



امارت اسلامی افغانستان

شرکت انکشاف ملی

ریاست ساختمانی هلمند

درخواست آفر

برای

مطالعات امکان سنجی نیروگاه 300 مگاواتی با سوخت زغال سنگ

Request for expression of interest for Coal-Fired Power Plant Feasibility Studies

شماره حکم (341)

تاریخ حکم (1444/12/02)

شماره درخواست نرخگیری: (251)

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شماره درخواست نرخ گیری: NDC/HCD/1402/CS-001

تاریخ صدور درخواست نرخ گیری:

به: { }

تاریخ: { }

(1) ریاست ساختمانی هلمند، شرکت انکشاف ملی - *Helmand Construction Directorate of National Development*

Corporation، تخصیص بودجه لازم برای تدارک خدمات مشورتی مطالعات امکان سنجی نیروگاه با سوخت زغال سنگ
(Coal-Fired Power Plant Feasibility Studies) مندرج این درخواست را دارد.

(2) تقاضا میگردد تا آفر سربسته خویش را الی تاریخ 20 سرطان 1402 مطابق 11 July, 2023 ساعت 10:30 قبل از ظهر برای
تدارک خدمات مشورتی مطالعات امکان سنجی نیروگاه 300 مگاواتی با سوخت زغال سنگ Coal-Fired Power Plant
Feasibility Studies در روابط عامه شرکت انکشاف ملی واقع منطقه قصبه، شهر کابل تسلیم داده شود.

(3) آفرها ئیکه بعد از میعاد معینه تسلیمی ارائه گردد، بدون اینکه باز شود مسترد می گردند. پاکت حاوی آفر باید به صورت واضح
عبارت نرخ برای تدارک خدمات مشورتی مطالعات امکان سنجی نیروگاه با سوخت زغال سنگ نشانی شده باشد.

(4) قیمت ارائه شده در آفرها باید الی مدت (60) روز تقویمی سر از تاریخ ختم میعاد تسلیمی آفرها اعتبار داشته باشد.

(5) در صورت تغییر در مقدار نیازمندی، اداره می تواند مقدار نیازمندی تقاضا شده را الی (25) فیصد زیاد و یا کم نماید، مشروط
به اینکه قیمت مجموعی آن از حدود صلاحیت پولی برای درخواست نرخ گیری تجاوز ننماید.

(6) ترجیح داخلی مطابق حکم چهارم طرز العمل تدارکات و با لزوم دید اداره قابل اجرا است. { }.

(7) آفر گشائی در محضر عام حتمی نبوده و فرمایش دهنده مکلف به قبول نازلترین نرخ نمی باشد. در صورت رد هر یک یا تمام
آفرها فرمایش دهنده کدام مسؤلیت در قبال داوطلب ندارد.

(8) آفر دهنده اسناد ذیل را با آفر خویش ضمیمه می نماید:

1- جواز تجارتي/ فعاليت/ کار قابل اعتبار؛

2- نمبر تشخیصیه تصدیق شده؛

3- اجازه نامه تولید کننده (در صورت لزوم).

4- اسناد تجربه کاری گذشته

5- شرکت مشاور برنده باید تضمین حسن اجرای کار بشکل تضمین بانکی مبلغ 5٪ قیمت کل قرارداد قبل از

امضای قرارداد ارایه نماید، (اختیاری)، در صورت تقاضای رسمی اداره، شرکت مشاور مکلف است که تضمین

حسن اجرا را در اسرع وقت در مدت یک هفته ارایه نماید.

(9) سند نرخ گیری تکمیل و توسط نماینده با صلاحیت اجرا کننده در هر صفحه امضاء شده باشد.

نام کارمند صادر کننده درخواست نرخ گیری:

وظیفه کارمند:

BID PRICE SCHEDULE FOR CONSULTANCY SERVICE – (1) جدول قیمت خدمات مشورتی

قیمت مجموعی (افغانی) Total bid Price-AFN	قیمت فی واحد (افغانی) Unit Price in AFN	مقدار QTY	واحد Unit	تشریح با مشخصات خدمات مشورتی Specifications (details) of Consulting service	Name – خدمات مشورتی of Consultancy service	شماره
		Lump Sum	Activities indicated in attached ToR	مطالعات امکان سنجی نیروگاه 300 مگاواتی با سوخت زغال سنگ – Detailed feasibility study of 300 MW Coal fired power plant in Afghanistan	تدارک خدمات مشورتی مطالعات امکان سنجی نیروگاه 300 مگاواتی با سوخت زغال سنگ Coal-Fired Power Plant detailed Feasibility Studies	1

Bidders shall provide details feasibility studies which includes all aspects as details in feasibility study report and they can propose better solution in addition of attached ToR.

داوطلبان باید مطالعات امکان سنجی نیروگاه با سوخت زغال سنگ را با جزئیات مکمل ارائه بدارند و شامل تمام موارد ایجابی در گزارش متذکره باشد. داوطلبان میتوانند بر علاوه لایحه وظایف ضمیمه شده، راه بهتر ارائه نمایند.

قابل یاد آوری است که لایحه وظایف ضمیمه شده اضافی سبب امتیاز به شرکت مشاور نمی گردد.

مجموع قیمت خدمات مشورتی به ارقام بدون مالیات:

مجموع قیمت خدمات مشورتی به حروف بدون مالیات:

مالیات به ارقام:

مالیات به حروف:

مجموع مبلغ به ارقام بشمول مالیات:

مجموع مبلغ به حروف به شمول مالیات:

محل و مدت تکمیل 16 هفته (128 days) خدمات مشورتی از تاریخ صدور امر خریداری:

مدت رفع نواقص بعد از تاریخ تکمیل فعالیت و یا راپور.

(2) معلومات تجهیزات داوطلب (تجهیزات عمده پیشنهاد شده توسط داوطلب برای مطالعات امکان سنجی نیروگاه با سوخت زغال سنگ)

Project Equipment:

Proposed Project Equipment

The Consulting firm shall provide all necessary project equipment required for carry out of Coal-Fired Power Plant Feasibility Studies

PROPOSED KEY STAFF – اهلیت کارمندان کلیدی پیشنهاد شده

1. Organization Chart for Feasibility Study

The organization chart may vary depending on the size and complexity of the power generation project and the specific roles and responsibilities required for the feasibility study.

1. Project Manager
2. Feasibility Study Team:
 - a. Technical Experts
 - i. Fuel Specialist
 - ii. Steam Generation Specialist
 - iii. Bulk Material and Machinery Specialist
 - iv. Operation & Maintenance Specialist
 - b. Financial Analyst
 - c. Environmental Specialist
3. Legal & Procurement Team:
 - a. Contracts & Regulatory Compliance Specialist
 - b. Supply Chain Specialist

Qualifications and details of the key staff shall be presented to NDC for approval during contract negotiation.

مهر اجرا کننده	نام اجرا کننده: اسم شخص یا نماینده با صلاحیت اجرا کننده: امضای شخص نماینده با صلاحیت اجرا کننده: تاریخ:
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شرایط تدارک و پرداخت

شرایط ذیل صرف با موافقه تحریری فرمایش دهنده قابل تغییر می باشد.

- (1) اجرای خدمات مشورتی باید در ظرف {16} هفته سر از تاریخ صدور مکتوب آغاز کار تکمیل گردد.
- (2) بعد از اجرای خدمات مشورتی، اجرا کننده باید نسخه اصلی و (2) کاپی صورت حساب (Invoice) را به فرمایش دهنده تسلیم نماید.
- (3) پرداخت توسط فرمایش دهنده، طی مدت (30) روز کاری درمقابل فعالیت انجام شده واقعی طبق جدول ذیل اجرا شده صورت می گیرد.

Milestone	% Payment
Advance payment after signing the project contract against advance bank guarantee acceptable from a domestic banks	30%
<u>Upon Acceptance of the Draft of a report on the following tasks:</u> 1.1 Coal and Water Screening and Analysis 1.2 Geotechnical Survey and Topography 1.3 Power Plant Location Selection and Site Layout 1.4 Power Plant Technology Screening 1.5 Conceptual Design of selected power plant technology 1.6 Project Capital Cost Breakdown and Estimates 1.7 Operation and Maintenance Requirements and Cost Estimates 1.8 Levelized Cost of Energy (Electricity Unit Rate) Estimation	20%
<u>Upon Acceptance of the Draft of a report on the following tasks:</u> 2.1 Environment, Social and Economic Impact Assessment 2.2 Assessment of existing manufacturing factories and Infrastructures 2.3 Review of local energy sector regulations and policies 2.4 Risk and Uncertainty Assessment Analysis 2.5 Contracting Strategy Analysis and Recommendation 2.6 Financial Model (NPV, IRR, Payback period, cash flow, etc.) 2.7 Preliminary Outline Of Project Schedule	20%
<u>Final Complete Feasibility Study Report</u> 3.1 Complete Report And Recommendations as per indicated TOR of the project	30%

(4) فرمایش دهنده میتواند در حالات ذیل با ارسال اطلاعیه کتبی به اجرا کننده، امر خریداری را کلاً یا قسماً فسخ نماید:

1- اجرا کننده موفق به تکمیل بخش یا تمام امور خدمات مشورتی مطابق لایحه وظایف ضمیمه شده در ظرف مدت معینه در امر خریداری نشود؛

2- اجرا کننده موفق به اجرای مکلفیت های دیگر تحت امر خریداری نشود.

- 3- اجرا کننده بعد از دریافت اطلاعاتیه موفق به رفع نواقص و کاستی ها در مدت معینه نگردد.
- 4- اجرا کننده، در جریان داوطلبی و یا حین اجرای وظایف محوله تحت این امر خریداری اقدام به فساد و تقلب نموده باشد.

روش و معیار های ارزیابی

ارزیابی آفرها

- (1) قبل از ارزیابی مفصل نرخ ها، اداره باید تشخیص نماید که آفرها:
 - 1- با شرایط و معیار های مندرج این درخواست نرخ گیری مطابقت دارد؛
 - 2- طور یکه لازم است امضا و مهر شده است.
- (2) آفر جوابگو آفر است که بعد از ارزیابی، معیار های کیفی و تخنیکی و شرایط مندرج این درخواست نرخ گیری در آن رعایت گردیده باشد.
- (3) فرمایش دهنده طور ذیل ارزیابی مالی را انجام می دهد:
 - 1- ارزیابی برای اقلام یا اجزاء صورت می گیرد؛
 - 2- هر گونه اشتباهات محاسبوی اصلاح می گردد؛
 - 3- تخفیفات غیر مشروط پیشنهاد شده محاسبه می گردد؛
 - 4- اعمال هر گونه ترجیح داخلی در صورت اجرا.
- (4) آفر های غیر جوابگو رد گردیده، بعد از آن نمیتواند با اصلاح اشتباهات یا انحرافات جوابگو ساخته شود.
- (5) مذاکره با داوطلبیکه نازلترین قیمت را پیشنهاد نموده یا داوطلب دیگر از لحاظ درجه قیمت صورت گرفته می تواند. در صورت رد مذاکره از جانب داوطلب (شرکت مشاور)، آفر آن رد و بدون محروم شده فاقد اهلیت شناخته می شود.
- (6) داوطلب مکلف نیست که منحیث شرایط برای اعطاء مسئولیت های را که در اسناد درخواست نرخ دهی تصریح نشده اند، مانند تغییر در قیمت را بپذیرد.

اصلاح اشتباهات محاسبوی

- (1) اشتباهات محاسبوی طور ذیل تصحیح می گردد:
 - 1- در صورت تفاوت میان مبلغ به ارقام و حروف، مبلغ به حروف قابل اعتبار می باشد؛
 - 2- در صورتیکه تفاوت میان قیمت فی واحد و قیمت مجموعی وجود داشته باشد، قیمت فی واحد برای ارزیابی قیمت ها و ترتیب امر خریداری قابل اعتبار می باشد.
 - 3- در صورت موجودیت تفاوت میان نرخ فی واحد و قیمت مجموعی (حاصل ضرب مقدار در نرخ فی واحد)، نرخ فی واحد قابل اعتبار می باشد. هرگاه از نظر فرمایش دهنده اشتباه در نقاط اعشاری در قیمت فی واحد برجسته باشد، در این صورت قیمت مجموعی اقلام طوریکه نرخ داده شده است قابل اعتبار بوده و قیمت فی واحد باید اصلاح شود.
 - 4- فرمایش دهنده مطابق مندرجات فوق اشتباهات محاسبوی را اصلاح و بعد از اخذ موافقه کتبی داوطلب در قیمت مجموعی آفر محاسبه می نماید.

5- داوطلب مکلف به پذیرش اشتباهات محاسبوی در آفر خویش می باشد. در صورت عدم پذیرش اشتباهات محاسبوی توسط داوطلب، آفر وی رد می گردد.

Consultancy TOR for Coal-Fired Power Plant Feasibility Studies

2. Project Background

The National Development Corporation (NDC), a government-owned corporate entity in Afghanistan, is mandated to develop power generation projects, specifically coal-fired power plants, to address the country's energy crisis and provide uninterrupted and affordable electric energy, to stimulate economic activity across all sectors. The power plant will rely on locally available hard coal resources for operation.

To achieve this, NDC has planned to look for a consulting services company that covers the requirement of establishing a feasibility study of a coal-fired plant project for validating the investment opportunity.

The scope of work covers the complete development of the feasibility study of the anticipated coal-fired power plant project through site selection, fuel analysis, screening of available technologies, social and environmental impact assessments, the conceptual design of the plant, cost estimation, and financial modeling.

3. Objectives of the Consulting Assignment:

The objective of the feasibility study is to evaluate the investment opportunity for the procurement of a coal-fired power plant with the intention to manufacture a significant portion of the equipment and machinery locally, in collaboration with a consultant. To support this objective, the establishment of a workshop dedicated to manufacturing power plant equipment and machinery is being pursued, thereby enhancing local resources and technical expertise.

4. Scope of Work

The scope of work is based on the project requirements, owner expectations, and consultant experience in delivering similar services globally. The suggested work plan encompasses the required scope of work, involving the following significant components:

i. Kick-off Meeting:

The meeting will give the project teams an opportunity to share project information and pertinent data along with reconfirming the proposed strategy and schedule. The consultant will discuss this request in the meeting and inform NDC of any new information.

The following major issues will be covered, among others, at the kick-off meeting:

- Develop the meeting agenda in consultation with the owner.
- Review information previously provided by the owner.
- Identify deficiencies in information.

- The schedule of meetings and data and information collection will be discussed and finalized.
- Project communication procedure.
- Review and discuss key study objectives.
- Finalize the tasks and requirements of the site visit study.

i. Site Selection for Power Plant

The consultant shall establish with NDC the basic criteria for the selection of a suitable location for the power plant. Based on the criteria, NDC will present multiple options. The consultant shall suggest the potential sites for coal-fired power plants, and recommendations will be presented to the owner. The consultant shall suggest the maximum capacity of the power plant as per raw material availability (coal, water, etc.), coal mine study, and grid capacity.

ii. Site visits and investigations

The site visit shall include key team members of consultant experts. The scope of the visit and schedule shall be agreed upon in the kick-off meeting. The visit shall in principle have the objective of confirming data and information previously collected, inspecting the manufacturing facilities of NDC, and visiting the selected power plant locations to confirm possible plant scenarios.

The consultant shall also conduct required topography and geotechnical studies. A geotechnical investigation shall be conducted to assess the stability of the site and identify any potential geological risks. The site layout and topography will be analyzed to determine the feasibility of constructing the power plant at the chosen location.

iii. Review of local regulations and of existing infrastructures

This study's objective is to assess the existing infrastructure, which includes roads, manufacturing facilities, and other important components, in order to guarantee a smooth execution phase free from any logistical or technical challenges.

Additionally, the owner will work with consultants to gather and analyze information on current electricity policies, tariffs, and any potential limitations or restrictions on the sale of electricity generated by independent power plants. The owner and a consultant must also work jointly to obtain documents about prior power purchasing agreements (PPAs) between utilities and independent power producers.

iv. Fuel and Water Screening and Analysis

The consultant shall develop and present to the owner an in-depth procedure for collecting samples of both coal and water. Coal and water samples shall be collected under the supervision of the consultant, and tests shall be arranged by the consultant. Post-sample collection, the consultant's responsibility extends to arranging the shipment of these samples to a designated overseas laboratory for a thorough analysis. The samples of coal will

be analyzed for composition and ash properties. The scope of this study foresees at least 3 samples of coal and 2 samples of water.

Furthermore, any previous analysis performed at the Afghan coal mines shall be requested, and compared to the results received for the laboratory. Water analysis shall be considered in the identification of the water treatment unit of the power plant.

v. Technology Screening

The consultant's scope includes a thorough screening process to shortlist potential technologies. The selected technologies will be presented, considering the following aspects:

- Considerations on the unit size and its economic implications: This encompasses the scale of the technology and its cost-effectiveness, ensuring an optimal balance between the size of the unit and potential economies of scale.
- Evaluation of combustion technologies: comprehensive analysis of available combustion technologies, assessing their compatibility with the project in terms of efficiency, environmental impact, and feasibility.
- Options for heat rejection: an exploration of various heat rejection methodologies to determine the most effective and environmentally friendly choice
- Waste and ash disposal and sales considerations: a detailed examination of waste and ash disposal mechanisms, including potential revenue-generating opportunities through the sale of byproducts
- Fuel flexibility: assessment of the plant's adaptability to utilize different types of fuels, thus maximizing operational efficiency and cost-effectiveness.
- Commercial maturity and vendor issues: evaluation of the technology's commercial readiness and potential challenges related to vendors, including the reliability, support, and financial stability of the technology providers
- Number of steam turbines: determination of the optimal number of steam turbines to balance efficiency and cost
- The consultant will suggest a globally recognized, proven technology for the project. The technology proposed by the consultant will be recognized worldwide for its reliability, effectiveness, and efficiency, thereby ensuring a robust and successful implementation for the power plant.

vi. Plant Design Basis

Consultant shall develop a plant design basis for the selected technology. The development of the design basis will be a collaborative effort with NDC. The plant design basis will serve as the basis for the plant conceptual design. The plant basic design, and this study, consider a single boiler power plant with size up to 150MW. The plant design basis shall be presented in a brief memorandum and issued to the Owner for review prior to initiation of work on the conceptual design. The plant design basis shall include the following criteria:

- Unit size (megawatts) and number.
- Technology.

- Fuel requirements.
- Transmission interconnection and transmission requirements.
- Water supply source.
- Cooling (heat rejection) system and its requirements, based on water supply constraints.
- Air quality / emissions criteria.
- Solid and liquid waste disposal.
- Plant performance specifications such as heat rate, efficiency, availability, maintenance outages to meet operating guidelines or other off-taker requirements.
- Infrastructure related issues with respect to plant construction and operation.

vii. Conceptual Design

The consultant will prepare a comprehensive conceptual design basis, serving primarily to facilitate accurate project cost estimation. Prior to initiating further work, the consultant will present this conceptual design basis to the owner for review and approval, ensuring alignment and understanding between all parties from the earliest stages of the project.

The design basis will cover the following criteria:

- **Specification of Unit Size and Number:** Determining the power output in megawatts, along with the number of units, to meet the energy demand and operational efficiency objectives.
- **Fuel Requirements:** Assessment of the type and quantity of fuel needed for the power plant's efficient functioning.
- **Source of Water Supply:** Identification of reliable water sources to support the plant's cooling system and other operational needs.
- **Cooling System and Associated Requirements:** Specification of the cooling mechanism and its requirements, with considerations given to available water resources.
- **Air Quality/Emission Standards Compliance:** ensuring that the plant's design conforms to current air quality and emission regulations, with provisions for future changes in standards.
- **Solid and Liquid Waste Disposal Strategies:** Development of a Comprehensive Waste Management Strategy Covering the disposal of both solid and liquid waste in line with environmental guidelines.
- **Plant Performance Specifications:** Determination of key performance indicators, such as heat rate, efficiency, and availability Also, the description of maintenance outages in accordance with operating guidelines and off-taker requirements.
- **Evaluation of Infrastructure Factors:** The consultant will give due attention to infrastructure elements critical to both the construction and operation of the power plant. This includes planning for access roads for easy transportation, storage facilities for essential resources, and utilities such as water and electricity supply necessary for the plant's function.
- **Development of the Site Layout Plan:** The consultant will prepare a schematic site layout plan. This layout will encompass block structures, fuel storage and handling

provisions, waste management systems, storage tanks, administrative buildings, warehouses, and crucial access roads.

- **Development of Heat and Water Mass Balance Diagrams:** The consultant will prepare diagrams outlining the mass balance of both heat and water under scenarios of maximum load as well as alternative operating conditions. These diagrams, although limited in their scope, will effectively highlight the water requirement for the plant and provide information pertaining to plant efficiency, estimation of capital costs, and calculation of the unit cost of electricity.
- **Plant Configuration and System Descriptions:** The consultant will outline a brief descriptions of significant plant systems. This will encompass key equipment descriptions. The data provided will be succinct yet sufficient for the feasibility analysis, providing insights into plant efficiency, capital cost, and the unit cost of electricity.
- **Fuel Supply Logistics Planning:** In collaboration with the owner, the consultant will draft an initial plan for fuel transportation to the project site.
- **Constructability Review and Infrastructure Evaluation:** The consultant will conduct an exhaustive review considering factors impacting the project's constructability and its infrastructure requirements. The examination will include areas like equipment accessibility, material lay-down regions, transport routes, heavy haul pathways, as well as interfaces with fuel and water supply systems. The review will also encompass an evaluation of space availability for ash and combustion waste storage and the integrity of the site data provided for the chosen plant location.
- **Review of Local Resources:** Examination of local labor availability, productivity levels, and prevailing wage rates to ensure a smooth and cost-effective construction process and comprehensive review of the Owner's local manufacturing capabilities, which could play a significant role in the plant's construction process.

viii. Develop Capital Cost Estimates

The consultant should include a detailed evaluation of the estimated capital cost of the project in feasibility study:

- This evaluation will involve assessing various cost factors, including construction expenses, equipment procurement, labor costs, infrastructure development, and other associated expenses.
- The study will also consider potential cost escalations or fluctuations in the market that could impact the project's budget.
- A comprehensive report will be prepared, outlining the estimated cost breakdown and providing an analysis of the project's financial feasibility based on the projected costs.
- The Consultant will prepare an indicative capital cost estimate for the project based on current market rates and data from similar facilities. This estimate, formulated using a "top-down" approach, will not include offsite facilities, project development costs, or any "Owner's costs". However, it will provide an approximation of such costs

based on previous projects. All assumptions and the basis for this estimate will be stated. All costs will be denoted in U.S. dollars (USD).

ix. Operation and Maintenance Requirements and Cost Estimates

Consultant shall prepare O&M cost estimates for the selected technology. O&M estimates shall consist of fixed and non-fuel variable O&M costs.

The Consultant will prepare operation and maintenance (O&M) cost estimates for the chosen technology, encompassing both fixed and non-fuel variable costs. This includes labor, materials, and maintenance costs, among others. Owner input, particularly on local labor and consumable costs, is encouraged. If certain assumptions aren't available, the Consultant will provide reasonable alternatives. The same assumptions used for the conceptual design and EPC capital costs will also apply to the O&M cost estimates. The findings of this study will be documented in a detailed report, outlining the costs involved in operating and maintaining the power plant over its expected lifespan.

x. Contracting Strategy Analysis

The consultant shall work with the owner to analyze each of the major contracting strategies and recommend the best strategy for the large-scale project. The owners have different capabilities to accept risk and participate in project control. The selection of the preferred contracting approach is an important risk management decision when developing a power facility. The contracting approach finally selected should balance the owner's desire and capability for involvement in implementation detail with the degree of acceptable risk and the owner's desire to control project contingencies and contractor fees.

xi. Financial Model

Consultant Development of a Financial Model: The consultant will establish a financial model that will protect the economic viability of the plant.

- Cash Flow Estimations: The model will forecast future cash flows, including revenue from electricity sales, operating costs, and capital expenditures.
- Calculations of NPV and IRR: Using the cash flow estimations, the model will compute the net present value (NPV) and internal rate of return (IRR) of the project.
- Consideration of External Factors: The model will also factor in elements such as inflation, discount rates, and the project's timeline, giving a comprehensive view of potential profitability and financial sustainability.
- Empowering Informed Decision-making: The generated financial model will assist the owner in evaluating the project's potential returns, associated risks, and overall financial feasibility, thereby facilitating more informed investment decisions and project planning.
- Payback Period: The feasibility study will include an analysis of the payback period for the project. This analysis will assess the time required for the project to generate sufficient revenue to recover the initial investment costs.

- It will consider factors such as electricity generation capacity, projected electricity prices, operational and maintenance costs, and revenue projections.
- The study will provide a detailed calculation of the payback period, which is an important indicator of the project's financial viability and potential return on investment.
- The findings will be documented in the feasibility study report, providing stakeholders with crucial information on the expected time frame for recouping the project's costs and achieving profitability.

xii. Electricity Unit Rate Estimation

The consultant shall analyze the costs associated with generating electricity from the power plant. A comprehensive report will be prepared, comparing the unit rate generation costs to national electricity rates, to determine the competitiveness and economic viability of the project. The report shall contain:

- LCOE Estimations: The consultant will generate estimates of the levelized cost of energy (LCOE) for the chosen technology, assessed at two or three capacity factors.
- Basis of LCOE: The LCOE calculations will be founded on estimates of plant performance, capital, and O&M costs, along with economic assumptions provided by the owner.
- Owner Engagement: The fixed charge rate will be supplied by the owner and reviewed by the consultant. A data request and basis for analysis will be provided to the owner to avoid any miscommunication.
- LCOE Result Presentation: The LCOE outcomes will be tabulated in a summary, showcasing data such as annual capacity factor, annual generation, a fixed charge of capital, levelized costs of fuel and non-fuel O&M, and total LCOE.
- Information required from the owner: We need details on the commercial operation date, evaluation period, general and specific escalation rates, present worth discount rate, AFUDC, owner's cost adder, levelized fixed charge rate, and first-year fuel cost with its escalation rate.

xiii. Social, Environmental, and Economical Impact Assessment

The consultant shall identify the potential emission limits for NOx and SOx based on local regulations and international standards. The consultant shall provide input to NDC regarding the applicability of regulations and the potential impact of project costs. The feasibility study shall assess the economic impact of the power plant on the local community. This evaluation shall identify opportunities for local employment and development that may arise from the project, contributing to the overall socio-economic growth of the region.

xiv. Preliminary outline of Project Schedule

A preliminary project schedule must be created by the consultant, and it must include estimated completion dates for all significant project tasks, including those related to project development, environmental permitting, engineering, procurement, and construction. The consultant will work with the owner to determine realistic time frames for each task based on their prior projects' hands-on experiences, taking into account the market's current conditions, which may affect the availability of crucial components as well as the skill and output of local labor. The length of licensing, permitting, and financing activities will be determined by the contracting strategy chosen, regional practices, and the processes necessary to secure funding.

xv. Feasibility Study Report

Finally, the feasibility study will provide a comprehensive report summarizing all the findings and recommendations. This report will assess the project's viability and sustainability, considering all the evaluated aspects, and provide recommendations for further action. The report's structure, subject to the owner's approval, will be as follows:

- Introduction: An overview of the study and its purpose
- Background: Description of the existing facility and reasons for considering expansion
- Technology Screening: Brief outlines of each technology, the screening criteria used, and the analysis results
- Conceptual Design: Presentation of the Proposed Facility Design
- Capital Cost Estimate: A budgetary forecast of the project's capital cost
- Environmental and Social Permitting Assessment: An analysis of the project's environmental impact and the process for acquiring necessary permits
- Preliminary Project Schedule: Initial timeline for the project's execution
- Summary of Findings and Recommendations: Comprehensive review of the study's results and suggested next steps
- Appendices: Additional material, including drawings from the existing facility, data from third parties, etc., as required.

5. Capacity-building program and Transfer of Knowledge

Knowledge transfer and capacity building are essential processes that contribute to the growth and development of individuals, organizations, and communities. They involve the sharing and acquisition of knowledge, skills, and expertise to enhance capabilities and improve performance. The consultant should provide specific details on the characteristics of the required services and propose an approach and methodology for this part.

7. Organization Chart for Feasibility Study

The organization chart may vary depending on the size and complexity of the power generation project and the specific roles and responsibilities required for the feasibility study.

4. Project Manager
5. Feasibility Study Team:
 - a. Technical Experts
 - i. Fuel Specialist
 - ii. Steam Generation Specialist
 - iii. Bulk Material and Machinery Specialist
 - iv. Operation & Maintenance Specialist
 - b. Financial Analyst
 - c. Environmental Specialist
6. Legal & Procurement Team:
 - a. Contracts & Regulatory Compliance Specialist
 - b. Supply Chain Specialist

Qualifications and details of the key staff shall be presented to NDC for approval during contract negotiation.

8. Payment Schedule

Milestone	% Payment
Advance payment after signing the project contract against advance bank guarantee acceptable from a domestic banks	30%
<u>Upon Acceptance of the Draft of a report on the following tasks:</u> 1.1 Coal And Water Screening and Analysis 1.2 Geotechnical Survey and Topography 1.3 Power Plant Location Selection and Site Layout 1.4 Power Plant Technology Screening 1.5 Conceptual Design of selected power plant technology 1.6 Project Capital Cost Breakdown and Estimates 1.7 Operation and Maintenance Requirements and Cost Estimates 1.8 Levelized Cost of Energy (Electricity Unit Rate) Estimation	20%
<u>Upon Acceptance of the Draft of a report on the following tasks:</u> 2.1 Environment, Social and Economic Impact Assessment 2.2 Assessment of existing manufacturing factories and Infrastructures 2.3 Review of local energy sector regulations and policies 2.4 Risk and Uncertainty Assessment Analysis 2.5 Contracting Strategy Analysis and Recommendation 2.6 Financial Model (NPV, IRR, Payback period, cash flow, etc.) 2.7 Preliminary Outline Of Project Schedule	20%
<u>Final Complete Feasibility Study Report</u> 3.1 Complete Report And Recommendations as per indicated TOR of the project	30%

9. Winner Consulting firms is required to provide performance security as bank guarantee an amount 5% of total contract amount. (Optional), in case the procuring entity officially request, the firm shall furnish the performance security within one week before signing of contract.