



Request for Proposal (RFP)
Capacity Expansion and Power Flow Analysis for
High Share of Variable Renewable Energy (VRE) in
Indonesia

Institute for Essential Services Reform

Tebet Barat Dalam VIII No. 20A-B

Jakarta Selatan

Indonesia

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OVERVIEW AND BACKGROUND

Institute for Essential Services Reform (IESR), a think tank based in Jakarta, Indonesia, has been working intensively to promote the acceleration of low carbon energy transition in Indonesia, through evidence-based policy advocacy. For the past 5 years, IESR also has been contributing significantly to promote energy transition discourse in Indonesia and has been working with national and local governments, associations, and civil society organizations.

Indonesia has ratified its commitment to the Paris Agreement through law no. 16/2016. As part of the mitigation action, Indonesia will increase its renewable energy development in accordance with National Energy Policy and Planning (*Kebijakan Energi Nasional/KEN* and *Rencana Umum Energi Nasional/RUEN*). According to the policy framework, Indonesia must achieve 23% renewable energy share in 2025 (from total energy mix). However, to comply with the Paris Agreement target, a higher penetration of renewable penetration (especially in the power sector), might be needed and therefore developed in this short span of time (2025).

Solar and wind energy hold one of the largest potentials of renewable energy in the country but lacking in terms of utilization, thus potentially serve as options to meet the higher renewable penetration target. On the other hand, the solar and wind energy have different generation characteristics than currently dominating thermal/fossil fuel power plant in the country power sector (the so-called intermittency/variable generation which will depend on the availability of sunlight or wind). The difference would cause disruption on the business-as-usual grid operation and development plan regime.

To provide a fact-based advocacy for implementation and identifying the challenges, limit, and opportunities of higher variable renewable energy (VRE) integration, IESR will conduct national grid data and information collection and grid integration study (power flow study).

1. PROJECT SUMMARY

This project will focus on two things:

1. Assembling the database of the Indonesia national grid which would include:
 - a. National grid systems (focus on the large interconnected grid system, not isolated one)
 - b. Grid infrastructure (grid capacity, length, location/GIS based)
 - c. Demand profile & peak load for each grid system
 - d. Planned grid expansion (RUPTL 2021-2030)
2. A grid integration study which will encompass two different scenarios and consist of:
 - a. The capacity expansion studies (focusing on transmission expansion) based on RUPTL 2021-2030 and a hypothetical high VRE scenario (provided by the IESR).
 - b. Power flow study (load flow analysis, frequency response, and voltage stability analysis) to ensure the technical feasibility and reliability of the business as usual and high VRE scenarios for at least two of the large, interconnected grid systems in the country (i.e., Java-Bali-Madura grid and South Sulawesi and Palu grid). The analysis would focus on the impact of VRE integration to the grid in the two scenarios in the year 2030.

The two scenarios that would be simulated in the study are:

- a. Business as usual (RUPTL 2021-2030)



b. Higher VRE generation in the grid

IESR could provide renewable energy resources potential and location used in the capacity expansion study. The high VRE scenarios would be built upon this data and further discussion with the IESR team.

IESR intends to use the data and study to further support our work to promote energy transition especially in the power sector.

With this RFP, IESR is soliciting proposals from experts, or institution with extensive experience and portfolio in power system planning and grid analysis. IESR will evaluate all the proposals submitted. Following review of all proposals, IESR will select the experts/institutions that brings suitable expertise, most closely aligns with project objectives, and articulates a clear, achievable research plan to meet those objectives within the required timeframe.

2. PROPOSAL GUIDELINES

Proposals will be accepted until 10:00 p.m. Indonesian Western Standard Time (WIB, GMT+0700) on Wednesday, 24 March 2021. Any proposals received after this date and time will be regarded inadmissible. All proposals must be signed by an official agent or representative of the company submitting the proposal.

Main proposals should not be more than 10 pages in length. The annex of proposal should include following item:

- 1) brief company/institution profile.
- 2) the latest Curriculum Vitae (CV) of team leader. CV of other team member with relevant experience is optional.

If the individual/organization submitting a proposal must outsource or contract any work to meet the requirements, this must be clearly stated in the proposal. Additionally, costs included in proposals must include any outsourced or contracted work. Any outsourcing or contracting organization must be named and described in the proposal.

Please describe the limitations and assumptions that would potentially be used in the study as well as software/tool to be used. The use of open-source software/tool is preferable.

Please itemize all costs and include a description of associated services. Contract terms and conditions will be negotiated upon selection of the winning bidder for this RFP.

3. PROJECT PURPOSE AND DESCRIPTION

IESR would like to establish a current database of power sector transmission which include the status of the Indonesia grid system and future expansion plan based on the latest power system planning (RUPTL 2021-2030). The chosen partner will create the database framework and complete it within project timeframe and then pass the ownership to the IESR team.

Minimum data and information in the database are:

- National grid systems (focus on the large interconnected grid system, not isolated one)
- Grid infrastructure (HV/MV lines, sub-station, grid capacity, length, location/GIS based)
- Demand profile & peak load for each grid system
- Planned grid expansion (RUPTL 2021-2030)



IESR would like to conduct a grid integration study that would consist of:

1. Transmission capacity expansion study based on the RUPTL 2021-2030 and a custom scenario for a high VRE generation expansion between 2021-2030. IESR will provide the general expansion of the power generation within 2021-2030 and RE resources potential and location. A more detailed VRE generation expansion scenario (year-on-year generation expansion and location) that would be used in this study would be built upon discussion between the chosen partner and the IESR team.

Minimum information to be included in the capacity expansion study report are:

- Methodology and tools used
 - Summary of the year-on-year generation and transmission expansion
 - Demand forecast for each large interconnected system (could refer to RUPTL 2021-2030)
 - A more detailed analysis of the transmission expansion plan for the high VRE scenario
 - An estimated capital cost expenditure for the expansion (including generation and transmission)
 - Analysis comparing the two scenarios
 - Assumptions used
2. Power flow study based on the RUPTL 2021-2030 and a custom scenario for a high VRE generation expansion in the year 2030. The power flow analysis would use the future system conditions in the 2030 which is developed from the capacity expansion study. The focus of the study would be on the technical feasibility and reliability of the grid in both scenarios for at least two interconnected grid system in Indonesia.

Minimum information to be included in the power flow study report are:

- Methodology and tools used
- The load flow analysis in both scenarios
- Demand and generation profile for a particular week in both scenarios
- Voltage stability and frequency response for a scenario with extreme RE and load condition (high RE, low load or vice versa)
- Analysis comparing the two scenarios including the tested scenario with extreme RE and load condition
- Assumptions used (e.g., dynamic generator parameter, transmission line parameter etc)

The study results will be used to support IESR's advocacy work with relevant power sector stakeholders, including the national government, utility, and local government.

4. REQUEST FOR PROPOSAL AND PROJECT TIMELINE

Proposal Timeline:

Proposals will be accepted until 10:00 p.m. Indonesian Western Standard Time (WIB, GMT+0700), 24 March 2021. Kindly address Program Manager Energy Transformation IESR at deon@iesr.or.id for inquiries.

Evaluation of proposals will be conducted from 25 March through 30 March 2021. Follow up with the top three candidates will be conducted within this window to obtain any necessary clarification on items described within proposals.

The selection decision for the winning bidder will be made by 1 April 2021.



Upon notification, the contract negotiation with the winning bidder will begin immediately and must proceed extremely quickly to meet the project timeline.

Project Timeline:

The project must commence before 5 April 2021 and results of the project must be finalized no later than 30 July 2021.

A draft timeline is presented below. Internal changes may be made if mutually agreed.

Market Survey	
<i>Database framework and completion</i>	5 April – 11 May 2021
<i>High VRE scenario proposed and approved</i>	5 April – 30 April 2021
<i>Preliminary report methodology and outline</i>	30 April – 11 May 2021
Idul Fitri holidays	12 – 18 May 2021
<i>Preliminary report presented and discussed with IESR</i>	21 – 25 June 2021
<i>Final results presented to IESR</i>	30 July 2020

Unless otherwise noted, work will be completed by the end of month identified above.

5. BUDGET

All proposals must include proposed costs (in Indonesian Rupiah/IDR) to complete the tasks described in the project scope. Costs should be stated as one-time or non-recurring costs (NRC).

NOTE: All costs and fees must be clearly described in each proposal.

6. BIDDER QUALIFICATIONS

Bidders should provide the following items as part of their proposal:

- Description of experience in power system planning and grid integration research,
- Examples of three or more similar projects conducted by you/your organization
- Anticipated resources you will assign to this project (total number, role, title, experience)
- Confirmation of timeframe for completion of the project
- Brief description on methodology, tools (preferably open-source tool), and assumptions used

Bidders must submit a digital copy of their proposal via email to Program Manager Energy Transformation IESR at deon@iesr.or.id by 10:00 p.m. Indonesian Western Standard Time (WIB, GMT +0700) on 24 March 2021. Please include “RFP Response – Grid Study” in the subject line.