

ICS 27.140
CCS P59

NB

**ENERGY INDUSTRY STANDARD OF THE
PEOPLE'S REPUBLIC OF CHINA**

NB/T 10350-2019

Guide for Sustainability Assessment of Hydropower Projects

可持续水电评价导则

Issued on: December 30, 2019

Implemented on: July 1, 2020

Issued by: National Energy Administration of the PRC

Table of Contents

1 General Provisions	1
2 Terms	2
3 Basic Requirements	3
4 Sustainability Assessment of Hydropower Projects at Design Stage	5
4.1 General Requirements	5
4.2 Socio-Economic Sustainability Assessment	5
4.3 Environmental Sustainability Assessment	5
4.4 Management Sustainability Assessment	6
5 Sustainability Assessment of Hydropower Projects at Construction Stage	7
5.1 General Requirements	7
5.2 Socio-Economic Sustainability Assessment	7
5.3 Environmental Sustainability Assessment	7
5.4 Management Sustainability Assessment	7
6 Sustainability Assessment of Hydropower Projects at Operation Stage	8
6.1 General Requirements	8
6.2 Socio-Economic Sustainability Assessment	8
6.3 Environmental Sustainability Assessment	9
6.4 Management Sustainability Assessment	9
7 Comprehensive Analysis and Assessment Conclusions	10
7.1 Comprehensive Analysis	10
7.2 Assessment Conclusions	10
Appendix A Indicators of Sustainability Assessment for Hydropower Stations	11
Appendix B Indicators of Sustainability Assessment for Pumped Storage Power Stations	13
Appendix C Quantitative Methods for Indicators of Sustainable Hydropower Assessment	15
Appendix D Contents of Sustainable Hydropower Assessment Report	29
Appendix E Scoring Criteria for Indicators of Sustainable Hydropower Assessment at Design Stage	31
Appendix F Scoring Criteria for Indicators of Sustainable Hydropower Assessment for Pumped Storage Power Stations at Design Stage	33
Appendix G Scoring Criteria for Indicators of Sustainable Hydropower Assessment at Construction Stage	35

Appendix H Scoring Criteria for Indicators of Sustainable Hydropower Assessment for Pumped Storage Power Stations at Construction Stage	37
Appendix J Scoring Criteria for Indicators of Sustainable Hydropower Assessment for Large and Medium-scale Hydropower Stations at Operation Stage	39
Appendix K Scoring Criteria for Indicators of Sustainable Hydropower Assessment for Pumped Storage Power Stations at Operation Stage	42
Appendix L Weighted Calculation Method for Comprehensive Scoring Indicators of Hydropower Project Sustainability	44
Explanation of Wording in This Guide	45
Addition: Explanation of Provisions	46

Foreword

This document was issued on 30 December 2019 by the National Energy Administration of the PRC and takes effect on 1 July 2020.

It is a NB/T standard: recommended rather than compulsory, but it is the text a Chinese reviewer applies when assessing a submission.

It is classified under ICS 27.140, Chinese classification P59.

This guide was prepared in accordance with the requirements of the Notice of the General Department of the National Energy Administration on Issuing the 2017 Plan for the Formulation and Revision of Energy Sector Standards and the Plan for Translation and Publication of English Versions (Guo Neng Zong Tong Ke Ji [2017] No. 52). The drafting group carried out extensive investigation and research, summarized practical experience, referred to relevant advanced foreign standards and widely solicited opinions before formulating this guide.

The main technical contents of this guide are: basic requirements, sustainability assessment at the design stage, sustainability assessment at the construction stage, sustainability assessment at the operation stage, and comprehensive analysis and assessment conclusions.

The National Energy Administration is in charge of the administration of this guide. It was proposed by, and is under the routine management of, China Renewable Energy Engineering Institute, which is also responsible for the explanation of its specific technical contents. Opinions and suggestions arising during implementation should be sent to China Renewable Energy Engineering Institute (address: No. 2 Liupukang Beixiaojie, Xicheng District, Beijing, postcode 100120).

Chief development organizations: China Renewable Energy Engineering Institute; Guojia Shuidian Kechixu Fazhan Yanjiu Zhongxin; PowerChina Guiyang Engineering Corporation

Limited. Participating development organizations: PowerChina Beijing Engineering Corporation Limited; PowerChina Zhongnan Engineering Corporation Limited; PowerChina Chengdu Engineering Corporation Limited.

1 Scope

NB/T 10350-2019 is the Chinese guide for assessing the sustainability of hydropower projects, including pumped storage plants. It gives developers, owners and reviewers a structured way to judge whether a project is sustainable across its life, rather than relying on a single environmental approval. The guide applies at three stages - planning and design, construction, and operation - and examines each on three dimensions: socio-economic, environmental and management. It sets the general provisions and defined terms, then the principles and procedure of an assessment and the evidence to be collected. The indicator system follows: for each stage and dimension the guide lists the indicators to be assessed, from resettlement, benefit sharing, public participation and cultural heritage, through water quality, ecological flow, fish, biodiversity, sediment and soil conservation, to governance, integrated planning, safety and financial viability. Each indicator is scored on a scale of one to five against defined criteria; the scores are weighted and combined into an overall result out of one hundred, and the project is classed as strongly, moderately or weakly sustainable, or not sustainable. The calculation method, the treatment of missing evidence and the content of the assessment report complete the guide, with appendices giving the indicator lists and scoring criteria.

1.0.1 This guide is formulated to standardize the contents and methods of sustainable hydropower assessment and to unify the technical requirements.

1.0.2 This guide is applicable to the sustainability assessment of hydropower projects at the design, construction and operation stages.

1.0.3 Sustainable hydropower assessment shall be based on national policies, laws and regulations, follow the strategies for ecological and environmental protection and for economic and social development, and observe the assessment principles of independence, objectivity, impartiality and scientific soundness. It shall pay attention to the reasonable demands of stakeholders, systematically assess the sustainability of the hydropower project in socio-economic, environmental and management aspects, and put forward opinions and suggestions for improvement, so as to promote coordinated regional development.

1.0.4 In addition to this guide, sustainable hydropower assessment shall also comply with the provisions of the current relevant national standards.

2 Terms

2.0.1 sustainability of hydropower project: On the basis of technical feasibility, safety and

reliability, the continuous improvement of a project during its design, construction and operation in terms of social harmony, environmental friendliness, efficient management and economic rationality, so as to achieve coordination with the regional society, economy and environment and to promote the socio-economic, environmental and management sustainability of the hydropower project.

2.0.2 comprehensive utilization benefit: The benefits of multi-purpose utilization, other than power generation, that a hydropower project delivers according to design requirements, such as flood control, water supply, improvement of the ecological environment, irrigation, navigation, waterlogging control, fisheries, tourism and regulation compensation.

2.0.3 carbon substitution effect: The benefit of reduced greenhouse gas emissions resulting from a hydropower project substituting for the consumption of high-carbon energy sources.

2.0.4 equivalent available factor (EAF): The percentage of unit available time within a given period, taking into account the effect of derating of the hydropower station output.

2.0.5 median: In a set of data arranged in order with an odd number of values, the value located in the middle position; in a set with an even number of values, the arithmetic mean of the two values located in the middle position.

2.0.6 economic benefit of environmental impact: The monetized value of the direct and indirect environmental benefits brought about by the beneficial environmental impacts of a hydropower project.

2.0.7 economic cost of environmental impact: The monetized value of the ecological and environmental costs incurred and of the environmental protection investment made for the adverse environmental impacts of a hydropower project.

2.0.8 environmentally sensitive object: The various natural and cultural protected areas, ecologically sensitive areas, areas of social concern, protected species and their important habitats, water intakes of all kinds, concentrated residential areas and the like that may be affected by a hydropower project.

3 Basic Requirements

3.0.1 The sustainability assessment of a hydropower project shall be carried out by the three stages of design, construction and operation, focusing on the economic feasibility, environmental feasibility and social acceptability of the project as well as its level of project management, and covering the three aspects of socio-economic sustainability, environmental sustainability and management sustainability. The stage to be assessed shall be selected according to the implementation status and needs of the assessment object.

3.0.2 The assessment object shall meet the following basic requirements: (1) there are no constraining factors arising from environmental protection laws and regulations; (2) no major design change has occurred, or a major design change has occurred but complies