Guidance on the development and decommissioning of new combined cycle gas turbine (CCGT) plant

energy institute

GUIDANCE ON THE DEVELOPMENT AND COMMISSIONING OF NEW COMBINED CYCLE GAS TURBINE (CCGT) PLANT

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FOREWORD

This is one of a pair of documents providing guidance on commissioning of combined cycle gas turbine (CCGT) plant. Also see Energy Institute (EI) *Guidance on the preservation and recommissioning of existing combined cycle gas turbine (CCGT) plant*, which focuses on preservation and recommissioning of existing plant.

This publication provides good practice for the safe commissioning of 'new build' CCGT plant projects. New build is plant that is being planned or has recently been constructed and being made ready (during the commissioning phase) for operation to an agreed specification and contract. It is intended to provide high-level guidance to the asset owner's/operator's technical management team.

Commissioning is the process of assuring that all systems and components of the new CCGT plant have been designed and installed correctly, tested and, where necessary, signed off, so that the plant can be taken over by the asset owner/operator to operate and maintain, according to the specified requirements. The commissioning process follows engineering procedures to check the installation is complete, and that every operational component and their individual functions, such as instruments and equipment, are fully inspected and tested. This includes their interfaces, the resulting plant systems and the system interactions up to the full plant operation. If the achieved performance meets the asset owner/operator's contractual and agreed expectations the project is completed and can be handed over.

However, the skills shortage in the power generation industry has been well documented, meaning there is less and less experience available of commissioning new build CCGT plant. This publication identifies ways to galvanise those limited resources to achieve the timescales required for bringing new CCGT plant on line.

This publication provides an overview of the project lifecycle, particularly to address aspects earlier in the project that will impact upon commissioning. It then focuses on the commissioning phase, providing high-level guidance of the main activities and equipment, skills needed for the commissioning team, typical commissioning timescales, etc. It also provides detailed check sheets for commissioning plant.

This guidance and check sheets provided are generic and intended to be independent of the CCGT technology, the plant configuration to be commissioned, and the supplier used. It provides a structured approach that can be utilised by the asset owner/operator to manage their project risk and record and report specific project and site knowledge.

This document focuses on the technical aspects and guidance for good industry practice. It does not purport to include all the necessary provisions of a contract. Full compliance with this guidance cannot confer immunity from any legal, regulatory and environmental obligations, including safety, environmental regulations and permits and licences. The user is responsible for the correct consideration and application of this guidance within their own safe systems of work, commissioning management and operational procedures.

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The EI welcomes feedback on its publications. Feedback or suggested revisions should be submitted to:

Technical Department
Energy Institute
61 New Cavendish Street
London, W1G 7AR
e: technical@energyinst.org

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1 INTRODUCTION

This publication provides guidance on establishing good practice for the safe and structured approach to planning and commissioning of newly built combined cycle gas turbine (CCGT) power plant. It is written from an asset owner/operator perspective.

With the phasing out of coal generation in many countries, new CCGT plant may be built to meet the gap in generating capacity and to help underpin intermittent renewable generation (predominantly wind and solar).

However, given the changing market conditions, consolidation of expertise in fewer and fewer companies, life extension of CCGT assets, and the subsequent retirement of personnel with experience of commissioning CCGT plant, experience of commissioning new CCGT plant is becoming rarer within asset owners/operators.

1.1 SCOPE OF GUIDANCE

This document provides guidance to an asset owner/operator for a structured approach to managing the project risks and programme when developing new CCGT plant.

It first provides background information, including the historical perspective explaining the need for this document, as well as the main assumptions, such as what type of plant is covered in this publication, the regulatory regime being operated in, etc.

Although this publication is primarily intended to cover the commissioning of plant, section 3 provides an overview of the project lifecycle, from considering operations, to tendering, design, construction, commissioning and operation. This information is provided, not for the purposes of providing a complete guide on how to undertake these stages, but rather because successful commissioning of plant requires that certain prerequisites be in place. Therefore, guidance is provided predominantly on those aspects that impact upon the commissioning of plant. Section 4 provides further general good practice guidance.

Section 5 focuses on the commissioning phase of the project lifecycle in much more detail. It identifies the associated high-level activities and main equipment items, and the typical skill sets and resourcing expected for commissioning. A typical Gantt chart is provided giving an estimate of the commissioning timescales. Commissioning team roles are described. Lastly, 'check sheets' are provided from which the asset owner/operator can understand the requirements and develop their specific site commissioning plan.

Section 6 provides guidance on issues that impact upon the resourcing of CCGT commissioning, including project timescales, staffing, training, as well as maintenance schedules.