



PROJECT IDENTIFICATION FORM (PIF)¹

PROJECT TYPE: Full-sized Project

TYPE OF TRUST FUND: GEF Trust Fund

PART I: PROJECT IDENTIFICATION

Project Title:	Green Urban Lighting		
Country(ies):	Armenia	GEF Project ID: ²	4742
GEF Agency(ies):	UNDP	GEF Agency Project ID:	4669
Other Executing Partner(s):	Municipalities of Yerevan and other main cities, Ministry of Nature Protection	Submission Date:	30 November 2011
		Resubmission Date:	22 December 2011
GEF Focal Area (s):	Climate Change	Project Duration (Months)	48
Name of parent program (if applicable):	N/a	Agency Fee (\$):	160,000
➤ For SFM/REDD+ <input type="checkbox"/>			

A. FOCAL AREA STRATEGY FRAMEWORK³:

Focal Area Objectives	Expected FA Outcomes	Expected FA Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Co-financing (\$)
CCM-2 (select)	Outcome 2.1 Appropriate policy, legal and regulatory frameworks adopted and enforced	Countries adopting EE policies and initiatives	GEFTF	500,000	600,000
CCM-2 (select)	Outcome 2.2 Sustainable financing and delivery mechanisms established and operational	Investment mobilized for energy efficiency	GEFTF	1,000,000	7,500,000
Sub-Total				1,500,000	8,100,000
Project Management Cost ⁴			GEFTF	100,000	500,000
Total Project Cost				1,600,000	8,600,000

B. PROJECT FRAMEWORK

Project Objective: Removal of barriers to energy efficient (green) lighting in Armenian cities						
Project Component	Grant Type	Expected Outcomes	Expected Outputs	Trust Fund	Indicative Grant Amount (\$)	Indicative Cofinancing (\$)
Knowledge and capacities for green urban lighting	TA	Municipal authorities in Yerevan and other cities have reliable information about urban lighting energy use and costs, are aware of energy saving potential, and familiar with green lighting technologies and solutions	1.1. Approved and enforced system to collect and analyze data on urban lighting energy use developed and piloted in Yerevan. Its replication supported in 5 other cities. 1.2. At least 10 completed public lighting energy audits in the capital and other major cities.	GEFTF	250,000	350,000

¹ It is very important to consult the PIF preparation guidelines when completing this template.

² Project ID number will be assigned by GEFSEC.

³ Refer to the reference attached on the [Focal Area Results Framework](#) when filling up the table in item A.

⁴ GEF will finance management cost that is solely linked to GEF financing of the project. PMC should be charged proportionately to focal areas based on focal area project grant amount.

			<p>1.3. Approved and enforced guidelines on green lighting applications for urban planners, architects and municipal energy managers are available to all municipalities in Armenia.</p> <p>1.4. Completed educational campaigns, exhibits and displays of advanced green lighting technologies.</p> <p>1.5. Completed study tour to GEF Public Lighting project in Central Europe (100% co-financed).</p>			
Policies and regulation for green urban development with a focus on energy efficient lighting	TA	Adopted and enforced national and municipal policies and regulations for green urban lighting	<p>2.1. Adopted municipal targets and action plan for lighting by at least 10 cities, including the capital of Yerevan.</p> <p>2.2. Revised and approved urban development and building codes that incorporate minimum efficiency requirements for urban lighting systems applicable nation-wide.</p> <p>2.3. Revised and approved public procurement rules to favor green products, including energy efficient lighting, applicable nation-wide.</p> <p>2.4. Approved and enforced national minimum quality standards and enforcement mechanism for imported lighting products.</p> <p>2.5. Formulated and approved national regulations for safe disposal of mercury-containing lighting products. Pilot system set-up in Yerevan.</p>	GEFTF	200,000	250,000
Financial and institutional models for green urban lighting	TA	Financial and institutional models in place for implementation of green lighting projects in Armenian cities	<p>3.1. Established and operational model green community fund in Yerevan.</p> <p>3.2. Established and operational public-private partnership on street lighting management and modernization in Yerevan.</p>	GEFTF	300,000	350,000

			3.3. At least one completed Energy Performance Contract (EPC) for energy efficient lighting retrofit of municipal facilities with local ESCO in Yerevan 3.4. Models replicated in 5-10 other cities			
Pilot urban green lighting projects	Inv	Widespread application of EE urban lighting in Armenian cities	4.1. At least 5 implemented community-led and financed EE public lighting projects (court yards, parking, playgrounds, parks) in Yerevan 4.2. Installed and operational energy efficient street lighting systems in Yerevan's key avenue 4.3. Completed energy efficient lighting upgrades in at least 5 municipal building in Yerevan	GEFTF	750,000	7,150,000
Sub-Total					1,500,000	8,100,000
Project Management Cost ⁵				GEFTF	100,000*	500,000
Total Project Costs					1,600,000	8,600,000

*This is in line with GEF guidance on PM cost “project management costs shall not exceed **10 percent** of total project costs for projects requesting GEF grants up **to \$2 million**”. The requested amount is within the established threshold of 10%. It will cover the cost of full-time Project Manager. The rest of PM costs, i.e. administrative and financial support, travel, office expenses, costs of audit, independent evaluation, Steering Committee, etc, etc, will be covered by UNDP.

C. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE AND BY NAME IF AVAILABLE, (\$)

Sources of Cofinancing	Name of Cofinancier	Type of Cofinancing	Amount (\$)
GEF Agency	UNDP	Grant	2,400,000
Local Government	Municipality of Yerevan and other municipalities (to be identified at PPG stage)	In-kind	1,500,000
National Government	Ministry of Nature Protection	In-kind	250,000
Private Sector	OeKB Austria	Grant	100,000
Private Sector	Under selection	In-kind(Cash)	4,250,000
Bilateral Aid Agency (ies)	SlovakAid	Grant	100,000
Total Cofinancing			8,600,000

D. GEF/LDCF/SCCF/NPIF RESOURCES REQUESTED BY AGENCY, FOCAL AREA AND COUNTRY¹ – N.A.

This is a single focal area, single country, single GEF Agency project, and single trust fund project.

¹ In case of a single focal area, single country, single GEF Agency project, and single trust fund project, no need to provide information for this table

² Please indicate fees related to this project.

⁵ Same as footnote #3.

PART II: PROJECT JUSTIFICATION

A. DESCRIPTION OF THE CONSISTENCY OF THE PROJECT WITH:

A.1.1. [GEF focal area/LDCF/SCCF](#) strategies /[NPIF](#) Initiative:

Proposed project is consistent with GEF climate change mitigation (CCM) focal area strategy and is designed to contribute to the achievement of **CCM Strategic Objective 2** “Promote market transformation for energy efficiency in industry and the building” by promoting investment, technologies and policies for green urban lighting in Yerevan and other major Armenian cities.

A.1.2. For projects funded from LDCF/SCCF: the LDCF/SCCF eligibility criteria and priorities: N.A.

A.1.3. For projects funded from NPIF, relevant eligibility criteria and priorities of the Fund: N.A.

A.2. National strategies and plans or reports and assessments under relevant conventions, if applicable, i.e. NAPAS, NAPs, NBSAPs, national communications, TNAs, NIPs, PRSPs, NPFE, etc.:

The proposed project is in compliance with the national priorities to strengthen the economic and energy independence of the Republic of Armenia by promoting resources efficient and climate resilient growth. In particular, the project is consistent with the following national policies and strategic documents:

2nd National Communication to UNFCCC: identifies energy sector as the main source of GHG emissions and *energy saving measures* as the largest and most cost-effective opportunities for GHG emission reduction.

Energy Sector Development Strategy in the Context of Economic Development of Armenia (2005). The strategy covers the period until 2025 and aims at addressing the following issues: contribute to sustainable economic development of Armenia and ensure energy security, including maximum utilization of renewable and nontraditional sources of energy; promotion of *energy saving*; and environmentally friendly energy supply.

National Program on Energy Saving and Renewable Energy (2007) recognizes energy efficiency as a key means for ensuring energy security and availability. The program provides assessment of the energy saving potential in power supply, heat supply and gas supply systems in the industrial production, transportation, housing and public sectors, as well as assessment of the potential for renewable energy and measures for effective exploitation of the energy saving potential. The program specifically *emphasizes the existence of potential for energy saving via improvement of street lighting systems in Armenian cities and towns.*

B. PROJECT OVERVIEW:

B.1. Describe the baseline project and the problem that it seeks to address:

Context: Modernization and beautification of Armenian cities

In Armenia, 12 cities generate almost 90% of the nation's GDP. Their competitiveness and attractiveness are therefore critical to the country's sustained economic growth. However, urban

infrastructure and municipal services delivery in most Armenian cities and towns are deficient. To provide more competitive environment for economic development and adequate living and working conditions for their residents and guests, Armenian cities are actively pursuing **modernization projects** to revamp their urban environment. The capital of Yerevan has been leading modernization efforts and attracted sizable private and public sector investment in city development. Annually, about US\$ 30 million is being invested by the municipality only for the improvement of its roads and associated infrastructure. One of the most recent initiatives is the launch in June 2011 jointly with UNDP of the “**Beautiful Yerevan**” project aimed at regenerating the urban environment in Yerevan by refurbishing municipal buildings, repairing streets and sidewalks, recuperating old and creation of new public spaces, repairing and renovation of other urban infrastructure in Yerevan. Furthermore, the Municipality of Yerevan is currently seeking private concessions for a number of flagship urban development projects aiming at construction and refurbishment of new public spaces (parks and amusement centres, shopping and recreational areas) for a total of US\$ 120 million.

Baseline project: Urban Lighting in Yerevan

The focus of the proposed project is on **Urban Lighting** sector, which covers all lighting installations which are managed and paid for by municipalities, such as lighting of outside public areas (e.g., streets, bikeways and pedestrian pathways, parks and rest areas and other open spaces, parking areas), illumination of city buildings (museums, monuments, religious and touristic objects), lighting system in municipally-owned and operated buildings and facilities (e.g., administrative offices, schools, hospitals, municipal facilities), and yards in residential areas. Urban lighting is one of the key resource-consuming sectors in municipalities that has so far been overlooked by city authorities and where significant technology advances have made energy saving and GHG mitigation options very cost-effective. It is the second largest source of municipal GHG emissions (after heating), accounting for about one third of municipalities’ GHG emissions and up to 50% of their electricity bill. **Urban lighting costs of Armenian municipalities account for more than US\$ 5 million per annum (power costs and maintenance).** The capital city of Yerevan has the largest energy consumption and saving potential in its lighting sector: it accounts for 90% of all urban lighting energy use in the country and consume about 56,000 MWh/year.

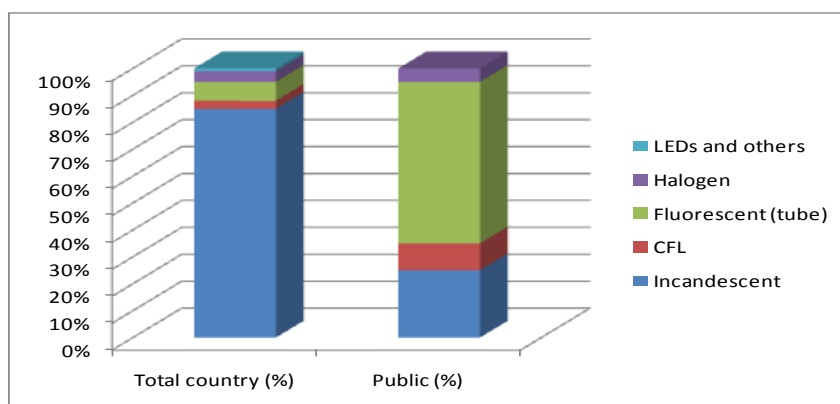
There is a large, yet untapped energy- and cost-saving potential in urban lighting systems, both outdoors and in municipal buildings and facilities. As shown in Table 1, street lighting power use in Yerevan is 1.3-1.5 times higher than the average street lighting power consumption in European cities and towns.

Table 1: Street lighting energy use in Yerevan and EU

	Germany	Vienna	Yerevan
Lighting Points (LP), #	9,125,000	150,000	50,000
Power Use, kWh/year	4,000,000,000	56,000,000	29,000,000
Power Use, kWh/LP/year	438	373	580

There is very little application of efficient lighting technologies (CFL, LEDs, and solar PV), in the country, let alone the adoption of such advanced features as intelligent lighting control systems, which are totally absent. Streets in Yerevan as elsewhere in the country are being lit by old 1960s technologies, such as high pressure sodium and mercury arc lamps (DRL); and public buildings predominantly use inefficient fluorescent and incandescent lamps (See Figure 1).

Figure 1: Utilization of lighting technologies in buildings



The following activities and investments are to take place in line with Yerevan's urban lighting sector *i.e. maintenance and retrofit of street lighting and installation of new lighting installations in public areas*:

- Yerevan Municipality continues paying its substantial energy bill for urban lighting services (about US\$ 4.5 million/year). It will also cover the costs of regular repair and maintenance of city's lighting infrastructure (about US\$ 2.7 million/year) and is interested in making additional investment of about US\$ 1 million to introduce LED on a pilot basis.
- The municipality will introduce a concession for capital investment in new and maintenance of existing street lighting systems.
- Austrian Bank, OeKB, will make grant contribution to the Municipality of about US\$ 100,000 to conduct energy audit and elaborate action plan for EE street lighting in Yerevan
- UNDP/Municipality "Beautiful Yerevan" Initiative will implement several infrastructure upgrade projects in selected public areas with a focus on creation of "green" jobs and promoting energy efficiency lighting worth US\$ 2.2 million (see Section C for details)
- New urban development projects will be pursued worth over US\$ 120 million for the construction and rehabilitation of flagship public spaces, such as Victory Park, with investment in new lighting systems constituting at least 5% or US\$ 6 million.

Because street lighting luminaires have an estimated lifetime of 30 years and the market for replacement or renovation of those installations is large, under BAU, street lighting retrofits/upgrades are based on old, energy inefficient technology. An additional barrier to increase the energy efficiency of existing street lighting installations is the lack of simple, energy saving, retrofit measures such as the self-ballasted compact fluorescent lamp in domestic lighting. Lamps in street lighting are mostly High Intensity Discharge lamps that need an appropriate ballast and optic system. In most cases the ballast and even the luminaire in its entirety need to be replaced, which is not to happen under BAU. Further, because the old, less performing technology is still widely available on the market and is cheaper than more EE solution, new street lighting installation will also likely to be based on inefficient solutions. The current planned investments in urban lighting present an excellent opportunity to promote and demonstrate energy efficient or green lighting solutions in Armenia. However, there are a number of barriers that hinder the application of EE urban lighting in Armenian cities.

such as:

Information and knowledge:

Firstly, there are no information and system to collect about the exact power consumption by public lighting systems (lighting bill “sit” within the overall municipal power bills which do not differentiate by type of power use), and which make it difficult to grasp the level of energy usage and inefficiencies. Furthermore, there is very limited practical knowledge of and information about modern efficient lighting technologies, their design features and the potential for cost- and energy-saving. Finally, there is little awareness among municipalities about the ancillary benefits of green lighting such as making public spaces, places and transport networks safer, with less crime, and more conducive for economic and social activities. This information and knowledge gap can be overcome via the implementation and monitoring of highly visible /“flagship” urban development projects demonstrating various economic, social and environmental benefits of green lighting. The Municipality of Yerevan is interested in making pilot investment in modernization of its street lighting system using LED and smart lighting technologies, but lacks expertise and capacities to design and implement such initiative.

Policy and regulations:

National Program on Energy Saving and Renewable Energy (2007) and Action Plan (2010) emphasize political importance of energy efficiency for Armenia. However, neither the Program, nor its Action plan envisages any specific policy measures, incentives or other measures for the municipal authorities to realize large energy saving potential in street lighting. There are no specific provisions regarding lighting and no mandatory requirements for energy efficiency of urban lighting in particular, neither in the Law on Energy Saving and Renewable Energy, nor in the building code. As a result, urban development projects are being planned and implemented without taking into consideration the need to achieve maximum efficiency and optimal lighting requirements (such as light density and distribution, light depreciation over the lamp time, maintenance requirements, life-cycle cost-effectiveness, light pollution, etc). When municipalities are making own investment, they are bound by the procurement rules which also favor least cost solutions and do not take full operational costs and benefits into account. Policies and regulations governing municipal investment in public infrastructure are ought to be changed to promote greater efficiency in urban lighting systems. Finally, penetration of efficient lighting technologies and products is hampered by the absence of a favorable national policy framework for energy efficient lighting product imports and safe disposal of mercury-containing lamps. As a result, consumer confidence and municipal interest are undermined as the market is gradually being flooded with inefficient low-quality CFLs and LEDs, which once and very quickly disposed, pose additional challenge for municipal authorities to take care off.

Institutions in charge of urban lighting:

There are a number of entities involved in urban lighting management. At the community level, associations of apartment owners (AAOs) are expected to provide for the management of common space and organize tenants to pay the bill. In practice, however, it is the municipality who stays in charge due to the low capacity of AAOs in technical and financial matters. This is a barrier that the proposed project seeks to address. Without proper involvement and capacity building of AAOs, implementation of any community-based EE measures in multi-apartment building blocks (where majority of Armenian urban residents live) is impossible. This is because according to the law,

AAOs are in charge of communal property management in multi-apartment buildings and therefore have to be adequately capacitated to implement this function. In Yerevan the municipal lighting company, Yerevan Luys, is responsible for outdoor lighting system management and upgrade. Company's ability to provide for adequate maintenance, let alone modernization, have been limited which prompted Municipality of Yerevan to start preparing the concession for a private partner to take over street lighting system. This on-going preparation represents a good opportunity to integrate energy efficient requirements and investment in system EE upgrade in the concession requirements. Finally, energy management system in public buildings is absent. Municipality is paying energy bills and investing in maintenance and capital renovation of hundreds of municipal properties and buildings every year, but have no practical means to reduce lighting bill and ensure energy efficient lighting is an integral part of public procurement and building retrofits.

Financing for urban lighting:

Urban lighting energy bills is substantial, i.e., US\$ 4.5 million a year only in the city of Yerevan. However, there is no dedicated source of funds to cover municipal investment in green lighting. Nascent ESCO business is not yet sufficiently familiar with lighting projects (due to information and capacity gaps described earlier). AAOs are not properly organized to finance and fundraise for community-level lighting improvements. Private and municipal investment in urban infrastructure while substantial does not prioritize and realize cost-saving opportunities of green lighting. On the financial market, there are no products available which are structured and adapted specifically to EE lighting projects. To address this barrier, project will work with financial institutions (Armenian EE/RE Fund, ArmSEFF and local banks) interested in the development and marketing of energy efficiency lending to work out targeted financial packages for EE lighting.

- B. 2. [Incremental /Additional cost reasoning](#): describe the incremental (GEF Trust Fund/NPIF) or additional (LDCF/SCCF) activities requested for GEF/LDCF/SCCF/NPIF financing and the associated [global environmental benefits](#) (GEF Trust Fund/NPIF) or associated adaptation benefits (LDCF/SCCF) to be delivered by the project:

The GEF funded alternative will address barriers to green urban lighting in the capital of Yerevan and other Armenian cities. In doing so it would raise awareness and capacities of relevant municipal stakeholders and city residents about green lighting, create more conducive national and local policy and regulatory framework and demonstrate practice institutional and financing models for design and demonstration of flagship urban green lighting projects in Yerevan.

The **objective** of the GEF funded alternative is the removal of barriers to energy efficient (green) lighting in Armenian cities. To realize this objective, the proposed project will carry out several activities that will deliver specific outputs that will enable and facilitate the removal of the barriers to energy efficient urban lighting in Armenian cities. The following are the various inter-related components of the proposed project:

Component 1: Knowledge and capacities for urban green lighting

This component is designed to remove informational and knowledge-related barriers to green urban lighting among city authorities, lighting professionals and residents. As a result, municipal authorities in Yerevan and other major cities will have reliable information about urban lighting energy use and saving potential, and will become familiar with modern EE lighting technologies and their economic, social and environmental benefits. The expected outputs will include:

- 1.1. Approved and enforced system in place to collect and analyse data on urban lighting energy use, as well as to monitor the improvements and energy, environment and social impacts of energy efficient lighting (EEL). The project will support development and introduction of such system in

Yerevan and its subsequent replication in other Armenian cities and towns.

1.2. At least 10 completed public lighting energy audits in the capital and other major cities (to be co-financed by participating municipalities).

1.3. Approved and enforced guidelines on green lighting applications for urban planners, architects and municipal energy managers available to all Armenian municipalities.

1.4. Completed educational campaigns, exhibits and displays of advanced green lighting technologies.

1.5. Completed study tour to GEF Public Lighting project in Central Europe (100% co-financed by Slovak and Czech ODA Trust Funds, managed by UNDP)

Component 2: Policies, regulation and enforcement capacities to promote green urban development with a focus on energy efficient lighting

Under this component, national policies, regulations and institutions will be strengthened to promote greater efficiency of urban lighting systems. The focus will be on adoption and enforcement of national energy and quality performance standards for lighting products and systems, revision of urban development code and public procurement rules, and regulation for collection and disposal of mercury containing lamps. At the municipal level the proposed changes concern adoption of city-wide green lighting targets and testing the system for collection and disposal of mercury containing lamps. Specific outputs will include:

2.1. Adopted municipal targets and action plan for EE lighting by at least 10 cities, including the capital of Yerevan.

2.2. Revised and approved national urban development and building codes that incorporate minimum efficiency requirements for urban lighting systems based on international best practices and standard recommendations in collaboration with leading international players in this field, such as GEF/UNEP en-lighten, CLASP and EU Lighting Association Initiative (see also section B.6). As a result all investment in new and upgrade of street lighting installations will have to meet new energy efficiency requirements to be stipulated in the revised urban development code.

2.3. Revised and approved public procurement rules to favour green products, including energy efficient lighting. This is an important policy change as it will allow to unlock sizable municipal investment in direct procurement of more energy efficient lighting product and services and thus will contribute to sustainability of investment in green urban lighting after project completion.

2.4. Approved and enforced national minimum quality standards and enforcement mechanism for imported lighting products based on international best practices in collaboration with leading international players, such as GEF/UNEP en-lighten, CLASP and EU Lighting Association Initiative (see also section B.6).

2.5. Formulated and approved national regulations for safe disposal of mercury-containing lighting products adopted and pilot system introduced in Yerevan.

Component 3: Institutional and financing models for pilot investment in green lighting projects

This component will aim to significantly increase investment in green urban lighting by supporting the design, establishment and operationalization of innovative institutional and financial models and schemes. These will include community-based green fund for residential investment in common areas, public-private partnership for street lighting management, and ESCO investment in energy efficient lighting retrofits in municipal buildings.

3.1. Established and operational model **green community fund**.

UNDP has successfully piloted community-based revolving funds in Kazakhstan, whereby cost-

saving from EE investment are accumulated on special accounts managed by condominiums and re-invested in further EE measures. Proposed project in Armenia will help to establish and institutionalize such model in Armenia, specifically in relation to public space lighting. While small on individual basis, this mechanism has a potential to generate sizable financing flows from urban residents at the city/country scale. There are 2 mln urban residents in Armenia (including 1.2 mln in the capital of Yerevan); even with small contribution of 1 US\$/capita, there is a possibility to raise additional 2 mln US\$/year into EE lighting for communal areas. To unlock this potential the project will help demonstrate how such funds can be set-up and jointly managed by residents and their associations and then facilitate replication nation-wide.

3.2. Established and operational **public-private partnerships (PPPs)** on street lighting management and modernization in Yerevan. PPP is a successful model for attracting EE investments in street lighting which worked well across EU and transition countries. Municipality of Yerevan is keen to follow the same model and is working on a concession for upgrade, operation and maintenance of its street lighting. The project will facilitate organization of the tender, contract award and monitoring for the **concession on EE street lighting management and upgrade** in Yerevan. Implementation of the proposed PPP model will ensure sustained investment in green urban lighting in Yerevan (which account for 90% of Armenian urban lighting sector) for at least 20 years, including 15 years post-project. The project will support its implementation in Yerevan and replication in other municipalities.

3.3. At least one completed **Energy Performance Contract (EPC)** for energy efficient lighting retrofit of municipal facilities with local **ESCO**. Armenia already has, although small but well-established ESCO market and business model (as a result of USAID-supported ESCO Development Program implemented in early 2000s). So far the focus of EPC contracts was on heating and industrial sector only. The proposed project will build on this and support existing local ESCOs to enter the lighting sector. GEF assistance will cover: technical support and advice to ESCOs on project design, legal and institutional advice with structuring EPCs, and facilitating access to financing⁶. Specifically, the project will develop and implement a) standard EPC for municipal EE lighting projects; b) standard monitoring and verification system for lighting-related energy saving; c) a package of standardized EE lighting solutions for municipal facilities. Having uniform provisions in place will significantly reduce risks and transaction costs of ESCO investment in municipal EE lighting. Also, project will work with financial institutions (Armenian EE/RE Fund, ArmSEFF and local banks) interested in the development and marketing of energy efficiency lending to work out targeted financial products for EE lighting and facilitate ESCOs' access to credit resources based on terms and provisions of a standardized EPC. All these activities are meant to create predictable and attractive conditions for ESCOs' operations and thus attract additional financing for EE lighting retrofit projects in municipal facilities. UNDP-GEF will support at least one EPC throughout full implementation period (from structuring through technical design and securing financing to monitoring and verification of saving

3.4. Based on analysis of established pilot models, PPPs, ESCO and community funds, their replication will be supported in five to ten other cities.

Component 4: Green urban lighting demonstration

The aim of this component is to demonstrate technical and economic feasibility, as well as various ancillary benefits of green lighting technologies to facilitate their widespread adoption by the Armenian cities. Demo-projects will be implemented within the framework of institutional and financial models set up under Component 3. GEF, UNDP, municipal and residents' funding will be

⁶ At PIF development stage, consultation were conducted with the Armenian EE/RE fund and the Sustainable Energy Financing Facility (ArmSEFF), as well as with a number of local banks, which indicated their willingness and interest in EE lighting projects.

pooled together for implementation of demonstration projects, as well as private sector contribution to be secured during the PPG phase. Specific outputs will include:

- 4.1. At least 5 implemented community-led and financed public lighting projects (court yards, parking, playgrounds, parks)
- 4.2. Installed and operational energy efficient street lighting systems in Yerevan's key avenue
- 4.3. Completed energy efficient lighting upgrade in at least 5 municipal building

The expected direct global environmental benefits from the demonstrations that will be carried out under the project are in the range of 200 tCO₂/year or 3,000 tCO₂ over the lifetime of the applied EE lighting technology. The estimated indirect cumulative impact from market transformation efforts is 40% from street lighting energy saving potential and 50% of indoor public lighting or about 190,000 tCO₂ as detailed in Table 2 below.

GHG emission reduction	Activity	Annual energy consumption, MWh		Total energy saving, MWh	GHG emission reduction, tCO ₂ e	
		BAU	Project		Annual	Total
Direct	EE Steert lighting: 2,000 installations	1,160	580	580	220	3,306
TOTAL Direct:						3,306
Indirect	40% reduction in energy use for street lighting in Yerevan	29,000	11,600	17,400	6,612	99,180
	50% reduction in energy use for indoor public lighting in Yerevan	32,000	16,000	16,000	6,080	91,200
TOTAL Indirect						190,380

- B.3. Describe the socioeconomic benefits to be delivered by the Project at the national and local levels, including consideration of gender dimensions, and how these will support the achievement of global environment benefits (GEF Trust Fund/NPIF) or adaptation benefits (LDCF/SCCF). As a background information, read [Mainstreaming Gender at the GEF.](#)⁷:

The following socio-economic benefits are envisaged as a result of the project:

- 1) Energy saving and associated cost reduction for municipalities will account for cca 40% in lighting energy use or cca US\$ 1.2 million/year in municipal spending, which makes 1% of the city budget.
- 2) The project will introduce LED-based street lighting, which apart from energy saving can provide for better light quality, improved visibility and perception of street safety⁷, the latter are important social benefits closely associated with energy efficiency technology to be promoted by the project. .

⁷ Case studies documenting strong positive assessment of LED street lighting in terms of brightness, uniformity and positive impact on safety: [Toronto, Canada](#); [Oakland, USA](#), [Portland, USA](#);

B.4 Indicate risks, including climate change risks that might prevent the project objectives from being achieved, and if possible, propose measures that address these risks to be further developed during the project design:

Risk	Risk Rating	Risk Addressing Measures
Co-financing for demonstration do not materialize	M	Securing firm commitments of responsible agencies and partners during the project design stage. Municipality of Yerevan and UNDP has both confirmed their commitment to allocate about US\$ 3.2 million to support demonstration. In addition, UNDP will work with private sector stakeholders throughout PPG to secure their firm agreement to co-finance demonstration
Proposed policy changes are not adopted or not sufficiently enforced	M	All proposed policy changes are in line with stated national priorities and objectives in the area of climate change mitigation and energy efficiency. Involvement of the Ministry of Natural Resources and Yerevan Municipality as key National Implementing Partners, will secure required political backstopping to the proposed policy changes at the national and municipal level. UNDP has successful track record in Armenia with promoting policy reforms, such as in district heating sector, and will build on its past experience and lessons learnt. In addition, at PPG stage written confirmation of the Governmental commitment to adopt EE performance and quality standards for lighting will be obtained, including the detailed roadmap and timetables for standards adoption and enforcement. Enforcement mechanisms for each proposed policy action will be elaborated at PPG stage and provisions made in the project to build the capacities of relevant national and municipal agencies.
Inadequate project implementation and coordination with other initiatives	M	In particular, for design and implementation of demo-projects, implementation time-frame and coordination with other partners and co-financiers is critical. At PPG, detailed implementation and procurement plans will be prepared and approved by all partners. UNDP Armenia has experience with implementing similarly complex projects for construction of pilot EE buildings; the same model and institutional arrangement for procurement will be adopted for green lighting projects.
Increased urban lighting will cause electricity consumption to rise even if energy efficient products are promoted.	M	The project will collaborate with the national power utility company, JSC "Electric Networks of Armenia", on the establishment of monitoring and metering system on urban lighting energy use, including the feasibility of introducing smart-metering system for street lighting as part of the company's demand side management program.

B.5. Identify key stakeholders involved in the project including the private sector, civil society organizations, local and indigenous communities, and their respective roles, as applicable:

Partner	Joint activities/ complementarily
Ministry of Nature Protection	<ul style="list-style-type: none"> • Coordination and supervision of the project implementation in accordance with UNDP and GEF procedures • Evaluation of GHG mitigation potential of the project (including demonstration projects) and its further replication • Development and adoption of regulation for environmentally safe collection and disposal of used lighting appliances

Municipality of Yerevan	<ul style="list-style-type: none"> • Design, implementation and monitoring of a demonstration project on EE street lighting in Yerevan: <ul style="list-style-type: none"> ○ Selection of the pilot area (is supposed to be the Mashtots avenue from the Victory bridge till Matenadaran, or/and adjacent streets), ○ Energy audit of the selected area for assessment of baseline situation with regard to the energy consumption (partly in the framework of the Austria funded technical assistance project. Assessment of technical condition of the system, and optimization opportunities for identification of the energy efficiency measures with highest reduction potential. ○ Training of the staff of the Yerevan Luys specialized company.
Ministry of Energy and Natural Resources of RA	<ul style="list-style-type: none"> • Provision of support to adoption and enforcement of regulatory and institutional framework
Ministry of Urban Development	<ul style="list-style-type: none"> • Integration of minimum lighting efficiency standards into relevant building and urban development codes
National Institute for Standardization	<ul style="list-style-type: none"> • Development and adoption/conformity of a minimum performance standard and an appropriate technical requirement for lighting products.
Joint-Stock Company "Electric Networks of Armenia"	<ul style="list-style-type: none"> • Collaboration on establishment of monitoring and metering system on urban lighting energy use • Design and implementation of demonstration projects on street lighting • Awareness campaign to consumers
Local self-government body (municipality) of the selected pilot site	<ul style="list-style-type: none"> • Design, implementation and monitoring of community-based demonstration projects and EE lighting upgrade in municipal buildings
State Engineering University of Armenia	<ul style="list-style-type: none"> • Education, training and awareness raising events
Non Governmental Organizations	<ul style="list-style-type: none"> • Trainings and awareness raising campaigns • Consumer rights protection from non quality products in the market

The primary means of stakeholder coordination will be via the Project Steering Committee (PSC), which will provide an official, ongoing forum for coordinating and synchronizing the work of various government agencies and other partners. PSC will include senior representatives from 3 national agencies, Ministries of Nature Protection, Energy, and Urban Development, as well as from the Municipality of Yerevan, NGOs and relevant private sector partners. PSC will meet at least twice a year or more often, including in its enlarged capacity (if involvement of other partners is required).

B.6. Outline the coordination with other related initiatives:

The proposed project will operate in close collaboration with two other on-going UNDP/GEF projects on energy efficiency in Armenia. The UNDP/GEF full-sized project “Removing Barriers to Energy-Efficient Municipal Heat and Hot Water Supply,” which will conclude around the time of the inception of the lighting project, has already been providing valuable connections with outreach partners, including apartment-owner associations and the Municipality of Yerevan. The UNDP/GEF full-sized project “Improving Energy Efficiency in Buildings (IEEB)” will also offer collaborative assistance with regard to building codes and demonstration projects in public buildings. Some objectives of the IEEB project are in line with those of the proposed project, thus, combination of efforts (e.g. integration of minimum lighting efficiency standards into building codes) will be mutually beneficial. Specifically, the UNDP-GEF “Improving Energy Efficiency in Buildings” project focuses on building envelope and will introduce new mandatory energy efficient building code that require a strict energy performance target (including for lighting). The proposed Green Urban Lighting project will complement these efforts by working on another

Building Code “On Design of outdoor lighting of cities, villages, and rural population centers.”; the Code will be revised to introduce minimum energy performance standard for *outdoor lighting systems*.

All three projects will be overseen by UNDP Climate Change Programme Coordinator and Head of UNDP Energy and Environment Unit of UNDP in Armenia (as described below in Section C). Collaboration will also be sought with the Armenian Renewable Resources and Energy Efficiency Fund which provides financial support to energy efficient projects (but so far has only focused on the heating sector).

At the international level, the project will work closely with and benefit from the GEF/UNEP en-lighten Initiative, CLASP and EU Lighting Association. Specifically, quality standards, as well as required testing methodology and enforcement mechanisms to be introduced under Component 2.4 will not be developed from scratch, but rather will be adopted based on international best-practices and standards as developed by en-lighten and other international partners.

Collaboration with new EU member states, such as Czech and Slovak Republics, will be established (co-financed by respective Governments) to learn about these countries’ practical experience with transposition of their technical regulation, norms and standards in line with EU requirements.

C. DESCRIBE THE GEF AGENCY’S COMPARATIVE ADVANTAGE TO IMPLEMENT THIS PROJECT:

Technical expertise with public lighting

In Europe and CIS, UNDP has successfully developed and delivered dozens cost-effective public lighting (PL) modernization projects. For example, in Russia and Slovakia, UNDP-GEF PL demonstration projects achieved up to 50-60% energy and cost saving impact (see Table 2). This makes us confident that 40% energy saving target as adopted in this proposal for Armenia is highly conservative and achievable. To facilitate knowledge exchange between UNDP-GEF PL projects and Armenia, a study tour to Slovakia will be organized (co-financed from Slovak Bilateral assistance funds).

Leveraging investment in energy efficiency

In Armenia alone, during last three years UNDP leveraged more than US\$ 18 million of private and public investment in restoration of municipal heat supply systems based on energy efficient and renewable energy technologies. In particular, UNDP effectively facilitated the establishment of new Heat Supply Company, based on PPP model between Municipality of Yerevan and foreign investor, for US\$ 10 million worth reconstruction of district heat supply system in the Avan district of Yerevan (7000 residents, 30 apartment buildings). This hands-on experience with mobilizing private investment in energy efficient municipal services is essential for the success of proposed urban lighting project and will be fully utilized by UNDP.

Table 2: Results of public lighting demonstration projects in Russia and Slovakia

	Russia	Slovakia
Lighting Points (LP), #	1,220	115
Power Use, kWh/year	1,014,000	62,545
Power Use, kWh/LP/year	831	544
Saving, %	61%	57%
Saving, kWh/year	616,000	35,392
Saving, kWh/LP/year	505	308
Costs, US\$	385,500	40,000
Annual saving, US\$/year	98,560	5,687
Simply pay-back	4	7

Community mobilization for energy efficiency projects in Armenia

UNDP also has proven track record with community-mobilization and building capacities of association of apartment owners (AAOs) to engage in energy efficient projects. In Kazakhstan, with UNDP-GEF support more than 300 AAOs initiated investment in energy efficient retrofits. In Armenia, UNDP facilitated signature of 197 new contracts between condominiums and EE service providers and implemented several pilot projects on co-financing principles with municipalities. The proposed project will build on and utilize UNDP's network of condominiums and expertise with community mobilization and outreach.

C.1. Indicate the co-financing amount the GEF agency is bringing to the project:

UNDP's comparative advantage lies in its capacity to broker finance from national and international sources, to assist countries to meet their environmental finance needs. In line with UNDP's mandate as chair of the UNDG it plays a key role in the leveraging of resources from a range of funding sources in the construction of a project funding package. UNDP has initially brokered US\$ 6.6 million for this project from multiple sources, to be confirmed during further project preparation, including US\$ 2.2 million to be delivered via "Beautiful Yerevan" project to cover the capital costs of demo lighting projects under Component 4 (see Text Box C1.1). UNDP contribution also includes a US\$ 200,000 UNDP TRAC allocation to co-finance project management costs. In-kind UNDP support will also be provided through its broader poverty and governance portfolio and through the range of technical staff working in the environment, as detailed in the next section.

Text Box C.1.1: Beautiful Yerevan Project: a replicable and sustainable development model for social inclusion and urban renewal. The main development objectives of this **joint UNDP/Municipality of Yerevan** Project are (1) to contribute to the regeneration of the urban environment in Yerevan, thus making the city more attractive places to live in and work and (2) to formulate and implement more efficient social policies that will contribute to improved employability of disadvantaged groups. The project consists of a number of small-scale high-priority and visibility sub-projects. The project is being implemented in phases starting with identification of pilot sites, preparation of technical specifications, and provision of training for the unemployed beneficiaries, pilot project implementation, monitoring and evaluation of results. Possible areas for interventions under Beautiful Yerevan project include:

- Restoration of historic and cultural heritage buildings/sites;
- Rehabilitation of city parks and recreation areas, children playgrounds and sport facilities;
- Refurbishment - with emphasis on energy efficiency measures as well as facilities for disabled - community centers, museums, etc;
- *Introduction of energy efficient street lightening;*
- Weatherizing of multiunit apartment blocks;

- Renovation of public squares, market places, etc.

C.2. How does the project fit into the GEF agency's program (reflected in documents such as UNDAF, CPA CAS, etc.) and staff capacity in the country to follow up project implementation:

Project is in line with 2010-2015 UNDAF Outcome 4: Environment and disaster risk management is integrated into national and local development frameworks, as well as expected Agency Output **4.1.4 “National and local capacities to develop innovative policies and practices to address climate change mitigation and adaptation strengthened”** and **Output 4.1.5 “Innovative policies and practices for environmentally sound, energy efficient technologies and cleaner production developed and implemented”**.

The UNDP Country Office will assign seven staff members to be responsible for the overall management and supervision of the project implementation. In particular, Environmental governance portfolio (EG) analyst (fifteen year of experience in programme policy development, environment and energy project design and execution at national and international level with background in industrial engineering and two MSs) will be responsible for the overall supervision and monitoring of the project activities, coordination with national government and other stakeholders.

The project will be under the direct supervision of the Head of Climate Change Programme, who has PhD in Biology and 12 years of experience in energy efficiency and climate change and was directly involved in design and implementation of a number of flagship EE projects in Armenia in the past.


Technical backstopping and implementation support on Procurement, Finance and Human Resources will be provided by five staff members – Finance Analyst (a Certified Management Accountant from Institute of Management Accountants, Montvale US with more than seven years experience in finance and management accounting of which five years are at the international level) and Finance associate (19 years of professional experience in Finance and Accounting including 7 year with UNDP), Procurement Associate (with UNDP in Armenia since 1993), HR associate (more than 10 years of experience in UNDP). These four staff members are directly supported and supervised by the Operations Manager (PhD, twelve years of professional experience in development programme and operations management in UNDP).

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY(IES)

A. RECORD OF ENDORSEMENT OF GEF OPERATIONAL FOCAL POINT (S) ON BEHALF OF THE GOVERNMENT(S): (Please attach the [Operational Focal Point endorsement letter\(s\)](#) with this template. For SGP, use this [OFP endorsement letter](#)).

NAME	POSITION	MINISTRY	DATE (MM/dd/yyyy)
Aram Harutyunyan	GEF Operational Focal Point	MINISTRY OF NATURE PROTECTION OF THE REPUBLIC OF ARMENIA	09/20/ 2011

B. GEF AGENCY(IES) CERTIFICATION

This request has been prepared in accordance with GEF/LDCF/SCCF/NPIF policies and procedures and meets the GEF/LDCF/SCCF/NPIF criteria for project identification and preparation.					
Agency Coordinator, Agency name	Signature	DATE (MM/dd/yyyy)	Project Contact Person	Telephone	Email Address
Yannick Glemarec UNDP/GEF Executive Coordinator		12/22/11	Marina Olshanskaya Regional Technical Advisor Climate Change Mitigation	+421 907 840 152	marina.olshanskaya@undp.org