



UNITED NATIONS  
INDUSTRIAL DEVELOPMENT ORGANIZATION



# SMALL HYDROPOWER FOR SUSTAINABLE INDUSTRY

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Helping industries and local communities in developing and transition countries advance a sustainable, reliable and low-cost energy source





Qingshuitan SHP, Zhejiang, China  
Photo: @UNIDO

**S**mall hydropower (SHP) is an integral part of a broader UNIDO strategy towards sustainable industrial development and the transition to a clean energy future. UNIDO is a strong advocate of small hydropower since this renewable energy technology provides access to clean and cost-efficient energy, and helps reduce CO<sub>2</sub> emissions, achieve greater energy independence and improve the living standards of local communities. SHP contributes to mitigating climate change and reducing poverty.

well as small and medium-sized enterprises (SMEs) thanks to their higher electricity production capacity and longer expected lifetime. They create opportunities for SMEs development and economic leap-frogging. For remote rural areas, SHP plants can serve as the primary energy source and provide grid stability for isolated grid solutions.

SHP plants are beneficial for industry as



## UNIDO'S EXPERTISE IN SMALL HYDROPOWER

UNIDO has a long track record and expertise in the area of small hydropower. For 20 years, supported by its broad network of international experts, UNIDO has been providing expert knowledge on SHP development and construction. Solutions are adapted to the needs of Member States and their industries, including SMEs, and UNIDO serves as an enabler and a mediator for projects of varying scales. UNIDO targets countries in need of sustainable electricity, least developed, as well as developing countries and countries in transition, that possess an available running water resource network. The Organization develops comprehensive and viable projects (from concept to implementation) by bringing together key elements: partners, knowledge, technologies and funding.



### Benefits of small hydropower

- **Mature, economically viable** technology
- **Low price of produced electricity**
- **Adaptable** for various geographical and infrastructural conditions
- Run-of-river SHP uses the kinetic energy of running water, **without reducing its quantity or quality**
- **Easier and faster** to implement than larger-scale hydropower plants
- Modern small hydropower turbines can **convert as much as 85 per cent** of the available energy into electricity
- Helps **adaptation to climate change** (fresh water storage, flood prevention, isolated grid, pumped water storage as a battery, etc.)
- **Provides grid stability**
- **Best solution for isolated grids** in remote rural areas
- **Works well in hybrid solution** (together with wind or solar power)
- **Good solution for [green hydrogen](#) production**



# UNIDO'S PORTFOLIO FOR SMALL HYDROPOWER

## 1. Small Hydropower Technical Guidelines

Combining global expert cooperation and successful experiences, UNIDO developed its Small Hydropower Technical Guidelines (SHPTGs). The Technical Guidelines are a means of sharing know-how and best practices from all over the world and serve as an important source of information for policymakers, industry and academia. They provide exceptional technical and multidisciplinary support for each stage of a project: site selection, planning, pre-feasibility study, feasibility study, construction, installation, operation and management.




 [See our collection of SHPTGs](#)

## 2. World Small Hydropower Development Reports

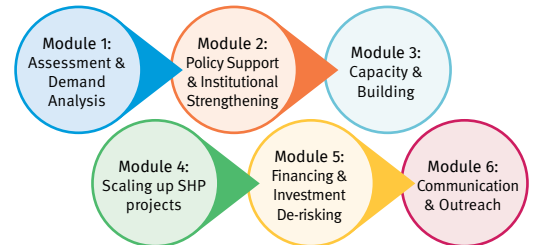
The World Small Hydropower Development Reports (WSHPDRs) are the result of a collaborative effort among UNIDO, the International Center on Small Hydro Power (China) and over 200 local and regional partners (small hydropower experts, organizations, engineers, academics and ministries across the globe). WSHPDRs provide baseline information, successful experiences and a strategic outlook for countries to develop their renewable energy plans. The Reports are an important knowledge resource for the global development of small hydropower and serve as a crucial guide for policymakers and investors.



 [See our collection of WSHPDRs](#)

## 3. Small Hydropower Service Package

The Small Hydropower Service Package, currently under development, is a model that facilitates the mobilization of partners, investments and other resources and helps create synergies to achieve a more significant development impact. The approach comprises six modules, which enable UNIDO to develop projects that are best suited to a country-specific context and future climate change scenarios.

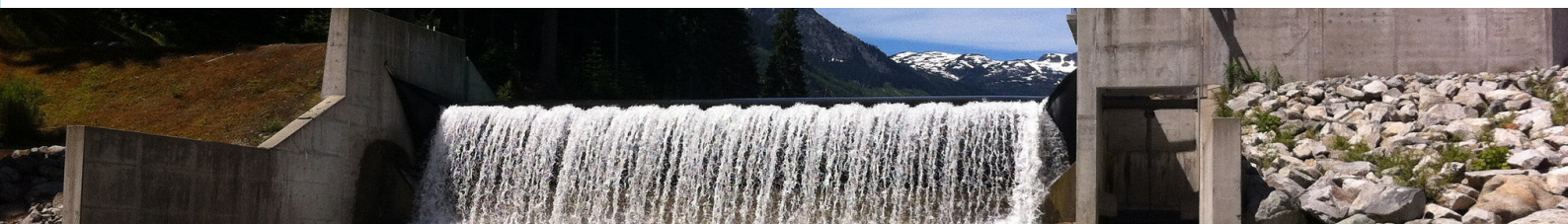


## 4. Field projects in eighteen countries on three continents

Worldwide in 2022, 21 SHP plants are operational and 18 are under construction. Technical support for UNIDO's SHP projects on the global level is provided by the [International Center on Small Hydro Power in Hangzhou](#).



 [Find our country activity-reports from different years](#)



## UNIDO's achievements in the area of small hydropower (by 2022)

- UNIDO is recognized as a **global expert / knowledge provider in small hydropower solutions**
- **18 ongoing SHP projects** (51 MW in total)
- **21 SHP plants currently operational** in 12 countries with a combined capacity of 11 MW
- **3 international SHP centres established**
- **An estimated 5,000 homes and businesses** gained access to electricity from UNIDO-developed SHP plants
- **Small Hydropower Technical Guidelines** are available on the UNIDO website
- **Keeping abreast of new trends:** 4 editions of the World Small Hydropower Development Report
- **Mobilized US\$ 200 million** in co-funding and US\$ 30 million in funding for SHP-related projects over the last 10 years

**Example:** Thanks to the UNIDO SHP project in Liberia, electricity connections were provided to 2,500 families, 5 schools, 2 health clinics, 1 hospital and several commercial establishments



## SHP AND GENDER

Small hydropower reduces the women's and girls' burden of homework and saves them time on labour-intensive tasks and chores. Electrification brings opportunities to women to work outside their homes, and promotes improvements in healthcare and education facilities for women and girls, as well as for men and boys.

In its work on small hydropower, UNIDO provides education and training, and guidance for youth, aiming to reduce the mismatch between youths' skills and employers' needs.



Photo: @ Atif Zeeshan Rauf

## SHP AND SDGS

Small hydropower can provide multiple services – including freshwater management, climate mitigation, and climate adaptation secondary services. It can therefore contribute to the affordable and clean energy goal (SDG 7), as well as clean water (SDG 6), resilient infrastructure (SDG 9) and climate change (SDG 13).







Photo: @UNIDO

## UNIDO SHP FOCAL POINT

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## KEY REGIONAL PARTNER



[International Center for Small Hydropower, Hangzhou, China](#)



## UNIDO'S RECENT PUBLICATIONS ON SMALL HYDROPOWER

gef GLOBAL ENVIRONMENT FACILITY  
 REPUBLIC OF MADAGASCAR  
 ONUDI ORGANISATION DES NATIONS UNIES  
 POUR LE DÉVELOPPEMENT INDUSTRIEL

# Madagascar

ELECTRIFICATION RURALE – PETITE HYDROÉLECTRICITÉ

Newsletter n°04 # 2019 / 2020

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En tant qu'agence d'exécution du Fonds pour l'Environnement Mondial (FEM), l'Organisation des Nations Unies pour le Développement Industriel (ONUDI) a lancé en 2015 le projet intitulé « Amélioration de l'accès à l'énergie à des fins productives par le développement de petites centrales hydroélectriques en zones rurales à Madagascar » en étroite collaboration avec le Ministère de l'Environnement et du Développement Durable (MEDD) ainsi que le Ministère de l'Énergie et des Hydrocarbures (MEH) et leurs entités rattachées.

Cette Newsletter présente une partie des réalisations majeures du projet FEM/ONUDI pour l'année 2019 et prévisions 2020.

En partenariat avec :

MEH  
 MINISTÈRE DE L'ENVIRONNEMENT ET DU DÉVELOPPEMENT DURABLE  
 MINISTÈRE DE L'ÉNERGIE ET DES HYDROCARBURES  
 O.R.E.

ONUDI Madagascar 01 Newsletter n°4 / # 2019/2020

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# Small Hydro Power Projects

Enabling an energy revolution in Tanzania

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[www.unido.org/small-hydropower](http://www.unido.org/small-hydropower)



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