

This is a preview of "IWA 33-2:2019". [Click here to purchase the full version from the ANSI store.](#)

AGREEMENT

First edition
2019-12

Technical guidelines for the development of small hydropower plants —

Part 2: Site selection planning



Reference number
IWA 33-2:2019(E)

© ISO 2019

This is a preview of "IWA 33-2:2019". [Click here to purchase the full version from the ANSI store.](#)



COPYRIGHT PROTECTED DOCUMENT

© ISO 2019

All rights reserved. Unless otherwise specified, or required in the context of its implementation, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
CP 401 • Ch. de Blandonnet 8
CH-1214 Vernier, Geneva
Phone: +41 22 749 01 11
Fax: +41 22 749 09 47
Email: copyright@iso.org
Website: www.iso.org

Published in Switzerland

This is a preview of "IWA 33-2:2019". Click here to purchase the full version from the ANSI store.

Contents

	Page
Foreword	v
Introduction	vi
1 Scope	1
2 Normative references	1
3 Terms and definitions	1
4 Planning principles	1
5 Planning scope	2
6 Planning methods and steps	2
7 Basic data collection and analysis	3
7.1 Data collection.....	3
7.2 Data analysis.....	4
8 Computation of river basin or sub-basin hydropower potential	5
9 Preliminary planning of site	7
9.1 Planning content and main considerations.....	7
9.2 Types of SHP stations and applicable conditions for development.....	7
9.2.1 Dam-type hydropower station.....	7
9.2.2 Diversion-conduit-type hydropower station.....	7
9.2.3 Reservoir-based, run-of-river hydropower station (hybrid).....	8
9.3 Utilization of several special geographical conditions of rivers.....	8
9.3.1 Utilization of natural waterfalls.....	8
9.3.2 Utilization of rapids or natural waterfalls.....	8
9.3.3 Utilization of river bends.....	8
9.3.4 Utilization of the fall on an irrigation channel.....	8
9.3.5 Utilization of kinetic energy of flowing waters in a river or canal.....	8
9.4 Estimation of the development scale of a hydropower station.....	8
10 Site surveys and investigations	9
10.1 Hydrological surveys.....	9
10.2 Surveys on the planning site.....	10
10.2.1 Dam site surveys.....	10
10.2.2 Plant site surveys.....	10
10.2.3 Water conveyance line surveys.....	10
10.2.4 Reservoir survey.....	10
10.3 Preliminary determination of available water heads for the hydropower station.....	10
10.4 Other construction conditions for investigation.....	10
11 Preparation of site construction plan	11
11.1 Selection of installed capacity.....	11
11.2 Selection of turbine types.....	11
11.3 Number of units.....	11
11.4 Selection of dam type.....	11
11.5 Selection of spillway structures.....	12
11.6 Selection of water intake structures.....	12
11.7 Selection of diversion structures.....	12
11.8 Types of powerhouse.....	13
11.9 Location of switchyard.....	13
11.10 Location of tailrace.....	13
11.11 Layout of main structures.....	13
12 Preliminary assessment of social and environmental impacts	13
13 Assessment of power demand	14

This is a preview of "IWA 33-2:2019". [Click here to purchase the full version from the ANSI store.](#)

14	Cost estimation and benefits assessments	14
15	Evaluation of planning site and development sequence recommendations	15
16	Preparation of site selection planning report	15
Annex A (informative)	Computation of theoretical potential of river water energy, estimation formula for installed capacity on a planned site	16
Annex B (informative)	Schematic diagram of development types and special terrain utilization of SHP stations	19
Annex C (informative)	Outline of a site selection planning report	24
Annex D (informative)	Workshop contributors	29

This is a preview of "IWA 33-2:2019". [Click here to purchase the full version from the ANSI store.](#)

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular, the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation of the voluntary nature of standards, the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the World Trade Organization (WTO) principles in the Technical Barriers to Trade (TBT), see www.iso.org/iso/foreword.html.

International Workshop Agreement IWA 33 was approved at a workshop hosted by the Standardization Administration of China (SAC) and Austrian Standards International (ASI), in association with the International Center on Small Hydro Power (ICSHP), held in Hangzhou, China, in June, 2019.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

A list of all parts in the IWA 33 series can be found on the ISO website.

Introduction

Small hydropower (SHP) is increasingly recognized as an important renewable energy solution to the challenge of electrifying remote rural areas. However, while most countries in Europe, in North and South America and in China have high degrees of installed capacity, the potential of SHP in many developing countries remains untapped and is hindered by a number of factors including the lack of globally agreed good practices or standards for SHP development.

The technical guidelines for the development of small hydropower plants contained in this document address the current limitations of the regulations applied to technical guidelines for SHP plants by applying the expertise and best practices that exist across the globe. It is intended for countries to utilize this document to support their current policy, technology and ecosystems. Countries that have limited institutional and technical capacities will be able to enhance their knowledge base in developing SHP plants, thereby attracting more investment in SHP projects, encouraging favourable policies and subsequently assisting in economic development at a national level. This document will be valuable for all countries, but especially allow for the sharing of experience and best practices between countries that have limited technical know-how.

This document is the result of a collaborative effort between the United Nations Industrial Development Organization (UNIDO) and the International Network on Small Hydro Power (INSHP). About 80 international experts and 40 international agencies were involved in this document's preparation and peer review. This document can be used as the principles and basis for the planning, design, construction and management of SHP plants up to 30 MW.