



UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION



SSTIC Impact Stories

Technical guidelines for small hydropower

SUMMARY

The project aims to develop a small hydropower (SHP) technical guideline which will serve as basis for the development of international standards for SHP development. The project will be part of UNIDO effort with the strategic partner at helping developing countries in the application of clean energies. Funded by the Government of China, the project promotes creating job opportunities through sustainable industrialization.



ICSHP team visiting UNIDO HQ in Jan. 2018

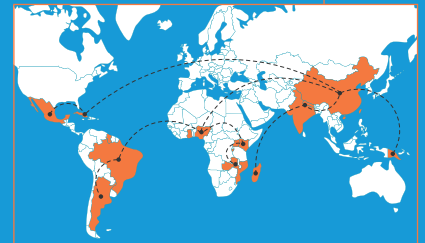
WORKING TOWARDS THE SDGs



SOUTH SOUTH COUNTRIES:

China, India, Nigeria, Kenya, Zambia, Micronesia, Nepal, Mexico, Madagascar, Papua New Guinea, Guyana, Cuba, Argentina, Brazil, Burundi, Ghana, Mozambique, Uganda

IDENTIFIED COUNTRIES:



SOUTH SOUTH PARTNERS:

- International Center on Small Hydro Power (ICSHP)
- Standardization Administration of the People's Republic of China (SAC)

DONORS & SUPPORTED BY:

- Government of China

FOLLOW US:



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SSTIC Highlights

129 experts of small hydropower and standards from 29 countries and international/regional organizations have participated in the IWA33 workshops in June 2019 and October 2021, including India, Nigeria, Kenya, Zambia, Micronesia, Nepal, Mexico, Madagascar, Papua New Guinea, Guyana, Cuba, Argentina, Brazil, Burundi, Ghana, Mozambique and Uganda.

Technical guidelines were drafted, and reviewed and a consensus was reached during the workshops.

The focus of the workshops was on small hydropower and standards. Some countries have developed successful small hydropower (SHP) technologies and established related guidelines/standards for SHP.

The SHP technologies and standards effectively support SHP planning, design, manufacturing, construction, operation and management within the country and/or region.



WHAT IS SSTIC?

South-South and Triangular Industrial Cooperation (SSTIC)

Is a process whereby two or more developing countries pursue their individual and/or shared national capacity development objectives through exchanges of knowledge, skills, resources and technical know-how, and through regional and interregional collective actions. UNIDO's SSTIC services are following the guiding principles for South-South cooperation set out in the Buenos Aires outcome document:

- 1 respect for national sovereignty
- 2 mutual benefit
- 3 national ownership and independence
- 4 equality
- 5 non-conditionality
- 6 non-interference in domestic affairs

SSTIC Project Narrative

Currently, only a few technical guidelines, standards and regulations involved with respect to SHP are available and some are included in relevant documents on energy, hydropower plant and power system. Most of the existing guidelines are used to deal with all sizes of hydropower, which are not suitable for SHP.

Therefore, in order to promote SHP development in a consistent way, an integrated SHP technical guideline and systematic standard are necessary. The SHP guidelines and standards should take costs into consideration as SHP has to be affordable to DCs. The useful and applicable technologies selected should not only conform to the product quality and safety, but also accord with reasonable and effective economic principles. Furthermore, the selection of the standards directly impacts the project cost, benefit and construction period and sometimes it is even the key factor that determines whether a project is feasible.

It is thus important and urgent to develop international standards for SHP through the support from technical guidelines that meet the demand of most countries for SHP development and international cooperation, so as to promote and accelerate Inclusive and Sustainable Industrial Development (ISID) and the achievement of UN Sustainable Development Goals by 2030.

This project stresses the importance of establishing a common framework for SHP planning, construction and operation worldwide which will borrow and compile best practices from existing SHP standards, allowing a more consistent development of the technology.



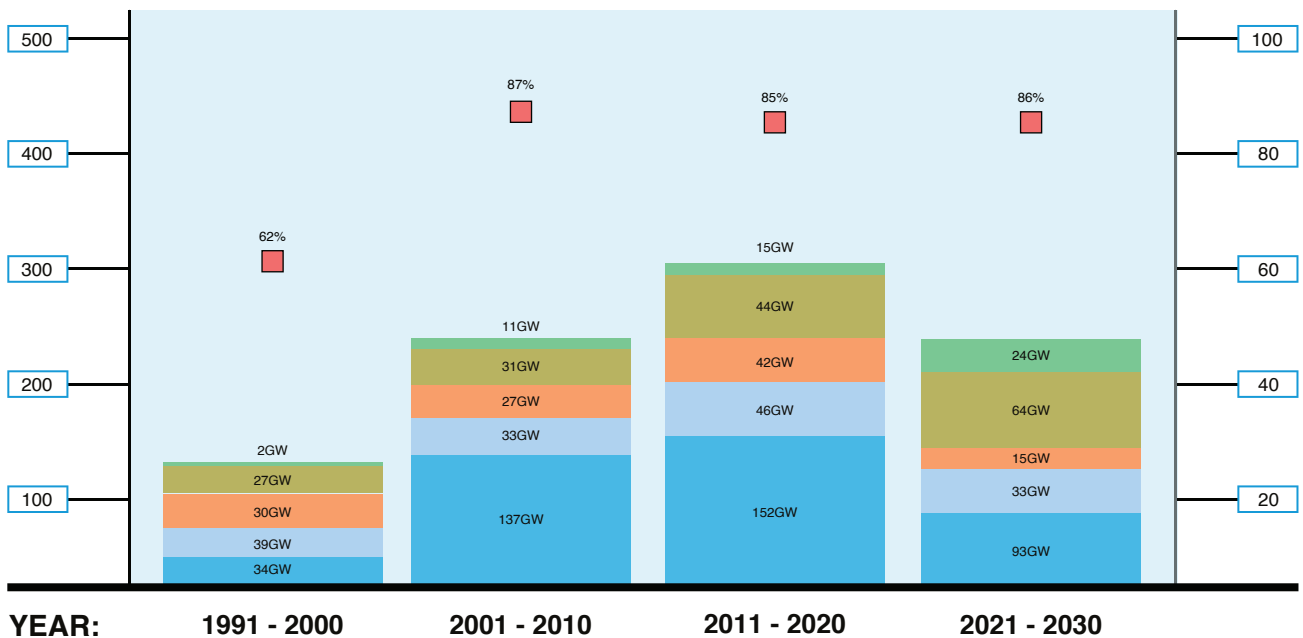
IWA Workshop held in June 2019 in Hangzhou, China



GLOBAL NET HYDROPOWER capacity additions by region, 1991-2030

**TOTAL
GROWTH**

**(%) TOTAL
PERCENTAGE**



- China
- Asia Pacific
- Europe, Eurasia & North America
- Latin America
- Africa & Middle East
- Share of emerging and developing countries

1

THE CHALLENGE

What the project aims to achieve.

The project aims to develop a SHP technical guideline which will serve as basis for the development of international standards for SHP development, so as to facilitate green, regulated, ordered and healthy development of SHP.

Hydropower is the backbone of low-carbon electricity generation, providing almost half of it worldwide today. Hydropower's contribution is 55% higher than nuclear's and larger than that of all other renewables combined, including wind, solar PV, bioenergy and geothermal. In 2020, hydropower supplied 17% of global electricity generation, the third-largest source after coal and natural gas. Over the last 20 years, hydropower's total capacity rose 70% globally, but its share of total generation stayed stable due to the growth of wind, solar PV, coal and natural gas.

2

THE SOLUTION

The methodology used that led to successful outcomes, outcomes achieved.

The project will follow ISO International Workshop Agreements (IWA) model, and will be coordinated through a Project Steering Committee consisting of representatives of Ministry of Commerce (MOFCOM) of the Government of China, UNIDO, International Center on Small Hydro Power (ICSHP), Standardization Administration of the People's Republic of China (SAC) and other major stakeholders. ICSHP as the main national executing agency will cooperate with UNIDO and the SAC in the execution of this project.

It is expected that international experts from stakeholder organisations will be invited to provide input for the project. There will be several international peer reviews to set the path for the development of the technical guidelines, furthermore, for an international standard development for SHP.



Small Hydropower Technical Guidelines booklets



3

SOUTH-SOUTH IMPACT

How were South-South and Triangular cooperation utilized to achieve results?

In order to promote the development of SHP, some countries have developed successful SHP technologies and further established related guideline/standards for SHP. These technologies and standards effectively support the SHP planning, design, manufacturing, construction, operation and management within the country and/or the region.

129 experts of small hydropower and standards from 29 countries and international/regional organizations have participated in the IWA33 workshops in June 2019 and October 2021, including India, Nigeria, Kenya, Zambia, Micronesia, Nepal, Mexico, Madagascar, Papua New Guinea, Guyana, Cuba, Argentina, Brazil, Burundi, Ghana, Mozambique, Uganda, etc where the technical guidelines are drafted, reviewed and consensus are reached.

4

SUSTAINABILITY AND REPLICABILITY

How is it sustainable and replicable?

The existence of an internationally recognised standard for SHP will lead to flourishing investment and benefit local businesses in and around rural areas where SHP potential resides. Through them, the benefits will accrue to individuals and enterprises that will be provided with reliable energy services and renewable energy as a stimulus to rural development and income generation activities. In the process, these communities, i.e. women, men and children, will have improved access to energy, and linking energy services to productive uses while achieving inclusive and sustainable industrial development.

SHP/TGS—WHAT WILL THEY DO?

The TGs can be taken as a principle and basis for planning, designing, constructing and managing SHP plants up to 30 MW. The TGs are divided into the following five key topics that address the multi-faceted nature of SHP development:



The Units

Guidelines specify the technical requirements for SHP turbines, generators, hydropower turbine governing systems, excitation systems, main valves as well as monitoring, control, protection and DC power supply systems.



The Construction

Guidelines can be used as the technical guidance document for the construction of SHP projects.



The Management

Guidelines provide technical guidance for the management, operation, maintenance, technical renovation and project acceptance of SHP projects.



The Terms and Definitions

Specify the professional technical terms and definitions commonly used for SHP plants.



The Design

Guidelines provide guidelines for basic requirements, methodology and procedure in terms of site selection, hydrology, geology, project layout, configurations, energy calculations, hydraulics, electromechanical equipment selection, construction, project cost estimates, economic appraisal, financing, social and environmental assessments—with the ultimate goal of achieving the best design solutions.



IWA Workshop held in June 2019 in Hangzhou, China

SSTIC Executive Summary

The project funded by the Government of China aims to create technical guidelines for small hydropower (SHP) and international standards for its development. The goal is to promote green, regulated, ordered, and healthy SHP development, create job opportunities through sustainable industrialization, and support clean energy in developing countries. Consensus was reached during workshops and the resulting SHP technologies and standards will support planning, design, manufacturing, construction, operation, and management.

The project aligns with Sustainable Development Goals (SDGs) 5, 7, 9, 13 and emphasizes the need for a universal framework for SHP planning, construction, and operation. It will follow the ISO International Workshop Agreements (IWA) model and be coordinated through a Project Steering Committee comprising representatives of the Ministry of Commerce (MOFCOM), UNIDO, International Center on Small Hydro Power (ICSHP), Standardization Administration of the People's Republic of China (SAC), and other stakeholders. International experts will provide input for the project.

CLICK THE LINKS BELOW FOR MORE INFORMATION



View project in UNIDO OpenData Platform



ISO news for three IWA publications



Technical guidelines



WANT TO LEARN MORE ABOUT SSTIC?

Scan the QR code to access more information about SSTIC. You will be directed to a website or a resource that provides detailed information about the concept, principles, benefits, and examples of SSTIC in action.



www.unido.org/south-south-cooperation



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