Appendix 2: Scope of Work

GHECO1 Heat Rate Improvement Theoretical Limit Analysis & Preliminary Optimization

Statement of Work

For

Global Power Synergy Public Company Limited

IROOTECH TECHNOLOGY (SINGAPORE) PTE. LTD

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Content

1 Project Background

GPSC is a leading energy and utilities company with a vision of becoming a leading innovative and sustainable power company globally and aspire to be the Top 3 power company in Southeast Asia with more than half of MW from green portfolio.

As a result of the recent business case proposal IROOTECH presented to GPSC, and as part of the Lighthouse Excellence program for Operational Best-in-Class (BiC) that IROOTECH is providing to GPSC, IROOTECH envisions further collaboration to optimize the GHECO1 plant's heat rate, a key performance indicator (KPI) linked to fuel efficiency and carbon neutrality. Given that it has significant impact to operational expenses and carbon emissions, improving heat rate through AI-driven optimization and process enhancements will result in significant cost savings and operational sustainability.

In this proposal, IROOTECH intends to kickstart this initiative with GPSC through a collaboration service that firstly, focuses on the theoretical limit analysis and preliminary optimization using the plant-wide's data.

2 Project Objectives

To develop preliminary optimization model that demonstrates the capability to improve the heat rate of GHECO1 with the use of operations data and advanced analytics.

This incorporates the leading practices of WEF Global Lighthouse Network, approach from McKinsey & Co., and the collaboration of GPSC engineering and technology teams together with operations to fulfill the needed support in the following 2-step approach.

1. Theoretical limit analysis and optimization development.
2. Preliminary optimization results and solution design.

The theoretical limit analysis will provide insights needed for the optimization model development. The preliminary optimization results show the capability of the optimization model to improve heat rate, and the solution design provides the plan of implementation.

3 Project Scope and Content

The aim of this project is to deliver a business case supported by a comprehensive analysis, leveraging on operations data and advanced optimization analytics to demonstrate the ability of optimizing GHECO1's past heat rate under different operating conditions. This project also leverages on IROOTECH's familiarity with GHECO1, plant optimization experience, world-leading consultant's approach and leading practices established by the WEF Global Lighthouse Network as well as the collaboration between GPSC operations, engineering, and technology teams.

The scope is covered by the proposed sequential two-step approach:

3.1 Theoretical limit analysis and optimization development

- Take into consideration the latest trends in technology and analytics algorithms, IROOTECH's familiarity with GHECO1, adopting the approach from one of the world-leading consultancy firm and best practices from WEF Global Lighthouse Network, as well as aligning it with GPSC's digitalization/AI and operational excellence strategies and practices.
- Collaborate with GPSC's operations, technology, and engineering team to assess and understand the various operating scenarios, logics, and enhancements that are currently in place and planned for GHECO1, and aligning on baselines, targets/goals and objective function for the optimization model.
- Access to 2-3 years historical plant operations data for deep-dive analysis, discovery, and application of advance analytics techniques.
- Simulation of scenarios and development of preliminary optimization model.

3.2 Preliminary optimization results and solution design

- Demonstrate the optimized heat rate of GHECO1 under different past conditions
- Develop a robust business case illustrating the potential operational and financial gains resulting from the implementation and operationalization of the optimization model.
- Define the scope and requirements for the proposed solution for implementation, considering factors such as data availability, analytics technology integration, platform standardization, operationalization approach and scalability, as well as project organization.
- Align with stakeholders from GPSC operations, engineering, and technology teams on organizational objectives and priorities.

The project scope encompasses activities aimed at delivering actionable insights and tangible recommendations to support informed decision-making and drive plant heat rate improvement.

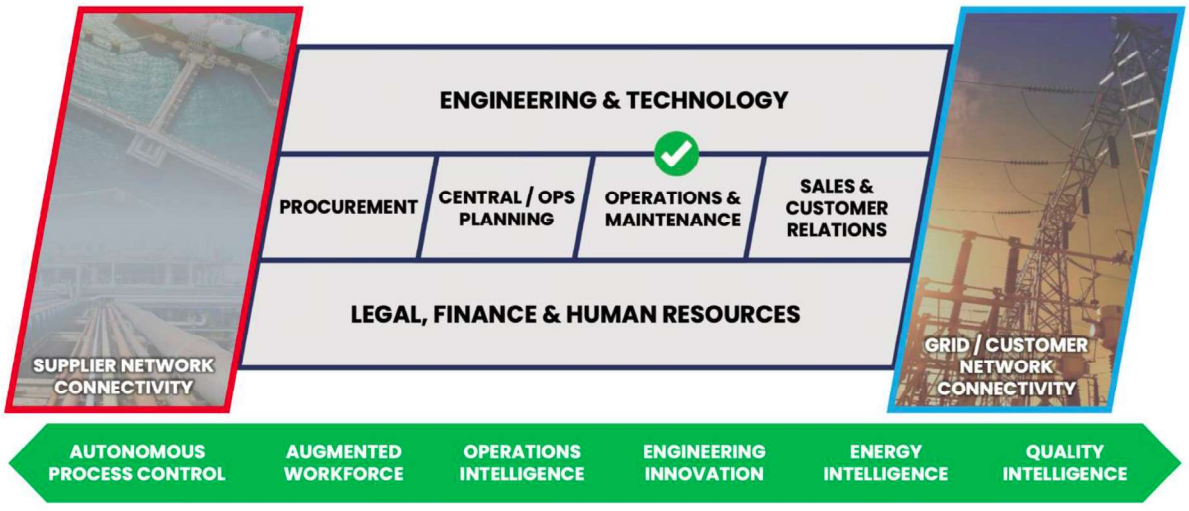


Figure 1: Collaboration between Operation & Maintenance and the Engineering & Technology teams

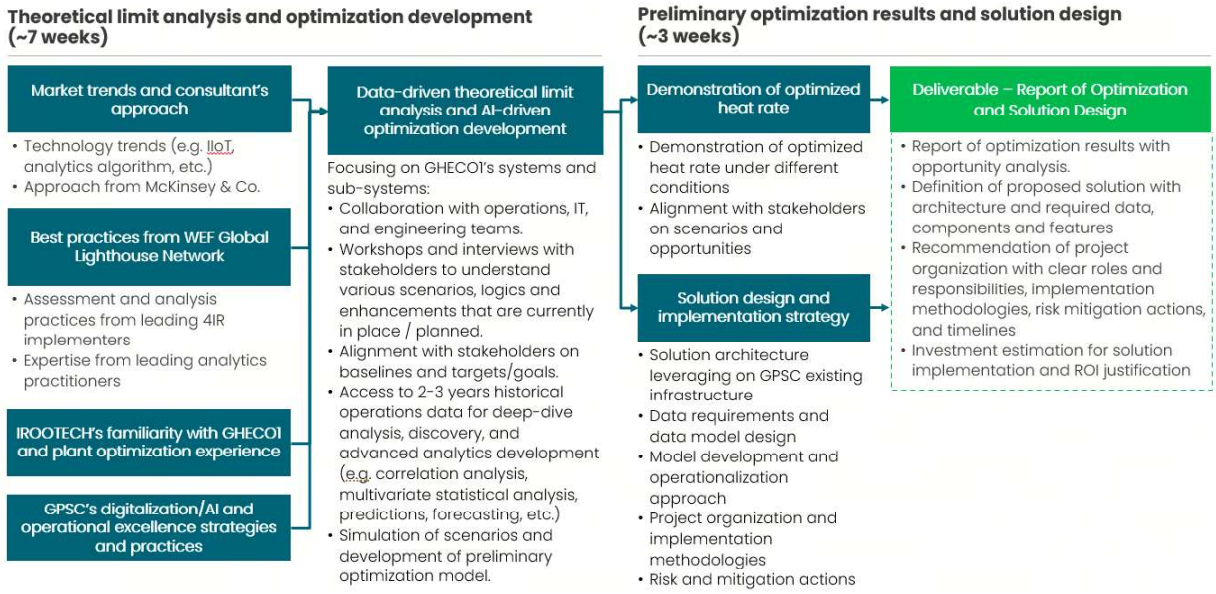
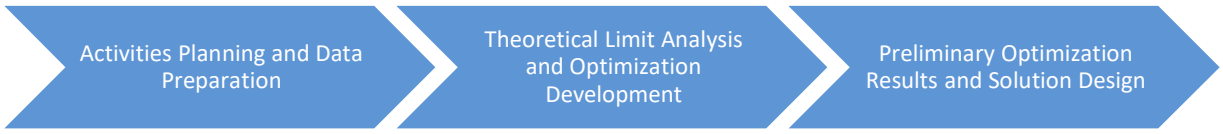


Figure 2: Project Scope and Content.

4 Project Milestone Plan

The Project period is about 10 weeks, and the plan of the project is subject to the date of Project Agreement signing.



Implementation phase	Work content	Date*
Activities Planning and Data Preparation	• Planning and preparation activities: o Study market trends on technology and analytics algorithms. o Establish specific assessment and analysis practices to adopt. o Align with GPSC digitization/AI and operational excellence strategies and practices. o Align understanding on the approach from the world-leading consultancy firm. o Align on baselines, targets/goals and objective function for the optimization model. o Identify and prepare relevant GHECO1 2-3 years historical operations and control data.	Week 0
Theoretical Limit	• Workshops and interviews with stakeholders to understand	Week 1-7

Implementation phase	Work content	Date*
Analysis and Optimization Development	various operating scenarios, logics, and enhancements that are currently in place and planned for GHECO1 with GPSC's operations, technology, and engineering teams. • Agree on baselines, targets/goals and objective function for the optimization model. • Access to relevant GHECO1 2-3 years historical operations and control data for deep-dive analysis, discovery, and application of advance analytics techniques. • Simulation of scenarios and development of preliminary optimization model.	
Preliminary Optimization Results and Solution Design	• Demonstration of optimized heat rate o Problem definition o Demonstrate the optimized heat rate of GHECO1 under different past conditions o Align with stakeholders on scenarios and opportunities o Develop a robust business case illustrating the potential operational and financial gains resulting from the implementation and operationalization of the optimization model. • Solution design and implementation strategy. o Solution architecture leveraging on GPSC existing infrastructure. o Data requirements and data model design. o Model development and operationalization approach. o Project organization and implementation methodologies. o Identify risk and mitigation actions. • Present and deliver business case report	Week 8-10

Table 1. Project milestone plan

*All date is based on best estimation

5 Project Implementation Method

1. Implementation work location

This Project is implemented by both "on-site" and "remote" development.

The following works are carried out at GPSC facilities.

- Workshops and interviews with stakeholders to understand various operating scenarios, logics, and enhancements that are currently in place and planned for GHECO1 with GPSC's operations, technology, and engineering teams.
- Agree on baselines, targets/goals and objective function for the optimization model.
- Initial access to relevant GHECO1 2-3 years historical operations and control data for deep-dive analysis, discovery, and application of advance analytics techniques.
- Initial simulation of scenarios and development of preliminary optimization model.
- Present and deliver business case report

The following works can be carried out remotely.

- Planning and preparation activities:
    - Study market trends on technology and analytics algorithms.
    - Establish specific assessment and analysis practices to adopt.
    - Align with GPSC digitization/AI and operational excellence strategies and practices.
    - Align understanding on the approach from the world-leading consultancy firm.
    - Align on baselines, targets/goals and objective function for the optimization model.
    - Identify and prepare relevant GHECO1 2-3 years historical operations and control data.

- Demonstration of optimized heat rate
    - Problem definition
    - Demonstrate the optimized heat rate of GHECO1 under different past conditions
    - Align with stakeholders on scenarios and opportunities
    - Develop a robust business case illustrating the potential operational and financial gains resulting from the implementation and operationalization of the optimization model.

- Solution design and implementation strategy.
    - Solution architecture leveraging on GPSC existing infrastructure.
    - Data requirements and data model design.
    - Model development and operationalization approach.
    - Project organization and implementation methodologies.
    - Identify risk and mitigation actions.

2. Project organization structure

The organizational structure of this Project should include industry advisors, project managers, process engineers, solution architects, data scientists, data engineers, and a Lighthouse 4IR enablement practitioner to form up the team. We suggest in having a project sponsor, project manager, plant optimization lead, process engineer and IT personnel from Party A to form the core personnel of the project team to support the requirements of the Project in a timely manner. In order to ensure the smooth implementation of the Project, Party A shall ensure that sufficient support of business, IT and other related personnel that meet the requirements of the project, participate in the project as agreed. If the project team members change, they shall inform the other Party one week in advance.

5.2.1 Composition and responsibilities of the core personnel of the project team (Party A)

Role	Job responsibilities	Number of people
PS	Project Sponsor – set overall goals for the project. Provide guidance and recommendation and make high level decisions to ensure successful project	1
PM	Project Manager – responsible for overseeing the direction of the project, risk control, quality management, resource coordination, and manage day to day communication between two teams.	1
IT	Information Technology – responsible for supporting the data and system access requirements as well as provide visibility of the current OT + IT architecture and system integration approaches / methods / practices.	At least 1
PE	Process Engineer – responsible for optimizing and improving the efficiency of GHECO1 and subject matter expert on the processes on the systems and subsystems of GHECO1	1
PO	Plant Optimization Lead – owner of the GHECO1 Heat Rate KPI and responsible to coordinate the relevant resources to support in this Project i.e. engineering to define calculation, parameters, etc.	1

Table 2. Responsibilities of the Party A personnel

5.2.2 Composition and responsibilities of the core personnel of the project team (Party B)

Role	Job responsibilities	Number of people
IA	Industry Advisor – responsible for providing domain expertise and consultancy on the domain of coal-fired power plants, and aligning the Project objectives with GPSC's strategic direction and market trends	2
PM	Project Manager – responsible for overseeing the direction of the project, risk control, quality management, resource coordination, and manage day to day communication between two teams.	1
SA	Solutions Architect – responsible for providing technical expertise on all aspect of the solution blueprint to support the implementation of analytics applications	1
DS	Data Scientists – responsible for preparing and analyzing large datasets using statistical and advance analytics techniques to develop the optimization model for optimizing heat rate	1
DE	Data Engineer – responsible for designing, building and maintaining data infrastructure and manage data pipelines allowing large datasets to be usable for analysis and analytics development.	1
AD	Analytics Developer – responsible for designing, building, and maintaining data pipelines and systems to collect, transform, and visualizing large datasets to translate complex information into actionable insights.	1
LP	Lighthouse 4IR Enablement Practitioner – responsible for providing 4IR implementation best practices leveraging on WEF Global Lighthouse Network framework and standards.	1

Table 3. Responsibilities of the Party B personnel

3. Responsibilities of the Parties

Party A:

- Prepare according to the requirements of the entire project for the site environment required by the Project, such as the working space, working environment, communication facilities (Internet, telephone, copier, fax machine, etc.), meeting rooms and print servers and other basic office supplies, which are required by the project team members. At the same time, Party A shall be responsible for coordinating the communication of the company's internal business departments to ensure that the project follow the overall Project implementation plan.
- In terms of business organization: Be responsible for organizing surveys on the needs of the buying Party's relevant departments and systems, be responsible for the unification of the business requirements of various departments and divisions, be responsible for arranging, organizing, and requiring all related interface system integrators to ensure sufficient and professional personnel to participate and formulate an executable and complete corresponding interface specification and interface plan and provide in a timely manner the necessary files and data for completing the Project, be responsible for requirement review, and the review and confirmation of requirement changes and their effects.
- If Party A postpones the payment stipulated in the Project Agreement, Party B can postpone the Project completion date accordingly, and has the right to suspend or terminate the service.

Party B:

- Participate in and lead the establishment of the specific work plan of project management, assist in the establishment of the project implementation team, be responsible for arranging in place the participants in the Project of Party B, and be responsible for preparing the documents required for the Project initiation, including: Project work objectives, descriptions of Project implementation scope, and inspections and milestones for the entire project implementation plan, and define the roles of key personnel and their respective responsibilities in the process of Project implementation; be responsible for coordinating and formulating Project overall plans with Project participants;
- In terms of project management: overall responsibilities for project management; convene project communication meetings; control project progress; be responsible for organizing the discussion and solution-making of major technical and business issues; be responsible for quality management; be responsible for project risk control management.
- In terms of business organization: Analyze and sort out the results of surveys and interviews; be responsible for requirement management; participate in the recording and writing of documents; confirm requirement changes and their impacts with Party A.

6 Project Deliverables and Acceptance Instructions

1. Deliverables

#	Deliverable name	Deliverable content description	Deliverable	Remark

			time	
1	Preliminary plan	A document detailing the service activities.	End of Week 0	
2	Service implementation	A document summarizing the results of the preliminary result from the study of the data discovery and model development.	End of Week 7	
3	Business case report	Completion of Optimization Report and Solution Design, signing of acceptance by GPSC	End of Week 10	

Table 4. Project deliverable

*all date is based on best estimation

2. Acceptance instructions

This Project will be checked and accepted according to the deliverables of each stage listed in the above table. Party B will submit the overall deliverables for acceptance, and the working documents will not be the subject of acceptance.

The acceptance criteria and procedures for the above deliverables are as follows:

6.2.1 Acceptance criteria

The content descriptions of the function list in the section 3.3 of this SOW shall prevail. The acceptance of the deliverables shall focus on the acceptance of the actual contents of the documents. If the actual contents of the deliverables conform to the scope, they shall be received and accepted. A small number of discrepancies in format, vocabulary, modification, etc. shall not be deemed as a reason for non-acceptance.

6.2.2 Acceptance process

- During the Project, all deliverables should be discussed and reviewed by Party A and the project manager of Party B to ensure that both Parties have the same understanding of the content of the documents and shorten the acceptance time of deliverables. Party A shall promptly provide suggestions, or requests for modifications and relevant advice, or approve the content for Party B.
- Party B will submit the achievements of different stages to the Party A project team in accordance with the working plan. If the deliverables meet the acceptance criteria, the project manager of Party A shall notify Party B that the acceptance is finished in the form of written confirmation within 10 working days after the report and acceptance meeting is held.
- If the project manager of Party A put forward a written objection due to non-compliance with the acceptance standards (each non-compliance with the acceptance standards is referred to as “non-conformity") within 10 working days after the report and acceptance meeting, Party B shall take its commercially reasonable efforts to correct the non-conformity within 5 working days (or within a longer time period as agreed by both Parties).
- The acceptance of deliverables of this Project is carried out in the form of on-site meeting acceptance. If Party A fails to hold a report and acceptance meeting within 15 working days after

receiving the delivered results, or if the project manager of Party A does not raise a written objection within 15 working days after the report and acceptance meeting is held, or if Party A has actually used the deliverables, the relevant deliverables are deemed to have been accepted by the Party A.

- The acceptance of the deliverables of each stage of this Project in accordance with the above-mentioned process is deemed as the completion of that stage. The completion of each Project stage should be deemed as Party B has fulfilled its obligations of that stage. It shall be deemed as the total completion of the acceptance of the Project that all deliverables are accepted in accordance with the above-mentioned acceptance process. For the delayed delivery or delayed acceptance of the Party B deliverables or the overall Project delay, due to the reasons not of Party B, Party B shall not bear any responsibility for this, and Party A shall bear the additional costs and expenses incurred thereby.
- At any stage of the Project, if Party A requests to change the content of the deliverables that have been accepted, it shall be deemed as a change request.

7 Change Management Process

During the implementation of this Project, any changes to the agreed content of this SOW will be handled through the agreed change management process in this section:

The two Parties designate the following personnel to be responsible for reviewing and signing the change application for approval. If any Party needs to change the designated personnel, the Party shall notify the other Party by writing.

Party A: 【Aungsuthon Puboonterm, aungsuthon.p@gpscgroup.com】

Party B: 【Siramet Subpayasomboon, siramet.s@rootcloud.com】

Either Party shall submit a change request in writing and describe the details of the proposed change. Party B shall be responsible for the change analysis. The change analysis should include the following content: change implementation method, change implementation time, risks brought by the change and impact analysis on service time, established work plans, workload, resource requirements, service fee and payment method.

Within 3 working days after Party A receives the change analysis submitted by Party B, Party A shall review the change analysis and decide whether to implement the change. If both Parties reach an agreement on the change, after the authorized personnel of both Parties sign a written supplementary agreement on the change and stamp their official seals on it, Party A can start to implement the change.

8 Assumptions and Premises

Both Parties agreed on the following Project assumptions. If any of the Project assumptions are not true or not fully true, it may cause changes in service schedules, costs, results, workload and other aspects. If one Party is unable to perform the service due to changes caused by one Party and without the consent of both Parties, the other party will not be liable and shall have the right to be compensated for the losses and costs caused to it by the changes.

The implementation location shall not change, any additional cost of location change shall be borne by Party A. The coverage of this project is Malaysia and Thailand only.

English is the agreed language for all aspects of the project implementation including the IIoT platform, functions, deliverables, documentation, etc.

During the project implementation, any changes that impact the cost and evaluation dimension changes will be discussed by both parties based on the actual situation.

Party A shall provide the necessary office and facilities for the Party B project team, including meeting rooms, Internet facilities, domestic telephones, effective teleconference facilities, printing, faxing, projectors, etc.

[End]