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Evaluation Report Upgrading of China Small Hydropower Capacity

Office of Evaluation and Internal Oversight

**OFFICE OF EVALUATION AND INTERNAL OVERSIGHT
INDEPENDENT EVALUATION UNIT**

Independent Evaluation of UNIDO project:

Upgrading of China Small Hydropower (SHP) Capacity Project

**UNIDO Project ID 140196
GEF Project ID 6919**



**UNITED NATIONS
INDUSTRIAL DEVELOPMENT ORGANIZATION**

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Abstract

This report presents the terminal evaluation of the project titled “Upgrading of China Small Hydro Power Capacity,” which aimed to enhance the environmental sustainability of small hydropower (SHP) plants in China. Implemented during the 13th Five-Year Plan (2016-2020), the project focused on reducing greenhouse gas (GHG) emissions and fossil fuel dependency by upgrading existing SHP stations. Managed by UNIDO and executed by the Ministry of Water Resources (MWR) with on-the-ground support from the International Centre on Small Hydropower (ICSHP), the project ran from May 2017 to December 2023 with a total GEF investment of USD 8,925,000. The evaluation was conducted from September 2023 to January 2024 and assessed project performance along OECD/DAC criteria. Data collection methods included stakeholder consultations, field visits, and online data collection, employing a six-point rating scale for assessment. Key findings highlighted the project’s alignment with China’s development priorities, relevance to environmental goals, and coherence with GHG decarbonization objectives. The evaluation identified achievements in establishing green SHP standards, demonstrating environmental benefits, and promoting gender mainstreaming. Partnerships between UNIDO, MWR, and ICSHP were deemed effective, although deeper engagement with non-water sector stakeholders was recommended. The project demonstrated adaptability during the COVID-19 pandemic and met co-financing targets, but sustainability concerns were raised regarding future funding for SHP certification. Recommendations focused on enhancing engagement with non-water sector stakeholders, disseminating project results nationally and internationally, raising awareness of green SHP benefits, and expanding ecological flow assessments. UNIDO was urged to advocate for project outcomes in policy dialogues and promote environmental results globally. Overall, the evaluation emphasized the project’s positive contributions to China’s SHP sector and recommended strategies for maximizing its impact on energy transition, rural development, and environmental conservation.

Contents

Abstract.....	3
Contents	4
Acknowledgements.....	5
Abbreviations and Acronyms	6
Glossary of Evaluation Related Terms.....	7
Executive Summary	9
1. Introduction.....	14
1.1 Evaluation Purpose and Scope.....	14
1.2 Evaluation Objectives and Scope	14
1.3 Theory of Change.....	16
1.4 Methodology	17
1.5 Limitations.....	19
2. Project Background and Context	20
2.1 Project factsheet.....	20
2.2 Project Background and Context.....	20
3. Findings	24
3.1 Project Design.....	24
3.1.1 Overall Design	24
3.1.2 Project Results Framework.....	24
3.2 Relevance	25
3.3 Coherence.....	26
3.4 Effectiveness.....	26
3.5 Efficiency	27
3.6 Sustainability.....	27
3.7 Progress to Impact	28
3.8 Gender Mainstreaming.....	29
3.9 Project Implementation Management	29
3.10 Performance of Partners	30
3.11 Environmental Safeguards	31
3.12 Social Safeguards	32
3.13 Project Ratings	32
4. Conclusions, Recommendations and Lessons Learned.....	34
4.1 Conclusions.....	34
4.2 Recommendations	35
4.3 Lessons Learned	36
5 Management Response Sheet	37
Annex 1: Evaluation Terms of Reference.....	41
Annex 2: Evaluation Framework / Matrix.....	57
Annex 3: List of Documentation Reviewed	64
Annex 4: List of Stakeholders Consulted	67
Annex 5: Project Logframe.....	69
Annex 6: Interview Questionnaires	70
Annex 7: Materialization of Co-financing.....	83

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Evaluation team:

Frank Pool, team leader

Su Zhang, team member

Abbreviations and Acronyms

Abbreviation	Meaning
ESMP	Environmental and Social Management Plan
FYP	Five Year Plan (12 th 2011-2015, 13 th 2016-2020, 14 th 2021-2025)
GEF	Global Environment Facility
GHG	Greenhouse Gas
GWh	Giga Watt hours
ICSHP	International Centre on Small Hydropower
MARA	Ministry of Agriculture and Rural Affairs (of PR China)
MEE	Ministry of Ecology and Environment (of PR China)
MOF	Ministry of Finance (of PR China)
MPE	Mid-term Performance Evaluation
MW	Mega Watts
MWR	Ministry of Water Resources (of PR China)
MWh	Mega Watt hours
NDRC	National Development and Reform Commission (of PR China)
PIF	Project Information Form (of GEF)
PMO	Project Management Office
PSC	Project Steering Committee
SHP	Small Hydropower
tCO ₂ e	tonnes CO ₂ equivalent
TE	Terminal Evaluation
ToC	Theory of change
ToR	Terms of reference
UNIDO	United Nations Industrial Development Organisation

Glossary of Evaluation Related Terms

Term	Definition
Baseline	The situation, prior to an intervention, against which progress can be assessed.
Effect	Intended or unintended change due directly or indirectly to an intervention.
Effectiveness	The extent to which the objectives of a development intervention were or are expected to be achieved.
Impact	Positive and negative, primary and secondary, intended and non-intended, directly and indirectly, long term effects produced by a development intervention.
Indicator	Quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement, to reflect the changes connected to an intervention, or to help assess the performance of a development actor. Means by which a change will be measured.
Intervention	An external action to assist a national effort to achieve specific development goals.
Lessons learned	Generalizations based on evaluation experiences that abstract from specific to broader circumstances.
Logframe (logical framework approach)	Management tool used to guide the planning, implementation and evaluation of an intervention. System based on MBO (management by objectives) also called RBM (results-based management) principles.
Outcome	The achieved or likely short-term and medium-term effects of an intervention's outputs.
Outputs	The products, capital goods and services which result from a development intervention; may also include changes resulting from the intervention which are relevant to the achievement of outcomes.
Recommendations	Proposals aimed at enhancing the effectiveness, quality, or objectives; and/or at the reallocation of resources.

Relevance	The extent to which the objectives of a development intervention are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donor's policies. Note: Retrospectively, the question of relevance often becomes a question as to whether the objectives of an intervention or its design are still appropriate given changed circumstances.
Results-Based Management (RBM)	A management strategy – at project and programme, portfolio, organizational, country, and global levels – based on managing for the achievement of intended results within a given context by integrating a results philosophy and principles into all aspects of management and by integrating good practices and lessons learned from past performance into management decision-making.
Review	A systematic and evidence-based self-assessment of the performance of a programme or project, aiming at determining performance against established criteria. It can be conducted internally, i.e. by personnel directly involved in a programme or project, or externally, i.e. by personnel hired specifically for the purpose of conducting the review, whereby the overall responsibility for the review rests with the programme or project management. Reviews can be carried out at different stages of the programme or project life cycle, i.e. for programmes and projects with start and end dates as mid-term reviews (MTRs) and terminal self-evaluations.
Risks	Factors, normally outside the scope of an intervention, which may affect the achievement of an intervention's objectives.
Sustainability	The continuation of benefits from an intervention, after the development assistance has been completed. The probability of continued long-term benefits. The resilience to risk of the net benefit flows over time.
Target group	The specific individuals or organizations for whose benefit an intervention is undertaken.
Theory of change	Theory of change or programme theory is similar to a logic model, but includes key assumptions behind the causal relationships and sometimes the major factors (internal and external to the intervention) likely to influence the outcomes.

Executive Summary

This report captures the terminal evaluation of the project, entitled “Upgrading of China Small Hydro Power Capacity”. The project aimed to reduce the environmental impact of small hydropower (SHP) plants and support the SHP Capacity Expansion and Efficiency Improvements Programme, a national initiative implemented during the 13th Five-Year Plan (FYP) period (2016-2020). The objective of the project was to reduce greenhouse gas (GHG) emissions and dependence on fossil fuels through upgrading, greening and improving the management of existing SHP stations. It was managed by UNIDO and implemented by the Ministry of Water Resources (MWR). The on-the-ground execution of the SHP project was undertaken by the International Centre on Small Hydropower (ICSHP). The project was implemented from May 2017 to December 2023, which included an extension of 19 months. The total GEF investment was USD 8,925,000 and the envisaged co-financing totalled USD 74,578,448. The project has four components: (1) Policy and institutional framework; (2) Technology demonstration; (3) Capacity building and increasing knowledge base; (4) Monitoring and Evaluation.

The evaluation covers the whole duration of the project from May 2017 to December 2023 and includes two specific objectives: (1) Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability, coherence, and progress to impact; (2) Develop a series of findings, lessons learned and recommendations for enhancing the design and implementation of projects by UNIDO and other GEF partners.

The evaluation took place from September 2023 to January 2024. Four main instruments for data collection were employed in the evaluation: (1) desk and literature review of the project documents; (2) consultations with 58 stakeholders, including implementing and executing agencies, contractors and beneficiaries; (3) field visits to Beijing, Guangxi and Zhejiang provinces where the project’s major stakeholders and four demonstrations were located; and (4) online data collection of government policies and regulations.

The evaluation team triangulated reported results with data collected through interviews, surveys, and document review. According to GEF Guidelines and UNIDO guidance, a six-point rating scale was used to assess outcomes, sustainability, quality of monitoring and evaluation, and quality of implementation and execution. The evaluation was limited by time allowed for the field visits, completion of some project work, and availability of some stakeholders.

Key Findings

Project design: The overall project design was consistent with China’s overarching development priorities at that time and UNIDO’s Inclusive and Sustainable Industrial Development approach. The project results framework provided a good summary of the baseline situation in a numerical sense. However, the link from the SHP project’s activities and their outputs to the desired outcomes¹ was limited to those activities/outputs that the project

¹ Outcomes are “the likely or achieved short-term and medium-term effects of an intervention’s outputs”, which is defined by the Guidelines for GEF Agencies in Conducting Terminal Evaluation for Full-sized Projects.

could control, and did not pay sufficient attention to factors outside the project's control (assumptions and risks).

Relevance: The project was highly relevant to the green re-development needs and suitably aligned with the 13th FYP's emerging focus on enhancing the green aspects of SHPs, especially on the provision of minimum environmental flows in SHP affected river sections. However, despite the SHP project's relevance to China's 2030 GHG emission goals and 2060 carbon neutrality goal, the 14th FYP (2021-2025) did not allocate funding for renovations of older SHPs nor did it prioritize SHPs in renewable energy development.²

Coherence: The project is coherent with China's GHG decarbonisation agenda and supports China's sustainable development, especially related to providing minimum ecological flows in SHP affected sections of rivers. The project is compatible with other interventions in China that aim to increase the uptake of green and safe SHP power generation and boost rural development. However, new policies on the removal of SHPs in protected areas interrupted some project demonstrations, leading to the inevitable loss of investments already made.

Effectiveness: The project achieved its key specific results by: establishing an enhanced green SHP standard; demonstrating the cost-effectiveness, environmental and social benefits of green and safe certified SHPs; and communicating the project's results to relevant groups to stimulate follow-on green and safe SHP replications.

Efficiency: The specified SHP project outputs and results were largely delivered, in a timely manner, and within budget. The designated inputs of key counterparts were provided as planned and in a timely manner. However, there appears to have been some duplication in the scope of some of the project-supported studies.

Sustainability: The project provided knowledge and capacity built in MWR, ICSHP, and water sector institutions are likely to persist over time. The provision of e-flows by SHPs is expected to be sustainable. The enhanced SHP installed capacity and efficiency will keep contributing to GHG emission reduction efforts. The sustainability and expansion of the SHP project's impacts on the whole SHP sector depends on whether there will be suitable new government retrofit incentives and an enhanced policy prioritisation in the upcoming 15th FYP, as well as on provincial-level green SHP preferential tariffs, tradeable renewable energy certificates, carbon credits, etc.

Progress to impact: The project has made a positive difference to China's SHP sector, with indications that experience sharing has led to other SHP renovations, and contributed to the growing numbers of green certification and safe production assessments being passed. A positive sign is that green preferential tariffs have been introduced in one of the project's pilot provinces. However, the SHP project's potential impact could have been enhanced if the project could have been more involved with non-water sector key stakeholders at the central level, which are critical in providing SHP renovation economic incentives such as green preferential tariffs, carbon credits, income from pumped energy storage, and in enhancing SHP's profile in rural development policies.

² The 14th FYP period coincided with the Covid-19 pandemic, where available government funds were largely allocated to pandemic related expenditure needs.

Gender mainstreaming: The SHP project took a consistent and strong approach in gender mainstreaming throughout the project cycle from planning, contracting, delivery, and monitoring of project activities.

Project implementation management: The project implementation was results-based, with all project outputs well documented and clearly filed. The project reflected good knowledge management practices. Both the Steering Committee and Project Management Office demonstrated adaptive management and took suitable mitigation actions in response to COVID-19 constraints and the withdrawal of demonstration SHPs. Best practice on technical support on the certification and scale-up of demonstration results could have been better documented.

Performance of partners: UNIDO, MWR and ICSHP worked closely and effectively to steer the implementation of the project. UNIDO was effectively involved in project approval and contracted service providers directly through its procurement system. MWR provided high-level support to the project and backed the revision of the Green SHP Evaluation Standard. ICSHP had the necessary strong technical and institutional capacity to work with the pilot provinces on developing and implementing the demonstrations. Partners in pilot projects demonstrated strong commitment and excellent knowledge about the project. The provincial level PMUs worked closely alongside local SHP owners and other provincial government agencies. However, it appears that MWR and the project could have engaged more deeply with other national level stakeholders outside the water sector.

Environmental safeguards: The project made its expected contribution to GHG emission reduction through improved SHP power generation capacity and efficiency. The project mitigated negative impacts through introducing environmental and social management plans (ESMP) and monitoring environmental performance of SHPs. It improved river longitudinal connectivity through the implementation of minimum e-flows. The project also supported biodiversity conservation through the revised Green SHP Standard and wetland restoration, but there was no consistent approach to monitor the project's impact on biodiversity.

Social safeguards: The project engaged local communities through the ESMP development - which required the SHP property owners to meet villagers and learn their needs. While retrofitting their SHPs, the property owners helped improve roads, bridges, and facilities related to irrigation, lighting, and water supply for villagers living nearby. The implementation of year-round e-flows attracts urban tourists, which in turn increases opportunities for local communities to earn non-agricultural income.

Key Conclusions

In conclusion, the evaluation team found that:

1. The original project design was the result of suitably comprehensive analysis and was appropriate for its time (2014-2016) in China.
2. The planned project outputs were largely achieved and documented. The project's most significant achievements were the improvement of China's Green SHP Standard and the technical support provided to retrofit the 19 demonstration SHPs.

3. The project produced impressive SHP environmental and social benefits. The project's work on gender mainstreaming was thorough and consistent.
4. The project's partners were committed and collaborative in general, guided by an effective Steering Committee. Engagement with non-water sector stakeholders at the provincial level was evident, but was limited at the national level. This reduced the project's potential wider impact on energy and climate policy, and on public perception.
5. The project's management was effective and suitably adaptive, especially during the nearly 3 years of China's Covid-19 lockdowns.
6. The project met its co-financing targets. Co-financing from key partners were above expectation, in particular from MWR's allied agencies funding SHP green and safe certification from their existing budgets. However, there must be questions as to how sustainable this model will be if specific SHP certification is not properly funded in the upcoming 15th FYP (2026-2030), regardless of provincial level policy and financial incentives.

Key Recommendations

The evaluation team makes the following recommendations:

Recommendations 1 – for MWR

1. MWR should undertake systematic outreach to, and engagement with, key non-water sector agencies and stakeholders regarding the role of SHPs as a key energy transition technology and as a contributor to rural development.
2. MWR should increase its efforts to get green / safe SHP policy and financial incentives and certification funding included in the upcoming 15th FYP (2026-2030), utilising in particular the findings of the four-SHP cost-benefit study as supporting evidence.
3. MWR should work to revise the 10% minimum ecological flow standard to better reflect natural river flow variability and seasonal rainfall patterns. It is also recommended that future SHP green standards have an expanded focus that also includes enhancing and monitoring aquatic biodiversity, especially the conservation of weak swimming non-migratory fish.

Recommendations 2 – for ICSHP, MWR and the wider water sector

4. MWR, related water agencies and ICSHP should actively disseminate the SHP project's results to the estimated 35,000 potential replication SHPs within China.
5. ICSHP, with the support of MWR, should disseminate the SHP project's knowledge and experience to the wider Global South - with potential support from China's South-South Co-operation Funds, or from other sources.

6. MWR, related water agencies, and ICSHP, should raise the profile of green SHPs in China's policy development and public discussions to highlight their social, environmental, and economic benefits.

Recommendation 3 – for UNIDO

7. UNIDO's China office should promote the SHP project's results to China's government in its policy dialogue and cooperation development settings.
8. UNIDO should promote the SHP project's environmental and safety results to other Global South countries through UNIDO's role in SHP promotion, SHP projects, and via the UNIDO regional SHP centres in India and Nigeria.

Lessons Learned

For future UNIDO supported project designs, SMART³ pathways and actions should be included that will more explicitly lead from any project supported demonstrations to replications. This is critical as major impacts will come from the follow-on replications, not from the necessarily limited number of project supported formal demonstrations. In the future project's implementation phase, explicit activities should be included to monitor the project's contribution to replications.

³ Specific, Measurable, Actionable, Realistic, and Time bound

1. Introduction

1.1 Evaluation Purpose and Scope

The project, entitled “Upgrading of China Small Hydro Power Capacity” (hereinafter referred to as ‘the SHP project’), aimed to reduce the environmental impact of small hydropower (SHP) plants and support the SHP Capacity Expansion and Efficiency Improvements Programme, a national initiative implemented during the 13th Five-Year Plan (FYP) period (2016-2020). The objective of the SHP project was to reduce greenhouse gas (GHG) emissions and dependence on fossil fuels through upgrading, greening and improving the management of China’s 43,000⁴ existing SHP stations. UNIDO, in association with the Ministry of Water Resources (MWR), started the formal design stage of the SHP project in August 2014 with the SHP project’s PIF (Project Identification Form) submission to GEF. The SHP project was approved for funding by GEF in June 2016 and the project was implemented from May 2017 to December 2023. The SHP project was expected to run for five years until 2022, but due to COVID-19 disruptions, it was extended until December 2023. The total GEF investment was USD 8,925,000 and the envisaged co-financing totalled USD 74,578,448.

The on-the-ground execution of the SHP project was undertaken by the International Centre for Small Hydropower (ICSHP). ICSHP was formed in 1994 and is a non-profit institution operating under the auspices of UNIDO and MWR, to promote the development of small hydro power. ICSHP’s headquarters are in Hangzhou, China.

The principal use of this terminal evaluation is to provide a structured understanding and assessment of the performance and achievements of the SHP project during the implementation period. This terminal evaluation provides insights into the direction of any follow-up activities and the extent to which lessons from the project can be adopted by the implementing partners and can be used to enhance the design of new, and implementation of ongoing, projects by UNIDO and other GEF partners. The evaluation took place from September 2023 to January 2024.

1.2 Evaluation Objectives and Scope

The evaluation covers the whole duration of the project from May 2017 to December 2023 and includes two specific objectives:

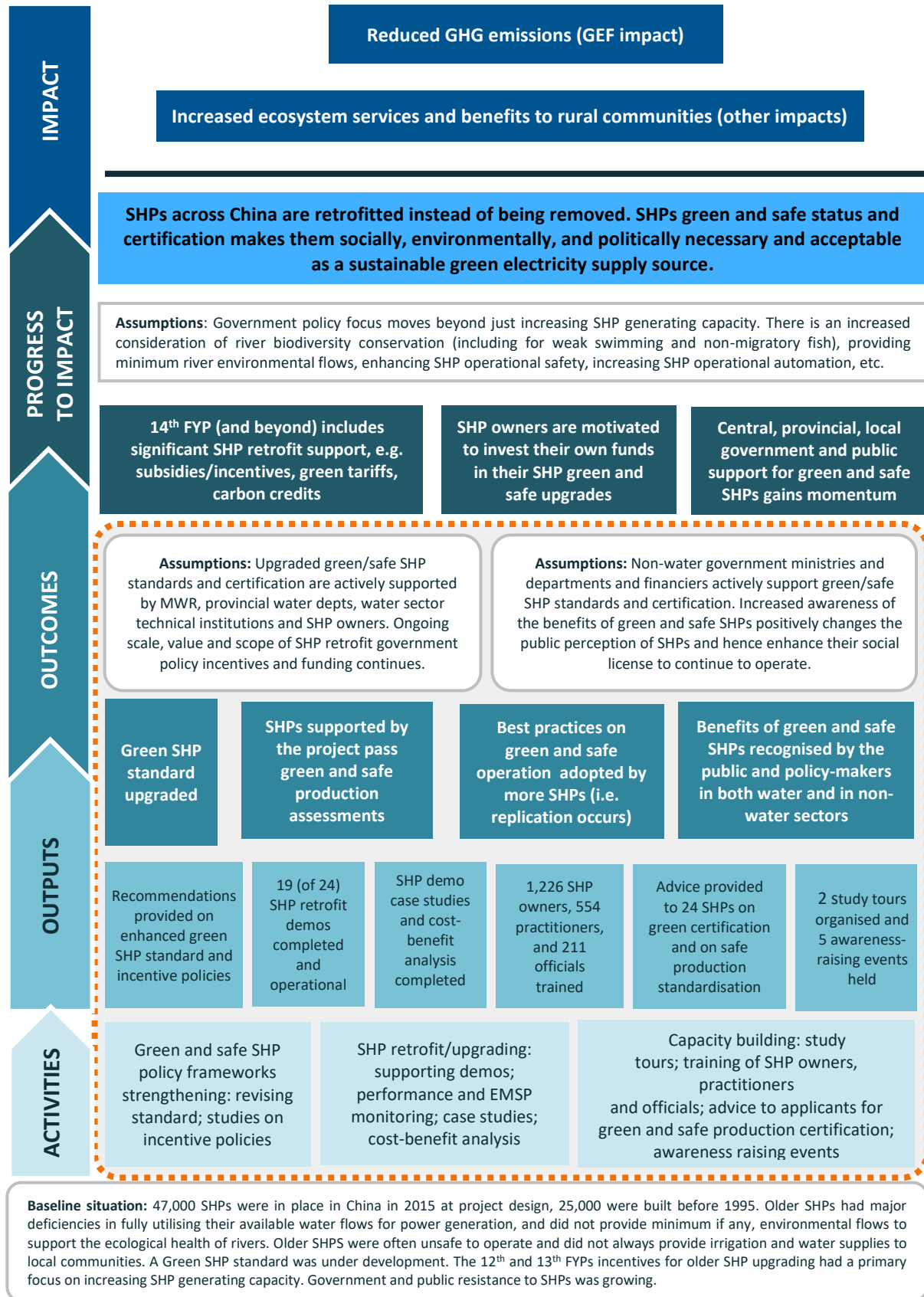
- a. Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability, coherence, and progress to impact; and
- b. Develop a series of findings, lessons learned and recommendations for enhancing the design and implementation of projects by UNIDO and other GEF partners.

⁴ At the project inception period China had 47,000 SHPs (in 2015). An SHP is defined in China as being a hydro power plant having an installed generation capacity of 50 MW or less. In many parts of the world the maximum size of what is called an ‘SHP’ is less than 50 MW.

The specific evaluations questions are listed below:

- 1) Relevance: Was the intervention doing the right things for the improved environmental upgrading of both new and rehabilitated existing SHPs in China? To what extent did the project's objectives and actions respond to national needs, policies, and priorities, including under continued global warming and ecosystem degradation trends?
- 2) Coherence: How well did the intervention fit into China's development goals in decarbonising its energy portfolio and sustaining economic and social development in an ecologically sustainable way? How compatible was the project with other interventions in the country to assist these national goals?
- 3) Effectiveness: Did the project achieve its objectives in the environmental upgrading of SHPs in China? What additional impact has the project generated over what would likely have happened in the absence of the project?
- 4) Efficiency: How well were resources used for achieving the project's objectives? Has the project delivered its results in an economic and timely manner?
- 5) Impact: What difference did the intervention make in China's SHP sector? To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects? Has the project had transformative effects in the SHP sector in China? What impact is the project expected to have on SHP development elsewhere in the world?
- 6) Sustainability: Will the benefits last? To what extent will the net benefits of the project continue, or be likely to continue, post project-end?

1.3 Reconstructed Theory of Change



1.4 Methodology

The evaluation methodology and data collection methods are summarised below, and interview questions are listed in Annex 6.

1.4.1 Data collection methods

Four main instruments for data collection were employed in the evaluation: (1) desk and literature review; (2) stakeholder consultations; (3) field visits; and (4) online data collection. The methods are elaborated as follows:

a. Desk and literature review

The review covered documents related to the project which fall into four categories as follows. Specific documents are listed in Annex 3.

- Approved project documents, including technical feasibility studies of demonstration projects (design reports) and preliminary environmental and social assessments.
- Documents related to project management, including project agreements (including extensions), project management documents, and inception reports.
- Monitoring reports, including annual progress and financial reports from the PMO, audit reports, the mid-term performance evaluation report, progress and technical reports of the implementers and vendor/subcontractors under the first three components, and relevant correspondence.
- Project Steering Committee and management meeting minutes.

b. Stakeholder consultations

The consultations were conducted through structured and semi-structured interviews in a face-to-face manner or remotely. A total of 58 stakeholders were interviewed, who are grouped as follows and listed in Annex 4:

- GEF implementing agency: UNIDO HQ head office and Beijing office
- Executing agencies: Ministry of Water Resources (MWR) and International Centre for Small Hydropower (ICSHP)
- Project Management Offices (PMOs): ICSHP and provincial water departments
- Contractors: ICSHP; demonstration plants; universities and research institutions; individual consultants
- Target beneficiaries: local residents

c. Field visits

The evaluation team travelled to Beijing, Guangxi and Zhejiang Provinces in China from 20-30 November 2023 in order to observe and/or verify reported results achieved by the project and to interview those involved in the SHP project's management and oversight.

The project supported 26 demonstration SHPs at 19 sites, which are located in eight provinces. Given time and budgetary restraints, it was not possible to visit all the SHP project supported demonstrations. The evaluation team selected SHPs in Guangxi and Zhejiang, based on the following rationale:

- Zhejiang is a more developed province and Guangxi is a less developed province, so any impact of the provincial level of development could be explored.
- The selected SHPs in both provinces have a range of installed and upgraded capacities, and they also cover a range in investment magnitude, which then can be used to examine the impacts of these effects.
- Given budget and time limits, the SHPs in the two provinces were relatively easy to access and/or close to each other. In addition, the field visits were combined with interviews with other vendors, especially in the case of Zhejiang province. This made the best use of the limited evaluation team's available time in China.

d. Online data collection

Relevant data, e.g., those related to government policies and regulations, were collected online in order to verify the results achieved by the project.

1.4.2 Data analysis methods

The evaluation has followed the UNIDO Evaluation Policy which requires “analysis of expected and achieved accomplishments, examining the results chain, processes, contextual factors and causality in order to ascertain the degree of achievement or the lack thereof”. The evaluation team triangulated reported results with data collected through interviews, surveys, and document review. A combination of quantitative and qualitative analysis was used to support ratings, conclusions and recommendations.

According to GEF Guidelines and UNIDO guidance, a six-point rating scale is used to assess outcomes, sustainability, quality of monitoring and evaluation, and quality of implementation and execution, where 6 is the highest score (highly satisfactory) and 1 is the lowest (highly unsatisfactory) as per Table 1 below.

Table 1. Project rating criteria

Score		Definition
6	Highly satisfactory	Level of achievement presents no shortcomings (90% - 100% achievement rate of planned expectations and targets).
5	Satisfactory	Level of achievement presents minor shortcomings (70% - 89% achievement rate of planned expectations and targets).
4	Moderately satisfactory	Level of achievement presents moderate shortcomings (50% - 69% achievement rate of planned expectations and targets).
3	Moderately unsatisfactory	Level of achievement presents some significant shortcomings (30% - 49% achievement rate of planned expectations and targets).
2	Unsatisfactory	Level of achievement presents major shortcomings (10% - 29% achievement rate of planned expectations and targets).
1	Highly unsatisfactory	Level of achievement presents severe shortcomings (0% - 9% achievement rate of planned expectations and targets).

1.5 Limitations

This evaluation was limited by the following factors:

- Time constraints limited the field visits to four demonstration SHP complexes in two provinces: Aibu Cascade II and III, and Sandieling in Guangxi Province; and Panxi Cascade II, III and IV, and Qingshuitan in Zhejiang Province. To ensure the samples were representative, the evaluation team employed the following criteria: inclusion of both developed and less developed provinces; inclusion of SHPs with small and large capacities; scale and scope of green upgrading undertaken; size of GEF investment; and accessibility (e.g., in terms of time and authorised permission to travel).
- Some project work was yet to be fully finalised at the time of the evaluation mission in China, including the cost-benefit analysis and the study on hydrological regimes. This was offset by interviews with the researchers who undertook the studies.
- Some stakeholders were not available for interview, such as the Ministry of Finance.

2. Project Background and Context

2.1 Project factsheet

Project title	Upgrading of China SHP Capacity Project
UNIDO ID	140196
GEF Project ID	6919
Country	China, PR
Project donor	GEF
Project approval date/GEF CEO endorsement date	05 May 2016
Actual project start date (First PAD issuance date)	22 May 2017
Planned project completion date (as indicated in project document/or GEF CEO endorsement document)	21 May 2022
Actual project completion date (as indicated in UNIDO ERP system)	31 December 2023
Project duration (year): Planned: Actual:	5 years 6 years and 7 months
GEF Focal Areas and Operational Programme	Climate Change
Implementing agency	UNIDO
Government coordinating agency	Ministry of Water Resources (MWR) & Ministry of Finance (MOF), China P.R.
Executing Partners	International Center on Small Hydropower (ICSHP)
Donor funding	USD 8,925,000
UNIDO input (in kind, USD)	USD 375,000
Co-financing at CEO Endorsement, as applicable	USD 74,578,448
Total project cost (USD), excluding support costs	USD 83,503,448
Mid-term evaluation date	1 Feb 2020

2.2 Project Background and Context

China is home to half of the world's SHP installed capacity. China had around 47,000 SHP stations with a total installed capacity of 75 GW and an annual output of over 220,000 GWh by the end of 2014.⁵ In the past, the construction of SHP plants was encouraged to provide electricity to rural areas and to reduce deforestation undertaken for fuelwood supplies.

⁵ https://www.gov.cn/xinwen/2015-09/20/content_2935615.htm

A total of 22,000 rural SHPs (with 18,000 MW of generating capacity) were constructed before 1995. These ageing SHPs now have inefficient equipment, unsafe infrastructure, high site staffing requirements and minimal, if any, environmental flows. To upgrade old SHPs, China started its SHP Capacity Expansion and Efficiency Improvements Programme for SHP refurbishment in 2011 under the 12th FYP (2011-2015). SHP plants built before 1995 were then eligible for government subsidies to expand their installed capacity and to improve their efficiencies. A total of 4,400 SHPs were refurbished with a main emphasis on capacity expansion, using CNY 8.5 billion (around USD 1.2 billion) of central government subsidies.^{6 7}

China's central government continued funding the SHP capacity expansion of old SHPs under its 13th FYP (2016-2020), covering the capacity expansion of around 2,100 SHP plants. Similar to the 12th FYP, eligible SHP plants were partially subsidised for the costs of capacity expansion and efficiency improvement. As China put increasing emphasis on environmental protection, the 13th FYP programme, which built upon the 12th FYP's SHP upgrading experience, put additional focus on environmental integrity at river basin scales.

The UNIDO-GEF SHP project was designed to leverage the opportunities presented by the 13th FYP programme to address the need to improve the environmental and social sustainability of SHP development and redevelopment in China.

The overall SHP policy landscape in China has significantly evolved since the design phase of the project. After decades of intensive SHP development, controversies emerged around the negative impact of SHP, such as the dewatering of many rivers and the disruption of river connectivity. Negative publicity prompted the central government to issue an environmental policy in 2018, requiring the removal and improvement of SHPs along the Yangtze River Economic Belt. The initiative was later extended to other major rivers, including the Yellow River. In addition, a policy published in 2020 required all SHPs to implement minimum environmental flows. The 14th FYP (2021-2025) did not include any SHP capacity increase/greening funding.⁸

Meanwhile, China's unified power grids have extended to cover most rural areas, which reduces rural areas reliance on SHPs to provide electricity. SHPs are now a lesser national energy policy focus as compared to other renewables, including large-scale wind, utility scale solar and large hydropower. SHPs now account for only 3% of China's 2021 energy mix.

The change of the SHP context in China since the project was designed affected what the project had expected to achieve. For example, four demonstration SHPs that were to be rehabilitated with SHP project support were dismantled instead, as they were located in newly designated protected areas.

The primary focus of the SHP project was sector transformation to a more societally acceptable 'Green SHP' status. MWR published an initial Green SHP Standard in 2014, trials were undertaken until 2017 when it came fully into force, following China's 2012 eco-civilisation strategy. The GEF SHP project then strengthened the Green SHP Standard in 2020.

⁶ http://paper.people.com.cn/zgnyb/html/2023-04/24/content_25979670.htm

⁷ Total funding (including funding from SHP owners) was CNY 24.4 billion, around USD 3.8 billion

⁸ The 14th FYP period coincided with the Covid-19 pandemic, where available government funds were largely allocated to pandemic related expenditure needs.

The project aimed to support the SHP Capacity Expansion and Efficiency Improvements Programme of the Ministry of Water Resources (MWR), by reducing the environmental impact of SHP plants to better meet the challenges imposed by climate change. The objective of this project was to reduce GHG emissions and the dependence on fossil fuels through the promotion of upgrading, greening and improving the management of existing SHP stations, contributing to the competitiveness of China's industries. Alongside important social and economic benefits, the project was expected to improve local river ecology, hence contributing to the adaptation of SHP plants to climate change. It was estimated that additional electricity generation of about 133,585 MWh/year would be obtained through the project activities, resulting in emission reductions of 2.2 million tonnes CO₂e over a 20-year period. The project was expected to transfer knowledge and technology in the field of green hydropower within China, leading to positive environmental impacts.

The SHP project was structured in three technical components, plus a monitoring and evaluation component, as set out below:

Component 1: Policy and institutional framework. This component aimed to strengthen the policy and regulatory framework to effectively promote and support green SHP upgrading by the development of a ministerial standard on green SHP, through support for incentive measures, as well as assisting in the roll-out of SHP safe production standards.

Component 2: Technology Demonstration. This component aimed to demonstrate the technical feasibility and commercial viability of green and safe upgraded SHPs at different capacities that would demonstrate a variety of environmental and safe production measures. Technical assistance and grants were provided to facilitate the SHP projects' development. This was to build the confidence of both industry and the finance sector, create best practice examples to pave the way for replication on the basis of experience gained, reduce (perceived) risk and increase capacity and awareness at multiple levels including the industry level (both at operational and decision-making level).

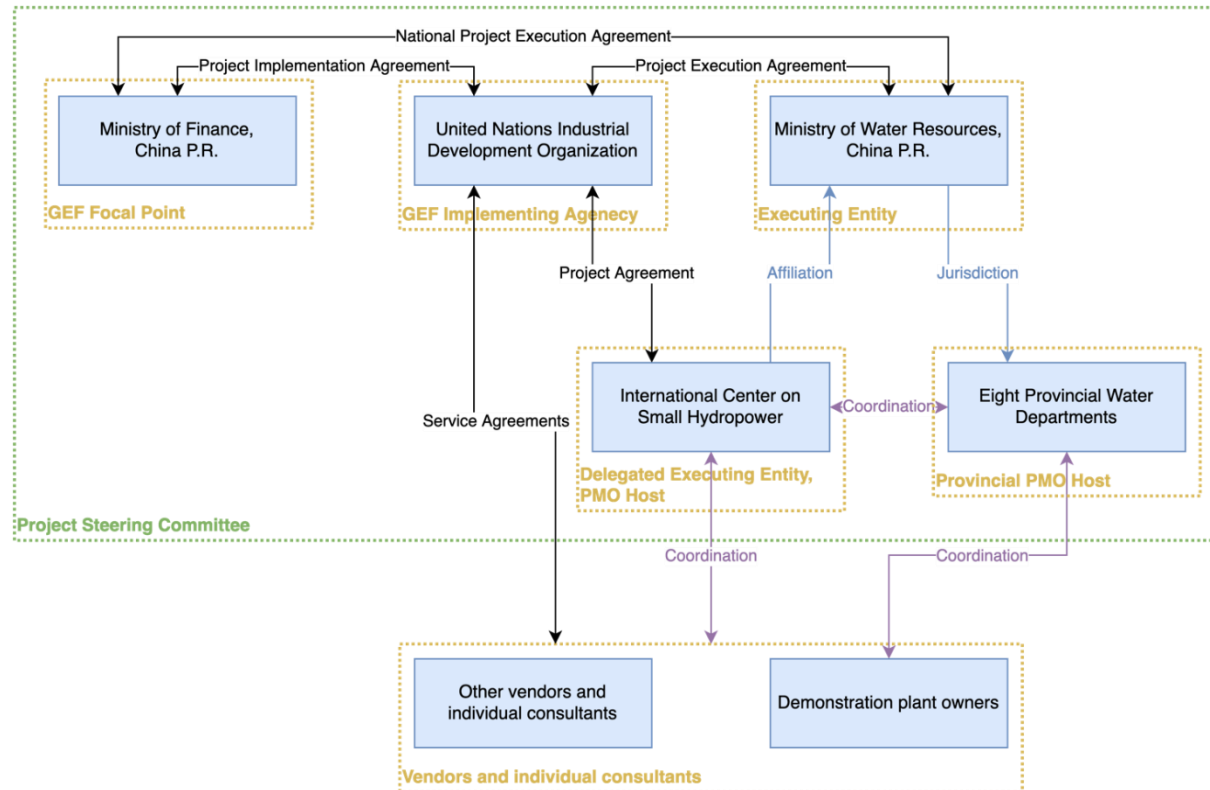
Component 3: Capacity building and increasing knowledge base. This component aimed to strengthen institutional capacity as well as to address technical capacity training, awareness and the development of knowledge products. Activities under this component were to be implemented in parallel with components 1 and 2 on policy frameworks and technology demonstrations in order to prepare for the scale-up / mainstreaming of green and safe SHP within and beyond the SHP project.

Component 4: Monitoring and Evaluation. A two-pronged approach was to be followed: 1) monitoring and evaluation against GEF strategic indicators, and 2) monitoring and evaluation of SHP project specific technical indicators for outputs per component (components 1-3 as listed above). Ultimately, this was to provide an indication of the achievement of the goals that the SHP project had set out to achieve.

Implementation of the Project was under a partnership between UNIDO and MWR and the Ministry of Finance (MOF), with additional partners including ICSHP and provincial water departments in the eight provinces where demonstration plants were located (see Figure 2). The partnership formed the basis of the Project Steering Committee (PSC), which was to meet

annually for review and for making decisions regarding the SHP project's implementation targets, milestones, and budgets.

Figure 2. Project Management Structure.



3. Findings

3.1 Project Design

3.1.1 Overall Design

The overall SHP project design was clearly the result of a comprehensive analysis of the SHP situation in China at the 2014-2016 timeframe of its development. The project design was conceived while China's 12th Five Year Plan (FYP) of 2011-2015 was in place - with its significant subsidies for enhancing SHP generating capacity in the oldest SHPs. The project design was also compatible with the 13th FYP of 2016-2020 that continued the subsidy focus on enhancing less old SHP's generating capacities. The overall SHP project design was also consistent with China's overarching development priorities at the time of its design.

The SHP project GEF funding's primary focus on supporting the incremental costs of the enhanced green and safety aspects of demonstration renovated SHPs was appropriate for the time of its design. However, in retrospect, the design could usefully have had an expanded focus that also included enhancing river biodiversity and especially maintaining the biodiversity of weak swimming non-migratory fish. The SHP project's design could also have usefully had an explicit focus on countering the then growing negative government and public perception of SHPs that saw many SHPs being removed rather than being green renovated and hence producing both green electricity and positively contributing to rural livelihoods.

The overall project design mentioned the need to engage a wide range of other ministries (beyond MWR) and interests. However, this was not fully achieved in practice.

The SHP project's overall design was consistent with UNIDO's Inclusive and Sustainable Industrial Development approach.

The overall project's design approach was generally sound, appropriate, technically feasible, and well aligned towards the fostering of gender equality.

The overall project's design is assessed as being 5/6 – satisfactory.

3.1.2 Project Results Framework

The SHP project's results framework was detailed in the GEF Council Document of May 2016 as its Annex A. The project results framework provided a good summary of the baseline situation in a numerical sense, and detailed the numerical output targets to be achieved for each component and activity. The SHP project's implementation was clearly very closely focussed on undertaking the specific activities and achieving the various numerical output measures. However, as is common, the link from the SHP project's activities and their outputs to the desired outcomes is limited to those activities/outputs that the project could control, so reinforcing or negating factors were not very well specified, and the stated assumptions were rather general. The reconstructed ToC in Figure 1 as above gives a more detailed overview of the baseline situation, what the project set out to do, and the various levels of stated and

unstated assumptions and logical links that would need to flow from SHP project components and activities to the wider outcomes and then impacts that were sought by GEF and by MWR.

The project design in Component 3.4 and 3.5 rested on enhancing the numbers of green SHP assessors and their capacities in independent assessment bodies, which presumably was the model for green SHP certification at the time. However, the central government issued a policy in 2017, requiring the easing of burdens on business. The certification sector was one of the targets for rectification. As a result, the certification model which the project was expected to support could not go ahead as planned. Instead, the certification scheme was then managed by MWR, in which recommended experts and various water departments performed free assessments for green SHP candidates. The original interventions under Component 3.4 and 3.5 were replaced with those to support green and safe production certification for 24 demonstrations – and these new 24 demonstrations were then completely separate from the 24 demonstrations under Component 2. This is logically confusing. In addition, the revised section 3.4 and 3.5 green and safe certification support interventions, although approved by the PSC, appear to have limited logical or operational connection with other parts of the project.

Some targets for impacts, outcomes and outputs are not differentiated, limiting the project's monitoring of its contribution to progress towards a wider impact. For example, active experience sharing, and the replication of piloting SHPs was not explicitly included in the project's results framework, thus the specific project contribution towards replication was not monitored. Hence the wider impact of the project's demonstrations and capacity building measures is not known.

The overall project's results framework is assessed as being 4/6 – moderately satisfactory.

3.2 Relevance

The SHP project was highly relevant to the green re-development needs and priorities of the very large numbers of older SHPs in China, particularly at the SHP project design stage when the 12th FYP was in force and when the 13th FYP was just starting its implementation.

The SHP project was strongly aligned with the 12th FYP (2011-2015) and the 13th FYP (2016-2020) with their significant funding for older SHP renovation works to expand SHP generating capacity. The SHP project was also suitably aligned with the 13th FYP's emerging focus on enhancing the green aspects of SHPs, especially on the provision of minimum environmental flows in SHP affected river sections.

However, the 14th FYP (2021-2025) did not include any central government funding for renovations of older SHP, thereby indicating that SHPs may have lost relevance or priority for the government. It is not yet known whether the 15th FYP (2026-2030) will include older SHP green renovation policy or funding support. The initial findings of the cost-benefit analysis⁹ supported by the project indicate that the societal green and safe benefits of SHP renovations appear to be of a similar magnitude to the economic benefits to the SHP owners from

⁹ The Four-SHP Cost-Benefit Analysis study had not been finalized and peer-reviewed at the time of the evaluation.

increased generating capacity. Therefore, there is a strong argument for ongoing government incentives and subsidies for SHP renovations. Without ongoing government support, including but not limited to central government support through the 15th FYP, SHP green and safe renovations will occur at a societally sub-optimal low rate as is already occurring to date in the 14th FYP (2021-2025 period).

The overall project's relevance is assessed as being 5/6 – satisfactory.

3.3 Coherence

The SHP project is coherent with China's GHG decarbonisation agenda in that it supports the continued and increased generation of low impact renewable electricity. The project also supports China's national development in an ecologically sustainable way, including, but not limited to, providing minimum ecological flows in SHP affected sections of rivers. The project is compatible with other interventions in China that aim to increase the uptake of green and safe SHP power generation and increase SHP automation. The project supports rural development through improving irrigation and domestic water supplies, reducing pollution and fostering village rejuvenation through tourism. The evaluation team noticed that partners at demonstration sites in Zhejiang built synergy between the project and other national interventions, such as the Initiative to Build New Countryside and River Chief System. Garbage was removed from rivers and wetlands were constructed downstream the SHPs – benefits that were visible and appreciated by local communities. However, as mentioned in Section 3.2 above, new policies on the mandatory removal of SHPs in protected areas interrupted the project implementation in some demonstration sites, leading to a loss of the SHP investments already made.

The overall project's coherence is assessed as being 5/6 – satisfactory.

3.4 Effectiveness

The SHP project achieved its key specific results by: establishing an enhanced green SHP standard; demonstrating the cost-effectiveness, environmental and social benefits of green and safe certified SHPs; and communicating the project's results to relevant groups to stimulate follow-on green and safe SHP replications. Immediately after the closure of the project, Chongqing, one of the pilot provinces, issued a policy in January 2024 on preferential tariffs for certified SHPs. All outputs were achieved with documented evidence and gender-disaggregated data.

The project materialised its expected co-financing by 96.54% (See Appendix 7). The water sector agencies undertaking green SHP certification from within their own budgets have delivered higher than anticipated SHP project co-financing. However, the long-term sustainability of water sector agencies continuing to provide green/ safe SHP certification is questionable if specific funding is not provided for this green SHP certification activity in the upcoming 15th FYP (2026-2030).

The perceptions of stakeholders and beneficiaries of project activities and results appear to be positive in general, especially regarding the project's emphasis on enhanced social and environmental perspectives.

However, the project could have usefully done more to raise the profile of the SHP sector by involving other key partners more, e.g. potential opinion leaders including NGOs and think tanks which advise the National Development and Reform Commission (NDRC)¹⁰, Ministry of Ecology and Environment, etc. It also appears that the communication to disseminate project results with the wider public was insufficient to significantly influence the negative public perception of SHPs. Finally, the project's impacts could have been better documented with extra supporting evidence, e.g. dissemination and replication of green SHP best practices and cost-effectiveness.

The overall project's effectiveness is assessed as being 5/6 – satisfactory.

3.5 Efficiency

The specified SHP project outputs and results were largely delivered, in a timely manner, and within budget. The designated inputs of key counterpart (especially MWR) were provided as planned and in a timely manner. The project extension of 19 months was reasonable given China's nearly three years of Covid-19 lockdowns.

The economic, environmental and social benefits of green and safe SHP upgrading were very usefully quantified in a cost-benefit analysis of the four ¹¹ project-supported SHP demonstrations.

However, there appears to have been some duplication in the wide range of project-supported studies. It is also noteworthy that the project's consultancy expenditure was largely targeted to water sector institutions, although non- water sector key stakeholders are also critical in providing economic incentives to SHP renovation.

The overall project's efficiency is assessed as being 5/6 – satisfactory.

3.6 Sustainability

The recently finalised UNIDO-GEF SHP project provided knowledge, achieved results, and built capacity in MWR, ICSHP, and water sector institutions. These benefits are likely to persist over time as the personnel and hence the knowledge in such organisations can be expected to be durable. The provision of e-flows by SHPs is expected to be sustainable, given the new strict policy requirements and the strong enforcement capacity that is now in place. The enhanced SHP installed capacity and efficiency will keep contributing to GHG emission reduction efforts.

The project has generated a very useful and innovative line of evidence - for future significant government funding for green-focussed SHP renovation in the 15th FYP. The cost-benefit study supported by the project ¹² demonstrates positive results that the societal monetised environmental and social benefits represent an around three-year simple payback. The simple

¹⁰ NDRC is the third-ranked executive department of the State Council of the government of China.

¹¹ Maoyandong II, Tangban, Sandieling – Dongpai, and Panxi 2, 3 and 4

¹² China-SHP 2023 11 23 Output 2.3 Cost-Benefit Assessment for 4 Pilot SHPs - G Tian - Hohai Uni - Summary Table-5-3 - EN

payback from the increased SHP capacity to the SHP owners is similarly around three years. There is a strong evidence that green and safe SHPs produce social and environmental benefits, public goods that are partly paid by SHP owners. Their expenditure is partially recovered by the extra revenue from the renovated SHP's enhanced capacity. This then justifies government support to cover part of the SHP owners' loss of revenue from providing minimum e-flows and to encourage the SHP owners to sustain the social and environmental services that they do not derive revenue from. In other words, the project supported SHP renovation cost-benefit study may provide the beginning of a strong evidence base for an expanded private-public funding model for future green and safe SHP upgrading in China.

The sustainability and expansion of the SHP project's impacts on the whole SHP sector depends on whether there will be suitable new government retrofit incentives and an enhanced policy prioritisation in the upcoming 15th FYP, as well as on provincial-level green SHP preferential tariffs, tradeable renewable energy certificates, carbon credits, etc. While this is outside the project's sphere of influence, it is important to note that without suitable central and provincial government level incentives and prioritisation, more SHPs may be removed instead of being renovated – due to stigmatisation of SHPs, ignorance of the role of SHPs in the renewable energy transition and rural development, and SHP owners' inability to meet the new minimum river environmental flow and safe operation requirements. The recent introduction of a provincial green SHP incentive tariff is a useful step, and a useful reminder that China is a large and complex country where changes can take time to occur.

The overall project's sustainability is assessed as being 5/6 – satisfactory.

3.7 Progress to Impact

The SHP project has made a positive difference to China's SHP sector, and no negative impacts to China's SHP sector were found. There are indications of the SHP project's positive impacts from demonstration site visits, experience sharing leading to other SHP renovations, and the growing numbers of green certification and safe production assessments passed. Another positive impact is evidenced by the fact that green preferential tariffs were just introduced in one of the project's pilot provinces.

However, the SHP project's impact outside China appears to be limited, partly as a result of the inaccessibility of the ICSHP website in English following internet security issues. The project's website¹³ is also not available in English. The progress towards impact is also not helped by ICSHP and other China water sector institutions not being funded for SHP promotion or development outside China under the current 14th FYP.

There was evidence that the project contractors reached out to other departments in policy studies and that cross-departmental collaboration existed at the local level. The SHP project's potential impact could have been enhanced if the project had been more involved with other non-water central government departments. In particular, the SHP project's limited involvement includes: the energy administration who are responsible for SHP preferential power tariffs and any SHP role in providing aggregated SHP pumped hydro energy storage; the environmental departments who are responsible for ensuring river minimum environmental flows, and those designing and developing carbon markets which could bring potential carbon

¹³ <http://101.35.186.214:9011/>

credits to SHP owners; and the agricultural departments who lead rural development and rejuvenation. These non- water sector key stakeholders are critical in providing SHP renovation economic incentives such as green preferential tariffs, carbon credits, income from pumped energy storage, and in enhancing SHP's profile in rural development policies.

The overall project's progress to impact is assessed as being 5/6 – satisfactory.

3.8 Gender Mainstreaming

The SHP project took a consistent approach in gender mainstreaming throughout the project cycle. The project document included a results framework with clear gender dimensions and prescribed measures for gender mainstreaming during implementation. Although a stand-alone action plan was absent, strong gender considerations were visible in the planning, contracting, delivery, and monitoring of project activities. Gender-related data, such as SHP female employees and beneficiaries, were collected and analysed in various monitoring reports under Component 2. Similar gender supporting practices were also followed in the training and seminar activities, which included gender as a standalone chapter in curricula and lectures. In policy studies where gender target was not required, delivery teams reported their consideration on gender, e.g. the proportion of female researchers.

The project monitoring reports show that the proportion of female employees at demonstration SHPs remained essentially unchanged at 29% after retrofitting, while the number of mid-level female managers in the whole work force increased slightly from 6.8% to 7.8%. The SHP project's support of automation reduced the reliance on manual labour in the monitoring and operation of SHP facilities, which was considered to benefit female staff in particular.

It is interesting to note that a female informant considered gender inequality not an important issue, thus suggested it was not worth special attention. Such a perspective may reflect the situation in a specific sector and geographical area.

The overall project's gender mainstreaming is assessed as being 6/6 – highly satisfactory.

3.9 Project Implementation Management

The project implementation was suitably results-based, with all specified project outputs generated and well documented. At the management level, annual reports were prepared to reflect the overall project progress against the results framework. At the operational level, a consistent approach was taken in defining reporting requirements for each contract. Technical monitoring, especially related to the SHP demonstrations, provided the necessary evidence to back up the results-based reporting and evaluation. In terms of knowledge management, the project kept a comprehensive filing system to record all project documents and records and categorised them in accordance with the results framework.

The Project Steering Committee was convened regularly and provided suitable strategic guidance on critical issues, including decisions to approve work plans and budgets, to extend the project and to handle the withdrawal of demonstration SHPs. PSC minutes provide clear documentation of progress, challenges and changes to the project's implementation. Adaptive

management was demonstrated in response to COVID-19 and suitable mitigation actions were taken, such as adjusting work plans and moving some meetings and training to a virtual format.

The project provided technical support to allow 43 SHPs (from both components 2 and 3) to pass green certification. This was a considerable success considering that only a small portion of SHPs (e.g. 5% in Zhejiang province) could otherwise obtain green SHP certificates. While the success was recorded as the project outputs, how this was achieved could have been usefully documented in detail as a knowledge product for peer learning.

Various informants commented that the project played an exemplary role to demonstrate green SHP retrofitting. But it was not monitored how the examples set by the project were shown to and taken up by other SHPs. This can be considered as a weak design element in the results framework - where the scale-up of demonstration results to subsequent replications was not factored in, let alone measured.

The overall project's results-based management is assessed as being 5/6 – satisfactory.

3.10 Performance of Partners

UNIDO, as the GEF project management agency, worked closely with MWR and ICSHP to steer the implementation of the project. UNIDO was effectively involved in project identification, formulation and approval. UNIDO also contracted service providers directly through its procurement system. Feedback from interviews showed that partners were satisfied with the UNIDO procurement process. UNIDO also proactively prepared for the project's completion and evaluation phases.

MWR, as the national executing agency, provided high-level support to the project through policy discussion, the Steering Committee and by convening the necessary inputs by local water departments. MWR backed the revision of the Green SHP Evaluation Standard, which was a major advance by giving more weight to biodiversity conservation.

ICSHP, which hosted the project management office, had the necessary strong technical and institutional capacity to work with the pilot provinces on developing and implementing the demonstrations. ICSHP's role as an advisory agency to both MWR and UNIDO placed it in a unique situation to regularly report to both. ICSHP coordinated with the wide range of affected project partners to ensure the timely delivery of activities and it supported UNIDO in contracting and monitoring. ICSHP also led the development of the Green SHP Standard.

Partners in pilot projects, including local water departments and property owners, demonstrated strong commitment and excellent knowledge about the project. The provincial level PMUs worked alongside local SHP owners and collaborated with other government agencies. Universities and research institutions provided technical support to the project in research, training, monitoring, and organising events. Although quality varied among different service providers, some did produce impressive outputs, such as case studies, performance monitoring reports, and cost-benefit analysis.

However, there is only limited evidence that the project engaged other national level stakeholders outside the water sector which were mentioned in the project document, such as

environmental departments, development and reform commissions, and civil society. This has limited its potential impacts on policy and the wider society.

The overall project's performance of partners is assessed as being 5/6 – satisfactory.

3.11 Environmental Safeguards

The purpose of the SHP project was to achieve GHG emission reductions through promoting green SHP practices in China. Hydropower itself is a sustainable energy source which can contribute to carbon emission reductions. Retrofitting of demonstration SHPs under Component 2, which improved power generation capacity and efficiency, helped reduce 21% more carbon emissions annually, or 55,370 tCO₂/year equivalent. This is smaller than the targeted 110,000 tCO₂/year equivalent, owing to factors that included less rainfall, delays in retrofitting, and lower electricity demand during COVID restrictions. The benefits of carbon emission reductions can be considered as the natural result of the National Programme on SHP Capacity Expansion and Efficiency Improvements, which this GEF project complemented.

While contributing to mitigation of climate change, hydropower draws criticism on its impacts on river connectivity and ecosystems. The project intended to mitigate these negative impacts through introducing various improved SHP operational practices. The feasibility studies undertaken prior to the approval of the project made recommendations on the interventions by aligning the retrofitting of the demonstration SHPs with the Green SHP Standard. The recommendations were reviewed at the start of the project and followed through during the retrofitting process. SHPs were also required to develop environmental and social management plans (ESMP) and their environmental performance was monitored and/or analysed by teams contracted by the project. In retrospect, some of these activities could have been streamlined somewhat to reduce repetition. And some ESMPs should usefully have been developed and implemented before retrofitting to serve as a monitoring baseline.

An outstanding outcome of the project is the improvement of river longitudinal connectivity through the implementation of minimum e-flows.¹⁴ The project was a forerunner in promoting minimum e-flows, which later became mandatory for all SHPs across China. E-flow facilities were installed at SHPs and e-flows, usually set at 10% of average annual flows, are now monitored at the local and provincial level. It was observed during the field visit that the monitoring systems were run effectively, and river flow maintained in the dry season. However, there was some feedback that the current monitoring system was perhaps too rigid to the extent that SHPs had to release e-flows even during heavy rains when flows were high, and the e-flows during heavy rains could have been used to generate electricity without affecting minimum flows in the affected parts of rivers. Fine-tuning of the minimum e-flow management would hence be desirable to better reflect seasonal rainfall and river flow changes.

On biodiversity, the revised Green SHP Standard puts increased emphasis on the protection of aquatic and terrestrial species, which encourage considerations on biodiversity conservation in hydraulic engineering. It was observed that wetlands were restored at some demonstration sites and new fish species was reported in a restored river.

¹⁴ Environmental waters are also referred to as e-flows, which are essentially releases of water diverted to specific areas in order to help preserve the ecosystem.

The overall project's environmental safeguards is assessed as being 6/6 – highly satisfactory.

3.12 Social Safeguards

Social benefits were often mentioned during the stakeholder interviews at the demonstration sites. The project engaged local communities through the ESMP development - which required the SHP property owners to meet villagers and learn their needs. While retrofitting their SHPs, the property owners helped improve roads, bridges, and facilities related to irrigation, lighting, and water supply for villagers living nearby.

SHPs are generally located at mountainous areas, and many of them are potentially very scenic. With the implementation of year-round e-flows, rivers under the Green SHPs now flow during the dry season, which then attracts urban tourists to spend weekends and holidays in the local areas around the sections of rivers affected by the SHPs. Some villagers operate farm stays to tourists to earn non-agricultural income. The new business opportunities gave a boost to rural development by attracting some farmers, who previously migrated to cities to earn a living, to come back and stay in their home rural areas. In addition, some SHPs, which are jointly owned by local communities, distributed increased profits to their local communities from the enhanced generation capacity after retrofitting.

The overall project's social safeguards is assessed as being 6/6 – highly satisfactory.

3.13 Project Ratings

#	Evaluation criteria	Mandatory rating	Rating
A	Progress to Impact	Yes	5
B	Project design	Yes	4.5
1	• Overall design	Yes	5
2	• Project results framework/log frame	Yes	4
C	Project performance and progress towards results	Yes	5
1	• Relevance	Yes	5
2	• Coherence	Yes	5
3	• Effectiveness	Yes	5
4	• Efficiency	Yes	5
5	• Sustainability of benefits	Yes	5
D	Gender mainstreaming	Yes	6
E	Project implementation management	Yes	5
1	• Results-based management (RBM)	Yes	5
2	• Monitoring and Evaluation, Reporting	Yes	5
F	Performance of partners		5
1	• UNIDO	Yes	5
2	• National counterparts	Yes	5

3	• Implementing partner (if applicable)	Yes	5
4	• Donor	Yes	5
G	Environmental and Social Safeguards (ESS), Disability and Human Rights	Yes	6
1	• Environmental Safeguards	Yes	6
2	• Social Safeguards, Disability and Human Rights	Yes	6
H	Overall Assessment	Yes	5

4. Conclusions, Recommendations and Lessons Learned

4.1 Conclusions

In conclusion, the evaluation team found that:

1. The original project design was the result of suitably comprehensive analysis and was very appropriate for its time (2014-2016) in China when: an initial Green SHP standard had been developed and trialled but it needed more project supported refinement and formal demonstration; SHPs were starting to be removed in appreciable numbers due to growing environmental concerns (particularly, but not limited to, ensuring minimum year-round e-flows); there was a need to look beyond a primary focus on primarily increasing generation capacity in renovating SHPs; and significant government incentive support under the 12th and 13th FYPs was being provided to increase SHP generating capacity in both very old and in all-new SHPs.
2. The planned project outputs were largely achieved (the early revision of outputs in terms of green and safe SHP certification processes did not reduce the value of the outputs per se) and were suitably documented. The project's most significant achievements were the improvement of China's Green SHP Standard and the technical support provided to retrofit the 19 demonstration SHPs. The project's impact can be demonstrated by the latest adoption of preferential tariffs for green certified SHPs in a pilot province.
3. The project produced impressive SHP environmental and social benefits, by improving river connectivity and amenities for local communities. The project's work on gender mainstreaming was thorough and consistent.
4. The project's partners were committed and collaborative in general, guided by an effective Steering Committee. Engagement with non-water sector stakeholders at the provincial level was evident, but was limited at the national level, which reduced the project's potential wider impact on energy and climate policy, and on public perception.
5. The project's management was effective and suitably adaptive, especially during the nearly 3 years of China's Covid-19 lockdowns.
6. The project met its co-financing targets. Co-financing from key partners were above expectation, in particular from MWR's allied agencies funding SHP green and safe certification from their existing budgets. However, there must be questions as to how sustainable this model will be if specific SHP certification is not properly funded in the upcoming 15th FYP (2026-2030), regardless of provincial level policy and financial incentives.

4.2 Recommendations

The evaluation team makes the following recommendations:

For MWR

1. It is recommended that MWR undertake a systematic outreach to, and engagement with, key non-water sector agencies and stakeholders - including but not limited to the National Development and Reform Commission (NDR), Ministry of Ecology and Environment (MEE), and Ministry of Agriculture and Rural Affairs (MARA) - regarding the role of SHPs as a key energy transition technology and as a contributor to rural development. The rationale is that SHPs can not only generate electricity, but also provide the increasingly sought-after dispatchable power (including through aggregating SHPs' pumped storage), produce carbon credits that can be used in emissions trading, and support rural livelihoods and infrastructure.
2. It is recommended that MWR increase its efforts to get green / safe SHP policy and financial incentives and certification funding included in the upcoming 15th FYP (2026-2030), utilising in particular the positive findings of the Four Cost-Benefit Study¹⁵ as supporting evidence.
3. It is recommended that MWR work to revise the 10% minimum ecological flow standard to better reflect natural river flow variability and seasonal rainfall patterns. It is also recommended that future SHP green standards have an expanded focus that also includes enhancing and monitoring aquatic biodiversity, especially the conservation of weak swimming non-migratory fish.

For ICSHP, MWR and the wider water sector

4. It is recommended that MWR, related water agencies and ICSHP actively disseminate the SHP project's results to the estimated 35,000 potential replication SHPs within China.
5. It is recommended that ICSHP, with the support of MWR, disseminate the SHP project's knowledge and experience to the wider Global South - with potential support from China's South-South Co-operation Funds, or other sources.
6. It is recommended that MWR, related water agencies, and ICSHP raise the profile of green SHPs in China's policy development and public discussions to highlight their social, environmental, and economic benefits.

For UNIDO

7. It is recommended that UNIDO's China office promote the SHP project's results to China's government in its policy dialogue and cooperation development settings.
8. It is recommended that UNIDO promote the SHP project's environmental and safety results to other Global South countries through UNIDO's role in SHP promotion, SHP projects, and via the UNIDO regional SHP centres in India and Nigeria.

¹⁵ China-SHP 2023 11 23 Output 2.3 Cost-Benefit Assessment for 4 Pilot SHPs - G Tian - Hohai Uni - Summary Table-5-3 - EN

4.3 Lessons Learned

The key lesson learned from the China SHP project is that future UNIDO supported project designs need to include SMART¹⁶ pathways and actions that will more explicitly lead from project supported demonstrations to subsequent replications. This is because the major project impacts will come from the replications, not from the necessarily limited number of formal demonstrations. In the project's implementation phase, explicit activities should be included to monitor the project's contributions to replications. This will help overcome the problem found in the SHP project where it is clear that the project contributed in an appreciable way to replications, but this was not tracked and monitored, so the number and impact of replications cannot be quantified.

¹⁶ Specific, Measurable, Actionable, Realistic, and Time bound

5 Management Response Sheet

#	Recommendation	Management Actions	Responsible Person / Entity	Target Date
1.	MWR to undertake a systematic outreach to, and engagement with, key non water sector agencies and stakeholders (including but not limited to the National Development and Reform Commission (NDR), Ministry of Ecology and Environment (MEE), and Ministry of Agriculture and Rural Affairs (MARA) regarding the role of SHPs as a key energy transition technology and as a contributor to rural development. The rationale is that SHPs can not only generate electricity, but also provide the increasingly sought-after dispatchable power (including through aggregating SHPs' pumped storage), produce carbon credits that can be used in emissions trading, and support rural livelihoods and infrastructure.	Small hydropower, as a clean and renewable energy source, has played a significant role in addressing rural electricity needs, supporting poverty alleviation, optimizing energy structures, and promoting local economic and social development. In recent years, MWR has firmly implemented the decisions and deployments of the Party Central Committee and the State Council, actively coordinated with departments such as the National Development and Reform Commission (NDR), the Ministry of Natural Resources (MNR), the Ministry of Ecology and Environment (MEE), and the National Energy Administration (NEA), and focused on addressing the prominent ecological and environmental issues caused by overexploitation of small hydropower in some regions, achieving certain results. In guiding the green transformation of small hydropower, MWR has actively communicated with relevant departments to promote the green renovation and modernization of small hydropower, guiding local governments to establish regional centralized control centers, carry out the work in areas such as complementary energy systems combining wind, solar and hydro, green certificates, and China's Certified Emission Reductions (CCER).	Department of Rural Water and Hydropower of MWR	By the end of 2025
2.	MWR to increase its efforts to get green / safe SHP policy and financial incentives and certification funding included in the upcoming 15th FYP (2026-2030), utilising in particular the positive findings of the Four Cost-Benefit Study ¹⁷ as supporting evidence.	Since 2020, the central government has issued a series of documents, including the <i>Guiding Opinions on Accelerating the Construction of a New Development Pattern</i> , <i>Notice of the State Council on the Action Plan for Reaching Carbon Emission Peaking by 2030</i> , <i>White Paper on Implementing China's Energy Policy in the New Era</i> , all of which explicitly state the need to promote the green transformation of small hydropower and increase financial input in river ecological restoration. In 2024, the National Development and Reform Commission, the Ministry of Industry and Information Technology, and eight other departments jointly issued the <i>Guidance Catalogue for Green and Low-carbon</i>	Department of Rural Water and Hydropower of MWR	By the end of 2026

¹⁷ China-SHP 2023 11 23 Output 2.3 Cost-Benefit Assessment for 4 Pilot SHPs - G Tian - Hohai Uni - Summary Table-5-3 - EN

		<i>Transformation Industries (2024 Edition)</i>, which explicitly includes the renovation and upgrading of small hydropower stations. MWR encourages local governments to actively seek financial support from all levels and guides them in formulating feed-in tariff policies for small hydropower that reflect the costs of ecological restoration and governance. Chongqing, Hainan and Jilin provinces have implemented green small hydropower tariff policies. At the same time, MWR has implemented President Xi's governance approach of "using both hands," which emphasizes the coordination of government roles and market mechanisms. MWR encourages social capital to promote the green development of small hydropower through financial means. Many local practices, such as financial leasing and water extraction loans in Lishui City, are excellent examples of this approach.		
3.	MWR work to revise the 10% minimum ecological flow standard to better reflect natural river flow variability and seasonal rainfall patterns. It is also recommended that future SHP green standards have an expanded focus that also includes enhancing and monitoring aquatic biodiversity, especially the conservation of weak swimming non-migratory fish.	In recent years, MWR, together with the Ministry of Ecology and Environment, has continuously strengthened the supervision of ecological flow in small hydropower stations. Specific requirements have been put forward for scientifically determining the ecological flow of SHP, improving the discharge facilities for ecological flow, conducting effective monitoring and supervision of ecological flow, promoting the ecological dispatch and operation of SHP stations, establishing a mechanism for ensuring ecological water use in SHP stations, and strengthening the supervision and management of ecological flow. In 2022, the General Office of MWR issued the <i>Notice on Conducting an Assessment of Ecological Flow Discharge at Small Hydropower Stations</i>, requiring all regions to standardize the determination, discharge, and monitoring of ecological flow based on the evaluation results. In cases where there are significant changes in upstream water inflow to the power station or downstream water demand for "production, ecology, and living," the ecological flow must be reassessed and adjusted in accordance with relevant laws and regulations. <i>The Green SHP Assessment Standard</i> is currently under revision, with a strong emphasis on the protection of aquatic organisms. Aquatic	Department of Rural Water and Hydropower of MWR	By the end of 2025

		organism protection is considered a fundamental and veto condition, requiring stations involving protected species or the spawning grounds, feeding grounds and overwintering grounds of fish (three grounds) to take corresponding protective measures. Stations that do not involve protected species or the "three grounds" of fish are also encouraged to adopt protective measures.		
4.	MWR, related water agencies and ICSHP to actively disseminate the SHP project's results to the estimated 35,000 potential replication SHPs within China.	MWR has guided PMO to establish a WeChat public account named "Green Small Hydropower Construction" and released several promotional articles on the effectiveness of the GEF project through this platform. In the next step, ICSHP website will be updated to include a special section on the GEF project. MWR and PMO will actively promote the webpage links and related promotional articles on other media platforms, such as MWR website, and actively promote the progress and achievements of the project within and outside the industry through various meetings, forums, and other platforms. The relevant local water administrative departments will further promote the GEF project to other small hydropower stations in China through more on-site research and guidance visits to small hydropower stations, organizing and coordinating visits and learning trips to pilot power stations by other stations.	Department of Rural Water and Hydropower of MWR, ICSHP and local departments of water resources	By the end of 2024
5.	ICSHP to disseminate the SHP project's knowledge and experience to the wider Global South - with potential support from China's South-South Co-operation Funds, or other sources.	MWR will work with relevant departments to further improve the policy system for the development of green small hydropower. Through platforms such as official websites, news journals, WeChat public accounts, announcements, bulletins, various conferences, and forums, MWR will strengthen the interpretation of policies, actively promote the achievements of green small hydropower construction and its ecological, social, and economic benefits, and raise public awareness and acceptance of green small hydropower. At the same time, MWR will guide local water administrative departments to actively promote the construction of green small hydropower stations, drive the green transformation and modernization of small hydropower through demonstration, and promote the development of the industry in a comprehensive manner. ICSHP organizes public welfare live broadcasts on the "Green Small Hydropower Construction" WeChat official account, sharing excellent cases	ICSHP	By the end of 2025

		of green SHP development in various regions, and conducting popular science promotion.		
6.	MWR, related water agencies, and ICSHP raise the profile of green SHPs in China's policy development and public discussions to highlight their social, environmental, and economic benefits.	During the project implementation, PMO actively shared the achievements and experiences of the GEF project through various international conferences, forums, and training sessions. In May 2024, ICSHP will organize the 10 th Hydropower for Today Forum, and will continue to organize or participate in various international conferences, training sessions, and other events in the future. At the same time, ICSHP will fully utilize the platform of the International Network of Small Hydro Power to promote the achievements and share the experiences of GEF project through various opportunities.	Department of Rural Water and Hydropower of MWR, ICSHP and local departments of water resources	By the end of 2025
7.	UNIDO's China office to promote the SHP project's results to China's government in its policy dialogue and cooperation development settings.	UNIDO in China will continue to promote the results of projects in China, including those achieved through the SHP project. References are made to project results and arrangements in annual UNCT reports, in meetings with relevant state and non-state counterparts, as well as in public statements/remarks at national and global fora/events. UNIDO in China will continue to promote the results of the SHP project in upcoming events, such as UR's public lecture at Nankai University, "10 th Hydropower for Today", coordination meetings with Ministries and other stakeholders, etc.	UNIDO in China	By the end of 2024
8.	UNIDO to promote the SHP project's environmental and safety results to other Global South countries through UNIDO's role in SHP promotion, SHP projects, and via its SHP regional centres in India and Nigeria.	By focusing on the Small Hydropower (SHP) projects in developing countries, UNIDO will leverage its influence and networks to disseminate the environmental and safety results of the GEF SHP project China to countries in the Global South. UNIDO will also enhance the regional centers to showcase the benefits of SHP projects and encourage their adoption in similar regions for the ongoing and pipeline projects. These efforts include capacity building, sharing best practices, and encouraging the use of SHPs, contributing to sustainable industrial development	IET/CTP Division of Climate and Technology Partnerships, UNIDO	By the end of 2024

Annex 1: Evaluation Terms of Reference

I. PROJECT BACKGROUND AND CONTEXT

1. Project factsheet¹⁸

Project title	Upgrading of China SHP Capacity Project
UNIDO ID	140196
GEF Project ID	6919
Country(ies)	China, PR
Project donor(s)	GEF
Project approval date/GEF CEO endorsement date	05 May 2016
Actual project start date (First PAD issuance date)	22 May 2017
Planned project completion date (as indicated in project document/or GEF CEO endorsement document)	21 May 2022
Actual project completion date (as indicated in UNIDO ERP system)	31 December 2023
Project duration (year): Planned: Actual:	5 years 6 years and 7 months
GEF Focal Areas and Operational Programme	Climate Change
Implementing agency(ies)	UNIDO
Government coordinating agency	Ministry of Water Resources (MWR) & Ministry of Finance (MOF), China P.R.
Executing Partners	International Center on Small Hydropower (ICSHP)
Donor funding	USD 8,925,000
UNIDO input (in kind, USD)	USD 375,000
Co-financing at CEO Endorsement, as applicable	USD 74,578,448
Total project cost (USD), excluding support costs	USD 83,503,448
Mid-term review date	1 Feb 2020
Planned terminal evaluation date	August 2023

(Source: Project document, UNIDO ERP system)

2. Project context

¹⁸ Data to be validated by the Consultant

UNIDO, in association with the Ministry of Water Resources (MWR), is currently implementing the project entitled Upgrading of China Small Hydropower (SHP) Capacity (hereinafter referred to as ‘the Project’). The Project will focus on environmental upgrading of rural SHP stations in China, in line with the priorities of the Chinese Government, as outlined in its 13th National Five-Year Plan (FYP) 2016-2020.

China sees hydropower as an important option to decarbonise its energy portfolio. In 2011, the country set a binding target of reducing CO₂ emissions per unit GDP by 17% in its 12th FYP. The bar was raised further to 18% in the subsequent 13th FYP. By the end of 2020, the plan aimed to increase the non-fossil proportion of primary energy consumption of the country to 15%. To realize this, the plan gave hydropower a prominent role, but also stipulated that its development should “prioritize ecological wellbeing”. Since 2004, small hydropower, also known as rural hydropower in China for being overwhelmingly located in rural areas, has been a pivot point in China’s rural development programmes for its contribution to renewable energy supply and poverty alleviation.

The Project was initiated in 2015 in alignment with China’s efforts to refurbish its existing SHP projects across the country under its 13th FYP. With most of the country’s SHP projects operating with ageing infrastructure and dwindling efficiency, in 2011 under its 12th FYP, China started its SHP Capacity Expansion and Efficiency Improvements Programme for SHP refurbishment. SHP plants built before 1995 were eligible for governmental subsidies for expanding their installed capacity and improving their efficiencies. The positive outcomes from the programme prompted the central government to continue funding SHP capacity expansion under its 13th FYP and include more SHP plants (built before 2000). Similar to the previous period, eligible SHP plants were partially subsidised for costs of capacity expansion and efficiency improvement. Moreover, the renewed programme built upon the 12th FYP experience to highlight environmental integrity at river basin scales. Therefore, the Project leverages the opportunities presented by this 13th FYP programme and addresses the need to improve the environmental and social sustainability of increased SHP development in China.

The Project generates significant environmental and social benefits that span across a spectrum of stakeholders. Additional outputs of renewable energy would meet energy demands that otherwise had to be met by fossil fuels and therefore contribute to GHG emission cuts. By managing the environmental impacts from SHP development that allows for the recovery and restoration of ecological services of the rivers, the benefits spill over to other stake-holding sectors that are reliant on these valuable services. Moreover, the success stories and improved policies and institutions that the Project contributed to are going to bolster confidence in green and sustainable SHP development, and hence allow replication and proliferation of similar practices across the country. The knowledge and experiences accumulated through the implementation of the Project will also be beneficial to other developing countries undergoing similar transitions.

3. Project objective and expected outcomes

The Project aims to support the SHP Capacity Expansion and Efficiency Improvements Programme of the Ministry of Water Resources (MWR), by reducing the environmental impact of SHP plants to better meet the challenges imposed by climate change. The objective of this project is to reduce GHG emissions and dependence on fossil fuels through the promotion of upgrading, greening and improving the management of existing SHP stations, contributing to

the competitiveness of China's industries. Alongside important social and economic benefits, the project will improve local river ecology, hence contributing to adaptation of SHP plants to climate change. It is estimated that additional electricity of about 133,585 MWh will be obtained through the project activities, resulting in emission reductions of 1.87m tCO₂e. The project will transfer knowledge and technology in the field of green hydropower within China, leading to positive environmental impacts.

More specifically, the project is structured in three technical components, plus a monitoring and evaluation component, as set out below:

Component 1: Policy and institutional framework. This component will strengthen the policy and regulatory framework to effectively promote and support green SHP upgrading by the development of a Ministerial Standard on green SHP, through support for incentive measures as well as assisting in the roll out of the Safe Production SHP standards.

Component 2: Technology Demonstration. This component will demonstrate technical feasibility and commercial viability of green and safe upgraded SHPs (see the name list below) at different capacities demonstrating a variety of environmental and safe production measures. Technical assistance and grants will be provided to facilitate the project's development. These will build the confidence of both industry and the finance sector, create best practice examples to pave the way for replication on the basis of experience gained, reduce (perceived) risk and increase capacity and awareness at multiple levels, i.e. industry (both at operational and decision-making level) and finance.

Component 3: Capacity building and increasing knowledge base. This component will strengthen the institutional capacity as well as address the insufficient technical capacity training, awareness and the development of knowledge products. Activities under this component will be implemented in parallel with components 1 and 2 on policy framework and technology demonstration in order to prepare for the scale up / mainstreaming of green and safe SHP within and beyond the project.

Component 4: Monitoring and Evaluation. A two-pronged approach will be followed: 1) monitoring and evaluation against the GEF's strategic indicators, and 2) monitoring and evaluation of project specific technical indicators for outputs per component (components 1-3 as listed above). Ultimately, this will provide an indication of the achievement of the goals that the project has set out to achieve.

The following are, in brief, some of the expected results of the project:

- Policy and institutional framework:
 - Green SHP Assessment Standard and aligned technical standards formulated and revised
 - Preferential green SHP policies developed and recommended
 - Safe Production standard criteria rolled out nationwide
- Technical demonstration:
 - Business plans and feasibility studies finalised for upgrading SHP demonstration plants
 - SHP plants rehabilitated and upgraded at demonstration sites with additional installed capacity and power output

- Socio-economic and environmental impact of green SHP rehabilitation recorded
- Capacity and knowledge sharing:
 - Capacity building programme for SHP project owners, developers and technicians delivered
 - Capacity building programme for officials on green SHP and Safety and Protection regulation
 - Inception awareness raising workshop held
 - Technical support provided to SHP plants for passing green SHP certification of MWR
 - Technical support provided to SHP plants for passing accreditation of operational safety

4. Project implementation arrangements

Implementation of the Project is under a partnership between UNIDO and China's Ministry of Water Resources (MWR) and Ministry of Finance (MOF), with additional partners including the International Center on Small Hydropower (ICSHP, an affiliated institution to MWR) and provincial water departments in 8 provinces where demonstration plants are located (see Figure 1). The partnership forms the basis of the Project Steering Committee (PSC), which meets annually for decisions in project implementation targets, milestones, and budgets. Additional meetings could be called for in case of need.

UNIDO, as the GEF Implementation Agency, is responsible for the overall supervision, monitoring, evaluation and implementation of the Project, in accordance with Project Documents, UNIDO-GEF Memorandum of Understanding, UNIDO-IBRD (GEF Trustee) Financial Procedures Agreement, and applicable GEF policies and procedures.

MOF, the national GEF Focal Point, is in a Project Implementation Agreement with UNIDO for an oversight role over the Project, and confirmed MWR as the Executing Entity to manage activities under the Project.

MWR, China's highest SHP regulator, has a Project Execution Agreement with UNIDO, according to which MWR is responsible for setting up and maintaining the Project Steering Committee for the duration of the Project consisting of senior MWR and GEF officials and UNIDO representatives. MWR appointed ICSHP as its Delegated Executing Entity to carry out the activities of the Project on its behalf.

As the Delegated Executing Entity agreed with MWR, ICSHP is responsible for the execution and day-to-day management of the Project. Under guidance of UNIDO and MWR, and direct supervision of the Project Steering Committee (PSC), ICSHP consults on all aspects of the execution of the Project as appropriate. ICSHP also hosts the Project Management Office (PMO) for management and execution of all national-level technical assistance and day-to-day Project coordination and monitoring.

See Figure 1 below for the management structure of the Project:

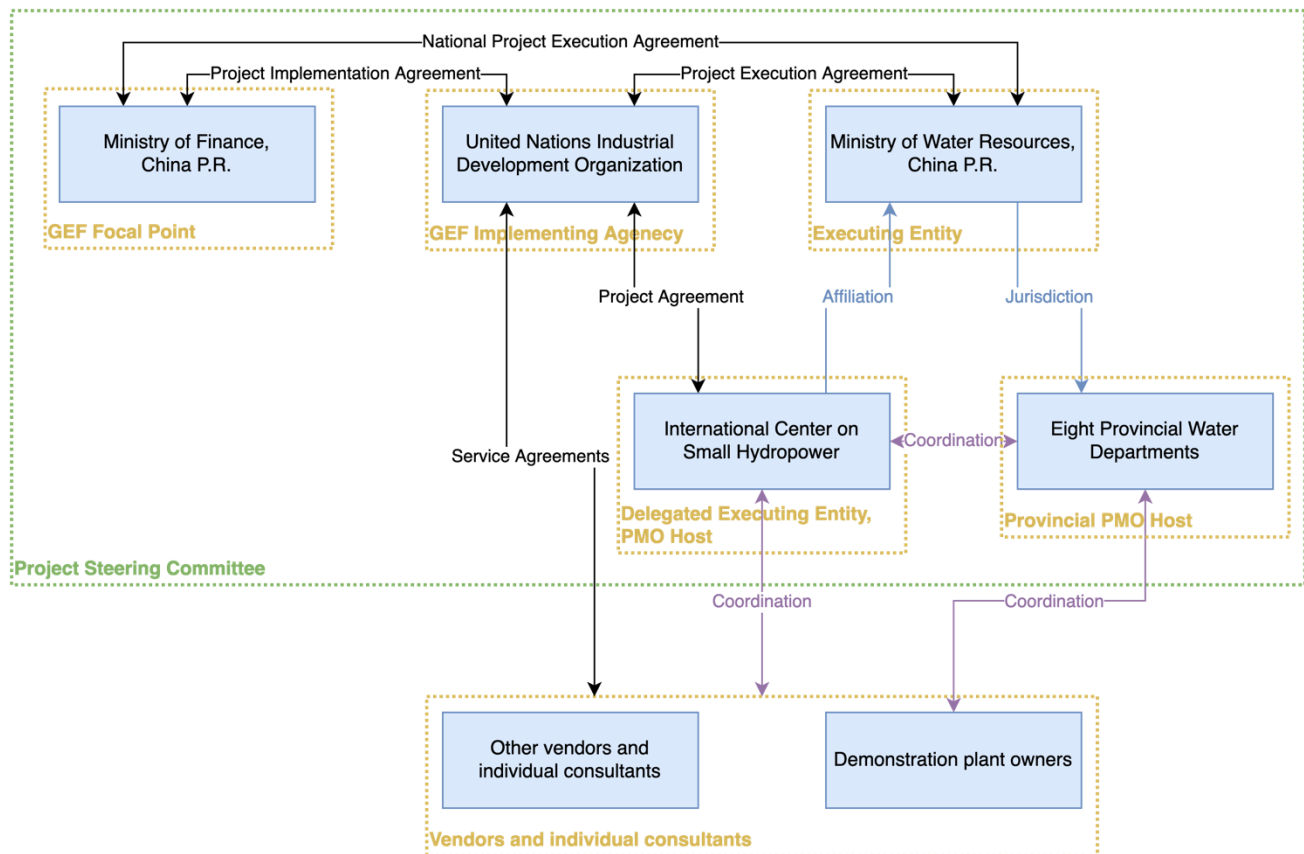


Figure 1. Project Management Structure

5. Main findings of the Mid-term review (MTR)

An Interim Performance Evaluation (IPE) was organised by the Project Management Office (PMO) between September 2019 and January 2020, in compliance with MOF's evaluation requirements for projects funded through international financing institutions. Due to the outbreak of the Covid-19 pandemic and restrictions of international travel, UNIDO was not able to organise a separate Mid-Term Review (MTR), which was also in repetition of the IPE. It was therefore agreed through the PSC and UNIDO that the findings and recommendations from IPE would be adopted for MTR.

Independent national consultants were recruited for the IPE, who reviewed the Project's inputs, activities, outputs and outcomes from May 2016 to September 2019 and came to the following conclusions:

- The Project has **very high relevance** to the sustainable development of the SHP industry in China, including national strategies of the industry, and the needs of key beneficiaries.
- The Project has **high efficiency** in output delivery, budget management, quality control, economy of investment, and innovation.
- The Project has **high effectiveness** in achieving milestones of project components and benefiting target communities.

- The Project has **very high sustainability** in mechanisms of financing, relevance to socio-economic priorities, partnership building, managing organisations and personnel.
- The overall implementation of the Project has been **smooth**.

The Project was included in MOF's report for the "2019 Case Study of Performance Evaluation of IFI and Foreign Governmental Loan Projects in China", and was the only project implemented by central government agencies of China included in the report.

The IPE also made these recommendations for the following implementation of the Project:

- **Communication with UNIDO:** As the Project is managed directly through the UNIDO SAP system, PMO should make more communication with UNIDO departments to streamline processes such as procurement, budgeting and recruitment.
- **Support for financial management:** PMO and provincial PMOs should provide more help for owners of the demonstration plants to be more familiarised with GEF policies and financial management rules of UNIDO, and improve reporting qualities.
- **Knowledge sharing and awareness raising:** The Project has accumulated valuable experience and knowledge through its implementation, which should be organised for more dissemination through opportunities such as seminars, media and research to disseminate, and awareness-raising to win more general support.
- **Tracking and supporting local policy formulation:** The Project needs to pay more attention to the formulated and opportunities of formulating local policies supporting green SHP, including those for payment for ecosystem services, government subsidies, tax discounts or refund, etc.

The above recommendations were integrated in the second half of the implementation. Additional UNIDO personnel joined the Project team to stay closely connected to the PMO and offer assistance. The PMO paid special attention to the financial management with regular practical support provided to plant owners in demonstration. As more tasks completed under the Project, knowledge sharing and awareness raising became a growing focus as Component 3 picked up. The tracking and supporting of local policies were incorporated into the development of recommendations for national and local policies under Component 1.

6. Budget information

Table 1. Financing plan summary - Outcome breakdown

Project outcomes/components	Donor (GEF) (\$)	Co-Financing (\$)	Total (\$)
Project Preparation	\$200,000	--	\$200,000
Policy and institutional framework	\$1,200,000	\$1,685,000	\$2,885,000
Technology Demonstration	\$6,000,000	\$66,614,448	\$72,614,448
Capacity building and increasing knowledge base	\$1,150,000	\$3,694,000	\$4,844,000
Monitoring and evaluation	\$150,000	\$700,000	\$850,000
Project management cost	\$425,000	\$1,885,000	\$2,310,000
Total (\$)	\$8,925,000	\$74,578,448	\$83,503,448

Source: Project document

Table 2. Co-Financing source breakdown

Name of Co-financier (source)	In-kind	Cash	Total Amount (\$)
Recipient national government (MWR / MOF)	3,709,000	22,956,835	26,665,835
Recipient local government (provincial and lower)	6,000,000	9,909,759	15,909,759
Beneficiary SHP plant owners	19,250,782	--	19,250,782
National and provincial bank loans	--	12,377,072	12,377,072
UNIDO (GEF Agency)	300,000	75,000	375,000
Total Co-financing (\$)	29,259,782	45,318,666	74,578,448

Source : Project document

Table 3. UNIDO budget allocation and expenditure by budget line

Budget line	Items by budget line	2017*	2018*	2019*	2020*	2021*	2022*	2023*	Total expenditure (at completion)		Total allocation (at approval)	
									(USD)	%	(USD)	%
1100	Staff & Intern Consultants	70,455.60	51,836.67	6,025.16	86,071.84	13,592.51	4,959.91	55,108.80	288,050.49	3.55	593,922.57	6.65
1500	Local Travel	0.00	0.00	38,003.27	-35.94	0.00	0.00	2,034.55	40,001.88	0.49	52,967.33	0.59
1700	Nat. Consult./ Staff	0.00	0.00	28,640.33	52,804.39	20,415.91	121,141.39	208,130.70	431,132.72	5.31	739,355.78	8.28
2100	Contractual Services	0.00	0.00	90,000.00	736,179.00	323,249.70	246,556.31	90,689.41	1,486,674.42	18.31	1,180,546.11	13.23
3000	Train/Fellowship/Study	0.00	0.00	58,000.00	109,970.00	370,456.20	-76.56	-36.78	538,312.86	6.63	614,970.00	6.89
3500	International Meetings	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0	22,693.04	0.25
4300	Premises	0.00	361,250.00	0.00	-252,875.00	0.00	0.00	0.00	108,375.00	1.33	307,447.00	3.44
4500	Equipment	0.00	4,714,568.52	126.42	91,957.24	-19,904.64	-107,941.57	-182,209.47	4,496,596.50	55.38	5,400,605.42	60.51
5100	Other Direct Costs	-11.74	4,553.46	-373.38	6,930.30	-35.95	368.13	13,915.15	25,345.97	0.31	12,492.75	0.14
9300	Support Cost IDC	6,692.16	487,559.82	20,940.04	78,945.26	67,238.51	18,841.50	24,159.25	704,376.54	8.68	0.00	0.00
Total		77,136.02	5,619,768.47	241,361.84	909,947.09	775,012.24	283,849.11	211,791.61	8,118,866.38	100	8,925,000.00	100

Source: Project document and UNIDO Project Management ERP database as of 30 June 2023.

* in fiscal years (1 July to 30 June), and excluding project preparation costs. Information for fiscal year 2024 (1 July 2023 to 30 June 2024) is to be completed.

Table 4. UNIDO budget allocation and expenditure by component

#	Project components	Total allocation (at approval)		Total expenditure (at completion)	
		USD	%	USD	%
1	Component 1. Policy and institutions	1,200,000	13.45	1,153,230.88	14.20
2	Component 2. Technical demonstration	6,000,000	67.23	5,700,514.40	70.21
3	Component 3. Capacity building & knowledge sharing	1,150,000	12.89	920,773.06	11.34
4	Component 4. Monitoring & evaluation	150,000	1.68	15,073.40	0.19
5	Project management	425,000	4.76	329,274.64	4.06
	Total	8,925,000	100	8,118,866.38	100

Source: Project document and UNIDO Project Management ERP database as of 30 June 2023. Project preparation costs excluded. Information for fiscal year 2024 (1 July 2023 to 30 June 2024) is to be completed.

II. SCOPE AND PURPOSE OF THE EVALUATION

The purpose of the evaluation is to independently assess the project to help UNIDO improve performance and results of ongoing and future programmes and projects. The terminal evaluation (TE) will cover the whole duration of the project from its starting date in May 2017 to the estimated completion date in December 2023.

The evaluation has two specific objectives:

- (i) Assess the project performance in terms of relevance, effectiveness, efficiency, sustainability, coherence, and progress to impact; and
- (ii) Develop a series of findings, lessons and recommendations for enhancing the design of new and implementation of ongoing projects by UNIDO.

III. EVALUATION APPROACH AND METHODOLOGY

The TE will be conducted in accordance with the UNIDO Evaluation Policy,¹⁹ the UNIDO Guidelines for the Technical Cooperation Project and Project Cycle,²⁰ and UNIDO [Evaluation Manual](#). In addition, the GEF Guidelines for GEF Agencies in Conducting Terminal Evaluations, the GEF Monitoring and Evaluation Policy and the GEF Minimum Fiduciary Standards for GEF Implementing and Executing Agencies will be applied.

The evaluation will be carried out as an independent in-depth exercise using a participatory approach whereby all key parties associated with the project will be informed and consulted throughout the process. The evaluation team leader will liaise with the UNIDO Independent Evaluation Unit (EIO/IEU) on the conduct of the evaluation and methodological issues.

The evaluation will use a theory of change approach²¹ and mixed methods to collect data and information from a range of sources and informants. It will pay attention to triangulating the data and information collected before forming its assessment. This is essential to ensure an evidence-based and credible evaluation, with robust analytical underpinning.

The theory of change will depict the causal and transformational pathways from project outputs to outcomes and longer-term impacts. It also identifies the drivers and barriers to achieving results. Learning from this analysis will be useful for the design of future projects so that the management team can effectively use the theory of change to manage the project based on results.

1. Data collection methods

Following are the main instruments for data collection:

- (a) **Desk and literature review** of documents related to the project, including but not limited to:
 - The original project document, monitoring reports (such as progress and financial reports, mid-term review report, technical reports, back-to-office mission report(s), end-of-contract report(s) and relevant correspondence.
 - Notes from the meetings of committees involved in the project.
- (b) **Stakeholder consultations** will be conducted through structured and semi-structured interviews and focus group discussions. Key stakeholders to be interviewed include:

¹⁹ UNIDO. (2021). Director General's Bulletin: Evaluation Policy (UNIDO/DGB/2021/11)

²⁰ UNIDO. (2006). Director-General's Administrative Instruction No. 17/Rev.1: Guidelines for the Technical Cooperation Programme and Project Cycle (DGA1.17/Rev.1, 24 August 2006)

²¹ For more information on Theory of Change, please see chapter 3.4 of UNIDO [Evaluation Manual](#).

- UNIDO Management and staff involved in the project; and
 - Representatives of donors, counterparts, and other stakeholders.
- (c) **Field visit** to project sites in China.
- On-site observation of results achieved by the project, including interviews of actual and potential project beneficiaries.
 - Interviews with the relevant UN Resident Coordinator and UNIDO Country offices' representative to the extent that he/she was involved in the project and the project's management members and the various national [and sub-regional] authorities dealing with project activities as necessary.
- (d) **Online data collection** methods will be used to the extent possible.

2. Key evaluation questions and criteria

The key evaluation questions (corresponding to the six OECD/DAC criteria) are the following:

- 1) **Relevance:** Is the intervention doing the right things for the upgrading and value adding of SHP development in China? To what extent do the project's objectives respond to national needs, policies, and priorities, and continue to do so under continued global warming and ecosystem degradation?
- 2) **Coherence:** How well does the intervention fit into China's development goals in decarbonising its energy portfolio and sustaining growth in an ecologically sustainable way? How compatible is the project with other interventions in the country for these national goals?
- 3) **Effectiveness:** Is the project achieving its objectives in environmental upgrading of SHP development in China? What additionalities has the project generated?
- 4) **Efficiency:** How well are resources being used for achieving the project's objectives? Has the project delivered results in an economic and timely manner?
- 5) **Impact:** What difference does the intervention make in China's SHP sector? To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects? Has the project had transformative effects in the SHP sector in China? What impact is the project expected to have on SHP development elsewhere in the world?
- 6) **Sustainability:** Will the benefits last? To what extent will the net benefits of the project continue, or are likely to continue?

The evaluation team should prepare a detailed questionnaire/interview guide based on the above items for individual communication.

The table below provides the key evaluation criteria to be assessed by the evaluation. The detailed questions to assess each evaluation criterion are in Annex 2 of UNIDO [Evaluation Manual](#).

Table 5. Project evaluation criteria

#	Evaluation criteria	Mandatory rating
A	Progress to Impact	Yes
B	Project design	Yes
1	• Overall design	Yes

2	• Project results framework/log frame	Yes
C	Project performance and progress towards results	Yes
1	• Relevance	Yes
2	• Coherence	Yes
3	• Effectiveness	Yes
4	• Efficiency	Yes
5	• Sustainability of benefits	Yes
D	Gender mainstreaming	Yes
E	Project implementation management	Yes
1	• Results-based management (RBM)	Yes
2	• Monitoring and Evaluation, Reporting	Yes
F	Performance of partners	
1	• UNIDO	Yes
2	• National counterparts	Yes
3	• Donor	Yes
G	Environmental and Social Safeguards (ESS), Disability and Human Rights	Yes
1	• Environmental Safeguards	Yes
2	• Social Safeguards, Disability and Human Rights	Yes
H	Overall Assessment	Yes

Other assessments required by the GEF for GEF-funded projects, for non GEF projects these topics should be covered as applicable:

The terminal evaluation will assess the following topics, for which **ratings are not required**:

- a. **Need for follow-up:** e.g. in instances of financial mismanagement, unintended negative impacts or risks.
- b. **Materialization of co-financing:** e.g. the extent to which the expected co-financing materialized, whether co-financing was administered by the project management or by some other organization, whether and how shortfall or excess in co-financing affected project results. At the terminal evaluation point, the Project Manager will update table 3 on co-financing and add two more columns to submit to the evaluation team: 1) Amount of co-financing materialized at mid-term review (MTR); and 2) Amount of co-financing materialized at terminal evaluation (TE). The evaluation team has the responsibility to validate and verify the co-financing amount materialized during the evaluation process. This table MUST BE included in the terminal evaluation report, as per requirement by the GEF.
- c. **Environmental and Social Safeguards**²²: appropriate environmental and social safeguards were addressed in the project's design and implementation, e.g. preventive or mitigation measures for any foreseeable adverse effects and/or harm to environment or to any stakeholder.

²² Refer to GEF/C.41/10/Rev.1 available at: http://www.thegef.org/sites/default/files/council-meetingdocuments/C.41.10.Rev.1.Policy_on_Environmental_and_Social_Safeguards.Final%20of%20Nov%2018.pdf

- d. **Updated Monitoring and Assessment tool of core-indicators:** The project management team will submit to the evaluation team the up-to-date core-indicators or tracking tool (for older projects) whereby all the information on the project results and benefits promised at approval and actually achieved at completion point must be presented. The evaluation team has the responsibility to validate and verify updated core-indicators during the evaluation process. This table MUST BE included in the terminal evaluation report, as per requirement by the GEF.
- e. **Knowledge Management Approach:** Information on the project's completed Knowledge Management Approach that was approved at CEO Endorsement/Approval.

3. Rating system

In line with the practice adopted by many development agencies, the UNIDO Independent Evaluation Unit uses a six-point rating system, where 6 is the highest score (highly satisfactory) and 1 is the lowest (highly unsatisfactory) as per the table below.

Table 6. Project rating criteria

Score		Definition
6	Highly satisfactory	Level of achievement presents no shortcomings (90% - 100% achievement rate of planned expectations and targets).
5	Satisfactory	Level of achievement presents minor shortcomings (70% - 89% achievement rate of planned expectations and targets).
4	Moderately satisfactory	Level of achievement presents moderate shortcomings (50% - 69% achievement rate of planned expectations and targets).
3	Moderately unsatisfactory	Level of achievement presents some significant shortcomings (30% - 49% achievement rate of planned expectations and targets).
2	Unsatisfactory	Level of achievement presents major shortcomings (10% - 29% achievement rate of planned expectations and targets).
1	Highly unsatisfactory	Level of achievement presents severe shortcomings (0% - 9% achievement rate of planned expectations and targets).

IV. EVALUATION PROCESS

The evaluation will be conducted from August 2023 to December 2023. The evaluation will be implemented in five phases, which are not strictly sequential, but in many cases iterative, conducted in parallel and partly overlapping:

- 1) Inception phase: The evaluation team will prepare the inception report providing details on the evaluation methodology and include an evaluation matrix with specific issues for the evaluation to address; the specific site visits will be determined during

the inception phase, taking into consideration the findings and recommendations of the mid-term review.

- 2) Desk review and data analysis.
- 3) Interviews, survey and literature review.
- 4) Country visits (whenever possible) and debriefing to key relevant stakeholders in the field.
- 5) Data analysis, report writing and debriefing to UNIDO staff at the Headquarters; and
- 6) Final report issuance and distribution with management response sheet, and publication of the final evaluation report in UNIDO website.

V. TIME SCHEDULE AND DELIVERABLES

The evaluation is scheduled to take place from September 2023 to December 2023. The evaluation field mission is tentatively planned for 11/2023. At the end of the field mission, the evaluation team will present the preliminary findings for key relevant stakeholders involved in this project in the country. The tentative timelines are provided in the table below.

After the evaluation field mission, the evaluation team leader will arrange a virtual debriefing and presentation of the preliminary findings of the terminal evaluation with UNIDO Headquarters. The draft TE report will be submitted 4 weeks after the end of the mission. The draft TE report is to be shared with the UNIDO Project Manager (PM), UNIDO Independent Evaluation Unit, the UNIDO GEF Coordinator and GEF OFP and other stakeholders for comments. The Evaluation team leader is expected to revise the draft TE report based on the comments received, edit the language and submit the final version of the TE report in accordance with UNIDO EIO/IEU standards.

Table 7. Tentative timelines

Timelines	Tasks
Sep 2023	Desk review and writing of inception report
Oct 2023	Online briefing with UNIDO project manager and the project team based in Vienna.
Nov 2023	Field visit to China.
Nov/Dec 2023	Online debriefing Preparation of first draft evaluation report
Dec 2023	Internal peer review of the report by UNIDO's Independent Evaluation Division and other stakeholder comments to draft evaluation report
Dec 2023	Final evaluation report

VI. EVALUATION TEAM COMPOSITION

The evaluation team will be composed of one international evaluation consultant acting as the team leader and one national evaluation consultant. The evaluation team members will possess a mixed skill set and experience including evaluation, relevant technical expertise, social and environmental safeguards and gender. Both consultants will be contracted by UNIDO.

The tasks of each team member are specified in the job descriptions annexed to these terms of reference. The evaluation team is required to provide information relevant for follow-up studies, including terminal evaluation verification on request to the GEF partnership up to three years after completion of the terminal evaluation.

According to UNIDO Evaluation Policy, members of the evaluation team must not have been directly involved in the design and/or implementation of the project under evaluation. The UNIDO Project Manager and the project management team in China will support the evaluation team. The UNIDO GEF Coordinator and GEF Operational Focal Point (OFP) will be briefed on the evaluation and provide support to its conduct. GEF OFP(s) will, where applicable and feasible, also be briefed and debriefed at the start and end of the evaluation mission.

An evaluation manager from UNIDO Independent Evaluation Unit will provide technical backstopping to the evaluation team and ensure the quality of the evaluation. The UNIDO Project Manager and national project teams will act as resource persons and provide support to the evaluation team and the evaluation manager.

VII. REPORTING

Inception report

These Terms of Reference (TOR) provide some information on the evaluation methodology, but this should not be regarded as exhaustive. After reviewing the project documentation and initial interviews with the project manager, the Team Leader will prepare, in collaboration with the team member, a short inception report that will operationalize the TOR relating to the evaluation questions and provide information on what type and how the evidence will be collected (methodology). It will be discussed with and approved by the responsible UNIDO Evaluation Manager.

The Inception Report will focus on the following elements: preliminary project theory model(s); elaboration of evaluation methodology including quantitative and qualitative approaches through an evaluation framework (“evaluation matrix”); Unit of work between the evaluation team members; field mission plan, including places to be visited, people to be interviewed and possible surveys to be conducted; and a debriefing and reporting timetable.

Evaluation report format and review procedures

The draft report will be delivered to UNIDO Independent Evaluation Unit (with a suggested report outline) and circulated to UNIDO staff and key stakeholders associated with the project for factual validation and comments. Any comments or responses, or feedback on any errors of fact to the draft report will be sent to UNIDO’s Independent Evaluation Unit for collation and onward transmission to the evaluation team who will be advised of any necessary revisions. On the basis of this feedback, and taking into consideration the comments received, the evaluation team will prepare the final version of the terminal evaluation report.

The evaluation team will present its preliminary findings to the local stakeholders at the end of the field visit and take into account their feedback in preparing the evaluation report. A presentation of preliminary findings will take place at UNIDO HQ afterwards (on-line).

The evaluation report should be brief, to the point and easy to understand. It must explain the purpose of the evaluation, what was evaluated, and the methods used. The report must highlight any methodological limitations, identify key concerns and present evidence-based findings, consequent conclusions, recommendations and lessons. The report should provide information on when the evaluation took place, the places visited, who was involved and be presented in a way that makes the information accessible and comprehensible. The report should include an executive summary that encapsulates the essence of the information contained in the report to facilitate dissemination and distillation of lessons.

Findings, conclusions and recommendations should be presented in a complete, logical and balanced manner. The evaluation report shall be written in English and follow the outline given by UNIDO Independent Evaluation Unit.

VIII. QUALITY ASSURANCE

All UNIDO evaluations are subject to quality assessments by UNIDO Independent Evaluation Unit. Quality assurance and control is exercised in different ways throughout the evaluation process (briefing of consultants on methodology and process of UNIDO Independent Evaluation Unit, providing inputs regarding findings, lessons learned and recommendations from other UNIDO evaluations, review of inception report and evaluation report by UNIDO's Independent Evaluation Unit).

The quality of the evaluation report will be assessed and rated against the criteria set forth in the Checklist on evaluation report quality. The applied evaluation quality assessment criteria are used as a tool to provide structured feedback. UNIDO Independent Evaluation Unit should ensure that the evaluation report is useful for UNIDO in terms of organizational learning (recommendations and lessons learned) and is compliant with UNIDO's evaluation policy and these terms of reference. The draft and final evaluation report are reviewed by UNIDO Independent Evaluation Unit, which will submit the final report to the GEF Evaluation Office and circulate it within UNIDO together with a management response sheet.

Annex 2: Evaluation Framework / Matrix

#	Evaluation criteria	Indicators/sub-questions	Data collection methods	Sources
A	Progress to Impact	- What difference did the intervention make in China's SHP sector? - To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects? - Has the project had transformative effects in the SHP sector in China? - What impact is the project expected to have on SHP development elsewhere in the world? - What are the key drivers and barriers to achieve the long-term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long-term objectives?	Desk review; stakeholder consultation; online data collection	Project reports; data on SHP policies and status. Ministry of Water Resources (MWR); UNIDO; International Center on Small Hydropower (ICSHP); Ministry of Finance (MoF)
B	Project design			
1	Overall design	- Is the project consistent with China's priorities? Does it meet the needs of the target group? Is it consistent with UNIDO's Inclusive and Sustainable Industrial Development? Is it in line with GEF priorities and policies? - Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices? - To what extent is the project design as foreseen in the project document still valid and relevant? - Are critical risks related to financial, socio-political, institutional, environmental and implementation aspects identified with specific risk ratings? Are their mitigation measures identified? Where possible, are the mitigation	Desk review; stakeholder consultation	Project document; UNIDO; MWR; ICSHP; provincial water departments

#	Evaluation criteria	Indicators/sub-questions	Data collection methods	Sources
		measures included in project activities/outputs and monitored under the M&E plan? - To what extent does the project design contribute to gender equality, the empowerment of women and the human rights-based approach?		
2	Project results framework/logframe	- Is the expected result-chain (impact, outcomes and outputs) clear and logical? Are the expected results realistic, measurable and not a reformulation or summary of lower-level results? - Do indicators describe and specify expected results in terms of quantity, quality and time? Do indicators change at each level of results and independent from indicators at higher and lower levels? Are indicators sex-disaggregated, if applicable? - Are key assumptions properly summarized and reflecting the proper level in the results chain in the logframe?	Desktop review; stakeholder consultation	Project document; UNIDO; ICSHP
C Project performance and progress towards results				
1	Relevance	- Is the intervention doing the right things for the upgrading and value adding of SHP development in China? - To what extent do the project's objectives respond to national needs, policies, and priorities, and continue to do so under continued global warming and ecosystem degradation?	Desk review; stakeholder consultation; online data collection	Project document; online data on SHP policies and status; UNIDO; MWR; ICSHP; provincial water departments
2	Coherence	- How well does the intervention fit into China's development goals in decarbonising its energy portfolio and sustaining growth in an ecologically sustainable way? - How compatible is the project with other interventions in the country for these national goals?	Desk review; stakeholder consultation	Project document; UNIDO; MWR; ICSHP; MoF; provincial water departments
3	Effectiveness	- Is the project achieving its objectives in environmental upgrading of SHP development in China? What additionalities has the project generated?	Desk review; stakeholder consultation; field visits;	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; SHP demonstration sites; local communities;

#	Evaluation criteria	Indicators/sub-questions	Data collection methods	Sources
		- What are the project's key results (outputs and outcomes)? To what extent have the expected results been achieved or are likely to be achieved? To what extent did the project achieve its results, against the original/revised target(s)? - To what extent is the identified progress result of the project attributable to the intervention rather than to external factors? - How do the stakeholders perceive the results? What is the feedback of the beneficiaries and the stakeholders on the project effectiveness?	online data collection	provincial water departments; vendors; data on SHP policies and status
4	Efficiency	- How well are resources being used for achieving the project's objectives? - Has the project delivered results in an economic and timely manner? - To what extent were expected results achieved within the original budget and timeframe? - Have the inputs from the donor, UNIDO and counterpart been provided as planned, and were they adequate to meet the requirements?	Desk review; stakeholder consultation	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; provincial water departments
5	Sustainability of benefits	- To what extent are the achievements likely to be sustained after the completion of the project? - Does the project have an exit strategy? To what extent do mechanisms, procedures and policies exist to carry forward the results attained? - What risks (in terms of financial, socio-political, institutional and environmental risks) will affect the continuation of results after the project ends?	Desk review; stakeholder consultation; field visits; online data collection	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; SHP demonstration sites; provincial water departments; data on SHP policies and status
D	Gender mainstreaming	- Was a gender analysis included in a baseline study or needs assessment (if any)? Were there gender-related project indicators?	Desk review; stakeholder consultation; field visits	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; SHP demonstration sites

#	Evaluation criteria	Indicators/sub-questions	Data collection methods	Sources
		- Are women/gender-focused groups, associations or gender units in partner organizations consulted/ included in the project? - How gender-balanced was the composition of the project management team, the Project Steering Committee (PSC), experts and consultants and the beneficiaries? - Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)? - To what extent were socioeconomic benefits delivered taking into consideration the gender dimensions?		
E Project implementation management				
1	Results-based management (RBM)	- Were there any delays in project start-up and implementation? What were the causes, and have they been resolved? - Are there any annual work plans? Are work-planning processes results-based? Has the logframe been used to determine the annual work plan (including key activities and milestone)? - How has the project's results framework/ logframe been used as a management tool? Were there any changes made to it since project start? - How do the project team and partners address delays or poor performance, if any? - How have results and lessons derived from the adaptive management process been documented, shared with key partners and internalized by partners?	Desk review; stakeholder consultation; field visits	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; SHP demonstration sites
2	Monitoring and Evaluation, Reporting	- Was an M&E system in place and did it facilitate timely tracking of progress toward project results? Did project team and manager make decisions and corrective actions based on analysis from M&E system and based on results achieved?	Desk review; stakeholder consultation; field visits	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; SHP demonstration sites

#	Evaluation criteria	Indicators/sub-questions	Data collection methods	Sources
		- Are annual/progress project reports complete, accurate and timely? - Was the information provided by the M&E system used to improve performance and adapt to changing needs? Was information on project performance and results achievement being presented to the PSC to make decisions and corrective actions? - Are monitoring and self-evaluation carried out effectively, based on indicators for outputs, outcomes and impact in the logframe? - Were resources for M&E sufficient? - How well have risks outlined the project document and in the logframe been monitored and managed? How often have risks been reviewed and updated? Has a risk management mechanism been put in place? - What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?		
F Performance of partners				
1	UNIDO	- Support to project design - Project modifications following changes in context or after the mid-term evaluation - Timely follow-up to address implementation bottlenecks - Role of UNIDO country presence (if applicable) in supporting the project - Supporting the project coordination function - Exit strategy, planned together with the government - Project's governance system - UNIDO HQ-based management, coordination, monitoring, quality control and technical input	Desk review; stakeholder consultation	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO

#	Evaluation criteria	Indicators/sub-questions	Data collection methods	Sources
2	National counterparts	- Ownership and commitment to designing the project - Ensuring alignment to national development priorities - Implementation - Ownership of the project - Financial contributions (cash or in-kind) - Support to the project, based on actions and policies - Internal government coordination - Exit strategy, planned together with UNIDO, or arrangements for continued funding of certain activities - Facilitation of the participation of non-governmental organizations, civil society, academia and the private sector where appropriate - Suitable procurement procedures for timely project implementation	Desk review; stakeholder consultation; field visits	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; provincial water departments; SHP demonstration sites
3	Donor	- Level of engagement and contribution to the project design and during the implementation - Donor monitoring and feedback to progress reports	Desk review; stakeholder consultation	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; MoF
G Environmental and Social Safeguards (ESS), Disability and Human Rights				
1	Environmental Safeguards	- Did the project use an environmental screening and assessment procedure? - To what extent did the project identify and realize opportunities to strengthen the environmental sustainability? - To what extent did the project assess those adverse environmental impacts and risks? - How did the project mitigate adverse environmental impacts and risks?	Desk review; stakeholder consultation; field visits	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; SHP demonstration sites; vendors
2	Social Safeguards, Disability	- Did the project use a social screening and assessment procedure?	Desk review; stakeholder consultation; field visits	Project reports & records; mid-term evaluation report; ICSHP; MWR; UNIDO; SHP demonstration sites; vendors

#	Evaluation criteria	Indicators/sub-questions	Data collection methods	Sources
	and Human Rights	- To what extent have poor, indigenous and physically challenged, women, men and other disadvantaged and marginalized groups benefited from the project? - To what extent did the project identify and realize opportunities to strengthen the social sustainability? - To what extent did the project assess those adverse social impacts and risks? - How did the project mitigate adverse social impacts and risks, based on the social safeguards specified in the UNIDO environmental and social safeguards policies and procedures (which include human rights)? - How did the project address disability inclusion?		
H	Overall Assessment			

Annex 3: List of Documentation Reviewed

1. Document related to project approval

- Project Proposal as endorsed by GEF CEO (2016)
- Feasibility studies of demonstrations (2015)

2. Documents & correspondence related to project management

- Project Agreement between UNIDO and International Center on Small Hydropower
- Project Execution Agreement between UNIDO and the Chinese Ministry of Water Resources
- Project Implementation Agreement between UNIDO and the Chinese Ministry of Finance
- Project Inception Report
- Letter from UNIDO GEF Focal Point, confirming the extension
- Letter from GEF Operational Focal Point in China, endorsing and requesting the extension
- Report from PMO proposing an extension to the PSC
- Project Inception Report, by ICSHP (2017)
- Approved Project Management Regulations
- Approved Financial Management Regulations
- Request for waiver of competitive bidding to deliver activities of Component 1 and 3, by ICSHP (2019)
- Vendor contracts and ToRs
- Work plans

3. Documents on project implementation

Output 1.1 & Output 1.3

- Progress reports (June and December 2020), Final report by ICSHP (2022)
- Report and Proposal on the Strategy of Green SHP Development in China, by ICSHP
- Work Report on Improving Green Hydropower Management Information System, by ICSHP
- Best-practice manual for operational safety accreditation of SHP projects, by ICSHP
- Report for promoting the standard of operational safety measures and its accreditation, by ICSHP
- Compilation of related policy documents on accreditation and standardisation of operational safety measure of SHP projects, by ICSHP
- Revised Green SHP Assessment Standard (draft version for review), by ICSHP
- Technical Guidelines on Dehydration Recovery in Downstream River of Small Hydro aligned to Green SHP Assessment Standard (draft version), by ICSHP
- Final Draft of Technical Guidelines on Green SHP Construction [assessment and certification] Measures, by ICSHP (2020)
- Small Hydropower Development Strategy Research and Proposal, by ICSHP (2020)
- Best Case Manual for Standardization of Production Safety in Rural Hydropower, by ICSHP (2020)
- Inception report (2020), Progress Reports (August, December 2020; June 2021), Final Report (2022), by Oliver Paish
- Review of China's 'Green SHP Assessment Stand' with reference to international standards and practices, by Oliver Paish (2022)

- International experiences of standardised measures to improve operational safety of SHP projects by Oliver Paish (2021)
- International experiences of green SHP development strategy, by Oliver Paish (2021)
- International experiences of mitigating negative impacts of SHP, by Oliver Paish (2021)

Output 1.2

- Final Design Report: Development of a Green Small Hydropower Assessment and Labelling System Aligned to the Green Small Hydro Assessment Standard (2019), Inception report and Progress Report (2019), by Development and Research Center (DRC)
- Final Design Report: Support to local government/provinces on preferential policies (2020), Inception Report and Progress Reports (2020), by DRC
- Compilation of policy documents related green SHP in China, by DRC (2020)
- A compiled list of central and local government policies on mandatory e-flow (2023)
- Final Report: Development of National-level Policies for GHP in China (2023); Inception Report (2022); Progress Report (2023), by DRC

Output 2.1

- Summary of Services by National Green SHP Technical Consultant (review and finalisation of design reports; research on green SHP technologies; recommendations on green SHP technologies and safety measures); integrating fishways/fish ladders into e-flow facilities), by Wang Yansong (2020, 2021)

Output 2.2

- List of selected plants, a sheet of plant names, plant owners, contract information (2023)
- Completion reports by demonstration SHP owners (2021, 2022, 2023)
- Inception, First and Second Progress reports, by demonstration SHP owners (2018, 2019, 2020, 2021)
- Documents related to withdrawn plants (2021, 2022)
- Contract and ToR between UNIDO and demonstration SHP owners (2018)
- Implementation Monitoring and Performance Analysis: Final Report (2021), Progress Reports (June and September 2021) Inception Report (2020), by Zhejiang University of Water Resources and Electric Power (2021)
- Monitoring and Evaluation of the Implementation of Environmental and Social Management Plan (ESMP): Final Report (2023), Progress Reports (2021, 2022, 2023), Inception Report (2021, 2022), by Tian Yaojin and Song Xiaoguang
- Final Report on ESMP Preparation, by Tian Yaojin and Song Xiaoguang (2020)
- Environmental and Social Management Plans (ESMPs), by demonstration SHP owners

Output 2.3

- Baseline and Impact Socio-Economic and Environmental Study: Final Report (2023) and Inception Report (2020), by Jiliang University
- Impact Study Report, by Jiliang University (2023)
- Baseline Study Report, by Jiliang University (2021)
- General Report of Case Studies, by Luo Yunxia (2023)
- Inception Report of Case Studies, by Luo Yunxia, Li Fang and Sun Lan (2022)
- Case Studies, by Luo Yunxia, Li Fang and Sun Lan (2023)
- Cost-Benefit Analysis: Final Report; Progress Report and Inception Report (All under preparation), by Tian Guiliang and Wang Guoqing

- Hydrological Regime Assessment: Final Report; Inception Report (All under preparation), by Tian Guiliang and Wang Guoqing

Output 3.1

- Compiled training materials for capacity building programmes for Green SHP, by ICSHP (2020)
- Capacity Building Programme & Establishment of Green SHP Plants and Safe Production Standardization for SHP owners: Final Report (2023), Progress Reports (2021, 2022), and Inception Report (2020), by Hohai University
- Documents on Study Tour to the US: Final Report (2019), Progress Report (2019), by International Economic & Technical Cooperation and Exchange Center, MWR

Output 3.2

- Compiled training materials for capacity building programmes for officials, by ICSHP (2020)
- Capacity Building Programme & Establishment of Green SHP Plants and Safe Production Standardization for officials: Final Report (2023), Progress Reports (2021, 2022), and Inception Report (2020), by Hohai University
- Documents on Study Tour to Austria and Switzerland: Final Report (2019); Progress Report (2019) by Training and Technology Transfer

Output 3.3

- Documents on Inception Workshop: Inception Report (2017), by ICSHP
- Project communications products: poster, brochure, film, social media, and website (2021)
- International and national seminars on SHP: Final Report (2023); Summaries of national seminars (2022, 2023), by China Hydraulic Engineering Society

Output 3.4

- Training materials for model green SHP (2020), by ICSHP
- Capacity Building Programme & Establishment of Green SHP Plants and Safe Production Standardization for SHP owners: Final Report (2023), Progress Reports (2021, 2022), and Inception Report (2020), by Hohai University

Output 3.5

- Training materials for SHP safety (2020), by ICSHP
- Capacity Building Programme & Establishment of Green SHP Plants and Safe Production Standardization for SHP owners: Final Report (2023), Progress Reports (2021, 2022), and Inception Report (2020), by Hohai University

4. Monitoring reports

- Mid-term Performance Evaluation Report (2021)
- Annual Progress Reports (2018, 2019, 2020, 2021, 2022)
- Project Implementation Reports (2018, 2019, 2020, 2021, 2022 and 2023)

5. PSC and management meeting minutes

- Documents on PSC meetings (2017, 2019, 2020, 2021, 2022 and 2023)
- Documents on regular meetings between PMO and UNIDO (March 2022-May 2023)

Annex 4: List of Stakeholders Consulted

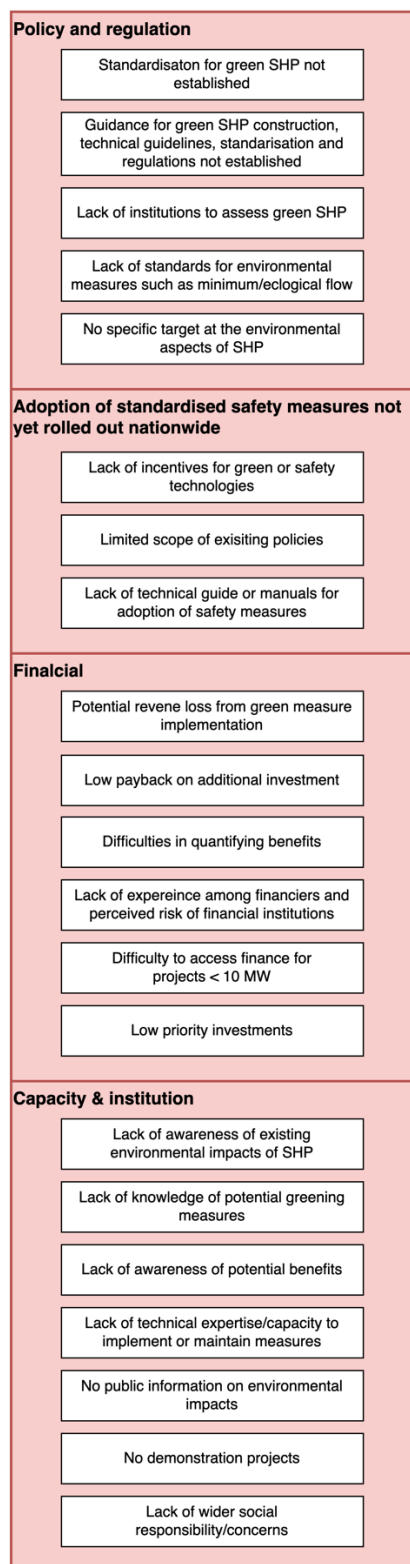
The list is in the chronological order of the consultations.

Name	Position
Heng Liu	Project Manager, UNIDO HQ
Tiantao Zhou	Project Coordinator, UNIDO
Xiaobo Hu	Division Chief, ICSHP
Yinnan Zhang	Programme Officer, ICSHP
Minmin Ye	Programme Officer, ICSHP
Yanming Wu	PMO Adviser
Yan Yang	Deputy Division Chief, Development Research Centre, MWR
Jia Sun	Researcher, Development Research Centre, MWR
Chen Chen	Researcher, Development Research Centre, MWR
Guoyin Xu	Researcher, Development Research Centre, MWR
Liyang Guo	Researcher, Development Research Centre, MWR
Yang Liu	Division Chief, China Hydrological Society
Shanhan Yang	Project Officer, China Hydrological Society
Fengzhen Tang	Project Officer, China Hydrological Society
Yaqin Sun	Division Chief, Department of Rural Water and Power, MWR
Jingjun Peng	Deputy Division Chief, Department of International Cooperation, Science and Technology, MWR
Stephen Bainous Kargbo	Representative and Head of Regional Office (China, DPR Korea, Mongolia), UNIDO
Ning Li	Project Administrator, UNIDO
Shiri Li	Deputy Director, Guangxi Provincial Hydropower Administration
Aiguang Mai	Division Chief, Guangxi Provincial Hydropower Administration
Andong Li	Manager, Jingxi Power Supply Company
Yi He	Vice Manager, Jingxi Power Supply Company
Haifang Pan	Engineer, Jingxi Power Supply Company
Jianren Xu	Manager of Power Generation Unit, Jingxi Power Supply Company
Ning Huang	Deputy Director, Jingxi Water Resources Bureau
Lei Huang	Director, Jingxi Electricity Management Station
Wujun Wei	Chief Engineer, Baise Water Resources Bureau
Lin Lin	Director, Base Electricity Management Station
Fengying Nong	Head, Aibu Village, Jingxi
Hela Huang	Farmer, Aibu Village, Jingxi
Shunhuan Huang	Farmer, Aibu Village, Jingxi
Qiyang Wei	Farmer, Naguo Village, Jingxi
Yide Zhou	Farmer, Donghe Village, Jingxi
Guoqing Wang	Researcher, Nanjing Hydraulic Research Institute
Jianfang Lu	Director, Jinyun County Bureau of Water Resources

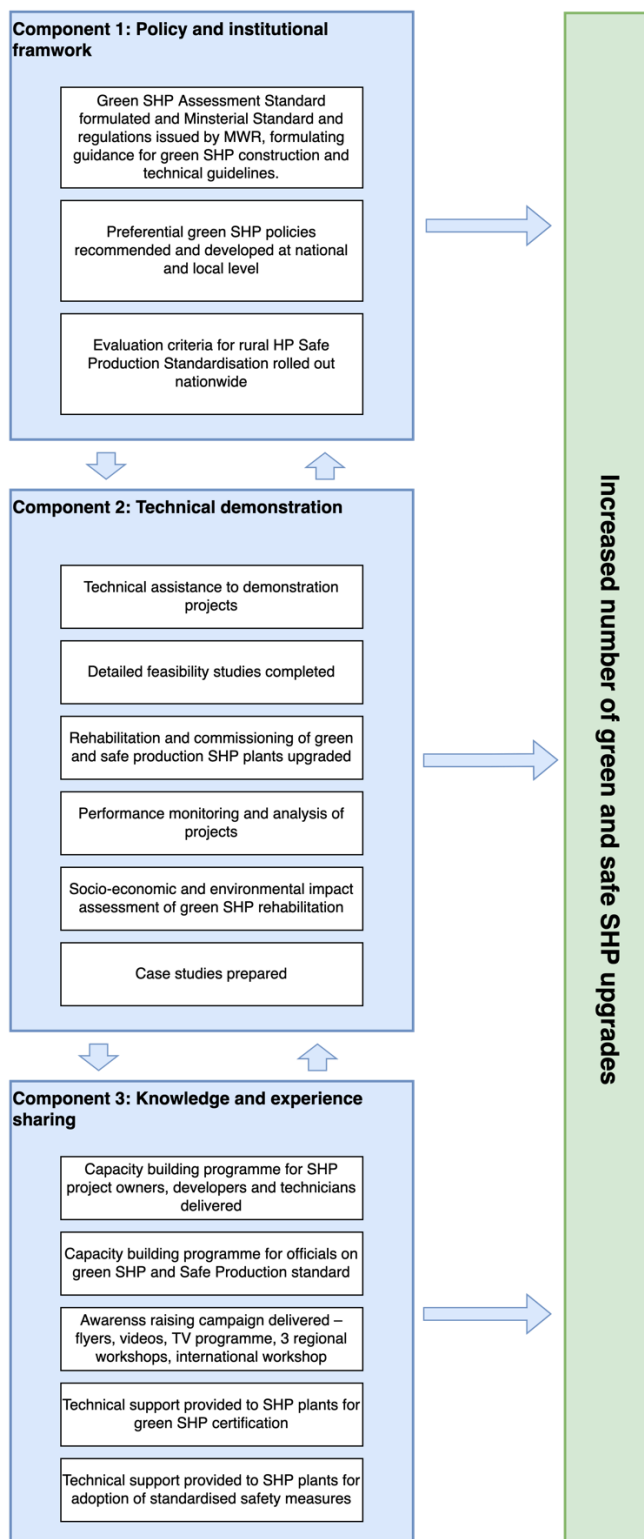
Yongqiang Hu	Deputy Director, Jinyun County Bureau of Water Resources
Lifeng Pan	Division Chief, Jinyun County Bureau of Water Resources
Haixia Xu	Deputy Division Chief, Jinyun County Bureau of Water Resources
Zhisheng Lu	President, Jinyun County Water Resources Investment Company
Xiaobing Ying	Vice General Manager, Jinyun County Water Resources Investment Company
Zhongcheng Sun	General Manager, Cascade Power Generation Company
Xiaofeng Lu	Vice General Manager, Cascade Power Generation Company
Aiming Feng	Professor, China Jiliang University
Jianfeng Zhu	Postgraduate, China Jiliang University
Yunxia Luo	Professor, Zhejiang University of Water Resources and Electrical Power
Yaojin Tian	Zhejiang Design and Survey Institute of Water Resources and Hydropower
Cheng Zheng	Deputy Director, Zhejiang Water Resources and Hydropower Management Centre
Xiaofei Wang	Division Chief, Zhejiang Water Resources and Hydropower Management Centre
Luyao Zhou	Deputy Division Chief, Zhejiang Water Resources and Hydropower Management Centres
Su Guo	Professor, Hohai University
Chuanqi Ou	Division Chief, ICSHP
Yue Zhao	Programme Officer, ICSHP
Chengguang Huang	Head, Qingshuitan SHP
Lei Jiang	Vice Department Manager, Quzhou Hydropower Development Co. Ltd.
Zhangxi Fu	Farmer, Waijiao Village, Quzhou
Guiliang Tian	Professor, Hohai University
Oliver Paish	Consultant
Yansong Wang	Consultant

Annex 5: Project Logframe

Barriers



Project components



Annex 6: Interview Questionnaires

For Ministry of Water Resources:

- A. Progress to impact
 - What difference did the intervention make in China's SHP sector?
 - What impact is the project expected to have on SHP development elsewhere in the world?
- B. Project design
 - What has been the overarching development path of SHP in China since the SHP project's formulation started in 2014?
 - To what extent is the project design as foreseen in the project document still valid and relevant?
- C. Project performance and progress toward results
 - How well does the intervention fit into China's development goals in decarbonising its energy portfolio and sustaining growth in an environmentally sustainable way?
 - How compatible is the project with other interventions in the country for these national goals?
 - Is the project achieving its objectives in environmental upgrading of SHP development in China? What additionalities has the project generated?
 - What are the project's key results (outputs and outcomes)? To what extent are the identified progress results of the project attributable to the intervention rather than to external factors?
 - How well were resources used for achieving the project's objectives?
 - To what extent were expected results achieved within the original budget and timeframe?
 - To what extent are the achievements likely to be sustained after the completion of the project? Is there an exit strategy?
 - What risks (in terms of financial, socio-political, institutional and environmental risks) will affect the continuation of results after the project ends?
- D. Gender mainstreaming
 - How gender-balanced was the composition of the project management team, the Project Steering Committee (PSC), experts and consultants and the beneficiaries?
 - Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)?
 - To what extent were socioeconomic benefits delivered taking into consideration the gender dimensions?
- E. Project implementation management
 - Were there any major delays in project start-up and implementation? What were the causes, and have they been resolved?
 - Was the information provided by the M&E system used to improve performance and adapt to changing needs? Was appropriate information on project

performance and results achievement presented in a suitable and timely way for the PSC to make necessary decisions and corrective actions?

- What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?

F. Performance of partners

- How well did MWR support the project design, implementation and governance/oversight? How strong do you think the MWR ownership of the project?
- How has MWR coordinated with relevant departments to support the delivery of the project?
- What is your view of UNIDO's role in the project?
- Have the counterpart contributions been provided as planned, and were they adequate to meet the requirements?
- How did the project's procurement procedures contribute to timely project implementation?

G. Environmental and social safeguards

- How was the trade-off between increased revenue from electricity sold and enhanced environmental flows to benefit local communities dealt with?
- To what extent did the project identify and realize opportunities to strengthen environmental sustainability? How did the project mitigate adverse environmental impacts and risks?
- To what extent have poor, indigenous and physically challenged, women, men and other disadvantaged and marginalized groups benefited from the project?
- To what extent did the project identify and realize opportunities to strengthen social sustainability?
- How did the project mitigate adverse social impacts and risks?

For Ministry of Finance:

- A. Progress to impact
 - What difference did the intervention make in China's SHP sector?
 - What impact is the project expected to have on SHP development elsewhere in the world?
- B. Project design
 - What has been the overarching development path of SHP in China since the SHP project's formulation started in 2014?
 - To what extent is the project design as foreseen in the project document still valid and relevant?
- C. Project performance and progress toward results
 - How well does the intervention fit into China's development goals in decarbonising its energy portfolio and sustaining growth in an ecologically sustainable way?
 - How compatible is the project with other interventions (including other GEF projects) in the country for these national goals?
 - Is the project achieving its objectives in environmental upgrading of SHP development in China? What additionalities has the project generated?
 - How well were resources used for achieving the project's objectives?
 - To what extent were expected results achieved within the original budget and timeframe?
 - To what extent are the achievements likely to be sustained after the completion of the project? Is there an exit strategy?
- D. Gender mainstreaming
 - How gender-balanced was the composition of the project management team, the Project Steering Committee (PSC), experts and consultants and the beneficiaries?
 - To what extent were socioeconomic benefits delivered taking into consideration the gender dimensions?
- E. Project implementation management
 - Were there any major delays in project start-up and implementation? What were the causes, and have they been resolved?
 - Was the information provided by the M&E system used to improve performance and adapt to changing needs? Was appropriate information on project performance and results achievement presented in a suitable and timely way for the PSC to make necessary decisions and corrective actions?
 - What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?
- F. Performance of partners
 - How well did UNIDO support the project design, implementation and monitoring? How strong do you think the ownership of the project was?
 - Have the counterpart contributions been provided as planned, and were they adequate to meet project requirements?
 - How did the project's procurement procedures contribute to timely project implementation?

For UNIDO:

A. Progress to impact

- What difference did the intervention make in China's SHP sector? What additionalities has the project generated?
- To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects?
- What impact is the project expected to have on SHP development elsewhere in the world?
- What are the key drivers and barriers to achieve the long-term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long-term objectives?

B. Project design

- What has been the overarching development path of SHP in China since the SHP project's formulation started in 2014?
- To what extent is the project design as foreseen in the project document still valid and relevant?
- Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices?
- Are the expected results (impacts and outcomes) realistic, measurable and not a reformulation or summary of lower-level results?

C. Project performance and progress toward results

- To what extent did the project respond to national needs, policies, and priorities, and fit into China's development goals in decarbonising its energy portfolio and sustaining growth in an environmentally sustainable way?
- How compatible is the project with other interventions in the country for national goals?
- To what extent has the project achieved its objectives in environmental upgrading of SHP development in China?
- What are the project's key results (outputs and outcomes)? To what extent are the identified progress results of the project attributable to the intervention rather than to external factors?
- How do the stakeholders perceive the results? What is the feedback of the beneficiaries and the stakeholders on the project effectiveness?
- How well were resources used for achieving the project's objectives?
- To what extent were expected results achieved within the original budget and timeframe?
- To what extent have the inputs from the donor, UNIDO and counterpart been provided as planned, and were they adequate to meet project requirements?
- To what extent are the achievements likely to be sustained after the completion of the project?
- Does the project have an exit strategy? To what extent do mechanisms, procedures and policies exist to carry forward the results attained?
- What risks (in terms of financial, socio-political, institutional and environmental risks) will affect the continuation of results after the project ends?

D. Gender mainstreaming

- How gender-balanced was the composition of the project management team, the Project Steering Committee (PSC), experts and consultants and the beneficiaries?
 - Are women/gender-focused groups, associations or gender units in partner organizations consulted/ included in the project?
 - Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)?
 - To what extent were socioeconomic benefits delivered taking into consideration the gender dimensions?
- E. Project implementation management
- Were there any major delays in project start-up and implementation? What were the causes, and how were they managed?
 - What were the changes made to the project since project start? What was the rationale for these changes? How were they managed?
 - To what extent was the information provided by the M&E system used to improve performance and adapt to changing needs? Was appropriate information on project performance and results achievement presented in a suitable and timely way for the PSC to make necessary decisions and corrective actions?
 - How well have risks outlined in the project document and in the logframe been monitored and managed? How often have risks been reviewed and updated?
 - What lessons can be drawn from the successful and unsuccessful practices in designing, implementing and managing the project?
- F. Performance of partners
- What support has UNIDO provided to the project design, coordination, monitoring, quality control and technical input?
 - What is the role of the UNIDO regional office in supporting the project?
 - What is your view of MWR's role?
 - How has MWR coordinated with relevant departments and other stakeholders to support the delivery of the project?
 - Have the counterpart contributions been provided as planned, and were they adequate to meet project requirements?
 - How did the project's procurement procedures contribute to timely project implementation?
 - What is your view of donor's level of engagement and contribution in project design, implementation and oversight?
- G. Environmental and social safeguards
- How was the trade-off between increased revenue from electricity sold and enhanced environmental flows to benefit local communities dealt with?
 - To what extent did the project identify and realize opportunities to strengthen environmental sustainability? How did the project mitigate adverse environmental impacts and risks?
 - To what extent have poor, indigenous and physically challenged, women, men and other disadvantaged and marginalized groups benefited from the project?
 - To what extent did the project identify and realize opportunities to strengthen social sustainability?

- How did the project mitigate adverse social impacts and risks, based on the social safeguards specified in the UNIDO environmental and social safeguards policies and procedures (which include human rights)?
- How did the project address disability inclusion?

For ICSHP (in its project management role):

A. Progress to impact

- What difference did the intervention make in China's SHP sector? What additionalities has the project generated?
- To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects?
- What impact is the project expected to have on SHP development elsewhere in the world?
- What are the key drivers and barriers to achieve the long-term objectives? To what extent has the project helped put in place the conditions likely to address the drivers, overcome barriers and contribute to the long-term objectives?

B. Project design

- What has been the overarching development path of SHP in China since the SHP project's formulation started in 2014?
- To what extent is the project design as foreseen in the project document still valid and relevant?
- Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices?
- Are the expected results (impacts and outcomes) realistic, measurable and not a reformulation or summary of lower-level results?

C. Project performance and progress toward results

- To what extent did the project respond to national needs, policies, and priorities, and fit into China's development goals in decarbonising its energy portfolio and sustaining growth in an environmentally sustainable way?
- How compatible is the project with other interventions in the country for national goals?
- To what extent has the project achieved its objectives in environmental upgrading of SHP development in China?
- What are the project's key results (outputs and outcomes)? To what extent are the identified progress results of the project attributable to the intervention rather than to external factors?
- How do the stakeholders perceive the results? What is the feedback of the beneficiaries and the stakeholders on the project effectiveness?
- How well were resources used for achieving the project's objectives?
- To what extent were expected results achieved within the original budget and timeframe?
- To what extent have the inputs from the donor, UNIDO and counterpart been provided as planned, and were they adequate to meet project requirements?
- To what extent are the achievements likely to be sustained after the completion of the project?
- Does the project have an exit strategy? To what extent do mechanisms, procedures and policies exist to carry forward the results attained?

- What risks (in terms of financial, socio-political, institutional and environmental risks) will affect the continuation of results after the project ends?
- D. Gender mainstreaming
- How gender-balanced was the composition of the project management team, the Project Steering Committee (PSC), experts and consultants and the beneficiaries?
 - Are women/gender-focused groups, associations or gender units in partner organizations consulted/ included in the project?
 - Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)?
 - To what extent were socioeconomic benefits delivered taking into consideration the gender dimensions?
- E. Project implementation management
- Were there any major delays in project start-up and implementation? What were the causes, and how were they managed?
 - What were the changes made to the project since project start? What was the rationale for these changes? How were they managed?
 - To what extent was the information provided by the M&E system used to improve performance and adapt to changing needs? Was appropriate information on project performance and results achievement presented in a suitable and timely way for the PSC to make necessary decisions and corrective actions?
 - How well have risks outlined in the project document and in the logframe been monitored and managed? How often have risks been reviewed and updated?
 - What lessons can be drawn from the successful and unsuccessful practices in implementing and managing the project?
- F. Performance of partners
- What is your view of UNIDO's role?
 - How has ICSHP coordinated with relevant departments and other stakeholders to support the delivery of the project?
 - Have the counterpart contributions been provided as planned, and were they adequate to meet project requirements?
 - How did the project's procurement procedures contribute to timely project implementation?
 - What is your view of donor's level of engagement and contribution in project design, implementation and oversight?
- G. Environmental and social safeguards
- How was the trade-off between increased revenue from electricity sold and enhanced environmental flows to benefit local communities dealt with?
 - To what extent did the project identify and realize opportunities to strengthen environmental sustainability? How did the project mitigate adverse environmental impacts and risks?
 - To what extent have poor, indigenous and physically challenged, women, men and other disadvantaged and marginalized groups benefited from the project?
 - To what extent did the project identify and realize opportunities to strengthen social sustainability?

- How did the project mitigate adverse social impacts and risks, based on the social safeguards specified in the UNIDO environmental and social safeguards policies and procedures (which include human rights)?
- How did the project address disability inclusion?

For provincial departments of water resources

A. Progress to impact

- What difference did the intervention make in the SHP sector of your province? What additionalities has the project generated?
- To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects?

B. Project design

- What has been the overarching development path of SHP in your province since the SHP project's formulation started in 2014?
- To what extent is the project design as foreseen in the project document still valid and relevant?
- Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices?

C. Project performance and progress toward results

- To what extent did the project respond to provincial needs, policies, and priorities, and fit into provincial development goals in decarbonising its energy portfolio and sustaining growth in an environmentally sustainable way?
- How compatible is the project with other interventions in the province for these national goals?
- To what extent has the project achieved its objectives in environmental upgrading of SHP development in your province?
- What are the project's key results (outputs and outcomes)? To what extent are the identified progress results of the project attributable to the intervention rather than to external factors?
- How do the stakeholders in your province perceive the results? What is the feedback of the beneficiaries and the stakeholders on the project effectiveness?
- How well were resources used for achieving the project's objectives?
- To what extent were expected results achieved within the original budget and timeframe?
- To what extent have the inputs from the donor, UNIDO and counterpart been provided as planned, and were they adequate to meet project requirements?
- To what extent are the achievements likely to be sustained after the completion of the project?
- Does the project have an exit strategy relevant to your province? To what extent do mechanisms, procedures and policies exist to carry forward the results attained?
- What risks (in terms of financial, socio-political, institutional and environmental risks) will affect the continuation of results after the project ends?

D. Gender mainstreaming

- How gender-balanced was the composition of the provincial project management team and the beneficiaries?
 - Are women/gender-focused groups, associations or gender units in partner organizations consulted/ included in the project?
 - Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)?
 - To what extent were socioeconomic benefits delivered taking into consideration the gender dimensions?
- E. Project implementation management
- Were there any major delays in project start-up and implementation? What were the causes, and how were they managed?
 - What were the changes made to the project since project start? What was the rationale for these changes? How were they managed?
 - How well have risks outlined in the project document and in the logframe been monitored and managed? How often have risks been reviewed and updated?
 - What lessons can be drawn from the successful and unsuccessful practices in implementing and managing the project?
- F. Performance of partners
- What is your view of the respective role of UNIDO, MWR and PMO?
 - How has your department coordinated with other departments and other stakeholders to support the delivery of the project?
 - Have the counterpart contributions been provided as planned, and were they adequate to meet project requirements?
 - How did the project's procurement procedures contribute to timely project implementation?
- G. Environmental and social safeguards
- How was the trade-off between increased revenue from electricity sold and enhanced environmental flows to benefit local communities dealt with?
 - To what extent did the project identify and realize opportunities to strengthen environmental sustainability? How did the project mitigate adverse environmental impacts and risks?
 - To what extent have poor, indigenous and physically challenged, women, men and other disadvantaged and marginalized groups benefited from the project?
 - To what extent did the project identify and realize opportunities to strengthen social sustainability?
 - How did the project mitigate adverse social impacts and risks?
 - How did the project address disability inclusion?

For ICSHP (in its vendor's role under Component 1 and 3); Development and Research Center, MWR; Zhejiang University of Water Resources and Electrical Power; China Jiliang University; Hohai University; Chinese Hydraulic Engineering Society; individual consultants under Component 1 and 2:

A. Progress to impact

- What difference did the intervention make in China's SHP sector? What additionalities has the project generated?
- To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects?

B. Project design

- What has been the overarching development path of SHP in China since the SHP project's formulation started in 2014?
- Is the applied project approach sound and appropriate? Is the design technically feasible and based on best practices?

C. Project performance and progress toward results

- To what extent did the project respond to national needs, policies, and priorities, and fit into China's development goals in decarbonising its energy portfolio and sustaining growth in an environmentally sustainable way?
- How compatible is the project with other interventions in the country for national goals?
- To what extent has the project achieved its objectives in environmental upgrading of SHP development in China?
- What are the project's key results that your organisation has contributed? To what extent are the identified progress results of the project attributable to the intervention rather than to external factors?
- To what extent are the achievements likely to be sustained after the completion of the project? Is there an exit strategy?
- What risks (in terms of financial, socio-political, institutional and environmental risks) will affect the continuation of results after the project ends?

D. Gender mainstreaming

- How gender-balanced was the composition of the project implementation team?
- Are women/gender-focused groups, associations or gender units in partner organizations consulted/ included in your work?
- Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)?
- To what extent were socioeconomic benefits delivered taking into consideration the gender dimensions?

E. Project implementation management

- Were there any major delays in project start-up and implementation? What were the causes, and how were they managed?
- What were the changes made to the project since project start? What was the rationale for these changes? How were they managed?
- What lessons can be drawn from the successful and unsuccessful practices in implementing the project?

F. Performance of partners

- What is your view of the respective role of UNIDO and PMO?
- How did you work with different stakeholders to support the delivery of the project?
- How did the project's procurement procedures contribute to timely project implementation?

G. Environmental and social safeguards

- How was the trade-off between increased revenue from electricity sold and enhanced environmental flows to benefit local communities dealt with?
- To what extent did your work identify and realize opportunities to strengthen environmental sustainability? How did the project mitigate adverse environmental impacts and risks?
- To what extent have poor, indigenous and physically challenged, women, men and other disadvantaged and marginalized groups benefited from the project?
- To what extent did your work identify and realize opportunities to strengthen social sustainability?
- How did your work mitigate adverse social impacts and risks?
- How did your work address disability inclusion?

For SHP owners:

- A. Progress to impact
 - What difference did the intervention make for your SHP? What additionalities has the project generated?
 - To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects?
- B. Project design
 - What has been the overarching development path of SHP in China since the SHP project's formulation started in 2014? How has your SHP been affected?
 - How do you assess the applied project approach to your SHP?
- C. Project performance and progress toward results
 - To what extent did the project respond to local needs and fit into the development of your SHP?
 - How compatible is the project with other interventions implemented in your province?
 - To what extent has the project achieved its objectives in environmental upgrading of your SHP?
 - What are the key results that the project has contributed to your SHP? To what extent are the identified progress results of the project attributable to the intervention rather than to external factors?
 - To what extent are the achievements likely to be sustained after the completion of the project?
 - What risks (in terms of financial, socio-political, institutional and environmental risks) will affect the continuation of results after the project ends?
- D. Gender mainstreaming
 - Are women/gender-focused groups and associations consulted/ included in the project?
 - Do the results affect women and men differently? If so, why and how? How are the results likely to affect gender relations (e.g., division of labour, decision-making authority)?
 - To what extent were socioeconomic benefits delivered taking into consideration the gender dimensions?
- E. Project implementation management
 - Were there any major delays in project start-up and implementation? What were the causes, and how were they managed?
 - What were the changes made to the project since project start? What was the rationale for these changes? How were they managed?
 - What lessons can be drawn from the successful and unsuccessful practices in implementing the project?
- F. Performance of partners
 - What is your view of the respective role of UNIDO and PMO?
 - How did you work with different stakeholders to upgrade your SHP?
 - How did the project's procurement procedures contribute to timely project implementation?

G. Environmental and social safeguards

- How was the trade-off between increased revenue from electricity sold and enhanced environmental flows to benefit local communities dealt with?
- To what extent did your work identify and realize opportunities to strengthen environmental sustainability? How did the project mitigate adverse environmental impacts and risks?
- To what extent have poor, indigenous and physically challenged, women, men and other disadvantaged and marginalized groups benefited from the project?
- To what extent did the upgrading identify and realize opportunities to strengthen social sustainability?
- How did the upgrading mitigate adverse social impacts and risks?
- How did the upgrading address disability inclusion?

For local communities:

A. Progress to impact

- What difference did the intervention make for your community? What additionalities has the project generated?
- To what extent has the project generated significant positive or negative, intended or unintended, higher-level effects?

B. Gender mainstreaming

- Are women/gender-focused groups and associations consulted/ included in the project?
- Did the project affect women and men differently? If so, why and how?

C. Environmental and social safeguards

- To what extent did the project respond to local needs?
- What changes (e.g., environmental, social or economic) have you witnessed since the upgrading of your local SHP? How have you been affected?
- Do you think there will be more/less/no benefits brought by your local SHP's upgrading?
- To what extent have poor, indigenous and physically challenged, women, men and other disadvantaged and marginalized groups benefited from the project?

Annex 7: Materialization of Co-financing

The project's promised co-financing totalled US\$74,578,448 at CEO endorsement and breakdown of sources was as follows:

Co-financing Source	In-kind	Cash	Total (\$)
Recipient national Government (MWR/MOF)	4,345,000	22,956,835	27,301,835
Recipient local Government (Provincial or lower)	5,364,000	9,909,759	15,273,759
Beneficiary SHP plant owners		19,250,782	19,250,782
National and provincial banks		12,377,072	12,377,072
UNIDO	300,000	75,000	375,000
Total Co-financing (\$)	10,009,000	64,569,448	74,578,448

By the time of the mid-term review in 2019, US\$44,417,583, or 59.56%, were delivered. From 2021-2022, five demonstration SHPs were withdrawn because of new national policy to demolish SHPs located in natural reserves. As a result, expected co-financing was updated as follows:

Co-financing Source	In-kind	Cash	Total (\$)
Recipient national Government (MWR/MOF)	4,345,000	19,414,281	23,759,281
Recipient local Government (Provincial or lower)	5,364,000	8,462,527	12,709,027
Beneficiary SHP plant owners		16,854,925	16,854,925
National and provincial banks		10,734,987	10,734,987
UNIDO	300,000	75,000	375,000
Total Co-financing (\$)	10,009,000	55,466,720	65,550,720

At project completion, co-financing was materialised as follows:

Co-financing Source	In-kind	Cash	Total (\$)
Recipient national Government (MWR/MOF)	4,380,000	20,002,321	24,952,021
Recipient local Government (Provincial or lower)	5,407,200	9,013,829	13,851,329
Beneficiary SHP plant owners		22,698,737	22,698,737
National and provincial banks		1,407,580	1,407,580
UNIDO	300,000	75,000	375,000
Total Co-financing (\$)	10,087,200	53,122,467	63,284,667

The materialisation rate was 96.54%, compared to the updated co-financing target.



Vienna International Centre
Wagramerstr. 5, P.O. Box 300,
A-1400 Vienna, Austria



+43 1 26026-0



www.unido.org



evaluation@unido.org



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INDUSTRIAL DEVELOPMENT ORGANIZATION