FINAL REPORT

TERMINAL EVALUATION - ENABLING SOLID STATE LIGHTING MARKET TRANSFORMATION & PROMOTION OF LIGHT EMITTING DIODE (LED) LIGHTING

UNDP CHINA

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PROJECT DATA		
Title of UNDP Supported GEF Financed Project	Enabling Solid State Lighting Market Transformation & Promotion of Light Emitting Diode (LED) Lighting	
UNDP and GEF Project ID Numbers and Focal Area	UNDP Project ID: PIMS 5120 GEF Project ID: 5669 GEF Operational Focal Area: Climate Change CCM2	
Evaluation Time Frame and Date of Evaluation Report	**Content**	**Time**
	Meeting with the PMO	May 18, 2021
	Ongoing data gathering and interviews as requested by the TE team	May 20 - 25, 2021
	PPT Presentation of initial TE findings and recommendations	June 11, 2021
	Validation of financial and other reporting information, additional analysis	April 2021
	Submission of Draft TE	June 18, 2021
Region and Countries included in the Project	Region: Asia Pacific Country: People's Republic of China	
GEF Operational Program/Strategic Program	Applicable GEF Strategic Objective and Program: GEF-5 CCM Strategic Program SP2: promote market transformation for energy efficiency in industry and the building sectors. Applicable GEF Expected Outcomes: Appropriate policy, legal and regulatory frameworks adopted and enforced; Sustainable financing and delivery mechanisms established and operational. Applicable GEF Outcome Indicators: Energy efficiency policy and regulation in place; Investment mobilized; Energy savings achieved.	
Implementing Partner and Other Project Partners	UNDP China, NDRC, MOST, MOHURD, MOT, NGOA, MIIT, SAC, NECC, Local Government Units, NGOs, Technical Agencies (e.g., CNIS, CNCA, CQC, NLTC), Lighting products manufacturers, energy service companies (ESCOs), lighting system service agencies, lighting products retailers, and consumers.	
Executing Agency	National Development and Reform Commission (NDRC) of the PRC	
Date of Inception Workshop	December 21, 2016	
Original Closing Date	February 28, 2019	
Revised Closing Date	March 31, 2021	
Evaluation Team Members	Ms. Umm e Zia (International Evaluator) Ms. Yanping Zhang (National Evaluator) Ms. Michelle Wang (National Evaluator)	

ACKNOWLEDGEMENT

This Terminal Evaluation report sets out findings, conclusions, lessons learnt and recommendations for the **Enabling Solid State Lighting Market Transformation & Promotion of Light Emitting Diode (LED) Lighting**. The report is developed in compliance with the terms of reference for the assignment. The conclusions and recommendations set out in the following pages are solely those of the evaluators and are not binding on the project management and sponsors.

The authors would like to thank all who assisted in the Terminal Evaluation, particularly the PMO and UNDP China for providing technical and logistic support, and all the stakeholders who consented to be interviewed.

ABBREVIATION & ACRONYMS

ACRONYM	MEANING
AWP	Annual Work Plan
BRESL	Barrier Removal to the Cost-Effective Development and Implementation of Energy Efficiency Standards and Labelling
CALI	China Association of Lighting Industry
CCM	Climate Change Mitigation
CEO	Chief Executive Officer
CNCA	Certification Accreditation Administration of the People's Republic of China
CNIS	China National Institute of Standards
CPD	Country Program Document
CQC	Care Quality Commission
EA	Executing agency
EE	Energy Efficiency
EOP	End of Project
ESCO	Energy Service Companies
ESL	Energy Saving Lamps
GEF	Global Environment Facility
GHG	Greenhouse Gas
GOC	Government of China
GRES	Gender Results Effectiveness Scale
GWh	Giga Watt Hours = 10^9 Watt hours
IA	Implementing Agency
ISA	International Solid State Lighting Alliance
KII	Key informant interviews
LED	Light Emitting Diode
MIIT	Ministry of Industry and Information Technology
MOF	Ministry of Finance
MOHURD	Ministry of Housing and Urban-Rural Development
MOST	Ministry of Science and Technology
MOT	Ministry of Transport
MTR	Medium Term Review
NDRC	National Development and Reform Commission of China
NECC	National Energy Conservation Center
NGO	Non-Governmental Organization
NGOA	National Government Offices Administration
NLTC	National Lighting Test Center

NPC	National Project Coordinator
NTPAS	National Targeted Poverty Alleviation Strategy
PEERAC	Promoting Energy Efficient Room Air Conditioners
PILESLAMP	Phasing-out of Incandescent Lamps and Energy Saving Lamps Promotion Project
PMO	Project Management Office
PRC	People's Republic of China
PSC	Project Steering Committee
RMB	Chinese Renminbi
SAC	Standardization Administration of the People's Republic of China
SME	Small and Medium enterprise
SP	Strategic Program
SSL	Solid State Lighting
TE	Terminal Evaluation
TOR	Terms of Reference
TYWP	Two Year Work Planning
UNDP	United Nations Development Program
UNEP	United Nations Environment Program

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PROJECT SUMMARY TABLE		
Goal of the Project	The goal of this project is the reduction of GHG emissions in power generation in China.	
Objective of the Project	The project objective is the facilitation of the enhanced production and widespread application of quality solid state lighting (SSL) products in China.	
Major Components and Outcomes of the Project	The SSLED project is composed of four major components and their major outcomes are as follows: • **Component 1: SSL Market Development** • Outcome 1: Enabling of enhanced and strategic SSL technology and market developments based on comprehensively assessed and documented up-to-date status of the SSL industry and market in China. • **Component 2: SSL Market Transformation Policies and Mechanisms**. • Outcome 2: Facilitation of support and incentives in the local production of quality SSL products, and in the application of SSL products compliant with established quality and energy performance standards. • **Component 3: SSL Application Demonstration** • Outcome 3: Increased penetration rate of SSL products especially in the residential sector in China. • **Component 4: Strengthening of SSL Quality Assurance Capabilities**. • Outcome 4: Enhanced quality and energy performance of locally produced SSL products both for the domestic and international markets	
Project Budget	GEF Fund	USD 6,242,694
	Government of China Co-Financing	USD 25,300,000
	Industry Association Co-Financing	USD 930,000
	UNDP Co-financing	USD 225,000
	Total Committed Funds	**USD** 32,697,694
	Total Actual Funds Utilized	**USD** 459,660,791

PROJECT DESCRIPTION

This project contributes to the reduction of GHG emissions through the transformation of the Chinese SSL products towards more energy-efficient lighting technologies. It is in line with GEF-5's CCM Strategic Program SP2 which aims to 'promote market transformation for energy efficiency in industry and the building sectors'.

The project objective is the facilitation of the enhanced production and widespread application of quality solid state lighting (SSL) products in China. This objective was to be achieved through the elimination of the barriers to the transformation of the Chinese lighting market to SSL. The barrier removal activities were implemented under four project components and corresponding outputs.

The SSLED project contributed to overcoming or weakening the barriers listed during the project design, while achieving or overarching the targets established in the project document and made significant contributions to the strategy and policy of the Government of China concerning energy efficiency, which has been a core priority of the GOC since the 1990's. The project has also contributed to The 13th Five Year Plan of the GOC (2017-2022) which builds upon the work under the previous 12th Five Year Plan with a strong focus on environment. The project is of global significance, since due to its high exports of LED lighting, the quality and output of China's LED lighting products production is an important factor in the global popularization of high efficiency lighting products.

EVALUATION RATINGS

TABLE 2: EVALUATION RATINGS

Evaluation Ratings Table	
1. Monitoring & Evaluation (M&E)	**Rating**
M&E design at entry	***Satisfactory***
M&E Plan Implementation	***Satisfactory***
Overall Quality of M&E	***Satisfactory***
2. Implementing Agency (IA) Implementation & Executing Agency (EA) Execution	**Rating**
Quality of UNDP Implementation/Oversight	***Satisfactory***
Quality of Implementing Partner Execution	***Satisfactory***
Overall quality of Implementation/Execution	***Satisfactory***
3. Assessment of Outcomes	**Rating**
Relevance	***Satisfactory***
Effectiveness	***Satisfactory***
Efficiency	***Satisfactory***

Overall Project Outcome Rating	***Satisfactory***
4. Sustainability	**Rating**
Financial sustainability	***Likely***
Socio-political sustainability	***Moderately Likely***
Institutional framework and governance sustainability	***Likely***
Environmental sustainability	***Likely***
Overall Likelihood of Sustainability	***Moderately Likely***

SUMMARY OF FINDINGS AND CONCLUSION

In conclusion, the Terminal Evaluation team has determined that the SSLED project design has remained relevant to the development context of China and the priorities of various stakeholders, including the Government of China, UNDP, GEF, and in line with the needs of the private sector players and energy consumers.

Moreover, the project has been efficiently implemented while engaging a large number of stakeholders as partners and sub-contractors. The ownership from all stakeholders has been demonstrated in exceeding committed co-financing by 1,614%. All co-financing has been in-kind, and included both direct and indirect contribution from the GOC with participation from National and Local Governments in the form of policy changes, public sector lighting projects, and donation of SSL lighting.

Based on the evidence reviewed, as provided in Annex 03, it was determined that the SSLED project contributed to overcoming or weakening the barriers listed during the project design, while achieving or overarching the targets established in the project document, namely: (1) lack of systematic analysis on status of SSL industry and applications; (2) absence of a systematic supporting policy framework on SSL market transformation; (3) lack of guidelines for SSL products application and low Level of social awareness; and (4) inadequate standard SSL testing, quality assurance and certification system.

Finally, while the sustainability of outcomes is likely due to policy development, standards, capacity building, and demonstrations facilitated by the project, the disruption in supply chains and demand due to international trade frictions and COVID-19 epidemic may slow down growth ~~o~~of the SSL industry in China.

KEY LESSON LEARNED

Based on consultations with key stakeholders and the conclusions drawn by the TE team, key lessons learnt from the SSLED project design and implementation experience are as follows:

- The SSL industry is highly sensitive to changes in policy orientation, macroeconomics, and technological changes.
- Policy and standards are cost-effective tools for market transformation in China.

- Projects implemented under the leadership of neutral agencies, such as GOC, UNDP, and GEF, can mobilize stakeholders with competing interests towards a common development goal.
- Continuous needs assessment, implementation, and post-implementation evaluation results are critical for projects addressing dynamic sectors that are constantly evolving due to technological advancements and politico-economic factors.
- Continued development of the SSL industry is highly reliant on development of integrated value chains.
- SSL production and utilization provides significant opportunity for international cooperation and climate change adaptation.

RECOMMENDATIONS SUMMARY

TABLE 3: RECOMMENDATIONS SUMMARY

Rec #	TE Recommendation	Entity Responsible	Time Frame
A	Category 1: Sustainability of Interventions	NDRC/NECC, CALI, etc.	Short to Medium Term (1 to 2 years)
A.1	An overarching recommendation in this regard is that to ensure maintenance of ongoing policy support, the SSL industry is incorporated in the 14th Five-year plan as a strategic emerging industry.		
A.2	A department or unit within the NDRC is given the mandate to facilitate ongoing review and development of the SSL policies and regulations based on dialogue and information exchange between all stakeholders for evolving technologies in the SSL industry.		
B	Category 2: Prioritization of Future Initiatives on SSL Development	GOC	Short to Medium Term (1 to 2 years)
B.1	Develop industry or sector-specific SSL frameworks, standards, and incentive schemes, etc. for newly emerging SSL technologies.		
B.2	Conduct research to improve the current SSL production processes in order to find a balance between product cost and energy efficiency.		
B.3	Expanding the scope of stakeholders in future projects by including other value chain agents, such as suppliers providing key components to the SSL industry as well as those in		

	distribution/marketing functions and system planners, e.g. industry associations of architects or town planners, etc. Through research and development support.		
B.4	Prioritize the SSL industry when developing the local semiconductor industry to reduce the high reliance on imports.		
B.5	To address the capacity of Small and Medium Enterprises, a major stakeholder in the SSL industry, special measures are required to be incorporated into future industry development frameworks.		
B.6	Continue the promotion of SSL among consumers based on evidence generated from demonstration activities.		
C	Category 3: International Development Cooperation	GOC/UNDP GEF	Medium Term (2 to 3 years)
C.1	Share widely the lessons learned from China's experience in SSL development and replicate the successful practices in other countries through collaboration between the pertinent agencies of both governments and the private sector in each country.		
C.2	China-led initiatives aimed at South-South cooperation must also promote international trade of SSLs through technical support actions such as harmonization of products standards and labels, patent pools/patent sharing mechanisms; and highlighting the adoption benefits of good quality SSLs.		
C.3			
D	Category 4: Monitoring Impact	NDRC/PMO	Short Term (< 1 year)
D.1	A systematic assessment is undertaken by the PMO/UNDP of the project's intended and unintended outcomes and shared broadly among stakeholders.		
D.2	-		
D.3	-		
E	Category 5: Gender	GOC/UNDP GEF	Medium to Long Term (2 years +)
E.1	Future project/program designs must include a thorough gender assessment of the sector, which was found to be missing from this project, and accordingly include active support to ensure that challenges faced by women workers can be overcome and their participation at advanced professional levels can be facilitated.		

E.2	-		

1. INTRODUCTION

1.1 PURPOSE AND OBJECTIVE OF THE EVALUATION

In accordance with UNDP and GEF Monitoring and Evaluation policies and procedures, all full and medium-sized UNDP supported- GEF financed projects are required to undergo a terminal evaluation upon completion of implementation.

The **objectives of this Terminal Evaluation (TE)** seek to fulfill the following overarching objectives of the monitoring and evaluation of GEF projects:

I. Promote accountability for the achievement of GEF objectives through the assessment of results, effectiveness, processes, and performance of the partners involved in GEF activities; and
II. Promote learning, feedback and knowledge sharing on results and lessons learned among the GEF and its partners, as basis for decision-making on policies, strategies, program management, and projects and to improve knowledge and performance.

In general, the TE Report will inform the future programming of key stakeholders, including GEF, UNDP, Government of China, and the EE SSL industry in the design and implementation of similar future initiatives.

1.2 SCOPE OF THE EVALUATION

The scope of this Terminal Evaluation (TE) covers the entire UNDP/GEF-funded project and its components as well as the co-financed components of the project.

The TE of the **Enabling Solid State Lighting Market Transformation & Promotion of Light Emitting Diode (LED) Lighting** project was carried out at the component level and project level. During the evaluation, an assessment was made of the progress towards achievement of the project outcomes and outputs, the relevance of the various project outputs, and effectiveness and efficiency of the different activities undertaken to achieve the outputs. Moreover, the inputs were analyzed by assessing the contributions made by the UNDP and its implementing partners, the appropriateness and effectiveness of the partnership strategy utilized, and sustainability of the project's outcomes and outputs.

Evaluation timeline of activities and list of stakeholders interviewed are provided in Annex 01 and Annex 02.

1.3 METHODOLOGY

As part of the methodology, the consultant team carried out various activities to undertake the evaluation, including literature review, development of an inception report and evaluation tools, and meetings with project stakeholders, analysis of findings, de-briefing presentation, and documentation of the TE report. Overall, the Evaluation team employed methods that yielded quality data and analysis

to achieve the wider evaluation purpose. In general, data collection process and evaluation questions were guided by the Evaluation Criteria Matrix, as provided in the SSLED TE ToRs.[1]

As a first step, a detailed **desk review** of relevant documents and sources of information was conducted. A list of documents reviewed as part of the evaluation is provided in Annex 03. The desk review helped to determine the stakeholders to be interviewed, aided in development of the assessment tools as well as facilitated an overall understanding of the project dynamics.

Following the desk review, an **Inception Meeting** was held virtually between TE team, UNDP China, and PMO representatives on 16 April 2021. The Inception Meeting also allowed for a more in-depth discussion on the TE approach, methodology, selection and sampling of stakeholders for interviews, method for undertaking interviews (i.e. face to face vs. virtually), tentative timeline for undertaking the terminal evaluation, support required by TE team from PMO and UNDP China, and expectations from the TE.

Further, based on the Desk Review and in consultation with UNDP China and the PMO, the TE Team presented a detailed **Inception Report**, outlining the agreed TE approach, methodology, and schedule. To facilitate the **interview process**, KII guide sheets developed by the consultants were utilized during the course of interviews with the Project Management Office (PMO) staff, various key stakeholders, partners, and sub-contractors, etc. The KII guide sheets pertaining to the various project participants are attached in Annex 04. In total, the TE team conducted interviews with 9 respondents from 20 - 25 May 2021, as listed in Annex 02: List of Stakeholder Interviewed.[2]

At the end of the data collection activities, a **de-briefing presentation** to share initial TE findings was conducted on June 11, 2021 by the Evaluation team. The presentation was attended by the representatives of UNDP China and PMO staff.

Led by the international evaluator, the **Draft TE report** was developed according to the prescribed Evaluations Guidelines[3] for UNDP-GEF projects. The evidence-based report consolidates and presents an analysis of the information gathered from literature review, interviews, discussions, and site visits. The report is divided into the following five main sections:

1. Introduction
2. Project description and development context
3. Findings

[1] Questionnaires submitted as part of the Inception Report were based on the Evaluation Criteria Matrix and were approved by the Client prior to initiating data collection activities.

[2] Due to COVID-19 travel restrictions, the International Evaluator undertook the evaluation remotely whereas the two national evaluators were based in China for undertaking the evaluation.

[3] Project-Level Evaluation: Guidance for Conducting Terminal Evaluations of UNDP-Supported, GEF-Financed Projects – UNDP Evaluation Office (2012)

3.1. Project Design / Formulation
3.2. Project Implementation
3.3. Project Results
4. Conclusions, Recommendations & Lessons
5. Annexes

The report covers the assessment of the project based on the following criteria: **relevance, effectiveness, efficiency, sustainability, and impact**. In addition, ratings (based on the obligatory rating scales) are provided for (a) monitoring and evaluation (b) IA & EA execution (c) assessment of outcomes (d) sustainability. Moreover, the report includes an analysis of the Project Finance and Co-finance, Mainstreaming, and Impact. To assess project finances, the project cost and funding data were analyzed. The planned and actual expenditures are presented and variances between the two are assessed and explained.

1.4 LIMITATIONS

This section presents limitations faced by the evaluation team and mitigation measures undertaken.

TABLE 4: LIMITATIONS FACED BY THE EVALUATION TEAM & MITIGATION MEASURES UNDERTAKEN

Limitation	Description	Mitigation Measures
Language Barrier	Some of the reporting and documentation were in the Chinese language. Moreover, most of the respondents were not comfortable being interviewed in English.	The PMO provided translated versions of documents upon request. In other cases, the international consultant relied on the national consultants to provide translations or review documents written in Chinese. Furthermore, according to guidance provided by the International Expert, the National Experts conducted interviews with respondents who were comfortable being interviewed in Chinese. And provided interview notes in English to the International Consultant.
Online Interviews	Due to Covid-19 related restrictions on international travel, the International Consultant could not travel to China.	The International Consultant conducted all interviews via video conferencing and the national consultants undertook selected in-person interviews at the PMO in Beijing. The TE team lead ensured that that the national consultants provide post interview debriefing in addition to drafting interview notes in English for review and analysis.

2 PROJECT DESCRIPTION

This section provides an overview of the SSLED development context in China at the time of project design, a description of the project strategy, expected results, key stakeholders, and major project milestones.

China has become the biggest energy consumer in the world with more than 80% of the electricity production in China is based on thermal power generation, a major contributor of carbon emission. With an increase in global energy demand, advancements in green lighting technologies have become an effective option for countries to achieve energy savings, reduce GHG emissions and address challenges of climate change.

Solid State Lighting (SSL) leads to low power consumption, long life, rich colors, as well as having greater applications and control. The core challenge hindering widespread production and utilization of SSL in China is the low quality of locally produced SSL products.

In response to global climate change and in recognition of a number of phasing-out actions beginning around the world, NDRC, UNDP and GEF agreed to co-operate to enable the implementation of the SSLED project. The project entitled "Enabling Solid State Lighting Market Transformation & Promotion of Light Emitting Diode (LED) Lighting" is part of the UNDP/GEF supported projects in efficient lighting systems and builds upon the earlier UNDP/GEF supported PILESLAPMS (GEF ID: 4166) in China Project which was completed in 2014.

The Project aimed to be instrumental in transforming the country's energy efficient lighting market in both national and international applications. SSLED Project's goal is the reduction of GHG emissions in power generation in China. This goal was sought to be achieved though the project objectives of facilitating the enhanced production and widespread application of quality Solid State Lighting (SSL) products in China.

The project results framework, as provided in the Project Document, is provided in Annex 05.

Problems that the project sought to address: threats and barriers targeted

Despite a healthy growth of China's SSL industry, at the time of project design, there were significant challenges in improvement of the quality and energy performance of SSL products and popularization of applications across various residential and commercial sectors. In particular, the SSLED Project primarily aimed to address the following market-related core problems:

- A rapid increase in SSL lighting products in China saw ***substandard quality*** lights flood the domestic markets, with almost half of the products being produced were deemed to have low quality, thus resulting in weak consumer confidence and limited applications of EE lighting.

- In certain parts of China, energy shortages still persisted. In 2012, there were still 597 thousand families (or 2.527 million people) suffering from power shortage[4]. Therefore, the project sought to improve ***energy efficient lighting*** that could be integrated in off grid systems and would work in combination with alternate energy sources.

In addition, the project set out to address barriers facing the production and promotion of quality EE lighting. These included:

- Lack of ***Systematic Analysis on the Status*** of SSL industry and applications led to discrepancies in production and sales data reporting, resulting in unreliable statistics to support development planning.
- The absence of an ***integrated policy framework*** for supporting SSL market transformation led to a lack of cross-ministerial synergy and an integrated government effort for uniform SSL-related policies.
- The ***SSL testing, quality assurance, and certification systems*** in the country were outdated, incomprehensive, and non-enforceable, thereby leading to the production of various SSL products of varying performance and quality. While the SSL Energy Conservation Product Certification process in China was also hampered by limited technical knowledge in SSL product quality inspection and resulted in long testing times and uncertainties in product lifetime, etc.

The abovementioned structural gaps deterred sustainable market investments in the industry on the one hand and on the other resulted in limited information to consumers regarding the uses and benefits of SSL.

Project Description and Strategy: Objective, Outcomes, and Expected Results

The goal of the project is the reduction of GHG emissions in power generation in China. The GHG emission reduction is in terms of the avoided electricity generation (mainly from coal-fired power generation) due to electricity savings from the use of SSL systems in energy end-use sectors with lighting requirements.

The project's objective is the facilitation of the enhanced production and widespread application of quality solid state lighting (SSL) products in China. This objective was to be achieved through the elimination of the barriers to the transformation of the Chinese lighting market to SSL. The barrier removal activities were implemented under four project components and corresponding outputs, as shown in the table below.

[4]Data source: Promotion of Electric Power Construction of Areas without Power Supply by SGCC, China Power Network, 2013.

TABLE 5: PROJECT COMPONENTS & CORRESPONDING OUTPUTS

Project Component	Project Outputs
Component 1: SSL Market Development Enhancements	Output 1.1: Completed Comprehensive SSL Industry and Market Survey
	Output 1.2: Established and Operational SSL Industry Database
	Output 1.3: Established and Operational SSL Technology Information Exchange Service
	Output 1.4: Established and Operational SSL Applications Service Industry Accreditation System
	Output 1:5: Completed and Operational SSL Product Manufacturer Support Program and Rating Scheme
Component 2: SSL Market Transformation Policies and Mechanisms.	Output 2.1: Completed Research Report on Energy Saving Lamp Policies and Regulations
	Output 2.2: Approved and Implemented SSL Industry Development Plans
	Output 2.3: Enforced Policy and Regulatory Frameworks for Supporting the SSL Industry
	Output 2.4: Established and Operational SSL Financing Scheme
	Output 2.5: Established and Operational SSL Manufacturers Accreditation Scheme
	Output 2.6: Completed technical assistance program for local SSL products manufacturers in the design and manufacture of quality compliant SSL products
Component 3: SSL Application Demonstration	Output 3.1: Completed Demonstrations on SSL Product Manufacturing and SSL Product Lighting Applications
	Output 3.2: Completed Report on the Demonstration Scheme Results Evaluation and Dissemination
	Output 3.3: Documented Sustainable Follow-up Program Design for Financially Supporting SSL Technology Innovations, and Production of New SSL Products and their Applications
Component 4: Strengthening of SSL Quality Assurance Capabilities.	Output 4.1: Completed Study on SSL Quality and Energy Performance Standards
	Output 4.2: Documented Identified Potential Improvements in SSL Products
	Output 4.3: Documentation on Completed Research and Development on SSL Product Improvements
	Output 4.4: Established and Enforced Chinese Standards for SSL Products
	Output 4.5: Completed Capacity Building Program on the Application of SSL Product Standards
	Output 4.6: Established and Operational SSL Product Testing and Certification System

	Output 4.7: Completed Assessment of the Impacts of the SSL Product Standards Implementation

In total, the project has four Outcomes, 21 Outputs, and 109 activities. These include 31 activities corresponding to Component 1, 34 activities against Component 2, 14 activities against Component 3, and 30 activities under Component 4.

The project's Theory of Change as of design is provided in Annex 06.

Expected Results

All expected results from the project are shown in Table 06.

TABLE 6: EXPECTED RESULTS OF SSLED PROJECT

Indicator	Target
Annual direct energy savings in China by EOP (GWh)	937.2
Annual direct CO_2 emissions reduced in China by EOP (kilotons)	850.4
No. of new jobs available in the ESL industry by EOP	1,000
No. of women employed in new jobs in the ESL industry by EOP	200
Value of quality standards compliant SSL products produced in China by EOP (billion RMB)	184
Export value of quality standards compliant SSL products produced in China by EOP (billion USD)	13.8
No. of policy recommendations adopted and enforced by relevant government agency departments by EOP	6
Percentage of lighting products in the domestic lighting market that are quality standards compliant SSL products by EOP	70%
Market share of qualified SSL products in general lighting market in China by EOP	28%
No. of SSL quality and energy efficiency certificates issued by state-certified institutions by EOP	1,500
No. of local SSL manufacturers that are complying to the new EE standard/label for SSL products by EOP	100

Project start and duration, including milestones

The project was endorsed by the GEF CEO on 04 April 2016. Following which, the Project Document (ProDoc) was officially signed on 22 August 2016, marking the official commencement of the Project. The Inception Workshop was on 21 December 2016. The project duration was originally three years and was scheduled to close on 21 December 2019. However, two project implementation period extensions were granted, and the project concluded after five years of operation, in March 2021. The request for **first extension** was approved and granted on April 28 in 2020 due to slow progress in approval procedures as a result of the Chinese government's new institutional reform in 2019 under which key government agencies went under fundamental adjustments. The request for **second extension** was approved and granted on December 8 in 2020, to accommodate delays caused by COVID-19 related disruptions.

Key stakeholders

The SSLED project's stakeholders include government organizations, representatives from non-government organizations, technical organizations such as testing and certification agencies, service agencies e.g. ESCOs, light product manufacturers, retailers and end-line consumers. The mandates of these stakeholders are directly or indirectly linked to the outcomes of promoting energy efficiency in the light manufacture industry in the country.

The project's mains stakeholders from the government sector include the National Development and Reform Commission (NDRC), Ministry of Science and Technology (MOST), Ministry of Housing and Urban-Rural Development (MOHURD), Ministry of Transport of the PRC (MOT), National Government Offices Administration (NGOA), Ministry of Industry and Information Technology of the PRC (MIIT), Standardization Administration of the People's Republic of China (SAC), National Energy Conservation Center (NECC) and local government units.

NGO stakeholders include relevant industry organizations including Solid State Lighting Alliance; China Association of Lighting Industry (CALI); and International SSL Alliance (ISA) – China.

Similarly, the project engaged technical agencies including CNIS, CNCA, CQC, NLTC which were mainly involved in undertaking research, product testing and certification and more. In addition to this, the project also engaged with light product manufacturers, energy service companies, lighting service agencies, lighting product retailers and end consumers.

Annex 07 provides a brief overview of the role assigned to each of the above categories of stakeholders.

3 FINDINGS

3.1 PROJECT DESIGN/ FORMULATION

The SSLED project was designed based on the recommendations and lessons learned from a previous cohort of UNDP-GEF Energy Efficiency (EE) projects in China implemented since 2009. In particular, the project concept was developed after successful implementation of the UNDP-GEF PILESLAMP Project (2009-2004). Other UNDP-GEF EE projects that were used as bases for the project approach included: BRESL GEF ID: 7189, MTEBRB GEF ID: 3675, and PEERAC GEF ID: 3700, and UNDP-GEF's global En.Lighten Project.

Moreover, the design was developed as a result of numerous stakeholder consultations with key industry influencers, such as GOC agencies, SSLED manufacturers, research organizations, and standardization and certification institutes. Moreover, the implementation strategy was developed based on research and analysis on the status of the EE lighting industry in China at that time, including exploration of enabling environment, production dynamics, and potential for market development of EE SSL, and overall capacities in the country.

Design Assessment

The TE Team found the design to be generally sound and comprehensive, providing a detailed step by step roadmap to facilitate the transformation of the EE SSL industry in China. An outstanding feature in the design is its comprehensive approach, targeting the entire value chain of LED lighting, from production to end-user while focusing on improving the enabling environment. In contrast, most other LED projects in the country focused only on certain segments. For instance, the LED-related initiatives undertaken earlier by MOST worked on technological breakthroughs.

In addition, the design provides guidance on aspects such as identification of potential key stakeholders, an indicative implementation schedule, risk assessment, total budget and workplan, institutional framework, and an M&E Framework. Similarly, the project document provided a clear Project Management Framework along with TORs for key staff members, thereby ensuring that roles and responsibilities of key GOC departments are clear, thereby limiting the possibility of turnover and ensuring that the assigned staff is available to the PMO for the entire duration of the project. Whereas the project design also lists the specific GEF support for the incremental activities and Co-financing support from stakeholders.

At the same time, flexibility has been incorporated in the design in accordance with standard UNDP-GEF project guidelines. For instance, the project was allotted a three-month Inception Period, while Project Steering Committee (PSC) was also assigned to review and approve necessary changes in the design during the course of implementation. In addition, the PMO was given the authority to recruit specialized sub-contractors in line with UNDP-GEF and GOC procurement processes to support the implementation of activities.

Furthermore, assigning NDRC the key agency of the GOC tasked with promoting national energy conservation policies and strategies, as the Implementing Partner for this project has ensured that the project will have access to sound technical guidance, strong policy support, and the potential to develop linkages between the industry and policy makers.

A review of the project's **Results Framework** also revealed that the Outcome level indicators are specific, measurable, attainable, relevant, and time-bound (SMART). However, in some cases, it is difficult to link the outcome level indicators to the activities proposed under a given outcome. For instance, the research to be undertaken in Component 1 is forcefully linked to changes in Value of quality standards compliant SSL products produced in China and Export value of quality standards compliant SSL products produced in China. In accordance with GEF requirements for Results Framework, Output level indicators are not provided either in the results framework or elsewhere in the project document. Instead, each output corresponds to a large number of activities. Nevertheless, the PMO found the results framework to provide sound guidance on monitoring the project progress against targets.

In total, the project has four Outcomes, 21 Outputs, and 109 activities. These include 31 activities corresponding to Component 1, 34 activities against Component 2, 14 activities against Component 3, and 30 activities under Component 4. This sheer number of outputs and activities can sometimes lead to overlaps across outcomes and outputs and also creates difficulty in monitoring and reporting, especially as the PMO, the primary responsible party for these tasks, is managed by only a handful of staff. For instance, the TE Team found some overlaps in activities under different outcomes. For instance, Outputs 1.4, 1.5, 2.5, and 4.6 all referring to rating and certification. While in theory, rating and certification activities are cross-cutting in the different outcomes, in practice, these activities are overlapping/interlinked, and should be clustered in one output for ease of implementation, management, and monitoring, etc.

With regard to Gender, the design document lists the 'number of women employed in new jobs in the ESL industry by EOP' as one of the 11 key indicators. However, a Gender Analysis is not provided in the document, as it was not a requirement under GEF-5.

Overall, the TE Team found the project's goal, objective, outcomes, indicators, and research and demonstration activities to be feasible and coherent. Also, while the project design provided a detailed framework for implementation, sufficient flexibility was also introduced into the design. In addition, the design provides detailed guidance on project management and monitoring activities. Therefore, the project design was found to be ***Marginally Satisfactory.***

4 PROJECT IMPLEMENTATION

4.1 ADAPTIVE MANAGEMENT

Based on ground reality, the PMO has made some important changes to project strategy since start. These include modification of activity timelines and prioritization during project inception period, reorientation of demonstration activity from urban areas to rural areas and change in delivery approach due to COVID-19 related challenges. It is important to note that all the changes detailed here materialized after PSC approval.

Since the project was designed in 2014-15, it was expected that the EE SSL dynamics would change by the time of project start and during implementation. Hence, in accordance with UNDP-GEF guidelines, the project was given an **Inception Period** constituting the first three months of implementation. Major adjustment activities undertaken during inception period included: review and finalization of the M&E plan and risk management plan, development of a strategic framework for building the local implementation mechanism, and finalization of co-financing agreements, etc.

In particular, as pointed out in the Inception Report, timelines, and priority sequence of all four components were reviewed and finalized during the Inception Phase. Based on this exercise, it was decided that component 1, 2, and 4 would be front loaded for delivery in Year 1, thereby generating baseline research on the state of EE SSL industry and regulations paving the way for SSL standard formulation and market development. Moreover, the sequential relationship among different activities across components was reviewed, some activities were merged or split (see Annex 11) for the sake of practical implementation, and new activities were added which were imperative but were missed by the original design. In line with these changes, the project budget was also adjusted accordingly but within the allowable limits for budget revisions. Hence, all project work plans were developed in accordance with this scheme of activities, which was slightly different than presented in the project's design document. However, the rationale for these changes was not documented, a concern raised by the MTR as well.

During implementation, A major change in the project's strategy was the decision after MTR to shift EE SSL promotion from urban areas identified in the project design to **demonstration in rural areas**, as the earlier by the time of project implementation had already demonstrated a considerable uptake of SSL technologies due to earlier initiatives of the GOC. Accordingly, the GOC aligned the project with its poverty alleviation programs and targeted 30 poverty-stricken counties in order to improve lighting environment and reduce electricity expenses made by poor families.

Furthermore, in order to keep pace with the technological developments in the LED industry, the project modified some activities to encompass the broader scope of this technology. For instance, research activities also took into consideration LED uses such as LED lighting application in the health industry, etc.

Finally, to continue operations within the constraints of **COVID-19**, the PMO conducted online meetings and workshops, increased the frequency of coordination with sub-contractors, and established multiple communication channels, including teleconference, webinar, onsite meetings and etc. Moreover, in order to finish the project activities on time, the support of NDRC was sought for follow up on delays, when required.

Hence, PMO was found to be proactive in making adjustments in project strategy and approach to ensure that the project deliver optimum results.

4.2 ACTUAL STAKEHOLDER PARTICIPATION AND PARTNERSHIP ARRANGEMENTS

Over the course of implementation, the PMO has partnered with various public and private stakeholders in the Chinese EE lighting industry to implement project activities. These partner organizations belong to a wide-array of industries, including government agencies, industry associations, manufacturing enterprises, research, and academic institutes, etc. and covered six thematic areas, including: research and development, standardization and certification, industrial research, policy formulation, publicity and training, international cooperation. A brief overview of the collaborative setup is provided in Annex 08.

Using a competitive process, the PMO sub-contracted project activities to key stakeholders in the EE lighting industry in China. Major partnership activities included research on framework and policies, policy development and standard setting, organizing information exchange events, and establishing demonstration units for LED promotion across the application area. In total, The PMO partnered with public and private stakeholder and research organizations by issuing 40 sub-contracts between 2017 and 2020, with a total value of USD 5,802,566. Annex 09 presents a year-wise distribution of the Sub-Contracts since the project's inception on 1 February 2016, with the first set of sub-contracts having been issued in May 2017.

The sub-contracts were issued following the GEF-UNDP procurement criteria. Moreover, in selection of the sub-contractors, the PMO also adopted public bidding abiding by the UNDP China project guidelines and the Law of the People's Republic of China on Tender and Bids. All the sub-contracts were issued to Chinese entities, some of which were also the project's key stakeholders, e.g. China International Engineering Consulting Corporation, China Academy of Building Research, and the NVC Lighting Technology Corporation.

To facilitate collaboration between partners, the PMO has held quarterly reporting and information sharing meetings between relevant local teams and subcontractors as well as topic-specific workshops, etc.

The TE determined that the sub-contracts were implemented according to the TORs provided by the PMO and all sub-contracts were concluded on time. Moreover, some of the partner organizations or individuals had also effectively partnered with the predecessor PILESLAMP project (GEF ID: 4166), thus demonstrating connections and ensuring sustainability of the two projects.

Moreover, the planning and information events held by the project have facilitated the exchange of ideas for implementation and helped the project in resolving issues through consultations. For instance, under Component 3, the project coordinated relationships with 30 counties to demonstrate the application of SSL devices and systems. Stakeholder interviews also revealed that their participation in such events held by the project helped them get a better understanding of the various stakeholders and functions involved in the EE SSL industry. Moreover, as a result of project-facilitated collaboration, a number of stakeholders also reported having strengthened their network and the potential for future collaboration across industries and sectors, such as potential partnerships between private sector and public research institutions.

Overall, the TE team assessed that SSLED PMO ensured close coordination between multiple stakeholders, which was instrumental in achieving market transformation of the EE lighting industry. Additionally, the evaluation team determined that the project's partnership with numerous stakeholders was a measure of efficiency as synergies and long-term partnerships were developed to achieve project goals. As shown in other relevant sections, the sub-contracting also had significant impact on effectiveness and sustainability of project activities. With the above findings, the project's partnership arrangements were ***Highly Satisfactory***.

4.3 PROJECT FINANCE AND CO-FINANCE

At the time of design, the total funding committed funding for the SSLED project was USD 32.7 Million. The project was designed to be funded by various sources, including USD 6.24 Million from GEF (19%), USD 25.3 Million from GOC (77%), and the remaining USD 1.15 Million (4%) from the UNDP and other sources, such as industry associations. Table below provides a break-up of the total allocated resources at project design phase.

TABLE 7: SSLED TOTAL ALLOCATED RESOURCES

Grant Fund	Committed[5]	Percentage of Total Committed
GEF	6,242,694	19%
UNDP		
Sub-Total Grant	6,242,694	19%
Co-Financing		
UNDP	225,000	1%
National Government	25,300,000	77%
Others	930,000	3%
Sub-Total Co-Financing	26,455,000	81%
Total Budget	32,697,694	100%

[5] Committed at Time of Project Design

The PMO has used standard UNDP-GEF guidelines for financial management. Accordingly, financial planning and reporting accompanied activity planning and monitoring. In addition, regular external financial audits were commissioned by UNDP China.

I. Utilization of GEF Funds

Table below shows a summary of the GEF grant, including approved budget, actual expenditures, and delivery rate of the project on a year-to-year basis.

TABLE 8: SSLED GEF-GRANT FUND ANNUAL DELIVERY RATE

	2017-18	2018-19	2019-20	2020-2021
Budgeted in AWP (USD)	1,793,000.00	1,705,600.00	1,534,065.97	1,663,997.33
Actual Expenditure (USD)	1,667,410.75	1,176,217.28	1,585,068.64	1,596,573.56
Percent Expenditure of Budget	93%	69%	103%	96%

The TE team found the project delivery rate to be satisfactory, with delivery ranging from 93% to 106% in three project years. However, low delivery (69%) was reported in 2018-19, the second year of the project due to the Government of China's new institutional reform in 2019 under which key government agencies went under fundamental adjustments, including the project's key stakeholders. However, the project somewhat recovered its stance in the following year and posted an ADR of 103%.

Table below presents the percentage expenditure on a per-component basis since the start of the project up to the 31 March 2021.

TABLE 9: LEVEL OF GEF-GRANT EXPENDITURE PER COMPONENT SINCE THE START OF THE PROJECT

GEF Outcome	Total Available Budget	Percentage Total Available Budget	Total Expenditure (2017 to 2021)	Percent Spent (2017 to 2021)[6]
Component 1	449,500.00	7.2%	456,013.09	101%
Component 2	1,072,600.00	17.18%	1,181,609.98	110%
Component 3	3,371,123.00	54%	3,422,923.49	102%
Component 4	1,052,200.00	16.85%	974,209.98	93%
Project Management	297,271.00	4.76%	289,694.04	97%
Unrealized Gain/Loss			-81,756.58	
Grand Total	6,242,694.00		6,242,694.00	100%

[6] As the CDR for 2021 was under development at the time of the TE, the final expenditure provided by the PMO for 2021 is predictive.

Component 3 linked to demonstration of SSLED lighting was by far the highest funded component, accounting for more than half (54%) of the GEF grant. Whereas, due to cooperation from GoC, only 4.76% of the GEF fund was utilized for Project Management.

By end of 31 March 2021, the project utilized 100% of the GEF-fund. It is worth noting that the SSLED project management has creatively spent the available GEF funds, as 7% funds from Component 4 and 3% from Project Management were reallocated to the Components 1, 2, and 3 in order to respond to the higher expenditures under these project components. Moreover, as some activities related to international research and exchange programs could not materialize due to the COVID-19 pandemic, funds amounting to USD 180,000 were utilized, under Component 3, to undertake research on emerging issues such as UV anti-virus LED and high quality LED.

II. Co-Financing

According to the project design, co-financing accounted for 80.91% of total resources expected for the project in either cash or in-kind contributions from stakeholders, viz., the Government of China (77.38%), industry association (2.84%) and UNDP (0.69%). However, the total actual co-financing has increased manifold. Resultantly, the total contribution from co-financing also jumped from 80.91% to 98.64% of the total funds, and all of the co-financing was in-kind[7].

TABLE 10: COMMITTED VS. ACTUAL CO-FINANCING FROM DIFFERENT SOURCES[8]

Financing Source	Committed (USD)	Percent Committed	Actual Allocation (USD)	Percent Change from Committed
National Government	25,300,000	77.38%	452,418,097	1,688%
UNDP	225,000	0.69%	NA	(100%)
Industry Association	930,000	2.84%	1,000,000	8%
Total Co-financing	26,455,000	80.91%	453,418,097	1,614%
Total Project Funds (GEF Fund + Co-Finance)	32,697,694	100.00%	459,660,791	

[7] Details on co-financing outcomes are provided in the Section on Effectiveness of Component 3.

[8] Calculated based on the exchange rate at 6.41

Co-financing has been tracked by the respective contributing organization and reported periodically to the PMO. As shown in above table, the proportion of actual co-financing from the Government increased exponentially, i.e. 1,688%, thereby demonstrating the GOC's strong commitment to the achievement of the project's objective.[9] A review of finance data provided by the PMO revealed that all of GOC's co-financing has been for Component 3 (Demonstration) and taken the form of in-kind contribution.

While there was also 8% higher co-financing from the private sector. Component-wise details of private sector co-financing are provided in below table.

TABLE 11: REALIZATION OF COMMITTED CO-FINANCE FROM THE INDUSTRY ASSOCIATION (PER COMPONENT)

Components	Commitment for Co-Financing (USD)	Allocated Co-Financing (USD)	Percentage of Committed (%)
Component 1	70,000	100,000	143%
Component 2	380,000	400,000	105%
Component 3	0.00	0.00	-
Component 4	480,000	500,000	104%
Total	**930,000**	**1,000,000**	**108%**

Conversely, due to funding constraints, the co-financing committed by UNDP did not materialize.

The evaluation team concluded that SSLED project's delivery rate was overall satisfactory. Moreover fund disbursement for activities was found to be timely. The actual co-financing from the GOC and private sector has also been consistently higher than committed. Consequently, the evaluation team found the project's financial management to be ***Satisfactory***.

4.4 MONITORING AND EVALUATION

The **UNDP China**'s designated Program Manager has effectively provided periodic oversight in implementation, including prompting timely reporting, providing guidance on UNDP-GEF reporting requirements to ensure that the progress is implemented in line with UNDP-GEF guidelines, and giving feedback on project planning accordingly. Accordingly, the Project Manager -UNDP China Office is in regular contact with the PMO management. Moreover, UNDP China has also arranged the project's Medium-Term Review (MTR) and Terminal Evaluation (TE), and also commissioned audits and spot checks as part of the agreed M&E mechanisms.

[9] Details of GOC contribution is provided in the section on Sustainability.

The **Project Management Office (PMO)** has adopted two main methods of tracking progress against project outcomes/goals, including: *objective orientation* and *whole process management*. Under objective orientation, activity progress is measured against the project's log frame and targets. Conversely, for the whole process management, all sub-contractors report and submit periodic reports and take part in meetings set up by the PMO.

The PMO develops a two-year work plan in accordance with the indicators and targets of the Results Framework provided in the Project Document. While sub-contractors' progress is tracked by the PMO through a series of M&E activities, including: progress report reviews, mid-term evaluation meetings, on-site field visits, as well as expert review of output before the contract conclusion. The M&E indicators and targets are presented in the sub-contractors' ToRs and the SCs are required to submit periodic progress reports to the PMO in line with an agreed reporting schedule and format. In addition, with the help of the Technical Advisory Committee (TAC), the PMO carried out a mid-term and end-term evaluation of each SC.

Data obtained as a result of these monitoring processes is posted on the project's M&E database maintained by the PMO's project manager. In addition, this information feeds into the M&E related work plans, budgets, quarterly progress reports and annual progress reports developed by the PMO and submitted to the Project Steering Committee (PSC) and UNDP China for review and approval.

The **Project Steering Committee (PSC)** has also contributed positively to the overall M&E processes. The PSC has met annually since project start to review the annual report, provide guidance on critical issues, and approve important changes in project strategy. The Director, Deputy Director, and NPC of PSC are representatives of the NDRC. In addition, UNDP China, PMO, and MOF are also represented on the PSC through their respective staff members. Whereas stakeholders relevant to the project, including government agencies, e.g. MOST, NECC, CNIS; private sector representatives, e.g. CALI, and sub-contractors have participated in the PSC when needed.

Major decisions made by the PSC over the course of the project include: the approval of two extensions and the reorientation of demonstration activities under Component 3 from urban areas (as indicated in the project document) to rural areas due to a lower penetration of EE SSL in the latter.

The evaluation team concluded that the project document provided sufficient guidance on M&E. Also, during implementation, SSLED project's M&E was carried out at multiple levels and all key responsible stakeholders, including PSC, UNDP China, PMO proactively tracked the project's progress. Moreover, the PMO management has effectively coordinated and consolidated M&E data generated by a large number of sub-contractors. Whereas, the Two Year Work Planning (TYWP) approach gave the PMO more flexibility to plan activities and budgets as compared to Annual Work Plans (AWPs). Based on this conclusion, the TE team found the project's M&E to be ***Satisfactory*** at both design and implementation.

4.5 UNDP IMPLEMENTATION OVERSIGHT AND IMPLEMENTATION EXECUTION

As part of the TE, the team assessed the implementation and oversight roles of UNDP and NDRC as the project's implementing agency and implementing partner, respectively. The SSLED Project's implementation institutional structure is provided in Annex 10.

NDRC

The NDRC executes and manages project implementation. For this purpose, NDRC appointed a senior officer as the National Project Coordinator (NPC) who was responsible for directing the PMO in areas of project implementation as well as heading the Project Steering Committee (PSC). NDRC also served as a liaison to coordinate between UNDP China and various government stakeholders as well as managed communication with members of PSC and PMO. For example, the "13th Five-year-plan" of China SSL development had been officially issued jointly by NDRC and 12 other major administrative authorities. Resultantly, NDRC, PMO and UNDP have collaborated strongly for the project's execution and alignment to the developing national policy and industry scenario. Moreover, in order to finish the project activities on time, the PMO sought support from NDRC, when required. Overall, NDRC has ensured that the project has access to sound technical guidance, strong policy support, and the potential to develop linkages between the industry and policy makers.

UNDP

The TE team determined that in accordance with its role outlined in the project design document, UNDP has delivered effectively on project identification and concept preparation. For example, at project identification and concept preparation stages, UNDP appropriately addressed GOC's concerns about the low quality of lighting products that are sold in domestic markets.

Further, UNDP effectively exercised its role in areas of oversight and monitoring. For this purpose, UNDP China's designated Program Manager has effectively provided periodic oversight in implementation, including prompting timely reporting, providing guidance about reporting to ensure that the progress is implemented in line with UNDP-GEF guidelines, and giving feedback on project planning accordingly. The Project Manager has also been in regular attendance of the PSC meetings. Moreover, to ensure timely completion of project activities, periodic advice has been provided by the UNDP to the PMO on risks and financial management. Moreover, UNDP China organized the project's Medium Term Review (MTR), this Terminal Evaluation (TE), and also commissioned audits and spot checks as part of strong M&E mechanisms.

UNDP has also played a key role by establishing and maintaining strong communication channels with GEF and the utilization of international experts has provided a good guarantee for the financial and technical support of the SSLED project.

Hence, the overall quality of UNDP Implementation/Execution and quality of implementing partner (NDRC) execution was found to be ***Satisfactory***

5 PROJECT RESULTS

5.1 RELEVANCE

China has become the biggest energy consumer in the world and more than 80% of the electricity production in China is based on thermal power generation, a major contributor of carbon emission. Addressing high energy consumption has become a major challenge not only for China but also other countries around the world. China is listed among the top manufacturers and exporters of LED lighting globally, with its products being imported by almost all major user countries of LED lighting.

Achieving energy efficiency has been a core priority of the GOC since the 1990's. The 13th Five Year Plan of the GOC (2017-2022) builds upon the work under the previous 12th Five Year Plan with a strong focus on environment as 10 out of the 25 targets in the Plan are related to the environment and all 10 of the environmentally related targets are included as part of the 13 binding targets that must be complete by 2020.[10]

The UNDP Country Program Document (CPD) for China (2016-2020) focuses on environment and its outcome 2 states '***More people enjoy a cleaner, healthier environment as a result of improved environmental protection and sustainable green growth'. Moreover,*** GEF-5's CCM Strategic Program SP2 aims to 'promote market transformation for energy efficiency in industry and the building sectors'.

Therefore, corresponding to the importance accorded to the environmental benefits of green lighting by the GOC, UNDP and GEF previously provided support to EE lighting in the country under the PILESLAMP Project (2009 to 2014); GEF ID: 4166. This project focused on advancing the utilization of energy saving lamps and accelerated China's overall efforts in the area of lighting energy savings. The current SSLED project has integrated lessons learned from PILESLAMP.

Hence, the TE team found that the SSLED project is relevant to the government-led SSL demonstration project for promoting SSL applications, including demonstration project by three government ministries, including: NDRC, MOST and MOF. Moreover, the project is also relevant to China's efforts to adhere to its international commitments under the Paris Agreement on Climate Change. Similarly, the project is also relevant to the priorities of UNDP-GEF in China. Finally, the project is of global significance, since due to its high exports of LED lighting, the quality and output of China's LED lighting products production is an important factor in the global popularization of highly efficient lighting products.

In fact, the higher than committed GOC's financial support to the project and positive industry trends resulting from project's technical support are a testament to the project's relevance to the development of EE lighting industry in China. Hence, the project's relevance was found to be ***Satisfactory*** at design and during implementation.

[10] 13th Five Year Plan – Government of China

5.2 EFFECTIVENESS

Effectiveness was assessed as the extent to which the project's objective and outcomes were achieved or are expected to be achieved. The following sections provide a component-wise achievement analysis of the four project outcomes.

Component 1: SSL Market Development Enhancements

Under this Component, the project aimed to address concerns regarding undefined SSL industry and market in China. Moreover, the project's expected outcome was enabling of strategic SSL technology and market developments by undertaking research in order to provide an up-to-date status of the SSL industry and market in China in order to inform the formulation of policies, strategies, and activities for development of the sector. This entailed delivering on the following five outputs to ensure the delivery of a comprehensive assessment[11]:

Output 1.1: Completed Comprehensive SSL Industry and Market Survey

Output 1.2: Established and Operational SSL Industry Database

Output 1.3: Established and Operational SSL Technology Information Exchange Service

Output 1.4: Established and Operational SSL Applications Service Industry Accreditation System

Output 1:5: Completed and Operational SSL Product Manufacturer Support Program and Rating Scheme

TABLE 12: SSL MARKET DEVELOPMENT ENHANCEMENTS

Indicator	Baseline	EOP Target	Achieved at MTR	Achieved at EOP	Percent Target Achieved at EOP
Value of quality standards compliant SSL products produced in China by EOP (billion RMB)	58.6	184	206.6	224.2	122%
Export value of quality standards compliant SSL products	5.4	13.8	12.9	15.43	112%

[11] Detailed list of main activities performed under each output is provided in Annex11.

produced in China by EOP (billion USD)					

While delivering this Component, the project generated a substantial body of research and publications and also developed an SSL industry database. The research activities integrated into all outputs corresponding to this Component have resulted in providing a baseline understanding of the market trends of both Global and Chinese SSL industry, guidance on capacity improvement of manufacturers, and an SSL Consumer Promotion Program Plan entailing the development of promotional literature and other materials for consumer awareness on SSL products[12]. Some of the information generated is also stored in the SSL industry database developed by the project (www.china-led.net)[13]. Updated once a quarter or as needed, the database acts as a repository of information gathered from more than 100 SSL companies on SSL industry news and data such as policy information, test results and export data, etc. Moreover, important findings from other outcomes under the project are also posted on this site. Being accessible to all industry stakeholders, the database has been viewed more than 50,000 times since its development in 2017-18.

In particular, the database received positive feedback from stakeholders. Prior to the project, the stakeholders agreed on the importance of an industry database, but lacked funding to develop such a system, a gap that was eventually filled by the project. In addition to providing information to individual stakeholders, the database is also used to generate an annual report on China's semiconductor lighting industry. This report has been reportedly been used by several companies to support corporate decision making.

After the project closure, the Beijing Mckenqiao Productivity Promotion Center Co., Ltd. will bear the maintenance of the industry database developed by the project. The database will be hosted on www.china-led.net, the website for China Semiconductor Lighting Network as the primary online information portal for the National Semiconductor Lighting Project, and operations costs are planned to be borne through the advertising revenues of the portal.

In addition, the project has undertaken several activities to promote information exchange and awareness among various stakeholders associated with the industry in China and other parts of the world. Among these, key events included Global Symposium on Efficient Lighting Promotion organized in collaboration with the United Nations Environment Program (UNEP) in June 2017 and support to an international workshop on Semiconductor Lighting Information Technology Exchange organized by the China National Energy Conservation Centre in November 2020.

[12] The list of activities is provided in Annex 11: DETAILED LIST OF MAIN ACTIVITIES PERFORMED UNDER EACH OUTPUT

[13] The database is embedded in the "industry research" section, which displays industry data, white papers, and other related information to the public. In addition, parts of the database are available only to GOC authorities and can be retrieved by relevant stakeholders.

Finally, the project planned to develop an SSL Product Manufacturer Support Program and Rating Scheme to encourage continuous improvement in production quality. However, this activity had to be cancelled due to change in national legislation which prohibited issuance of such ratings for individual businesses. Instead, the GOC introduced reportedly introduced a number of other policies, such as the 'Top Runner' enterprise to encourage the effective supply of medium and high-end products and services. Therefore, the project replaced this activity through financing research related to capacity assessment of SSL lighting manufacturers, market mechanisms and promotion of SSL lighting applications.

In accordance with the evidence reviewed, the TE found that the information generated under this Component has resulted in increased awareness among all stakeholders. In fact, the project has over-achieved targets against both outcome indicators corresponding to this Component as shown in the above table, and has therefore satisfactorily achieved Component 1.

Component 2: SSL Market Transformation Policies and Mechanisms.

This component was designed to address the barriers related to SSL market transformation policies and mechanisms for SSL sustainable development, and designing incentives to SSL manufacturers, lighting system professionals, and product distributors/retailers for production and distribution of SSL products that are compliant with established quality and energy performance standards.[14]

Output 2.1: Completed Research Report on Energy Saving Lamp Policies and Regulations

Output 2.2: Approved and Implemented SSL Industry Development Plans

Output 2.3: Enforced Policy and Regulatory Frameworks for Supporting the SSL Industry

Output 2.4: Established and Operational SSL Financing Scheme

Output 2.5: Established and Operational SSL Manufacturers Accreditation Scheme

Output 2.6: Completed technical assistance program for local SSL products manufacturers in the design and manufacture of quality compliant SSL products.

TABLE 13: SSL MARKET TRANSFORMATION POLICIES AND MECHANISMS

Indicator	Baseline	EOP Target	Achieved at MTR	Achieved at EOP	Percent Target Achieved at EOP
No. of policy recommendations adopted and	03	06	06	06	100%

[14] Detailed list of main activities performed under each output is provided in Annex 11.

enforced by relevant government agency departments by EOP					
Percentage of lighting products in the domestic lighting market that are quality standards compliant SSL products by EOP	50%	70%	84%	82%	117%

As a result of this component, 06 policies on EE SSLs have been developed and approved at the national and provincial level.

Policies and implementing rules and regulations that were developed as a result of project's activities include:

1) 13th Five-Year Plan for the Development of SSL Industry
2) Notice on Issuing the Rules for the Implementation of the Energy Efficiency "Leader" System of Five Types of Products Including Electric Washers and Lighting Products and Selection of Energy Efficiency "Leader" Products
3) Notice on Issuing the Implementation Opinions of Jiangsu Province on Accelerating the Development of the SSL Industry
4) Implementation Rules for Energy Efficiency Labeling of LED Products for Indoor Lighting
5) Implementation Rules for Energy Efficiency Labeling of LED Lamps for Roads and Tunnels
6) Notice on Issuing the Government Procurement List of Energy-saving Products.

Several research studies were carried out and published by the project on SSL policies and regulations, encompassing the development process, technology and market trends, available policy frameworks, financing options, taxation, and international experience in order to provide policy direction of China's high efficiency lighting industry for the medium and long term. As a result of this research, the project provided substantial inputs to the formulation of Development Strategy for Chinese SSL industry in the 13th five-year plan. The plan was issued jointly by NDRC and 12 other major administrative authorities and accorded priority to SSL development at the highest policy and planning level. Similarly, the project has provided inputs to the development strategy for Chinese SSL industry for the 14th five-year plan, which is in a draft form.

Moreover, following on the recommendations of the MTR, research was conducted on the Roadmap of Global SSL Cooperation under the Belt and Road Initiative (BRI) and Sustainable Financial Support mechanisms. The NDRC aims to build a future project based on these two concepts, as it would ensure the development of EE SSL industry in China on one hand and help disseminate the Chinese experience to other countries under the South-South cooperation modality.

In view of the evidence reviewed, the TE team found that the results of this component have resulted in establishing a supportive policy framework for the promotion of SSL industry in China, thereby encouraging the production and promotion of EE SSLs. Moreover, the way has also been paved for international development of EE SSL through plans of integrating this priority in the BRI. Therefore, the project has Satisfactorily delivered on Component 2.

Component 3: SSL Application Demonstration

This Component focused on two-pronged demonstration of SSL products, including: a) Production of quality compliant SSL products; and b) Application of SSL products in lighting systems in the public/institutional and residential sectors. The overall purpose of the Component was to demonstrate the socio-economic and environmental benefits of SSL, leading to increased penetration rate of SSL products especially in the residential sector in China. This was to be accomplished through the implementation of the following three outputs[15]:

Output 3.1: Completed **Demonstrations** on SSL Product Manufacturing and SSL Product Lighting Applications

Output 3.2: Completed **Report on the Demonstration Scheme Results** Evaluation and Dissemination

Output 3.3: Documented **Sustainable Follow-up Program Design for Financially Supporting SSL Technology Innovations** and Production of New SSL Products and their Applications.

TABLE 14: SSL APPLICATION DEMONSTRATION

Indicator	Baseline	EOP Target	Achieved at MTR	Achieved at EOP	Percent Target Achieved at EOP
Market share of qualified SSL products in general lighting market in China by EOP	8.2%	28%	28%	52.7%	188%

By far the largest in financial contribution, the activities that were planned to bring about Outcome 3 were implemented through the issuance of 16 sub-contracts. Although Component 3 was designed to

[15] Detailed list of main activities performed under each output is provided in Annex 11.

increase urban market penetration of be demonstration of EE SSL in six sectors, namely: Public building lighting system; Industrial lighting system; Traffic lighting system; Intelligent lighting system; and Renewable energy powered lighting system. However, these markets had already seen an increase in usage of SSL since the time of design, especially after the approval of the 13th Five Year Plan on SSL. Consequently, with approval from the PSC in 2019, it was decided to target rural areas to demonstrate SSL applications in the road and residential sectors. Also, capitalizing on this shift to rural areas, the GOC decided to integrate this activity into its National Targeted Poverty Alleviation Strategy (NTPAS), thereby allowing for smoother outreach and higher funding availability to SSL promotion through GOC due to linkage to the existing organizational infrastructure of the Poverty Alleviation Strategy.

Accordingly, the project was implemented in 30 key counties[16] of the NTPAS, selected in collaboration between the NDRC and PMO, and targeted the residential sector within poor areas for demonstration through distribution of LED bulbs. These lights were distributed by PMO through sub-contracts with three SSL manufacturers, including NVC Lighting, Opple, and Hyderson. Progress reports submitted by these sub-contractors to the PMO confirmed that these demonstrations have taken place.

These activities have reportedly contributed to GOC's poverty alleviation goals through reduction in energy consumption, while also improving awareness about SSLs. However, as poverty alleviation was not a target of the logical framework, the project's quantifiable effect on poverty has not been tracked by the PMO.

In addition, as a result of the project's impact on policy and advocacy for SSL though sharing the positive results with local government officials, the GOC also promoted demonstrations of LED lighting in public spaces . For instance, the GOC conducted the energy conservation transformation project for urban road lighting. At the national level, in years 2017 and 2018, GOC supported a total of 75 road lighting LED transformation projects, with an investment of about USD 448 million and a central government subsidy of about USD 48 million. This support resulted in transformation of about 438,000 lamps. Similarly, in 2017 the central government supported 26 road lighting LED transformation projects, with an investment of about USD 154 million and a central government subsidy of about USD 16 million, This resulted in about 93,000 lamps having been transformed. The central government budgetary investment in 2018 supported 49 road lighting LED transformation projects, with an investment of about USD 293 million, a central government subsidy of about USD 32 million, and about 345,000 lamps having been transformed. Furthermore, in 2020, driven by local governments, China has sold 9 million LED street lamps to the domestic market in 2020.[17]

[16] Semiconductor lighting products demonstration & poverty alleviation were carried out in the following regions: Hebei, Shanxi, Shaanxi, Inner Mongolia, Jilin, Heilongjiang, Henan, Anhui, Jiangxi, Hubei, Hunan, Guangxi, Hainan, and Chongqing, Tibet, Xinjiang, Yunnan, Gansu, Sichuan, Qinghai, Ningxia, and Guizhou

[17] Conversion rate calculated at 1 USD = 6.47 RMB

The activities under this Component were informed by various guidelines developed under the project. For instance, the demonstrations were implemented based on an SSL implementation plan developed by the project, providing recommendations on planning and implementation of SSL demonstration projects in China, including guidelines on selection of demonstration sites, identification of experts, assessment of results, and ways to publicize the outcomes of demonstration. Similarly, guidelines on Market Investigation and Quality Surveys were developed and a pilot survey was conducted on 50 SSL enterprises in 15 provinces.

In addition, a number of evidence-based research studies were also conducted nationwide on evaluation of SSL. These evaluation guidelines provided guidance on how to document and disseminate best practices and success stories of SSL demonstration, and included LED Lighting System Application Effect Evaluation Index Standards & Methods and Evaluation Implementation Verification. These studies informed the development of Management Framework on LED Lighting System Effects and Energy Efficiency Evaluation. Similarly, studies were undertaken on four emerging SSL product applications, including Agriculture / Medical Treatment, Intelligent Lighting, Promotion of China's UV LED in Public Health, Safety & Epidemic Prevention, and High-quality Healthy LED Lighting Products in Schools' Application and Promotion Model.

Moreover, 04 Energy Saving Retrofitting Implementation Plans for public places were developed, including Urban Street Lighting, Public Institutions Lighting (colleges & universities), Traffic Lighting, and Building lighting were also developed. However, since these plans were developed before the shift in strategy to rural areas, these plans could not be directly applied by the project. Nevertheless, the plans were integrated into the 14th five-year plan to ensure the promotion of EE SSL in urban areas across China supported by funding contributions from the central government to local governments.

Finally, under Output 3.3 the project also commissioned research to explore further international cooperation and exploring international project funding channels for promotion of SSL. These primarily include, Research Report on Sustainable Funding Support Scheme for SSL Lighting, Research Report on SSL Lighting International Cooperation Path between China and "One Belt One Road" Key Countries" and "One Belt One Road" National SSL Lighting Industry Research Report.

Overall, this component entailed extensive collaboration between national and local level governments, and also required broad involvement of research organizations, manufacturers, and distributors, etc. Due to the project's contribution, the market share of qualified SSL products in general lighting market in China reached 52.7% compared to a target of 28%. Hence, reflecting a significant change in the market share of the locally produced quality EE SSL products. Therefore, based on evidence reviewed by the TE team, it was found that Component 3 was Satisfactorily delivered.

Component 4: Strengthening of SSL Quality Assurance Capabilities

This component aimed to address the barriers related to SSL product quality assurance and the need to improve the current quality and performance of locally made SSL products. Accordingly, activities were

designed to attain the realization of enhanced quality and energy performance of locally produced SSL products both for the domestic and international markets[18].

Output 4.1: Completed Study on SSL Quality and Energy Performance Standards

Output 4.2: Documented Identified Potential Improvements in SSL Products

Output 4.3: Documentation on Completed Research and Development on SSL Product Improvements

Output 4.4: **Established and Enforced Chinese Standards** for SSL Products

Output 4.5: Completed **Capacity Building Program on the Application of SSL** Product Standards

Output 4.6: Established and Operational **SSL Product Testing and Certification System**

Output 4.7: Completed Assessment of the **Impacts of the SSL Product Standards Implementation**

TABLE 15: STRENGTHENING OF SSL QUALITY ASSURANCE CAPABILITIES

Indicator	Baseline	EOP Target	Achieved at MTR	Achieved at EOP	Percent Target Achieved EOP
No. of SSL quality and energy efficiency certificates issued by state-certified institutions by EOP	1,200	1,500	2,733	4,512	300%
No. of local SSL manufacturers that are complying to the new EE standard/label for SSL products by EOP	0	100	56	135	135%

The results of this component were complimented by the SSL market transformation policies and mechanisms developed and approved under Outcome 2. The significant contribution of this outcome has been:

- The development and approval of two new EE standards, including:

[18] Detailed list of main activities performed under each output is provided in Annex 11.

- GB30255-2019 Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades of LED Products for Indoor Lighting;
- GB37478-2019 Minimum Allowable Values of Energy Efficiency and Energy Efficiency Grades of LED luminaires for Road and Tunnel Lighting; and

- Approval and successful implementation of **energy efficiency labels** for semiconductor lighting products

The development of standards was a result of extensive research of international and national SSL standards and testing systems in economies such as Europe and North America, etc. and data collection on energy efficiency lighting within China. This entailed a review of more than 200 standards of 9 international standardization organizations and 4 domestic standardization organizations, and several testing agencies, covering semiconductor materials and lighting products, etc. were reviewed. In addition, to develop standards, consultations were reportedly undertaken with more than 100 enterprises and institutions. These consultations also aimed to educate industry players about the upcoming standards as well as give them a sense of ownership due to their participation in the standards development process.

The results of research under this component were also documented in the form of 'China SSL product quality improvement plan', 'General report on the framework of policies, regulations and systems for the development of efficient lighting industry', and the 'SSL product standards and testing system research report'. Moreover, several documents of technical nature referencing particular aspects of EE SSL have also been published, such as those detailing technical requirements for installation, as well as research on emerging uses of EE SSL, such as standards and system framework on plant lighting.

As a result of efforts to develop and approve SSL standards, the project has overachieved its goal of No. of local SSL manufacturers that are complying to the new EE standard/label for SSL products by EOP by 200% and the goal for No. of local SSL manufacturers that are complying to the new EE standard/label for SSL products by EOP is 35% overachieved. Hence, based on the evidence reviewed, the TE team found that Component 4 was satisfactorily delivered.

Hence, the TE team determined that the project has successfully addressed all four barriers that it had set out to address at the time of design, while overachieving targets in most instances. In addition, the project has contributed towards the additional goal of poverty alleviation in China and also initiated research and activities covering emerging applications of SSL and explored venues for international cooperation. Hence, the project's effectiveness was found to be ***Satisfactory.***

5.3 EFFICIENCY

The project's efficiency was assessed as a measure of economic conversion of financial, human, and time resources to project results.

The evaluation team determined that the UNDP and PMO have closely coordinated the project's planning and implementation. Moreover, partnerships were developed with a wide array of organizations in the public and private sectors, including Chinese national government agencies, NGOs, technical organizations, light manufacturers, retailers, consumers, research bodies, and academia, etc. Leveraging these partnerships, all project targets have been met and most project indicators have been over achieved.

The project's finances have been managed efficiently. The project has also leveraged the GEF grant by obtaining 1,614% of committed co-financing from the GOC and local private sector, thereby significantly leveraging the GEF contribution.

The TE team also concluded that the SSLED project's M&E was carried out at multiple levels and all key responsible stakeholders, including PSC, UNDP China, PMO proactively tracked the project's progress and proactively responded to issues highlighted by monitoring activities. Moreover, the PMO management has effectively coordinated and consolidated M&E data generated by a large number of sub-contractors. Also, the Two Year Work Planning (TYWP) approach gave the PMO more flexibility to plan activities and budgets as compared to Annual Work Plans (AWPs).

The project staffing has also been efficient with the PMO being housed in the NDRC and operated by a limited number of staff and partnering with leading industry organizations as subcontractors for the implementation of activities. Furthermore, assigning NDRC the key agency of the GOC tasked with promoting national energy conservation policies and strategies, as the Implementing Partner for this project has ensured that the project's access to sound technical guidance, strong policy support, and the potential to develop linkages between the industry and policy makers. Moreover, project was found to be focused on gender equality in staffing with 50% women reported in senior positions such as project manager of UNDP China, PSC Coordinator and PMO Deputy Director.

The project was granted two project implementation period extensions. The first extension was granted on April 28 in 2020 to compensate for the slow progress in approval procedures as a result of the Chinese government's new institutional reform in 2019. The second extension was granted on December 8 in 2020, as part of the Chinese government's measures to curb COVID-19 and subsequent closure of office spaces.

Based on this assessment, the TE team determined the project's Efficiency was ***Satisfactory.***

5.4 OVERALL OUTCOME

Based on the detailed assessment of the SS LED project, the TE team found the project to be ***Satisfactory.***

`TABLE 16: ASSESSMENT OF OUTCOMES

Assessment of Outcomes	Rating
Relevance	Satisfactory
Effectiveness	Satisfactory
Efficiency	Satisfactory

Overall Project Outcome Rating	Satisfactory

5.5 COUNTRY OWNERSHIP

All key stakeholders in China, specifically the GOC, research bodies, and private sector have shown strong ownership of the SSLED project and its objectives.

The PMO was placed within the NDRC, the key planning agency of the GOC. In addition, NDRC has also led the PSC since its establishment. This enabled project to have direct access to and influence over important public sector institutions and expertise across China. Moreover, the GOC demonstrated its ownership of the project by approving six key SSL related policies and two major standards influencing both national and local development strategies, these policies and standards being the two driving factors of the rapid transformation of the SSL industry in China.

The GOC's strong ownership of the SSLED project is also evident from its significantly higher (1,688%) financial contribution against the commitment at design, i.e. USD 452,418,097 actual allocation as compared to USD 25,300,000 commitment at design. While the actual contribution from private sector also exceeded by 8% as compared to the commitment at design.

Furthermore, throughout the project's implementation, a strong collaborative spirit in the form of information sharing, research, and demonstration, etc. prevailed among stakeholders from all sectors. While a number of local entities participating in the project have also committed to continuing efforts for the development of SS LED industry in China and abroad, and a number of plans have already been formulated towards this end. For instance, NDRC's efforts to integrate an SSL development strategy in the BRI.

As a result of this strong ownership, the project has not only met all its targets but also exceeded most of its targets, as elaborated in the sections on Effectiveness and Impact.

5.6 GENDER EQUALITY AND WOMEN'S EMPOWERMENT

The project design set a target of employment of 200 women in new jobs in the ESL industry by EOP was.

A Training Need Assessment survey of the manufacturers conducted by the PMO revealed that there is little discrimination in the hiring of women workers[19], as the SSL manufacturing process includes a number of operations that entail attention to fine detail and are therefore more suited to women workers. In addition, it was determined that automated tasks can also be performed well by women. Consequently, the training programs and capacity building events organized by the project ensured that skills for tasks which are generally undertaken by women are also incorporated in these activities. Moreover, all members of the project staff, including the project manager, have been briefed on or received training on gender issues.

[19] For instance, the TE interview with the NVC Lighting Technology Corporation, a major SSL manufacturer revealed that of the 4,000 production line workers employed by the company, more than 30% are female.

The TE team found that the project has successfully led to employment opportunities for women at both at technical and decision-making levels within different stakeholders. Among the key stakeholders, including PMO, UNDP, and PSC, a total of 06 women participate in the project's planning and management[20]. Whereas, among sub-contractors, women are reported to hold more than half of the management positions contributing to the project. Overall, the project has far exceeded the targets for number of women employed in new jobs in the ESL industry by EOP, as against a target of 200 women, 4,062 (2,031%) women are employed in new jobs in the ESL industry.

In addition, TE interviews revealed that women in the demonstration areas from the 30 targeted poor counties have also particularly benefitted from the project. For instance, improved lighting of public spaces has improved women's safety and mobility after dark, etc. However, as these outcomes were not foreseen in the project design, such socio-economic impact has not been recorded by the project.

Hence, based on the Gender Results Effectiveness Scale (GRES), the TE team assessed that project was 'Gender Targeted' as the results focused on the number of women, men or marginalized population that were targeted. Moreover, the TE team also determined that there were no potential negative impacts on gender equality and women's empowerment as a result of the project.

5.7 SUSTAINABILITY

Sustainability was assessed as the continuation or likely continuation of positive outputs and outcomes of the SS LED project after it has come to an end, and the potential for scale-up and/or replication. In this regard, the project's environmental, institutional, financial, political, cultural, and social sustainability were analyzed.

The TE team determined that major outputs with potential for contribution to sustainability include approved SSL policies, frameworks, standards, and industry database developed through the project's support. In particular, the project's contribution to the 13th Five Year Plan and the development of two approved standards on SSL is expected to lead to continued development of the SSL industry in China. Furthermore, the 1,688% higher financial contribution by the GOC as compared to the commitment at design reflects the ongoing commitment of the government to promote SSLs in China.

As such, a number of provincial governments have also reportedly adopted the use of LED lighting in their municipal policies. For instance, Beijing has piloted a promotion scheme in 2021, providing 70% discount for households towards LED lighting purchases, for a maximum subsidy of RMB 150, and aims to cover 100,000 LED lights[21]. Similarly, a three year action plan for the development of the third generation semiconductor UV LED industry in Changzhi (2020-2022) has been officially released, while several policies for accelerating the development of UV LED industry in Changzhi (Trial Implementation)

[20] These women include: 01 PSC Coordinator, 01 PSC Member, 01 Manager (UNDP), 01 Assistant (UNDP), 01 Deputy Director (PMO) 01 Administrative Staff (PMO), 01 Financial Staff, and 03 Technical Advisors.

[21] http://bj.people.com.cn/BIG5/n2/2021/0604/c14540-34762001.html

have also been launched[22]. These policy measures are an indicator of up scaling of project's outcomes and are likely to lead to increased usage of SSLs in both domestic households and public sector projects.

The buy-in at the industry-level is also demonstrated by the commitment of the Beijing Mckenqiao Productivity Promotion Center Co., Ltd., the brother unit of Beijing Semiconductor Lighting Technology Promotion Center, to bear the maintenance of the industry database developed by the project. The database will be hosted on www.china-led.net, the website for China Semiconductor Lighting Network as the primary online information portal for the National Semiconductor Lighting Project, and operations costs are planned to be borne through the advertising revenues of the portal.

In addition, the project has led to the documentation of extensive research and dissemination of knowledge on various aspects of SSL, including technology, standards, utility, and marketing, etc. of existing and emerging SSL uses. Also, the project's collaborative approach to implementation has led to cross-fertilization of knowledge and experiences across various key sectors and organizations critical for sustainable development of the SSL sector in China. These interactions have matured into ongoing linkages and collaborations between various stakeholders, e.g. research organizations, standards developing agencies, and private manufacturers, etc.

Furthermore, the project also commissioned research to assess further international cooperation and exploring international project funding channels for promotion of SSL. Linked to this has been the launch of the One Belt One Road Green Lighting Initiative by NDRC in collaboration with international organizations. Moreover, the emerging uses of LED in various specialized sectors, such as agriculture and health can potentially lead to wider-scale applications of LEDs in these sectors and also lead to the adoption of this technology in other allied sectors.

However, in the absence of collaborative execution and information exchange mechanisms introduced by the project, the rate of development of SSL industry is likely to lose momentum. In particular, the neutral role played by UNDP and GEF and NDRC's reinforcement of collaboration between diverse stakeholders were key driving forces of the project. However, after the project completion, it is unclear how this platform for collaboration will be replaced, especially in the absence of a follow up program.

Going forward, sustainability is also likely to be adversely affected by issues relating to international trade, demand, and technological developments. In particular, most high efficiency LED components such as Integrated Circuits (ICs) are reliant on import. Therefore, the trade friction between China and US can slow down the growth of Chinese LED manufacturing. Furthermore, while domestic demand has continued to grow, the COVID-19 pandemic since early 2020 has led to disruption of international supply chains, set back economies around the world, and weakened consumer purchasing power. This

[22] https://m.leju.com/news-ci-6703485270282795515.html

development in turn has led to fluctuation in international demand for SSLs, although with exports declining in 2020 but recovering in early 2021.

In fact, although the project has significantly surpassed most of its EOP targets, in light of the abovementioned contributing factors, the SSL sector has reportedly seen a slow rate of development since the MTR undertaken in 2018-2019. For instance, the value of quality standards compliant SSL products produced in China has changed from 206.6 billion RMB at MTR to only 224.2 billion RMB, or a change of only 8.5%, and the export value of quality standards compliant SSL products produced in China has increased from 12.9 Billion RMB at MTR to 15.43 Billion RMB (19.6%).

As a result, the TE team determined that the overall potential for sustainability of the project outcomes is ***Moderately Unlikely.*** In particular, while the financial, environmental, institutional, and governance is ***Likely***, the socio-political sustainability of the SSLED project is ***Moderately Unlikely.***,

5.8 IMPACT

This section presents an assessment of the progress made towards long-term impact of the SSLED project, as demonstrated by both qualitative and quantitative evidence gathered during the Terminal Evaluation.

The TE team assessed the project had a strong environmental impact, especially in areas of environmental stress reduction and environmental status change. Most prominently, the project contributed to increasing the market share of qualified SSL products, a technology with the least adverse **environmental impacts** among artificial illumination solutions, in general lighting market in China from 8.2% at baseline to 62% by project end. As a result, the project was able to achieve 5,260.6 GWh of annual direct energy savings in China, which was 561% of target achieved; and 3,035.4 kilotons of annual direct CO2 emissions reduction in China by EOP, far exceeding the baseline target of 850 kilotons.

The project also positively impacted contributions to changes in **policy, legal and regulatory frameworks** supporting the overall SSLED industry. In particular, the project facilitated the development of supportive policy frameworks for SSL promotion in China's domestic market to address the barriers related to SSL market transformation policies and mechanism. In total, as a result of the project's efforts, 02 standards and 06 policies on EE SSLs have been developed and approved at the national and provincial level, including substantial inputs to the formulation of Development Strategy for Chinese SSL industry in the 13th five-year plan. At the industry-level, more than 130 enterprises completed EE labeling certification following publication of project supported standards, policies, and regulations. The resultant project impact on changes in regulatory framework was evident from the production of 82% quality standards compliant SSL products at EOP.

The project's impact towards **changes in socio-economic status** could be best gauged in terms of increase in employment, especially for women in the overall SSLED sector. In this regard, the project activities led to the generation of 13,542 new jobs, of which 4,062 (30%) jobs employed women. Moreover, within the project management six women were engaged in the PMO with half of the senior

positions being held by women professionals. Moreover, the project was also able to contribute towards and make a positive impact on GOC's poverty alleviation goals, especially through Component 3. The project's shift from urban to rural areas and subsequent integration with the GOC's National Targeted Poverty Alleviation Strategy resulted in an unintended positive impact on alleviating poverty in rural areas though demonstration activities in 30 key counties of NTPAS that included distribution of more than 700,000 LED bulbs. However, as poverty alleviation was not a project target, the project's quantifiable effect on poverty has not been tracked by the PMO.

According to the *Annual Development Report of China's Power Industry 2020* issued by China Electricity Council, China's CO_2 emissions per unit of electricity generated was about 577 g/kWh in 2019. In the above project, the annual electricity savings reaches 5,260.6 MWh, which is equivalent to 3,035.4kt CO_2 emission reductions. In other words, taking into consideration the electricity savings due to urban road lighting and home lighting transformation projects supported by the central government budgetary investment, targeted poverty alleviation funds, and financial investment from the local government, while putting aside the electricity savings due to the improvement of lighting product energy efficiency standards, project demonstration promotion and other factors, the project has outperformed both targets of electricity savings and CO_2 emission reductions.

The project has also made an impact by **addressing barriers and risk** associated with the development of the SSL industry in China. It had a positive impact through development and approval of two new EE standards, and approval and successful implementation of energy efficiency labels for semiconductor lighting products. This has resulted in overachievement of the EOP goals for number of local SSL manufacturers that are complying to the new EE standard/label for SSL products and the number of local SSL manufacturers that are complying to the new EE standard/label for SSL products by 300% and 135%, respectively, compared to the set EOP targets.

Furthermore, the project made a strong impact by undertaking substantial **research and publications**, especially under Component 1. Such research determined a baseline assessment of SSL product market trends in China and internationally, provided guidance on capacity improvement of manufacturers, and evaluated the results of demonstrations, etc. Moreover, the project has also had unquantified impact through the promotion of **information exchange and awareness activities**, including two global symposiums/workshops on SSL, numerous trainings in standards, and SSL promotional activities. As a result of these efforts, the project has contributed to the production of 224.2 billion RMB of quality standards compliant SSL products in China.

Overall, the project has contributed to the rapid transformation of the SSL industry in China, fully achieved one and surpassed the remaining ten targets established at the time of design. However, although the role of SS LED project has been highly appreciated due to its comprehensive scope, the unintended impacts of the project, such as the impact on poverty alleviation, have not been tracked.

6 MAIN FINDINGS, CONCLUSIONS, LESSONS, AND RECOMMENDATIONS

6.1 MAIN FINDINGS AND CONCLUSIONS

The in-depth review of the SS LED project revealed that project is relevant to the priorities of all key stakeholders, including the Government of China, UNDP, GEF, and in line with the needs of the private sector players and energy consumers.

Based on the evidence reviewed, as provided in Annex 03, it was determined that the SSLED project contributed to overcoming or weakening the barriers listed during the project design, while achieving or overarching the targets established in the project document, namely: 1) lack of systematic analysis on status of SSL industry and applications; (2) absence of a systematic supporting policy framework on SSL market transformation; (3) lack of guidelines for SSL products application and low Level of social awareness; and (4) inadequate standard SSL testing, quality assurance and certification system.

In general, the project is regarded as a comprehensive attempt at addressing multi-faceted challenges faced by EE SSL in China. The availability of extensive research on various components of SSL carried over four years, establishment of industry database, formulation of key SSL policies, regulations, and standards have been the key transformative factors. In addition, the supportive role played by UNDP and NDRC as key implementing stakeholders and the active collaboration by various sub-contractors and other participants has facilitated the achievement of results.

The project has significantly contributed to the transformation of LED lighting industry in the country. In addition, the demonstration activities under the project have contributed to the unanticipated result of poverty alleviation, although the exact extent of this cannot be assessed in absence of available data. Whereas inter-organizational linkages developed during project implementation has led to an improved overall collaborative environment among SSL stakeholders from diverse industries and sectors.

Moreover, to pave way for ongoing development of the industry, the project has conducted research on emerging sectors in LED lighting, explored the possibility of future collaboration with international entities, and scanned the horizon for potential funding opportunities for new development initiatives.

It was also determined that the Project's implementation approach is based on active collaboration and partnership between various stakeholders from the public, private, and international development sectors, thereby resulting in operational efficiency and progress towards planned targets. The project's finances have been managed efficiently as the project has over-achieved key targets within the allotted GEF fund while garnering 1,614% additional co-financing. Furthermore, all key responsible stakeholders, including PSC, UNDP China, PMO proactively tracked the project's progress and proactively responded to issues highlighted by monitoring activities. Moreover, project was found to be focused on gender equality in staffing with 50% women reportedly occupying senior positions and 2,031% women as compared to the EOP target were employed in new jobs created due to project support to the SSL industry.

Finally, while the sustainability of outcomes is Likely due to policy development, standards, capacity building, and demonstrations facilitated by the project, the disruption in supply chains and demand due to international trade frictions and COVID-19 epidemic may slow down growth of the SSL industry in China. Similarly, the collaboration and information sharing mechanisms established by the project will require continuous institutional and financial support to prompt future development of the industry.

6.2 RECOMMENDATIONS

The TE team presents the following recommendations for designing future projects and strategies for development of the SSL sector in China.

1. **Sustainability of Interventions**

While the project has achieved its targets, the sustainability of outputs is likely to depend on multiple factors, including policy support, financing, and follow up research. Therefore, after the project completion, it is unclear how this platform for collaboration will be replaced, especially in the absence of a follow up program.

An overarching recommendation in this regard is that to ensure maintenance of ongoing policy support, the of SSL industry is incorporated in the **14th Five-year plan** as a strategic emerging industry. This measure is expected to result in the prioritization of the industry for provision of comprehensive technical and financial support, with attention not only to the end product manufacturing but also critical associated industries, such as semi-conductor availability.

As elaborated above, the sustainability of **collaboration mechanism** and information sharing resources introduced by the project is critical for rapid development of the SSL industry. It is therefore recommended that a department or unit within the NDRC is given the mandate to facilitate ongoing review and development of the SSL policies and regulations based on dialogue and information exchange between all stakeholders for evolving technologies in the SSL industry. Similarly, to guarantee comprehensive development, future policies, and strategies, e.g. industry support initiatives must incentivize cooperation between multiple stakeholders with diverse mandates.

Entity Responsible: NDRC/NECC, CALI, etc. Timeframe: Short to Medium Term (1 to 2 years)

2. **Prioritization of Future Initiatives on SSL Development**

Despite the fact that the SSLED project was comprehensive in nature, there are still considerable gaps in the advancement of the Chinese SSL industry, some of which were identified during the project implementation. The rapid advancement in technology and changes in the socio-economic context necessitate ongoing support to the lighting sector. Accordingly, some recommended strategies to consider in the design of future development initiatives of the GOC and international development sector are:

Support to specialized SSL applications e.g. intelligent lighting; and products such as LED tubes, control gears, etc. In this regard, it will be important to develop industry or sector-specific SSL frameworks, standards, and incentive schemes, etc. for newly emerging SSL technologies.;

- Conduct of research to improve the current SSL production processes in order to find a balance between product cost and energy efficiency;
- Expanding the scope of stakeholders in future projects by including other value chain agents, such as suppliers providing key components to the SSL industry as well as those in distribution/marketing functions and system planners, e.g. industry associations of architects or town planners, etc.; Through research and development support.
- Due to its status as a major contributor to reduced GHG emissions, prioritize the SSL industry when developing the local semiconductor industry to reduce the high reliance on imports;
- Since small and medium enterprises (SMEs) are known to be the main producers of low quality SSL products, in order to address the capacity of these companies, special measures are required to be incorporated into future industry development frameworks; and
- Continue the promotion of the use of SSL products among consumers based on evidence generated from demonstration activities.

Entity Responsible: GOC. Timeframe: Short to Medium Term (1 to 2 years)

3. International Development Cooperation

Due to the far reaching global implications of EE lighting, it is recommended that the lessons learned from China's experience in SSL development are shared widely and successful practices are replicated in other countries through collaboration between both government agencies and private enterprises. Moreover, China-led initiatives aimed at South-South cooperation must also promote international trade of SSLs through technical support actions such as harmonization of products standards and labels, patent pools/patent sharing mechanisms; and highlighting the adoption benefits of good quality SSLs.

Entity Responsible: GOC/UNDP GEF. Timeframe: Medium Term (2 to 3 years)

4. Monitoring Impact

Monitoring is an important aspect of projects to not only track progress but also ensure that lessons learned, and challenges are highlighted.

While the project has reported against all outcome indicators, which are quantitative in nature, there is a value in understanding the broader details of project results. For instance, there is value in realizing how the project has led to building capacities, the nature of activities being performed by women hired into the new jobs, or the extent of project's impact on poverty. Also, while the guidance in project design document was followed on assessing the project's impact on outcome level indicators, the extent to

which the project's activities contributed to the accomplishment of these results is unclear as compared to exogenous factors, such as overarching policy, demand, and technology, etc.

It is therefore recommended that a systematic assessment is undertaken by the PMO/UNDP of the project's intended and unintended outcomes and shared broadly among stakeholders.

Entity Responsible: NDRC/PMO. Timeframe: Short Term (< 1 year)

5. Gender

Considering women's high employability in SSL manufacturing, it is recommended that future initiatives capitalize on this opportunity. In this regard, future program designs must include a thorough gender assessment of the sector, which was found to be missing from this project, and accordingly include active support to ensure that challenges faced by women workers can be overcome and their participation at advanced professional levels can be facilitated.

Entity Responsible: GOC/UNDP GEF. Timeframe: Medium to Long Term (2 years +)

6.3 LESSONS LEARNED

The implementation of the SSLED project revealed major lessons in the areas of policy, approach, and prioritization, as elaborated:

- The SSL industry is highly sensitive to changes in policy orientation, macroeconomics, and technological changes.
- Policy and standards are cost-effective tools for market transformation in China.
- Projects implemented under the leadership of neutral agencies, such as GOC, UNDP, and GEF, can mobilize stakeholders with competing interests towards a common development goal.
- Continuous needs assessment, implementation, and post-implementation evaluation results are critical for projects addressing dynamic sectors that are constantly evolving due to technological advancements and politico-economic factors.
- Continued development of the SSL industry is highly reliant on development of integrated value chains.
- SSL production and utilization provides significant opportunity for international cooperation and climate change adaptation.

ANNEXES

ANNEX 1: EVALUATION TIMELINE OF ACTIVITIES

Tasks to be Undertaken	Timeline
Signing of Contract	15th March, 2021
Inception Meeting	16th April, 2021
Date of Inception Report Submission	23rd April, 2021
Starting Date of Interviews	20th May, 2021
Ending Date of Interviews	25th May, 2021
Debriefing Presentation	11th June, 2021
Submission of Draft Terminal Evaluation Report	18th June, 2021

ANNEX 2: LIST OF STAKEHOLDERS INTERVIEWED

No	Name of Interviewee	Title	Name of Interviewer	Organization Name	Contact Info	Date
1	Wang Shuxiao	Professor/ Director of Luminous Environment and Illuminating Research Center	Yanping ZHANG Gen WANG	China Academy of Building Research	-	2021-5-20
2	Jun LU	Project Manager	Yanping ZHANG Gen WANG	NVC Lighting Technology Corporation	+86 133 112 07097	2021-5-20
3	Wei ZHANG	Vice Director, National Lighting Test Centre	-	National Lighting Test Centre	136 8322 0140 zhangwei@nltc.cn	2021-05-20
4	Jianqun Hao	Deputy Director	Yanping ZHANG Gen WANG	Beijing SSL Promotion Center	13811763773 haojq@china-led.net	2021-05-20

5	Mr. Jun RUAN	General Secretary	Yanping ZHANG Gen WANG	China Solid State Lighting Alliance (CSA)	+86 1391 0222 335 ruanjun@china-led.net	2021-05-21
6	Yuxin WEN	Project Manager	Yanping ZHANG Gen WANG	China International Engineering Consulting Co., Ltd	13439855660 wenyuxin08@126.com	2021.05.21
7	Xiuying Liang	Research Fellow	Yanping ZHANG Gen WANG	China National Institute of Standardization (CNIS)	86-10-58811789 liangxy@cnis.ac.cn	2021.05.21
8	Jianguo ZHANG	SSLED-T2017005	Yanping ZHANG Gen WANG	Energy Research Institute of NDRC	13552865296 zhangjg@eri.org.cn	2021.05.21
9	Jinghao JIANG	Director	Conducted via Questionnaire Coordinated by PMO Reviewed and translated by Yanping ZHANG and Gen WANG	Department of Resources Conservation and Environmental Protection, National Development and Reform Commission (NDRC)	+86 1381 0552 389	2021.05.25

ANNEX 3: LIST OF DOCUMENTS REVIEWED AND SOURCE OF VERIFICATION

1. Annual Project Report APR (2017, 2018, 2019 and 2020)
2. Combined Delivery Report by Project CDR (2017, 2018, 2019 and 2020)
3. SSLED Project Document
4. Project Implementation Review PIR (2018, 2019 and 2020)
5. Project Identification Form PIF
6. Approval Letter – Project Identification Form PIF Clearance and Project Preparation Grant PPG Approval
7. Spot Check - National Energy Conservation Center (Jan – Oct 2020)
8. Spot Check – National Energy Conservation Center (Jan – Oct 2017)
9. Spot Check – National Development and Reform Commission (Jul 2018 – Jun 2019)
10. Spot Check – National Development and Reform Commission (Jan 2018 – Jun 2019)
11. SSLED Two Year Work Plan (2018 – 2019, 2019 – 2020 and 2020 - 2021)
12. Micro Assessment Report for National Energy Conservation Center Oct 2017
13. SSLED Endorsement Letter – Ministry of Finance, PRC - Aug 2013
14. Midterm Review Report for UNDP Supported GEF Financed Project on Enabling Solid State Lighting Market Transformation & Promotion of Light Emitting Diode (LED) Lighting in China
15. Signed PAC Minute Meetings Enabling Solid State Lighting Market Transformation & Promotion of Light Emitting Diode (LED) Lighting in China – Dec 2015
16. Inception Report Enabling Solid State Lighting Market Transformation & Promotion of Light Emitting Diode (LED) Lighting in China – 2016
17. UNDP Finance Audit Report – Jan to Dec 2019
18. Co-financing by Each Outcome
19. Finance Data Tables
20. List of Stakeholders (2021-4-20)
21. Summary of Pre-assessment Report
22. Sub-contracts and Consultancies Awarded by the Project SSLED
23. List of Trainings Conducted by the Project
24. Organogram of SSLED project
25. Details/Explanation of the USD 100,000 Spent on EE SSL in Health Sector Spent due to the Pandemic
26. List of Activities Conducted Online Due to COVID19
27. List of Women Staff and Their Role in the Project
28. Training and Capacity Building
29. “13th Five-Year” Development Plan on Solid State Lighting Industry
30. China Solid State Lighting Industry Information Platform
31. Completion of Evaluation Indicators

32. List of Policy Outputs
33. Meeting Minutes of SSLED PSC (2017, 2018, 2019, 2020)
34. List of Technical Advisory Committee
35. Guidance for Conducting Terminal Evaluations of UNDP-Supported, GEF-Financed Project
36. Consultant on Enabling Solid State Lighting Market Transformation & Promotion of Light Emitting Diode (LED) Lighting
37. Preliminary study on the development planning of semiconductor lighting industry in the 14th five-year plan
38. Financial performance under the GEF funded components
39. One belt, one road semiconductor lighting international cooperation path and sustainable financial support scheme
40. Research on the development of semiconductor lighting industry and the construction of industry database in China
41. Research on certification system of semiconductor lighting products in China
42. Research on the evaluation standard and method of application effect of semiconductor lighting system
43. Research on the organization and implementation of demonstration project, evaluation index system and demonstration promotion of China semiconductor lighting promotion project
44. Semiconductor lighting products consumer purchase promotion activities planning and Implementation
45. Research on the quality investigation and improvement scheme of semiconductor lighting products in China
46. Research and formulation of national standards for energy efficiency of semiconductor lighting products in China
47. Research on the implementation scheme of semiconductor lighting technology innovation in China
48. Research on the framework of the policy and regulations for the development of high efficiency lighting industry
49. SSLED Extension Approval 20200331
50. SSLED Extension Approval 20201221
51. Implementation plan of semiconductor lighting precision poverty alleviation project
52. Poverty Alleviation Project 1st batch report from NVC
53. Poverty Alleviation Project 2nd batch report from OPPLE
54. Poverty Alleviation Project 3rd batch report from Hyderson

Indicator Description	Source of Verification
Annual direct energy savings in China by EOP (GWh)	PMO M&E Calculations
Annual direct CO2 emissions reduced in China by EOP (kilotons)	PMO M&E Calculations
No. of new jobs available in the ESL industry by EOP	PMO - 2017-2019 financial reports of 36 listed companies
No. of women employed in new jobs in the ESL industry by EOP	PMO - 2017-2019 financial reports of 36 listed companies
The value of quality standards compliant SSL products produced in China by EOP (billion RMB)	*Annual Report on China SSL Industry* for 2015-2020, China Solid State Lighting Alliance. https://mp.weixin.qq.com/s/TnYGoqkkuRoHIZMYZE6g6g
The export value of quality standards compliant SSL products produced in China by EOP (billion USD)	*Annual Report on China SSL Industry for* 2015-2020.https://mp.weixin.qq.com/s/TnYGoqkkuRoHIZMYZE6g6g
No. of policy recommendations adopted and enforced by relevant government agency departments by EOP	http://www.ndrc.gov.cn/gzdt/201707/t20170728_856262.html http://www.ndrc.gov.cn/zcfb/zcfbtz/201712/t20171218_870678.html http://jssjxw.jiangsu.gov.cn/module/download/downfile.jsp?classid=0&filename=c889f6b771924e51a2e3411f28dc94df.pdf https://www.ndrc.gov.cn/xxgk/zcfb/ghxwj/202004/t20200427_1226859.html https://www.ndrc.gov.cn/fggz/hjyzy/jnhnx/201904/t20190422_1134183.html
Qualified rate of quality standards compliant SSL products by EOP	China Association of Lighting Industry - subproject "SSLED-2017022 Quality Investigation and Study on Improvement Plan of China's SSL Products"
Market share of qualified SSL products in general lighting market in China by EOP	Beijing SSL S&T Promotion Center and China Association of Lighting Industry- subprojects "SSLED-T2017001 Research on the Development of China's SSL Industry and Industry Database Construction" and "SSLED-T2017022 Quality Investigation and Study on Improvement Plan of China's SSL Products" *Annual Report on China Solid State Lighting Industry 2019* at https://mp.weixin.qq.com/s/1dHuhViZR3fmmK5pMmckCw

No. of SSL quality and energy efficiency certificates issued by state-certified institutions by EOP	China Quality Certification Centre (CQC). http://www.cqc.com.cn/www/chinese/zscx/
No. of local SSL manufacturers that are complying to the new EE standard/label for SSL products by EOP	China National Institute of Standardization

ANNEX 4: KII GUIDE SHEETS

Assessment Tools	Respondent(s)
KII/FGD	PMO Staff

Date	
Name(s) of Staff	
Position(s) in Project	
Contact Info	
Name of Interviewer	

I. Project Design and Adaptive Management

1. What were the major lessons learned from the PILESLAMP project that were integrated into the design of this project?

2. Have the project design and log frame been relevant across the project duration? If no, why not?

3. Are any outputs or activities in the logical framework repetitive? E.g. Do Outputs 1.4 and 1.5 overlap with the outputs under the standards scheme, such as Output 2.5,

4. Have there been any changes to the original project design/Log Frame? If yes, why?

5. How were these changes approved? E.g. recommendations of MTR, PMO's recommendations to the PSC Meetings, etc.

6. Has the log frame/project document been reviewed to reflect these changes?

7. What led to the early achievement or over achievement of the project results? E.g. unambitious project design, industry trends, govt. regulations, etc.
8. Also, if these goals were exceeded, were the funds transferred to other activities and/or were new activities added to the project?

II. Timeliness

9. How many extensions has the project received thus far?

10. When were these extensions granted and what were the reasons for these extensions?

11. What was the process for obtaining these extensions?

12. Were these extensions no-cost or were additional funds provided by GEF or the Government for implementation during the extension? If yes, what was the amount of additional funds?

13. What has been the impact of these extensions on project implementation and progress?

14. How has COVID-19 impacted project activities and outcomes? And what have been the mitigation measures employed?

III. Project Management and Planning

15. What are the advantages of placing the PMO within the NDRC?

16. What is the reason for undertaking two year work plans instead of annual work plans? E.g. standard practice in UNDP China, etc.

17. What are the advantages and limitations of developing two year work plans as compared to annual work plans?

IV. Personnel and Staffing

18. What is the organogram of the PMO?

19. Has the project faced any HR challenges, e.g. insufficient or under qualified staff, high turnover, non-availability on in country technical knowhow, etc.?

20. If yes, how have these been resolved? E.g. through hiring of ICs or subcontractors, providing training to existing staff, etc.

21. Did the early achievement of results have any impact on staffing numbers? E.g. some staff were laid off, etc. Please elaborate.

V. Subcontracts and Consultancies

22. How many sub-contracts and consultancies have been issued under each project component (year, topic, and budget)?

23. Have all subcontracts been completed? If no, which ones are outstanding? When are they expected to complete? What have been the reasons in implementation delay of these subcontracts?

24. What was the general process of selecting the subcontractors and consultants?

25. What problems were faced in engaging contractors, e.g. limited capacity, delayed delivery by contractor, etc. How were these mitigated?

26. What problems were faced in managing the contractors, e.g. limited budgets, large volume of contracts, etc.

27. Which of the contracts have contributed most positively to the project's outcomes/goals?

VI. Technical Advisory Committee

28. Which of the contracts had the least contribution or were ineffective? Why?

29. What are the main functions of the TAC?

30. How many members does TAC have? And what industries do they belong to?

31. What have been some of the major inputs of TAC that have contributed to the project's success?

32. What have been the significant challenges faced by the TAC in performing its role? E.g. coordination, lack of data, etc.

VII. M&E

33. Is the project using the project logical framework to track progress against targets?

34. What are the methods and process of tracking progress against project goal, outcome, and outputs?
35. Does the project have a Monitoring database? If yes, please provide details, e.g. what information is recorded in the database? Who updates the database? And how often is the database updated?

36. What were some of the challenges faced in tracking progress against the logical framework? E.g. indicators were not SMART, or information was difficult to track, etc.

37. How were these challenges overcome?

VIII. Steering Committee

38. Has the PSC met regularly? If no, what have been the reasons?

39. Who are members of the PSC? And have these members changed during the course of the project? If yes, please provide details.

40. What key role has the PSC played in guiding / facilitating the project implementation? Please provide examples.

41. How can the role of PSC be strengthened during future projects?

IX. Progress and Outputs and Activities

42. Are any there any outstanding project outputs or activities at this time?

43. If yes, what are the reasons?

44. When will these activities close out?

X. Training and Capacity Building

45. List of various training and outreach activities (including budget, and people reached) under each of the three project components.

46. What was the process of trainee selection?

47. Has the training/outreach impact been assessed? If yes, what have been the outcomes?

48. How can the trainings contribute to project impact and sustainability?

49. What key challenges were faced in the training program? E.g. availability of local technical knowhow, interest by trainees, etc.

50. How were these challenges mitigated?

XI. Communications and Outreach

51. Does the project have a communications and outreach strategy? If yes, what are the major elements of this strategy?

52. How have the experiences and lessons from the project been recorded and saved so that they are easily accessible to any stakeholder who wishes to build on the project's success in the future? E.g. a website, library of NDRC, etc.

XII. Partnerships

53. Which stakeholders under each component have made the most productive contribution towards the project goal? Which stakeholders have made the least productive contribution?

54. What is the liaison mechanism between PMO and other institutional stakeholders? (e.g. UNDP, NDRC, etc.)

55. What is the liaison mechanism between the PMO and beneficiaries, e.g. producers?

56. What challenges have been faced with managing the partnerships? E.g. procurement, reporting, delivery of outputs, understanding the project concept, coordination, and communication, etc.

57. How do the various stakeholders and partners interact to ensure communication and linkages between their respective activities?

58. What are some of the other major government and development sector initiatives focused on LEDs that were active during this project? How has the project collaborated/coordinated activities with these? And what have been the challenges and opportunities during this cooperation?

59. How has this cooperation contributed to the project achieving its targets and outcomes?

XIII. Stakeholder Collaboration

60. What role has the UNDP China played in project implementation? How can this role be further improved?

61. What support has been provided to the project by the GEF Focal Point? How can this support be further improved?

62. What support has been provided by the NDRC/GoChina? How has this support ensured effective project outcomes? Also, what have been some of the challenges with support from the NDRC/GOC? E.g. frequent changes of officials, etc.

63. How has the collaboration between the various stakeholders leveraged the project performance?

64. What key challenges have been faced by the key stakeholders in collaborating with each other? How were some of these challenges mitigated?

XIV. Financing and Co-Financing

65. Have there been any delays or problems faced with the project's financial disbursements from the different stakeholders?

66. If yes, how did these impact project implementation?

67. How were these problems resolved?

68. Have regular project financial audits been undertaken? Were these audits satisfactory?

69. If not, what were the reasons and how were these issues resolved?

70. How is the project co-financing data tracked? What are the challenges in tracking co-financing?

XV. Effectiveness

71. What have been some of the project's key successes?

72. What factors have been critical for the success of the project to achieve its goals and objectives? E.g. GOC policies, trade environment, stakeholder collaboration, etc.

73. What have been some of the project's key challenges?
74. To what extent has the project contributed to the transformation of EE SSL in China as compared to other projects and initiatives active during this time?

XVI. Gender

75. What efforts has the project made to improve/ensure the engagement of women in the SSLED industry/value chain?

76. What have been the challenges and opportunities faced by the project for the engagement of women?

77. How many women have been engaged as a result of the project? Also, as a result of the project support, what proportion of women have been engaged at senior levels?

78. What are the major aspects in which women are engaged?

XVII. Impact

79. Has the PMO undertaken an impact assessment of increase in %age share of LED lighting as a result of the project, %age of high quality LED lights manufactured in China, and total electricity saving, etc.[23].

80. Similarly, has the project calculated impact towards improving the quality and widespread application of LED lighting in China?

81. If yes, how were these calculated and what are the results?

82. How do the results compare with the change anticipated in the ProDoc?

83. To what extent is this impact the result of the GEF project and to what extent have other ongoing projects focused on LED lighting contributed to these results?

84. Has the project's contribution to the UNEP-GEF En.Lighten program been measured? If yes, what has this contribution been?

XVIII. Sustainability

85. What have been the key measures of sustainability/replicability embedded in the project design and delivery?

86. Which elements/results of the project are particularly sustainable? Why?

87. Which elements/results of the project are least sustainable? Why?

[23] According to the MTR, the assumptions related to the calculations of energy savings targets are somewhat unclear.

88. Are there any plans of the UNDP or GoChina to design future similar projects for further development of the SSL industry? If yes, what are the major elements of these projects and when will these project be implemented?

XIX. Lessons Learned and Recommendations

89. What have been some of the project's key lessons learnt?

90. What are your recommendations for the sustainability of project interventions?

91. What are your recommendations for design of similar future projects?

Assessment Tool	Respondent(s)
KII	**Institutional Stakeholders** (NPD (NDRC), NPC (NDRC), PMO Director (NECC), CTA (GEF), PSC, UNDP, etc.)

Date	

Name of Interviewee	
Title	
Name of Interviewer	
Organization Name	
Contact Info	

I. Background

1. Since when has your organization been collaborating with the EE SSL project?

2. How does the project fit into the strategic priorities and current programming of your organization?

3. What particular role does your organization perform in relation to the project?

4. In your opinion, what have been the key successes of the project?

5. How has your organization contributed to some of these project successes?

6. In your opinion, what have been the key challenges faced by the project?

7. How could these challenges have been mitigated?

II. Project Design and Adaptive Management

8. Was your organization involved in the design of the project? If yes, please provide details of your organization's role in the design.

9. Has the project design and log frame remained relevant over the course of the project? E.g. due to the various developments in the EE SSL policy, technology, and demand since the project design.

10. If no, what key factors were irrelevant and how were these redundancies addressed during the course of implementation?

11. The project has well exceeded a number of goals set in the ProDoc even before the MTR and more so after the MTR. Does this mean that the project design document underestimated the potential of the project? If no, what factors have led to the project surpassing its targets? E.g. GOC Policy, market demand, etc.

12. Also, if these goals were exceeded, could/should the funds have been transferred to other/additional activities or should other activities have been added to the project?

III. Project Results

13. In addition to this project, what other EE lighting programs has your agency been involved in? Also, have there been any linkage between this project and other EE Lighting programs being implemented by your organization?

14. How would you rate the comparative contributions and challenges of this project with the other EE Lighting programs?

IV. Project Management

15. What were the key opportunities for establishing the PMO at the NDRC? How were these opportunities utilized?

16. Have there been any key delays in project implementation? f yes, what caused these delays? What has been the impact of these on project implementation and progress?

17. What measures were taken by key stakeholders to avoid any further delays?

V. Monitoring

18. How are the project activities implemented by your organization monitored and reported?

19. Have there been any challenges with monitoring and reporting? E.g. availability of data, reporting format, reporting frequency, etc.

20. How have these challenges been mitigated?

VI. Steering Committee

21. What key role has the PSC played in guiding / facilitating the project implementation? Please provide examples.

22. What challenges and opportunities has the PSC faced in overseeing the project activities? E.g. policy, stakeholder buy in, etc.?

23. How can the role of the PSC be further strengthened in future projects?

VII. Replication and Up Scaling

24. How can/will the project's successes/activities feed into future programming/strategy of your organization?

25. Have the positive results of the project been replicated or plan to be replicated by other key stakeholders? e.g. provincial governments, manufacturers, testing laboratories, distribution channels, etc. If yes, How?

26. What are the challenges to replication or upscaling? E.g. policy, market, or technical, etc. How can these challenges be overcome?

VIII. Stakeholder Collaboration

27. Which project stakeholders/beneficiaries do you deal with directly?

28. What is the mechanism for collaboration with the project? E.g. quarterly meetings, etc.

29. In your opinion, which stakeholders have played a key role in ensuring the project's success?

30. What have been some of the opportunities/positive outcomes of the stakeholder collaboration under this project? E.g. funding leverage, policy support, higher outreach, etc.
31. What have been some of the challenges in regard to collaboration among stakeholders? E.g. difference in organizational priorities, delay in reporting, etc.

32. Have these issues been resolved? How?

33. Will there be opportunity for the project stakeholders from the business and/or public sector to continue collaboration after project end? How?

34. What can the project do to institutionalize such collaboration platforms before it closes?

IX. Lessons Learned and Recommendations

35. In your opinion, what are the key lessons learned from the project design and implementation?

36. Based on these lessons, what are your suggestions for improvement in future projects?

Assessment Tool	Respondent(s)
KII	**Sub-Contractors and Industry Representatives**

	(e.g. China Association of Lighting Industry, China Quality Certification Center, International SSL Alliance, etc.)

Date	
Name of Interviewee	
Title	
Name of Interviewer	
Organization Name	
Contact Info	

I. Background

1. Was your organization engaged in the implementation of the predecessor PILESLAMP project? If yes, what was the nature of engagement and what were the outcomes of this engagement?

2. Since when has your organization been involved in the EE SSL Project?

3. What particular role does your organization perform in relation to the project?

4. How does the project fit into the strategic priorities and current programming of your organization?

5. In your opinion, what have been the key successes of the project?

6. In your opinion, what have been the key challenges faced by the project?

7. How could these challenges have been mitigated?

II. Project Results

8. In your opinion, what have been the key successes of the project? And what are the underlying reasons for these successes?

9. How has your organization contributed to some of these project successes?

10. In your opinion, what have been the key challenges faced by the project? How could these challenges have been mitigated?

11. In addition to EE SSL project, what other EE lighting programs has your organization been involved in? Has there been any linkage between the EE SSL project and these other programs?

12. How would you rate the comparative contributions and challenges of EE SSL project with these other programs towards transforming the SSL industry in China?

III. Capacity Building and Support

13. What support has the project provided to your organization for the promotion of EE SSL products? Please provide details.

14. Are you satisfied with the level of administrative, financial, and technical support provided by the project to your organization or to other stakeholders? If yes, why? If no, why not?

15. How have the project activities contributed to building the capacity of your organization? (e.g. training of personnel, technology transfer, policy support, market mapping, etc.)

16. What were the key problems faced by your organization in receiving support from the project? E.g. funding delays, outdated or advanced technology transfer, etc.

17. How were these problems resolved?

IV. Replication and Up Scaling

18. How can/will the project's successes/activities feed into future programming/strategy of your organization?

19. Have the positive results of the project been replicated by other stakeholders? e.g. manufacturers, testing laboratories, distribution channels, etc. If yes, How?

20. What are the potential opportunities and challenges for such replication? E.g. finance, policy, market demand, etc.

V. Monitoring

21. How are the project activities implemented by your organization monitored and reported?

22. Have there been any challenges with monitoring and reporting? E.g. availability of data, reporting format, reporting frequency, etc.

23. How have these challenges been mitigated?

VI. Stakeholder Collaboration

24. Which project stakeholders/beneficiaries do you deal with directly in relation to the EE SSL project?

25. What is the mechanism for collaboration with the project? E.g. quarterly meetings, etc.

26. What have been some of the opportunities/positive outcomes of the stakeholder collaboration under this project? E.g. funding leverage, policy support, higher outreach, etc.

27. What have been some of the challenges in regard to collaboration among stakeholders? E.g. difference in organizational priorities, lack of time, etc.

28. Will there be opportunity for the project stakeholders from the business and/or public sector to continue collaboration after project end? How?

29. What can the project do to institutionalize such collaboration platforms before it closes?

VII. Lessons Learned and Recommendations

30. In your opinion, what are the key lessons learned from the project?

31. Based on the project implementation experience, what are your suggestions for improvement in similar future projects?

Assessment Tool	Respondent(s)
KII	**Enterprises** (e.g. Manufacturers, Distributers, etc.)

Date	
Name of Interviewee	
Title	
Name of Interviewer	
Company Name	
Company Ownership (State Owned, Private, Joint Venture, MNC)	
Year of Establishment of Company	
Contact Info	

I. Background

1. What SSL products does your company produce or trade in?

2. What is the market share of your enterprise in China and outside China?

3. Which countries are the major buyers of your EE SSL products?

4. Since when has your organization been involved in the EE SSL Project?

5. What particular role does your organization perform in relation to the project?

6. How does the project fit into the strategic priorities and current priorities of your company?

II. Project Results

7. In your opinion, what have been the key successes of the project? And what are the underlying reasons for these successes?

8. In your opinion, what have been the key challenges faced by the project?

9. How could these challenges have been mitigated?

10. In addition to EE SSL project, what other EE lighting programs has your company been involved in? Has there been any linkage between the EE SSL project and these other programs?

11. How would you rate the comparative contributions and challenges of EE SSL project with these other programs towards transforming the SSL industry in China?

III. Capacity Building and Support

12. What support has the project provided to your organization for the promotion of EE SSL products? Please provide details.

13. Are you satisfied with the level of administrative, financial, and technical support provided by the project to your organization or to other stakeholders? If yes, why? If no, why not?

14. How have the project activities contributed to building the capacity of your organization? (e.g. training of personnel, technology transfer, policy support, market mapping, etc.)

15. What were the key problems faced by your organization in receiving support from the project? E.g. funding delays, outdated or advanced technology transfer, etc.

16. How were these problems resolved?

IV. Replication and Up Scaling

17. How can/will the project's successes/activities feed into future operations/strategy of your company?

18. Have the positive results of the project been replicated by other stakeholders? e.g. manufacturers, testing laboratories, distribution channels, etc. If yes, How?

19. What are the potential opportunities and challenges for such replication? E.g. finance, policy, market demand, etc.

V. Stakeholder Collaboration

20. Which project stakeholders/beneficiaries do you deal with directly?

21. What is the mechanism for collaboration with the project? E.g. quarterly meetings, etc.

22. What have been some of the opportunities/positive outcomes of the stakeholder collaboration under this project? E.g. funding leverage, policy support, higher outreach, etc.

23. What have been some of the challenges in regard to collaboration among stakeholders? E.g. difference in organizational priorities, lack of time, etc.

24. Will there be opportunity for the project stakeholders from the business and/or public sector to continue collaboration after project end? If yes, how?

25. What can the project do to institutionalize such collaboration platforms before it closes?

VI. Lessons Learned and Recommendations

26. In your opinion, what are the key lessons learned from the project?

27. Based on the project implementation experience, what are your suggestions for improvement in similar future projects?

Assessment Tool	Respondent(s)
KII	PMO

Date	
Name of Interviewee	
Title	
Name of Interviewer	
Organization Name	
Contact Info	

I. Effectives – Output 1

1. What are the main components of the Industry and Market Survey database?
2. What format is the data now stored in and who is the data accessible to?
3. Who will be responsible for the maintenance and updating of this database?
4. To what extent was the data from existing organizations or other sources used to inform the Industry and Market survey?
5. What were the potential advantages and challenges of this approach?
6. Who has been responsible for the development of the Annual Reports on the Status and Trends in the SSL industry?
7. Who will be responsible for developing these reports after the project end?

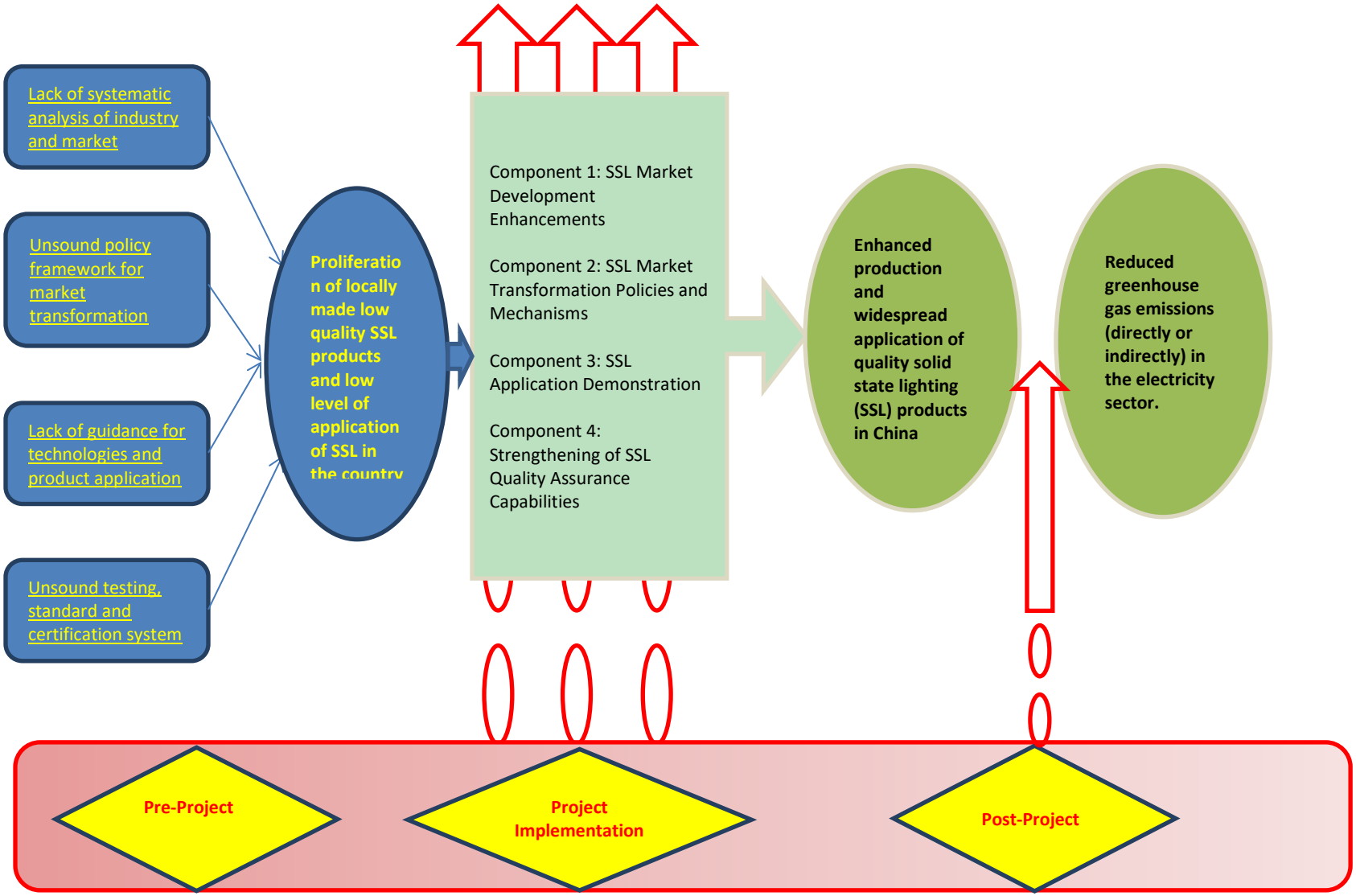
ANNEX 5: RESULTS FRAMEWORK

This project will contribute to achieving the following Country Programme Outcome as defined in CPAP or CPD:					
Country Programme Outcome Indicators:					
Primary applicable Key Environment and Sustainable Development Key Result Area (same as that on the cover page, circle one): 1. Mainstreaming environment and energy OR 2. Catalyzing environmental finance OR 3. Promote climate change adaptation OR4. Expanding access to environmental and energy services for the poor.					
Applicable GEF Strategic Objective and Program: GEF-5 CCM Strategic Program SP2: promote market transformation for energy efficiency in industry and the building sectors Climate change (energy efficiency)					
Applicable GEF Expected Outcomes: Appropriate policy, legal and regulatory frameworks adopted and enforced; Sustainable financing and delivery mechanisms established and operational					
Applicable GEF Outcome Indicators: Energy efficiency policy and regulation in place; Investment mobilized; Energy savings achieved					
Strategy	**Objectively Verifiable Indicators**			**Source of Verification**	**Critical Risks**
	Indicator	**Baseline**	**Target**		
Project Objective: Facilitation of the enhanced production and widespread application of quality solid state lighting (SSL) products in China	• Annual direct energy savings in China by EOP (GWh) • Annual direct CO_2 emissions reduced in China by EOP (kilotons) • No. of new jobs available in the ESL industry by EOP • No. of women employed in new jobs in the ESL industry by EOP	•158 •143 • 0 • 0	• 937.2 • 850.4 •1000 •200	• Progress reports on the demonstrations • Project monitoring and evaluation reports • Project Final Report • Survey Report	• Stable economic growth in China will be sustained
Outcome 1 *Enabling of enhanced and strategic SSL technology and market developments based on*	• Value of quality standards compliant SSL products produced in China by EOP (billion RMB) • Export value of quality	• 58.6 • 5.4	•184 •13.8	• Annual reports on China SSL industry • Annual export reports on China SSL products	

comprehensively assessed and documented up-to-date status of the SSL industry and market in China	standards compliant SSL products produced in China by EOP (billion USD)				
Outcome2 *Facilitation of support and incentives in the local production of quality SSL products, and in the application of SSL products compliant with established quality and energy performance standards.*	• No. of policy recommendations adopted and enforced by relevant government agency departments by EOP • Percentage of lighting products in the domestic lighting market that are quality standards compliant SSL products by EOP	• 3 •50%	• 6 •70%	• Documents on the recommendations referred in related policy • Monitoring reports on SSL product quality	• Sustained support of Chinese government for SSL industry
Outcome 3 *Increased penetration rate of SSL products especially in the residential sector in China*	• Market share of qualified SSL products in general lighting market in China by EOP	•8.2%	•28%	• Market research reports on the SSL market	• Demonstration projects can be completed as scheduled
Outcome 4 *Enhanced quality and energy performance of locally produced SSL products both for the domestic and international markets*	• No. of SSL quality and energy efficiency certificates issued by state-certified institutions by EOP • No. of local SSL manufacturers that are complying to the new EE standard/label for SSL products by EOP	•1200 • 0	•1500 •100	• Records of the issuance of certificates of energy efficiency and quality	• The government strengthen the supervision of SSL market continuously

ANNEX 6: THEORY OF CHANGE

Figure: Theory of Change – SSLED Project



ANNEX 7: BRIEF OVERVIEW OF THE ROLE ASSIGNED TO STAKEHOLDER

Stakeholder		Roles and Responsibilities during Project Implementation
Government Agency	National Development & Reform Commission	Responsible for coordination with MOF and UNDP and contact with local authorities of provinces where there is an existing SSL industry; Project management and financial management
	Ministry of Finance	Support the co-financed demonstration and the SSL product financing scheme activities
	Ministry of Science and Technology	Support research and development to improve SSL quality and technology, and technical integration of demonstration project
	Ministry of Housing and Urban-Rural Development	Provide advice and support in the formulation and implementation of project-proposed green lighting policy in cities
	Ministry of Transportation	Provide advice and support in the formulation and implementation of project-proposed green lighting policy in the transportation sector
	Ministry of Industry and Information Technology	Provide advice and support in the formulation and implementation of project-proposed green lighting policy in industries
	National Government Offices Administration	Provide advice and support in the formulation and implementation of green lighting policy in government offices
	Standardization Administration of the People's Republic of China	Provide technical advice and support in the design and development of standards for the quality and energy performance of SSL products
	National Energy Conservation Center	Oversee on behalf of the NDRC the management of the implementation of project activities and provision of technical support and capacity development to the project management office (PMO)
	Local governments and energy centers	Support the design and implementation of the pilots and demonstrations that will be carried out under the project.
Non-Government Organization	Industry organization	Assist in the design and implementation of the SSL products application demonstrations; Collect information on the various applications of SSL products.

Technical Organization	Design institutes, standard, test and quality and certification organizations.	Assist in the development of standards and implementation of testing and quality certification, and provide information related to R&D on SSL production
Lighting products manufacturer, retailer, and consumers	SSL product manufacturers and lighting system designers	Active participation in the financing and implementation of the demonstrations
	SSL product manufacturers hosting demonstrations	Commitments to completing demos and sharing information on demo results, and for scaling up/replication of demos
	SSL product distributors/retailers and consumers	Participation in project activities, particularly in the impact studies and market surveys
	Energy Service Companies (ESCOs)	Participation in demo activities; Supporting the SSL system applications
UNDP	Beijing Office	Provide technical advice and project management coordination in the project implementation.

ANNEX 8: BRIEF OVERVIEW OF THE COLLABORATIVE SET UP

The project has established six levels of cooperation mechanism. The stakeholders of the six levels have a certain intersection. There are about 9 core stakeholders and about 1000 participating stakeholders:

1) The first is technology **research and development**, with the Institute of semiconductors, Chinese Academy of Sciences and Changzhou Wujin District semiconductor lighting application technology research institute as the leading units, contacting major domestic R & D units and enterprises to jointly carry out technological innovation and research, with about 50 stakeholders.
2) The second is **standardization and certification**, which is carried out by China Institute of standardization, national electric light source center, China Quality Certification Center, and other units. Industry organizations also carry out group standard revision, with about 100 stakeholders.
3) The third is **industrial research** institutions. Led by the national semiconductor lighting alliance, it organizes scientific research institutions, industry organizations, enterprises, and engineering companies to participate in the industry research. It publishes industry reports and research results in subdivided fields every year, with about 600 stakeholders.
4) The fourth is **policy formulation**. The Energy Institute of national development and Reform Commission, national semiconductor lighting alliance and other units contact various domestic stakeholders to carry out industrial policy formulation and support the government to issue policies. There are about 100 stakeholders.
5) Fifth, **publicity and training**. National semiconductor lighting alliance, Wuxi Lide times Technology Co., Ltd., national electric light source center and other units have carried out forums, publicity, and training. There are many stakeholders, and there are about 1,000 stakeholders on the cable every month.
6) The sixth is **international cooperation**. The international semiconductor lighting alliance carries out international cooperation in technology, standards, market, and production capacity, with about 70 stakeholders.

ANNEX 9: YEAR-WISE DISTRIBUTION OF THE SUB-CONTRACTS

No	Contract Number	Name of Contract	Name of Sub-Contractor	Value of Contract	Public or Private Sector Organization	Start Date of Contract	End Date of Contract	Activity Performed
1	SSLED-T2017001	Investigation of China SSL Industry Development along with the Establishment and Operation of China SSL Industry Database	Beijing SSL Promotion Centre	146000USD	Public	2017-5-26	2018-6-21	Completed China Comprehensive SSL Industry and Market Survey, Established and Operational SSL Industry Database
2	SSLED-T2017002	Research on the Global SSL Industry Development and Market Trend	Beijing Pan-Light International Co., Ltd.	50000USD	Private	2017-5-26	2018-6-21	Completed Global Comprehensive SSL Industry and Market Survey
3	SSLED-T2017003	Organizing International SSL Information Exchange Event	Global Efficient Lighting Centre, Guanghua Quintiles (Beijing) International Business Consultants Limited	96000USD	Public/Private United	2017-5-26	2020-11-13	Established and Operational SSL Technology Information Exchange Service
4	SSLED-T2017004	Research on the SSL product manufacturer capability improvement based on the marketization mechanism	China Standard Conformity Assessment Co., Ltd.	50000USD	Private	2017-5-26	2018-12-5	Completed and Operational SSL Product Manufacturer Support Program and Rating Scheme

5	SSLED-T2017005	Research on the Energy Saving Lamp Policy and Regulation Frames	Energy Research Institute of NDRC	96000USD	Public	2017-5-26	2018-11-30	Completed Research Report on Energy Saving Lamp Policies and Regulations, Enforced Policy and Regulatory Frameworks for Supporting the SSL Industry
6	SSLED-T2017006	Research on the Development Strategy of China SSL Industry in the 13th Five-year-plan	Zhongguancun Solid-State Lighting Alliance	130000USD	Public	2017-5-26	2018-6-21	Approved and Implemented SSL Industry Development Plans
7	SSLED-T2017007	Produce the research report of the supporting policy for China SSL Industry financial taxation	Jiangxi University of Finance and Economics	50000USD	Public	2017-5-26	2018-11-26	Enforced Policy and Regulatory Frameworks for Supporting the SSL Industry
8	SSLED-T2017008	Produce the research report of the cycling mode for SSL product based on the life-cycle-assessment	China Association of Circular Economy	50000USD	Public	2017-5-26	2018-12-12	Enforced Policy and Regulatory Frameworks for Supporting the SSL Industry
9	SSLED-T2017009	Produce the research report of the promotion mode for SSL product and government procurement policy	China Certification & Inspection Group testing technology co., LTD., CCIC	146000USD	Public	2017-5-26	2018-12-26	Enforced Policy and Regulatory Frameworks for Supporting the SSL Industry

			Southern Electronic Product Testing (Shenzhen) Co., Ltd.					
10	SSLED-T2017010	Produce the research report on SSL industry investment and financing mode	China Energy Conservation Association	100000USD	Public	2017-5-26	2018-12-4	Established and Operational SSL Financing Scheme
11	SSLED-T2017011	Research on the China SSL Technology Innovation and Implementation Plan	Institute of Semiconductors, CAS, Institute of Semiconductor Lighting Application Technology Research, Changzhou Wujin District	100000USD	Public	2017-5-26	2018-12-22	Completed technical assistance program for local SSL products manufacturers in the design and manufacture of quality compliant SSL products
12	SSLED-T2017012	Produce the implementation plan of urban street lighting retrofit for energy-saving	National Lighting Test Centre	60000USD	Public	2017-5-26	2018-12-4	Design of the urban street lighting demonstration schemes

13	SSLED-T2017013	Produce the implementation plan of public institutions lighting retrofit for energy saving in colleges and universities	China International Engineering Consulting Corporation	60000USD	Public	2017-5-26	2018-12-12	Design of the public institutions lighting demonstration schemes
14	SSLED-T2017014	Produce the implementation plan of traffic lighting retrofit for energy saving	China Academy of Transportation Sciences	60000USD	Public	2017-5-26	2018-6-21	Design of the traffic lighting demonstration schemes
15	SSLED-T2017015	Produce the implementation plan of large building lighting retrofit for energy saving in exhibition center / stadium	China Academy of Building Research	60000USD	Public	2017-5-26	2018-12-27	Design of the large building lighting demonstration schemes
16	SSLED-T2017016	Produce the promotion mode of SSL products in agriculture / medical applications and other emerging areas	Institute of Environment and Sustainable Development in Agriculture, CAAS, Wuxi Ledage Technology Co., LTD., Xiamen Lumigro Technology Co. Ltd.	60000USD	Public/Private United	2017-5-26	2018-12-22	Design of SSL products in agriculture / medical applications demonstration schemes

17	SSLED-T2017017	Produce the demonstration and application promotion of intelligent lighting	China Illuminating Engineering Society	60000USD	Public	2017-5-26	2018-12-24	Design of the intelligent lighting demonstration schemes
18	SSLED-T2017018	Produce the evaluation criteria and methods of SSL system application effect	China National Institute of Standardization	96000USD	Public	2017-5-26	2018-6-21	Research Report on Evaluation Index Standards and Methods of LED Lighting System Application Effect
19	SSLED-T2017019	Implementation and verification of SSL system application effect evaluation	China Energy Conservation Association	96000USD	Public	2017-5-26	2018-11-29	LED lighting system application effect evaluation implementation verification report, LED lighting system effects and energy efficiency evaluation management methods
20	SSLED-T2017020	Research on the standard system and testing system of SSL products in China along with Developing relevant national standards	National Lighting Test Centre	176000USD	Public	2017-5-26	2020-9-25	Completed Capacity Building Program on the Application of SSL Product Standards, Established and Operational SSL Product Testing System, Completed Assessment of the Impacts of the SSL

								Product Standards Implementation
21	SSLED-T2017021	Research on the China SSL product certification system	China Quality Certification Centre	50000USD	Public	2017-5-26	2018-12-25	Established and Operational SSL Manufacturers Accreditation Scheme, Established and Operational SSL Product Certification System
22	SSLED-T2017022	Produce Research Report on the China SSL product quality statues and recommendations for improvement	China Association of Lighting Industry	150000USD	Public	2017-5-26	2020-11-13	Documented Identified Potential Improvements in SSL Products, Carry out the 2017-2019 LED lighting product quality survey and complete the quality survey report, Documentation on Completed Research and Development on SSL Product Improvements

23	SSLED-T2017023	Research and establish the national energy efficiency standard for China SSL product	China National Institute of Standardization	96000USD	Public	2017-5-26	2018-11-29	Completed Study on LED Energy Performance Standards, Issue national energy efficiency standards for indoor/outdoor LED lighting products, Established and Enforced Chinese Standards for SSL Products
24	SSLED-T2017024	Research on the Up-Mid stream standards of China SSL product	China Electronics Standardization Institute	50000USD	Public	2017-5-26	2018-12-27	Research on China's LED Lighting Upper and Midstream Product Standards
25	SSLED-T2017025	Produce the 13th Five-year-plan of China SSL development	Zhongguancun Solid-State Lighting Alliance	20000USD	Public	2017-5-26	2017-9-27	Approved and Implemented SSL Industry Development Plans
26	SSLED-T2018001	Development of SSL-related Standards (second batch)	National Lighting Test Centre	150000USD	Public	2018-11-9	2020-9-25	Completed the research report on the status quo and demand analysis of lighting systems and plant lighting, and issued 5 related standards

27	SSLED-T2018002	Study on 14th Five-Year Plan for the Development of SSL Industry of China	Zhongguancun Solid-State Lighting Alliance	150000USD	Public	2018-11-9	2020-9-29	Approved and Implemented LED Industry 14th Development Plan
28	SSLED-T2018003	Research on Issues of SSL Product Export	HUA SHANG International Engineering Co., Ltd.	69348USD	Public	2018-11-9	2020-9-29	Completed the research report on several issues of China's LED lighting products export
29	SSLED-T2018004	Study on Urban SSL Promotion Roadmap	China Association of Building Energy Efficiency	100000USD	Public	2018-12-24	2020-12-3	Complete the research on the marketization mechanism of my country's urban LED lighting application, compile my country's urban green lighting evaluation system and methods, and propose the promotion path of my country's urban LED lighting
30	SSLED-T2018005	SSLED Project Implementation Review and Pre-Appraisal	China International Engineering Consulting Corporation	100000USD	Public	2018-12-24	2021-3-24	Compilation of SSLED project results and publicity manuals, complete SSLED project

								results pre-assessment report
31	SSLED-T2018006	Study of SSLED Demonstration Projects Implementation Plan and Evaluation/Supporting System	Beijing SSL Promotion Centre, China Energy Conservation Association	180000USD	Public	2018-12-24	2020-12-3	Review of the potential demo/pilot projects that were identified during the project preparation stage as to their financial and technical viability, Finalization of the line-up of confirmed SSL product manufacturing and application demos/pilots. Show LED poverty alleviation projects on CCTV
32	SSLED-T2018007	Planning And Implementation of SSL Products Purchase Publicity for Consumers	Wuxi Ledage Technology Co., LTD., Beijing Ruichen Youdao Marketing Consultant Co., Ltd., Beijing Blue Planet Low Carbon	150000USD	Private	2018-12-24	2020-11-13	Prepare SSLED project publicity planning plan, video materials, and prepare SSLED project publicity implementation summary report

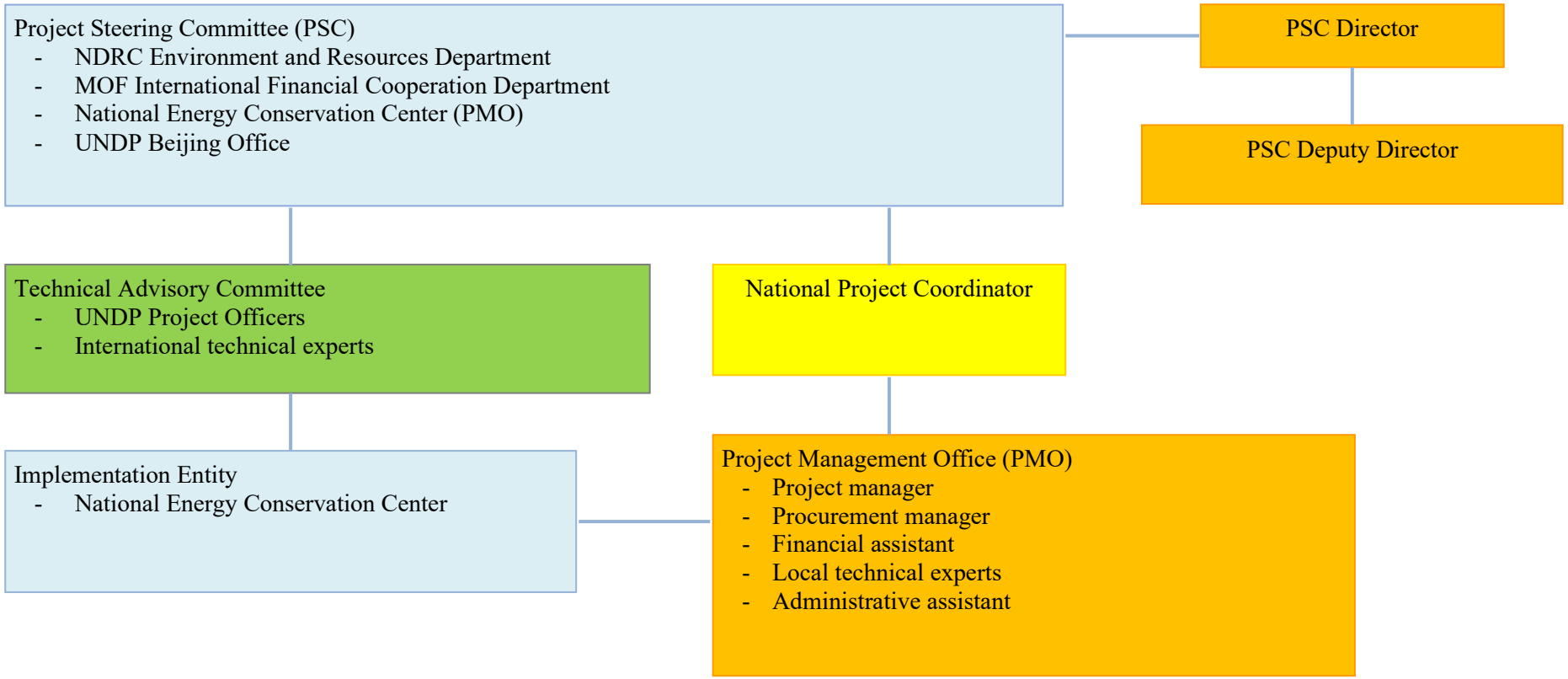
			Technology Co., Ltd.					
33	SSLED-T2018008	Implementation of Global Cooperation on SSL Demonstration Project	Beijing Pan-Light International Co., Ltd.	100000USD	Private	2018-12-24	2020-9-29	Documented Sustainable Follow-up Program Design for Financially Supporting SSL Technology Innovations, and Production of New SSL Products and their Applications
34	SSLED-T2018009	Study on Roadmap of Global SSL Cooperation, Belt and Road Initiative (BRI) and Sustainable Financial Support Program	China National Institute of Standardization Carbo n Trust (Beijing) Consulting Ltd., China Council for an Energy Efficient Economy	150000USD	Public/Private United	2018-12-24	2020-9-25	Documented Sustainable Follow-up Program Design for Financially Supporting SSL Technology Innovations, and Production of New SSL Products and their Applications
35	SSLED-T2020001	Research on the application and promotion model of LED lighting products in public health safety and epidemic prevention	Zhongguancun Solid-State Lighting Alliance, Shanxi Zhongke Lu'an Ultraviolet Photoelectric	150000USD	Public/Private United	2020-9-23	2020-12-16	Compile a research report on the development of the UV LED industry and a research report on the promotion of China's UV LED in

			Technology Co., Ltd.					public health, safety, and epidemic prevention
36	SSLED-T2020002	Research on the application and promotion model of high-quality and healthy LED lighting products	Institute of Semiconductors, CAS, Zhongguancun Key Laboratory of Solid-State Lighting Joint Innovation Xiamen Leedarson Lighting CO., Ltd.	80000USD	Public/Private United	2020-9-23	2020-12-16	Compile high-quality healthy LED lighting technology and market research reports and high-quality healthy LED lighting products in school's application and promotion model research reports
37	SSLED-2019601	Implement LED lighting products poverty alleviation project Firs(t Pack)	NVC Lighting Technology Corporation	4408800RMB	Private	2019-12-16	2020-12-16	Production and transportation of 225,000 LED bulbs (193,000 for 9W products and 32,000 for 20W products) ,which were applied in poverty-stricken counties in Hebei, Shanxi, Shaanxi, Inner Mongolia, Jilin, Heilongjiang and Henan, and organized publicity and promotion activities.

								Completed Report on the LED lighting for poverty alleviation
38	SSLED-T2019602	Implement LED lighting products poverty alleviation project (Second Pack)	OPPLE Lighting Co., Ltd.	4432000RMB	Private	2019-12-16	2020-12-16	Production and transportation of 225,000 LED bulbs (193,000 for 9W products, and 32,000 for 20W products), which were applied in poverty-stricken counties in 7 regions of Anhui, Jiangxi, Hubei, Hunan, Guangxi, Hainan, and Chongqing, and organized publicity and promotion activity.

39	SSLED-T2019603	Implement LED lighting products poverty alleviation project (Third Pack)	Suining Hyderson Lighting Co., Ltd.	5989800RMB	Private	2019-12-16	2020-12-16	Production and transportation of 264,000 LED bulbs (226,000 for 9W products, and 38,000 for 20W products), which were applied in poverty-stricken counties in 8 regions of Tibet, Xinjiang, Yunnan, Gansu, Sichuan, Qinghai, Ningxia, Guizhou, and organized publicity and promotion activity.

ANNEX 10: SSLED PROJECT'S IMPLEMENTATION INSTITUTIONAL STRUCTURE



ANNEX 11: DETAILED LIST OF MAIN ACTIVITIES PERFORMED TO DELIVER EACH OUTPUT

Number	Output	Achievements
Component 1		
1	Output 1.1: Completed Comprehensive SSL Industry and Market Survey	Research on the China SSL Industry Development along with the Establishment and Operation of China SSL Industry Database Publish research reports on China's SSL industry Produce the Global SSL Industry Development and Market Trend Report
2	Output 1.2: Established and Operational SSL Industry Database	
3	Output 1.3: Established and Operational SSL Technology Information Exchange Service	Organize two international exchange meetings Publish the current status and trends of the global SSL lighting industry Complete Global SSL lighting industry and technology application research report
4	Output 1.4: Established and Operational SSL Applications Service Industry Accreditation System	Policy adjustment, NDRC does not allow Accreditation, selection and other work for service providers
5	Output 1.5: Completed and Operational SSL Product Manufacturer Support Program and Rating Scheme	Study Report on the Improvement of the Ability of SSL Lighting Product Manufacturers Research on the Market Mechanism of SSL Lighting Application in Chinese Cities China's urban green lighting evaluation system and method Research Report on the Promotion Path of Urban SSL Lighting in China

Component 2		
6	Output 2.1: Completed Research Report on Energy Saving Lamp Policies and Regulations	Research and analysis report of domestic and foreign high-efficiency lighting product policies and regulations Research Report on the Framework of Policies and Regulations for the Development of Efficient Lighting Industry High-efficiency lighting industry development policy compilation
7	Output 2.2: Approved and Implemented SSL Industry Development Plans	China's SSL lighting industry "13th Five-Year" development strategy research report The 13th Five-Year Development Plan for China's SSL Lighting Industry (Draft Proposal) China's SSL Lighting Industry "14th Five-Year Plan" Development Strategy Research Report Research Report on China's SSL Lighting Industry
8	Output 2.3: Enforced Policy and Regulatory Frameworks for Supporting the SSL Industry	Field research plan for recycling and utilization of SSL lighting products Recycling mode based on the whole life cycle of SSL lighting products Implementation Plan for Recycling and Utilization of SSL Lighting Products in China SSL lighting product circulation status and problem analysis report SSL lighting product circulation link promotion mode and government procurement policy recommendations LED lighting product knowledge manual and concise reader Research Report on Several Issues of China's SSL Lighting Products Export China SSL Lighting Promotion Project Achievement Compilation and Publicity Manual China SSL Lighting Promotion Project Achievement Pre-assessment Report

9	Output 2.4: Established and Operational SSL Financing Scheme	China SSL Lighting Industry Finance and Taxation Support Policy Research Report China SSL Lighting Industry Development Research Report International SSL lighting industry investment and financing experience and typical cases Research on Investment and Financing Mode of China's SSL Lighting Industry Based on Market Mechanism
10	Output 2.5: Established and Operational SSL Manufacturers Accreditation Scheme	Study on the Capability Evaluation of SSL Lighting Product Manufacturers (with Evaluation Guidelines)
11	Output 2.6: Completed technical assistance program for local SSL products manufacturers in the design and manufacture of quality compliant SSL products	Investigation and analysis report on technical difficulties of enterprise design and manufacturing SSL lighting industry technology upgrades integrated solutions---from design to manufacturing SSL lighting product manufacturer's technical innovation capability improvement implementation plan
Component 3		
18	Output 3.1: Completed Demonstrations on SSL Product Manufacturing and SSL Product Lighting Applications	Market research and transformation implementation plan for 8 SSL application fields Research Report on Evaluation Index Standards and Methods of SSL Lighting System Application Effect SSL lighting system application effect evaluation implementation verification report Lighting system effects and energy efficiency evaluation management methods Lighting system effect and energy efficiency network platform Donated 714,000 LED lights to 30 poverty-stricken counties in 22 provinces, and carried out publicity and promotion activities

19	Output 3.2: Completed Report on the Demonstration Scheme Results Evaluation and Dissemination	China SSL Lighting Promotion Project Demonstration Project Organization Implementation Plan SSL lighting demonstration project evaluation system Summary of SSL lighting demonstration project implementation Prepare the SSLED project publicity planning plan, broadcast popular science programs through CCTV, carry out publicity activities such as entering the community and entering the lighting city, and complete the SSLED project publicity implementation summary report
20	Output 3.3: Documented Sustainable Follow-up Program Design for Financially Supporting SSL Technology Innovations, and Production of New SSL Products and their Applications	Research Report on Sustainable Funding Support Scheme for SSL Lighting SSL lighting international cooperation demonstration project list Report on Promoting the Implementation of SSL Lighting International Cooperation Demonstration Project Research Report on SSL Lighting International Cooperation Path between China and "One Belt One Road" Key Countries" "One Belt One Road" National SSL Lighting Industry Research Report
Component 4		
34	Output 4.1: Completed Study on SSL Quality and Energy Performance Standards	Research Report on National Energy Efficiency Standards for Indoor/Outdoor LED Lighting Products in China National Standard for Energy Efficiency of Indoor/Outdoor LED Lighting Products Publishing books Current Status and Trends of International Standards for Upper and Midstream Products in the SSL Lighting Industry The Status Quo and Trends of China's SSL Lighting Industry Upper and Midstream Standard System Research on China's SSL Lighting Upper and Midstream Product Standards

35	Output 4.2: Documented Identified Potential Improvements in SSL Products	China SSL lighting product quality survey plan China SSL lighting product quality improvement plan
36	Output 4.3:Documentation on Completed Research and Development on SSL Product Improvements	Annual Survey Report on the Quality of SSL Lighting Products in China
37	Output 4.4: Established and Enforced Chinese Standards for SSL Products	Implement 6 national standards, 2 of which are mandatory standards
38	Output 4.5: Completed Capacity Building Program on the Application of SSL Product Standards	SSL lighting product standard and testing system research report Investigation report on the status quo of China SSL lighting product certification system Investigation report on the status quo of the international SSL lighting product certification system Construction content and main measures of SSL lighting product certification system during China's "13th Five-Year Plan" Formulate SSL lighting product certification rules
39	Output 4.6: Established and Operational SSL Product Testing and Certification System	Implement new testing and certification implementation rules
40	Output 4.7: Completed Assessment of the Impacts of the SSL Product Standards Implementation	China SSL Lighting Promotion Project Achievement Pre-assessment Report

ANNEX 122: UNEG Code of Conduct for Evaluators

UNEG Code of Conduct for Evaluators

Independence entails the ability to evaluate without undue influence or pressure by any party (including the hiring unit) and providing evaluators with free access to information on the evaluation subject. Independence

Evaluators/Consultants:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings, and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.
8. Must ensure that independence of judgement is maintained, and that evaluation findings and recommendations are independently presented.
9. Must confirm that they have not been involved in designing, executing, or advising on the project being evaluated and did not carry out the project's Mid-Term Review.

Evaluation Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System:

Name of Evaluator: __Umm e Kalsoom Zia _____

Name of Consultancy Organization (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at _____Islamabad_____ (Place) on _____ (Date) 21-Jun-2021

Signature: _____

An independent evaluation reduces the potential for conflicts of interest which might arise with self-reported ratings by those involved in the management of the project being evaluated. Independence is one of ten general principles for evaluations (together with internationally agreed principles, goals, and targets: utility, credibility, impartiality, ethics, transparency, human rights and gender equality, national evaluation capacities, and professionalism).

UNEG Code of Conduct for Evaluators

Independence entails the ability to evaluate without undue influence or pressure by any party (including the hiring unit) and providing evaluators with free access to information on the evaluation subject. Independence

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1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study imitations, findings, and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.
8. Must ensure that independence of judgement is maintained, and that evaluation findings and recommendations are independently presented.
9. Must confirm that they have not been involved in designing, executing, or advising on the project being evaluated and did not carry out the project's Mid-Term Review.

Evaluation Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System:

Name of Evaluator: Zhang Yanping

Name of Consultancy Organization (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at _____ (Place) on 21/06/2021 (Date)

Signature: Zhang Yanping

UNEG Code of Conduct for Evaluators

Independence entails the ability to evaluate without undue influence or pressure by any party (including the hiring unit) and providing evaluators with free access to information on the evaluation subject. Independence

Evaluators/Consultants:

1. Must present information that is complete and fair in its assessment of strengths and weaknesses so that decisions or actions taken are well founded.
2. Must disclose the full set of evaluation findings along with information on their limitations and have this accessible to all affected by the evaluation with expressed legal rights to receive results.
3. Should protect the anonymity and confidentiality of individual informants. They should provide maximum notice, minimize demands on time, and respect people's right not to engage. Evaluators must respect people's right to provide information in confidence and must ensure that sensitive information cannot be traced to its source. Evaluators are not expected to evaluate individuals and must balance an evaluation of management functions with this general principle.
4. Sometimes uncover evidence of wrongdoing while conducting evaluations. Such cases must be reported discreetly to the appropriate investigative body. Evaluators should consult with other relevant oversight entities when there is any doubt about if and how issues should be reported.
5. Should be sensitive to beliefs, manners and customs and act with integrity and honesty in their relations with all stakeholders. In line with the UN Universal Declaration of Human Rights, evaluators must be sensitive to and address issues of discrimination and gender equality. They should avoid offending the dignity and self-respect of those persons with whom they come in contact in the course of the evaluation. Knowing that evaluation might negatively affect the interests of some stakeholders, evaluators should conduct the evaluation and communicate its purpose and results in a way that clearly respects the stakeholders' dignity and self-worth.
6. Are responsible for their performance and their product(s). They are responsible for the clear, accurate and fair written and/or oral presentation of study limitations, findings, and recommendations.
7. Should reflect sound accounting procedures and be prudent in using the resources of the evaluation.
8. Must ensure that independence of judgement is maintained, and that evaluation findings and recommendations are independently presented.
9. Must confirm that they have not been involved in designing, executing, or advising on the project being evaluated and did not carry out the project's Mid-Term Review.

Evaluation Consultant Agreement Form

Agreement to abide by the Code of Conduct for Evaluation in the UN System

Name of Evaluator: Gen WANG

Name of Consultancy Organization (where relevant): _____

I confirm that I have received and understood and will abide by the United Nations Code of Conduct for Evaluation.

Signed at Shanghai (Place) on 23 June 2021 (Date)

Signature: _____

An independent evaluation reduces the potential for conflicts of interest which might arise with self-reported ratings by those involved in the management of the project being evaluated. Independence is one of ten general principles for evaluations (together with internationally agreed principles, goals, and targets: utility, credibility, impartiality, ethics, transparency, human rights and gender equality, national evaluation capacities, and professionalism).

ANNEX 133: EVALUATION REPORT CLEARANCE FORM

EVALUATION REPORT CLEARANCE FORM

(to be completed by CO and UNDP GEF Technical Adviser based in the region and included in the final document)

Evaluation Report Reviewed and Cleared by

UNDP Country Office

Name: Liu Shijun

Signature: Liu Shijun Date: 09/13/2021

UNDP GEF RTA

Name: Manuel Soriano

Signature: _____ Date: 16 Sep 2021