

**PROGRAM FOR A SUSTAINABLE AND EFFICIENT  
MANAGEMENT OF THE ENERGY RESOURCES IN PERU  
(PROSEMER)**

*Non Refundable Cooperation Agreement N° ATN/CN-13202-PE*

**Enhancement of the Implementation  
System for Electrical Generation  
Planning**

Terms of Reference

**Lima, November 2013**

## **INDICE**

<b>1. PRELIMINARIES .....</b>	<b>4</b>
1.1 PROSEMER .....	4
1.2 PROBLEM .....	4
<b>2. OBJECTIVE .....</b>	<b>5</b>
<b>3. SCOPE .....</b>	<b>6</b>
3.1 REVISION OF AUCTION REGULATIONS .....	6
3.2 PROPOSAL OF ENHANCEMENT TO SECURE GENERATION CAPACITY IN SEIN .....	7
3.2.1 Normative enhancements to secure the availability of reserve in SEIN - RM N° 177-2013-MEM/DM .....	7
3.2.2 Firm Power determination and payment procedure .....	8
3.3 PRESENTATION TO STAKEHOLDERS AND FINAL PROPOSAL .....	9
<b>4. DELIVERABLES .....</b>	<b>10</b>
<b>5. TIME AND FORM OF PAYMENT .....</b>	<b>10</b>
<b>6. COORDINATION AND SUPERVISION .....</b>	<b>10</b>
<b>7. WORK TEAM .....</b>	<b>11</b>
7.1 QUALIFICATIONS, EXPERIENCE Y SKILLS .....	11
7.1.1 Expert on Electricity Markets .....	11
7.1.2 Expert on Project Finance .....	11
7.1.3 Lawyer on Energy .....	11
<b>8. PLACE OF WORK .....</b>	<b>12</b>
<b>9. PROPERTY RIGHTS .....</b>	<b>12</b>

## **ACRONYMS AND ABBREVIATIONS**

IDB: Inter American Development Bank.

COES: System Economical Operation Committee.

Technical Committee: PROSEMER's task force for energy planning and promotion schemes on renewable energy and energy efficiency.

Consultant: Consultancy firm in charge of the study.

Technical Team: UCPS personnel in charge of carrying PROSEMER.

LCE: Electrical Concessions Law.

Law 28832: Law to ensure the development of efficient electrical generation.

MEF: Ministry of Economics and Finance.

MINEM: Ministry of Energy and Mines.

OSINERGMIN: Supervising Organism for Investment on Energy and Mining.

PROSEMER: Program for a Sustainable and Efficient Management of the Energy Resources in Peru.

SEIN: National Interconnected Electrical System.

UCPS: Coordination Unit of Sectorial Loans of MEF.

## **1. Preliminaries**

### **1.1 PROSEMER**

The Government of Peru (GdP) and the Inter-American Development Bank (IDB) have signed the Non Refundable Agreement for the Program for a Sustainable and Efficient Management of the Energy Resources in Peru – PROSEMER.

In the execution process of this Agreement has been approved the development of a technical assistance in benefit of OSINERGMIN named "Enhancement of the Implementation System for Electrical Generation Planning".

OSINERGMIN is in charge of setting electricity tariffs and checking on the complying of regulations in energy, hydrocarbons and mining. On the other hand, MINEM is in charge of formulating the energy policy, granting concessions and approve regulations for the operation of the energy market, among others.

### **1.2 Problem**

SEIN extends about 3 000 km by 500 kV, 220 kV and 138 kV transmission lines in order to supply a 5 291 MW maximum demand by means of installed capacity of 7 117 MW, in 2012.

Electricity in Peru is organized on the basis of a wholesale market, known as MCP, in which two differentiated prices are paid, one for the energy delivered and another for the firm capacity that each generator guarantees to SEIN.

The first one is equivalent to the marginal cost of production of the most expensive unit delivering energy at each time. The second one is revisited each year and is equivalent to the unit investment cost on a gas turbine running on diesel oil.

In this market on a centralized basis COES decides how much energy each generating unit produces by minimizing the system total operating and failure costs. Also amount of firm capacity are set by COES monthly by means of administrative procedures.

On this general basis investment in generation has been decided by private agents only based on the expected return on assets obtained by selling electricity, not taking any relation with the development plans posted by MINEM.

All electricity sold to end users must be backed up by the firm power and firm energy determined by COES.

Legislation defines firm power as the power that can be delivered with high certainty. In this way, if all end user demand is supported on firm power and firm energy it is expected that the probability of curtailment is very low.

The market model is based on the hypothesis that these price signals and physical obligations will give rise to non-centralized decisions of investment that will provide sufficient capacity to supply demand at least cost.

This model was set in 1992 and its results during the last 10 years can be summarized in a demand growth of 6,2% on average versus a capacity growth of 4,9% on average during the same period of time. At the same time generation capacity expansion has relied mainly on gas fired turbines that use the gas of Camisea. This creates a situation where about one third of the existing generation capacity could go out of service if something happens to the only gas pipeline.

As a consequence, investment in generation is behind demand, there is a high dependence on the gas transportation system reducing the reliability of the system and increasing the risk of curtailment. Thus in 2004 this was observed as an increase in electricity prices that has obliged to adopt especial purpose schemes to increase generation capacity and somehow establish the technologies in which private sector should invest according with the energy plan.

These measures imply auctions to allocate PPAs with durations of at least five years, auctions to supply energy from renewable resources with PPAs of up to 20 years, and auctions to construct and operate peaking plants that can operate with natural gas and oil with contracts of 20 years. OSINERGMIN acts on the two first ones, as a supervisor in one and as an auctioneer in the other.

Nonetheless these measures help they need to be complemented with other measures that solve the fundamental problems that led to the less than adequate investment situation.

To this respect, since 1998 many studies pointed that the deficiencies arisen from an ill defined concept of firm power, together with the fact that prices were administrative settled, would lead to the decrease of the reliability of the electrical system. Also, a 2005 MEM-OSINERGMIN committee pointed that it had been observed that generation could not guarantee the firm energy that COES was recognizing as existing.

It is understood that due to this, by Ministerial Resolution N° 177-2012-MEM/DM, it is been given to OSINERGMIN and COES the assignment of revising the procedure of determination and payment of firm capacity and to propose the regulation amendments required to guarantee the availability of a proper reserve in SEIN; or what is the same the generation capacity that MINEM determines necessary through its energy plan.

Thus, OSINERGMIN requires the assistance for the development of the corresponding proposals.

## **2. Objective**

The main objective of this technical assistance is to enhance the regulatory mechanisms for effectively implementing energy development plans, in particular the provision of electricity in a reliable and timely basis. In order to do that, proposals must be developed to enhance the actual procedures and

its associated contracts that regulate the auctions to promote new generation, and also the procedures for recognition and payment of firm capacity.

### **3. Scope**

The minimum activities to be carried by the consultant as part of this service are described below, these must not be considered limitative in order to reach the objective, so the Consultant can extend them or modify them in case that according to his experience that be needed to fulfill the goal.

The consultant must look at Peruvian regulations on auctions, including OSINERGMIN's procedures, paying special attention to the allocation of risks set in the corresponding contracts and its impact as financing tools.

The Consultant must also take a look on the regulations for firm capacity payment and the provision of security of supply for electricity demand, including COES procedures.

In that order, it is foreseen the necessity to visit these laws and its regulations:

- Law Decree "Electrical Concessions Law"
- Law N° 28832 "Law to ensure the development of efficient electrical generation"
- Law N° 29970 "Law that Supports the Energy Security and Promotes the Development of the Petrochemical Pole in the South of the Country"
- Legislative Decree N° 1002 "Legislative Decree that Promotes Investment on Electricity Generation by means of Renewable Energies"
- Legislative Decree N° 1041 "Decree that modifies diverse norms of the electric framework"

#### **3.1 Revision of Auction Regulations**

OSINERGMIN by Resolution OSINERGMIN N° 688-2008-OS/CD established the "Procedure for Long Term of Supply Auctions under Law N° 28832"<sup>1</sup>, which regulates the methodology from calling until the award of supply contracts by means of competitive auctions. This procedure includes a reference contract to be signed by distribution and generation companies.

On the other hand under Legislative Decree N° 1002 and its regulations, terms of reference<sup>2</sup> (Basis) have been elaborated for the procurement of renewable energies, which also include a reference contract to be signed by generation companies and MINEM.

It is worth noticing that these reference contracts have as a goal to facilitate the process of financing the projects of the generating companies, so as to promote the implementation of the energy plan (renewable energy plan and

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<sup>1</sup> See <http://www2.osinerg.gob.pe/Resoluciones/pdf/2008/OSINERGMIN%20No.688-2008-OS-CD.pdf>

<sup>2</sup> See <http://www2.osinerg.gob.pe/EnergiasRenovables/contenido/3eraSubastaRER.Bases.html>

margin of reserve in SEIN) and as a consequence the timely supply of electrical demand.

Thus the Consultant must analyze the following aspects based on his experience and the performance of the auction processes already carried out:

1. Efficiency of the adopted auction methodology in order to fulfill the following objectives as established by legislation:
  - i) Ensure the supply of electricity,
  - ii) Promote economies of scale in new generation investment,
  - iii) Facilitate and promote the development of new investment in generation, y
  - iv) Prevent market power and abuse of dominant position (promote competition for the market).
2. Allocation to the part that can better bear the risks, and mechanisms for mitigating the risks, foreseen in the contracts.

As a result enhancements must be proposed to OSINERGMIN's procedures and the Basis<sup>3</sup>, including the corresponding reference contracts.

## **3.2 Proposal of enhancement to secure generation capacity in SEIN**

### **3.2.1 Normative enhancements to secure the availability of reserve in SEIN - RM N° 177-2013-MEM/DM**

OSINERGMIN has contracted different studies from which it can be concluded that in order to secure timely generation of electricity it is necessary to establish clearly the scope of the obligation that generating companies must comply in exchange for the firm capacity payment they receive.

In this context it is required that the Consultant develops in detail the proposal for regulatory reform to be sent to MINEM and the corresponding proposal of procedure to be approved by OSINERGMIN<sup>4</sup>, mainly taking into account that: i) it is necessary a clear and objective definition of the capacity payment obligation, ii) capacity payment shall not be received if there is no availability of the primary energy that supports the corresponding firm capacity, iii) capacity price must be discovered from a competitive mechanism; and iv) capacity payment should be guaranteed for a sufficiently long period that helps finance the investment.

On this matter, due to the fact that all capacity serves the same to all customers connected to the grid, it is necessary that the proposed methodology is based on a firm power auction carried out with enough time ahead to guarantee the availability of the needed firm power as foreseen by the energy plan set by the competent authority.

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<sup>3</sup> For this analysis the Consultant will receive the documentation of each auction process carried out to date. This way a confidential agreement will be signed to preserve its integrity.

<sup>4</sup> It must be pointed out that COEs procedures for calculation and payment of firm power are approved by OSINERGMIN.

Modifications to be proposed by the Consultant must not limit to the firm power concept but must consider its relation to firm energy and the control schemes that establish the obligation that every supply contract must be backed up by firm power and firm energy, as set by Peruvian legislation.

In this sense the consultant's proposal must take as a starting point the document attached as Annex, and must make its recommendations in the following aspects:

- The scope of the auction, in terms of if it must be carried out for all the required power in each zone or just for the incremental part expected between periods among auctions. In this case it will be analyzed if it is convenient to carry out separate auctions for new capacity and existing capacity.
- The specification of the product under auction (including its duration), establishing the physical and financial obligations, or both, to be required to the winners.
- Time in advance and periodicity of the auction, guarantees to be required, form of the updating formula. Must be considered how these auctions complement those under Law N° 28832.
- The operability of a backup system to be applied in case the power acquired as a result of the auction is less than required.
- The organization of a centralized secondary market in which generators can acquire the auctioned product in order to comply with its obligations.

### **3.2.2 Firm Power determination and payment procedure**

The Consultant in accordance with the proposal of amendment developed considering 3.2.1 will develop the detailed application procedure to carry out capacity auctions, including the corresponding reference contract that shall be signed as a result of the auction process.

It is considered that the auction procedure must include at least the following aspects:

- i. Sorts of Auctions.- The procedure must detail the one or more auction designs in detail, taking into account the degree of concentration of the Peruvian electricity system, the expectations of the participants and the size of the capacity requirements.
- ii. General procedures.- It must be established the procedures that regulate the participation of the involved agents through the auction process, from the moment in which expression of interest is withheld through the subscription of contracts, in order to ensure a transparent and competitive process with complete, clear, credible and unambiguous rules.
- iii. Administrative procedure of the auction.- It must be established among others, the general aspects for the calling, schedule and stages of the auction process, the conditions and characteristics



- of the auctioned product, the content of the proposals, the competition factor, the treatment of consultations, the opening of bids, the mechanism of valuation of offers, the awarding of the auction and the formulas for updating prices.
- iv. Technical procedures to prepare the terms of the auction.- It must be included the aspects to be considering in the preparation of the terms of the auction in order to fulfill the objective of preventing and/or mitigating anticompetitive behavior during the auction process. It must be recommended the sorts of auctions that could be specified in the terms of the auctions.
  - v. Reserve Prices.- Considering the international experience about this issue the Consultant must analyze the convenience of introducing a reserve Price in the auctions by watching on the impact of that price on its efficiency. The consultant must propose an ex-post mechanism to evaluate the results of the auction and its relationship with the reserve price.
  - vi. Reference Contracts.- The Consultant must analyze several alternatives for contracting the product. The proposed alternatives must facilitate or promote competition and assign adequately the risks among the parts. These proposed contracts must include all technical and commercial aspects that allow an adequate relation between parties; thus on the international and local practice a minimum contract structure with its necessary clauses are required.
  - vii. Guarantees.- It must be proposed the guarantees that the winners of the auctions should present according to their risk level. Theses guarantees will be designed in such a way that do not rise unnecessary barriers to the entrance of new agents.
  - viii. Auction supervision.- Must propose the mechanisms that OSINERGMIN should implement in order to exert an effective supervision, protecting the end users' interests through the increase of competition without interfering with the auction process. To this end, the procedure must identify the key elements of the auction and the way to control them.

### **3.3 Presentation to stakeholders and final proposal**

The proposals required on **¡Error! No se encuentra el origen de la referencia.** and 3.2 above, must be presented by the Consultant in a workshop and will be posted in order to get opinions and suggestions of stakeholders (market agents, users and MINEM). It will be given 20 days to stakeholders to send their opinions.

The Consultant must analyze this input and as a result prepare the final proposal that incorporates the suggested modifications to the legal framework during the next 30 days after receiving the comments.

#### **4. Deliverables**

It is foreseen the completion of three deliverables. Each deliverable must be presented in printed (one original and two copies) numbered and also on electronic media (.doc file), accompanied by all data files that supports it (data bases, spreadsheets, data tables, programs, calculation models, information sources, etc.). Also, a pdf file will be presented that integrates texts, tables and annexes, in such a way that it must reflect exactly the printed version.

<b>Deliverable</b>	<b>Content</b>
First Deliverable	-Analysis that supports the proposals as required by 3.1 y 3.2 of this Terms of Reference. - Normative proposals: i) Auction procedure under Law N° 28832, ii) Basis for the auctions under Legislative Decree N° 1002, iii) Regulations for the timely provision of firm power and firm energy, and procedures for the recognition of firm power.
Second Deliverable	Must contain the complete development of 3.1, 3.2 y 3.3 of this Terms of Reference. Must include an executive summary and the corresponding conclusions and recommendations.

#### **5. Time and Form of Payment**

The service will last about 150 natural days counted from the date of contract signature. The time of the deliverables and its percentage of payment are shown below:

<b>Deliverable</b>	<b>Delivery date</b>	<b>Percentage of Payment</b>
First Deliverable	90 days after signed the contract	60%
Second Deliverable	150 days after signed the contract	40%

#### **6. Coordination and Supervision**

The coordination and supervision of the activities and the deliverables is in charge of the Technical Team in coordination with the Technical committee.

UCPS will make the payments after received accordance report by the Technical Committee and the Technical coordinator of PROSEMER. Also, for the Second Deliverable IDB non-objection is required.

## 7. Work Team

### 7.1 Qualifications, Experience y Skills

The Consultant must be experienced on energy markets, including design, leading or supervision of auction mechanisms for electricity procurement in systems with demands higher than 6 000 MW.

Also, it is required the following specialists.

#### 7.1.1 Expert on Electricity Markets

##### **Training:**

- Professional in electrical engineering or affine with more than 10 years of experience.
- Master Degree on matters relevant to the object and scope of the study in terms of design and operation of electricity markets.

##### **Minimum Experience:**

Must have participated in the making of at least four studies on the design of competitive mechanisms for the promotion of investment in electricity generation in systems with demands higher than 6 000 MW

#### 7.1.2 Expert on Project Finance

##### **Training:**

- Professional in Engineering, administration, and economics or affine with more than 10 years of experience in project finance, analysis and/or risk administration, and debt structuring and contracts development.
- Master Degree on economics, finance or affine.

##### **Minimum Experience:**

Must have participated of the analysis and valuation of at least five projects (project finance), two of which must be related to the electricity sector.

#### 7.1.3 Lawyer on Energy

##### **Training:**

- Lawyer with more than 10 years in the electricity sector and on project finance.

##### **Minimum Experience:**

Must have participated of at least two activities related with the design and making of regulation and/or legislative proposals of the Peruvian electricity sector. Also, must have participated of at least two energy projects (project finance).

## **8. Place of Work**

Activities can be made in Peru or abroad in the Consultants office. In case the activities are carried out abroad, the Consultant must guarantee to be available for videoconferences and be physically present for the workshop.

## **9. Property Rights**

All drawings, specifications, designs, reports, programs or informational platforms and any other report prepared by the Consultant as part of this service will be property of the contracting party and OSINERGMIN, holding both the property rights as owners of the deliverables.

**Annex:**

**Report N° 0190-2013-GART  
Adequate and Sufficient Generation Capacity Problem  
(Spanish only)**