

Formal Report 337/08

Regulatory Review of Power Purchase Agreements: A Proposed Benchmarking Methodology

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Regulatory Review of Power Purchase Agreements: A Proposed Benchmarking Methodology

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Abbreviations and Acronyms

C_{CAPACITY}	Maximum Declared Availability of the Facility
C_{NOMINAL}	Nominal Capacity of the Facility
CP	Capacity Purchase Charge
CP_{AV}	Average Capacity Purchase Charge
CP_{CALC}	Calculated Capacity Purchase Charge
CP_{GEN}	General and Administration Costs for the Facility
CP_{LEV}	Levelized Average Capacity Purchase Charge
CP_{INSUR}	Cost of all forms of Insurance for the Facility
CP_{INV}	Investment component of the Capacity Purchase Charge
CP_{OF}	Fixed Operation and Maintenance Cost for the Facility
CP_{OTHER}	Other Capacity Related Costs
D_i	Average Annual Interest Rate on the Long-Term Debt
D_p	Proportion of Total Investment financed through Long-Term Debt
E	Energy Purchase Charge
E_{AV}	Energy Charge Payable at the expected date of commercial operation
E_{CALC}	Calculated Average Energy Purchase Charge
E_{ENERGY}	Amount of Energy Purchased
E_F	Fuel Cost component of the Energy Purchase Charge
E_i	Target Pre-tax Average Return on Equity
E_{OV}	Variable Operation and Maintenance Cost for the Facility
E_p	Proportion of the Total Investment financed through Equity
EPSR Act	Electricity Power Sector Reform Act of 2005
ESMAP	Energy Sector Management Assistance Program
F_{cal}	Average Calorific Value of Fuel used in the Facility
F_{conv}	Average Energy Conversion Efficiency in the first full year of operation of the Facility
F_{cost}	Unit Cost of the Fuel in the first full year of operation of the Facility
i	Seller's Weighted Average Cost of Capital
I	Total Investment in the Facility
IPP	Independent Power Producer
MYT	Multiyear Tariff
n	Duration of the PPA (in years)
N	Number of payments due under the PPA
NERC	Nigerian Electricity Regulatory Commission
NOPR	Notice of Proposed Rulemaking

P_{aux}	Proportion of Energy Generated consumed in the Facility
P_{AV}	Average Purchase Price of power under the PPA
P_{min}	Minimum Monthly Payment for Energy
PLF	Plant Load Factor
PPA	Power Purchase Agreement
PRG	Partial Risk Guarantee
S	Supplemental Charges
S_{AV}	Average Supplemental Charge
SSA	Sub-Saharan Africa

1 Introduction

Power purchase agreements (PPAs) are central to the health of power sectors, particularly in countries that have opted for single-buyer market structure. The capital costs of electricity-generating plants often constitute a large share of the final cost of power delivered to retail customers. In addition, in the case of thermal generation fueled by imported oil, input fuel costs have experienced major escalations because of large increases in world oil prices. If the risk allocation and sale price in the PPA are one sided, the bulk supply price of power that results from the PPA may turn out to be very high and economically unsustainable.

There are around 700 electricity-generation plants in developing countries that have been financed, constructed, and operated by independent power producers (IPPs), of which around 28 are in Sub-Saharan Africa (SSA). Almost all the PPAs for these plants have take-or-pay features, and the price of power ranges between 4 cents per kWh to around 40 cents per kWh, depending on the fuel used.¹ Most of the utilities in Sub-Saharan Africa are not able to meet their financial obligations under these PPAs. As a consequence, governments are often forced to meet this shortfall from their general revenues. This, in turn, often creates an unsustainable macroeconomic burden. It is therefore very important for developing countries in general and SSA countries in particular to develop effective mechanisms to evaluate PPAs.

Competitive procurement of bulk power can help to address this situation. But competitive procurements are still the exception rather than the rule in Sub-Saharan Africa.² Full competitive bidding is generally feasible only when bidders are bidding on a relatively standardized and well-specified commodity and the potential bidders are bidding on a single attribute (i.e., price) or several attributes that can be scored on a relatively objective basis. Since the conditions for this type of bidding do not exist in most African countries, the best that may be possible in the near future is some hybrid form of bidding that combines elements of competition and negotiation.

An additional complication in Africa is that the buyer, usually a state-owned power enterprise, is rarely commercially viable. As a consequence, most IPPs are not willing to sign PPAs unless the PPA is also accompanied by a government support package (such as sovereign guarantees, tax holidays, escrow accounts, currency conversion, repatriation of profits, protection against nationalization, and expropriation). Given the large amounts of money associated with PPAs, it is perhaps not surprising that there have been widespread allegations of corruption in purchases from IPPs in Guatemala, Pakistan, Philippines, Tanzania, and Nigeria. It is not unknown for ministers and prime ministers to present a PPA as a *fait accompli* to utility managers. There have also been reports of utility managers being

¹ See Gratwick and Eberhard, "An Analysis of Independent Power Projects in Africa: Understanding Development and Investment Outcomes," University of Cape Town Graduate School of Business, November 2006, www.gsb.uc.ac.za/mir.

² Idem.

“instructed” to sign on the dotted line, with little or no opportunity to analyze the costs or risks for the utility created by the PPAs. Given these *ad hoc* and nontransparent procurements, it should not be surprising that there is often wide variation in the costs of PPAs for similar projects across different countries.

In this context, Africa’s new regulatory institutions can play a critical role. Though the PPAs are essentially bilateral contracts between utilities and IPPs, these bilateral contracts will have major financial implications for the consumers that pay for the power in their retail bills or for taxpayers (who may or may not be electricity consumers) who pay for the shortfalls through higher taxes.

A recent development in Africa is that the new regulatory statutes in a number of African countries now require the regulator to review the “prudence” and “reasonableness” of such purchases, as well as their effect on the purchasing utility’s finances and retail tariffs. The interpretations of how this review should be done vary from country to country. In some cases, regulators have chosen to approve or disapprove PPAs. In other cases (such as in Nigeria), they have chosen to “advise” the government, the purchasing utility and the IPP on the implications of the PPA with issuing formal approvals or disapprovals. Under both approaches, the regulatory entity has to unpack the PPA into several elements and examine these elements individually. The regulators may view the PPA from several perspectives: the reasonableness of costs, how the costs compare with other PPAs operating under similar environments, and the risk allocation to the various parties to the transaction. Such reviews have usually been performed on an *ad hoc* basis. *This paper proposes a systematic approach to evaluating price and risk allocation in proposed PPAs.*

This paper reports on a proposed methodology that would facilitate a regulatory review of PPAs for fossil-fuel plants by explicitly benchmarking them for price and risk allocation. As part of this exercise, the energy unit of the Africa Region of

the World Bank (AFTEG), with support from the Energy Sector Management Assistance Program (ESMAP) of the World Bank, collaborated with the Nigerian Electricity Regulatory Commission (NERC) as part of the World Bank’s Nigeria country engagement. Chapter 2 presents the rationale for regulatory review of PPAs. Chapter 3 describes the specific process that was proposed in Nigeria. The substantive methodology described in this paper was formally proposed by NERC in a December 2006 Notice of Proposed Rulemaking (NOPR). This methodology is described in Chapters 4 through 7 and Annexes to these chapters. A NOPR is the written equivalent of a public consultation by a regulator. This paper supplements NERC’s NOPR in two ways. First, it provides NERC and the federal government of Nigeria with a reference document that describes the technical details of the methodology proposed in the NOPR. Second, since many African countries besides Nigeria face the challenge of getting balanced PPAs, the paper is intended to familiarize regulators, utilities, and other stakeholders with a methodology that may be equally useful in their countries. *Although the methodology was designed for regulatory review, it could also be useful for utility managers that have to evaluate competing offers of long-term power supplies.*

Benchmarking can be performed on a parameter-by-parameter basis, as has been done in the Indian state of Andhra Pradesh, or on an overall basis, as is proposed by NERC in its NOPR. Under the first approach the benchmarking is highly disaggregated. It requires reviewing numerous specific technical and commercial parameters. In Andhra Pradesh, the regulator has revised proposed PPAs by mandating specific values for a number of key parameters such as auxiliary power consumption, open cycle or combined cycle stabilization periods, the station heat rate, specific oil consumption and the plant load factor (PLF). In addition, the regulator has set financial norms for initial capital costs of the plants and for operating costs. Typically, such reviews require reviews of financing charges,

related escalation factors, as well as proposed formulas for dealing with future changes in the cost of operating and maintaining the plants. The Andhra Pradesh regulator has also attempted to take account of inflation and foreign exchange risk by capping their maximum effect on the PPA tariff. With respect to financing charges, these were reviewed by taking into account the prevailing interest rates at the time of financial closure. Additionally, the wholesale price index and the consumer price index were used to normalize the benchmarked prices. Two criticisms of the Andhra Pradesh approach, a regulator reviewing a PPA on a parameter-by-parameter approach, are that it leads to a high level of second guessing and micromanaging and that it may fail to capture tradeoffs because of its focus on individual parameters. But its proponents argue that a regulator has no other choice when presented with a PPA that may have been negotiated by an inexperienced buyer or where there are allegations of corruption.

Table 1.1 summarizes the benchmark values mandated by the Andhra Pradesh regulator.³

Other Possible Regulatory Approaches for Power Purchases

Benchmarking, whether performed on a parameter-by-parameter or overall basis, is not the only tool available to regulators when faced with the need for reviewing power purchase costs. As can be seen in Table 1.2, regulators around the world have adopted a variety of approaches in reviewing power purchase costs that would affect the retail tariffs paid by captive customers. The observed regulatory approaches seem to fall into two general categories: those that relate to regulating *conduct* of the buyer, seller, or both, and those that relate to regulating *outcomes*. The benchmarking approach proposed by NERC falls into the latter category. It does *not* examine the process by which the PPA was brought forth.

Table 1.1 Benchmarks Adopted by the Andhra Pradesh Electricity Regulator

PPA Component	Benchmark
Auxiliary power consumption	7-9%
Coal plant	Stabilization period: 1.5%
Gas plant (open cycle)	Subsequent period: 1.0%
Gas plant (combined cycle)	Stabilization period: 3.5%
	Subsequent period: 3.0%
Station heat rate	Coal based plants: 2050 to 2350 kcal/KWh
	Gas plants: 1850 Kcal/KWh
Specific gas consumption	2.0 ml/KWh
Plant load factor (PLF)	85%
Wholesale price index	60%
Consumer price index	40%
Rate of return	16% (<i>subject to prevailing interest rates</i>)
Incentive to investors	A cap of 0.5% if 85% PLF was achieved (<i>Deemed generation not eligible</i>)

Source: Besant-Jones, Tenenbaum and Tallapragada.

³ Developing regulatory benchmarks-G.P. Rao-Andhra Pradesh Electricity Regulatory Commission, India.

Instead, it focuses on the proposed outcome as manifested in the prices and risk allocation embedded in the PPA. And it proposes a specific methodology for benchmarking these outcomes against the terms and conditions in other PPAs for fossil fuel IPPs (bottom line in Table 1.2).⁴

The NERC approach is not the only possible form of benchmarking. For example, regulators in Colombia and the Netherlands have attempted to benchmark the overall prices paid by distribution companies that arise from all of their short-, medium- and long-term purchases. Unlike NERC, the Dutch and Colombian regulators do not look at individual PPAs or individual purchases. Instead, they compare the overall average power purchase prices of the different distribution companies under their jurisdiction. These prices are the end result of a mix of short-, medium- and long-term purchases. This type of benchmarking is feasible only if

there are a number of separate distribution companies under the regulator's jurisdiction and there is a relatively active and open wholesale power market. Some have argued that such comparisons are not necessary if a distribution company purchases power in competitive wholesale market. However, the regulatory presumption is that even if the wholesale market is competitive, this, by itself, does not guarantee that different distribution companies will all buy with equal skill. Moreover, the competitive wholesale market structures that exist in Colombia and the Netherlands do not currently exist in Nigeria or elsewhere in Sub-Saharan Africa. In addition, the norm in Sub-Saharan Africa is one distribution company in the country, or a distribution company that has no control over its power purchases because all of its power supplies are acquired from an entity that is buying on its behalf. Therefore, the

Table 1.2 Possible Approaches to Regulatory Review of Power Purchase Costs

Type	Regulatory Action	Observations
CONDUCT	Assist in negotiating PPAs	Kenya (Second wave of IPPs)
	Before or after the fact regulatory approval of PPAs	Andhra Pradesh (India) and United States (1980s and early 1990s) and Panama
	Standardized/model PPA	Proposed in Pakistan and India; must allow for exceptions
	Mandated (competitive) procurement guidelines	Proposed in Laos and Florida
	Independent procurement monitor	Issue public reports Southeastern United States: the affiliate problem
PERFORMANCE	Administratively specify a maximum price	Chile: too low Pakistan: too high initially (did not benefit from competition) Nigeria: proposed as the generation component of the MYTO
	Tie maximum price to competitive power sales	Chile: maximum price in "nonfree" market can be no higher than 15% of "free" market price
	Benchmarking of overall power purchase costs of discos	Colombia and Netherlands; need multiple discos
	Benchmarking of individual PPAs	Proposed in Nigeria (12/2006)

Source: Besant-Jones, Tenenbaum and Tallapragada.

⁴ See Arizu, Maurer and Tenenbaum. "Pass Through Power Purchase Costs: Regulatory Challenges and International Practices." World Bank, Energy and Mining Sector Board Discussion Paper No. 10, February 2004, www.worldbank.org/energy.

“average price” benchmarking approach used in Colombia and the Netherlands is simply not feasible, at least in the near term, for Nigeria and other countries in SSA.

Regulators need not be limited to using a single approach. For example, NERC stated in its December 2006 NOPR that it was considering adopting model PPAs (line 3) and mandated competitive procurement guidelines, in addition to the PPA benchmarking proposed in the NOPR. NERC’s underlying presumption is that a combination of regulatory approaches that examine both conduct and outcomes may produce a better result than a single approach that is limited to benchmarking proposed PPAs.

Suggestions for a Possible Way Forward

If the December 2006 NOPR is viewed as Phase I, we think that it is important for NERC to consider elements of a possible follow-up in a Phase II. Based on our discussions with NERC over the last several months, it appears that there is now a consensus on the following possible components for a Phase II:

- i. **Model PPA:** Develop a model PPA or PPAs that can be used as the basis for vesting contracts and that provides guidance for both buyers and sellers for future long-term power transactions in Nigeria.
- ii. **PPA benchmarking:** Test the feasibility of using the PPA price and risk assessment methodology proposed in the December 2006 NOPR.

- iii. **Competitive power procurement guidelines:** Develop guidelines for Competitive Power Procurement for future long-term purchases of power by a single buyer or other entities (e.g., distribution companies) serving captive customers.
- iv. **Independent monitoring:** Assess the feasibility of using one or more “independent monitors” for determining compliance with the CPP guidelines.

The NOPR proposed a specific methodology. But it has yet to be tested on any PPAs actually used in Nigeria or elsewhere. So a critical component of any follow-up is the testing of the NOPR methodology on actual PPAs to see whether it provides a workable regulatory approach, and, if not, to see how it should be modified to make it workable (component ii). The rationale for the other components is that NERC should not “put all of its eggs in one basket.” As seen in Table 1.2, there are a variety of regulatory approaches to encourage the signing of efficient, fair, and sustainable PPAs. The three other components of Phase II—a model PPA that could be used in vesting contracts, competitive power procurement guidelines, and independent monitoring of compliance with these guidelines—are techniques that have been tried or are under consideration by electricity regulators in other countries. If NERC concludes that these are potentially useful approaches, The World Bank would be pleased to work with NERC funding Phase II technical assistance that would examine how these other approaches might work in the current conditions in the Nigerian power sector.

2 Purpose of Regulatory Review of PPAs

Basic Purpose of Regulatory Review of PPAs

The overall purpose of a regulatory review of PPAs is to ensure that the terms of the PPAs are “fair and balanced” to all parties who will be directly and indirectly affected by these transactions. In particular, the prices paid by purchasers of power (typically a distributor or a single buyer) under the PPAs should be compatible with fair pricing to consumers supplied with power procured under the PPAs. In addition, the prices received by sellers of power (typically an IPP) under the PPAs should be sufficient to allow the sellers to finance the development and construction of their generation facilities and to earn reasonable returns on capital invested under efficient operation of these facilities.

The regulatory review of PPAs discussed in this chapter covers the individual review of a PPA before it is signed by the parties to this transaction (*ex ante* review).⁵ The Nigerian regulator’s current proposal is to evaluate the *reasonableness* of the prices, risk allocation, and other contract terms. Based on its assessment, the regulator may approve full passthrough of payments for power procured under the PPA to retail customers, especially if its comments are properly reflected in the signed PPA. Otherwise, the regulator may not allow full passthrough of these payments. Or, in the alternative, the evaluations may be strictly advisory and the real regulatory control may be a specified generation

component of an annually adjusted multiyear tariff that establishes the generation component of a maximum nationwide retail price. At present, it appears that NERC has adopted the “advisory” approach with the real regulatory control exercised through a proposed multiyear tariff (MYT) setting mechanism.

In other countries, such as Guatemala, Panama, and Nicaragua, the electricity laws mandate competitive procurement for the distributors, and the power purchase contracts have to be approved by the regulator before the prices can be passed through in retail tariffs. Once the contracts are approved, there is a usually a guarantee of full passthrough as long as no amendments are made to the contracts without regulatory approval. Mandated competitive procurement was the dominant regulatory approach used during the 1980s throughout the United States. More than 100 competitive procurements of new power supplies took place in the United States between 1984 and 1993.

An *ex ante* review has the advantage of helping to minimize the level of regulatory intervention in market-based transactions, since a good review can reduce the need for regulatory intervention during the term of the PPA. It does not, however, remove the need for the regulator to retain some form of intervention during the life of the PPA. And both an *ex ante* review and an *ex post* review expose the regulator to the risk of being held responsible by the parties to the PPA for the performance of the PPA, on the grounds that the regulator became more of

⁵ See Arizu, Maurer and Tenenbaum. “Pass Through of Power Purchase Costs: Regulatory Challenges and International Practices,” World Bank, Energy and Mining Sector Board Discussion Paper No. 10, February 2004, www.worldbank.org/energy.

a manager than a regulator when it assumed the role of reviewing contracts and requiring changes in one or more contract provisions. The regulator should avoid this risk by following clear guidelines for its reviews of PPAs.⁶ As a general rule, it is preferable for a regulator to review a PPA before it is signed. Reviews that take place after a PPA is signed can cause major delays that are politically dangerous in countries like Nigeria that are facing major power shortages.

Importance of Regulatory Review of PPAs

A regulator must be concerned about power purchase costs under PPAs whenever the power purchaser sells power directly or indirectly to captive customers (i.e., customers who do not have the legal right to purchase from alternative suppliers or choose not to exercise this right). The challenge is to create regulatory mechanisms to provide purchasers with incentives for good procurement of bulk power, while also providing IPPs with financial incentives to build and operate the plant efficiently. Hence, the regulator has to consider the needs of both purchasers and sellers when reviewing PPAs.

When the purchaser is a distributor that supplies captive customers by means of a monopoly franchise, the regulator should be concerned that the distributor may not be buying or building efficiently and thereby is hurting its captive customers. This is important because the cost of bulk power supply, irrespective of the structure of the power supply industry, typically represents between 50 percent and 70 percent of the distributor's total costs of supplying power to consumers. Distributors argue that these costs should be fully passed through in the tariff-setting process through automatic passthrough mechanisms because the costs are largely beyond their control. In contrast, regulators are generally wary of automatic passthrough mechanisms, since they blunt the

incentives to procure efficiently and carefully. There is evidence that automatic passthrough mechanisms can lead to generally inefficient and sloppy procurement practices; sweetheart deals with affiliated generators; or even corruption. The regulator should presume, therefore, that the distributor has some influence over the price that it pays for purchased power.

When the seller is an IPP that must invest in new generation capacity to meet its obligations under a PPA, the regulator must recognize that the IPP and its financiers will evaluate the possibility that the purchasers will miss payments or make late payments under the PPA. If there is a high risk that buyer will miss or delay payments, the IPP will inevitably face a higher cost of capital. This will lead to a higher price for the power supplied by the IPP and, in turn, a higher retail price of power. Even if there is a backup payment guarantee from the government, an IPP may be concerned that the government will not actually step in and make payments without involving the IPP in considerable litigation. At the time of this writing, the Federal Government of Nigeria and the World Bank are exploring the possibility of an alternative payment guarantee mechanism that is known as a "partial risk guarantee (PRG)." Under a PRG, the World Bank will guarantee some amount of payments to the IPP if the government is willing to issue a counter guarantee to the World Bank.

The regulator should be concerned, therefore, that the purchaser can afford to meet its payment obligations under the PPA in the context of the policies laid down by government and the regulator for retail power tariffs and pass through of bulk supply costs to retail power tariffs. Distributors will not find willing suppliers if the regulator sets an artificially low cap on passthrough of power purchase costs, which would jeopardize the long-term expansion of power supply. This is particularly the case in countries in which bulk power markets are in the early stages of development.

⁶ One obvious exception to this rule is when a review is necessitated after a PPA is signed because evidence emerges of corruption connected with the PPA.

3 The Proposed Process for Review of PPAs in Nigeria

Legal Authority

NERC is required to perform regulatory reviews of PPAs under the Electricity Power Sector Reform Act of 2005 (EPSR Act). Under this Act, NERC is obliged “to ensure that the prices charged by licensees are fair to consumers and are sufficient to allow the licensees to finance and to allow for reasonable earnings for efficient operation.” In addition, NERC has authority under the EPSR Act to specify terms and conditions in a license to ensure that a licensee will “purchase power and other resources in an economical and transparent manner.” NERC also has authority under the EPSR Act (Section 71) to vary its regulatory requirements by imposing appropriate terms and conditions depending on the type of entity that is being regulated.

These provisions form the legal basis for the proposals contained in NERC’s Notice of Proposed Rulemaking (NOPR) that it published for public consultation in December 2006.⁷ The NOPR proposes that a regulatory review will be required only for PPAs for which the purchaser will be purchasing power that will resold either directly (e.g., a distribution company) or indirectly (e.g., a bulk reseller) to captive customers. This requirement applies whether the PPAs for the sale of such power are contracts between affiliated or unaffiliated parties.

NERC interprets its legal obligation to ensure that a purchase is “economical” in three ways:

- i. **The right plant in the right place.** The general characteristics of the proposed generation

facility must be reasonable. Specifically, NERC must see evidence at a general level that the entity seeking the license is proposing an appropriate technology, an appropriate fuel and will locate the plant at a reasonable location. In addition, the application for a license must be consistent with any formally enunciated energy policies of the federal government of Nigeria.

- ii. **A reasonable combination of price and risk.** NERC must see evidence that the proposed combination of price and risk allocation in the PPA is both fair and efficient.
- iii. **Affordable to the buyer.** NERC must see evidence that the purchaser will be able to afford to purchase the electricity with the revenues that it is likely to receive from its customers and, if available, government-provided subsidies or guarantees. In particular, NERC will require an assurance from the purchaser that it will be able to afford its payment obligations under the PPA under existing or expected retail tariffs with the support of subsidies or guarantees.

Overall, NERC considers that the regulatory process proposed in the NOPR will produce four major benefits.

- i. It will allow NERC to fulfill its legal obligation to ensure that its regulatory actions are “fair and balanced” and that long-term power purchases made on behalf of captive customers are economical.
- ii. It will provide a checklist of terms and provisions and risks that must be considered

⁷ This NOPR be downloaded from www.nercng.org.

in developing PPAs. This should ensure better-quality PPAs in the future and avoid unnecessary and costly disputes.

- iii. It will provide NERC with better information that can be used to develop projections of the generation costs that constitute a major component of future end-use tariffs.
- iv. It will ensure that the general public will have better knowledge of the basis for NERC's decisions and will have the opportunity to provide NERC with informed comments based on facts rather than hearsay.

As a general rule, NERC considers that the two parties to a contract should have substantial discretion in writing the terms and conditions of the contract, subject to any general guidance that NERC decides to give in the future and any overall caps on retail tariffs that may be established as part of a future multiyear tariff setting system. However, NERC's fundamental regulatory concern is that such contracts can also have a major impact on the prices paid by consumers of electricity who are not direct parties to the contract. Therefore, NERC considers that it has a clear regulatory responsibility to ensure that the terms and conditions of such contracts are fair and efficient in order to protect those Nigerian consumers who will ultimately pay for the electricity but who are not signatories to the PPA.

The Proposed Regulatory Review Process

NERC Will Review a PPA, Rather than Approve It

NERC will not approve or disapprove of a PPA. Instead, NERC's review will be limited to providing comments and observations on the submitted PPA. The ultimate and binding control on the prices to consumers of electricity that result from a PPA will be exercised through NERC's system of setting retail tariffs for end

users. NERC intends to establish end-user tariffs through a multiyear tariff setting system that is the subject of a separate NOPR.

The seller and purchaser will have the flexibility to decide how they incorporate NERC's comments into their PPA when they negotiate a final signed version of the PPA.⁸ However, they do so at their own risk. If the parties choose to ignore NERC's comments and observations, they are more likely to run the risk of failing to satisfy the implicit annually adjusted cap on the power purchase costs that distribution entities will be allowed to pass through to their captive customers under NERC's planned multiyear tariff setting system.

NERC Is Proposing a Two-stage Regulatory Process for the Review of Generation Licenses and Associated PPAs

In the first stage, the application for a generation license will be reviewed according to NERC's standard review of such applications and the license issued if the application meets all of the requirements of its licensing regulations. This involves a review of the legal, technical, and financial elements of the applicant and its proposed generation facility. NERC issues a generation license to an applicant that has shown the legal, financial, and technical capacity to build and operate the proposed generation facility. However, the granting of a license does **not** imply that NERC has given approval to the terms of any PPA that will be used to sell the power produced from this generation facility.

In the second stage, NERC will review the submitted documents to facilitate compliance with its legal obligation to ensure that the power is purchased economically and with a reasonable allocation of risk. It will provide written comments to the purchaser and seller. The process for this stage is described in this chapter.

⁸ The seller will also be required to file the final executed version of the PPA with NERC. This final executed version will be a publicly available document.

NERC considers that this two-stage process has several advantages. First, it avoids the risk of delay to the process of reviewing an application for a generation license. Such delays are likely to occur if NERC required explicit review of a PPA as a prerequisite for the issuance of a generation license. Second, a PPA is likely to be more accurate and complete if it is reviewed some time after a license is issued. Third, by conducting the review before a PPA is signed, NERC will be able to give timely feedback to the purchaser and seller of power about price and nonprice provisions in the PPA that could lead to outcomes that are too costly, too risky, or both.

To ensure compliance with this two-stage process, NERC will attach conditions to the licenses of entities that will be buying or selling power on behalf of captive customers (e.g., a bulk supplier, generator, or distributor) requiring that these entities provide NERC with the information needed to conduct its review of the PPA as presented in the questionnaires and tables in the annexes attached to its NOPR (and described later in this paper).

The Seller Files the Application for a PPA Review, Accompanied by a Declaration by the Purchaser

In the second stage, once the PPA has been fully negotiated (though not executed) between the purchaser and the seller, the seller will be required to submit the proposed PPA to NERC and also complete the questionnaires and tables about prices and risk allocation under the PPA. The seller will be required to vouch by means of a declaration for the accuracy of the information that it submits in the questionnaires and tables. Separately, the purchaser will be formally required to vouch by means of a declaration that

it can afford its purchase obligations under the PPA.⁹ In addition, the purchaser will be required to state whether it agrees or disagrees with the answers provided by the seller.

NERC will encourage early submission of completed questionnaires and tables with the accompanying PPA so that its review can be given in a timely manner. In all instances, NERC's review will be contingent (i.e., conditional) on the filing of a final and legally binding version of the PPA with NERC.

The Seller and Purchaser Must Use "Plain English" for Their Answers

The answers about prices and risk allocation must be complete, concise, and written in "plain English." If the answers do not meet this standard, NERC will view the application as being not compliant with these requirements and will not consider the application further. All other things being equal, applicants are more likely to get a faster and positive evaluation from NERC if they provide accurate, clear, and complete answers.

Completion of the questionnaires and tables about prices and risk allocation will not impose an undue burden on sellers because sellers have to provide much of the same information to equity and debt investors in order for these investors to conduct a *due diligence* review prior to making their investment decisions.

NERC will combine the appraisal of both factual information (e.g., charges, plant specification) and subjective evaluations (e.g., assessments of how risks are allocated between the purchaser and seller) provided about a PPA by the seller according to the proposed methodology set out in the NOPR (and described later in this paper). It reserves

⁹ One reviewer of this report argued that the affordability of the PPA is critical and that NERC's current proposal is inadequate because it "relies on some subjective questions that are posed to the purchaser by way of self-assessment and it is hard to see why he would have incentives to answer these questions truthfully." She recommended that the questionnaire be supplemented with "some basic numbers [that] could be collected that would allow a simple test of affordability that is grounded in objective financial data." The reviewer suggested several possible statistics: (i) the average price of power provided under the PPA compared to the distributor's current average cost of power; and (ii) the average price of power provided by the PPA as a percentage of the current end-user tariff; and (iii) the cost of the PPA as a percentage of the utility's total costs; and (iv) the percentage of the utility's total power distributed that would come from the new PPA.

the right to seek clarifications from an applicant where it finds evidence of inaccuracies and misrepresentations. It also reserves the right to use its own assessment of a particular provision where it considers that the applicant's assessment is not accurate.

The accuracy and completeness of information supplied about prices and risk allocation must be vouched for by a designated officer of the companies that are filing the application for review.

NERC Will Select an Independent Party to Analyze the Seller's Answers, and the Seller and Purchaser Will Pay for This Service

To ensure that the review is both objective and informed, NERC will hire one or more experts to conduct a written evaluation of the answers given by the purchaser and seller. NERC needs this help to review a PPA comprehensively because a PPA is usually a lengthy document with complicated and subtle relationships among its many parts.

The cost of this evaluation will be borne by the seller, or by the purchaser, or shared by the two parties in whatever way they deem appropriate, and NERC will require the application to specify the payment arrangements. The written expert evaluation will be made public. NERC will establish a roster of experts and will determine which expert will be used to evaluate the answers provided in an application. NERC will also specify the terms of reference for the experts' evaluations. NERC anticipates that the evaluation will take between 10 to 20 person-days, depending on the complexity of the PPA. In selecting the roster of experts, NERC will give preference to individuals or firms who commit to training Nigerian citizens in the relevant evaluation techniques.

NERC Proposes to Make Public the PPA, the Seller's Answers to the Questionnaires and Tables, and NERC's Comments on the PPA

NERC proposes that the answers to these questionnaires and the PPAs on which these answers are based will be public documents, since it places considerable emphasis on the transparency of its regulatory processes. Such transparency is important, given the large quantities of money involved in transactions under PPAs.¹⁰ Such participation will be effective (because it will be informed) when the general public has access to the key documents that affect the prices that they will have to pay over the life of the PPA. In addition, the fundamental legitimacy of NERC's new regulatory system requires that the general public must have confidence in the fairness and impartiality of both the process that NERC employs and the decisions that it renders. This confidence can be developed when the general public understands the logic of NERC's decisions and provides informed inputs to its decisions by having access to the necessary information. Purchasers and sellers will also benefit from the greater sustainability of their transactions over the long run when NERC adopts open and transparent processes.

NERC Does Not Intend to Review All PPAs

NERC will exempt two types of transactions involving PPAs from its proposed requirements for regulatory review. First, NERC will not review PPAs where the purchaser's customers will have alternative sources of supply and are therefore less vulnerable to the exercise of market power by a seller such as the purchaser under the PPA.¹¹ This might occur, for example,

¹⁰ NERC's previously issued regulations for the review of license applications require that the general public must be able to participate in such regulatory processes.

¹¹ These customers are defined as "eligible" customers under Section 27 of the EPSR Act.

if a generator proposes to sell to an industrial customer or a group of commercial customers that have alternative sources of supply.

NERC will also not require generators with a rated capacity of 100 MW or less to fill out the questionnaire and matrix related to risk allocation, so as to lighten the regulatory burden on smaller generators. However, NERC will require that these smaller generators complete the questionnaire and table about the average purchase price, because it will still need to know the prices at which these generators will sell power to entities that supply captive customers. The purchasers in these transactions will still have to complete the declaration of affordability.

Possible Further Development of the Regulatory Process

NERC Will Examine the Scope for a More Limited Regulatory Review

NERC intends to match its regulatory methods and standards of review with the process by which the power supply is acquired.¹² In the future, if NERC is satisfied that the PPA accompanying the generation license application is the outcome of a competitive process such as has been employed successfully in other countries, NERC will employ a “fast track” and more limited form of regulatory

review. This is based on the presumption that consumer interests can be best protected by effective competition and, where competition exists, regulation can and should be more light-handed. Therefore, NERC intends to initiate a consultation that will focus on the necessary elements of open and competitive procurements for new generation capacity, as well as possible elements of one or more model PPA that will be fair and efficient for sellers, purchasers and retail customers. Standardized PPAs may be especially beneficial for smaller IPPs.¹³

NERC Will Develop a Database of PPA Terms and Conditions for Benchmarking Future PPAs

Consistent with its emphasis on the importance of transparency, NERC intends to use the information provided in the questionnaires and tables to create a reference database of PPA terms and conditions. It will use this database to derive benchmarks for reviewing the terms and conditions in PPAs submitted in association with applications for generation licenses. NERC will periodically update this database and make it publicly available. Since many energy regulatory agencies in Africa and elsewhere appear to have similar legal obligations to review PPAs, NERC also intends to explore how this information can be shared with these agencies to develop better information than would be obtainable on a single country basis.¹⁴

¹² As noted earlier, Section 71 of the ESPR Act clearly gives NERC the authority to vary its regulatory methods.

¹³ This does not imply that an IPP would have to adopt the standard PPA exactly as given. Instead, it would be a starting point and modifications would be allowed if they are highlighted and explained. For example, binding and nonbinding model PPAs have been developed by government authorities in Pakistan and India.

¹⁴ In any decision to issue a license, the Ugandan electricity regulator must review “the costs of the project” (Section 38.1.e) and “the price or tariff offered” (Section 38.1.k) (The Electricity Act, 1999). In setting tariffs, the Public Utilities Regulatory Commission of Ghana is required to take account of the “the cost of production of the service” (Section 16) and whether the cost of production is “justified and reasonable.” (PURC Act, 1997). In South Africa, the National Energy Regulator “may facilitate the conclusion of an agreement to buy and sell power between a generator and a purchaser of electricity.” (Electricity Regulation Act, 2006, Section 46 (3) (b)). In Tanzania, the new electricity law states that “a distribution licensee’s “obligations pursuant to a power purchase agreement may only influence a licensee’s regulated tariffs if the Authority deems that the costs were prudently incurred.” (Electricity Act, 2008, Paragraph 25).

4 The Proposed Methodology for the Review of PPAs in Nigeria

Methodological Issues

The main informational issues for NERC's proposed methodology are: (i) what types of cost are reviewed; (ii) what types of risks are assessed; and (iii) how these two categories of information will be assessed jointly. This chapter outlines NERC's proposed methodology for dealing with these issues, and the chapters that follow this one provide a detailed description of the methodology.

NERC's proposed methodology requires that the applicants provide information on both price and risk allocation between the seller and the purchaser because both factors influence the actual payments made by the purchaser under a PPA. For example, a PPA may propose low initial prices for capacity and energy but transfer most performance risks (e.g., target availability) to the purchaser, so that the purchaser may actually pay a lot more for power procured under the PPA than under another PPA with higher initial prices but with more risk borne by the seller. If a licensee proposes to bear more risk than usual, it will generally incur an additional cost for bearing this risk and it will expect to be compensated for this cost. The proposed methodology tries to capture this trade-off between risk and price under a PPA.

The pattern of risk allocations that is feasible in Nigeria at this time may be quite different from patterns of risk allocation that are feasible and observed in more developed power sectors (e.g., power sectors where there is better quality of service, lower levels of technical and commercial losses, an average tariff that recovers costs, more extensive metering and sufficient

generation capacity). Therefore, the prices and risk allocations observed in other countries with healthier power sectors may not be appropriate to Nigeria. In addition, one particular combination of price and risk may not be appropriate at all times and all circumstances (e.g., different fuels and technologies) in Nigeria.

Approach to Assessment of PPAs

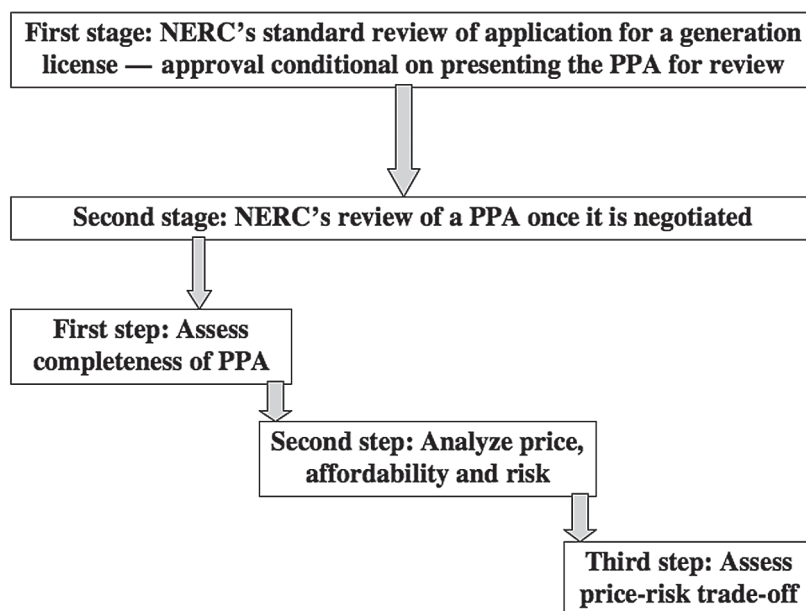
As noted earlier, NERC's assessment will be limited to PPAs where the purchaser will be selling directly (through distribution companies) or indirectly (e.g., as a bulk reseller) reselling this power to captive customers, and the seller is selling the electricity from a plant with a rated capacity of 100 MW or greater.

NERC proposes to adopt the following three-step approach for assessing the reasonableness of PPAs under the second stage of its review process:

- i. Assessment of a PPA's completeness
- ii. Performance of the average purchase price analysis, affordability analysis, and risk assessment of the PPA
- iii. Application of the price-risk trade-off approach to assessing PPAs

This approach is depicted in Figure 4.1.

The first step in NERC's review of PPAs is designed to separate PPAs that are complete from those that are not. In this step, NERC will determine whether the PPA satisfies certain minimum, or *threshold*, conditions that justify further regulatory review. If the PPA does not

Figure 4.1 Overview of NERC's Proposed Approach for Reviewing PPAs

Source: Besant-Jones, Tenenbaum and Tallapragada.

satisfy the minimum, or threshold, conditions, then NERC cannot justify using its limited regulatory resources on further review of the PPA.

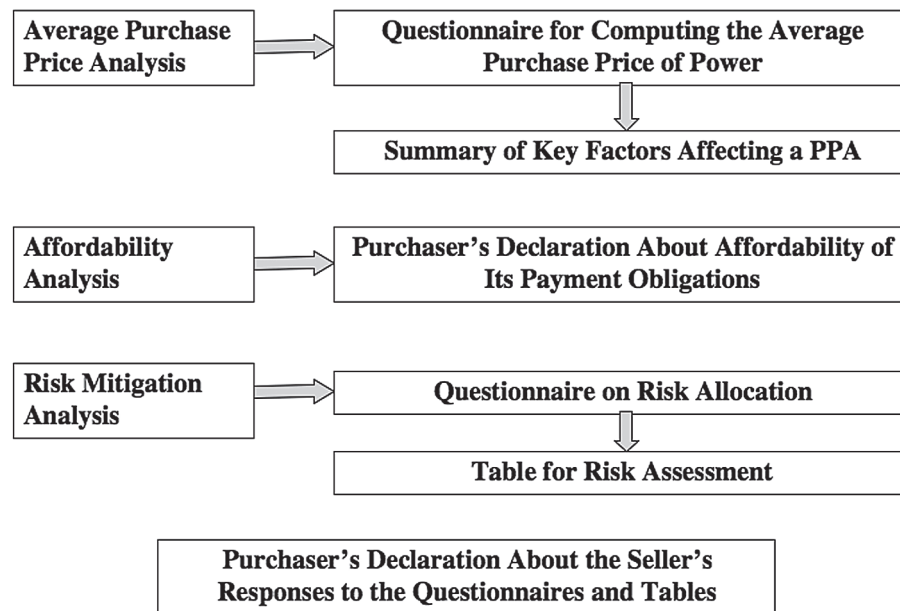
Under the second step in NERC's review, the seller must provide NERC with a completed copy of the questionnaires and tables shown in the NOPR and reproduced herein in Annexes 1, 2, 4, and 5. The seller must vouch for its responses to these questionnaires and tables by attaching a declaration to them. The focus of these questionnaires and tables is to abstract basic information from the lengthy and complex documents that are typical of PPAs. That information will be used to evaluate systematically the reasonableness of the price and nonprice terms of PPAs. Specifically, the seller's analysis of the average purchase price and risk allocation for its PPA provides a set of values for these key variables that is used in the third step: the review of the price-risk trade-off. These questionnaires and tables also incorporate a considerable amount of standardization to help NERC to benchmark PPAs.

Annex 6 is a sample of a completed version of the risk assessment (Annex 5). This version is entirely illustrative.

The purchaser carries out the affordability analysis under this stage, for which it provides a declaration to NERC. The purchaser must complete and vouch for its responses to Annex 3 by attaching a declaration to it. The purchaser must also complete Annex 7 about the extent to which it agrees or disagrees with the seller's responses to the questionnaires and tables. The purchaser should be able to provide this information from its due diligence on the PPA and related documentation.

In summary, NERC's review of a PPA will be carried out by means of the following annexes:

- Annex 1: Questionnaire for Computing the Average Purchase Price of Power under a Power Purchase Agreement
- Annex 2: Summary of Key Factors Affecting a Power Purchase Agreement
- Annex 3: Purchaser's Declaration about Affordability of Its Payment Obligations under a Power Purchase Agreement
- Annex 4: Questionnaire on Risk Allocation under a Power Purchase Agreement
- Annex 5: Table for Risk Assessment of a Power Purchase Agreement

Figure 4.2 Links between the Review Approach and the Questionnaires and Tables

Source: Besant-Jones, Tenenbaum and Tallapragada.

- Annex 6: Illustrative Risk Assessment of a Power Purchase Agreement
- Annex 7: Purchaser's Declaration about Seller's Responses to Questionnaires and Tables under a Power Purchase Agreement

These annexes apply to the case of a new fossil-fueled generation plant. The links between these annexes and the three-stage review process are depicted in Figure 4.2.

Assessment of the Completeness of an Applicant's PPA

Assessment of the completeness of an applicant's PPA is the first step of NERC's approach to reviewing a PPA. Once NERC deems the PPA

to have satisfied this minimum standard, it will evaluate the PPA for price and the risk exposure to the purchaser under the PPA.

A PPA should cover all critical subjects and not have omissions that might disrupt the operation of the PPA or cause avoidable costs for the seller or purchaser during the life of the agreement. NERC may decide to suspend further analysis of a PPA that is not complete in this respect.

NERC will create checklists for PPAs for fossil-fueled and other power generation technologies. An illustrative checklist—excluding standard legal provisions—for a typical PPA for a new fossil-fueled power project is shown in Tables 4.1a and 4.1b.¹⁵

¹⁵ The terminology used in Tables 4.1a and 4.1b to describe these clauses, articles and schedules is not prescriptive since it varies among PPAs. The importance of these terms lies in the substantive content that they cover.

Table 4.1a Typical Main Clauses/Articles in a PPA for a New Fossil-Fueled Power Plant

Definition of Contract Terms	Seller's Responsibilities	Purchaser's Responsibilities
Construction of the power plant	Compliance with technical, operational and environmental standards and regulations	Compliance with the grid code
Compliance with metering and telecommunication specifications	Control, operation, and dispatch of the power plant and maintenance coordination	Interconnection with transmission system
Supply of fuel	Availability commitments and capacity testing procedure	Supply of and payment for electricity
Fees, pricing and billing	Time and place of payment	Compliance with laws
Liability and indemnification	Payment guarantee (if any)	Contract term
Insurance	Force majeure	Taxes
Liquidated damages	Suspension, events of default and termination, and buy-out	Assignment of rights, benefits and obligations
Dispute resolution	Law, jurisdiction; agents for service	Representations and warranties

Source: Besant-Jones, Tenenbaum and Tallapragada.

Table 4.1b Typical Main Schedules Annexed to a PPA for a New Fossil-Fueled Power Plant

Specifications for Electricity	Plant Operating Parameters	Milestone Schedule
Guaranteed completion date	Compliance with grid code, transmission connection, dispatch, coordination and scheduling, and emergency procedures	Description of site
Delivery point	Transmission Line Specifications	Electricity delivery procedures
Metering and recording of electricity, collection and validation procedures	Calculation of Payment	Capacity and performance testing procedures
Guarantor support provisions	Seller and purchaser insurance requirements	Governmental approvals

Source: Besant-Jones, Tenenbaum and Tallapragada.

Note: Clauses/articles form the main part of the PPA. Schedules are attached to the PPA and contain detailed provisions relating to clauses/articles. Both clauses/articles and schedules are integral parts of the PPA, and the PPA is not complete without all of them.

5 Average Purchase Price Analysis

Analysis of the average price of purchased power under a PPA forms the first component of the second step of NERC's assessment of the reasonableness of a long-term PPA.

Structure of Power Purchase Price

The average price of power purchased under a PPA is estimated from the rates payable for a specified level of power purchased over the life of the PPA. These rates typically include the following components under a PPA for a fossil-fueled generation plant that is financed, constructed and operated by an independent power developer (IPP):¹⁶

- Capacity purchase charge
- Energy purchase charge
- Supplemental charges

The *capacity purchase charge* consists of a periodic—usually monthly—payment that is typically tied to a declaration by the seller that the plant has available production capacity at a level that is periodically verified according to a procedure specified in the PPA. This charge is usually defined to cover the seller's cost for investment in developing and constructing the power plant, as well as the fixed operating costs such as insurance and fixed operating and maintenance costs for the plant.

The *energy purchase charge* consists of a periodic payment for the amount of energy produced and purchased under the PPA during a specified period. It is usually defined to cover fuel costs and variable operation and maintenance costs.

The *supplemental charge* may cover plant start-up and ramp-up costs, the costs of providing ancillary services to the system operator such as reactive power, frequency response, black start and fast start, and miscellaneous costs.¹⁷

The schedule for the calculation of payments due under the PPA will typically give a base set of rates for capacity purchase charge, energy purchase charge and supplemental charges and various specified adjustment mechanisms. The rates charged will be heavily affected by the investment cost for the plant, the foreign exchange rate, the foreign inflation rate, the domestic inflation rate, and the price of fuel consumed by the plant.

The *average purchase price of power* purchased under the PPA is computed from these charges according to a basic general formula given in Box 5.1.

There are various formulations that can be used to compute the values of the charges that make up this expression for the average purchase price of power. NERC has selected simple formulations to facilitate its review process, even though these formulations may not capture secondary factors that could influence the

¹⁶ NERC does not favor a price structure that is based on a single charge for all costs based on the amount of energy sold under the PPA, because payments under this structure do not reflect the actual costs involved in supplying power. Instead, it prefers separation of charges into components that reflect the actual costs, such as the three shown here (capacity charge, energy charge, and supplemental charges).

¹⁷ NERC encourages sellers to accept obligations to provide ancillary services, so as to improve the overall reliability of supply in the Nigerian power system.

Box 5.1 General Formula for Calculating the Average Purchase Price Under a PPA

The main components of the average purchase price (P_{AV} expressed in US\$/kWh) are:

- Capacity purchase charge (CP)
- Energy purchase charge (E)
- Supplemental charges (S)

These components are expressed in US\$/month (since a month is the usual billing period):¹

$$P_{AV} = (CP + E + S) / E_{ENERGY}$$

where E_{ENERGY} is the amount of net electrical energy supplied during the month that is metered at a delivery point specified in the PPA (expressed in kWh/month).

The *capacity purchase charge* (CP) covers the costs of the following components:

- Investment for power plant and equipment, dedicated fuel supply link, and dedicated transmission link (CP_{INV})
- Operation & maintenance - Fixed portion (CP_{OF})
- Insurance (CP_{INSUR})
- General and administration (CP_{GEN})

These unit costs are usually expressed in terms of US\$/kW/month. This charge is payable independently of the amount of energy supplied under the PPA:

$$CP = (CP_{INV} + CP_{OF} + CP_{INSUR} + CP_{GEN}) \times C_{CAPACITY}$$

where $C_{CAPACITY}$ is the average available capacity provided during the month (expressed in kW).

The *energy purchase charge* (E) covers the costs of the following components:

- Fuel (E_F)
- Operation and Maintenance–Variable portion (E_{OV})

These unit costs are usually expressed in terms of US\$/kWh.

$$E = (E_F + E_{OV}) \times E_{ENERGY}$$

Unless the fuel market that supplies the power plant is fully liberalized, the cost of fuel is usually indexed to the prevailing market price of this fuel or a benchmark fuel price, which passes through the fuel price risk to the purchaser.

Supplemental charges (S , usually expressed in US\$/month) cover charges such as plant start-up and ramp-up costs above a maximum number of such events per period specified in the PPA (in which case, the monthly charge is the charge per event times the chargeable number of these events), as well as the costs of providing ancillary services and miscellaneous costs specified in the PPA.

Note 1: The selection of U.S. dollars in this illustration as the currency for expressing costs does not preclude the adoption of the naira in practice, where appropriate. An advantage of expressing the values in U.S. dollars is that it will facilitate comparisons with PPAs in other countries.

Source: Besant-Jones, Tenenbaum and Tallapragada.

level of charges under the PPA. NERC expects, however, the seller and purchaser to consider all the relevant factors in their analysis.

Sellers will be required to provide the information needed to compute the average purchase price of power under the PPA by completing the questionnaire reproduced in Annex 1. They will also be required to complete a summary table shown Annex 2, based on their responses to the questionnaire in Annex 1. The purpose of Annex 2 is to provide a convenient summary of the key components of overall average purchase price of power and the factors that affect this average price. In the event that information given in Annex 2 is not consistent with information

given in Annex 1, NERC will use the information given in Annex 1 for its assessment.

Purchaser's Price versus Seller's Cost

The average purchase price is calculated from the purchaser's perspective under the PPA. It depends on the actual costs incurred by the seller in developing, constructing, operating, and financing the plant over the life of the plant (life-cycle cost).

The capacity purchase charge spreads (*levelizes*) over a period of years specified in the PPA the construction and other initial costs

incurred by the seller in developing the power facility. Usually for new generation facilities, this period is at least as long as the repayment period for the seller's long-term debt used to finance these costs. Hence, the formula for the average purchase price given in the box represents a levelized cost for power under the PPA for the purchaser. In a PPA where the capacity purchase charge is reduced after a period of years specified in the PPA, the average purchase price of power over the term of the PPA is a function of both levels of capacity purchase charge.

Both the seller and the purchaser enter into long-term financial obligations under the PPA that expose them to financial risks.¹⁸ Whereas the cost of the seller's risk exposure is normally reflected in the seller's cost of capital that is recovered in the capacity purchase charge,¹⁹ the cost of the purchaser's risk exposure (e.g., the unwillingness or inability of the purchaser's customers to pay the purchaser in full or promptly for power sold by the purchaser to them) is not reflected in the rates for power supplied under PPA.

The purchaser's risk exposure is therefore assessed separately in the affordability analysis and the risk assessment. These two key dimensions of any PPA—average price and risk exposure—are then combined in a way that trades off low price with high risk—and vice versa—as a basis for comparing a number of PPAs that have various combinations of these variables. The underlying assumption is that a full and objective regulatory review requires an examination of both dimensions of the PPA and the trade-offs between them.

Benchmarking the Average Purchase Price of Power

NERC will compare the average purchase price of power computed from rates given in a PPA with a benchmark of prices for other PPAs.

This comparison will complement the risk assessment by indicating any unusual features of the payments to be made under the PPA. It will draw on NERC's reference database of PPAs as well as other data sources.

Differences in subsidies received and taxes paid—in both their direct and indirect forms—for power projects can strongly influence the price of purchased power under a PPA. An important example in the case of a fossil-fueled power plant is any subsidies and taxes on fuels used for generating power from the plant. The questionnaire on average purchase price (Annex 1) therefore asks for information about any subsidies received and taxes payable by the project company for the generating plant and that will be incorporated into the costs specified in the PPA. NERC will adjust the costs for the main components of the average purchase price of power to take account of these subsidies and taxes, and compute an *adjusted average purchase price of power* from these adjusted rates. NERC will use this cost when comparing average purchase prices of power under PPAs.

Affordability of the PPA for the Purchaser

Affordability analysis forms the second component in the second step of NERC's assessment of the reasonableness of a long-term PPA.

NERC recognizes that even if a PPA is fair and efficient for the parties to the agreement, the PPA *may still not be affordable* for the purchaser (or to distributors or final consumers of electricity that bear the costs passed through by the purchaser under the terms of the PPA). In other words, the PPA may create payment obligations that are simply not affordable for the purchaser because the payments cannot be covered with revenues that the purchaser will receive from its retail customers for power procured under the PPA. For NERC to make a determination that a

¹⁸ In the case of a new 500MW plant with combined-cycle gas turbines that burn natural gas, for example, the seller can invest around US\$400 million in the plant, and the purchaser may enter into payment obligations of around US\$130 million per year for capacity, energy and supplementary charges under the PPA when the plant is operated near to its capacity.

¹⁹ A basic justification for the long-terms of PPAs is to reduce the seller's cost of capital.

purchase is “economical,” therefore, it must be able to examine the revenues that will be earned by the purchaser and the possible impact of this purchase on regulated electricity tariffs.²⁰ And if the tariff increase is not affordable to Nigerian consumers, the Nigerian government is likely to find itself paying for the shortfall under guarantee or securitization agreements. But in either case, Nigerian citizens will ultimately pay for the shortfall either as electricity consumers or as taxpayers.

This does *not* imply that NERC will use its review of the PPA to conduct a full evaluation of the level and structure of the basis for the purchaser’s revenues. This will require a separate regulatory tariff review that NERC intends to conduct in the context of its proceedings dealing with the setting of multiyear tariffs for distribution entities and the establishment of regulations for the passthrough of changes in generation costs to retail tariffs. Nevertheless, NERC’s regulatory review of a PPA would have little point if it had good reason to consider that the purchaser cannot afford its payment obligations under the PPA due to the impact of this commitment on regulated tariffs.

NERC recognizes the seller will probably not have accurate information about the “affordability” of the PPA for the purchaser.²¹ Such information is likely to be known only by the purchaser. Therefore, NERC will require that the purchaser shall complete a separate questionnaire (**Annex 3**) that must be accompanied by a signed statement from an authorized representative of the purchaser that provides answers to the following questions:

- i. Can you afford to make this proposed purchase under your existing tariff(s) to your own customers?
- ii. If the answer is no, what is your current estimated revenue shortfall without the addition of this PPA?
- iii. If nothing else changes, by how much would your current expected revenue shortfall increase on a percentage and absolute basis as a result of the expected payments under the PPA?
- iv. Estimate the required percentage increase in your average tariff(s) to eliminate any additional shortfall as a result of this PPA.

²⁰ This is a standard regulatory exercise that is routinely performed by electricity regulatory commissions around the world. For example, BC Hydro (Canada), in seeking approval of 38 PPAs that were selected after a competitive tender, provided a “rate impact analysis” that estimated that the first year rate impact would be an increase of 8.1 percent. The British Columbia Utilities Commission decided not to use the BC Hydro assessment because it found flaws in the underlying assumptions. See British Columbia Utilities Commission, “Electricity Purchase Agreements—Reasons for Decision, Order No. E-7-06, September 21, 2006. Available at <http://www.bcuc.com/RecentDecision.aspx>.

²¹ The affordability of the PPA for the purchaser is nevertheless highly important for the seller and its lenders, since it has a major influence of the cost of capital to the seller for its investment in the generation plant. Where the lenders and investors are concerned about the adequacy of the purchaser’s tariffs, they will expect to receive a risk premium that raises the cost of capital for developing and constructing the power plant.

6 Risk Assessment

Risk assessment forms the third component in the second step of NERC's assessment of the reasonableness of a long-term PPA.

Risk assessment analyses the risk exposure to increases in costs for the parties under the PPA. NERC's analysis focuses on risk exposure from the purchaser's perspective. NERC adopts the purchaser's perspective because of its legal mandate to protect the interests of captive electricity consumers whose demand is served with power procured by the purchaser (EPSR Act, Section 71(2)(b)).

Since some purchasers may be totally or largely state-owned, the assessment also takes account of the risk implications for the federal government of Nigeria (Government) or any other level of government that owns a power enterprise that is purchasing electricity for captive customers under a PPA. For example, if the Government provides the seller with a guarantee that the purchaser will perform its payments obligations under the PPA, then the Government accepts the risk of being the "payer of last resort" if the purchaser fails to do so. Any such guarantee may appear in the PPA or be recorded in a separate agreement between the Government and the seller to the PPA. If one seller has access to a Government payment guarantee and another seller does not, the first seller is likely to accept a lower capacity charge, all other things being equal, because the payment guarantee lowers its cost of the capital invested in the power generation facility. A similar advantage occurs

when Government provides other forms of guarantee for the performance of state-owned or controlled parties to the PPA. Failure to take account of such a guarantee would distort comparisons across PPAs.²² Therefore, NERC will require a description of any guarantee mechanism, regardless of whether it is recorded in the PPA or in another legal document, unless the Government of Nigeria formally requests NERC not to make public the details of the guarantee.

Risk exposure is assessed by means of a two-part formula that is applied to each of a number of risk factors:

- One part is the relative weighting for each risk factor.
- The other part is the rating of the purchaser's risk exposure to each risk factor.

The analysis of how different risks are allocated will be based on information contained in the PPA and other related documents. This information will be provided by the seller through the Questionnaire on Risk Allocation shown in Annex 4. NERC will also require the seller to use this information to fill out the Risk Assessment table shown in Annex 5 in order to derive a risk assessment of the PPA, which NERC will then review. The seller will be required to provide a signed statement from an authorized representative that vouches for the accuracy of the information given in their assessment.

²² The reverse also applies, namely failure to take account of the absence of such a guarantee would distort the comparison of the PPA with benchmarks with guarantees.

Analysis of Risk Factors

The analysis of risk factors under the PPA shows which party to the PPA bears the risk exposure to increases in costs and how this party bears it for each factor. These risk factors fall into two groups:

- **Construction Period Risks.** Risks during the construction period for the PPA cover the following six principal risk factors in the case of a new fossil-fueled power generation plant:
 - i. Increases in construction costs
 - ii. Increases in financing costs
 - iii. Delay in completion of the power plant
 - iv. Delay in completion of associated facilities
 - v. Failure of plant to meet performance specifications at completion tests
 - vi. Government actions
- **Operation Period Risks.** Risks during the operation period for the PPA cover the following thirteen principal risk factors in the case of a new fossil-fueled power generation plant.
 - i. Constraints on plant operation
 - ii. Increases in operating costs
 - iii. Non availability/non convertibility of foreign exchange
 - iv. Forced outage/derating or temporary shortfall in capacity
 - v. Deterioration in heat rate below the rate(s) specified in the PPA
 - vi. Increased fuel costs and variable operation and maintenance costs
 - vii. Prolonged outage of the plant due to major damage to equipment
 - viii. Failure of purchaser to perform its obligations under the PPA
 - ix. Failure of the seller to meet its obligations under the PPA that is caused by the plant operator
 - x. Environmental incidents caused by the seller/operator

- xi. Control over the seller's rights to assignment of the PPA
- xii. Termination of the PPA in case of an event of default
- xiii. Resolution of disputes between the seller and the purchaser

For a new fossil-fueled power generation plant, the total risk exposure is allocated among these two groups of risks in the following proportions:

- Construction period, 30%
- Operation period, 70%

Each risk factor is assigned a relative weighting. These weightings are shown in the Questionnaire on Risk Allocation (Annex 4). The sum of the weightings for all risk factors for the construction period equals 30 percent, and the sum of the weightings for all risk factors for the operation period equals 70 percent. The highest weightings are given to risk factors associated with increases in operating costs (15 percent relative weighting), forced outage/derating of the plant (14 percent), delay in construction completion (11 percent), and increase in construction costs and financing costs during construction (9 percent), which together account for about half of the total weighting for all risk factors.

The allocated proportions for the construction period and the operation period are assessed from the relative exposures to risks of cost increases for the purchaser under the PPA.²³ The purchaser is exposed both to the risk of increases in the average purchase price of power under the terms of the PPA such as indexation of cost components, and of external costs associated with these risks, such as the cost of procuring power from alternative sources in the event of a prolonged outage of the plant.

These proportions would be considerably different for other generation technologies. In the case of a hydropower project, for example, most of the weighting would be associated with

²³ These proportions do not necessarily reflect the relative proportions of construction costs and operating costs in the life-cycle cost of a typical new fossil-fueled power generation plant, as when the seller carries the risk of increases in construction costs.

the risks of the construction period. Moreover, some of the risk factors for a hydropower scheme would differ from the risk factors for a fossil-fueled power scheme. For example, risk exposure to hydrological uncertainty would replace risk exposure to fuel price uncertainty, and risk exposure to available energy would probably be higher for a hydropower plant than for a fossil-fueled power plant. Other sources of renewable but intermittent energy, such as wind power, have similar risk exposure features to hydropower.

Assessment of Risk Exposure

The risk assessment rates the purchaser's risk exposure based on the analysis of risk factors. It assesses the remedies and recourses permissible under the PPA for the main parties to the PPA for managing their risks.

- **Remedy.** A remedy is a legal means under the PPA for an aggrieved party to be compensated by another party, either by means of payment, or conversely, by relief from an obligation to make a payment. For example, under specified events the purchaser may be temporarily relieved from the obligation to make periodic payments to the seller.
- **Recourse.** A recourse allows a party to take a course of action that avoids or mitigates the effects of a specific event without necessarily having the right to receive compensation from another party under the PPA. For example, the purchaser may have the right to withdraw from a PPA if the seller fails to meet certain major conditions, and instead to seek alternative sources of power.

This approach implies that the party that is best able to manage these risks should bear them and, where appropriate, be compensated for so doing. In this regard, the assessment takes account of industry norms for risk allocation, especially norms that protect investors in power

generation facilities under long-term power purchase agreements.

As noted earlier, NERC recognizes that the pattern of risk allocation that is feasible for Nigeria is likely to be different from the risk allocations observed in PPAs in countries with better economic and technical conditions in their power sectors (i.e., full cost recovery, full and accurate metering, sufficient generating capacity, low technical and commercial losses, full electrification). A “good” application is not an application where no risk is borne by the purchaser and all risk is borne by the seller. NERC recognizes that there is also a cost to bearing risk. *The point of this review is not to try to transfer all risks from the purchaser to the seller, but instead to have each risk borne by the party that is in the best position to manage this risk.*

The assessment of the risk exposure is based on a scale of 0 to 5, with 0 representing no risk exposure to the purchaser and 5 representing full risk exposure for the purchaser. The assessment should take account of any recourse and remedy available to the party exposed to a risk factor.

The weighted risk value for a particular risk factor is computed from the formula:

$$\text{Weighted rating} = (\text{Weighting} \times \text{Rating}) / 5$$

The total weighted risk assessment for all the risk factors is the sum of the weighted risk assessments for individual risk factors. This total would be zero if all risk factors are rated 0 (i.e., purchaser bears no risk, seller bears all risk), and 100 percent if all risk factors receive a rating of 5 (i.e., purchaser bears all risk, seller has no risk). This computation is shown in Table 6.1.

To assist applicants, an illustrative benchmark risk assessment for a fossil-fueled power plant developed under a PPA is given in Annex 6. NERC considers that this assessment represents the lowest practicable overall risk exposure for a purchaser under PPAs for fossil-fueled generation plants financed, constructed and operated by foreign developers in developing countries. Under this illustrative risk assessment, the purchaser bears about 20 percent of the overall risk exposure.

Table 6.1 Methodology for Risk Assessment			
Risk Factor	Risk Weighting	Risk Rating	Weighted Rating
Construction Period (6 risk factors)			
Risk factor 1	w_1	r_1	$(w_1 \times r_1)/5$
Risk factor 2	w_2	r_2	$(w_2 \times r_2)/5$
Risk factor 6	w_6	r_6	$(w_6 \times r_6)/5$
S, Total Construction Period	30%		
Operation Period (13 risk factors)			
Risk factor 7	w_7	r_7	$(w_7 \times r_7)/5$
Risk factor 8	w_8	r_8	$(w_8 \times r_8)/5$
Risk factor 19	w_{19}	r_{19}	$(w_{19} \times r_{19})/5$
S, Total Operation Period	70%		
Total for All Risk Factors	100%		Overall risk rating Sum ($w_x \times r_x/5$)

Source: Besant-Jones, Tenenbaum and Tallapragada.

7 The Price-Risk Trade-off Approach to Assessing PPAs

The assessment of price-risk trade-off forms the third step of NERC's approach for assessing the reasonableness of a long-term PPA. It is carried out to satisfy the central regulatory goal of ensuring that a licensee will "purchase power and other resources in an economical and transparent manner." (EPSR Act, Section 71(2)(b)).

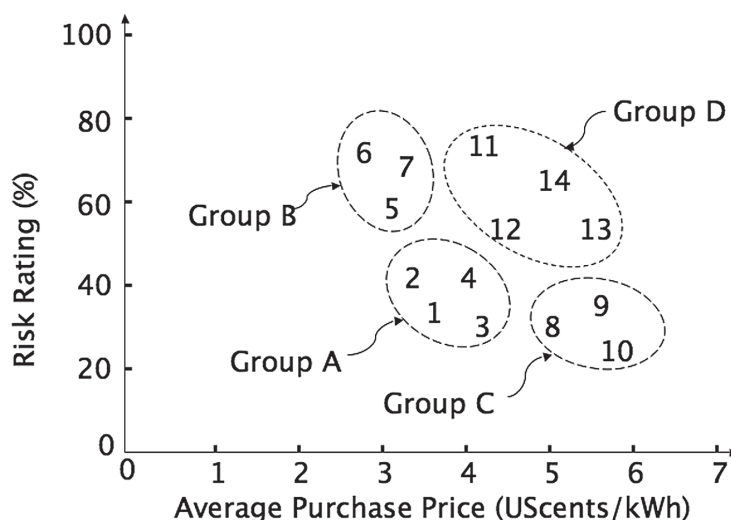
NERC recognizes that a trade-off will usually occur between the average price of power purchased under a PPA and the amount of risk to which the purchaser is exposed under this PPA. For well-developed PPAs, a lower purchase price will usually be associated with a higher risk exposure, and vice versa.

Analysis of this trade-off is important because greater risk exposure may cause the purchaser actually to pay more over time than the average purchase price based on the initial rates for capacity and energy purchase charges that are given in the PPA.

The objective of this analysis is to identify the PPAs with the best combinations of purchase price and risk exposure. This approach provides an indication of the trade-off between risks to which the purchaser is exposed under PPAs and the actual purchase price.

This approach is depicted in Figure 7.1. The horizontal axis represents the average purchase

Figure 7.1 Price-Risk Trade-off Chart for PPAs



Each number on the chart represents a PPA by its price level and risk rating

Source: Besant-Jones, Tenenbaum and Tallapragada.

price computed according to the formula given in the Box in Chapter 3. The vertical axis represents the risk rating derived from the risk assessment described in Chapter 4.²⁴

NERC intends to classify PPAs into the following four categories under the price-risk trade-off approach:

- **Group A.** PPAs offer a combination of relatively low average purchase price and relatively low risk exposure, shown inside Group A in Figure 1. These PPAs have the best trade-off for economical purchase of power, and therefore should be the first to be selected by the purchaser.
- **Group B.** PPAs offer a combination of relatively low average purchase price and relatively high risk exposure, shown inside Group B in Figure 1.
- **Group C.** PPAs offer a combination of relatively high average purchase price and relatively low risk exposure, shown inside Group C in Figure 1.
- **Group D.** PPAs offer a combination of relatively high average purchase price and relatively high risk exposure, shown inside Group D in Figure 1.

PPAs that fall into Groups B and C are candidates to supplement capacity procured under PPAs that fall into Group A. For PPAs that fall into Groups B and C, NERC will advise the sellers and purchasers to take note of NERC's comments with a view to improving the risk assessments of PPAs in Group B and the purchase prices for PPAs in Group C.

For PPAs that fall into Group D, NERC will strongly urge the sellers and purchasers to consider the concerns expressed by NERC with a view to substantially improving the price-risk features of these PPAs.

When PPAs from Groups B and C are needed to supplement PPAs from Group A, they should be selected on a portfolio basis. This approach considers the combined average price of purchased power and the combined risk exposure for the purchaser from all the selected PPAs. The objective is to select a group of PPAs that together offer the best combination of price and risk exposure for the purchaser.²⁵

At this stage, PPAs based on a variety of power generating technologies (diesel, gas turbine, hydropower, and other technologies for using renewable energy forms) can be brought together for evaluation on this common basis.

²⁴ The computed value for the average purchase price of power under a PPA is given at the end of Annex 1, and the risk rating for a PPA is given at the end of Annex 5.

²⁵ This approach helps to manage the risk of future increases in the price of bulk power purchased to serve the loads of captive customers. It therefore improves the sustainability of regulatory approaches—such as multiyear tariff orders—for passing through the costs of purchasing bulk power to retail power tariffs.

Annex 1 Questionnaire for Computing the Average Purchase Price of Power Under a Power Purchase Agreement for a New Fossil-Fueled Generation Plant

Seller: _____ Purchaser: _____
 NERC's License Application Number: _____ Number of Pages: _____

General Instructions to this Questionnaire

- Note 1** This computation is solely for the purpose of facilitating NERC's assessment of a PPA. It is not intended to form part of or be used for any commercial transaction by the parties to the PPA.
- Note 2** All the questions should be answered in the shaded areas located at the end of each question. The values of the components of the average purchase price of power should be computed from these answers according to the formulas given herein, which are provided for information.
- Note 3** Answers to this questionnaire about costs should include any subsidies from Nigerian sources, including the federal government of Nigeria, available to the project. The costs that are reported should include any taxes payable on plant, equipment, fuels and administration costs (including social charges on labor) and any holidays or waivers available on these payments.
- Note 4** If the charges payable under the PPA are expressed in terms of Naira, responses to this questionnaire should be expressed in naira, instead of in U.S. dollars, and NERC will use the Central Bank of Nigeria's prevailing free exchange rate at the time of its assessment for its computation of the *average purchase price of power*. In this case, responses should be supplemented with details of the indexation formulas applied to the charges.
- Note 5** The questions about the components of the capacity purchase charge, the energy purchase charge and supplemental charges are intended to help NERC understand the basis or the actual value of these charges that are payable by the purchaser under the PPA (the purchaser), as well as to enable NERC to develop benchmark values. In the event that any of these computed benchmark values differ significantly from the actual charge that is payable, NERC may seek clarification of the responses from the purchaser. NERC will take account of a significant difference that is not explained to its satisfaction in its risk assessment of the PPA. NERC will use the actual charges that are payable by the purchaser in its computation of the *average purchase price*.

General formula for computing the average purchase price (P_{AV}):

$$P_{AV} = (CP + E + S)/E_{ENERGY}$$

where CP = Capacity purchase charge

E = Energy purchase charge

S = Supplemental charges

E_{ENERGY} = Amount of energy purchased

The valuation of these variables is described below in this questionnaire.

- Q1:** What type(s) of technology are employed for the plant and main equipment used to generate power in the facility?
- Q2a:** What is the nominal capacity of the facility under the expected ambient operating conditions, expressed in kW (C_{NOMINAL})?
- Q2b:** What is the maximum declared available capacity of the facility under the expected ambient operating conditions, expressed in kW (C_{CAPACITY})?

Note 6 The amount of capacity (C_{CAPACITY}) used for this computation is adjusted each month to reflect the declared available capacity resulting from tests and/or level of declared capacity availability of the plant during this period relative to a reference level or target availability defined in the PPA. This charge is payable independently of the amount of energy supplied under the PPA during the period.

- Q3:** What is the duration of the PPA, expressed in years (n)?

Capacity Purchase Charge

- Q4:** What is the average capacity purchase charge payable during the first full year of operation of the facility given in the PPA, expressed in US\$/kW/month (CP_{AV})?
- Q5a:** How does the capacity purchase charge—excluding indexation of the values of the components of this charge—vary over time under the PPA?
- Q5b:** What is the levelized value for the capacity purchase charge over the life of the PPA, excluding indexation of the values of the components of this charge (CP_{LEV})?

Note 7 This levelized value for the capacity purchase charge (CP_{LEV}) should be computed from the following formula:

$$CP_{\text{LEV}} = \frac{\text{Sum of all capacity purchase charges payable}}{N}$$

where N is the number of payments due under the PPA

- Q5c:** Is the capacity purchase charge linked to an index or indexes?
- Q5d:** If the capacity purchase charge is linked to an index or indexes, identify the index or indexes and give the indexation formula(s) here:
- Q6a:** What is the total investment by the seller in developing the facility, expressed in U.S. dollars (I)?
- Q6b:** Which of these categories are included in the seller's total investment:
- Land acquisition and development?
 - Supply and construction of power plant and associated equipment?
 - Dedicated fuel supply link?
 - Dedicated transmission link?
 - Other ancillary infrastructure and facilities?
- Q6c:** What is the investment per kW of nominal capacity (I/C_{NOMINAL})?
- Q6d:** Will the amount of investment to be recovered under the capacity charge be finalized at the time of signing the PPA?

Q6e: If the amount of this investment won't be finalized at the time of signing the PPA, describe any formula used to incorporate this amount in the value of the capacity purchase charge: _____

Note 8 The formula may link the value of CP to the ratio of the actual final investment cost to a reference investment cost. If this ratio is unity (1), then all the cost difference is borne by the purchaser. If this ratio is less than unity, then the cost difference is divided between seller and purchaser.

Q7a: What proportion of the total investment is financed by the seller through long-term debt (D_p)? _____

Q7b: What is the average annual interest rate payable on this debt by the seller, expressed in percent per year (D_i)? _____

Q7c: What proportion of the total investment is financed through equity by the seller, expressed as a percentage of the total investment (E_p)? _____

Q7d: What is the pretax average return on equity sought for this investment, expressed in percent per year (E_i)? _____

Q7e: What is the seller's weighted average cost of capital (i)? _____

Note 9 The seller's weighted average cost of capital (i), expressed in percent per year, should be computed from the following formula:

$$i = (D_p \times D_i + E_p \times E_i) / 100$$

The sum $D_p + E_p$ should equal 100 percent.

Q8: What is the component of the capacity purchase charge that covers the total investment in the facility, expressed in US\$/kW maximum declared capacity/month (CP_{INV})? _____

Note 10 This component is computed from the following formula:

$$CP_{INV} = I \times \{i / [1 - 1/(1+i)^n]\} / 12 / C_{CAPACITY}$$

where I is given in the response to Q6a
 $C_{CAPACITY}$ is given in the response to Q2b

Q9: What is the fixed operation and maintenance cost for the facility, expressed in US\$/kW maximum declared capacity/month (CP_{OF})? _____

Q10: What is the cost of all forms of insurance for the facility, expressed in US\$/kW maximum declared capacity/month (CP_{INSUR})? _____

Q11: What are the general and administration costs for the facility, expressed in US\$/kW maximum declared capacity/month (CP_{GEN})? _____

Q12: What other capacity related costs are recovered under the capacity purchase charge, expressed in US\$/kW maximum declared capacity/month (CP_{OTHER})? _____

Q13a: What is the capacity purchase charge component of the average purchase price, expressed in US\$/kW maximum declared capacity/month, that is calculated from the following formula (CP_{CALC})? _____

$$\text{Calculated capacity purchase charge } CP_{CALC} = (CP_{INV} + CP_{OF} + CP_{INSUR} + CP_{GEN} + CP_{OTHER})$$

Q13b: What is the percentage difference between the value of the levelized average capacity purchase charge (CP_{LEV}) of the PPA and the calculated capacity purchase charge (CP_{CALC})? _____%

Note 11 This percentage difference should be calculated as follows:

$$[(CP_{LEV} - CP_{CALC})/CP_{LEV}] \times 100$$

The levelized value for the capacity purchase charge (CP_{LEV}) is given in the response to Q5b. If no response is given to Q5b, the average first year value (CP_{AV}) given in the response to Q4 should be used instead.

Energy Purchase Charge

Q14: What is the level of the energy charge payable at the expected date of commercial operation given in the PPA, expressed in US\$/kWh (E_{AV})?

Note 12 If this energy charge is not explicitly stated in the PPA, write, "Not explicitly stated."
If fuel is to be provided for the plant at no cost to the seller, write, "No fuel charge payable."
Provide details of the fuel supply arrangements in the response to Q14 of the Questionnaire on Risk Allocation.

Q15: What type of fuel (natural gas, liquid fuels, or coal) will be used principally for generating power in the plant?

Q16: What is the average calorific value of this fuel, expressed in joules per unit of fuel—cubic meter for natural gas, liter for liquid fuels, tonne for coal (F_{cal})?

Q17: What is the average energy conversion efficiency (*heat rate*) of the power plant that the seller has committed to in the first full year of operation with the principal fuel—taking into account any difference in quality from normal standards—for the planned operating mode of the plant under the PPA in the expected ambient operating conditions, expressed in joules consumed per kWh produced from the generating plant (F_{conv})?

Q18: What is the unit cost of the fuel in the first full year of operation to be used for generating power in the facility, expressed in US\$/unit of fuel—cubic meter for natural gas, liter for liquid fuels, tonne for coal (F_{cost})?

Q19: What proportion of energy produced by the generating plant is consumed in the facility, expressed as a percentage of energy produced (P_{aux})?

Q20: What is the estimated fuel cost component of the energy purchase charge, expressed in US\$/kWh sent out from the facility (E_F)?

Note 13 The estimated fuel cost component (E_F) of the energy purchase charge is calculated as follows:

$$\text{Fuel cost } E_F = [F_{cost} \times (F_{conv}/F_{cal})]/[100 - P_{aux}]/100$$

Q21a: Is the fuel charge linked to an index or indexes?

Q21b: If so, identify the index or indexes and give the indexation formula(s) here:

Q22: What is the variable operation and maintenance cost for the facility, expressed in US\$/kWh sent out from the facility (E_{OV})?

Q23a: What is the amount of energy expected to be sent out from the facility, averaged over a year to allow for planned maintenance periods and unplanned outages, expressed as kWh per month (E_{ENERGY})?

Q23b: What is the expected average monthly capacity utilization of the plant based on the expected amount of sent-out energy?

Note 14 The expected average monthly load factor should be calculated from the following formula:

$$\frac{\text{Expected amount of energy produced monthly } (E_{\text{ENERGY}})}{\text{Expected declared available capacity } (C_{\text{CAPACITY}}) \times 720}$$

The value for E_{ENERGY} is given in the response to Q23a.

The value for C_{CAPACITY} is given in the response to Q2b.

For the purposes of computing the average purchase price in the case of a fossil-fueled power plant that is to operate in base load mode, E_{ENERGY} will be computed on the assumption that the plant will operate at the equivalent of its declared available capacity for 70 percent of the payment period (equivalent to 534 hours in a month of 720 hours), even if the plant is expected to operate for longer.

$$E_{\text{ENERGY}} = C_{\text{CAPACITY}} \times 534 \text{ kWh/month}$$

Q24: What—if any—is the purchaser’s minimum monthly payment for energy under the PPA (allowing for planned maintenance) under a “take-or-pay” provision, expressed as US\$/month (P_{min})?

Note 15 This minimum payment for energy—if applicable—will be used for computing the average energy purchase charge (E_{AV}) component of the average purchase price (P_{AV}) under Q29, if the purchaser is committed under the PPA to pay for an amount of energy that is greater than 70 percent capacity utilization during each payment period according to the response to Q23b. Also in this event, the amount of energy (E_{ENERGY}) used in the formula for the average purchase price will be set at the equivalent of 70 percent monthly capacity utilization.

Q25: What is the estimated average energy purchase charge payable from the date of commercial operation, expressed in terms of US\$/kWh (E_{CALC})?

Note 16 The energy charge component (E_{CALC}) of the average purchase price, expressed in US\$/month, is calculated as follows:

$$E_{\text{CALC}} = (E_{\text{F}} + E_{\text{OV}}) \times E_{\text{ENERGY}} \text{ if this amount is greater than } P_{\text{min}}$$

Otherwise, if applicable: $E_{\text{CALC}} = P_{\text{min}}$

E_{F} is given in the response to Q20

E_{OV} is given in the response to Q22

Q26: What is the percentage difference between the level of the energy charge given in the PPA (E_{AV}) and the estimated energy cost (E_{CALC})?

Note 17 This percentage difference should be calculated as follows;

$$[(E_{\text{AV}} - E_{\text{CALC}})/E_{\text{AV}}] \times 100$$

E_{AV} is given in the response to Q14

E_{CALC} is given in the response to Q25

Q27: What supplemental charges are payable by the purchaser for normal operation of the plant under the PPA, showing each charge separately with any applicable indexes, and expressed in US\$/month (S)?

Q28: What is the average supplemental charge payable by the purchaser, expressed in US\$/kW, maximum declared availability/month (S_{AV})?

Note 18 The average supplemental charge (S_{AV}) should be calculated from the following formula:

$$S_{AV} = S / C_{CAPACITY}$$

Q29: What is the average purchase price of power under the PPA from the following formula, expressed in US\$/kWh (P_{AV})?

$$P_{AV} = (CP_{LEV} + S_{AV}) \times C_{CAPACITY} / E_{ENERGY} + E_{AV}$$

Note 19 CP_{LEV} is given in the response to Q5b

S_{AV} is given in the response to Q28

$C_{CAPACITY}$ is given in the response to Q23a

E_{AV} is given in the response to Q14

Where a value for CP_{LEV} is not available from the PPA, use instead the value for C_{PAV} given in the response to Q4

Where a value for E_{AV} is either zero because fuel is supplied at no charge or is not available from the PPA, use instead the value for E_{CALC} given in the response to Q25.

Q30: What exchange rate is used for converting costs incurred in Nigerian currency to equivalent amounts in U.S. dollars? Naira = 1 US\$.

Seller's Declaration:

Date of Declaration:

Annex 2 Summary of Key Factors Affecting a Power Purchase Agreement for a New Fossil-Fueled Generation Plant

Seller: _____ Purchaser: _____
 NERC's License Application Number: _____

Factor	Reference in the Average Purchase Price Questionnaire ^a	Unit	Value
Duration of the PPA	Q3	years	
Capacity Purchase Charge:			
Types of technology employed	Q1	n.a.	
Nominal capacity of the facility	Q2a	kW	
Total investment in the facility	Q6a	US\$	
Investment per unit of nominal capacity	Qbc	US/kW	
Levelized capacity purchase charge	Q5b	US\$/kW/month	
Proportion of the total investment as equity	Q7c	%	
Weighted average cost of capital	Q7e	%/year	
Energy Purchase Charge:			
Energy charge payable	Q14	US\$/kWh	
Type of fuel used for generating power	Q15	fuel	
Energy conversion efficiency of the power plant	Q17	joules/kWh	
Unit cost of the fuel	Q18	US\$/unit of fuel	
Average monthly capacity utilization of the plant	Q23b	%	
Minimum monthly payment for energy, if any	Q24	US\$/month	

Factor	Reference in the Average Purchase Price Questionnaire ^a	Unit	Value
Supplemental Charges:			
Supplemental charges payable	Q28	US\$/kW/month	
Average Purchase Price of Power	Q29	US/kWh	
General			
Exchange rate: Naira per U.S. dollar	Q30	Naira/US\$	

^a Questionnaire for Computing the Average Purchase Price of Power under a PPA

Seller's Declaration:

Date of Declaration:

Annex 3 Purchaser's Declaration About Affordability of Its Payment Obligations Under a Power Purchase Agreement for a New Fossil-Fueled Generation Plant

Seller: _____

Purchaser: _____

NERC's License Application Number: _____

- Q1:** Can you afford to make this proposed purchase under your existing tariff(s) to your own customers? _____
- Q2:** If the answer is no, what is your current estimated revenue shortfall without the addition of this PPA? _____
- Q3:** If nothing else changes, by how much would your current revenue shortfall increase on a percentage and absolute basis as a result of the expected payments under the PPA? _____
- Q4:** Estimate the required percentage increase in your average tariff(s) to eliminate any additional shortfall as a result of this PPA. _____

Purchaser's Declaration:

Date of Declaration:

**Annex
4**

**Questionnaire on Risk Allocation Under
a Power Purchase Agreement for a New
Fossil-Fueled Generation Plant**

Seller:

NERC's License Application Number:

Purchaser:

Number of Pages:

Question	PPA Clause (see Note)	Response
Risks under the Power Purchase Agreement during the Construction Period		
1. Increases in construction costs		
Q1a. Will the plant be constructed under a turnkey fixed-price contract or a cost-plus contract? Describe the contract form if neither of these two forms is used.		
Q1b. Who bears any construction cost overruns that fall within the control of the construction consortium?		
Q1c. What security in terms of letters of credit and retention bonds are to be posted by the construction consortium(s) (or equivalent contractor) as a percentage of the contract price(s)?		
Q1d. Does the seller or purchaser pay for power consumed during plant construction?		
Q1e. What provisions are being made—including stand-by financing—for meeting construction cost overruns that fall outside the control of the construction consortium in the following events: insured event; insured <i>force majeure</i> ; seller variation orders; ground conditions; changes of law?		
Q1f. Does the seller or purchaser pay for the fuel consumed during plant commissioning?		

Question	PPA Clause (see Note)	Response
2. Increases in financing costs		
Q2a. What financial resources does the seller have in hand or on call to cover the estimated construction cost?		
Q2b. What are the timing and terms of financing arranged for the project?		
Q2c. What are the security requirements (assets, assignment of license/concession, direct agreements with purchaser/EPC contractor/O&M operator, pledge of shares, retention accounts, assignment of insurance, etc.) by the lenders for the power plant?		
Q2d. Are there any liens—or possibility of any liens—on power plant assets or the assets of the company that is developing the power plant (other than liens of lenders for the power plant)?		
Q2e. What stand-by financing will be available to the seller to cover increases in costs arising from increases in interest rates until the seller receives additional revenues under the PPA for covering these increases?		
Q2f. What stand-by financing will be available to the seller to cover increases in costs arising from changes in exchange rates until the seller receives additional revenues under the PPA for covering these increases?		
Construction Completion Delay		
3. Completion of power plant		
Q3a. What land use rights over the duration of the PPA for the site on which the plant is to be located has the seller secured, and what rights have yet to be secured?		
Q3b. Which necessary licenses, permits, and approvals have been obtained to date, and which ones have not been obtained to date?		
Q3c. Under what terms can the purchaser and Fuel Supplier withdraw from the PPA and fuel supply agreement (FSA), respectively, if the seller does not complete the construction financing package by a date specified in the PPA or FSA?		

Question	PPA Clause (see Note)	Response
Q3d. Under what terms can the purchaser and Fuel Supplier withdraw from the PPA and FSA, respectively, if the seller's plant does not enter into service by a date specified in the PPA or FSA?		
Q3e. What daily penalties would be payable by the construction consortium for a delay in completion beyond the contracted date of entry into service under the PPA that is within the control of the construction consortium?		
Q3f. What is the daily rate of compensation payable by the seller to the purchaser for a delay in completion beyond the contracted date of entry into service under the PPA that is beyond the control of the construction consortium?		
4. Completion of associated facilities		
Q4a. Does the seller have a signed connection agreement with the power transmission operator?		
Q4b. Who is responsible for getting the power plant connected to the power transmission network (seller or transmission operator)?		
Q4c. Who pays for any works required to connect the power plant to the power transmission network, including any extension to the transmission network (seller, transmission operator, purchaser, or a third party)?		
Q4d. Who pays for any cost overruns or delays in commissioning the power plant caused by delays in connecting the power plant to the transmission network?		
Q4e. Does the seller have a signed agreement for fuel supply?		
Q4f. Who is in charge of building the connection (such as a natural gas pipeline or rail or road connection to a coal port or diesel storage facility) from the power plant to fuel supply facilities?		
Q4g. Who is responsible for funding the fuel pipeline or other connection facility supplying the power station (seller, purchaser, fuel provider, or a third party)?		

Question	PPA Clause (see Note)	Response
Q4h. Who pays for any cost overruns or delays in commissioning the power plant caused by delays in building the fuel connection to the power plant?		
Q4i. Who pays for any cost overruns or delays in commissioning the power plant caused by delays in building or installing other associated facilities to the power plant, such as roads, water supply and discharge, and telecoms?		
5. Insured force majeure		
Q5a. What is the definition of <i>force majeure</i> affecting the seller (distinguishing between construction and operation periods)?		
Q5b. What is the definition of <i>force majeure</i> affecting the purchaser?		
Q5c. What—if any—is the definition of force majeure affecting third parties to the PPA, such as fuel supplier and plant operator?		
Q5d. What insurance—such as business interruption insurance—will the seller carry to cover costs arising from delay to construction completion because of force majeure events?		
6. Capacity shortfall		
Q6a. What penalties, including liquidated damages, are payable by the construction consortium in the event that the plant fails to meet the specified capacity availability at completion tests?		
Q6b. What insurance is available to cover the seller's costs or revenue forgone under the PPA to supplement penalties payable by the construction consortium in the event described in Q6a?		
7. Heat rate shortfall		
Q7. What penalties, including liquidated damages, are payable by the construction consortium in the event that the plant fails to meet the specified heat rate standards at completion tests?		
8. Government actions		
Q8a. What provisions are included in the PPA (or the implementation agreement, if there is one) to take account of changes in tax, law, customs, and regulations that do not fall under <i>force majeure</i> as defined in the PPA?		

Question	PPA Clause (see Note)	Response
Q8b. Under what conditions and terms of compensation is the seller entitled to terminate its obligations under the PPA in the event that Government either expropriates the plant or withdraws consent or interferes in other ways that cause severe prejudice to the seller's financial performance under the PPA?		
Risks under the Power Purchase Agreement during the operation period		
9. Plant operating mode		
Q9a. What are the plant operating constraints or any other constraints in the PPA that will affect the dispatch and scheduling of maintenance of the generation plant within the dispatch and scheduling principles and procedures established in the Grid Code?		
Q9b. What technical capability will the plant have to provide operational reserve and other ancillary services?		
Q9c. What ancillary services will be paid for under the PPA, and will they be paid under separate charges or as part of other charges?		
Q9d. What incentives are provided in the PPA for faster plant ramp-up and ramp-down time profiles, and, conversely, penalties for slower times?		
Q9e. What technical support arrangements will be provided by the manufacturers of the main plant components (such as turbines)?		
Q9f. What are the available warranties from the equipment supplier and O&M contractor?		
Q9g. What are the seller's insurance policies for operations (quality, quantity, efficiency and reliability)?		
Q9h. How is the purchaser's obligation to pay the capacity purchase charge adjusted in the event of transmission constraints affecting the dispatch of the seller's plant?		
Q9i. How will the purchaser be compensated for reduced delivery of power in the event of a prolonged transmission constraint?		
10. Increases in operating costs		
Q10a. How are increases in operating costs arising from changes in government regulations allocated between the seller and the purchaser?		
Q10b. How are increases in operating costs arising from the actions or inactions of the purchaser allocated between the seller and the purchaser?		

Question	PPA Clause (see Note)	Response
Q10c. How are increases in operating costs arising from the actions or inactions of the seller and/or power plant operator allocated between the seller and the purchaser?		
Q10d. What recourse is available to the purchaser under the PPA to limit increases in payments for insurance, O&M—both fixed and variable—and other categories of charges?		
Q10e. What provisions under the PPA, if any, does either the seller or the purchaser have for compensation for financial losses incurred because of errors in meter readings of the plant output?		
11. Forex nonavailability/nonconvertibility		
Q11. What recourse would the seller have in the event of nonavailability or nonconvertibility of foreign exchange due to the seller for purposes defined in the PPA or other agreement?		
12. Forced outage/derating or temporary shortfall in capacity availability		
Q12a. Does the purchaser have the right under the PPA to call for an availability test?		
Q12b. If the purchaser has the right to call for an availability test, how many times a year can the purchaser call for this test?		
Q12c. How much advance notice must the purchaser give to the seller for this test?		
Q12d. If the plant fails an availability test, how long will the seller have to restore the plant to its declared available capacity before a default situation arises?		
Q12e. What compensation—if any—is payable by the seller to the purchaser when the seller is at fault for forced outage/derating or temporary shortfall in capacity below the declared available capacity between availability tests?		
Q12f. What proportion of the capacity purchase charge is payable when the purchaser is at fault for forced outage/derating or temporary shortfall in capacity below the declared available capacity between availability tests?		

Question	PPA Clause (see Note)	Response
Q12g. If the seller fails to deliver the electrical output in full from the plant that is requested by the purchaser or system operator within the declared available capacity of the plant, what remedies are available to the purchaser from the seller under the PPA?		
Q12h. What proportion of the capacity purchase charge is payable by the purchaser to the seller under a <i>force majeure</i> event specified in the PPA?		
13. Deterioration in heat rate below specified rate(s)		
Q13. What adjustment—if any—would be made to the energy purchase charge for deterioration in the plant's heat rate below rate(s) specified in the PPA for which the seller is at fault?		
14. Increased fuel costs (not arising from deterioration in heat rate) and variable O & M costs		
Q14a. Is the seller responsible for procuring fuel for the power plant?		
Q14b. If the seller is not responsible for procuring fuel for the power plant, who is responsible for procuring this fuel and paying for it?		
Q14c. How are increases in the seller's fuel costs (not arising from deterioration in heat rate) reflected in the payment for power by the purchaser under the PPA?		
Q14d. If there is a FSA, do the FSA obligations mirror the PPA obligations in terms of start date, PPA indexation formula, liquidated damages triggers (delay of plant commissioning date, plant availability), <i>force majeure</i> , and so on?		
Q14e. What, if any, is the take-or-pay obligation for the FSA?		
Q14f. What are the requirements for fuel-buyer security and fuel-seller guarantees in the FSA? (Evidence of the terms of the FSA, such as a copy of an FSA signed by the seller, should be provided to the Commission with this completed questionnaire.)		

Question	PPA Clause (see Note)	Response
Q14g. Does the seller or the purchaser bear the consequential costs of lost power output due to a shortage of fuel for the plant—including delay in delivery—or fuel supplied below the specified quality?		
Q14h. Under what conditions specified in the PPA is the seller permitted to use an alternative fuel to the main fuel specified in the PPA for generating power?		
14i. If this type of fuel switching is permitted under the PPA, provide the following details about the permitted alternative fuel; type of fuel: average calorific value of this fuel (in BTUs per unit of fuel); average heat rate of the power plant when using this fuel (in joules per kWh); any change to the fuel charge; and any change to indexation of the fuel charge.		
15. Prolonged outage from major damage to equipment		
Q15a. What insurance coverage must the seller provide before the commencement of commercial operation of the plant for the costs of physical reinstatement of damaged plant and equipment and for business interruption?		
Q15b. For how long—if at all—is the purchaser committed to paying the capacity purchase charge while plant capacity is unavailable arising from major damage to equipment?		
16. Failure of purchaser to perform its obligations under the PPA		
Q16a. What compensation is payable by the purchaser to the seller in the event that the purchaser fails to fulfil its obligations to take power or make payments under the PPA?		
Q16b. What guarantees and/or credit support will the seller receive from or through the purchaser in case of payment default by the purchaser?		
Q16c. Has the seller received a Government guarantee if the purchaser is state owned or otherwise credit support from the purchaser's owner? If so, describe the nature of this support.		

Question	PPA Clause (see Note)	Response
17. Failure of the seller to meet its obligations under the PPA that is caused by the plant operator		
Q17. Where the seller retains the services of a plant operator under an operation and maintenance agreement, what indemnity is payable by the operator to the seller under the PPA in the event that the plant operator breaches the terms of this agreement?		
18. Environmental incidents caused by the seller/Operator		
Q18a. Who bears responsibility under the PPA for payment of penalties imposed for breach of environmental regulations at the plant?		
Q18b. Who bears responsibility under the PPA for meeting the costs of complying with changes to environmental regulations?		
Q18c. What provisions are in the PPA for indemnifying the purchaser against any liabilities that it may face arising from the transportation and handling of hazardous waste (as defined in law) by the seller or its contractor during commissioning, operation, and decommissioning of the plant?		
19. Assignment, termination, choice of law, and dispute resolution		
Q19a. Is consent required from the purchaser and/or the project lenders for the assignment of the PPA, change in operation, or control of the plant by the seller?		
Q19b. How much time must elapse after the effectiveness of the PPA before an amendment can be made to the PPA?		
Q19c. What—if any—specific provisions are contained in the PPA for renegotiation of the PPA in the event that bulk power prices in the Nigerian power market fall well below the average total payment for power per kWh of energy taken by the purchaser under the PPA?		
Q19d. What—if any—are the buy-out terms of the PPA in the case of an event of default by the seller or in the case of an event of default by the purchaser? Does the buy-out price cover outstanding debt plus minimum return on equity?		
Q19e. What law will apply to the PPA and the FSA: for example, New York law, English law or Nigerian law?		

Question	PPA Clause (see Note)	Response
Q19f. What are the provisions—including but not limited to cure periods—for dispute resolution under the PPA?		
General		
Q20. Are there any particular factors about the project and the PPA and associated agreements that will or may cause higher costs and that the seller wishes to bring to the attention of the Commission?		

Seller: _____

Purchaser: _____

NERC's License Application Number: _____ **Number of Pages:** _____

Note: The relevant clause references in the PPA, FSA, and any related documents for each response should be noted in this column. In the case of responses that do not have such references, the abbreviation "n.a." should be inserted instead.

Seller's Declaration:
Date of Declaration:

**Annex
5**

**Table for Risk Assessment of a Power
Purchase Agreement for a New
Fossil-Fueled Generation Plant**

(see Note 1)

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)	
			Seller	Purchaser	W	R
Risks under the PPA during the Construction Period						
Increases in construction costs	Within construction consortium control	1a, 1b, 1c, 1d, 1e			3%	
	Outside construction consortium control:					
	Insured event, insured force majeure, seller variation orders, ground conditions, changes of law	1f			3%	
	Increases in financing costs arising from a rise in interest rates and/or change in exchange rates	2			3%	

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)	
			Seller	Purchaser	W	R
Delay in completion of power plant beyond the contracted date of entry into service under the PPA	Licenses, permits, and approvals; construction financing; plant commissioning	3a, 3b, 3c, 3d			3%	
	Unanticipated difficulties both within and beyond the control of the constructor	3e, 3f			3%	
	Completion of connections to power transmission and fuel supply systems and other infrastructure	4			3%	
	Insured force majeure	5			2%	
Plant fails to meet specified performance at completion tests	Capacity shortfall	6			3%	
	Heat rate shortfalls	7			3%	
Government actions	Changes in tax law, customs, and regulations not covered by force majeure	8a			2%	
	Expropriation, withdrawn consents, interference causing severe prejudice	8b			2%	
Subtotal Construction Period					30%	

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)	
			Seller	Purchaser	W	R
Risks under the PPA during the Operation Period						
The plant cannot be operated as envisaged under the PPA	Plant operation limited by generation technology or transmission constraint	9			5%	
Increases in operating costs	Changes in government regulations	10a			5%	
	Arising from the purchaser's actions	10b			5%	
	Arising from the seller's actions	10c, 10d, 10e			5%	
Forex nonavailability/nonconvertibility	Government default	11			5%	
Forced outage/derating or temporary shortfall in capacity availability	Seller's fault; weak procedure to verify capacity availability	12a, 12b, 12c, 12d, 12e			6%	
	Purchaser's fault	12f, 12g			4%	
	Force majeure event	12h			4%	
Deterioration in heat rate below specified rate(s)	Seller's fault	13			5%	
Increased fuel costs (not due to deterioration in heat rate) and variable O&M costs	Increase in price of fuel, interruption in fuel supply, maintenance needs	14			7%	

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)	
			Seller	Purchaser	W	R
Prolonged outage from major damage to equipment	Insured event	15			5%	
Failure of purchaser to perform obligations under the PPA	Factors such as insufficient demand for the output of the plant in the power markets served by the purchaser	16			3%	
Failure of the seller to meet obligations under the PPA that is caused by the plant operator	Operator breaching operations and maintenance agreement	17			3%	
Environmental incidents caused by the seller/operator	Operator breaching operations and maintenance agreement	18			3%	
Assignment, termination, choice of law, and dispute resolution	Seller and purchaser with serious disputes about PPA terms	19			5%	
Note 1: This table does not substitute for a full risk analysis of agreements entered into by the purchaser with the IPP that the purchaser should undertake as part of its technical, financial, and legal due diligence. Note 2: Questionnaire on Risk Allocation for Entities that Propose to Sell Power under Power Purchase Agreements to purchasers with Captive Customers from New Fossil-Fueled Generating Plants Note 3: W is Weighting, with total weighting = 100%. R is Rating on a scale 0 to 5 (0 is zero risk exposure for purchaser/Government). WR is Weighted Rating (%) = $W \times R/5$			Subtotal Operation Period		70%	
			Total Risk Rating		100%	

Seller's Declaration:

Date of Declaration:

**Annex
6**

**Illustrative Risk Assessment of a Power
Purchase Agreement for a New Fossil-
Fueled Generation Plant**

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)		
			Seller	Purchaser	W	R	WR
Risks under the PPA during the Construction Period							
Increases in construction costs	Within construction consortium control	1a, 1b, 1c, 1d, 1e	Include in fixed price lump sum contract		3%	0	0.0%
	Outside construction consortium control:						
	Insured event, insured force majeure, seller's variation orders, ground conditions, changes of law	1d, 1e, 1f	Use proceeds of business interruption insurance. Draw on stand-by financing if policy exhausted		3%	0	0.0%
	Increases in financing costs arising from a rise in interest rates and/or change in exchange rates	2	Draw on stand-by financing until purchase price adjusted.	Index adjustment to purchase price.	3%	3	1.8%
Delay in completion of power plant beyond the contracted date of entry into service under the PPA	Licenses, permits, and approvals; construction financing; plant commissioning	3a, 3b, 3c, 3d	Seller has all licenses, permits, and approvals in hand by financial closure.		3%	0	0.0%
	Unanticipated difficulties both within and beyond the control of the constructor	3e, 3f	Draw on stand-by financing.		3%	0	0.0%

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)		
			Seller	Purchaser	W	R	WR
Plant fails to meet specified performance at completion tests	Completion of connections to power transmission and fuel supply systems and other infrastructure	4	Penalties payable by construction consortium to the seller cover debt interest and fixed operating costs.	Seller compensates the purchaser at a daily rate that covers the purchaser's avoided cost of power.	3%	0	0.0%
	Insured force majeure	5	Use proceeds of business interruption insurance policy plus stand-by financing.		2%	0	0.0%
	Capacity shortfall	6	Penalties are payable by construction consortium, supplemented by insurance		3%	0	0.0%
Government actions	Heat rate shortfalls	7	Penalties from construction consortium. seller bears any further costs.		3%	0	0.0%
	Changes in tax law, customs, and regulations not covered by force majeure	8a	Adjust purchase price (if stand-by financing drawn during construction period.	Index adjustment to purchase price.	2%	3	1.2%
	Expropriation, withdrawn consents, interference causing severe prejudice	8b	Seller is entitled to terminate as Government default with "reasonable" compensation.		2%	0	0.0%
Subtotal Construction Period					30%		3.0%

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)		
			Seller	Purchaser	W	R	WR
Risks under the PPA during the Operation Period							
The plant cannot be operated as envisaged under the PPA	Plant operation limited by generation technology or transmission constraint	9	Purchase price terms penalize seller for technology choice, but give incentive to upgrade plant despatch.	Purchaser pays at least the minimum capacity purchase charge under transmission constraints.	5%	0	0.0%
Increases in operating costs	Changes in government regulations	10a		Index adjustment to purchase price.	5%	3	3.0%
	Arising from the purchaser's actions						
		Arising from the seller's actions	10c, 10d, 10e	No adjustment to purchase price.		5%	0
Forex nonavailability/nonconvertibility	Government default	11	Seller can terminate with compensation for debt repayment, loss of earnings, and termination costs.		5%	4	4.0%
Forced outage/derating or temporary shortfall in capacity availability	Seller's fault; weak procedure to verify capacity availability	12a, 12b, 12c, 12d, 12e	Penalties payable by seller to purchaser.	Purchaser has some control over timing and testing of plant inspections.	6%	0	0.0%

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)		
			Seller	Purchaser	W	R	WR
	Purchaser's fault	12f, 12g	Seller can terminate with compensation for debt repayment, loss of earnings, and termination costs.	Capacity purchase charge is payable.	4%	3	2.4%
	Force majeure event	12h		Capacity purchase charge is payable under narrowly defined force majeure events.	4%	3	2.4%
Deterioration in heat rate below specified rate(s)	Seller's fault	13	No adjustment is made to purchase price.		5%	0	0.0%
Increased fuel costs (not due to deterioration in heat rate) and variable O&M costs	Increase in price of fuel, interruption in fuel supply, maintenance needs	14		Index adjustment to purchase price.	7%	3	4.2%
Prolonged outage from major damage to equipment	Insured event	15	Use insurance proceeds for the costs of physical reinstatement of damaged plant and equipment and business interruption (plus stand-by financing).	Payment of capacity purchase charge is suspended while plant capacity is unavailable.	5%	0	0.0%

Risk Factor	Cause	Reference in the Risk Alloc. Questionnaire (see Note 2)	Risk Bearer and Remedy/Recourse		Risk Rating (see Note 3)	
			Seller	Purchaser	W	R WR
Failure of Purchaser to perform obligations under the PPA	Factors such as insufficient demand for the output of the plant in the power markets served by the purchaser	16	Seller can terminate with compensation for debt repayment, loss of earnings, and termination costs.	Purchaser compensates seller according to the terms of the PPA.	3%	3 1.8%
Failure of the seller to meet obligations under the PPA that is caused by the plant operator	Operator breaching operations and maintenance agreement	17	Indemnity from the operator is supplemented by seller's equity.		3%	0 0.0%
Environmental incidents caused by the seller/operator	Operator breaching operations and maintenance agreement	18	Indemnity from the operator is supplemented by seller's equity.		3%	0 0.0%
Assignment, termination, choice of law, and dispute resolution	Seller and purchaser with serious disputes about PPA terms	19	Go to dispute resolution under PPA. Renegotiate terms if dispute resolution fails or not sought by seller and purchaser.	Go to dispute resolution under PPA. Renegotiate terms if dispute resolution fails or not sought by seller and purchaser.	5%	0 0.0%
Note 1: This table does not substitute for a full risk analysis of agreements entered into by the purchaser with the IPP that the purchaser should undertake as part of its technical, financial, and legal due diligence. Note 2: Questionnaire on Risk Allocation for Entities that Propose to Sell Power under Power Purchase Agreements to purchasers with Captive Customers from New Fossil-Fueled Generating Plants Note 3: W is Weighting, with total weighting = 100%. R is Rating on a scale 0 to 5 (0 is zero risk exposure for purchaser/Government). WR is Weighted Rating (%) = $W \times R/5$					Subtotal Operation Period	70% 17.8%
					Total Risk Rating	100%

Seller's Declaration:
Date of Declaration:

Annex 7 Purchaser's Declaration About Seller's Responses to Questionnaires and Tables Under a Power Purchase Agreement for a New Fossil- Fueled Generation Plant

Seller: _____ Purchaser: _____

NERC's License Application Number: _____ Number of Pages: _____

Questionnaire for Computing the Average Purchase Price of Power under a Power Purchase Agreement for a New Fossil-Fueled Generating Plant (Annex 1)

Q1: Have you seen the seller's responses to this questionnaire? _____

Q2: Are you in general agreement or disagreement with these responses? _____

Q3: Please state the particular responses with which you disagree, and why. _____

Q4: Are you adding your own set of responses to this questionnaire? _____

Summary of Key Factors Affecting a Power Purchase Agreement for a New Fossil-Fueled Generating Plant (Annex 2)

Q1: Have you seen the seller's responses to this summary? _____

Q2: Are you in general agreement or disagreement with these responses? _____

Q3: Please state the particular responses with which you disagree, and why. _____

Q4: Are you adding your own set of responses to this summary? _____

Questionnaire on Risk Allocation Under a Power Purchase Agreement for a New Fossil-Fueled Generating Plant (Annex 4)

Q1: Have you seen the seller's responses to this questionnaire? _____

Q2: Are you in general agreement or disagreement with these responses? _____

Q3: Please state the particular responses with which you disagree, and why. _____

Q4: Are you adding your own set of responses to this questionnaire? _____

Table for Risk Assessment of a Power Purchase Agreement for a New Fossil-Fueled Generating Plant (Annex 5)

Q1: Have you seen the seller's responses to this table? _____

Q2: Are you in general agreement or disagreement with these responses? _____

Q3: Please state the particular responses with which you disagree, and why. _____

Q4: Are you adding your own set of responses to this table? _____

Seller's Declaration:

Date of Declaration:

List of Formal Reports

Region/Country	Activity/Report Title	Date	Number
SUB-SAHARAN AFRICA (AFR)			
Africa Regional	Anglophone Africa Household Energy Workshop (English)	07/88	085/88
	Regional Power Seminar on Reducing Electric Power System Losses in Africa (English)	08/88	087/88
	Institutional Evaluation of EGL (English)	02/89	098/89
	Biomass Mapping Regional Workshops (English)	05/89	—
	Francophone Household Energy Workshop (French)	08/89	—
	Interafrican Electrical Engineering College: Proposals for Short- and Long-Term Development (English)	03/90	112/90
	Biomass Assessment and Mapping (English)	03/90	—
	Symposium on Power Sector Reform and Efficiency Improvement in Sub-Saharan Africa (English)	06/96	182/96
	Commercialization of Marginal Gas Fields (English)	12/97	201/97
	Commercializing Natural Gas: Lessons from the Seminar in Nairobi for Sub-Saharan Africa and Beyond	01/00	225/00
	Africa Gas Initiative—Main Report: Volume I	02/01	240/01
	First World Bank Workshop on the Petroleum Products Sector in Sub-Saharan Africa	09/01	245/01
	Ministerial Workshop on Women in Energy and Poverty Reduction: Proceedings from a Multi-Sector and Multi-Stakeholder Workshop Addis Ababa, Ethiopia, October 23-25, 2002	10/01	250/01
	Opportunities for Power Trade in the Nile Basin: Final Scoping Study	03/03	266/03
	01/04	277/04	
	Energies modernes et réduction de la pauvreté: Un atelier multi-sectoriel. Actes de l'atelier régional. Dakar, Sénégal, du 4 au 6 février 2003 (French Only)	01/04	278/04
	Énergies modernes et réduction de la pauvreté: Un atelier multi-sectoriel. Actes de l'atelier régional. Douala, Cameroun du 16-18 juillet 2003. (French Only)	09/04	286/04

	Energy and Poverty Reduction: Proceedings from the Global Village Energy Partnership (GVEP) Workshops held in Africa	01/05	298/05
	Power Sector Reform in Africa: Assessing the Impact on Poor People	08/05	306/05
	The Vulnerability of African Countries to Oil Price Shocks: Major	08/05	308/05
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