids can be related to reserve prices, but minimum opening bids necessarily are revealed to bidders prior to the start of the auction. For the first bids on a PPA (e.g., in round 1 of the auction), only those bids that are at least as high as the minimum opening bid for the PPA will be considered valid bids. Minimum opening bids can jump-start the auction, but minimum opening bids are subject to tradeoffs similar to those for reserve prices.

Normally, minimum opening bids are lower bounds on what bids will be considered acceptable. An exception to this is if the auctioneer has discretion to lower the minimum opening bid for a PPA once the auction begins if no bids are submitted for a PPA. Allowing this discretion is not usual practice in SAA auctions, but it may be prudent in some circumstances.

Recommendations on minimum opening bids should reflect a conservative intent to underestimate initial bids that can facilitate jump-starting the auction, while not understating the minimum opening bids so much so as to risk achieving the objective of optimizing auction revenue if bidding competition turns out to be low.

Recommended minimum opening bids are likely to be negative for some PPAs. This reflects the need to set them conservatively low and it is consistent with the way bidders are likely to derive



Recommended Auction Rules

value from the PPAs: value is not derived from the value of the plant underlying the PPA, but from the difference between what the PPA holder expects to realize in selling electricity under the PPA and what the PPA holder expects to pay out under the PPA.

5.8. ACTIVE BIDS

The auction's activity rule (described below) ensures that bidders submit sincere bids and that the PPA auction proceed at a reasonable pace. The activity rule uses a measure of "activity" that depends on the notion of an active bid.

- A bidder's bid on a PPA is an active bid in a round if:
 - It is the current high bid for the PPA prior to the beginning of the round (i.e., at the end of the preceding round), *or*
 - It is a new, valid bid submitted during the round. (See definition of valid bid.)
- All the bidder's active bids for the round are counted toward the bidder's activity for the round. A bidder can have no more than one active bid for a PPA; otherwise there would be double-counting for the purpose of measuring the bidder's activity. For example, if the bidder has the current high bid for a PPA prior to the beginning of the round, and it submits a new, higher bid on the same PPA in the round, it gets credit for having only a single active bid on the PPA.
- Any bid withdrawals count against the bidder's activity.



Recommended Auction Rules

5.9. VALID BIDS

A bidder's bid on a PPA in a round is a valid bid if:

- The bid amount is at least as high as the minimum required bid amount for the PPA, *and*
- Having an active bid on the PPA (see definition of active bid), along with the bidder's other active bids, does not violate the auction's activity rule, *and*
- Having an active bid on the PPA, along with the bidder's other active bids, does not violate the auction's restrictions on which PPAs the bidder can be active (see PPA holding restrictions).

5.10. MINIMUM-BID INCREMENTS

In order for a bid on a PPA to be valid it must be at least as high as the minimum-required bid for the PPA. The minimum-required bid for a PPA in a round is the current high bid for the PPA from the preceding round plus the minimum-bid increment for the PPA.

Care must be taken in setting minimum-bid increments. Bid increments that are too small slow the progress of the auction and convergence toward market values. Bid increments that are too large risk closing out bidding on a PPA before its market value has been reached.

Minimum-bid increments normally are a percentage (5-15 percent) of the current high bid or are a fixed dollar amount per point, whichever yields the higher increment. Alternatively, slightly more complicated formulas include exponential smoothing to determine minimum-bid increments. Also, the auction authority should be allowed the discretion to manually set minimum-bid increments if necessary, but this discretion should be exercised only rarely.

The minimum-bid increment formula varies by stage of the auction, so that increments typically decline in later rounds. For example, rounds in later stages of the auction will have minimum-bid increments computed using lower percentages and lower fixed-dollar amounts than for rounds in earlier stages of the auction.

As with bid deposits, reserve prices, and minimum opening bids, it is premature at this time to specify the formula for minimum-bid increments.



Recommended Auction Rules

5.11. ACTIVITY, ELIGIBILITY, AND WAIVERS

Activity is a measure of how many valid bids a bidder has submitted in a round and how many current active bids the bidder holds. Eligibility is a restriction (upper bound) on this activity.

To ensure that the auction closes within a reasonable period of time, the auctioneer will impose an activity rule that relates eligibility and activity. To prevent bidders from holding back in the PPA auction, the activity rule requires that each bidder maintain a minimum level of bidding activity in order to maintain its eligibility level.

The details of eligibility, the activity rule, and activity rule waivers are explained below.

5.11.1. Activity

Activity is a measure of the bidder's active bids for a round: it equals the sum of the points of the bidder's active bids for the round. Activity is not allowed to exceed eligibility; this is one of the restrictions on the PPAs the bidder can have active bids for. For each round after the first, the bidder's eligibility is equal to the bidder's activity for the preceding round divided by the activity rule ratio in effect for the round. As explained below, the activity rule ratio is a positive number not to exceed one.

5.11.2. Eligibility

Eligibility is the maximum activity a bidder can achieve. Eligibility cannot increase during the auction, and it will decrease during the auction if the bidder does not maintain sufficient activity in accordance with the activity rule and does not use a waiver. This provides an incentive for a bidder to submit sincere bids if it would like to maintain the opportunity of submitting bids in future rounds of the auction. As explained above, a bidder's eligibility level at the start of the PPA auction will be based on the bid deposit the bidder makes prior to the start of the auction.

5.11.3. Activity Rule

The activity rule relates the eligibility (E_r) for the current round r to the activity (A_{r-1}) for the preceding round $r-1$: $E_r = \text{Min} [E_{r-1}, M * A_{r-1}]$, where $M \geq 1$ and declines by stage. Thus, the bidder's activity in a round cannot exceed its eligibility for the round, which is proportional to the bidder's activity in the preceding round. The bidder's activity in the current round will



Recommended Auction Rules

determine the bidder's eligibility (and therefore maximum possible activity) in the subsequent round. Each stage of the auction increases the bidder's activity requirement for maintaining its eligibility from round to round in the stage. As an example, $M=2$, $M=4/3$, and $M=1$ for stages 1, 2, and 3, respectively.

The formula above that relates activity and eligibility raises roundoff issues. Typically, the roundoff convention adopted is that eligibility, as calculated from a given activity level, is rounded downward to the nearest integer. (Corresponding to this convention, the minimum activity level required to maintain eligibility is rounded upward to the nearest integer.)

5.11.4. Waivers

Waivers allow a bidder to maintain eligibility points even if the bidder's activity fails to satisfy the activity rule. Each bidder is given an initial number of waivers at the beginning of the auction to use during the auction. Using a waiver maintains the bidder's eligibility from one round to the next even if the bidder's activity in the round is insufficient to satisfy the activity rule. But the bidder has a finite number of waivers, so each use of a waiver in earlier rounds reduces the number of waivers available for use by the bidder in later rounds.

Typically, a bidder is assumed to exercise a waiver by default if its activity is insufficient to maintain the bidder's eligibility. This protects the bidder's eligibility if the bidder is unable to participate in a round. But the bidder is given the choice to override the default (i.e., automatic) exercise of one of its waivers; the bidder may prefer this in order to preserve the number of its waivers available for use in future rounds.

Another type of waiver that can be considered for the PPA auction is the "proactive waiver," which keeps the auction open if exercised. The bidder can choose to use a proactive waiver — which counts against its total number of waivers available for use — regardless of whether the bidder has sufficient activity to maintain its eligibility in order to keep the auction open at least one more round (i.e., in case no one other bidder submits a bid and the auction would close absent a bidder submitting a proactive waiver).

Our current assessment is that bidders be given four waivers at the beginning of the auction. This should be a sufficient number for bidders without encouraging the overuse of waivers that would slow down the auction. We do not see much value in allowing proactive waivers for the PPA auction.



Recommended Auction Rules

5.11.5. An Example of the Activity Rule

An example of the activity rule is as follows:

Stage	Round	Eligibility (points)	Activity (points)	Activity Rule Ratio	Eligibility Next Round*
1	1	10	6	2	Min [10, 6•2] = 10
1	2	10	4	2	Min [10, 4•2] = 8**
2	3	8	6	4/3	Min [8, 6•4/3] = 8
2	4	8	4	4/3	Min [8, 4•4/3] = 5**
3	5	5	4	1	Min [5, 4•1] = 4**

* Assuming roundoff rule is to round down computed eligibility to the next integer.

** Assumes bidder does not exercise a waiver.

In the example above, the bidder enters round 1 of the auction with 10 points of eligibility. During the round the bidder submits valid bids on PPAs worth 6 points of activity. Round 1 is in stage 1 of the auction and the activity rule ratio (which will be specified in the final auction rules) for rounds in stage 1 is 2 — that is, in each round of stage 1, a bidder must be active on PPAs (as measured in points) worth at least 1/2, or 50 percent, of its eligibility in order to maintain its eligibility level for the next round. (Otherwise, the bidder either will lose eligibility points or will need to use a waiver.) As the bidder's activity in round 1 was 6 points, which is at least 5 points, or half of its eligibility in round 1, its eligibility remains at 10 points for round 2. Note that a bidder's eligibility is not allowed to increase from round to round. So the bidder's activity of 6 points in round 1 does not translate into eligibility of 12 points for round 2; it is capped at its 10 points of eligibility for round 1.

Entering round 2 in the example above, the bidder has 10 points of eligibility. For the round the bidder is active on bids worth only 4 points, which is less than the minimum of 5 points needed to maintain its eligibility level for round 3. Thus, the bidder's eligibility for round 3 will be that eligibility that is consistent with its activity points and the activity rule ratio: (4 points)*2 = 8 points.

Note in the example above that the activity rule ratio becomes smaller (more restrictive) with stage transitions, falling from 2 in stage 1 to 4/3 in stage 2, and to 1 in stage 3 of the auction. This ensures that bidders' bids are sincere commitments and that the auction progresses in reasonable time to convergence on market values for the PPAs.



Recommended Auction Rules

5.12. BID WITHDRAWALS

The auction rules will allow for “cancelled” bids (during a round) and bid “withdrawals” (subject to penalties).

5.12.1. Cancelled Bids

Bids submitted during a round normally are considered binding offers to purchase. However, before the round closes, bidders can revise a mistaken bid made during the round or cancel it altogether. A bid submitted during a round can be cancelled in the same round with no penalty. A bidder’s last submitted bid during a round is that bidder’s binding bid for the round, superseding any prior bids submitted during the round.

5.12.2. Bid Withdrawals

A bid withdrawal involves withdrawing a current high bid that was submitted in an earlier round. Bid withdrawals allow bidders to back out of failed aggregations of PPAs they attempted to acquire. But serious withdrawal penalties and limitations on withdrawals (such as a maximum number of allowed withdrawals) are needed to discourage bidders from using withdrawals for nonproductive reasons.

We recommend the withdrawal penalty be set so as to keep the auctioneer whole. For example, any bidder that withdraws a bid on a PPA that is above the winning bid for the PPA at the close of the auction should be assessed a withdrawal penalty that is at least equal to the withdrawn bid amount less the ultimate winning bid amount for the bid (known only at the close of the auction). If the ultimate winning bid amount exceeds the withdrawn bid amount, there is no withdrawal penalty. There also should be withdrawal penalties for PPAs that remain unsold at the close of the auction but that had withdrawn bids during the auction.

5.13. TIE BREAKER RULE

Two or more bidders may submit the same bid amount for a PPA in a round. In this case, a tie breaker rule is needed to determine the current winning bidder for the item at the end of the round. One possibility is a tie breaker rule of first-come, first-served. This assigns the bidder with the earliest time-stamped bid as the current winning bidder. An alternative rule assigns the current winning bidder from the set of tied bidders based on a random number assignment. This



Recommended Auction Rules

rule discourages bidders from spending resources to submit bids the quickest, and it also eliminates the need to report the time-stamp, which could be used as an unproductive signaling device.

5.14. REPORTING ROUND RESULTS

At the end of each round, the auctioneer, from a secure website, will report the results of the PPA auction through the round just completed. The auction rules specify what information is revealed and reported to bidders at the end of each round. Results can be obtained by fax in the event a bidder is unable to access the Internet.

- Reported for each PPA:
 - New current high bid.
 - New minimum-bid requirement for next round.
- Each bidder informed of:
 - Its eligibility for submitting bids.
 - Any current high bids it holds (i.e., total bid amount outstanding).
 - Its current activity and how much additional activity, if any, the bidder needs to establish from new bids this round (net of any new bid withdrawals this round) in order to maintain its eligibility for the next round.
 - The number of waivers it has remaining.
 - Any withdrawals it has made and potential withdrawal penalties for which it is liable.
 - The current high bid for each PPA.
 - The minimum-bid amount required for each PPA.



Recommended Auction Rules

- Optionally reported to all bidders:
 - Current high bidder for all PPAs.
 - All bids and withdrawals submitted, including bids that are not current high bids.
 - Eligibility and number of waivers for all bidders.

The advantage of reporting the optional information above to bidders is that it provides full transparency and promotes aggressive bidding in competitive auctions with many bidders. The potential disadvantage of reporting the optional information above is that this information can facilitate less aggressive bidding in auctions with fewer competing bidders by making retaliation strategies among bidders (to enforce collusive agreements) more feasible.

5.14.1. Recommendation: Anonymous Auction

At present, we recommend an “anonymous” auction in which bidders are informed only of the current high bids and minimum-required bids for the PPAs. Prior to the auction, bidders also would be informed of who the participating bidders are. But during the auction, bidders would not be informed of the bidder for each bid submitted. With relatively few PPAs being auctioned (13 thermal PPAs), it is conservative at this point to assume that a small enough number of bidders will be participating in the auction, and we believe that an anonymous auction is prudent. Closer to the auction, if it appears that a very large number of bidders will be bidding, then we would recommend that the auction be run with full information as outlined above.

5.15. FREQUENCY OF ROUNDS

The frequency of rounds is set by the auction authority, both in terms of the duration of each round as well as the time between each round. We recommend the following.

- The round schedule for the first few days of the auction will be announced prior to the auction, and likely will include only one or two rounds for the first day of the auction.
- The round schedule is updated as the auction progresses.
- The number of rounds per day is likely to increase for later rounds — possibly up to 10 or so per day — depending on the level of bidding activity.



Recommended Auction Rules

5.16. END OF THE PPA AUCTION

The PPA auction will close when a round in stage 3 of the auction occurs with no new bids submitted on any PPA (and no proactive waiver has been submitted by a bidder). At the close of the auction:

- The current high bidder on a PPA wins the PPA and is committed to paying its current high bid within a pre-specified period following the close of the auction.
- Required documents are executed and a downpayment or full payment is due.
- Failure to execute documents and to provide required payment results in default penalties, and re-auction or otherwise re-assignment of the PPA. One possibility for a default penalty is that the penalty be the larger of 10 percent of the defaulted amount or 110 percent of the difference between the amount bid and the price at which the PPA is eventually resold.
- Bid withdrawal penalties and default penalties are due. Withdrawal penalties were discussed earlier.

5.17. NO POST-AUCTION NEGOTIATION

There is no reason to allow negotiations after the conclusion of the PPA auction. The more likely it is perceived by bidders before the auction that negotiation will be possible after the conclusion of the auction, the greater uncertainty and the less transparency there will be in the auction process and the less sincere and vigorous will be the bidding. The terms of the PPAs being auctioned will be defined clearly and comprehensively prior to the start of the auction. The number of PPAs being auctioned and the likely number of winning bidders also make it impractical to allow post-auction negotiation.

5.18. MINIMUM GENERATING CAPACITY AND AUCTION CANCELLATION

In accordance with the EUA, the IAT makes a recommendation to ADRD on the minimum amount of generating capacity under the PPAs that must be sold at auction, and makes a recommendation to ADRD on reserve prices. The EUA states that “if acceptable bids are not received at the public auction for at least the minimum amount of generating capacity” as determined by the Minister, the auction is cancelled and the PPAs are converted to financial instruments. Moreover, the EUA states that if acceptable bids are received at auction for at least



Recommended Auction Rules

the minimum generating capacity as determined by the Minister, but no acceptable bid is received for a particular PPA, the PPA will form the basis for a financial settlement.

The minimum generating capacity sold at the PPA auction could be one criterion for determining the success of the auction. Reserve prices were discussed above in this context. Given the objectives of the PPA auction and process, there are multiple criteria for determining the success of the auction. We do not recommend that the generating capacity sold at auction alone be the determining factor. Thus, strictly speaking, our recommended minimum generating capacity for the purpose of satisfying the EUA is zero. This does not preclude considering the actual generating capacity sold at the PPA auction as one of the criteria for determining the success of the PPA auction.

It is traditional and appropriate that the auctioneer reserves the right to cancel the auction because of an unacceptable outcome. This is a risk that all bidders face. Reasons for cancellation include bid amounts that are insufficient (either by item or in total) and an insufficient number of bid items sold. These are two reasons that are specified in the EUA. But there are many other reasons as well, especially unforeseen circumstances. Many of the factors are interdependent: the failure to achieve one objective may be offset by achieving another objective. (If winning bids on only a few PPAs were exceptionally high, it may be decided that the auction should not be cancelled.) It is difficult — if not impossible — for the auctioneer to specify prior to the auction the circumstances under which the auction will be cancelled.



6. Conclusion

This final report provides the IAT's final recommendations on PPA auction design given the current status of restructuring in Alberta. In this report we provide the context for making the recommendations by discussing general issues in auction design and applying them to the PPA auction, surveying alternative auction formats, analyzing market power issues, and providing the advantages and disadvantages of various auction rules. The recommendations in this report also reflect a productive consultation process that we believe provided stakeholders and interested parties sufficient and ample opportunities to provide comments and viewpoints that we considered.



Appendix A: Selected Changes from Draft Report

This appendix to the final report on PPA auction design summarizes selected differences in this report from the draft report on PPA auction design dated September 10, 1999.

Single Auction of Less-Than-Full-Term-PPA Instruments

This final report on PPA auction design addresses in more detail than the draft report the alternative of a single, one-time auction of less-than-full-term-PPA instruments. As discussed, we conclude that there are several problems and limited advantages with an auction of less than full-term PPAs. See primarily section 2.7.5 of this final report.

PPA Holding Restrictions

For this final report on PPA auction design, we have eliminated what was PPA holding “restriction #3” in our draft report — a restriction that is analogous to restriction #2 but is based on some appropriate measure of total generating capacity serving Alberta rather than on PPA capacity. (The recommended restrictions have been re-numbered for this final report, so that what is now restriction #3 was restriction #4 in the draft report.) Dropping this additional constraint has a small effect on potential market shares that can be achieved at the time of the PPA auction and in the near term following the auction because of the high proportion of total generating capacity serving Alberta that falls under the PPAs. Dropping the constraint also avoids the possibility of institutionalizing a rigidity unnecessarily.

It is our assessment, as we have suggested before, that it is more appropriate that there be an expanded scope for market monitoring and oversight — most likely led by the MSA — that ensures there are appropriate guidelines, rules, and enforcement concerning appropriate measures of capacity, mitigation of market power, and promotion of competition. We are confident that our recommendations on PPA holding restrictions and the overall auction design will be effective in achieving the objectives of the PPA auction — including promoting competition and mitigating market power at the time of the auction and in the near term following the auction. However, there is a limitation on how effective and appropriate PPA holding restrictions imposed at the time of the PPA auction can be going forward as the electric power market evolves. See primarily section 4.3 of this final report.



Appendix A: Selected Changes from Draft Report

TAU's Hydro Capacity

This final report also differs from the draft report in that we have addressed specifically the issue of how much, if any, of TAU's hydro capacity should be counted for the purposes of our recommended PPA holding restrictions. We recommend that 393 MW be counted for this purpose. See primarily section 4.3.2 of this final report.

BC Tie-Line

With respect to the BC tie-line, this final report reiterates our general recommendation in the draft report and elsewhere that institutions need to be established and made effective in order to address complicated market behavior and performance issues, rather than relying on PPA holding restrictions at the time of the auction. For the BC tie-line in particular, we recommend the Power Pool of Alberta or the TA take the lead in addressing the issue of potential market power. See primarily section 4.4.2 of this final report.

Affiliate and Associate

For the purpose of making the PPA holding restrictions effective, this final report recommends a definition for an "associate" company that is stricter than the definition of affiliate that is referenced in the PPAs. See primarily section 4.3.7 of this final report.

Minimum Generating Capacity

In this final report, we recommend that minimum generating capacity not be a critical factor in determining the success of the PPA auction. There are multiple objectives of the PPA auction that require consideration of multiple criteria for the success of the auction. See primarily section 5.18 of this final report.



Appendix B: Responses to Comments on Draft Report

This appendix to the final report on PPA auction design provides responses to selected comments that were posted on ADRD's website forum that invited comments following the posting of the IAT's draft report on PPA auction design. We appreciate the comments received and the time taken by interested parties. The responses to issues raised in the comments are given in the order that the comments appear on ADRD's website forum.

ENMAX (10/15/99)

In its letter to ADRD dated October 15, 1999, ENMAX suggests the IAT focused its interpretation of HESI's simulation results on only some measures and ignored others. In fact, in interpreting the results of HESI's simulations, the IAT considered many measures reported in the results, not just average prices for example. The IAT's recommendations for PPA holding restrictions took these various measures into account, but other factors were considered important including the overstated effects of strategic behavior, the conservative assumptions underlying the simulations, sensitivity analyses, and the effect that very stringent PPA holding restrictions would have on achieving the objectives of the PPA auction. We also recognize that an attempt to develop complex, precise PPA holding restrictions to capture all possible forms of market power is clearly inferior to effective market monitoring and guidelines implemented by an appropriate institution such as the MSA.

We agree that monitoring market behavior should be a high priority for the government going forward. We see no connection between that recommendation and a justification for auctioning less-than-full-term-PPA instruments.

With respect to the comments on bidding consortia and company relationships, this final draft should answer most of the questions. Remaining, detailed questions will be addressed in the auction implementation process.

ENMAX appears to misunderstand the hydro PPA. There is only a single hydro PPA and it will not be auctioned. The Balancing Pool is the holder of this PPA. At the time of this report, no decision has been made by the government on whether financial derivatives based on the hydro PPA will be made available. But for most financial derivatives that could be envisioned, there should be little, if any, added incentive to exercise market power that was not already present without the existence of the financial derivatives.



Appendix B: Responses to Comments on Draft Report

With respect to other details raised by ENMAX:

- Any bids that would be made visible to other bidders would be visible only at the end of each bidding round, not during the round.
- Withdrawal penalties represent a detail that will be clarified early in the auction implementation process. The principles for setting these penalties are laid out in this report.
- This report addresses the questions on bid deposits. Cash bid deposits likely would earn interest at a pre-specified rate.
- The PPA holding restrictions are enforced in real-time during the bidding. For example, if a bidder tried to submit bids on PPAs that would violate any of the holding restrictions, the bid submission would be rejected. Thus, it is not possible for a winning bidder to violate the PPA holding restrictions.

City of Calgary (10/20/99)

In response to the question regarding what is to be auctioned, our recommendation is that full-term PPAs should be auctioned. We see no connection between the term of the auctioned instrument and the issue of mitigating market power that justifies auctioning less-than-full-term PPA instruments. Our recommendation of auctioning full-term PPAs is based on our analysis that this would best achieve the objectives of the PPA auction including optimizing the Balancing Pool value.

In response to the question on paying the winning bid amount for a positive winning bid, we strongly recommend that full payment be due within a pre-specified time period after the close of the auction. Allowing installment payments adds increased risk for the Balancing Pool. Other high-stake auctions similar to the PPA auction have concluded very successfully without installment payments for positive winning bids. The few high stakes auctions that have allowed installment payments have experienced defaulting winning bidders, lawsuits, and delayed benefits to consumers.

The question on reserve prices is addressed in this final report.

In response to the comment on “5-year derivatives” and “market holding restrictions,” we continue to recommend that an institution such as the MSA be given effective authority to



Appendix B: Responses to Comments on Draft Report

establish guidelines and monitor market behavior. The guidelines and rules necessarily will need to evolve over time as the market itself evolves.

The question about what is capacity is moot as our final recommendations rely only on the capacities stated in the PPAs themselves. The question on affiliates is addressed in this final report.

Enron Capital & Trade Resources Canada Corp. (10/21/99)

The official website for information on the PPA auction process is <http://www.auctionppa.com>. This site will include a timeline of events for the auction process.

We have recommended for some time that the MSA be responsible for post-auction market power restrictions and monitoring. This recommendation implies an expanded role for the MSA.

In response to the comment on minimum opening bids, the intent is to set these conservatively low and as early as possible for obvious reasons. There is a tradeoff as to when to set and publish these. On the one hand, for the reasons discussed by Enron, it would be preferable to set them earlier rather than later. On the other hand, many factors can change as the start of the auction approaches that may affect the assessment of appropriate minimum opening bids. The auctioneer should endeavor to resolve as soon as possible uncertainties under its control that may affect the appropriate minimum opening bids.

In response to the comment on reserve prices, auctioneers reserve the right to reject any and all bids for any reason. It is common in high-stakes auctions such as the PPA auction for the auctioneer not to reveal reserve prices. Indeed, it is very difficult for the auctioneer to commit to reserve prices when there are multiple objectives for the auction. High-stakes auctions such as the PPA auction have attracted vigorous, competitive bidders and have been very successful without revealing reserve prices.

In response to the comment on plant site visits, our view is that this could be problematic given the number of facilities involved, any reasonable number of prospective bidders, the logistics and costs involved, and the need to minimize contacts between bidders. When asking prospective bidders on an informal basis, little interest in plant visits has been expressed. There is a great deal of information that is and will be made available for prospective bidders. Weighing the tradeoffs, our assessment is that plant site visits would be costly and time-consuming for a number of parties and the marginal benefits appear to be minimal relative to the wealth of



Appendix B: Responses to Comments on Draft Report

information and data that will already be made readily available. Some divestiture sales of physical plants in the United States have not involved plant site visits.

PICA (10/21/99)

In response to the comment on pre-defined measures of auction success, we have discussed this elsewhere in this report. To reiterate, there are multiple objectives for the PPA auction, making it difficult for ADRD to pre-specify completely all the possible circumstances for which it would consider the auction a success. ADRD has made official statements that it intends to have a successful auction.

In response to the comment on affiliates, this final report addresses the affiliate issue in more detail than the draft report on PPA auction design.

In response to the comment on auctioning shorter-term instruments, we have presented the arguments at length. Maximum flexibility with respect to the term of the auctioned instrument does not necessarily generate the most efficient economic outcome. As discussed elsewhere and in this final report, given the objectives of the PPA auction and the problems with auctioning less-than-full-term-PPA instruments, we recommend a one-time auction of full-term PPAs. This option best achieves the PPA auction objectives and maximizes benefits to consumers.

In response to the comment on holding restrictions for hydro capacity for entities that control the BC tie-line, this final report discusses our recommendations on these issues.

IPPSA and SPPA (10/22/99)

The comments on PPA holding restrictions ignore the numerous assumptions in HESI's simulations that overstate the incentive effects to exercise market power. The IAT's recommendations for PPA holding restrictions took various measures and factors into account, including the overstated effects of strategic behavior, the conservative assumptions underlying the simulations, sensitivity analyses, the effect that very stringent PPA holding restrictions would have on achieving the objectives of the PPA auction, and a recognition that an attempt to develop complex, precise PPA holding restrictions to capture all possible forms of market power was clearly inferior to effective market monitoring and guidelines implemented by an appropriate institution such as the MSA.

In response to IPPSA/SPPA recommendations and other comments:



Appendix B: Responses to Comments on Draft Report

- We have nothing to add to what has been discussed elsewhere on the issue of PPA “size” as this is outside the scope of auction design.
- Typically, bidders must declare their memberships and positions prior to the auction.
- What generators should declare to the MSA is outside the scope of auction design.
- We disagree that incumbent regulated generator-owners should be precluded from participating in the PPA auction for the reasons stated in this final report. Our rationale does not rely on the stable rate option.
- This final report presents our assessments and recommendations on capacity to be included for the purpose of the PPA holding restrictions, hydro capacity, affiliates, and the BC tie-line.
- We agree and have stated for some time that the MSA most likely is the institution that should have expanded authority to oversee market power issues.
- Recommending the effective term of the legislation is outside the scope of auction design.
- We agree some oversight function is needed covering PPA resales.
- The IAT’s assessment of HESI’s simulation results was that the benefit-cost tradeoff did not justify adding the PPA holding restriction that a PPA holder should be excluded from holding H.R. Milner or Rainbow and any peaking PPA.
- Based on communications to date and on other successful high-stakes auctions, there is no compelling evidence that there will be insufficient bidders and bidding activity at the PPA auction.
- We disagree with the characterization of the relationship between expected future pool prices, market power, and Balancing Pool proceeds. It is based on an unsupported premise and ignores rational economic and business behavior.
- See our response above to the City of Calgary on our strong recommendation to avoid installment payments for positive winning bids. Moreover, we disagree with the comment that “financial eligibility criteria would be lower” if installment payments were allowed. If anything, the criteria would need to be *higher*. It is our assessment that allowing installment



Appendix B: Responses to Comments on Draft Report

payments would be detrimental to achieving the objectives of the PPA auction and would lower consumer benefits. Ample evidence is found in other high-stakes auctions.

- The rationale for our recommendations on reserve prices, minimum opening bids, and term of the auctioned instruments are discussed elsewhere in this final report.

EPCOR (10/22/99)

The comment on the point system ignores the fact that the peaking units have higher costs than non-peaking units. The comparison to spectrum auctions is weak at best. The PPA auction involves assessments of a variety of factors including the structure of revenues, costs, and risks in ways that are quite different than found in spectrum auctions of assets.

The comments on reserve prices and minimum opening bids assume that reserve prices are well formulated and that there is a single criterion for auction success. The rationale for our recommendations on reserve prices and minimum opening bids is discussed in this final report.

The comment on enforcing the holding restrictions only at the end of the auction ignores the detrimental effect this has on transparency and the need for credible, sincere, committed bids in the auction.

This final report addresses the comments raised with respect to the hydro PPA, PPA holding restrictions, affiliates, hydro capacity, and the BC tie-line.

TransAlta Utilities (10/22/99)

In response to the comment on letting generator-owners bid on their own PPAs, it is our assessment that the tradeoffs discussed in this final report and as raised by interested parties compel us to recommend against this.

In response to the comment on TAU's hydro capacity, this final report discusses our rationale for counting some of the TAU's hydro capacity for the purpose of the capacity-share-based PPA holding restriction.

In response to the comment on a limit of 22 percent rather than 20 percent, our assessment of HESI's simulations and the comments of interested parties taken as a whole is that 20 percent best achieves the objectives for the PPA auction.



Appendix B: Responses to Comments on Draft Report

Industrial Power Consumers Association of Alberta (10/21/99)

This final report discusses our recommendations on reserve prices, including an aggregate reserve price.

In response to the comment on letting unregulated affiliates of the integrated utilities bid on the PPAs of other utilities, it is our assessment that any perceived informational asymmetries can be mitigated sufficiently. The auction process will be open and transparent, and is designed to create a level playing field for participants.

In response to the comment on the BC tie-line, we have had communications with the Power Pool and ADRD on the alternatives for addressing the issues.

