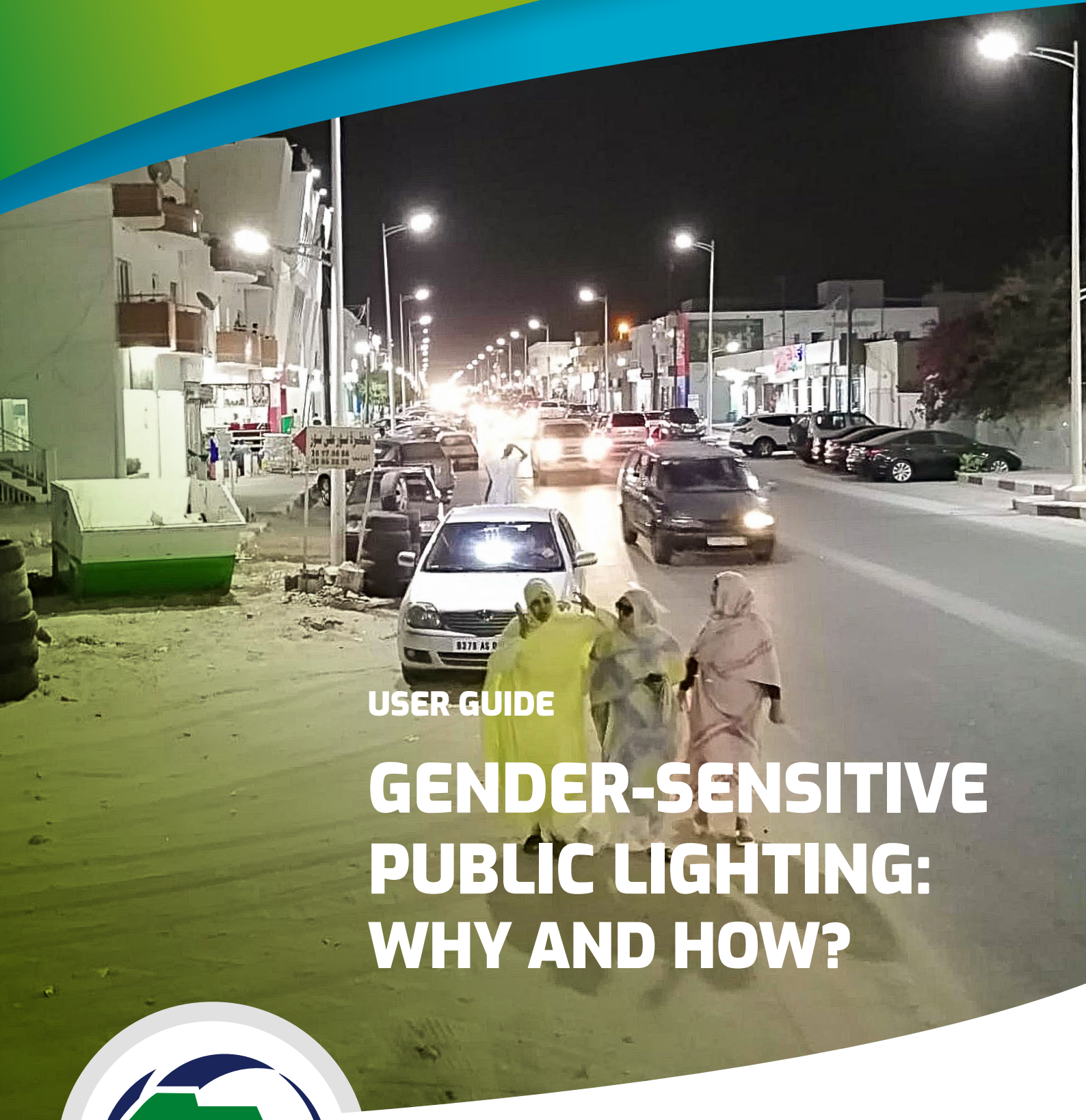

USER GUIDE

GENDER-SENSITIVE PUBLIC LIGHTING: WHY AND HOW?

Covenant of Mayors
in Sub-Saharan Africa

Programme co-funded
by the European Union

CO-IMPLEMENTED BY
AFD
AGENCE FRANÇAISE
DE DÉVELOPPEMENT

ACKNOWLEDGEMENT

This publication was produced by the AFD within the context of the Covenant of Mayors in Sub-Saharan Africa and with the financial support of the European Union. Its content is the sole responsibility of the authors and does not necessarily reflect the views of the European Union. The publication was prepared by the consultation firm Econoler in collaboration with Silvia Puddu, Camille Le Thuc and Sébastien Carreau of the AFD. It was written by Joëlle Matte, Alina Meyer, and My Ton with the guidance of Amandine Gal and Giulia D'Angiolini. Econoler would like to thank its team of local data collectors: Lalla Aicha Cheikh and Rebecca Kukundakwe.

We would like to especially thank the following people for their support, information, and interesting feedback: Olga Koukoui, AFD; Fatimetou Boukhreiss, Region de Nouakchott; Nicolás Enrique Larrañaga Lapique, AECID.

The AFD would like to thank all the stakeholders and community representatives who took part in this research, as well as the citizens who took the time to share their experience through focus group discussions and exploratory walks.

Published: June 2021

TABLE OF CONTENTS

ABBREVIATIONS

AFD	Agence Française de Développement
AGPO	Access to Government Procurement Opportunities
AREDDUN	Appui à la Résilience environnementale et développement durable de la ville de Nouakchott (Support to the environmental resilience and sustainable development of the city of Nouakchott)
ARENDDRE	Appui à la Région de Nouakchott pour un Développement Durable Résilient et Equitable (Support to the Nouakchott Region for resilient and equitable sustainable development)
CoM SSA	Covenant of Mayors in Sub-Saharan Africa
CSO	Civil society organization
EE	Energy efficiency
FGD	Focus-group discussion
GESI	Gender equality and social inclusion
IPMVP	Performance Measurement and Verification Protocol
KCCA	Kampala Capital City Authority
KII	Key informant interview
LED	Light-emitting diodes
M&E	Monitoring and evaluation
M&V	Monitoring and verification
MRV	Measuring, Reporting and Verification
NGO	Non-governmental organization
NR	Nouakchott Region
SDGs	UN's Sustainable Development Goals
SL	Street lighting
SLS	Street lighting systems
SOMELEC	Société Mauritanienne d'Electricité
SSA	Sub-Saharan Africa
VPUU	Violence Prevention through Urban Upgrading

1 INTRODUCTION

Urban planning tends to reflect society's dominant values, which are typically neither inclusive nor equitable. Cities have long reflected traditional gender roles and the gendered division of labour, marginalizing women and girls from public spaces. This is because historically, cities have been planned and designed by men with little knowledge or concern for how their decisions affect women. Street lighting systems (SLS) are an extension of this marginalization and are still planned and designed without considering gender-differentiated uses of urban spaces.

These issues are exacerbated in many developing regions, including sub-Saharan Africa (SSA), where cities are dimly lit due to the use of non-efficient street lighting technologies, financial challenges, deficient operation, and maintenance and limited in-country technical capacity for planning and operations, among other things.

With cities joining networks such as the Covenant of Mayors in Sub-Saharan Africa (CoM SSA) that help to build knowledge and internal capacity regarding sustainable energy projects, there is an opportunity to design and implement energy-efficient street lighting projects that are gender responsive.

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This publication is intended to inform on the status and challenges of existing SLS and presents a set of methodologies and tools for planning and implementing gender-sensitive public lighting infrastructure projects.

It was drafted for the attention of municipal stakeholders and other institutions in charge of designing and implementing SLS, civil society organizations (CSOs), and international donors.

Depending on your needs and interest, following are some pointers on how to use this guide:

- If you wish to understand the nexus between street lighting and gender equality, **see Section 2**.
- If you are involved in the development of an SLS project, **see Section 4** for specific recommendations at each step of the project.
- If you want to understand how to collect sex-disaggregated data, **see Section 5**.
- If you want to monitor the gender-specific impacts of your SLS project, **see Section 6**.
- If you are interested in seeing project examples, you will find two case studies in **Section 7**.

2 WHAT IS THE NEXUS BETWEEN STREET LIGHTING AND GENDER EQUALITY IN SSA?

Impacts of Dimly lit Cities and How Street Lighting Make Cities more Inclusive

Traditional urban design leads to three main exclusion patterns of women and girls, which are based on spatial planning, as well as economic and social factors. The marginalisation of women and girls from public spaces and urban areas is reinforced in cities that are dimly lit since a lack of adequate street lighting systems exacerbates their feelings of insecurity or limits their economic empowerment.

CHALLENGES FOR LIGHTING URBAN AREAS IN SUB-SAHARAN AFRICA

Street lighting is recognised as the most important environmental feature that influences subjective safety perceptions after dark. However, the deployment of SLS in SSA countries face major shortcomings, which can be summarised in three points:

LACK OF FINANCIAL RESOURCES. Sub-Saharan Africa cities are constantly expanding and requiring infrastructure extensions and increased investments in SLS. For example, the current cost of lighting Kampala, Uganda, is around EUR 3.5 million per annum[1]. Most SSA municipalities are underfunded and do not collect enough revenues to fully light up their towns and maintain the lights. Financial challenges will vary greatly depending on the SLS's contractual arrangement, whether it is managed directly by the municipality, by a public entity, through a public-private partnership, etc.

TECHNICAL SKILLS GAPS. Technical challenges for the deployment of SLS systems in SSA cities include limited in-country technical capacity for planning and operations, deficient operation and maintenance (O&M) due to financial and technical constraints, lack of anti-theft management leads to vandalism and theft of SLS, lack of clear community complaint and maintenance mechanisms through which residents can report issues and request services. Combined with the financial shortcomings, technical challenges directly affect the sustainability and reliability of SLS and, as a result, SSA urban areas are generally too dimly lit.

SLS DESIGN FOCUSED ON MOTORISED ROAD USERS. Street lighting systems in SSA countries are generally not designed with a pedestrian-centered approach, who are primarily women, children, youth, the elderly and vulnerable groups such as informal workers and disabled people by letting alone a gender responsive one. The most common approach is for SLS to be designed to facilitate road traffic by only providing streetlights at intersections and along major traffic arteries. Design approaches demonstrate little consideration for low traffic or pedestrian-only locations (public markets, squares, residential areas, etc.) that comprise most of the urban locations where women gather and transit through.

CONNECTIONS BETWEEN PUBLIC LIGHTING, URBAN SAFETY, AND INCOME-GENERATING OPPORTUNITIES

Two main impacts of street lighting reassure people and enhance urban safety. First SLS enhance natural surveillance (i.e. visibility) by decreasing hiding places for potential offenders and providing a better overview of someone's surroundings[2]. Second, improved SLS send a positive message on investment in a community, which in turn enhance social integration (i.e. informal social controls derived from a community's confidence and social trust)[3]. **While improving urban safety is a universal need, it is especially important for women and girls, who are the primary victims of gender-based violence.**

While improving urban safety is a universal need, it is especially important for women and girls, who are the primary victims of gender-based violence

The relationship between low street lighting, crime and gender-based violence is documented, global and widespread. For example, in Kampala, Uganda, a city where, as of 2016, only eight percent of paved road and street networks is illuminated, 79% percent of young women reported feeling unsafe when walking in their city's streets[4]. In Cape Town, South Africa, a street improvement initiative changed a high-crime area into a multifunctional public space and led to a 30% increase in pedestrian activity[5].

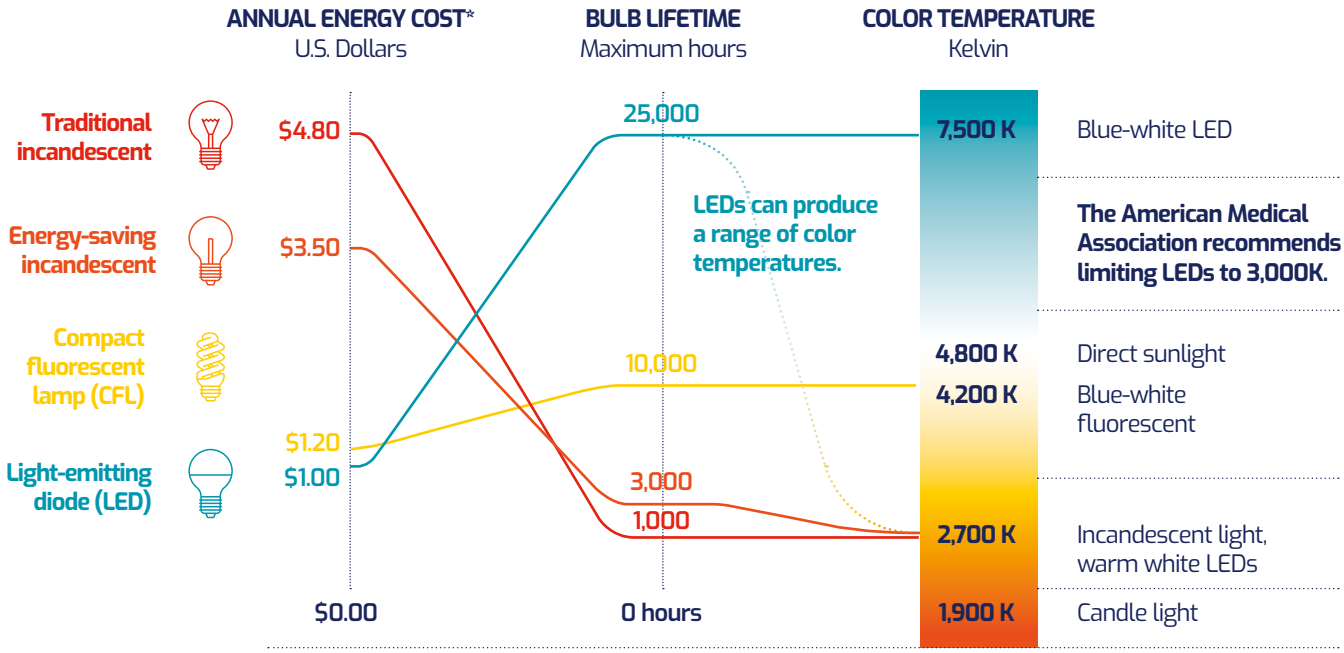
Gender-responsive SLS should furthermore improve employment and leadership opportunities for women in the municipal workforce, where they are currently underrepresented

SLS can yield significant economic benefits. Diagnostics performed in Nouakchott and Kampala (see Section 7) showed evidence of improved streetlighting providing for extended trading hours and improving commercial elements. Both cities indicated many women working at night in the informal sector and as street vendors, who would benefit especially from streetlighting. **Gender-responsive SLS should furthermore improve employment and leadership opportunities women in the municipal workforce, where they are currently underrepresented**.

There is an opportunity to build collective ownership and buy-in from the population towards SLS by conducting gender equal and socially inclusive consultations and raising civil society advocacy. This will in turn foster social integration, improve the sustainability of the systems (by improving maintenance mechanisms and reducing vandalism) and promote women's social and political empowerment.

THE NEED TO USE THE RIGHT TECHNOLOGIES AND STANDARDS

The widespread adoption of light-emitting diodes (LEDs) has demonstrated that they provide clear economic and environmental performance advantages over traditional high-intensity discharge (HID) (e.g. mercury vapour, low and high-pressure sodium and metal halide lamps) and incandescent lights. Figure below compares the technical features of four categories of light bulbs.



(6)

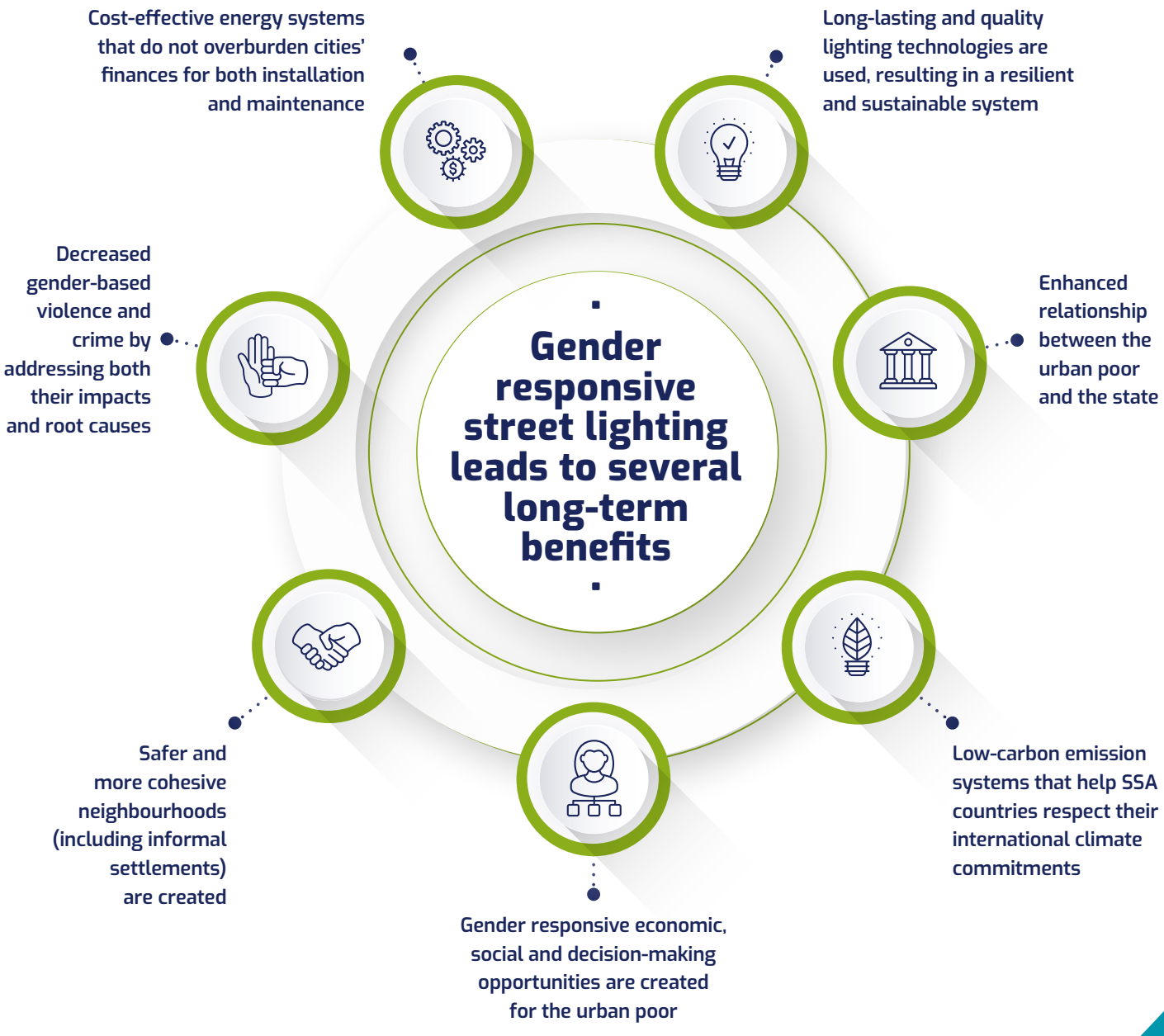
* ENERGY COST BASED ON TWO HOURS OF DAILY USAGE AT 11 CENTS PER KILOWATT-HOUR.

City administrations however tend to overuse LEDs and over-illuminate areas. Over-illumination is the inappropriate or excessive use of artificial light. It can take many forms including glare (or excessive brightness), sky glow and light trespass (when light falls where it is not needed). Over-illumination is not a solution to producing safer urban spaces and may even have undesirable impacts on crime rates and women's and girls' feeling of safety. Consequently, **only carefully designed, energy efficient (EE) SLS increase urban safety while limiting other detrimental impacts.**

What is Gender Responsive Energy Efficient Street Lighting?

Gender responsive street lighting encompasses resilient and sustainable systems that:

- → use an intersectional gender approach to consider the gender-differentiated lighting needs of both motorised road users and pedestrians;
- → address women's and girls' urban safety needs by promoting natural surveillance and social integration;
- → actively enable women's economic, social and political empowerment.



3 GENDER MAINSTREAMING PILLARS

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This guide, and similar gender inclusive street lighting projects, is aligned to the work of the UN's Sustainable Development Goals (SDGs), especially SDG 3 (good health and well-being), SDG 5 (gender equality), SDG 7 (affordable and clean energy), SDG 8 (Decent work and economic growth), SDG 9 (industry, innovation and infrastructure), SDG 10 (reduced inequalities) and SDG 11 (sustainable cities and communities). All of the SDGs are interlinked and mutually reinforcing, hence work towards any of these goals creates dividends.


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The gender equality outcome is to have **SLS that are responsive to women's, girls', men's and boys' needs and priorities (not just drivers'), and are accessible, affordable, safe and sustainable.**

Next page presents a result framework, broken down in five pillars, to achieve this outcome. The gender-mainstreaming pillars are interconnected and equally important to achieve gender-responsive SLS.

Gender Equality Outcome [7]

Street lighting systems and services are responsive to women's, girls', men's and boys' needs and priorities, and accessible, affordable, safe and sustainable

4 HOW TO DESIGN GENDER SENSITIVE STREET LIGHTING SYSTEMS

THE GENERAL STEPS OF AN ENERGY EFFICIENCY STREET LIGHTING SYSTEMS PROJECT

PROJECT ORGANIZATION AND PREPARATION	PLANNING AND DESIGN	PROCUREMENT PROCEDURES	CONSTRUCTION	OPERATION AND MAINTENANCE	MONITORING AND EVALUATION
• Involving relevant stakeholders/ decision-makers • Team setup and training • Project financial requirements	• Public consultations • Choosing technologies • Economic analysis • Design M&E plan	• Defining legal aspects • Defining financial aspects • Tender procedures	• Purchase of equipment • Test installations • Installation of the complete system	• Monitoring and verification • Preventive and corrective maintenance	• Post-installation follow-up • Evaluation against the M&E indicators

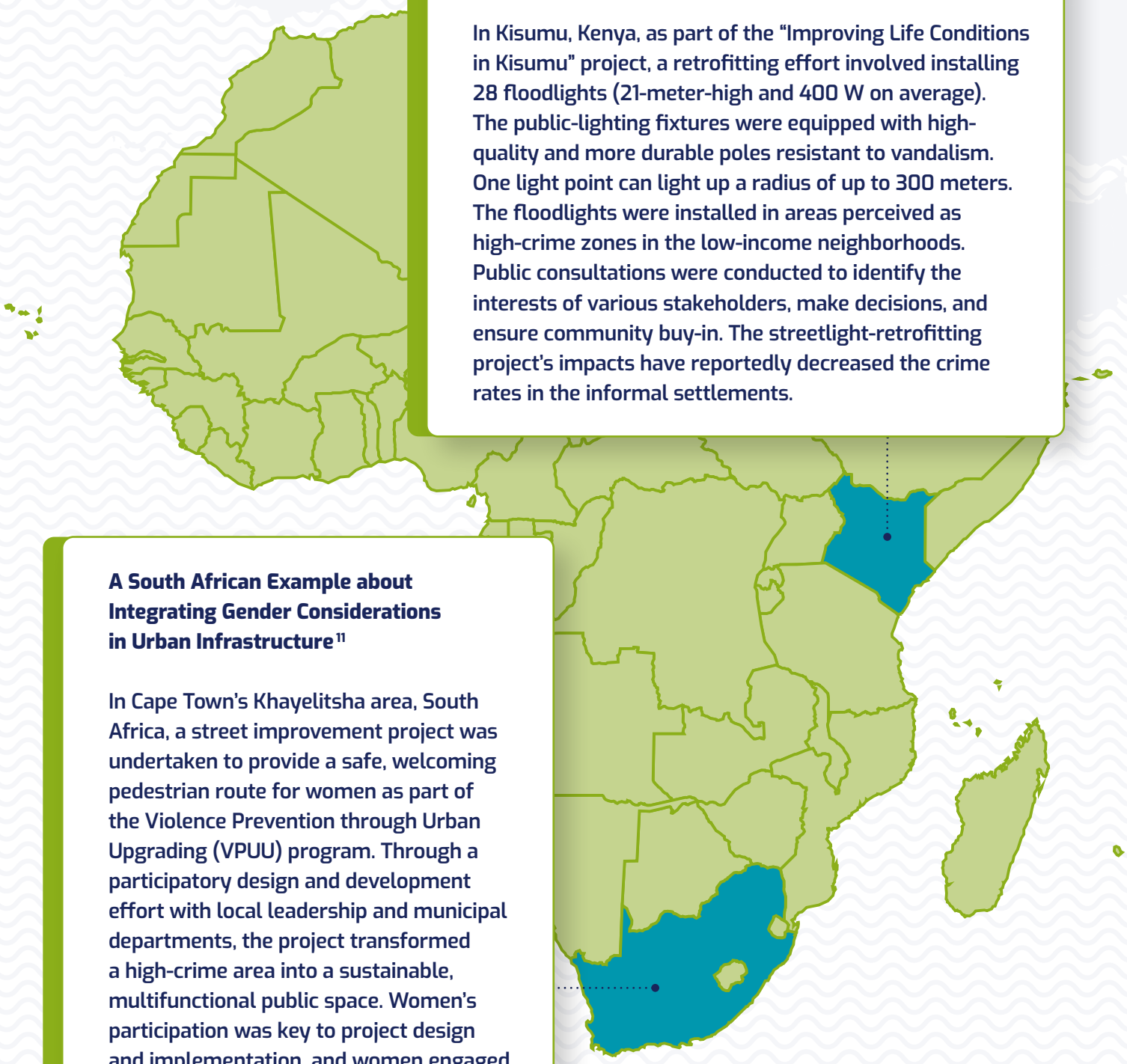
This section highlights the methodologies and approaches to mainstream gender equality and social inclusion (GESI) across each step of the EE SLS project cycle. Recommendations and methodologies are connected to the five gender mainstreaming pillars.

The list of recommendations and approaches is comprehensive, and it is not necessary to implement all of them to mainstream gender. Project managers must hence select the approaches most relevant to their project and in alignment with their scope of work, as well as available human and financial resources. The **priority** approaches that have the most potential to yield a gender responsive SLS are indicated in **bold**.

PROJECT ORGANIZATION AND PREPARATION → PLANNING AND DESIGN → PROCUREMENT PROCEDURES → CONSTRUCTION → OPERATION AND MAINTENANCE → MONITORING AND EVALUATION

PROJECT ACTIVITIES	GENDER EQUALITY AND SOCIAL INCLUSION (GESI)	PILLARS
INVOLVING RELEVANT STAKEHOLDERS / DECISION-MAKERS	• **Project initiators must seek buy-in of all key stakeholders involved in street lighting (municipal agencies, electricity utility, ministries, etc.) and raise their awareness of GESI and EE aspects from the project's onset.** • Ensure that the decision-makers follow national policy/ regulatory framework for street lighting and if not available, follow international norms.	
TEAM SETUP AND TRAINING	• **Create environments to promote women's employment and leadership in municipal agencies.** • Ensure that women are included in the project team and in decision-making power positions.	
	• Recruit a local gender expert as part of the team.	
	• **Train team members on basic concepts about gender and EE, street lighting international and local norms, gender-responsive street lighting and how to use gender-mainstreaming tools and guidelines.**	
PROJECT FINANCIAL REQUIREMENTS	• **Integrate GESI and EE in the project budget as a specific component or as part of the existing budget items.**	

PROJECT ACTIVITIES	GENDER EQUALITY AND SOCIAL INCLUSION (GESI)	PILLARS
PUBLIC CONSULTATIONS	• **Establish an inclusive and gender-balanced stakeholder consultation process[8]. Collaborate with civil society organizations to perform these consultations. Use this information to develop your monitoring and evaluation (M&E) baseline data.** • **Utilize civil society actors as partners in the design of street lighting.**	
SLS DESIGN (COVERAGE, TECHNOLOGIES AND ECONOMIC ANALYSIS)	• **Expand street-lighting coverage beyond highways and major thorough fares to include neighborhoods, slums and informal settlements following public consultations recommendations.**	
	• **Select energy-efficient and cost-effective technologies adapted to the necessary illumination level throughout their life cycle (installation, maintenance and decommissioning) following EN 13201 standard or similar.** • Design the SLS properly (electric safety, control system, implanting, size, number, etc.). Consider including safety equipment in urban areas (for example, call/emergency call boxes on light poles), following international standards requirements.	
	• Ensure that GESI considerations are adequately integrated into technology selection and infrastructure coverage and design.	
	• **Ensure that the project has a maintenance plan, including human and financial capacity. Promote the involvement of female technicians in maintenance. Where relevant, promote a private-sector maintenance model.**	
DESIGN AN M&E AND LEARNING PLAN AND A COMMUNICATION STRATEGY	• Ensure that all key stakeholders have accepted the frameworks and objectives about implementing an energy-efficient gender-responsive SLS, employ the same monitoring indicators[9] and have a gender capacity-building plan.	
	• **Promote social integration through an active collaboration with communities targeted by the project by keeping them informed throughout the project steps (results of public consultations and how it informed the project design, development of the maintenance plan, selection of technologies, construction methods, anticipated positive social impacts, etc.).**	



A Kenyan Example about Integrating Findings from Public Consultations in SLS Design[10]

In Kisumu, Kenya, as part of the "Improving Life Conditions in Kisumu" project, a retrofitting effort involved installing 28 floodlights (21-meter-high and 400 W on average). The public-lighting fixtures were equipped with high-quality and more durable poles resistant to vandalism. One light point can light up a radius of up to 300 meters. The floodlights were installed in areas perceived as high-crime zones in the low-income neighborhoods. Public consultations were conducted to identify the interests of various stakeholders, make decisions, and ensure community buy-in. The streetlight-retrofitting project's impacts have reportedly decreased the crime rates in the informal settlements.

A South African Example about Integrating Gender Considerations in Urban Infrastructure[11]

In Cape Town's Khayelitsha area, South Africa, a street improvement project was undertaken to provide a safe, welcoming pedestrian route for women as part of the Violence Prevention through Urban Upgrading (VPUU) program. Through a participatory design and development effort with local leadership and municipal departments, the project transformed a high-crime area into a sustainable, multifunctional public space. Women's participation was key to project design and implementation, and women engaged in the project's long-term sustainability through maintenance opportunities. Strategies such as tree-planting, high-quality overhead lighting, and easy-to-maintain materials have led to a 30% increase in pedestrian activity.

PROJECT ACTIVITIES	GENDER EQUALITY AND SOCIAL INCLUSION (GESI)	PILLARS
DEFINING THE LEGAL AND FINANCIAL ASPECTS OF THE TENDERING PROCEDURES	• Establish gender responsive procurement protocols to ensure those bidding on contracts demonstrate a gender balanced team with women in key roles (this should form part of the assessment criteria) and to give opportunities to women-owned businesses or businesses with a strong representation of women in senior leadership roles. • Establish EE-responsive procurement protocols, including a selection process with technical and budget criteria. • Establish specific evaluation criteria for the design and equipment that must meet international standards regarding urban planning. • Require contractor staff, consultants, and equipment suppliers to conduct training or provide expertise in relevant areas. • **Indicate that the Measuring and Verification (M&V) procedure should include GESI and EE aspects.**	

A Kenyan Example about Gender-responsive Public Procurement [12]

Kenya's Public Procurement and Asset Disposal Act (2015) led to the creation of a government-supervised procurement system. The procurement policies are transformative in terms of women's economic empowerment, as they specify explicit affirmative actions favouring women entrepreneurs and women-owned businesses.
The Access to Government Procurement Opportunities (AGPO) policy stipulates that 30% of all government procurement opportunities, including street-lighting infrastructure, are to be reserved for women, youth, and persons with disabilities.

PROJECT ORGANIZATION AND PREPARATION | PLANNING AND DESIGN | PROCUREMENT PROCEDURES | **CONSTRUCTION** | OPERATION AND MAINTENANCE | MONITORING AND EVALUATION

PROJECT ACTIVITIES	GENDER EQUALITY AND SOCIAL INCLUSION (GESI)	PILLARS
PURCHASING EQUIPMENT AND TESTING INSTALLATIONS	• **Use test installations not only to ensure that technologies and infrastructure are suitable, but also to allow for gender equality and social inclusion considerations to be examined and monitored.** [13] • Publicize the intent of the design approach to encourage underserved communities to provide feedback on the test installations. • Purchase cost-effective equipment that meet relevant standards and requirements defined during the design phase. • Develop an Measuring, Reporting and Verification (MRV) process to evaluate both EE and GESI impacts of the test installation.	
INSTALLING THE COMPLETE SYSTEM	• Ensure that the test installation provides feedback and make adjustments for any technical and safety issues. • Complete the commissioning process to ensure that the system meets technical requirements (related to lighting services) and the design intent (i.e., to allow for better safety through better lighting).	

A Ugandan Example about Fostering Social Integration through Street Lighting [14]

Enhanced social integration in an informal settlement was observed in a solar street-lighting project in two Ugandan cities (Kampala and Jinja). In Kibugumbata, Jinja's informal settlement, the coproduction of solar-powered streetlights created solar-sector jobs for the vulnerable population. Meanwhile, it helped strengthen existing livelihoods and social networks by allowing trading to continue outside daylight hours and enhancing safety and security in the area. Such multi-stakeholder projects involving residents from informal settlements, NGOs and local and national governments can create a space for ongoing dialog between municipal authorities and the urban poor, a segment of the society normally excluded from urban development initiatives.

PROJECT ORGANIZATION AND PREPARATION → PLANNING AND DESIGN → PROCUREMENT PROCEDURES → CONSTRUCTION → **OPERATION AND MAINTENANCE** → MONITORING AND EVALUATION

PROJECT ACTIVITIES	GENDER EQUALITY AND SOCIAL INCLUSION (GESI)	PILLARS
MONITORING AND VERIFICATION (M&V)	• Use M&V to assess the performance of the energy-efficient street-lighting lamps installed and to verify and monitor the lamps' energy and emission savings and lighting performance.	
PREVENTIVE AND CORRECTIVE MAINTENANCE	• **Build local technical capacity for ongoing maintenance. Ensure that men and women have a fair and equal access to capacity building program and job creation opportunities.**	

A Mauritanian Example about Involving Citizens in Maintenance [15]

As part of the AREDDUN program, some solar street-lighting management committees were set up in the neighborhoods targeted by the projects financed by international donors. The management committees forwarded the population's complaints to the Nouackhott Region's public-lighting technical unit (the beneficiary organization). The unit's technicians are in charge of dealing with any power failure and performing general maintenance of the solar equipment.

PROJECT ORGANIZATION AND PREPARATION → PLANNING AND DESIGN → PROCUREMENT PROCEDURES → CONSTRUCTION → OPERATION AND MAINTENANCE → **MONITORING AND EVALUATION**

PROJECT ACTIVITIES	GENDER EQUALITY AND SOCIAL INCLUSION (GESI)	PILLARS
POST-INSTALLATION FOLLOW-UP	• Ensure that the installed energy-efficient street-lighting lamps' energy and emission savings and lighting performance is properly verified and monitored.	
EVALUATION AGAINST M&E INDICATORS	• Perform M&E to compare the project results against the indicators and the baseline data. • **Ensure that the project collects sex-disaggregated data as part of its M&E activities.**	

5 HOW TO COLLECT RELEVANT SEX-DISAGGREGATED DATA?

Reliable sex-disaggregated data is crucial to designing, implementing and evaluating the impacts of a gender responsive SLS. This section proposes a set of qualitative and quantitative data-collection methods and sampling techniques that should be used for performing gender inclusive consultations prior to designing SLS and for conducting M&E activities.

A gender-sensitive M&E approach was utilized for the two case studies, presented in section 7 and the results are presented in the diagnostics. The suggested data collection methods for collecting relevant, gender-sensitive and sex-disaggregated data to measure future street lighting are the same as those used in the two case studies. These clearly demonstrate the importance of a mixed-methods approach in order to capture the various layers and aspects of the situation with regard to both women and men, and their approaches to street lighting (or lack thereof) in the built environment.

Data Collection Methods

Interviews, exploratory walks and focus-group discussions are some common approaches used to perform mental mapping. They are often used in behavioral geography and now have been extended to other fields. A mental map is used to capture a person's point of view regarding his or her area of spatial interaction. It aids researchers in determining the subjective qualities of the public, such as personal preferences and practical uses of geography. The table below proposes suitable data-collection methods.

QUALITATIVE METHODS		QUANTITATIVE METHODS	
Exploratory Walks	**Focus-group Discussions (FGDs)**	**Key Informant Interviews (KIIs)**	**Surveys**
A field observation method carried out by a small group that allows for analyzing different population samples in the places and times of the day where and when they feel least safe and identifying areas that should be prioritized to improve street lighting. Each group is provided with an itinerary and a set of leading questions.	Small-group discussions that allow participants to share their thoughts and experiences on a theme. A facilitator asks open-ended questions and facilitates the discussion. It is recommended that these discussions be held separately for women and men to allow for a discussion in a safe space.	KIIs can be conducted to complement the other data-collection approaches. They can target different categories of respondents, such as decision-makers and technical staff from the ministries or agencies in charge of street lighting projects; community leaders and CSOs; donors and partners.	Face-to-face surveys administered to collect information on a community or urban location targeted by a new SLS infrastructure. It may be administered at a single time or at different time point. There are two key features of survey research: questionnaires and choice of sampling technique.

This methodology allows for analyzing the factors involved in increasing gender-mainstreaming in urban areas through better and more energy-efficient street lighting in the target cities. Refer to Section 7 to show the application of data collection methods in two case studies. Samples of tools developed for some methods are presented in Appendix III - Appendix IV

Sampling Techniques

The following sampling methods should be applied to quantitative data collection methods (survey). The selection is based on the hypothesis that most CoM SSA cities do not have address and telephone directories and that census data may be unreliable, outdated, or unavailable. Having representative samples of the city or neighborhood population might thus prove impossible. Sample sizes, which may or may not be fixed prior to data collection, will usually be dictated by the time, the statistical relevancy, and the financial availability. The minimum sample size can be determined based on theoretical saturation (the point in data collection when new data no longer bring additional insights to the research questions).

Urban sampling methods[16] that are both convenient and cost effective can be used for quantitative and qualitative M&E data collection, as listed below. The geographic units of the sample should be limited to areas targeted by the street lighting project.

RANDOM SAMPLING	SYSTEMATIC SAMPLE	QUOTA SAMPLING
Can be used for a larger targeted area. A numbered grid is overlaid over a map or a satellite image of the targeted area to segment it in smaller areas. Numbers are then randomly selected to create the sample. Systematic sample and quotas can then be used to sample households and individuals.	When samples are taken at fixed intervals, (e.g., every tenth household, vendor or passerby), usually along sampling line is set up across the targeted areas.	Should be employed to ensure demographic balance, when reliable data on population size and characteristics in a specific neighborhood are available (typically based on gender, age groups and social or economic characteristics). Quota sampling can be used with random and systematic sampling to ensure that the sampling includes a diverse array of stakeholder groups, including people with a disability, elderly, youth, ethnic and religious minority populations, and other marginalized groups.

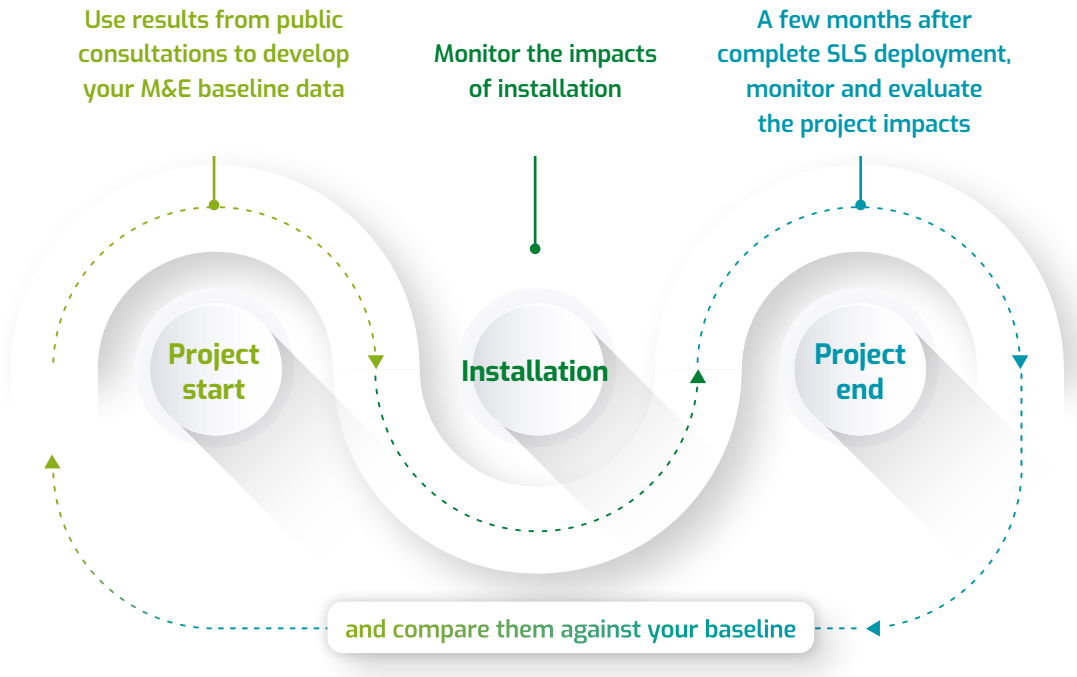
Concerning the sample methodology for measurement of technical aspects related to lamps and SLS, such as energy efficiency or illumination level, it is recommended to follow the International Performance Measurement and Verification Protocol (IPMVP)[17].

6 HOW TO MONITOR AND EVALUATE GENDER-SPECIFIC IMPACTS?

M&E is essential to ensure that gender is mainstreamed throughout the project cycle and that the SLS uses EE technologies that will yield sustainable results.

Designing an M&E Plan

An M&E plan should be developed at the onset of the project, while still in the planning stages. The project managing team will use the priority indicators indicated below and plan how to collect data and monitor project activities based on the human and financial resources available. A specific budget item should be reserved for M&E activities. When designing the M&E plan, the project managing team should keep in mind that M&E should be performed throughout the project cycle: at the start of the project, after the installation, and at the end of the project (as illustrated in the figure below).



To ensure cost efficiency, M&E activities should be performed along with other activities related to gender mainstreaming or energy efficiency. For example, most of the M&E baseline data can be collected when performing public consultations to inform the design of the system, using data collection methods and sampling techniques as presented in Section 5.

Priority M&E Indicators

The table below presents the priority indicators and proposes data collection methods. If more than one method is suggested, the project team should select the one that is more closely aligned with the time and resources available with the premise that the first method presented is optimal. It is nevertheless better to collect data with a less-than-optimal data collection method than not to collect data at all.

Data should be minimally collected at the beginning of the project to develop a baseline, and again at the end of the project (a few months after street lighting is installed and fully effective).

Pillars	Indicators	Data Collection Methods	Frequency
	Number of urban locations accessible mainly to non-motorized road users (e.g., markets, public places, residential areas, informal settlements, etc.) targeted by the project design.	Document review: Project design documents, project final report	Start and end of the project
	Number of women and girls, men and boys who report increased usage of public spaces, including after sunset (disaggregated by sex, age, and income)	Face-to-face survey among residents/ users of public space AND/OR FGDs with representatives/ users/ residents	Start, after installation, and end of the project
	Number and percentage of new businesses established by women and men due to project activities (disaggregated by sex and age)	Face-to-face survey among residents/ users of public space AND/OR Field observations	Start, after installation, and end of the project
	Proportion of informal female and male vendors who report a higher number of clients/ higher profits when conducting commercial activities at night (disaggregated by sex, age, and neighborhoods).	Face-to-face survey among vendors AND/OR FGD with vendors.	Start, after installation, and end of the project
	Percentage of women in senior urban planning, management, professional, technical, and supervisory positions within the project team.	Document review AND/OR Interview with project manager	Start and end of the project

Pillars	Indicators	Data Collection Methods	Frequency
	Number and percentage of women and men attending consultation meetings on the planning, design, or pricing of services (disaggregated by sex and age).	Document review: consultations attendance list.	Project mid-term
	Evidence that equal employment opportunity policy and practices are implemented for staff and contractors (core labor standards, equal pay for work of equal value, occupational health and safety, and separate sanitation facilities).	Document review AND/OR Interview with project manager	Start and end of the project
	Use of an international standard to design the SLS (EN13201 or other)	Review of project documents	At the end of system design
	Average illumination level (lux) of above 10,000	Measurement of 10% of installed lights before the replacement or installation of new SLS: • At specific sites or lighting units for illumination level • Replaced lighting units for lamp efficiency . • Lamps or electrical cabinet for energy consumption Measurement of 5% of installed lights after the replacement or installation of new SL.[18]	Before the replacement
	Energy consumption of SLS (kWh/year)		
	Average efficiency of SLS lamps (lum/W) for both on-grid and solar lights		

7 CASE STUDIES

The diagnostics of Nouakchott and Kampala were performed to inform the design of upcoming street lighting projects. Qualitative methods (document review, exploratory walks, focus group discussion and key informant interviews) were used to collect field information. The main findings and recommendations are presented through the following case studies.

Support to the Nouakchott Region for resilient and equitable sustainable development*

Nouakchott, the capital of Mauritania, is a city of 1.2 million inhabitants. It is home to one third of Mauritania's population and is growing rapidly (4.4% per year)[19]. The city is also experiencing a yearly spatial growth of 4% to 10%[20]. Funded by the European Union, the ARENDDRE project promotes urban development in the city of Nouakchott. The project, which is being implemented from 2020 to 2023, includes a public lighting component under which a detailed diagnosis of the public lighting system will be conducted. Low-consumption solar lighting fixtures will also be installed in the outlying neighborhoods, which have yet to be determined. The Nouakchott Region (NR) is the beneficiary and entity responsible for implementing the program.

GOVERNING BODIES AND REGULATORY FRAMEWORK

There are two main regulatory bodies responsible for managing street lighting in Nouakchott: the NR and the Société Mauritanienne d'Electricité (SOMELEC). However, the two organizations have very little contact with each other[21], have different funding sources, and oversee the development and implementation of different systems. There is no legislation on the public lighting system. In the context of the projects, the actors do not use specific standards for the design and operation of the systems.

PUBLIC LIGHTING COVERAGE

Only the capital's main arteries, a few streets in the upscale neighborhoods (Tevragh Zeïna), the downtown area, and certain areas in the outlying neighborhoods targeted by previous projects are now equipped with public lighting. Residential areas are without street lighting, particularly the central working-class areas (Sebkha, El Mina, Arafat) and the outlying areas (Teyaret, Toujounine, Riyad).

DIAGNOSTIC RESULTS

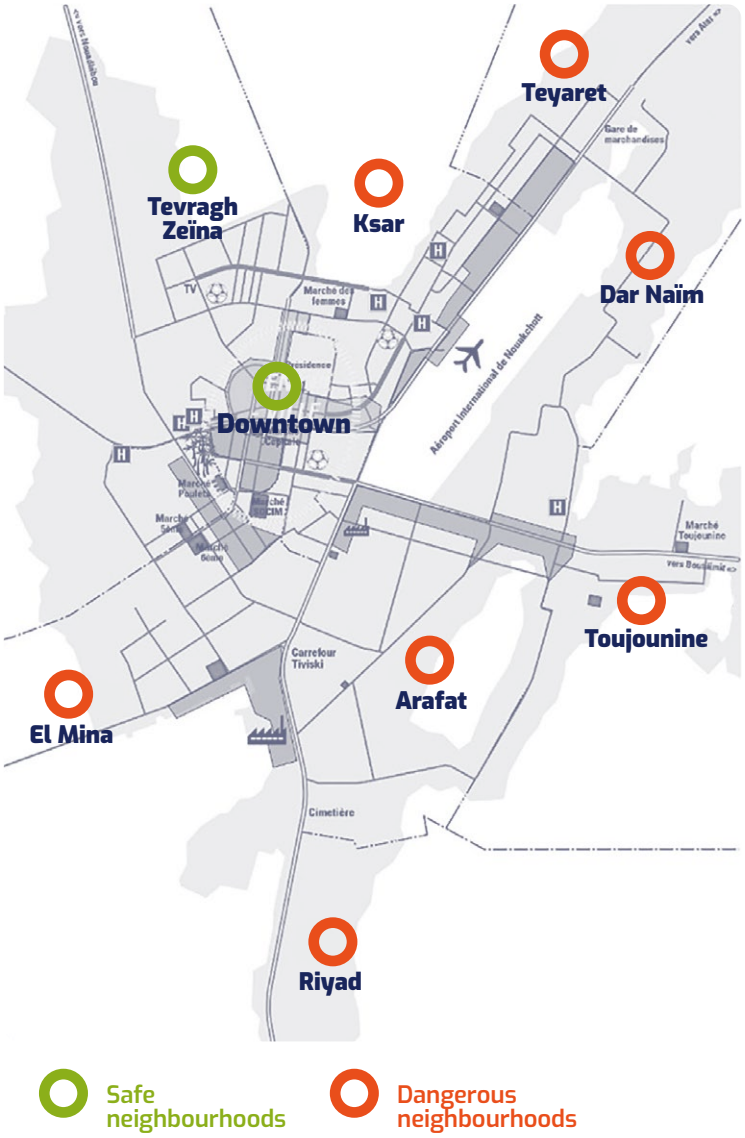
A qualitative data collection was conducted in Nouakchott in February and March 2021, as described in the table below.

* (ARENDDRE: Appui à la Région de Nouakchott pour un Développement Durable Résilient et Equitable)

COLLECTION METHODS	DESCRIPTION
Exploratory Walks	Non-mixed exploratory walks were organized on the university campus, downtown and in the Ksar neighbourhood. Each walk consisted of groups with 4 to 6 participants.
	Questionnaires from the exploratory walks were distributed to informal female vendors in three central neighborhoods (Tevragh Zeina, 6th and 5th streets)
Focus Groups	Three non-mixed focus groups were conducted with students and NGO representatives (12 participants)
Interviews	5 interviews were conducted: 2 with decision makers and technicians, 2 with community and civil society leaders and 1 with a project partner.

The qualitative data revealed that the lack of street lighting in Nouakchott leads to a sense of insecurity, including fear for physical safety, fear of crime, and fear of harassment and sexual violence. All 19 participants in the focus groups (men and women) indicated that they sometimes felt unsafe at night in their city or neighbourhood. The perception of safety in the various neighbourhoods is illustrated on the map below.

The assessment of Nouakchott revealed that the lack of lighting affects everyone's social and economic life (men, women, young and old, etc.), but that certain groups are more affected by the negative impacts. These include female informal street vendors, young women, and residents of peripheral and informal neighbourhoods.



Kampala City Lighting and Infrastructure Improvement Project

Kampala is the capital and largest city of Uganda, with an annual growth rate of 3.9%, and a current population is 1.7 million of inhabitants. Approximately 23% of Kampala is fully urbanised, while 60% is semi-urbanised, with the remainder consisting of rural settlements. A large portion of the population live in informal settlements (64 settlements within the city accommodating more than 40% of urban population)[22].

Financed by AFD, the Kampala City Lighting and Infrastructure Improvement Project unfolds from 2018 to 2025. The first task was the formulation of a master plan, approved in November 2018, followed by the second task, a feasibility study, concluded in March 2020, entitled "Master Plan and Feasibility study for street lighting in Kampala City." The new street lighting infrastructure as planned in the master plan would increase lighting coverage from 8% to 90%. Community consultations were performed to inform the current round of street lighting installations.

RESPONSIBLE ENTITY AND POLICY FRAMEWORK

The Kampala Capital City Authority (KCCA) is the principal institution in charge of the design, deployment, and maintenance of SLS in the whole metropolitan area. KCCA benefits from the support of technical, social and environmental experts for the design of SLS. The installation of streetlights is currently guided by standards set by the Ministry of Works and Transport. The standards outline the designs, type of lights, spacing and location for the streetlights in the city. KCCA has a policy framework on social and environmental considerations in urban infrastructure design (currently under review). It does not however provide specific directives on gender and street lighting.

STREET LIGHTING COVERAGE

There are currently 5,436 streetlights in Kampala City. Of these, 3,698 are connected to the national grid while 1,738 are solar light installations[23]. As of February 2021, the functionality percentage was 75.2% compared to the target of 95%. The central business district and some wealthy residential areas (Kololo, Muyenga, Munyonyo, Ntinda, Entebbe Road, Naguru) are generally well covered, while peripheral areas (Wakiso, Mpigi and Mukono) are moderately illuminated (mainly on highways) and informal settlements (found in all divisions of Kampala) are not covered by SLS.

DIAGNOSTICS FINDINGS

The data collection activities were held in Kampala in February and March 2021, as described in the next table.

DATA COLLECTION METHOD	DESCRIPTION
Exploratory walks	Exploratory walks were organised in several areas of Kampala, covering Central, Makindye, Nakawa, Kawempe, and Lubaga divisions. 5 mixed groups walks were organised, with 14 participants in total, with an average number of 3 participants each per walk.
	Questionnaires were devised for the exploratory walks and these questionnaires were distributed to all participants on the walks and filled in at each of the three city stops.
Focus group discussions	4 focus group discussions were held, consisting of 2 mixed groups (one of community leaders and one of traders and businesspeople) and 2 women only groups (women end-users and community leaders and women and girl end-users), totalling 27 participants.
Key informant interviews	14 key informants were interviewed, consisting of key members of KCCA as well as civil society and community leaders: 5 interviews were held with decision makers and technical staff, 5 with community leaders and civil society and 4 with donors and partners. 12 interviews were held in total because 2 interviews were done jointly.

In well illuminated areas people feel safer- physically, economically and emotionally

Respondents also disclosed feeling safer-physically, economically and emotionally- in areas that are better illuminated. It is noteworthy that 92% of respondents, both men and women, indicated sometimes feeling unsafe a night in their neighborhoods. The data collected tells a story of both men and women feeling unsafe at night, with the results not differentiated based on gender. The research found that the majority of places identified as unsafe include pathways in informal settlements, slum areas, public transport waiting areas, marketplaces and walkways to and from work. The importance of more ubiquitous **public lighting was emphasized as key to providing enhanced safety** along these commuter journeys. Areas that require street lighting include recreational and leisure sites such as city squares, centenary park, public taxi ranks and different public commuter taxi waiting areas.

Street lighting enables children to move safely

Robbery and theft were listed as the most prominent security concern. These crimes were reported as being more common at night. Discussions with informal sector traders and businesswomen revealed the precarious situation of women street vendors in Kampala. Both men and women reported feeling unsafe, although women experienced the consequences of inadequate streetlighting more sorely. Many women and girls highlighted fear of rape and other forms of sexual and physical assault and harassment, in addition to the concerns of robbery and bag snatching, murder and kidnapping. With regards to children, respondents mentioned that street lighting enables children to move safely during school time thus helping in child protection and overall wellbeing.

The women's focus group discussions indicated consensus that **street lighting expands economic opportunities for women** by enabling them to engage in additional/initial commercial activity after the end of their other business activities, daily employment or household and childcare duties.

Appendix I – Notes

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7. The result flow chart was developed using ADB (2013) Toolkit on Gender Equality Results and Indicators. Manila, Philippines, p. 83.
8. Refer to Section 5.
9. A detailed list of indicators is provided in Section 6.
10. Econoler (2020), Interview with "Improving Life Conditions in Kisumu" project team.
11. World Bank (2020), Handbook for Gender-Inclusive Urban Planning and Design. Available online: https://openknowledge.worldbank.org/bitstream/handle/10986/33197/145305.pdf
12. See http://ppra.go.ke/download/ppda2015/
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Appendix III – Questionnaire – Exploratory walks

Date: _____

Walk itinerary: _____

Project Presentation and Instructions

Thank you for your participation in this exploratory walk!

The objective of the study is to contribute to the development of more sustainable and inclusive cities for all in Sub-Saharan Africa by improving gender equality. More specifically, the study will analyze to which extent urban public lighting projects which would be developed in the frame of Covenant of Mayors in Sub-Saharan Africa (CoM SSA) may reduce the feeling of insecurity through a better consideration of the needs of women and men in the urban public space and thus enhance use of public spaces as well as economic activities. You will be requested to walk along a pre-defined itinerary accompanied by a consultant and to fill a questionnaire about your impressions on specific locations. The walk will last for about 2 hours. The filled questionnaire must be handed to the consultant at the end. The information compiled in the questionnaire will be kept anonymous.

Tell us more about you!

› My name: _____

› My age:/ age group) _____

› My gender: _____

› Neighborhood where I live: _____ since _____ years.

› What I do for a living: _____

› I have to frequently go to different neighborhoods for work/ study / other reasons. Yes_____ No_____

- If yes, two neighborhoods I frequently go to:

_____

_____

3 words to describe the street lighting system in the neighborhood where I live:	Means of transportation I use on a weekly basis:
1. _____ _	1. _____ _
2. _____ _	2. _____ _
3. _____ _	3. _____ _

Your general experience in your city or neighborhood at nighttime

	Yes	No
1. Do you ever feel unsafe after sunset in your city or neighborhood? (e.g. fear of theft, mugging, physical accident, street harassment, sexual violence, etc.)		

1.1. **If yes**, name three places in the city where you feel the least safe to walk alone at night and tell us why:

	Name of place/ short description	Reasons for feeling unsafe
1		• _____ • _____
2		• _____ • _____
3		• _____ • _____

1.2. **If no**, why do you feel safe?

_____

_____

	Yes	No
2. Have you ever changed your route to walk along better-lit streets after sunset?		
3. Would you be more likely to go to places that have good lighting after sunset?		

4. Think about three places where you would go after sunset that have good lighting. What type of activities do you do there?

	Name of place/ short description	Activities
1		• _____ • _____
2		• _____ • _____
3		• _____ • _____

First Stop

Location: _____

1. According to you, how do people use or transit through this urban space? (circle all that apply)

1.1. During the day:

Shopping/ running errands	To do business	To go to school	To go to work	To go to a place of worship	Leisure/ sport	Social gathering	Spend family time

1.2. After sunset:

Shopping/ running errands	To do business	To go to school	To go to work	To go to a place of worship	Leisure/ sport	Social gathering	Spend family time

2. **During the day**, do you think this place is safe for…				If not, why?
	men			
	women			
	boys			
	girls			

3. **After sunset,** do you think this place is safe for…				If not, why?
	men			
	women			
	boys			
	girls			

4. Pay attention to the sources of light around you and tell us what you think by circling your answer:

4.1. Does the light allow you to see your surroundings well?	Yes, very well	Medium well	no
4.2. Is the light bright or dim?	bright	neutral	dim
4.3. If you could, how would you change the brightness of the light?	brighter	No change	dimer
4.4. Is the light cold (white, fluorescent) or warm (yellow, soft)?	warm	neutral	cold
4.5. If you could, how would you change the colour of the light?	warmer	No change	colder
4.6. Overall, how does the lighting (or lack of) make you feel?	safe	neutral	unsafe

5. Please share your comments and recommendations on the street lighting in this location:

Second Stop

Location: _____

1. According to you, how do people use or transit through this urban space? (circle all that apply)

   1.1. During the day:

Shopping/ running errands	To do business	To go to school	To go to work	To go to a place of worship	Leisure/ sport	Social gathering	Spend family time

   1.2. After sunset:

Shopping/ running errands	To do business	To go to school	To go to work	To go to a place of worship	Leisure/ sport	Social gathering	Spend family time

				If not, why?
2. **During the day**, do you think this place is safe for…	men			
	women			
	boys			
	girls			

				If not, why?
3. **After sunset,** do you think this place is safe for…	men			
	women			
	boys			
	girls			

6. Pay attention to the sources of light around you and tell us what you think by circling your answer:

6.1. Does the light allow you to see your surroundings well?	Yes, very well	Medium well	no
6.2. Is the light bright or dim?	bright	neutral	dim
6.3. If you could, how would you change the brightness of the light?	brighter	No change	dimer
6.4. Is the light cold (white, fluorescent) or warm (yellow, soft)?	warm	neutral	cold
6.5. If you could, how would you change the colour of the light?	warmer	No change	colder
6.6. Overall, how does the lighting (or lack of) make you feel?	safe	neutral	unsafe

7. Please share your comments and recommendations on the street lighting in this location:

Third Stop

Location: _____

1. According to you, how do people use or transit through this urban space? (circle all that apply)

   1.1. During the day:

Shopping/ running errands	To do business	To go to school	To go to work	To go to a place of worship	Leisure/ sport	Social gathering	Spend family time

   1.2. After sunset:

Shopping/ running errands	To do business	To go to school	To go to work	To go to a place of worship	Leisure/ sport	Social gathering	Spend family time

				If not, why?
2. **During the day**, do you think this place is safe for…	men			
	women			
	boys			
	girls			

				If not, why?
3. **After sunset,** do you think this place is safe for…	men			
	women			
	boys			
	girls			

4. Pay attention to the sources of light around you and tell us what you think by circling your answer:

4.1. Does the light allow you to see your surroundings well?	Yes, very well	Medium well	no
4.2. Is the light bright or dim?	bright	neutral	dim
4.3. If you could, how would you change the brightness of the light?	brighter	No change	dimer
4.4. Is the light cold (white, fluorescent) or warm (yellow, soft)?	warm	neutral	cold
4.5. If you could, how would you change the colour of the light?	warmer	No change	colder
4.6. Overall, how does the lighting (or lack of) make you feel?	safe	neutral	unsafe

5. Please share your comments and recommendations on the street lighting in this location:

Wrapping up

	Yes	No
6. Do you think an exploratory walk is a good method for citizens to share their opinion about their city or neighborhood?		

6.1. Why?

_____

_____

7. Imagine you are in charge of street lighting development for your city. Which locations/ areas that are currently not covered by the street lighting system would you illuminate first. Why?

8. What more should be done to enhance the street lighting in your city or your neighborhood?

Thank you for your participation!

Leave us your email if you want to receive a copy of the study:

_____

Appendix IV
Questionnaire – Focus group discussions: demographic details

Please answer the following questions in the spaces provided, circle or tick the most appropriate options. The data collected by this questionnaire will be kept anonymous.

Date: _____

1 Which gender identity do you most identify with?

- Female
- Male

2 What is your age?

- ☐ 18-24 years old
- ☐ 25-34 years old
- ☐ 35-44 years old
- ☐ 45-54 years old
- ☐ 55-64 years old
- ☐ 65 years older

3 What is your profession?

_____

4 Which neighborhood do you live in? For how long?

_____ for _____ years

5 Do you frequently go to different neighborhoods for work, study or other reasons?

- ☐ Yes
- ☐ No

6 If yes, what neighborhood do you most frequently go to? (Name two)

a. _____

b. _____

7 What are the means of transportation you use on a weekly basis to move in the city? (You may check more than one answer)

- ☐ Personal car
- ☐ Taxi
- ☐ Bus
- ☐ Mini-bus
- ☐ Scooter
- ☐ Bicycle
- ☐ Walk

Appendix V – Focus group discussions

Descriptor	This Instrument
Instrument Type	Focus group discussion (FGD)
Average Group Size	5-8 people
Estimated Time to Complete	2 hours
Target Audience	Local inhabitants/ community members, Women's groups/NGO workers/community activists, trader groups/ business people.
Expected Number of Completions	
Fielding Firm	
Estimated Timeline for Fielding	

Instructions to Interviewer **[TEXT]**

[TABLE SET UP BEFORE ARRIVAL OF PARTICIPANTS: PROJECT FACT SHEETS SHOULD BE AVAILABLE ON THE TABLE, AS WELL AS ANTIBACTERIAL GEL]

[DISTRIBUTE THE CONSENT FORM AND DEMOGRAPHIC DETAILS QUESTIONNAIRE, AND COLLECT THEM ONCE THEY ARE FILLED]

Welcome and thank you for volunteering to take part in this focus group. You have been asked to participate because your point of view as a citizen of the city of **[KAMPALA/ NOUAKCHOTT]** is important to design and implement urban infrastructures.

[EXPLAIN THE PROJECT IN YOUR OWN WORDS, USING THE INFORMATION BELOW]

Project Description: Agence Française de Développement (AFD) supports the Covenant of Mayors in Sub-Saharan Africa (CoM SSA) to meet the interconnected challenges of climate change, sustainable energy and social development. The support is aimed at attracting regional level climate finance for planning and implementing concrete projects in Sub-Saharan African municipalities. The AFD is preoccupied by the situation of inequality with respect to gender and vulnerable individuals (such as people with disabilities, the elderly, informal workers, etc.) in planning and implementing urban public lighting projects in sub-Saharan Africa. Therefore, the AFD has contracted the services of Econoler to elaborate tools and methodologies that are useful to municipalities and other actors involved in preparing and implementing urban public lighting projects. The aim of the study is to formulate recommendations that public lighting actors can directly apply to help design projects and implement infrastructure that factor in the specific needs of women, men and vulnerable individuals.

Instructions: This focus group discussion is designed to assess your experience and perception of the street lighting systems in your neighborhood and city. The focus group discussion will take two hours. May I tape the discussion to facilitate later consultation? (If yes, switch on the recorder.)

Ground Rules:

- The most important rule is that only one person speaks at a time. There may be a temptation to jump in when someone is talking, but please wait until they have finished.
- Emphasize that everyone's views are important.
- There are no right or wrong answers.
- You do not have to speak in any particular order.
- Note taking is for reporting purposes only and will be used for analysis. We shall not quote your names unless you agree to.
- Photography permissions (as indicated in the Consent form)
- Emphasize observing of the national sanitary measures to prevent COVID-19

Warm-Up: Please introduce yourself.

Introductory Question:

Think about your experience circulating (on foot or with a vehicle) in your neighborhood or city at dusk or during the night. Do you ever feel unsafe?

i) If yes, name the places and moments where you feel the least safe when it is dark.
ii) If yes, do you think street lighting could enhance your feeling of security? How?
iii) If no, why do you feel safe?
iv) Do you think that women/ men **(ASK ABOUT THE OPPOSITE GENDER OF THE PARTICIPANTS)** would have the same answer to that question?

Guiding Questions:

<u>Benefits of streetlighting</u>

- To the best of your knowledge, which areas are covered by street lighting systems in Kampala?
- Are there some activities that you would do if there was better street lighting in your neighborhood or in the city? (e.g. shopping, leisure/ sport, social gathering, visit friends or relatives, work in other neighborhoods, etc.)
- Do you think street lighting can have positive impacts on:
  - Business and job opportunities? Why?
  - Community life and wellbeing? Why?

- Mobility at night (for motorized and non-motorized road users)? Why?
- The city development? Why?
- The security of pedestrians? Why?

› **(SEEK THE ANSWERS OF ALL PARTICIPANTS)** Imagine you are in charge of street lighting development for the city of Kampala. Which locations/ areas that are currently not covered by the street lighting system would you illuminate first. Why?

› According to you, what are some of the income-generating opportunities that arise with adequate lighting in urban areas?

Technical Specificities of Streetlighting Infrastructure

› In general, in your neighborhood, do the street lighting infrastructures:
  - Work well?
  - Are well-maintained?
  - Look safe?

› What in your view needs to be done by the municipality to enhance the efficiency and quality of street lighting systems?

› Have you ever made an official complaint about a defective streetlight?

Recommendations

› What more should be done to enhance the street lighting in Kampala?

› Is there any other information you would like to share to help us with our study?

Covenant of Mayors
in Sub-Saharan Africa

Programme co-funded
by the European Union

CO-IMPLEMENTED BY
AFD
AGENCE FRANÇAISE
DE DÉVELOPPEMENT