Request for Information (RFI)

HYBRID REPOWERING

OF EXISTING CONVENTIONAL STEAM

CYCLE POWER PLANT

June, 2026

INTRODUCTION

These days NOGA Israel Independent System Operator is investigating the possibility to Repower the conventional power plants to operate in - **Hybrid Repowering Configuration.**

Key features of such Repowering are**:**

- Addition of Main equipment - 2 x H Type Gas Turbines and 2 x Heat Recovery Steam Generators (HRSG) in parallel to the original boiler (operated on Gas/Coal).
- Utilization of the existing steam turbine and condenser from the original steam unit.

The Repowered power plant shall be designed to operate in one of the following two modes of operation:

- Combined Cycle Mode: Operation without the existing boiler.
- Original Configuration Mode: Maintaining the ability to operate the unit in its original steam cycle configuration using the existing boiler (fired by gas or coal).

The purpose of this RFI is to identify engineering/steam turbines OEM companies with proven experience in power plant repowering (Hybrid repowering especially), as well as Power plants design, to conduct a comprehensive Feasibility Survey, including a Technical-Economic Viability Survey for the above-mentioned project.
Additionally, we seek to determine the estimated costs and timeline associated with executing this in-depth technical analysis.

Subject to the survey results confirming the technical viability and economic feasibility of the Hybrid Repowering project, consideration may be given to involving the company conducting the survey in the implementation phase of the project, including the addition of new equipment such as gas turbines, HRSGs, and related systems.

Offers and any questions or requests for clarification concerning this RFI shall be submitted by **email** as follows:

Subject: "Hybrid Repowering RFI - name of your company"
Mail recipient: Itay.Heidemann@noga-iso.co.il

Clarification questions shall be submitted no later than **05.07.26**.
Offers shall be submitted no later than **15.07.26**.

1. POWR PLANTS

Rutenberg units 1-2 (2x575 MW) operated since 1990/1991 and Orot rabin units 5-6 (2x575 MW) operated since 1995/1996, all four units have the same technical parameters and technology, while Rutenberg units 3-4 (2x550 MW) operated since 2000/2001, are different.

These days all six boilers are in a process of conversion to burn NG (Natural gas) as primary fuel and coal as a secondary fuel and would be able to produce the maximum continuous capacity either by burning pulverized coal or NG.

The steam turbine turbo sets of all six units are reheat condensation turbines with HP-Turbine, with a single flooded IP Turbine (Rutenberg units 1-2, Orot rabin 5-6) / double flooded IP Turbine (Rutenberg units 3-4) and with two double flooded LP-Turbines. For the preheating of the condensate /Feedwater 4 LP heaters, one feedwater tank (Deaerator) and 2 HP Heaters are used. The condenser is designed as a two-chamber condenser on two different pressure levels (HP condenser and LP condenser).

1.1. Steam cycle description of existing units

Rutenberg 1-2 and Orot Rabin 5-6 units

- Four similar Tangential fired, drum type boilers, manufactured by Combustion Engineering.
- The steam turbines of those units were supplied by MAN.
- The nominal continuous parameters of each unit at ST inlet and outlet (at 575MW):
  - Main steam parameters: 1,673,705 kg/hr, 175 kg/cm^2, 535ºC

- HRH Parameters: 39.93 kg/cm^2, 535ºC
- CRH Temperature =331.7ºC

- The condenser Back pressure is 0.05 ata and cooled directly by sea water at average temperature of 22 ºC and temperature rise of 10 ºC.
- Maximum condenser steam flow is about 1100 t/h

Rutenberg 3-4 units

- Two similar wall-fired, Drum type B&W boilers.
- The steam turbines of those units were supplied by ABB.
- The nominal continuous parameters of each unit at ST inlet and outlet (at 550MW)
  - Main steam parameters:1,554,696 kg/hr, 169 kg/cm^2, 538ºC
  - HRH Parameters: 38.5 kg/cm^2, 538ºC
  - CRH Temperature: 334.5ºC
- The condenser back pressure is 0.05 ata and cooled directly by sea water at average temperature of 22 ºC and temperature rise of 10 ºC.
- Maximum condenser steam flow is about 1030 t/h

2. PRELIMINARY COMBINED CYCLE PERFORMANCE WHILE UTILIZING EXISTING STEAM TURBINE AND CONDENSER (*)

	Preliminary Repowered Unit performance (ISO Conditions)
Expected GT load, MW (**Based on H type GTs**)	2 x 448
Expected ST load, MW	421
Total Repowered unit in CC mode, MW	1,317
Expected Repowered unit efficiency, %	62.2

3. FESABILITY SURVEY TECHNICAL REQUIREMENTS

Feasibility survey shall examine all modifications required in the original equipment such as but not limited to steam turbine, condenser, by-pass system, control system, etc. to integrate them with the new equipment.
The survey requires a comprehensive and in-depth assessment of the following topics**,** but not limited to**,** to ensure continuous, reliable and full operational capability in both operating modes related to the suggested Repowering configuration: Combined cycle mode and original steam cycle mode.
The survey results are also expected to include the project's cost estimation and economic feasibility as well as defining the project implementation timeline.

Feasibility survey will be conducted for one generation unit out of each identical pair, resulting in a total of three feasibility surveys. (One survey for one unit out of Rutenberg units 1-2, second survey for one unit out of Orot-rabin units 5-6 and third survey for one unit out of Rutenberg units 3-4).

3.1 ST upgrade survey, shall include (but not be limited to) the following:

- ST control stage and/or modifying sequence/logic of the ST control valves.
- ST dynamic loads, governing stage performance, etc.
- Forces on ST bearings and on ST blades under conditions of reduced steam flow and zero extractions.
- Evaluation of minimum flow required in the final stages of the HP (High Pressure) and LP (Low Pressure) turbines to prevent overheating and vibrations.
- Extraction Line Isolation during combined cycle operation**:** Implementation of isolation valves on steam extraction lines (with strict emphasis on preventing water induction into the turbine).
- Impact and restrictions of connecting steam lines from the new CCGT (Combined Cycle Gas Turbine) unit to the existing steam turbine (ST). (Type of configuration related to layout restrictions)

3.2 Operational Flexibility: Analysis of unit startup, shutdown, and steady-state operation across both operating modes.

- Alignment and adaptation of the existing steam turbine startup curves with the new Gas Turbines (GT) and Heat Recovery Steam Generators (HRSG).

3.3 Steam Turbine Bypass Systems

- New High-Pressure (HP) and Intermediate-Pressure (IP) bypass systems shall be implemented, taking into consideration existing IP bypass connection into condenser.
- **LP Bypass Addition**: Integration of a new Low-Pressure (LP) bypass system, including the necessary **condenser upgrades** to accommodate new LP bypass connections.
- Operational Mode Adaptation: Evaluation of bypass system for full operational capabilities in both operating modes.
- Transient & Emergency Response: Adaptation of the bypass systems to support all possible startup sequences and emergency scenarios.

3.4 Control System Upgrade: Upgrading the unit's Distributed Control System (DCS) to fully support both operating modes (including new DCS system of Combined cycle).

3.5 Existing Equipment Life Assessment: Evaluation of the current condition of equipment that is part of the Hybrid Repowering configuration, to ensure operational reliability throughout an extended lifecycle of at least 25 years under the Hybrid Repowering configuration.

3.5 Based on the survey results, it will be required to specify the time frame for implementing such Hybrid repowering project, with relation to the existing equipment.

3.6 Based on the survey results, it will be necessary to estimate the project budget and assess the project's financial viability.

3.7 The company conducting the survey shall bear full responsibility for the survey's conclusions.

3.8 Additional Technical Requirements

	Subject	Units of Measurement	System Data	Remarks
	Operation condition			
1	Operating Ambient Temperature Range	°C	-4°C to 50°C	
2	Combined-Cycle Minimum Environmental Compliance Load (MECL)	% of nominal output	MECL ≤ 40% of nominal output	under all ambient weather conditions.
	Operational Flexibility			
3	Max Ramp Rate	% nominal output /minute	>4	corrected for ambient temperature
4	Annual planned number of starts	starts/year	at least 100	
	Transmission Grid			
	Grid connection voltage	kV	400	
	Nominal frequency	Hz	50	

3.9 Additional requirements

- All documentation related to the existing equipment that is available in IEC will be submitted to the RFP, that will be publicized. Also, site visits most likely will be required.
- The survey results will be summarized in a document that includes an overview of all existing equipment inspected and required for replacement/upgrade, including the explanation / reasons for replacement/upgrade. A specification of the new equipment will be required for the implementation of the survey results.

4. THE SUPPLIER PROPOSAL SHALL INCLUDE

4.1 Company proven experience in Repowering field (especially in Hybrid repowering) including reference list in last 10 years (that will include at least: Name of the power plant including the contents of the project, scale of the project, date of implementation of the project and type of Repowering)

4.2 Budgetary price for Conducting Feasibility Surveys as described above.

4.3 Timeline to perform Feasibility study.

4.4 Company preliminary opinion regarding the feasibility of executing Hybrid Repowering as specified in RFI.

5. LEGAL STATUS OF THIS INVITATION

This RFI is a preliminary process, which may or may not be followed by a separate, bidding or other contractual process.

NOGA shall be under no obligation to enter any transaction with any party whomsoever who responds to or participates in any procedure for the Receipt of Information to be used for the purposes of acquisition of services/equipment/systems/goods or data which is the subject of the Request for Information (hereinafter referred to as: "**RFI**") or for purposes of their development, application, production or construction.

NOGA shall be entitled to use the information obtained by way of the RFI, as well as any data, solution, process, technique or suggestion contained in any of the responses or documents/response material submitted to NOGA related thereto. Without derogating from the above, NOGA shall keep any information/data received from any person responding to the RFI in strict confidence and shall not permit the use or use same for any purpose than for its own needs unless such information must be disclosed subject to a right granted by law, to a participant, to review the tender documents.

A response to an RFI shall not bestow upon any person responding thereto (hereinafter referred to as the "**Respondent**") any advantage in any procurement

procedure, if such procedure should be publicized at all, and NOGA shall not be obliged to include the Respondent in the procurement process.

Any exceptions, changes or additions to these above instructions (whether Any exceptions, changes or additions to these above instructions (whether contained in any response to the RFI or otherwise) shall be devoid of validity and legal effect and shall not obligate NOGA.

If you have a Local Israeli agent, please send his name, address, phone, fax and e-mail.

NOGA wishes to thank you for your anticipated participation and cooperation in the successful completion of this R.F.I invitation.