# TRANSFORMING THE MARKET FOR EFFICIENT LIGHTING IN UKRAINE (TMEL)

UNDP/GEF PROJECT 00076692 (PIMS 4175)

**TERMINAL EVALUATION REPORT** 

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Project Data: Transforming the Market for Efficient Lighting in Ukraine					
Title of UNDP Supported GEF Financed Project	Transforming the Market for Efficient Lighting in Ukraine (TMEL)				
UNDP and GEF Project IDs	UNDP Project ID: 00076692 GEF Project ID: 4175				
Evaluation Timeframe and Date of Evaluation Report	Content	Time			
	Meeting at the PMO	15 December, 2016			
	TE Visit	23 January – February 2017			
	Presentation of initial TE findings	3 February 2017			
	Report drafting and analysis	20 January – 20 February 2017			
	Submission of Draft TE Report	21 February 2017			
Region and Countries included in the Project	Region: CIS Country: Ukraine				
GEF Operational Program/Strategic Program	GEF Strategic Program No. 1, Promoti and Commercial Buildings (SP-1) GEF Operational Program: 5: Removal energy conservation.	ing Energy Efficiency in Residential of barriers to energy efficiency and			
Implementing Partner and Other Project Partners	UNDP Ukraine Government: Ministry of Ecology and Sector: Maxus Fund (NGO), Epicentre	Natural Resources Ukraine, Private (Retail)			
Date of Inception Workshop	28 November 2011				
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Original Closing Date	31 January 2016				
Revised Closing Date	31 March 2017				
Evaluation Team	International: My Ton National: Petro Pavlychenko				

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# Acronyms and Abbreviations

EE	Energy Efficient
CDR	Combined Delivery Report
CFL	Compact Fluorescent Lamp
CMU	Cabinet of Ministers of Ukraine
CO <sub>2</sub>	Carbon Dioxide
СТА	Chief Technical Advisor
DehrzStandard	State Standard of Ukraine
EA	Executing Agency
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GOC	Government of the Country
GWh	GigaWatt-hour
IA	Implementing Agency
IL	Incandescent Lamp
10	Implementing Organisation
kWh	Kilowatt-hour
LED	Light Emitting Diode
MDG	UN Millenium Development Goals
M&E	Monitoring and Evaluation
MENR	Ministry of Ecology and Natural Resources
MTR	Mid-Term Evaluation Report
Mtn	, Million Tons
MWh	Megawatt-hour
NAER	State Agency on Energy Efficiency and Energy Saving
NEFCO	Nordic Environment Finance Corporation
NGO	Non-Governmental Organisation
NOx	Oxides of Nitrogen
OECD	Organisation for Economic Cooperation and Development
PM	Project Manager
РМО	Project Management Office
РВ	Project Board
PSC	Project Steering Committee
QA/QC	Quality Assurance/Quality Control
RTA	Regional Technical Advisor
SEIA	State Environment Investment Agency
SanPin	Sanitary Regulations and Standards
SNiP	Construction Norms and Regulations of Ukraine
SOx	Oxides of Sulfur
TE	Terminal Evaluation
TMEL	Transforming the Market for Efficient Lighting
ToR	Terms of Reference
TWh	TeraWatt-hour
UAH	Ukrainian Hrivnya (local currency)
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme

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Thanks are also due to various representatives of the Cities of Mykolayiv and Sumy, Odessa Oblast, Odessa Regional State Administration, City and Municipal Governments of Odessa, their advisors, stakeholders from the Private Sector, NGOs, as well as others who have met with the Evaluation Team – we are grateful for your time.

### **Executive Summary**

Pr	oject Data: "Transforming the Market for Eff	icient Lighting in Ukraine"				
Goal of the Project	To reduce the annual growth rate of lighting emissions from the Ukrainian public and res	electricity use and resultant GHG idential sectors.				
Objective of the Project	The enhanced promotion and implementation lighting in Ukraine through the transformation and the phasing-out of incandescent lamp p	on of the utilization of energy efficient on of the local lighting market, products, roduction and sale.				
Major Components and Focus	<ul> <li>TMEL consists of five specific components and outcomes:</li> <li>Component 1: Prepare and set-up national policy framework to promote EE lighting: focuses on improving the national policy framework for promoting energy efficiency and energy efficient lighting and the handling and disposal of spent mercury containing lamps.</li> <li>Component 2: Improve QA/QC framework for EE lighting market: focuses on setting up the framework for national quality assurance and quality control systems for imported and domestic lighting products in Ukraine.</li> <li>Component 3: Efficient lighting demonstration in municipal educational sector: focuses on providing technical assistance and increasing knowledge of EE lighting in this sector.</li> <li>Component 4: Improve EE Lighting product penetration in the Residential Sector: addresses the information and availability gap for EE lighting among consumers.</li> <li>Component 5: Replication and Dissemination of the Project Results: focuses on proviet sustainability measures</li> </ul>					
Project Budget	GEF Fund	USD \$6,500,000				
	Government of Ukraine Co-financing	USD \$19,375,000 (Direct) USD \$1,600,000 (in-kind)				
	Private Sector Co-financing	USD \$3,275,000				
	Other Sources	USD \$250,000 (UNDP)				
	Total Committed Funding	USD \$31,000,000				

#### **Project Description**

The overall goal of the TMEL project was to reduce the annual growth rate of GHG emissions from the Ukrainian public and residential sectors. The project objective was the enhanced promotion and implementation of the utilization of energy efficient lighting in Ukraine, through the transformation of the local lighting products market and the phasing-out of incandescent lamp production and sale. The TMEL project represented an innovative approach to energy efficiency projects, and comprised of an important part of UNDP-GEF portfolio, which would complement and build upon the lessons learned from other similar UNDP-GEF market transformation projects in Russia, Romania and Vietnam.

#### Summary of Conclusions, Lessons Learned, and Recommendations

**Note:** The Evaluation Team believes that the challenges encountered by the TMEL project over the course of its implementation and the lessons learned warrant a longer narrative than is usual with an executive summary.

**CONCLUSIONS**: In general, a case can be made that the TMEL project was able to deliver most of its planned activities and outputs. However, even with initial interest and commitment by the Ukrainian Government, and the project's outputs, not all desired outcomes were achieved. Challenges remain in the final stages of implementation for the project's full outcomes to be realized.

Over the course of its implementation, the TMEL project experienced significant challenges, including:

- Changing national political and economic conditions, including a change in government,
- Worsening security situations in some areas of the country (armed conflict in the eastern areas),
- A collapsed international (and national) carbon market, and
- Rapid technological shifts towards more advanced and efficient lighting products (and corresponding price reduction).

Despite these external challenges, the TMEL project was able to exercise adaptive management, achieved most of its outputs, and delivered on a number of areas not covered by the project document, including close coordination with municipalities and cities to effect the phase out of inefficient lamps.

Possibly due to the scale and ambition of the project's objectives, as well as the fact that TMEL was the first full-scale, market transformation project in Ukraine with complex, interlinked outputs, there were also internal and implementation challenges. Factors contributing to reduce operational effectiveness included inconsistent administrative support, lack of technical input, and changes in key staff: TMEL was managed by three different project managers and was advised by at least two International Consultants/Technical Advisors (CTA) over the span of six years. Neither CTA was engaged from the outset, nor were they fully utilized in all project aspects as envisioned by the project document.

The size of the project team, as well as composition and skillsets of the team resulted in increased costs and reduced efficiency for the project (22% of project budget was spent on staffing). In addition, the team responsible for Partnerships and Relations with Government and National Authorities had a separate reporting structure. While this structure may have recognized the importance and sensitivity of this team's tasks, it allowed for less coordination between the team leader and project manager, and limited interactions with the CTA as well the rest of the project team on matters related to product testing, quality assurance framework, as well as international outreach, among others. Without a CTA, the project commissioned extensive research on its own on a wide array of topics rather than building from, and coordinating with, internationally available work. The conduction of these studies delayed needed activities, and reduced overall project cost effectiveness.

With respect to project expenditures and budget management, the project exercised adaptive management by redirecting spending from the originally planned budget. The continued emphasis on increasing awareness and market penetration showed good results. However, the fact that spending on pilots and demonstrations was much less than originally planned (6% actual vs. 28% planned) was a

significant shift. It also indicated that the project needed better feedback mechanisms for using market intelligence, as there remain high levels of interest for public demonstrations and pilot projects among municipalities not affected by the security situation, and additional spending could have been justified.

The project's informational campaigns were its bright points, and resulted in the creation of a number of highly visible messages for Ukrainian consumers on energy efficient lighting and climate change. However, it must be noted that the project invested significant resources for general awareness raising, and continued to do so even after it has achieved significant gains and advised by the Mid-term Evaluation to refocus (spending on awareness and education accounted for 42% of total component activities). In terms of message longevity and project sustainability, it may have been more effective once increased awareness was achieved to create more linkages with other project outputs and desired outcomes, such as quality control mechanisms or framework, or connecting the characteristics of energy labels and product performance with the need for testing and verification. This is especially important since the technological shift to light-emitting diode (LEDs) occurred much faster than anticipated, resulting in increased availability, penetration, and more competitive pricing, but also issues of quality, and how to properly measure project impacts in this area.

In conclusion, the Evaluation Team has determined that the TMEL project design has remained highly relevant to the development context of Ukraine and the priorities of various stakeholders, including GEF, UNDP, municipal governments, cities, schools, test laboratories, and the private sector. Its combined outputs have met the GEF's guidelines for a **Moderately Satisfactory** project (the project incurred some moderate shortcomings, including lack of output progress on certain components, and inconsistent project progress, resulting in the need for an extension).

**LESSONS LEARNED**: Based on consultations with key stakeholders and the conclusions drawn by the Evaluation Team, some key lessons learned from the TMEL project design and implementation include:

- Interest/support by the appropriate government agency(ies): The project has demonstrated that full support by recipient Government of the Country (GOC) and cooperation between relevant ministries/departments are necessary to achieve the intended outcomes (for example, more than one government ministries is needed to facilitate legislation adoption);
- **Private sector engagement**: Engagement with private sector is necessary for achieving marketrelated goals (for example, working with Epicentre on product promotion, including training of sales staff to realize increased penetration and awareness of efficient lighting products at retail);
- Support awareness with availability: In medium and small cities and rural areas, having products available to consumers in conjunction with awareness campaigns can significantly increase market share.
- Interlink messages: Efforts to increase awareness of energy efficient lighting can be combined with, or followed by focused messages on project outputs and desired outcomes, such as quality control mechanisms or framework, or connecting the characteristics of energy labels and product performance with the need for testing and verification to increase effectiveness.
- Active, engaged, and comprehensive PSC: An active and engaged PSC representing a wideranging group of stakeholders is needed to appropriately address the challenges and risks, as

well as determining when to revise or adopt new objectives based on changing market or political conditions.

- **Update project objectives:** Projects may take longer than expected to be approved, as are proposed legislation, and technological or political developments may happen almost overnight. Such situations may require the project plans to be modified to address new realities.
- Better feedback mechanisms for using market intelligence: A high level of interest for public demonstrations and pilot projects existed during the course of the project implementation, yet this level of interest was not reflected in the annual planning process, which could help to increase focus additional spending for pilots in place of awareness raising activities.
- Administrative communication and coordination: Communication and coordination arrangements are essential to support project planning and implementation, especially under changing market and political situations;
- Administrative support: Projects starting up may require staffing adjustments or other administrative support, such as development of tenders or securing short-term consultants. A good relationship between the project administration and implementation teams can be valuable in helping a project to achieve its initial successes;
- **Comprehensive M&E**: An M&E system that focuses on all key project aspects, including cofinancing, sub-contracts, and impact indicators is essential to assessing a project's progress and impacts;
- **Team composition and skillsets are important factors**: It is important to match the team member skillsets with the project requirements. Market transformation programs, for example, tend to require team members with entrepreneurial traits, who can understand or adapt quickly to changing market situations. Technically-focused projects, on the other hand, can require team members with deep technical knowledge and experience.
- **Clear reporting structure**: A clear reporting structure should be apparent to all team members, and opportunities for coordination and cooperation cross-sector/objectives should be encouraged.
- Adaptive management practices should be encouraged: Projects tend to experience market shifts, but a few may be affected by more than one "game-changing" factors. In these cases, projects are forced to adapt in order to remain relevant. Such examples, where available, should be shared and reviewed to learn from, if possible.
- **Clear documentation:** Instances of significant adjustments to budget or output deliveries need to be clearly documented, with justifications and approvals. This is critical, and can be helpful especially with changes in project management.
- **Technical support by international experts**: For projects that aim to transform the market for products or services, especially to pioneer an approach that can be used by other projects, it is essential to secure the services of an experienced international expert from the outset. Such an expert should have experience in technical issues as well as previous hands-on experience in market transformation projects and can be valuable for implementation input.
- **Draw from international best-practices from the outset**: Securing the services of experienced international experts can also provide projects with access and understanding to best-practices

internationally. While project evaluation and other documentation available from UNDP and elsewhere can provide useful information, finding and accessing them can be a challenge to new project teams learning novel approaches, and understanding this information without the help of an international expert can add another layer of complexity.

• **Market research**: International best-practice information can be further supplemented with research focusing on the local market's particular characteristics or cultural preference, which can increase effectiveness and reach.

**RECOMMENDATIONS**: Based on the above conclusions and the lessons learned, the Evaluation Team recommends the following actions:

- Replication and Up-Scaling: The project has made significant contributions to the awareness of energy efficiency and energy efficient lighting in Ukraine's consumer, local and municipal governments. To ensure the sustainability of this contribution, the outputs in this area need to be maintained and continue to be disseminated. The conversion of retailers and manufacturers to energy efficient lighting, as well as adoption of decrees by municipal and city governments need to be further promoted and adopted by others.
- 2. Documentation and Dissemination of Results: The project has made significant contributions to the development of the EE lighting industry and lighting knowledge by undertaking consumer research, developing pilots, and facilitating technology transfer, etc. For future efforts and projects to fully utilize these products as well as the lessons learned, it is important that the project can document and disseminates its results, achievements, and lessons learned in market transformation. UNDP should consider keeping the project website or transfer it to the maintenance of another project.
- 3. **Stakeholders Collaboration**: To ensure effective planning and implementation, it is important to have open communication lines between key stakeholders. To avoid delays in implementation in the future, the UNDP and PMO need communicate openly to address issues related to implementation, such as unfamiliar approach or time-sensitive activities.
- 4. **Tracking Co-Financing and Impacts**: Due to changing political situations and other challenges, the PMO was not able to fully track and justify project co-financing, or fully assessed project GHG impacts. This situation should be addressed in other future projects.
- 5. Attainment of Outcomes: Given the multiple challenges faced by the TMEL project during the implementation process which may be unlikely to be faced by another project we suggest that UNDP take these conditions into consideration, and consider the development of a more exhaustive listing of risks for Ukraine, as well as more detailed risk mitigation strategies for design of projects, and consider ways for active involvement by the PSC in these cases to help address any required changes in project designs or outputs in a more timely manner.

Specific to the desired legislative and QA framework outcomes, we suggest that the project and UNDP explore all venues for cooperation with the Ministry of Regional Development, Construction, Housing and Community Services so that these objectives can be sustained. Given that the project has provided all of the necessary legislative outputs and National Roadmap, as well as support for the QA framework, it would be beneficial for all involved if the MRDCHCS can be persuaded to continue to pursue progress towards these important outcomes.

Evaluation Ratings					
1. Monitoring and Evaluation	Rating	2. IA & EA Execution	Rating		
M&E Design at Entry	S	Quality of UNDP Implementation	MU		
M&E Plan Implementation	MS	Quality of Execution – Executing Agency	MS		
Overall Quality of M&E	MS	Overall Quality of Implementation/Execution	MS		
3. Assessment of Outcomes	Rating	4. Sustainability	Rating		
Relevance	R	Financial Resources	MU		
Effectiveness	S	Socio-Political	ML		
Efficiency	MS	Institutional Framework and Governance	L		
Overall Project Outcome	MS	Environmental	L		
		Overall likelihood of sustainability	ML		

# 1. INTRODUCTION

#### 1.1. Purpose of the Evaluation

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

This Terminal Evaluation (TE) seeks to fulfill the following overarching objectives of the monitoring and evaluation of GEF projects:

- Promote accountability for the achievement of GEF objectives through the assessment of results, effectiveness, processes and performance of the partners involved in GEF activities. GEF results will be monitored and evaluated for their contribution to global environmental benefits;
- Promote learning, feedback and knowledge sharing on results and lessons learned among the GEF and its partners, as basis for decision-making on policies, strategies, program management, and projects and to improve knowledge and performance.

#### **1.2.** Scope and Methodology

This TE covers the entire UNDP/GEF-funded project number 00076692, known as *Transforming the Market for Efficient Lighting* (TMEL) for Ukraine, and its components as well as the co-financed components of the project.

The Terminal Evaluation of the TMEL Project was carried out at the project level and component level. The TE is an assessment of the progress towards achievement of the project outcomes and outputs, the relevance of the various project outputs, and effectiveness and efficiency of the different activities undertaken to achieve the outputs. In addition, the project inputs in the form of contributions made by the UNDP and its implementing partners, were assessed for the appropriateness and effectiveness of the partnership strategy utilized, and sustainability of the project's outcomes and outputs.

The Evaluation Team (the Team), consisting of the International Evaluator and National Evaluator, carried out various activities during the course of the evaluation, including:

- Literature review
  - Review and assessment of select major research studies commissioned by the project<sup>1</sup>
- Development of an Inception Report and evaluation tools
- Meetings with project stakeholders.

#### I. Development of Evaluation Tools

In order to understand of the scope, objectives, and complexity of this project, the Evaluation Team began the TE with a detailed review of the project-related documents, and an evaluation inception visit took place in December 2016.<sup>2</sup> During the inception mission, the Team met with the PMO, the Regional

<sup>&</sup>lt;sup>1</sup> A listing of the research studies commissioned by the project is provided in Annex G.

<sup>&</sup>lt;sup>2</sup> A complete list of documents reviewed during the course of the assignment is provided in Annex A.

Technical Advisor, and project staff responsible for the various project outputs and activities in order to obtain an overview of the project's implementation mechanisms and associated challenges and opportunities. Based on the document review and inception visit, the Team developed a detailed programmatic and geographic scope of the evaluation activities, evaluation visits, as well as sample interview guides for interviews.

The proposed evaluation methodology, developed interview tools, and schedule of evaluation were shared with the UNDP and PMO in the form of an Inception Report.

# II. Country Mission and Field Visits

The TE Country Mission and Field Visits were conducted from 23 January to 3 February 2017 to various locations in and around Kyiv, as well as Mykolaiv, Odessa, Potlava, and Sumy. During this Mission, the Team worked together to review additional documents, conduct interviews, site visits, and preliminary analyses.<sup>3</sup>

The Team developed two interview guides (list of questions) for use during the course of the evaluation visits. A shorter guide was developed for use with various project stakeholders, partners, and subcontractors, etc. A longer interview guide was developed for interviews with the Project Managers and other relevant project staff.<sup>4</sup> These guides were used in interviews with project staff, stakeholders, including UNDP, Ministry of Ecology and Natural Resources of Ukraine, and Ministry of Regional Development, Construction, Housing and Community Services, UNDP Small Grants, sub-contractors, and others.<sup>5</sup>

# III. Mission Debriefing

At the end of the TE mission, the Team met with the UNDP PMO on 3 February to deliver an overview of the initial findings. An Inception Report, and Inception Report Brief with initial key lessons learned were also delivered to UNDP PMO on 20 December 2016.

# **1.3.** Structure of the Evaluation Report

A draft report was developed for UNDP review using the outline provided by GEF's Evaluation Guidance document.<sup>6</sup> The draft report presented an initial analysis of the information gathered from literature review, interviews, discussions, and site visits.

Per UNDP's guidance on terminal evaluations, the draft report covered the key criteria of relevance, effectiveness, efficiency, sustainability and impact. In addition, ratings based on the obligatory rating scales are provided for the following:

- Monitoring and Evaluation
- IA & EA execution

<sup>&</sup>lt;sup>3</sup> A detailed mission schedule is presented in Annex C.

<sup>&</sup>lt;sup>4</sup> The interview guides are included in Annex B.

<sup>&</sup>lt;sup>5</sup> A complete list of stakeholders interviewed during the TE is included in Annex C.

<sup>&</sup>lt;sup>6</sup> *Guidance for Conducting Terminal Evaluation of UNDP-Supported, GEF-Financed Project*. UNDP Evaluation Office 2012

- Assessment of outcomes
- Sustainability.

The draft report also included an analysis of the Project Finance and Co-finance, Mainstreaming, and Impacts. To assess project finances, the project cost and funding data was analyzed, the planned and actual expenditures were presented and the variances between the two were assessed and explained.

The report includes detailed Conclusions, Recommendations, and Lessons Learned from the project implementation experience in order to inform UNDP, GEF, and various stakeholders as well as to benefit future projects. In addition to this TE report, the project manager and international CTA are also producing a lessons learned study to help better inform future projects.

#### 2. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

Ukraine has one of the highest GHG emissions level per unit of GDP among CIS countries, with a per capita emission of 9,45 tons of CO2 equivalent per year.<sup>7</sup> Consequently, Ukraine ranks 19th among the world's largest emitters of GHGs. In addition, Ukraine is one of the countries in Europe with the lowest energy-efficiency. The Ukrainian energy sector contributes 69% of overall GHG emissions (299,7 million tons), including the emissions from electricity production, which in 2007 amounted to 101,7 million tons of CO2 equivalent. The high share of coal-fired thermal power plants in electricity production and high losses in electricity distribution grid combines to give Ukraine a relatively high CO2 emission factor per MWh of produced power 1.031 tons CO2/MWh2.

The high levels of energy consumption compared to GDP can be tied to the lack of investments for the modernization of industry since the collapse of the Soviet Union. Insufficient implementation of energy efficient technologies in Ukraine can limit industrial global competitiveness, and causes severe impacts on the local and global environment. It should be pointed out that the low energy efficiency is one of the major factors that have exacerbated the financial crisis in the Ukrainian economy. The economic crisis and natural gas crises between Russian and Ukraine that took place in recent years has also had a strong impact on energy policy formation and governmental goals in Ukraine. As a consequence, the Government of Ukraine has established a roadmap on Energy Strategy for Ukraine to 2030 that plans to save up to 470 million tons of equivalent oil by 2020, which will lessen import of energy resources by up to 38 billion USD.

In response to global climate change and in recognition of a number of phasing-out actions beginning around the world UNDP, GEF, and the Government of Ukraine, via the Ministry of Environment Protection agreed to co-operate to enable the implementation of the TMEL project. TMEL is the first UNDP/GEF-supported projects in efficient lighting and market transformation for Ukraine, and is expected to parallel with another UNDP/GEF lighting project being implemented in Russia. The primary context of the TMEL project can be described in broad terms as follows:

**Development and CO2 savings potentials for Ukraine**: There is untapped potential for the development and implementation of new energy efficient technologies in Ukraine, including energy-efficient lighting. Energy-efficient lighting has been given a lower priority in Ukraine compared to measures for energyefficiency related to energy intensive applications such as heating supply. Unlike heating supply, which tend to use gas or coal-fired district networks, energy consumption from lighting impacts electricity production and distribution, and not as seasonal. Because EE lighting initiatives impact a different industrial complex than other energy-savings programs, these measures are an important and complementary energy efficiency tool.

**Support for Ukraine's energy priorities**: In line with the Government's priorities, this project addressed an overlooked issue in the reduction of greenhouse gas emissions through large-scale improvements in energy efficiency for Ukraine using a five-part approach:

<sup>&</sup>lt;sup>7</sup> Per the project document, annual per capita emissions in 2007 for Germany is 10.40 tons, and for Russia 12.00 tons.

- 1. Improve the national policy framework for promoting energy-efficient (EE) lighting
- 2. Improve the national quality-assurance (QA) & quality-control (QC) systems for imported and produced lighting products in Ukraine
- 3. Design and implement EE lighting demonstrations in the municipal sector focusing on public schools
- 4. Improve EE Lighting product penetration in the Residential Sector
- 5. Replicate and disseminate the project results

Within the context of the UNDP Millennium Development Goals, other than the major contribution to environmental sustainability (Goal 7) by this project within and outside of Ukraine, the TMEL project is also expected to contribute to the empowerment of women (Goal 3) and reducing poverty (Goal 1).

# 2.1. Project Start and Duration

The project document was signed on 31 March 2011, and the first disbursement of funds to the project was made in mid 2011 (10 June). The original project duration was five years (60 months), with an expected kick off date of September 2010 and closure in September 2015. The original project document submitted for the GEF CEO endorsement indicated the five-year timing as January 2011 to January 2016. Due to the delay in project approval, the Inception Workshop was held on 18 November 2011, followed by start-up activities such as organization of the PSC and PMO. With the five-year planned duration, the project was to be implemented from 2011 to 2016. However, a no-cost extension was applied for by the project and granted by UNDP/GEF, extending the implementation for a further 15 months, to March 2017.

# 2.2. Problems that the Project Sought to Address

Major problems that the project sought to address include the following:

- Inadequate legislation to promote energy efficiency and energy efficient lighting
- Inadequate ability to realize the transformation by the public and private sectors
- Lack of quality control and supervision system for energy saving lamps;
- Inadequate control of the pollutants from spend and discarded lamps;
- The need for promoting energy efficiency lighting in cities and rural areas.

# 2.3. Immediate and Development Objectives of the Project

The project aimed to achieve the objective set out in the GEF Strategic Program No. 1, which is Promoting Energy Efficiency in Residential and Commercial Buildings (SP-1).

The overall goal of the TMEL project was to reduce the annual growth rate of GHG emissions from the Ukrainian public and residential sectors. The project objective was the enhanced promotion and implementation of the utilization of energy efficient lighting in Ukraine, through the transformation of the local lighting products market and the phasing-out of incandescent lamp production and sale. It was expected to contribute to the reduction of GHG emissions through the transformation of the lighting market in Ukraine towards more energy-efficient lighting products, awareness of new technologies and best practices.

In addition to reflecting national priorities in Ukraine, the project was expected to build upon the existing goals and activities of UNDP, with environmental sustainability being one of the eight millennium development goals (MDGs) that UNDP is playing a central role in helping to promote. With respect to UNDP activities, the TMEL project represented an innovative approach to energy efficiency projects, and comprised of an important part of UNDP-GEF portfolio, which would complement and build upon the lessons learned from other similar UNDP-GEF projects in Russia, Romania and Vietnam.

#### 2.4. Main Stakeholders

In general, the stakeholders of the TMEL project encompass organizations and groups involved in the local lighting industry, supply chain, market demand as well as economy and social issues of the phase out of the manufacture and sales of incandescent lamps (ILs). The mandates of these stakeholders are directly or indirectly linked to the impacts of IL phase out and energy efficient lighting promotion, on the lighting industry and the users of lighting products in Ukraine.

The TMEL project document was developed with extensive stakeholder involvement, including Ministry of Environmental Protection (now Ministry of Ecology and Natural Resources), Ministry of Economy and European Integration, State Committee for Municipal Housing, Oblast Administrations, Municipalities, Association "Energy Efficient Cities of Ukraine", Association of Local and Regional Authorities, etc. Discussions have also been held with potential project partners from the private sector, e.g. Phillips Lighting, OSRAM, Kosmos, Gazotron-Lux, etc. At the national level, the project has the full support of the State Committee for Municipal Housing, the Ministry of Environmental Protection, and benefitted from the participation of the Association "Energy Efficient Cities of Ukraine," and Association of Local and Regional Authorities – an NGO very active in the environment field. A more comprehensive list of the stakeholders involved during the preparation phase is shown below.

Figure 1.	. Stakehold	lers in th	e Project	Design	Process
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Public Sector	Municipal	Private Sector	International/Multi- lateral Organizations	NGOs
Ministry of Environmental Protection.	L'viv City Municipality	Gazotron-Lux	World Bank	Association "Energy Efficient Cities of Ukraine"
Ministry of Education and Science of Ukraine	Rivne City Municipality	TM "Kosmos"	European Bank for Reconstruction and Development (EBRD)	Association of Local and Regional Authorities
Ministry of Health of Ukraine	Chernivtsi Regional State Administration	Phillips Lighting	(NEFCO)	
Ministry of Industrial Policy of Ukraine	Cherkasy Regional State Administration	Osram	EU Mission to Ukraine	
National Environmental Investment Agency of Ukraine	Autonomous Republic of Crimea	General Electric		
National Agency of Ukraine for Efficient Use of Energy	Dnipropetrovs'k city council	Platinum Bank		
State Committee for Standardization, Metrology and Certification of Ukraine	Kamianets- Podilskyi city council	Cool NRG		
Institute of Legislation of the Verkhovna Rada of Ukraine	Mariupol city council	Sanyo		
National Technical University of Ukraine "Kyiv Polytechnic Institute"	Vinnytsia Regional State Administration	UKREXIM Bank		
Dehrzstandard	Luganska Oblast State Administration			
	Khmelnitska Oblast Rada (Local Parliament)			

#### **2.5 Expected Results**

The project's market and institutional interventions were designed to lead to a number of significant outcomes, including improved laws and regulations promoting EE lighting, increased capacities for lighting testing laboratories and the quality assurance framework, and capacity building for municipalities on the benefits and use of EE technologies, helping Ukraine to achieve its energy saving

objectives. It is expected that the implementation of the project would bring together the human and financial resources necessary to draft laws and regulations supporting EE lighting, which can feed into the wider national actions on energy-efficiency, and to make available the technical assistance needed to initiate pilot projects in order to demonstrate the benefits of EE lighting in the residential and municipal sectors. These activities were expected to develop both demand and supply of efficient lighting equipment, and in parallel transform the market.

Actions to promote EE lighting by this project were expected to effectively double the growth of EE lighting market penetration. This would increase the annual growth rate to 25% year on year during the project period. Based on this increase, the project was projected to contribute a net CO2 reduction over its lifetime of 4.15 million tons from 2011 to 2015 from direct electricity reduction in the residential sector. National benefits would include improved local environment air quality (reductions in SOx, NOx, and particulate emissions), long-term savings for consumers, and a better balance of payments for electricity producers and the state, which subsidized residential electricity costs.

For the municipal sector, the project goal was 100% compliance with CMU Order #1337-rr by 2020, i.e. 100% replacement of municipal ILs with EE lighting products. The share of energy efficient light bulbs in the municipal sector buildings was assumed as 25% for the baseline in 2010. This figure was expected to increase at a faster rate due to project activities aimed at improving compliance and giving municipalities access to financing for large EE lighting renovations. By the end of 2015, the compliance rates were projected to be 63% (from 25% today), and 100% by 2020 respectively (full compliance with the CMU order). The projected CO2 reductions due to the project activities in the municipal sector from the increased compliance rates by 2015 was estimated to be 900,000 tons.

In addition to emissions reduction, a number of outcomes resulting from project activities and achievement of outputs were expected. These include:

- Improved availability and accessibility of energy efficient lamps and lighting systems in the Ukrainian market;
- Improved availability and quality of locally available energy efficient lamps;
- Reduced hazardous waste pollution from mercury-containing lamp handling and disposal;
- Improved capacity of stakeholders to promote energy efficiency, energy efficient lamps and systems;
- Expanded marketing channels for energy efficient lamps and lighting systems at the retail level across the country;
- Increased sales of energy efficient lamps and reduction in the sales of incandescent lamps in all areas (including small towns & villages);
- Improved public awareness on the benefits and application of energy efficient lamps in all areas.

# 3. FINDINGS

Detailed findings of the TE are presented in this section, and include an assessment of the TMEL project Formulation and Design, Project Implementation Approach and Modality, as well as a summary of project results. Where possible, detailed examples are included to support the findings.

The stated goal of the TMEL project is to help transform the Ukrainian lighting market towards more energy efficient lighting products, technologies and practices. It proposed to achieve this goal by promoting a gradual phase-out of inefficient lighting products in the residential and public building sectors. Specifically, the project proposed to reduce CO2 emissions by up to five million tons over its lifetime of from direct reduction in electricity consumption. The project design comprised of the following five major components and corresponding activities.

- **Component 1**: Prepare and set-up national policy framework to promote EE lighting This component focuses on improving the national policy framework for promoting energy efficiency and energy efficient lighting.
- Component 2: Improve QA/QC framework for EE lighting market This component focuses on setting up the framework for national quality assurance and quality control systems for imported and domestic lighting products in Ukraine.
- **Component 3**: Efficient lighting demonstration in municipal educational sector This component a focuses on providing technical assistance and increasing knowledge of EE lighting in this sector.
- **Component 4**: Improve EE Lighting product penetration in the Residential Sector This component addresses the information and availability gap for EE lighting among consumers.
- **Component 5**: Replication and Dissemination of the Project Results This component focuses on project sustainability measures.

Activities under these components were designed to be implemented in an integrated fashion, and to produce real and demonstrable results with outcomes that can be monitored.

It should be noted that market transformation projects by their nature, are ambitious, complex projects that set out to facilitate the introduction of energy efficient products into the market, and to address existing or anticipated barriers in order to accelerate and solidify such introductions. Well-designed projects seek to address all aspects of the market transformation process, including the economic, information, institutional, technical, and sustainability barriers by applying the appropriate policies, supporting actions, and financial instruments in an integrated and complementary fashion. They also attempt to minimize the associated risks typically encountered through the incorporation of experiences and best practices from energy efficiency and/or climate change/market transformation projects implemented in other parts of the world.<sup>8</sup>

<sup>&</sup>lt;sup>8</sup> Achieving the Global Transition to Energy Efficient Lighting Toolkit, UNEP 2012.

**Note**: although much of the information contained in this Toolkit was available from other sources, the Toolkit itself was not available until 2012, several years after TMEL was developed and implemented.

Over the course of its implementation, TMEL experienced significant challenges, including changing national political and economic conditions (changes in government and policies), worsening security situations, a collapsed international carbon market, and rapid technological shifts to more energy efficient technologies. Along with these external challenges, the project also experienced a number of internal challenges. At its inception, the project operated without an international CTA experienced in market transformation. Over its six-year duration, the TMEL project was managed by three different project managers and was advised by at least two International Consultants/Technical Advisors.<sup>9</sup> Neither CTA was fully utilized in all project aspects as envisioned by the project document.<sup>10</sup>

Generally, most projects of this scale and type can expect to encounter one or two major identified risks. In most cases, the project design process, risk management strategies, as well as the project advisory framework can help to mitigate the impacts of these challenges. Similarly, UNDP country offices are set up to provide administrative support to projects and to minimize implementation disruptions.

It is also worth noting that the TMEL project was the initial effort by UNDP/GEF to introduce a full-scale country project using the market transformation approach to Ukraine, working with national institutions and agencies to address barriers in the market.<sup>11</sup> TMEL was initiated shortly after another similar UNDP/GEF project working on introducing full-scale market transformation to the Russian Federation. While both project's design relied upon past international experience in this area, Ukraine has less national experience in the implementation of such a project, and therefore there may have been less available knowledge, familiarity and input that can be called upon during implementation, especially in the initial stages.

In evaluating the TMEL project, it may be necessary to view the project activities, outputs, and outcome from two different perspectives. The project can be evaluated for its achievements against the original objectives as laid out by the Project Document, as these incorporated all indicators and metrics for market transformation by the original project design.<sup>12</sup> Considerations may also be given to the evaluation of the project against its revised path, as this can also provide an indication of project adaptation, achievements and outputs given the various challenges that the project encountered over the course of its implementation.

#### 3.1. Project Formulation & Design

An expert team of international and national consultants conducted the TMEL project design and prepared the Project Document, following the guidelines for GEF-UNDP project formulation. The design was informed by UNDP and GEF's experience of efficient lighting and climate change projects

- Olexander Severin (Acting): January 2015 July 2015
- Andriy Buriakovskiy: July 2015 March 2017
- The CTAs:

<sup>&</sup>lt;sup>9</sup> The project managers and their service duration:

<sup>•</sup> Sergei Varga: June 2011 – December 2014

Vladimir Gabrielyan (National Strategy only): 2014

<sup>•</sup> Steve Coyne: Jan 2015 – March 2017

<sup>&</sup>lt;sup>10</sup> The TOR from the project document was not fully applied to either CTA.

<sup>&</sup>lt;sup>11</sup> The first UNDP full-scale country project was ESCO Rivne.

<sup>&</sup>lt;sup>12</sup> It can also be said that the original project objectives became overly ambitious given the challenging conditions encountered.

implemented in other parts of the world. At the time of the project Document preparation, the design team was supported by baseline research of the Ukrainian lighting and energy markets, and therefore had a solid foundation for the planned project activities based on conditions that existed. However, as noted above, Ukrainian security, economic and political conditions changed significantly over the course of the project implementation, as did the technical progress of energy efficient lighting.

**Findings:** The Evaluation Team found that, based on the conditions that existed at the time of conception, the project's logical framework provided a detailed, cohesive, and applicable course for project implementation, reflecting international best practices. With respect to the relevancy of the logical framework, the evaluation team found that the logical framework remained relevant for the project in terms of creating the necessary conditions to sustain market transformation.

The Evaluation Team also found that the activities contained under the different components were coherent, replicable, can be sustainable. They were also designed as an integrated approach, and in a cost-effective manner. In addition, the implementation arrangements and responsibilities of the various stakeholders were outlined clearly in the project document. However, the Team noted that specific co-financing from the various stakeholders, including the private sector, was not specified in detail, which made the tracking of these details challenging for the M&E process.

#### 3.1.1. Stakeholder Participation in Project Design

Per the Team's interview with the Project Document consultant, key stakeholders were consulted and their experiences and recommendations were integrated into the project design and logical framework. Stakeholder involvement in the design stage included the Ministry of Environmental Protection, Ministry of Economy and European Integration, State Committee for Municipal Housing, Oblast Administrations, Municipalities, Association "Energy Efficient Cities of Ukraine", Association of Local and Regional Authorities, etc.). Discussions were held with potential project partners from the private sector, e.g. Phillips Lighting, OSRAM, Kosmos, Gazotron-Lux, etc. At the national level, the project has the full support of the State Committee for Municipal Housing, the Ministry of Environmental Protection and benefits from the participation of the Association "Energy Efficient Cities of Ukraine" and Association of Local and Regional Authorities, for example.

**Findings**: Upon review of the Project Document, the Team found that stakeholders at various levels were consulted at the time of project formulation, and as much as possible, stakeholders' commitments and buy-in were obtained at the design stage. The Team also noted that changing institutional and market conditions resulted in new stakeholders, some of these stakeholders were identified by the project and subsequently consulted or cooperated with the project, but other potential stakeholders were not recognized or fully engaged by the project.

One example of changing conditions and stakeholders is the recently organized Ministry of Regional Development, Construction, Housing and Communal Services (MRDCHCS), whose purview now includes energy efficiency for buildings and lighting.<sup>13</sup> Due to the fact that the TMEL project is housed under the

<sup>&</sup>lt;sup>13</sup> Previously Ministry of Construction, Architecture, and Communal Living.

Ministry of Ecology and Natural Resources, cooperation between ministries has been minimal.<sup>14</sup> However, exploring how the project can work with the new ministry could have been one of the key tasks for the team responsible for Partnerships and Relations with Government and National Authorities. In addition, the project had very limited interaction with other donors very active in the area of energy efficiency in Ukraine such as USAID, GIZ, EBRD, World Bank, IFC, or NEFCO. It was difficult to ascertain whether this non-engagement of new potential stakeholders was a result of project consideration, or lack of willingness of these stakeholders to cooperate and engage with the project, as there was no work plan or PIR items indicating the need for this task.

#### **3.1.2.** Management Arrangements (Project Design)

TMEL was designed to be a National Implementation Modality (NIM) project by the Ukraine Government. Key management arrangements outlined in the design included the role of the Ministry of Ecology and Natural Resources (originally Ministry of Environmental Protection per the project document) as the Implementing Partner (or Executing Agency), a PMO responsible for day-to-day management of the project activities as well as for financial and administrative management services (UNDP Ukraine). In addition, the design called for the establishment of a Project Steering Committee (PSC) with representation from all key stakeholders. The project document also presented a detailed stakeholder involvement plan while specifying the role of each stakeholder.<sup>15</sup> Note that according to the RTA, the TMEL project converted to a Donor Implementation Modality (DIM) project when conflicts arose in Eastern Ukraine, but there is no documentation regarding this conversion.

**Findings**: The Evaluation Team concluded that the original project design would have provided a costeffective approach, while incorporating inter-agency and inter-stakeholder collaboration and oversight at various levels of management. The roles and responsibilities of the various stakeholders involved in the project's management had been clearly defined in the project design document.

#### **3.1.3.** Replication of Approach

Replication and uptake has been a key part of UNDP project design. The design for TMEL facilitated replication by including stakeholders that have the capacity and stake in the promotion of energy efficiency, product quality, adoption of energy efficient lighting, and management of hazardous waste management. Key examples in this include working with the Implementing Partner (and Executing Agency) – the Ministry of Ecology and Natural Resources of Ukraine, as well as non-governmental organizations.

A number of project activities outlined in the Logical Framework were specifically aimed at technology transfer and demonstration to support replication. These activities included the development of a National Roadmap and policy for conversion to energy efficient lighting, support to testing laboratories in energy efficient lighting technology and handling of hazardous substances. Also included were the establishment of a collection network for spent lamps containing mercury, demonstration, pilots, and awareness raising activities, as well as the promotion and establishment of marketing venues. Moreover,

<sup>&</sup>lt;sup>14</sup> According to some stakeholders, this limited interaction allowed for Ministries to act more independently, and with less external influence.

<sup>&</sup>lt;sup>15</sup> A listing of the PSC is included in Annex F

the project design included the development of various documents, including market studies, documentation of pilots, product standards, and guidelines, etc., as well as linkages and knowledge sharing with international activities.

The project design also incorporated recent lessons learned. For example, the project design addressed policy improvements in parallel with concrete actions to raise the quality of EE lighting products on the market, while providing initiatives for overcoming the larger upfront cost of quality EE lighting products. In previous GEF EE projects, overcoming the upfront cost barrier was seen as more critical for success than only providing awareness raising activities. These were also the same recommendations made by the MTR and the new CTA upon their review of project activities in 2014 and 2015. Both experts recognized progress made in awareness raising by the project up to that point, and suggested a renewed focus on other outcomes with less progress.<sup>16</sup>

**Findings**: The Evaluation Team concluded that the original project design would have provided a costeffective approach, with inter-agency and inter-stakeholder collaboration, and oversight at various levels of management. Therefore, the approach used is replicable.

#### 3.1.4. Assumptions and Risks

The project design was cognizant of the some of the major potential risks associated with implementation of the five components, including weak government support, ineffective QA/QC enforcement measures, low level of participation from the private sector, ineffective long-term financing programs for the pilot projects and their replication, and low level of involvement of regional authorities in demonstration project activities. Accordingly, practical mitigation actions were suggested for each of these risks, which included securing firm commitments from responsible institutions during the project design stage, working with suggestions made by DehrzStandard for improvements in the QA/QC system, involving the private sector during the project design stage, etc. The design also stipulated for the constant monitoring and revision of these risks in accordance with the implementation realities during key stages, e.g. a revision at the inception stage as well as at the time of submission of Annual Work Plans.

**Findings**: The Team found that although a number of risks and risk mitigation strategies were identified, some of the challenges occurring during the project implementation were not anticipated, and could be classified as outside of the norms. Anticipated risks include weak government support, and low level of involvement from the private sector. Unanticipated risks included changing national security situations and a collapsing carbon market. Another point to consider is the rapid pace of advancement in LED technologies, which resulted in lower pricing and faster penetration of LEDs than anticipated. This faster penetration helped to increase the adoption rates, but also presented its own challenges in issues of quality, user familiarity, and how to properly measure their impacts. Therefore, not all practical mitigation actions were covered, or covered in sufficient details by the Project Document, and needed actions or guidance were not available to the Project Steering Committee or the Project Team to

<sup>&</sup>lt;sup>16</sup> *PIMS* 4175 *Mid-Term Evaluation Report*, March 2015; *Mission Report*, October 2015.

effectively address all challenges as they arose. In addition, given the challenges, a more broad and active or engaged PSC may have been required.

#### 3.1.5. UNDP Comparative Advantage

UNDP regional office has provided technical support to numerous market transformation and climate change projects in various countries across the region. In addition, UNDP has implemented over 30 technical assistance projects related to energy efficiency in the past decade, with estimated value of over USD \$100 million. This experience enabled the UNDP and the Regional Technical Advisor to provide technical support to the project formulation and input into the development of the logical framework, recruitment of international experts for the project formulation and implementation, and identification of key stakeholders, etc.

**Findings:** The Team concluded that based on prior experience, the UNDP was able to provide guidance for establishment of institutional coordination mechanisms, and for leveraging the project activities through collaboration between public and private sectors.

In conclusion, the Evaluation Team found the process of project formulation and the project design to be **satisfactory** for a typical market transformation project. Given the challenges faced by the TMEL project during the implementation process – which may be unlikely to be faced by another project – we suggest that UNDP take these conditions into account, and consider the development of a more exhaustive listing of risks for Ukraine, as well as more detailed risk mitigation strategies for design of projects, and consider ways for active involvement by the PSC in regions that may experience rapid changes for other projects to reference should they encounter the same situations.

#### 3.2. Project Implementation

The original project duration was five years (60 months), with an expected kick off date of 2010 and closure in 2015. The original project document submitted for the GEF CEO endorsement indicated the five-year timing as January 2011 to January 2016. The project document was signed on 31 March 2011, and the first disbursement of funds to the project was made in June 2011. As a result, the Inception Workshop was held on 18 November 2011, followed by start-up activities such as organization of the PSC and PMO. With the five-year planned duration, the project was to be implemented from 2011 to 2016. However, due to challenges and delays in project start-up, a no-cost extension was applied for by the project and granted by GEF, extending the implementation a further 15 months, to March 2017.

# **3.2.1.** UNDP and Implementing Partner Implementation/Execution Coordination, and Operational Issues

Figure 2: Project Management Structure of TMEL



The implementation and coordination role played by the various stakeholders is detailed below:

- Government of Ukraine (National Implementing Partner NIP): Ministry of Ecology and Natural Resources, Ukraine. MENR acted as the lead implementing agency, and was the recipient of legislative outputs from the project, and coordinated government response. MENR also provided office space and in-kind services for the duration of the project.
- UNDP: UNDP Ukraine and the UNDP-GEF Regional Technical Advisor for Climate Change in the region have provided GEF oversight. In this capacity, UNDP has been responsible for overall M&E, organizing project reviews, providing support in the recruitment of international consultants and technical experts, approving project implementation reviews (PIRs), budgets, and providing feedback to ensure that all reporting is carried out in line with standard UNDP-GEF procedures. The UNDP Ukraine office had both an oversight role as well as a member of the PSC. In addition, the UNDP-GEF Regional Advisor provided ongoing technical support and guidance to the project.
- Project Steering Committee (PSC): A PSC was established at the onset of the project and comprised of representatives from key stakeholders, including Government of Ukraine and UNDP Ukraine. The PSC was intended to meet once a year since the project inception, but convened a total of two times (December 2012, February 2014).<sup>17</sup> A list of the PSC members is provided in Annex F. The PSC contributed to the implementation as an advisory committee and provided guidance to project planning.
- Project Management Office (PMO): The PMO, working first under the NIP was responsible for performed effective implementation, M&E, and stakeholder collaboration. The placement of the PMO within the government Ministry also helped to elevate the visibility of the project with stakeholders.

<sup>&</sup>lt;sup>17</sup> A third meeting scheduled in February 2016 was cancelled due to lack of participants.

The above entities worked together to implement and monitor the project.

However, there were a number of internal issues that together, contributed to a less than smooth project execution during certain periods. Some issues specific to project administration were identified by the Mid-Term Review, which was conducted between February and March 2014. The majority of administrative issues identified by the MTR has been, or in the process of being corrected during the TE missions, exceptions include staff size and uneven focus on project components.

There remain a number of administrative challenges that warrant mention, including:

- Less than ideal communications or coordination between the project team and UNDP administrative support, which contributed to the delays in hiring of some sub-contractors, staff, or securing needed services, and reduced effectiveness.<sup>18</sup>
- Adherence to the project document strategy was also inconsistent, leading to a number of implementation issues, including, for example:
  - The lack of consistent engagement by an experienced CTA from the outset, whose regular visits and input could have reduced the initial research needs, the time needed for the rollout of awareness campaigns, and QA/QC framework.<sup>19</sup>
  - Delays in the preparation of the National Road Map for EE Lighting Market Transformation, which may have helped with setting up the framework for Quality Assurance sooner;
  - Delays in the preparation of legislation to improve the quality of electricity supplied to public and residential consumers, which remains unfinished.
  - Confusion over management reporting, including a dual reporting structure.<sup>20</sup>



#### Figure 3. TMEL Management Structure (Organigram)

<sup>&</sup>lt;sup>18</sup> Staff indicated wait time of up to nine months for hiring, although the Evaluation Team's contracts were put in place within a few weeks.

<sup>&</sup>lt;sup>19</sup> The first CTA hired lacked international implementation experience, and produced unsuitable documents from others' work.

<sup>&</sup>lt;sup>20</sup> There was confusion due to the fact that some TORs were not consistent in their translation from the project document. For example, the English version of the Project Assistant's TOR indicated that the position reports to "Advisor on New Partnerships and Relations with Government and National Authorities," instead of the Project Manager.

As can be seen above, the project "organigram" does not show the position of a CTA, which is a key position per the project document. It also shows a mixed project management and reporting structure, which was not an optimal and cost efficient set up, due to the fact that:

- The team responsible for Partnerships and Relations with Government and National Authorities had a separate reporting structure.<sup>21</sup>
- The size and composition of the team may be overly large, as discussed by the MTR.

While the above structure may have recognized the importance and sensitivity of the Partnerships and Relations with Government and National Authorities team's tasks (and its successes, including securing support by MPs), it created a separate "silo," allowing for less coordination between the team's leader and project manager.<sup>22</sup> It also allowed for little or no interactions between this team and the CTA on matters related to product testing, quality assurance framework, and international outreach. In fact, Steve Coyne (the CTA) reported that there was no communications between the 2<sup>nd</sup> PM and himself before the transition to the 3<sup>rd</sup> PM due to the language barrier, and the way the team was structured.

Per the project document, TMEL was intended to coordinate and share information with the UNEP's en.lighten program, cooperate with the UNDP/GEF EE lighting project in the Russian Federation, and through the translation and distribution of the UNEP global program's newsletter at the National Level. Conversely, the activities and lessons learned from the Partnerships Team in working with Ukraine's Parliament and securing support of an MP, as was the rationale for this structure, were not fully documented or captured by the project.

The TMEL project did not retain the services of an experienced international CTA until 2014 (4 years into a 6 years project), which was one of the key project positions as envisioned by the project document, including frequent visits to Ukraine, with missions once per 1-2 months. The terms of reference (TOR) for a CTA for a project such as this typically include strategic guidance, workplanning, review of project outputs, and participation in preparation of ToR and selection of sub-contractors to help improve the overall quality of the project. This was not the case for TMEL from the outset. The main assessment of the international CTA on the project is that a highly qualified expert was hired too late in the project with insufficient visits to Ukraine (twice per year) to have any significant impacts on all of the project's outputs. While the involvement of the international CTA helped to move a number of issues forward, such as a the development of a quality assurance framework, including inter-laboratory testing and training of laboratory technicians. However, this support could have happened earlier and included more topics, such as collection and disposal, as well as pilot project developments, training for retail staff, and outreach to cities and municipalities, as well as internationally.

Based on the above, the Evaluation Team concluded that the overall project management structure and arrangements were a part of a participatory and consultative approach to implementation and monitoring of project results. However, the pace, internal (and international) coordination and

<sup>&</sup>lt;sup>21</sup> Per the project organigram, the team responsible for Partnerships and Relations with Government and National Authorities reported to the Head of EE cluster.

<sup>&</sup>lt;sup>22</sup> The team leader was also not based in the project office at the time of the TE visit.

consistent delivery of project implementation, as well as the cost structure clearly suffered from the dual reporting arrangement and the large size of the team (which remained unchanged after the MTR). As indicated earlier, the fact that this project represented the initial introduction of a full-scale, market transformation project to Ukraine, administrative caution or inexperience with implementation may have contributed to such issues.<sup>23</sup>

Therefore, the evaluation team found the UNDP and Implementing Partner management of the project to be **Moderately Satisfactory**, and determined that the implementation / execution coordination on operational issues (specifically project communications, planning process and PSC involvement) has been **Moderately Unsatisfactory**.

#### 3.2.2. Adaptive Management

Over the course of its implementation, the TMEL project experienced significant, if not unprecedented challenges: changing political and economic conditions, a worsening security situation (an armed conflict in Eastern region from 2014), rapid technological shifts, and internal issues. It was also the initial effort by UNDP/GEF to introduce a full-scale project to Ukraine, working with national institutions and agencies to transform the market, whose design and approach may have been unfamiliar in comparison to other full-scale UNDP Projects.

Because of the significant implementation challenges, the hallmark of the TMEL project's implementation has been adaptive management. The project has implemented a number of "work-arounds" in its efforts to maintain forward momentum towards its objectives. These adjustments allowed the project to continue and made some important contributions to the overall market transformation efforts. As indicated, the project's achievements should be considered against its progress towards its objectives as well as the approach taken to address challenges and barriers.

In fact, the project met a number of conditions for which adaptive management is required as defined by the GEF Guidance document, which include:<sup>24</sup>

- Original objectives were not sufficiently articulated;
- Exogenous conditions changed, due to which a change in objectives was needed;
- Project was restructured because original objectives were overambitious;
- Project was restructured because of a lack of progress;

A significant example of adaptive management was demonstrated in the project's focus on outreach and support for municipalities and cities to phase out incandescent lamps. While the project had made progress in developing outputs supporting national legislations to introduce energy efficiency and energy efficient lighting for Ukraine, these legislations have not been passed. The outreach to municipal and city governments enabled the project to take advantage of the decentralization of authority (which

<sup>&</sup>lt;sup>23</sup> For example, it was not entirely clear why the project did not hire an experienced CTA from the outset, but it could be attributed to unfamiliarity with this type of projects, and the possibility for applying best international practice to local messaging was not recognized.

<sup>&</sup>lt;sup>24</sup> Guidance for Conducting Terminal Evaluations of UNDP-Supported, GEF Financed Projects, UNDP 2012.

happened after project initiation) to achieve its goals effectively through partnering with a wide-range of highly relevant stakeholders that were not initially specified in the project document.

#### Adaptive Management and the MTR

There were other project areas that did not necessarily require the same adaptive treatment. For example, the project had made significant progress in the area of increasing general public awareness, yet, the project resources remained focused on this area, perhaps to compensate for less progress in other areas. This focus continued despite recommendations from the MTR to reduce emphasis on marketing, or recommendations from the CTA to target more specific consumer topics, such as increasing awareness of differences in product quality. The UNDP RTA's recommendations to focus on ESCO market development for street lighting and working with EBRD as a means of promoting additional investment in efficient lighting in Ukraine were also not included as a part of adaptive management.

The MTR was carried in 2014 reviewed the project's progress until then with respect to the output intended by the project document. The MTR made a series of recommendations in terms of project administrative and implementation areas. In term of project implementation, the MTR proposed that the project has succeeded in adaptive management by concentrating on increasing energy efficiency awareness by Ukrainians through marketing and outreach efforts. The MTR recommended going forward that the project focused less on marketing and instead focusing on areas were not as advanced, including legislation, quality control framework, demonstrations, and support for local producers. In terms of administrative recommendations, the MTR recommended the hiring of a CTA, a smaller team and reporting structure, along with M&E improvements. However, while some recommendations were adopted, the spending remained on marketing and outreach, and the team size was not adjusted, affecting implementation cost effectiveness.

The project document remained highly relevant through the of the implementation period. However, to adjust the activities according to the on-the-ground reality and to ensure efficient achievement of project goals, a few outputs and activities were modified initially by the PSC. Of these, significant changes include changes Outcome 3 (implementation of efficient lighting demonstrations in the municipal sector). This Outcome was originally designed to implement lighting demonstrations in the municipal educational sector, such as schools. However, during the Inception Workshop, a decision was made to increase the locations, and expand coverage beyond schools to include other municipal targets, such as buildings, street lighting and traffic lights.

The evaluation team concluded that, while the outputs and indicators stated in the project design document are relevant and appropriate, as part of the adaptive management approach, the management team could and had proposed to adopt or change some approaches and output implementing details, when necessary.

#### 3.2.3. Partnership Arrangements

Over the course of implementation, the project has partnered with government agencies, industry associations, enterprises, research institutes, testing laboratories, certification bodies, consultants, and

media outlets. Major partnership activities included research, policy development, demonstration projects, testing, awareness raising, and training programs.

These partners were engaged using a sub-contracting modality, with the project having issued 30 subcontracts, including to two or more organizations for joint implementation. The total value of the subcontracts awarded was approximately USD \$3.83 million. A year-wise distribution of subcontracts awarded is presented in the Table below:

Contracts	Year 1	Year 2	Year 3	Year 4	Year 5	Extended	Adjusted Total	% of Total
							Total	
Component 1	2,274	92,036	178,618	118,901	519,319	237,579	1,148,727	30%
Component 2	145	27,835	190,109	267,462	461,813	215,061	1,162,426	30%
Component 3	0	15,124	4,590	32,846	53,605	46,632	152,797	4%
Component 4	145	137,132	145,036	83,154	308,940	171,061	845,469	22%
Component 5	145	202,856	44,847	164,127	44,897	68,112	524,984	14%
Total	2,710	474,983	563,202	666,490	1,388,574	738,444	3,834,403	
% of Total	0.1%	12%	15%	17%	36%	19%		

#### Table 1. Year-Wise Distribution of Sub-Contracts, by Component

As shown in Table 1 above, the highest proportion of funding for sub-contracts was spent during Years 3, 4 and especially Year 5 of the Project (36% of total). This is due to the fact that the pace of project implementation accelerated in response to the MTR, after a third full-time Project Manager was retained, and an international CTA was hired to focus on the QA framework and other technical areas such as ESCO development and add street lighting. This is different than the usual project pace, as the first and last years of a project would be expected to have comparatively lesser activities to due to the focus on initiating or closing of the project.

The evaluation team concluded that the project's partnerships with stakeholders served to create or developed the synergies needed to achieve project goals. As shown in other relevant sections, the sub-contracting also played a role on cost efficiency, effectiveness, and sustainability of project activities.

#### 3.2.4. Monitoring and Evaluation (M&E)

According to the project design document, UNDP Ukraine and the project were jointly assigned responsibilities of M&E. In addition, the project document provided a clear M&E plan and budget, including annual outcome level targets and a detailed M&E plan, a monitoring plan together with concise targets, a simple logical framework with SMART indicators, and a budget for M&E activities. The UNDP Regional Technical Advisor (RTA) for Climate Change also provided periodic oversight for project implementation, including prompting timely reporting, providing guidance about reporting to ensure that the progress is implemented in line with UNDP-GEF guidelines, and providing feedback on project planning, including encouraging the project to follow and implement and follow the MTR

recommendations.<sup>25</sup> Similarly, the project has undertaken impact assessments to demonstrate progress towards its goals and objectives.

The PMO had the responsibility of project-level monitoring. For this purpose, the PMO has devised and implemented an M&E plan that is responsive to the project's logical framework. The plan comprises of the following key elements:

- Project management rules
- Sub-contract bidding evaluation management rules
- M&E rules
- PMO logistic administration rules
- Duties and responsibilities of PMO staff
- Website maintenance rules

The plan was developed by the PMO team at the start of the project and was approved by the PSC. The M&E plan complied with UNDP-GEF project reporting guidelines. In addition, the PMO has developed and made appropriate use of a Project Management System that helps in monitoring activities and tracking results.

**Findings**: The evaluation team concluded that the project's M&E plan was well designed and adequately implemented, with a few exceptions, for example: co-financing from the various stakeholders, including the private sector, which was not specified in detail, and therefore was not fully tracked by the project; the impacts monitoring was also problematic, due to security situations, as well as lack of reliable data on sales and emissions. The project's M&E is **Moderately Satisfactory**.

#### 3.2.5. Project Finance

Grant Fund	Committed (USD)	Percent of Commitments
GEF	6,500,000	21%
Government of Ukraine Co-financing <ul> <li>Direct: 19,375,000</li> <li>Indirect: 1,600,000</li> </ul>	24,500,000	67%
Private Sector Co-financing	3,275,000	10%
UNDP	250,000	1%
Total Budget	31,000,000	100%

#### **Table 2. Committed Project Funding and Sources**

<sup>&</sup>lt;sup>25</sup> The RTA also raised CTA engagement and budget management issues during the course of project implementation through the PIRs and periodic inputs. It is not clear why the RTA's recommendations on these issues were not taken into account.

The TMEL project was designed to be funded by various sources. The original total project budget was USD\$ 31,000,000, consisting of \$ 6,500,000 from GEF, \$ 20,975,000 commitment from the Government (both central and municipal), \$ 250,000 form UNDP, and \$ 3,275,000 from the private sector (\$1,125,000 from Ltd. STK-Ukraine and \$2,150,000 from LLG Gazotron-Lux, respectively). Per the discussion to follow, it should be noted that the USD \$20.9 million commitment is a significant amount – for comparison, the USD \$14 million UNDP China EE lighting project (PILESLAMP) received a total commitment from the Chinese Government of USD \$27 million.

#### I. Utilization of GEF Funds

This sub-section provides details about the utilization of allocated GEF funds amounting to USD 6.5 million.

	Year 1	Year 2	Year 3	Year 4	Year 5	Total	% of Budget
Component 1	262,500	190,000	160,000	105,000	69,800	787,300	12%
Component 2	497,700	239,000	140,000	95,000	95,000	1,066,700	16%
Component 3	385,000	394,000	350,000	340,000	330,000	1,799,000	28%
Component 4	480,000	330,000	285,000	264,000	265,000	1,624,000	25%
Component 5	144,000	124,000	155,000	175,000	175,000	773,000	12%
Other Costs	130,920	81,020	81,020	79,020	78,020	450,000	7%
Total	1,900,120	1,358,020	1,171,020	1,058,020	1,012,820	6,500,000	
% of Budget	29%	21%	18%	16%	16%		

#### Table 3. Approved Project Budget and Distribution, by Year and by Component

The Table above shows the summary of the approved budget, original allocation per component, and by year. The Table below shows the actual expenditures and delivery rate of the project on a year-to-year basis, including the actual amount and percentage of budget expenditure on a per-component basis. The actual expenditure reflected the fact that the project took steps to adapt to political and security challenges during implementation.

#### Table 4. Actual Budget Expenditure, by Year and by Component

	Year 1	Year 2	Year 3	Year 4	Year 5	Extended	Adjusted Total	% of Budget
Component 1	5,373	96,731	194,348	139,953	535,083	253,299	1,234,841	19%
Component 2	145	33,956	221,673	292,522	754,787	356,380	1,724,224	27%
Component 3	0	65,442	39,141	59,436	116,583	98,977	388,579	6%
Component 4	145	149,316	410,704	410,704	352,439	130,336	1,238,900	19%
Component 5	2,170	227,514	690,641	187,800	292,823	72,612	1,481,060	23%
Other Costs	118,399	61,555	68,226	94,968	56,789	18,702	418,640	6%
Total	126,232	634,515	1,359,265	1,185,383	2,090,899	930,306	6,500,000	
% of Budget	2%	10%	21%	18%	32%	14%		

The actual spending for Components 1, 4 and 5 were much higher than planned for by the original budget. Specifically, as summarized in the table below, Component 5 accounted for 23% of the overall budget, versus 12% of the planned budget, a 92% increase (spending for this component included

expenses for schools and other educational activities). Conversely, spending for pilot projects (Component 3) was much lower than planned: 6% vs. 28%, a 78% decrease.

	% of Original Budget	% of Actual Expenditure	% Change from Original
Component 1	12%	19%	57%
Component 2	16%	27%	62%
Component 3	28%	6%	-78%
Component 4	25%	19%	-24%
Component 5	12%	23%	92%
Other Costs	7%	6%	-7%

Table 5. Actual Expenditures Compared to Original Budget Allocation (in %)

It is understood by the Evaluation Team that the changes to the expenditures per component were necessary due to the economic and security situations. For example, a number of the pilot projects developed by the project initially (or municipalities that have shown interest) are now in conflict zones, and that the carbon market experienced significant setbacks. However, there are other areas of the country that are not limited by on-going conflict, with highly interested, motivated local officials that would benefit from a combination of hands-on experience with new technologies, along with the guidebooks and other technical information delivered by the project. Given that the MTR had already recommended additional demonstration projects, it was not clear why additional projects were not pursued in parallel with other municipal outreach efforts. There was no documented decision, nor supporting analysis to indicate that demonstration projects were not successful or not cost effective.<sup>26</sup>

A review of the expenditures indicated that in addition to the outreach and marketing campaign implementation costs, the project invest significantly in a number of studies, market analyses, legal analyses and support related to legislation activities (Components 1, 2 & 4). For example, a study which analyzed the state of product quality in the Ukrainian market in support of Component 2 cost over USD \$500 000 (for reference, this is more than seven times the cost of the inter-laboratory comparison study that was commissioned in 2016).<sup>27</sup> Yet, activities to support a QA/QC framework have been identified by the project documents, and were not implemented until the last two years of the project. Similarly, an analysis of electricity supply cost over USD \$175 000, which may or may not be necessary, given that these issues were also identified by the project document. A summary of the activities commissioned by the project is included in Annex G.

The table below shows overall project management and staffing implementation costs over six years, averaging about USD \$233,000 per year, which totaled USD \$ 1.4 million, or about 22% of the overall project budget. This is a higher percentage of implementation and staff costs than a number of other

<sup>&</sup>lt;sup>26</sup> Support to municipalities after the MTR came primarily in the form of the draft phase-out decree and technical support for local decree adoption.

<sup>&</sup>lt;sup>27</sup> Street lighting analysis - original in Ukrainian "Оцінка якості енергоефективних вуличних ламп і світильників доступних на ринку україни"

<sup>[</sup>https://drive.google.com/file/d/0B0ENyYqfz4jedzU2Q1I6YTIwWHM/view?usp=sharing]

lighting projects.<sup>28</sup> One reason of this high implementation cost was due to the large number of staff retained by the project over the implementation period. As pointed out by the MTR, this level of staffing may not have been necessary, and could have been changed, given the success of the awareness campaigns and the lack of progress on other components by 2014. It is possible that the discontinuous project management resulted in less attention focused on this high percentage.

Regarding the per-component implementation and staffing costs, it can be seen in the table below that staff costs for Components 1 and 4 accounted for the majority of the staffing and project management budget (27% and 28%, respectively). Combined, these components accounted for over half of the budget. It can be seen that spending on Component 2 ceased after 2013, indicating that the progress that was made in this area from 2014 on was mostly due to activities supported by the CTA. The focus on public outreach and awareness over demonstrations is also reflected here, with the expenditures on Component 4 (product penetration) accounting for the highest portion of the overall budget, while Component 3 (demonstrations) accounted for 8%, or about one-third of Component 4.

Component	2011	2012	2013	2014	2015	2016	Total
Component 1	2,274	42,441	72,698	73,983	53,324	132,750	377,471
Component 2	145	27,813	27,525	-	-	-	55,484
Component 3	-	15,111	-	28,645	36,409	39,445	119,609
Component 4	145	45,960	97,657	79,280	85,747	90,740	399,529
Component 5	145	38,106	44,271	33,675	35,926	38,751	190,874
Other	24,559	58,356	57,816	53,484	53,355	17,211	264,781
Sub-total	27,269	227,787	299,967	269,066	264,761	318,897	1,407,748

#### Table 6. Project Implementation/Staffing Costs, per Component

As of January 2017, the project was projected to have utilized 97% of the GEF-fund. The PMO plans to expend the remaining funds by project closure on 31 March 2017.

The Evaluation Team concluded that the GEF funding has been adaptively reallocated within the five project Components, and the PMO had notified UNDP of such adjustments when they occurred. However, as demonstrated by the low delivery rate in Years 1 and 2, the over-allocation for Component 4 and 5, and high staffing costs, the process of financial planning was not smooth. The situation also resulted in the need for a one-year extension. Therefore, the project's financial planning is rated as **Moderately Satisfactory**.

#### II. Co-Financing

According to the project design, co-financing accounted for 79% of total resources expected for the project, in either cash or in-kind contributions from stakeholders, including the Government of Ukraine

<sup>&</sup>lt;sup>28</sup> Project management costs for China's PILESLAMP, for example, was less than 10% of overall project budget of USD \$14,000,000.
(67%), private sector (10.5%) and others (1%). Due to changes in economic and political situations, cofinancing from stakeholders have not been fully realized for a number of categories, including:

- Co-Finance from Government of Ukraine (Per Component)
- Co-Finance from the Private Sector (Per Component)
- Committed Co-financing Inputs from other Partners (Per Component)

Specifically, it was estimated by the MTR that only \$ 234,000 has materialized to date from the total of almost USD \$ 19 million committed by the Government by 2014, with no direct additional funding since then or into other EE lighting related areas as a direct result of project activities.

However, in 2008 the Ukrainian Government accepted and approved implementation of a State target scientific and technical program "Development and implementation of energy saving LED light sources and lighting systems based on them."<sup>29</sup> This LED program was originally intended for implementation during 2009 - 2015, in parallel to the project. This program was discontinued in 2014 by the Ukrainian government. From 2009 to 2014, the Ukrainian Government spent a total of 187,477,700 UAH (approximately USD \$23.4 million), of which 177,417,700 UAH (approximately USD \$22.2 million) came from the state budget and 10,060,000 UAH (approximately USD \$1.2 million) from other sources. It can be assumed that this may have been one of the co-financing commitment activities. To date, no reportable results are available from this project to support the TMEL project objectives or outcomes.<sup>30</sup> The UNDP Regional Technical Advisor on Climate Change mitigation noted that in his view, this should not be counted as co-financing as it was not listed in the project, and it was initiated before the project started (due to the fact that the project did not work with the Government's LED program).

The committed amounts from STK-Ukraine and Gazotron-Lux did not translate into actual funding, as both companies went out of business during the lifetime of the project. There was only one remaining local producer (ISKRA) by the end of the project, and no cooperation took place. Nevertheless, there have been co-financing from others in the private sector for various project activities. For example, a number of private sector entities (Maxus Fund, Epicenters, other retailers and NGOs) provided cofinancing for the project's policy, awareness and mercury re-cycling activities. A number of retailers also invested in the development of EE lighting retail displays, supply and service, which are not fully captured in the co-financing reporting.

Given the lack of realization from the committed co-financing from stakeholders, and even taking into account the government's LED program, the Evaluation Team concluded that the project's co-financing results are **Moderately Unsatisfactory**.

<sup>&</sup>lt;sup>29</sup> http://zakon2.rada.gov.ua/laws/show/632-2008-п#n54

<sup>&</sup>lt;sup>30</sup> Referencing GEF guidelines, which defines co-financing as "resources that are additional to the GEF grant and that are provided by the GEF Partner Agency itself and/or by other non-GEF sources that support the implementation of the GEF-financed project and the achievement of its objectives," then the State target scientific and technical program "Development and implementation of energy saving LED light sources and lighting systems based on them" met the definition of co-financing

# 3.3. Project Results

This section provides a summary of the project results and an assessment of the relevance, effectiveness and efficiency, country ownership, mainstreaming, sustainability, and impact of the TMEL project. Evaluation ratings for overall results, effectiveness & efficiency, and sustainability are also provided.

# 3.3.1. Overall Results (Attainment of Objectives)

The overall goal of the TMEL project is the reduction in the annual growth rate of GHG emissions from electricity generated and used for lighting in Ukraine. The project was designed to target five specific areas in an integrated, coordinated manner in order to accomplish its goals:

- 1. Residential/Consumer Lighting
- 2. Public Sector Lighting
- 3. Domestic Lighting Suppliers
- 4. Foreign Lighting Suppliers
- 5. Domestic Testing Facilities for Quality Control

These five areas were targeted by five project components, listed previously. Activities under these components were designed to complement each other, to produce real and demonstrable results with outcomes that can be monitored. The following sections contain details of progress achieved by activities under each component.

# Component 1: Prepare and set-up national policy framework to promote EE lighting

Under this Component, it was planned that the project would assist in the development of legislations to phase out incandescent lamps; improve the quality of electric supply; introduce an energy efficient lighting scheme that is harmonized with European standards and norms for EE lighting; and improve the collection, disposal, and waste- handling of CFLs and other potentially hazardous lighting products.

Table 7 contains the accomplishments under Component 1, along with the evaluation ratings, a more detailed summary follows.

### Table 7. Component 1: Outputs, Indicators, Accomplishments, and Ratings

	Component 1: Improve the National Policy Framework for promoting EE lighting					
Output	Success Indicator	End of Project Target	Project Accomplishments	Achievement of Target	Rating	
1.1 Improve the National Policy framework for promoting EE lighting	National Roadmap for EE lighting & market transformation is developed	To develop an EE lighting-specific Roadmap that is integrated with overall Government priorities for energy security & savings	The National Road- map was drafted, discussed and submitted to the MENR on 30 June 2015 by Letter №26-45	100%	Satisfactory	
1.2 Develop and prepare for governmental acceptance draft legislation for improving the electricity supply for Ukrainian consumers	Draft legislation is prepared and submitted	To improve the right of consumers vis-à-vis Oblenegros and to provide enforcement of electricity supply standards	The project commissioned "Study of Ukrainian and international legislation as it pertains to the quality of electricity in order to improve the consumer rights protection" (2015). The results of the study were presented to the MENR on 30 June 2015 by Letter №26-45. The study did not include suggestions improving the Laws of Ukraine due to the fact that currently applicable Law of Ukraine "On Electricity" regulates protection of rights of electricity consumers in full. The study proposed to bring in line only the electricity standards system (GOST).	75%	Moderately Unsatisfactory	
1.3 Develop and submit for governmental acceptance an energy efficient lighting scheme that is harmonized with European standards and norms for EE lighting and the usage of such products	Draft legislation is prepared and submitted	To improve the right of consumers vis-à-vis Oblenegros and to provide enforcement of electricity supply standards	Compendium "EU Legislation in the Energy Efficient Lighting" was published and formally submitted to the MoJ for registration. A comparative analysis of Ukrainian legislation and EU Directives on the subject will submitted to MENR during 2017 reporting period. Draft Law "On basics of Energy-efficient Lightning in Ukraine" (#3245) was registered on 7 October 2015. Draft Law "On Introduction Amendments to the Legislation of Ukraine (regarding improving Energy-efficiency in Lighting)" was filed on 4 May 2016. Draft Resolution on the adoption of regulations with regard to labeling of lamps and luminaires was submitted to the MENR in November 2013.	100%	Satisfactory	

1.4 Improve waste handling directives for lighting products	Draft legislation is prepared and submitted	To properly classify and promote programs to recycle CFLs and other mercury containing equipment	<ul> <li>A "Draft Resolution on collection, disposal and utilization of electrical equipment waste" has been submitted to the MENR in September 2012. This draft resolution deals with the collection, handling and disposal of CFLs and other potentially hazardous lighting products.</li> <li>In 2014 this draft Resolution were transformed to Draft Law by Project IC and passed and registered in Verhovna Rada (Draft Law 3374). There were two positive conclusions from VR Committees and one from GNEU received.</li> <li>A Technical Regulation on collection, disposal and utilization of electrical equipment waste was developed and submitted to MENR on 30 June 2015 together with Letter #26-45. Later this Technical Regulation was included into National Strategy on Waste Handling.</li> </ul>	100%	Satisfactory
		I	Overall Rating	: Component 1	Moderately Satisfactory

# Outcome 1: Improved National policy framework for promoting EE lighting.

# *Output 1.1: Develop and submit a national road-map for EE lighting market transformation.*

**Current Status**: The National Road- map was drafted by the experts with direct assistance from the project, discussed and submitted to the MENR on 30 June 2015 by Letter №26-45.

# *Output 1.2: Develop and prepare for governmental acceptance draft legislation for improving the electricity supply for Ukrainian consumers.*

**Current Status**: The project commissioned "Study of Ukrainian and international legislation as it pertains to the quality of electricity in order to improve the consumer rights protection" (2015). The results of the study were presented to the MENR on 30 June 2015 by Letter No26-45.

- The study did not include suggestions improving the Laws of Ukraine due to the fact that currently applicable Law of Ukraine "On Electricity" regulates protection of rights of electricity consumers in full. The study proposed to bring in line only the electricity standards system (GOST).
- Recommendations providing for the improvement of applicable legislation have been developed and submitted to the Cabinet of Ministers for a final decision. On 22.09.2016, the Parliament approved in principle the bill of the Cabinet "On electric energy in Ukraine." (<u>Http://w1.c1.rada.gov.ua/pls/zweb2/webproc4\_2?pf3516=4493&skl=9</u>).

# Output 1.3: Develop and submit for governmental acceptance an energy efficient lighting scheme that is harmonized with European standards and norms for EE lighting and the usage of such products.

**Current Status**: The project was responsible for, or directly supported the following legislative activities on energy efficient lighting:

- The project commissioned the translation of Directive 2012/27/EU of 25 October 2012 on energy efficiency, amending Directives 2009/125/EC and 2010/30/EU and repealing Directives 2004/8/EC and 2006/32/EC. Compendium "EU Legislation in the Energy Efficient Lighting" was published and formally submitted to the MoJ for registration (see the letter from MoJ in Annex G.<sup>31</sup>
- A comparative analysis of Ukrainian legislation and EU Directives on the subject matter was undertaken in 2016, to be submitted to MENR during 2016 reporting period. The compilation will be submitted to MENR prior to project completion.
- Draft Law "On Basics of Energy-efficient Lightning in Ukraine" (#3245) was registered on 7 October 2015.
- Draft Law "On Introduction Amendments to the Legislation of Ukraine (regarding improving Energy-efficiency in Lightning)" was filed on 4 May 2016 to replace a previous draft. It received positive Resolution from the Committees of Verhovna Rada, but still is pending Parliament

<sup>&</sup>lt;sup>31</sup> Also available from <u>http://lampochki.org.ua/?p=791&lang=en</u>

- Draft Law "On Introduction Amendments to the Legislation of Ukraine (regarding improving Energy-efficiency in Lightning)" was filed on 4 May 2016 to replace a previous draft. It received positive Resolution from the Committees of Verhovna Rada, but still is pending Parliament adoption. This draft proposes changes to the Law of Ukraine on Energy-saving and to the Code of Ukraine on Administrative Offences.
- Draft Resolution on the adoption of regulations with regard to labeling of lamps and luminaires was submitted to the MENR in November 2013. In 2015 this Draft was used as basis for Technical Regulation "Energy labeling of lamps and luminaries" (CMU Resolution #340 dated 27/5/2015, as well as Draft Resolution on LED equipment.

The project also focused on promotion energy efficient lightning scheme at the regional level. The DBN (Construction Norms and Regulations) on "Natural and Artificial Lighting" that includes specific minimum energy performance requirements of lighting systems in municipal buildings, new residential construction and street lighting were developed by the project and transformed into edition of the State Construction Norms (DBN) and passed to the MRDCHCS for approval. These amendments to DBN are still under consideration.

Before the development of the specific minimum energy performance requirements, the procurement of LED lighting equipment by municipalities faced significant drawbacks due to the lack of rigorous requirements. This lack of minimum requirements led to the cancellation of tenders or procurement of low-quality products that did not perform as expected. In order to ensure compliance with the European and international standards in the process of procurement of lighting equipment for public purposes, the technical requirements have been developed for certain classes of LED lighting equipment.

The TMEL project developed a Draft Instruction on promotion energy efficient lighting equipment in the cities and proposed it to the mayors and executive committees of local councils. Recommendations for procurement and for technical specifications for the energy efficient lightning were developed and disseminated among 150 municipalities. As the result, 24 municipalities and Odessa Oblast adopted respective regulations and started planning and procurement according to Instructions and Recommendations abovementioned (see examples at <a href="http://lampochki.org.ua/wp-content/uploads/2015/11/All-Local-Regulatory-Acts.1.pdf">http://lampochki.org.ua/wp-content/uploads/2015/11/All-Local-Regulatory-Acts.1.pdf</a>. It was recommended that these requirements were adopted when procurement is made with use of the state budget, municipal, investment funds or private one. Specific requirements have been designed individually for outdoor lighting (roads of different categories, parks, green areas) and indoor illumination (schools, hospitals, administrative buildings). The guidelines developed by the TMEL project were used by the abovementioned municipalities when they prepared tender documentations and organized procurement process for lightning equipment.<sup>32</sup>

<sup>&</sup>lt;sup>32</sup> These recommendations were developed by the project with the assistance of the Lighting Association's Dr. Sorokin in 2015.

# Output 1.4: Improve waste-handling directives for lighting products

**Current Status**: The project was responsible for, or directly supported the following legislative activities on handling of wastes from lighting products:

- A "Draft Resolution on collection, disposal and utilization of electrical equipment waste" has been submitted to the MENR in September 2012. This draft resolution deals with the collection, handling and disposal of CFLs and other potentially hazardous lighting products. In 2014 this draft Resolution were transformed to Draft Law by Project IC and passed and registered in Verhovna Rada (Draft Law 3374). There were two positive conclusions from VR Committees and one from GNEU received.<sup>33</sup>
- A Technical Regulation on collection, disposal and utilization of electrical equipment waste was developed and submitted to MENR on 30 June 2015 together with Letter #26-45. Later this Technical Regulation was included into National Strategy on Waste Handling.<sup>34</sup>

# MTR Recommendations & implementation status:

The MTR identified that there was not much that the project can do to get Ukrainian Government to promptly approve and implement the required decrees/regulations, thus development of the national road map for EE lightning market transformation was recommended. The project properly implemented this advice and developed respective road map, which was submitted to the MENR on 30 June 2015. Provisions of this Roadmap were used by MENR during the planning process for the ministry, proposing respective draft by-laws by the ministry, and proposing draft legislation by the MPs. The Head of Department of the MENR confirmed that MENR used findings and recommendations from the Roadmap, and for coordination of awareness and education campaigns on the subject matter.

MTR identified that Ukraine has not yet joined UNEP's enlighten initiative; however, in view of enlighten's focus on market transformation, this situation should be reassessed. This item remains outstanding.

### Component 2: Improve Quality Assurance & Quality Control systems for EE lighting market

Under this Component, it was planned that the project would support the NAER and DerzhStandard in the development of improved environmental, energy-efficiency and quality standards and norms for lighting products; improve the Ukrainian institutional capabilities for auditing and assessing the quality of imported EE lighting products; support local development of EE lighting products and modernization of national lighting industry; and to create a system for CFL collection, recycling and/or disposal.

In course of the Project implementation The Derzhstandard was liquidated and now part of its functions conducts the Department on Technical Regulation in Ministry of Economic Development, see <a href="http://www.me.gov.ua/Documents/Detail?lang=uk-UA&id=d71e145f-452e-4412-b1f8-">http://www.me.gov.ua/Documents/Detail?lang=uk-UA&id=d71e145f-452e-4412-b1f8-</a>

<sup>&</sup>lt;sup>33</sup> <u>http://w1.c1.rada.gov.ua/pls/zweb2/webproc4\_1?pf3511=56893</u>

<sup>&</sup>lt;sup>34</sup> <u>http://menr.gov.ua/garbage/5632-tekhnichna-redaktsiia-proektu-natsionalnoi-stratehii-povodzhennia-z-vidkhodamy-dlia-podalshoho-hromadskoho-obhovorennia</u>

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247504f403d1&title=DepartamentTekhnichnogoReguliuvannia. The State Agency on Energy Efficiency and Energy Saving of Ukraine had become a successor of NAER function in 2014. The State Agency on Energy Efficiency and Energy Saving of Ukraine (Derzhenerhoefektyvnosti) was established by Resolution of the Cabinet of Ministers of Ukraine #676 dated 26 November 2014 as a central executive power institution, whose activities are directed and coordinated by the Cabinet of Ministers of Ukraine by Vice Prime Minister of Ukraine - Minister of Regional Development, Construction and Housing and implements state policy in the efficient use of energy resources, energy efficiency, renewable energy and alternative fuels. This change created a number of challenges to the project. For example, NAER had branches throughout Ukraine and 400 employees. In 2015 the branches of National agency were liquidated and only the central body now exists. The TMEL project made a number of unsuccessful attempts to coordinate efforts with Derzhenerhoefektyvnosti.<sup>35</sup>

Table 8 contains the accomplishments under Component 2, along with the evaluation ratings, a more detailed summary follows.

<sup>&</sup>lt;sup>35</sup> For example, the Project in cooperation with Institute of Semi-conductors of National Academy of Sciences suggested cooperation with Derzhenerhoefektyvnosti to update the Resolution 992 of CMU on requirements for LED equipment purchased from budget costs (see letter from DCD) as the existing requirements are in line with 2012 LED technology which results in purchase of lowest quality LEDs. The invitation was declined by Derzhenerhoefektyvnosti.

# Table 8. Outputs, Indicators, Accomplishments, and Ratings

	Component 2: Improve Quality Assurance & Quality Control Systems for imported and locally produced lighting products in Ukraine					
Output	Success Indicator	End of Project Target	Project Accomplishments	Achievement of Target	Rating	
2.1 Support the development of improved environmental, energy-efficiency, and quality standards and norms for lighting products	New standards for EE lighting are developed for Dehrstandard & NEA	An incentive scheme is implemented for products & a penalty scheme is implemented for sub-standard products	State Standards on LED technology developed (five have entered into force). DSTU-P IEC/PAS 62717:2014 LED Modules for General Lighting – Performance Requirements DSTU-P 7732: 2015 Light Emitting Diodes. CIE 127-2007 Measurement of LEDs DSTU XXXX: 201X General Purpose Luminaires w/ LED Light Sources – Performance Requirements DSTU-P IEC/PAS 62722-1:2014 Luminaire Performance – Part 1: General Requirements DSTU-P IEC/PAS 62722-2-1: 2014 Luminaire Performance – Part 2-1: Particular Requirements for LED luminaires DSTU IEC TR 62778:2014 Application of IEC 62471 for the Assessment of Blue Light Hazard to Light Sources and Luminaires	75%	Moderately Unsatisfactory	
2.2 Improve the Ukrainian institutional capabilities for auditing and assessing the quality of imported EE lighting products	<ol> <li>Equipment delivered to Dehrstndard</li> <li>Independent testing of EE lighting samples in stores allowed in Ukraine</li> </ol>	Testing and certification of products is started and maintained	The National Accreditation Agency of Ukraine (NAAU) issued accreditation documents for 18 laboratories that are equipped to test lighting products, and deliver certification that they meet standards that are presently in place, none of them requires equipment upgrade. Three government laboratories were validated by the International Consultant hired by the project, and three laboratories received certificates from ILAC. Testing of products initiated.	90%	Moderately Satisfactory	

2.3 Support for local development of EE lighting projects & modernization of national lighting industry	<ol> <li>Workshops held at interested lighting manufacturers</li> <li>Business plans developed for selected companies</li> </ol>	At least one IL manufacturer has new EE lighting product line	Due to the fact that there is only one local producer of incandescent lamps (lskra) and production of the incandescent lamps is not banned in the country until the legislations are adopted, the project did not pursue activities under this output.	0%	N/A
2.4 Create an improved system for CFL collection, recycling and/or disposal	A new municipal system for CFL collection, recycling and/or disposal	A locally adapted system that is sustainable is developed from best practices in other countries	<ul> <li>The project conducted a review of CFL collection and recycling schemes in Western European countries, and a funding scheme for collection and recycling was formulated. 3 NGOs were awarded by grants to address the issue of collection and disposal of mercury-containing lamps. They are:</li> <li>Dzherela Radosti</li> <li>Zelenyi Parus</li> <li>Eco-club Babylon</li> </ul>	100%	Satisfactory
		·	Overall Rating	: Component 2	Moderately Satisfactory

# *Output 2.1: Support the development of improved environmental, energy-efficiency and quality standards and norms for lighting products.*

**Current Status**: Six new State Standards on LED technology were developed with direct support from the project, five of them have entered into force. These standards will enable the removal of substandard products from the market. They are:

- DSTU-P IEC/PAS 62717:2014 LED Modules for General Lighting Performance Requirements
- DSTU-P 7732: 2015 Light Emitting Diodes. CIE 127-2007 Measurement of LEDs
- DSTU XXXX: 201X General Purpose Luminaires w/ LED Light Sources Performance Requirements
- DSTU-P IEC/PAS 62722-1:2014 Luminaire Performance Part 1: General Requirements
- DSTU-P IEC/PAS 62722-2-1: 2014 Luminaire Performance Part 2-1: Particular Requirements for LED luminaires
- DSTU IEC TR 62778:2014 Application of IEC 62471 for the Assessment of Blue Light Hazard to Light Sources and Luminaires

An incentive scheme according to MTR was supposed to be designed in the second half of 2014, nevertheless no proven record is available.

# Output 2.2: Improve the Ukrainian institutional capabilities for auditing and assessing the quality of imported EE lighting products

**Current Status**: The National Accreditation Agency of Ukraine (NAAU) issued accreditation documents for 18 laboratories that are equipped to test lighting products, and deliver certification they meet standards that are presently in place.<sup>36</sup> According to assessment made by the project, none of them requires equipment upgrade. Three government laboratories were validated by the International Consultant hired by the project, and three laboratories received certificates from ILAC (International Laboratory Accreditation Cooperation).

An inter-laboratory comparison test (IC) and staff training initiative was initiated by the project, called "Conducting Inter-laboratory Comparison Test and Laboratory Staff Training Course for Testing of Efficient Lighting Products." The IC was conducted to investigate and understand the measurement capabilities of five selected Ukrainian laboratories with regard to SSL lighting products. The IC activity was organized in compliance with ISO/IEC 17043 Conformity Assessment – General requirements for proficiency testing, and served as a "star type" IC for the five participating laboratories from Ukraine. The National Lighting Test Centre (NLTC) in Beijing, China is the reference laboratory. The final results from the IC testing will be presented at the Project Closure Conference in March, 2017.

<sup>&</sup>lt;sup>36</sup> <u>http://naau.org.ua/reyestr-akreditovanix-oov/</u>

# *Output 2.3: Support for local development of production of EE lighting equipment & modernization of national lighting industry*

*Current Status*: Due to the fact that there is only one local producer of incandescent lamps (Iskra) and production of the incandescent lamps is not banned in the country until the legislations are adopted, the project did not pursue activities under this output, only to focus on legislative activities.<sup>37</sup> It was not clear that attempts for cooperation were made to Iskra without success, or the Project was not consistent in its approach to recruit partners. A LED equipment producer in Potlava indicated that Gazotron Lux withdrew from the market as none of the domestic producers was able to compete with production in China.<sup>38</sup>

# Output 2.4: To create an improved system for collection, recycling and/or disposal of mercurycontaining lighting equipment

*Current Status*: The project conducted a review of CFL collection and recycling schemes in Western European countries, and a funding scheme for collection and recycling was formulated. 3 NGOs were awarded by grants to address the issue of collection and disposal of mercury-containing lamps. They are:

- Dzherela Radosti (45 530 USD),
- Zelenyi Parus (45 585USD)
- Eco-club Babylon (45 255USD).

# MTR Recommendations & Implementation status:

The MTR recommended the recruitment of a local or international consultant with expertise in testing laboratories to validate the project's findings that all 3 Government-accredited laboratories in Ukraine do not require any equipment upgrade. This was confirmed for Output 2.3 above.

# Component 3: Efficient lighting in the municipal educational sector

Under this Component, it was planned that the project would provide bankable municipal projects for co-financing based upon municipal EE lighting projects in the tertiary sector; design and implement pilot demonstration projects in 7 participating municipalities that targets school buildings; and pay for independent EA of the final pilot project EE lighting solution and performance against relevant lighting standards and the design requirements stated in the service contracts. Note that these original outputs from the project document were modified with input from the PSC at project inception.

Table 9 contains the accomplishments under Component 3, along with the evaluation ratings, a more detailed summary follows.

# Outcome 3: Implement efficient lighting demonstrations in the municipal educational sector

<sup>&</sup>lt;sup>37</sup> Iskra established a new line of LED lamps during the course of project implementation.

<sup>&</sup>lt;sup>38</sup> The Evaluation Team were told by the project staff that Iskra by itself suspended cooperation. A number of industry representatives also indicated that only viable way to stay on the market is to buy LED components and equipment from China, or place production of component parts of LED equipment in China, and only assemble them in Ukraine.

# Table 9. Component 3: Outputs, Indicators, Accomplishments, and Ratings

Component 3: Implement efficient lighting demonstrations in the municipal educational sector					
Output	Success Indicator	End of Project Target	Project Accomplishments	Achievement of Target	Rating
3.1 Provide bankable projects for co- financing by existing credit facilities	Municipalities receive co-financing/credit lines to support EE lighting projects developed by the project	Municipalities that need co- financing for EE lighting projects can receive it on a case-by-case basis and/or programmatic basis from World Bank, Ukreximbank, NEFCO, etc.	The project has co-financed a feasibility study in Gorlovka for expanding street lighting under a proposed UAH 3 million (approx. \$ 345,000) credit from NEFCO. However, due to the fact that the city is now in an area not controlled by the Ukrainian Government (it has been occupied since 2014), the credit was not settled.	50%	N/A
3.2 Design and implement pilot demonstration projects in 7 participating municipalities that target school buildings	<ol> <li>Number of schools with successful upgrading/refurbishment of school lighting systems.</li> <li>Energy savings per schools</li> </ol>	Revised: Design and implement pilot demonstration projects in at least 7 participating municipalities	At least 9 pilot projects have been initiated in 8 participating municipalities since project initiation.	100%	Satisfactory
3.3 Provide independent performance audits of the pilot projects	<ol> <li>Number of audits performed</li> <li>All audit non- conformities are resolved satisfactorily</li> </ol>	50 audits at 50 schools at least once per project lifetime	The "investment-grade" audits necessary for undertaking techno- economic feasibility studies related to lighting retrofits have been conducted in early-2015.	100%	Moderately Satisfactory
			Overall Rating	: Component 3	Moderately Unsatisfactory

# Output 3.1: Provide bankable municipal projects for co-financing by existing credit facilities

*Current Status*: The project has co-financed a feasibility study in Gorlovka for expanding street lighting under a proposed UAH 3 million (approx. \$ 345,000) credit from NEFCO. However, due to the fact that the city is now in an area not controlled by the Ukrainian Government (it has been occupied since 2014), the credit was not settled.

# *Output 3.2: Design and implement pilot demonstration projects in at least 7 participating municipalities*

*Current Status*: At least 9 pilot projects have been initiated in 8 Municipalities since project initiation. The locations are:<sup>39</sup>

- Sadzhava Village: 15 LED lamps equipped with high quality LED modules from one of the world's LED lighting leaders have been purchased from one of the local producers in order to light the main street and the schoolyard of Sadzhava village of Ivano-Frankovsk region.
- Berdyansk: The project provided for replacement of existing street lights with up-to-date and efficient fixtures capable of saving energy and be operable in adverse weather conditions.
- Lugansk: As a result of implementation of the project for replacement of outdoor lamps jointly implemented by the TMEL project and MiskSvitlo Public Utility Company, Lugansk installed 1100 energy-saving lamps. The city purchased and installed another 1,200 energy-saving lamps for additional locations.
- Dobrotvir: The project helped to replace incandescent light bulbs in a number of municipal residential apartment buildings (entrance lobbies, staircases) with LED lighting sources. Estimated total lifetime energy savings for this activity is about 1387.6 MWh, with financial savings estimated to be 107,1076 UAH, and CO2 emissions reduction of 1387 tons.
- Nesheriv Village: The village replaced 75 150W mercury-containing street light sources for 75 30W LED lights. It also replaced incandescent accent lighting system on the Cathedral of Saviour's Transfiguration Monastery Compound with 22 12W LED light sources. Estimated annual energy savings is about 34.7 MWh, which equals to USD \$3,225. Energy savings based upon the useful life of light bulbs installed is estimated to be 866.7 MWh over 25 years, Reduction of CO2 emissions based upon the useful life of light bulbs installed to be 867 tons.
- Gorlovka: The TMEL project provided for engineering contractor services in order to support a complex upgrade of the outdoor lighting system and retrofitting of the traffic lights in the city. For the purposes of this project, NEFCO was planning to partially cover the engineering design and further installation of smart lighting management system. The city also planned to replace 22 street-light luminaires and provide free Wi-Fi access within the section limited by Rudakov and Lenin streets.
- UNDP, Kiev: This project included installation of ten 35Watt LED down lights and three (3) 600x600mm 56Watt LED lighting fixtures.

<sup>&</sup>lt;sup>39</sup> Note that Lugansk and Gorlovka are areas no longer under control of the Ukrainian Government.

• UNDP, Kiev: This project included installation of ten 35Watt LED down lights and three (3) 600x600mm 56Watt LED lighting fixtures.

Recommendations for procurement and technical specifications for the EE lighting were placed in the Handbooks titled "Energy Efficient street lighting, building and exploitation and "Energy Efficient Lighting" disseminated among municipalities (see details under Output 5.2). It resulted in adoption by 15 municipalities of respective regulations for procurement and tender process that provided them with turn-key EE lighting solutions.

# **Output 3.3: Provide independent performance audits of the pilot projects**

*Current Status*: The project targeted 50 audits for 50 projects for this activity. The "investment-grade" audits necessary for undertaking techno-economic feasibility studies related to lighting retrofits have been conducted in early-2015.<sup>40</sup>

# MTR Recommendations & implementation:

Recommendations were made to ensure that municipal stakeholders are thoroughly briefed on the objectives of the pilots, as well as that their learning process is facilitated in a way that they are able to replicate pilots on the basis of their own resources. With issuing and dissemination a Handbook the first recommendation was executed. As to the organization of the learning process for municipal stakeholders, in the framework of 2014 and 2015 conferences there was essential part of the activity dedicated to demonstration of the project activities on piloting including the municipal stakeholders (see presentation <u>https://drive.google.com/drive/folders/0B06VW9ErMx4EQXczY1hSQThaeD</u>).

### **Component 4: Improve EE lighting product penetration in the Residential Sector**

Under this Component, it was planned that the project would collaborate with local and international EE lighting producers, consumer banks like Platinum Bank, and national retailer networks to design and implement EE lighting dissemination program for residential consumers; introduce EE lighting and Green Light Label component in educational curricula for school children; design and implement municipal PR campaigns on EE lighting in parallel with implementation of demonstration projects; and tailor selected global CFLs promotional activities to Ukrainian consumers.

Table 10 contains the accomplishments under Component 4, along with the evaluation ratings, a more detailed summary follows.

### Outcome 4: Improved EE Lighting product penetration in the Residential Sector

<sup>&</sup>lt;sup>40</sup> Details of locations and issues addressed have yet to be provided.

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# Table 10. Component 4: Outputs, Indicators, Accomplishments, and Ratings

Component 4: Improve EE lighting product penetration in the Residential Sector					
Output	Success Indicator	End of Project Target	Project Accomplishments	Achievement of Target	Rating
4.1 Design and implement the CFL dissemination program for residential consumers	<ol> <li>Establishment of retail chain EE lighting promotion program</li> <li>Amount/volume of EE lighting purchased via the program</li> </ol>	Establishment of retail chain EE lighting promotion program available for most consumers Target 2 municipalities initially and spread to top 5 population centers by end of project Consumer awareness survey to be conducted by the project to establish baseline level of awareness for EE lighting technologies	<ul> <li>Three promotional campaigns have been developed and conducted in the retail stores:</li> <li>1. All-Ukrainian LED promotional campaign (2016): Covered 35 retail stores (Epicentre) in 23 cities.</li> <li>2. All-Ukrainian awareness campaign on EE lighting (2nd phase) (2015): This campaign focused primarily on broadcast and printed media, public transit and out-of-home advertising.</li> <li>3. Ukraine retail chain Epicenter (largest in Ukraine) and some other (e.g. Foxtrot) are implementing a micro-finance facility with the support of Ukrsibbank, Platinum Bank for residential customers</li> <li>Follow up surveys were conducted, with the following results:</li> <li>All-Ukrainian awareness campaigns was estimated to cover more than 27 million Ukrainians of the age 17 and older (73,8%), who live in rural areas, towns and cities.</li> <li>Advertising events in the retail stores was estimated to cover 23,4% of Ukrainians of the age 17 and older (about 7,5 million people).</li> <li>Increase sales of EE lighting products used in households to 53,3%.</li> <li>Market share of EE bulbs used in households has grown by 22,5%</li> </ul>	100%	Highly Satisfactory
4.2 Introduce EE lighting and Green Light components in educational curricula	<ol> <li>Creation of educational materials</li> <li>Number of institutions accepting the educational curricula throughout Ukraine</li> </ol>	Data from UNDP/Ministry of Education regarding dissemination of materials and incorporation into school curriculum	The All Ukrainian Educational Awareness Campaign on Energy Efficient Lighting in Schools was conducted from March 2014 until February 2015. 6896 schools of all 24 Ukrainian oblasts/regions, including cities, towns and rural areas, were involved in the campaign. 12000 lessons for school children and 25 seminars for teachers have been held. The campaign is estimated to cover 55,3% of all school students in	100%	Satisfactory

			Ukraine (2 334 766 school children), 19,6% of all adults in Ukraine (6 199 532 teachers and parents).		
4.3 Design and implement municipal PR campaign on EE lighting	<ol> <li>Scope of PR Campaign</li> <li>Effectiveness of PR Campaign</li> </ol>	Campaign visible in the top 10 municipalities in Ukraine by population A measureable increase of 20% in awareness by consumers in the municipalities	<ol> <li>Four nation-wide promotional and PR campaigns have been developed and conducted:</li> <li>All-Ukrainian awareness campaigns on EE lighting (1st phase): Conducted from December 2012 through June 2013 covering cities, towns and rural areas of all 25 regions of Ukraine.</li> <li>All Ukrainian Educational Awareness Campaign in Schools on Energy Efficient Lighting (2014-2015): see output 4.2</li> <li>All-Ukrainian awareness campaigns on EE lighting (2nd phase): Conducted from May 2015 through February 2016 covering cities, towns and rural areas of all 24 regions of Ukraine.</li> <li>All-Ukrainian LED promotional campaign (2016): See output 4.1.</li> <li>Post-campaign surveys by the project showed that the level of public awareness has increased by 7%, with 3.6% directly attributed to the All- Ukrainian awareness campaigns on EE lighting (1st phase) and 3.4 % as a result of campaigns of EE lighting equipment producers in course of years 2012-2013, and by 35,7% in 2016 compared to 2013 due to 2014-2016 project's campaigns. In general, in comparison with 2012 the awareness level on the EE lighting benefits has grown by 42,7% as of 2016.</li> </ol>	100%	Highly Satisfactory
4.4 Tailor selected global EE lighting promotional activities to Ukrainian consumers	<ol> <li>Scope of PR Campaign</li> <li>Volume of sales (data) of targeted products</li> </ol>	Increase in sales of EE lighting products by at least 20% per year at the participating outlets	<ul> <li>Four nation-wide promotional and PR campaigns have been developed and conducted (see output 4.3) resulting in:</li> <li>Sales of EE bulbs used at households have increased by 53,3% in 2016 (vs. 2012)</li> <li>Market share of EE bulbs used at households has grown by 22,5% in 2016 compared to 2012.</li> <li>Market share of LED bulbs used at households has made 48,5% in comparison with CFLs and incandescent bulbs in 2016.</li> </ul>	100%	Satisfactory
			Overall Rating	g: component 4	Hignly Satisfactory

# Output 4.1: Design and implement EE light bulb dissemination programs for residential consumers

*Current Status*: The following three promotional campaigns have been developed and conducted in the retail stores:

1. All-Ukrainian LED promotional campaign (2016): Covered 35 retail stores (Epicentre) in 23 cities. The campaign included:

- Giving event participants discounts for buying a LED bulb in the Epicentre in exchange for a used mercury-containing bulb.
- Disseminating the booklet "ABC Book of Light Bulbs" developed by the project among the customers in the Epicentre
- Providing the Epicentre shop assistants with training sessions on how to properly choose energy efficient LED bulbs for the consumers for different rooms and purposes

2. All-Ukrainian awareness campaign on EE lighting (2nd phase) (2015): This campaign focused primarily on:

- Broadcast and printed media, public transit and out-of-home advertising. It also covered retail stores (via airing of videos/commercials on EE lighting on video screens). 19 retail stores (Epicenter) in 9 cities have been covered.
- Demonstration campaign on collection and disposal of used mercury -containing bulbs and EE lighting promotion (2015). It covered 5 retail stores Epicenter in 5 cities.

Follow up surveys were conducted, with the following results:

- All-Ukrainian awareness campaigns was estimated to cover more than 27 million Ukrainians of the age 17 and older (73,8%), who live in rural areas, towns and cities.
- Advertising events in the retail stores was estimated to cover 23,4% of Ukrainians of the age 17 and older (about 7,5 million people).
- Increase in sales of EE lighting products used in households reached 53,3%.
- Market share of EE bulbs used in households has grown by 22,5% from 2012 to 2016.

As the surveys are based on desk review, there is no proven records on the fact that significant increase in sales of EE lighting products and growth of market share of EE bulbs can be attributed solely to success of the awareness campaign held by the Project.<sup>41</sup>

Decrease of prices of EE lighting products and growing tariffs for electricity also were substantial effect factors. At project start, most EE lamps carried a one-year warranty, today the warranties are typically two to three years. These two above factors (availability of credit helping to make higher priced lamps more affordable; and longer term of warranty for EE lamps) are believed to help resolve partially the

<sup>&</sup>lt;sup>41</sup> Note that one of the surveys supposedly covered over 40,000 subjects. This volume of survey response was not kept in the project office, but with the contractor – which the Evaluation Team believes to be a contractual oversight.

problem of low-quality bulbs flooding the market, which was cited an issue at the start of the project by the project document.

As pointed out earlier, the rapid pace of advancement in LED technologies resulted in lower pricing and faster penetration of LEDs than anticipated (and reduced the volume of CFLs for disposal). This faster penetration definitely helped to increase the adoption rates in the residential sector. However, the increased availability of LEDs also presented its own challenges in issues of testing for quality, user familiarity, and how the project can properly measure their impact – currently, results provided by the project assumed that gains market penetration were the results of the project's activities, however, this assumption underestimates the effect of the overall rapid decline of product pricing and increased availability over the project implementation period.

3. Ukraine retail chain Epicenter (largest in Ukraine) and some other (e.g. Foxtrot) are implementing a micro-finance facility with the support of Ukrsibbank, Platinum Bank for residential customers to purchase goods including EE light lamps on credit.

# Output 4.2: Introduce EE lighting and Green Light Label component in educational curricula

*Current Status*: The All Ukrainian Educational Awareness Campaign on Energy Efficient Lighting in Schools was conducted from March 2014 until February 2015, with the following elements:

The project commissioned a study of the core curriculum, standard and functional curricula, and syllabus for the school year. The subjects and topics directly/indirectly related to EE lighting in primary school (1-4 grades), secondary school (5-9 grades) and high school (10 - 11 grades) were identified as well as the lessons' synopses for each school grades were developed.

The project also commissioned logo and slogan for use with this campaign. Campaign materials included:

- Informational booklets for pupils of secondary and high schools, bookmarks for pupils of primary school, thematic transformable booklets for pupils of secondary school),
- Promotional gifts for school children (kits of thematic stickers for pupils of primary school, thematic fridge magnets), and printed materials and promotional gifts for teachers (booklets and thematic fridge magnets),
- Educational animated cartoon and film on EE lighting are designed, produced and delivered to schools. Physics Classroom demonstration stands for school bulletin boards are developed, produced and delivered to schools, as well as EE Lighting and informational leaflets for using during lessons.
- 10000 textbooks Energy Efficient Lighting and 5000 practical textbooks on Energy Efficient Outdoor Lighting have been developed, produced, and disseminated in 1500 establishments (universities, colleagues, libraries, local municipalities, etc.).

Generally, 6896 schools of all 24 Ukrainian oblasts/regions, including cities, towns and rural areas, were involved in the campaign. 12000 lessons for school children and 25 seminars for teachers have been

held. The campaign is estimated to cover 55,3% of all school students in Ukraine (2 334 766 school children), 19,6% of all adults in Ukraine (6 199 532 teachers and parents). Number of effective contacts with targeted audience was 29,4% of all Ukrainians at the age of 6 and older (8 534 298 children and adults). During the All-Ukrainian awareness campaigns on EE lighting (1st phase) conducted in 2013, informational booklets for students were also developed and disseminated.

### Output 4.3: Design and implement municipal PR campaigns on EE lighting

The following four nation-wide promotional and PR campaigns have been developed and conducted:

- 1. All-Ukrainian awareness campaigns on EE lighting (1st phase): Conducted from December 2012 through June 2013 covering cities, towns and rural areas of all 25 regions of Ukraine. It included: design of campaign slogan and logo; broadcasting developed commercials on TV and Radio channels; placement of thematic pages on social networks and on specialized Internet portals; placement of informational posters on billboards and city-lights and informational blocks on invoices for municipal services; placement of thematic articles in printed issues and information leaflets in residential blocks/elevators; distribution of developed informational booklets for students, environmental services and municipal services departments.
- 2. All Ukrainian Educational Awareness Campaign in Schools on Energy Efficient Lighting (2014-2015): see output 4.2
- 3. All-Ukrainian awareness campaigns on EE lighting (2nd phase): Conducted from May 2015 through February 2016 covering cities, towns and rural areas of all 24 regions of Ukraine. The social event "The Day of Light in Your City" was conducted, and the thematic magnets, fans and 'Hat and Scarf' sets have been produced and distributed. The project also commissioned an educational film, children's cartoon, and promotional commercials to be aired on TV channels, video screens in retail chain stores and undergrounds, as well as on out-of-home boards. Public transportation facilities (buses and undergrounds) were also used as communication channels for placement of informational posters and city-lights, and branding.
- 4. All-Ukrainian LED promotional campaign (2016): See output 4.1.

Post-campaign surveys by the project showed that the level of public awareness has increased by 7%, with 3.6% directly attributed to the All-Ukrainian awareness campaigns on EE lighting (1st phase) and 3.4% as a result of campaigns of EE lighting equipment producers in course of years 2012-2013, and by 35.7% in 2016 compared to 2013 due to 2014-2016 project's campaigns. In general, in comparison with 2012 the awareness level on the EE lighting benefits has grown by 42.7% as of 2016.

**NOTE**: Same caveats apply to the statements above regarding discounting the contribution of reduction in price and increase in product availability towards increased awareness.

# Output 4.4: Tailor selected global EE lighting promotional activities to Ukrainian consumers

**Current Status**: Four nation-wide promotional and PR campaigns have been developed and conducted (see output 4.3) that have led to the following results: in comparison with 2012 sales of EE bulbs used at households have increased by 53,3% in 2016. Moreover, market share of EE bulbs used at households has grown by 22,5% in 2016 compared to 2012 and has made 72,6% in 2016. The market share of LED bulbs used at households has made 48,5% in comparison with FCLs and incandescent bulbs in 2016.

The MTR mentioned development by the project together with Maxus a second phase of the All-Ukrainian Public Awareness Campaign on EE Lighting. This phase of Campaign included TV commercials, posters and distribution of leaflets/calendars in supermarkets. The project target for this output was increase in sales of EE lighting products by 20% at the participating outlets.

**NOTE**: Same caveats apply to the statements above regarding discounting the contribution of reduction in price and increase in product availability towards increased awareness.

### MTR Recommendations & implementation:

The MTR made the recommendation to have awareness activities going hand in hand with other activities was only partially implemented (as is the output's objective of "tailor selected global EE lighting promotional activities to Ukrainian consumers – it was not clear from the materials that what global EE lighting promotional activities were adopted and tailored). At the same time, the recommendation for project to develop a road map that should ensure sustained awareness raising after the project has come to an end was not implemented to full scale. Partially, this recommendation can be considered as implemented, as NGOs, including All-Ukrainian Environmental League confirm their commitment and capacity to continue the awareness campaign using materials prepared by the Project.

### **Component 5: Dissemination and Replication of the Project Results**

Under this Component, it was planned that the project would develop project website; develop training booklet for schools, in cooperation with the schools which participated in the project, and develop a training booklet for school children on energy-efficient lighting; design the second stage of EE lighting demonstration projects in municipal buildings covering at least 20 municipalities across Ukraine for use with the sustainable financing mechanism(s); develop and conduct seminars for municipalities on the sustainable financing mechanism outlined under 3.1 & 5.1 and on carbon finance, and other alternative financing; and support organizations that focus on energy efficiency in the public sector/municipalities of Ukraine.

Table 11 contains the accomplishments under Component 5, along with the evaluation ratings, a more detailed summary follows.

# **Outcome 5: Dissemination and Replication of the Project Results**

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# Table 11. Component 5: Outputs, Indicators, Accomplishments, and Ratings

Component 5: Dissemination and Replication of Project Results					
Output	Success Indicator	End of Project Target	Project Accomplishments	Achievement of Target	Rating
5.1 Implementation of project website	Website up and maintained regularly	Website updated with historical, current and planned project activities & progress.	A project website (www.lampochki.org.ua) was developed and is being maintained by the project with regular update of information on all on- going pilots, contacts, new developments etc., the website was upgraded and is currently updated on by-weekly basis.	100%	Satisfactory
5.2 Design the second stage of demonstration project covering at least 20 municipalities across Ukraine	Municipal applications to participate in new projects/program Selection results from the process selecting 100+ schools Initial lighting site-audits at the participating schools	Over 40 applications from municipalities to participate in the program Applications result in 20 municipalities participating and supporting the program 100 to 200 schools participating, depending on funding	The project has developed the following handbooks: "Energy Efficient Street Lighting, Building, and Development"; and "Energy Efficient Lighting" with introduction and recommendations on EE lightning schemes on a municipal level and for educational purposes. Over 10,000 copies of these publications have been distributed to municipalities. This output is closely interlinked with Output 3.2.	90%	Moderately Satisfactory
5.3 Support and work with local organizations that focus on energy efficiency in the public sector	The number and type of organizations which cooperate with GEF/UNDP projects	Cooperate and support at least 2 regional/national organizations (staff in several locations) Cooperate with at least 1 organization in the 12+ pilot municipalities	<ul> <li>Cooperation has been initiated and further developed with several organizations, regarding energy efficient lighting, and best practices on collection and disposal of mercury-containing CFL lamps. They include: <ul> <li>All-Ukrainian Ecological League,</li> <li>State Ecological Academy of Post-Graduate Education and Management,</li> <li>Eco-club Babylon,</li> <li>International Economic Committee,</li> <li>Foundation on Development of Environment and Energy Market,</li> <li>Dzherela Radosti,</li> <li>Zelenyi Parus,</li> </ul> </li> </ul>	100%	Highly Satisfactory

5.4 Develop and conduct seminars for municipal governments regarding EE projects and opportunities for leveraging carbon finance, and other alternative finance	Development of the training program Number of seminars Participants at the seminars New project ideas & financing proposals developed at the outcome from seminars	At least 10 seminars in 10 municipalities At least 2 new projects developed & implemented as a result of the seminars	Carbon finance seminars were held with Eco-Forum in 2012 and NEFCO in April 2013. Due to the fact that there is no longer carbon finance market exists since 2014, the target for this output to have 10 seminars in 10 municipalities held was not achieved.	N/A	N/A
Overall Rating: Component 5					Satisfactory

# Output 5.1: Implement project website

*Current Status*: A project website (www.lampochki.org.ua) was developed and is being maintained by the project. Per the MTR's recommendations on regular update of information on all on-going pilots, contacts, new developments etc., the website was upgraded and is currently updated on by-weekly basis.

# Output 5.2: Design the second stage of demonstration project covering at least 20 municipalities across Ukraine

*Current Status*: The project has developed the following handbooks: "Energy Efficient Street Lighting, Building, and Development"; and "Energy Efficient Lighting" with introduction and recommendations on EE lightning schemes on a municipal level and for educational purposes. Over 10,000 copies of these publications have been distributed to municipalities. This output is closely interlinked with Output 3.2.

# *Output 5.3: Support and work with local organizations that focus on energy efficiency in the public sector*

*Current Status*: Cooperation has been initiated and further developed with several organizations, regarding energy efficient lighting, and best practices on collection and disposal of mercury-containing CFL lamps. They include:

- All-Ukrainian Ecological League,
- State Ecological Academy of Post-Graduate Education and Management,
- Eco-club Babylon,
- International Economic Committee,
- Foundation on Development of Environment and Energy Market,
- Dzherela Radosti,
- Zelenyi Parus,

# *Output 5.4: Develop and conduct seminars for municipal governments regarding EE projects and opportunities for leveraging carbon finance, and other alternative finance*

*Current Status*: Carbon finance seminars were held with Eco-Forum in 2012 and NEFCO in April 2013. Due to the fact that there is no longer carbon finance market exists in Ukraine since 2014, the target for this output to have 10 seminars in 10 municipalities held was not achieved.

# MTR Recommendations & implementation:

The MTR recommended to more frequently update the website with latest information on the project in general and with easy to understand, for the general public, information on project achievements. The website is currently updated on a regular basis. However, the analytical tools for tracking website "hits" are not available on the regular website, but only on social media accounts. UNDP CO, as a matter of policy, does not favor the idea of having project sites, but rather concentrating all project information on UNDP CO website.

#### Summary of Results:

Overall, the project had implemented activities to support 19 outputs from 5 project components, completing activities for nearly 16, and achieving "Satisfactory" or "Highly Satisfactory" ratings on 11 output activities. Based on an evaluation of the activities, outputs, and achievements, the evaluation team concluded that the overall results of the TMEL project **Moderately Satisfactory**. The table below provides a summary of the results and ratings:

Project Component	# of Sub-components	Overall Rating
Component 1	4	Moderately Satisfactory
Component 2	4	Moderately Satisfactory
Component 3	3	Moderately Unsatisfactory
Component 4	4	Satisfactory
Component 5	4	Satisfactory
<b>Overall Rating for The Proj</b>	ect	Moderately Satisfactory

#### **Table 12. Summary and Overall Project Rating**

#### 3.3.2. Relevance

From the development perspective, UNDP and GEF are committed to climate change adaptation and management internationally, and continue to support energy efficiency projects as an important tool towards reduction in GHG emissions. Further, international experience has shown that comprehensive energy efficient lighting programs have proven to be effective in the introduction of institutional and market changes that can help to pave the way for other energy efficient products and initiatives.

Per the project document, the Government of Ukraine has established a roadmap on Energy Strategy for Ukraine till 2030. According to this Strategy, in 2020 Ukraine plans to save up to 470 million tons of equivalent oil, which will reduce import of energy resources by about 38 billion USD. Therefore, energy-efficiency measures are a policy focus for the drive to improve energy independence and security for Ukraine. Furthermore, the economic crisis and natural gas crises between Russian and Ukraine that took place in recent years has also had a strong impact on policy formation and governmental goals in Ukraine.

Although the Ukrainian government has supported energy efficiency through some policy measures funds are lacking for implementing large-scale energy-efficiency programs, in general. Consequently, there remains untapped potential for the development and implementation of new energy efficient technologies in Ukraine, including energy-efficient lighting. In line with the Government's priorities, the TMEL project helped to address an often over-looked issue in the reduction of greenhouse gas emissions through large-scale improvements in energy efficient lighting in Ukraine's residential and communal sector. The government of Ukraine and its implementation agency – the Ministry of Environmental Protection (The MENR was not the GEF Focal Point at that time) – had also indicated that energy efficiency was one of the government's priorities from the project outset. Certain levels of government commitment remained high, especially regarding education, increasing awareness, and disseminating results of the project. Given that government agencies and their focus have shifted since the project inception, the Ministry of Ecology and Natural Resources remains to be a major designated body for the project. In addition, the Ministry of Communal Services, which was defined in the project document as a stakeholder, has underwent several reforms and restructuring since project has been launched. As of now there is a Ministry of Regional Development, Construction, Housing and Communal services (MRDCHCS) with extended scope of authority and staff changes. MRDCHCS has indicated renewed interest in energy efficient lighting.

Consequently it can be concluded that since its inception, the TMEL project has been **relevant** to the Ukrainian development context and needs of all key stakeholders involved. However, the challenges remain on a number of fronts, in particular on the legislative side, with a number of draft laws yet to be passed by the Parliament.

#### 3.3.3. Effectiveness and Efficiency

In general, a case can be made that the project has been effective in delivering most of its planned activities and outputs. However, challenges remain in the final stages of implementation, due to the various external factors, and the Ukraine government's willingness in adopting the key project outputs in order for the project's full outcomes to be achieved in the near future.

Among the project's effective activities have included the development of a National Roadmap, the development of standards and specifications, comparative analysis of Ukrainian legislation and EU Directives, providing accreditation support for testing laboratories, and awareness-raising through outreach activities and pilots.

For example, activities on the National Roadmap were initiated as one of the recommended actions by the MTR in March 2014. The Roadmap was completed, discussed and submitted to the MENR on 30 June 2015 by Letter №26-45. Implementation of this Roadmap would have provided encouragement to the private sector to convert to energy efficient lighting technologies, and will also lead to a progressive replacement of inefficient technologies by consumers. Similarly, the support to various laboratories for testing and accreditation only occurred after a CTA was contracted by the project in 2015. Yet, activities in this area have increased awareness of testing methodologies, need for laboratory accreditation, and improved the country's capacity on testing of efficient and safe lighting products. Finally, the successive awareness and outreach campaigns have combined to increase consumer awareness and acceptance of new lighting technologies, and gained recognition for the project's efforts nationally and perhaps internationally.<sup>42</sup>

<sup>&</sup>lt;sup>42</sup> There has been little or no contact between the project and other UNDP and UNEP lighting and market transformation activities as envisioned in the project document.

In terms of operational issues and implementation, the project's external implementation arrangements relied on existing organizational structures in the lighting industry, as well as NGOs that are typical in other markets. However, this was not entirely applicable, as the lack of a strong lighting industry association and an independent consumer organization, as well as a market surveillance and enforcement infrastructure made it difficult to promote and maintain product quality assurance. Internally, factors contributing to reduce operational efficiency included inconsistent administrative support, changes in key staff, and high costs.

The Evaluation Team also noted that the coordination and cooperation among the staff responsible for key project outcomes could have been improved, which may help to increase implementation efficiency (for example, the integration of QA into product awareness campaign's messaging). The combination of challenges and issues contributed to the delay of project closure from 2016 to 2017. However, through the support of an experienced project manager and CTA in the last two years, the project was able to utilize the extension granted by UNDP to deliver a number of needed outputs.

Overall, it is concluded that the TMEL project's effectiveness was **Satisfactory**, while the project's efficiency has been **Moderately Satisfactory**.

### 3.3.4. Country Ownership

At the project's outset, both the Ukrainian Government and the private sector have shown strong commitment and ownership of the TMEL project. However, as the project progressed, the Government was facing many issues, and while it commitment may still be strong, it has not been able to take full advantage of the project's deliveries, or leveraged the rapid changes in the in the market. The private sector has been more proactive, and was able to leverage the project's awareness raising efforts. For example, key contributions from retailers included using/displaying educational/outreach materials, allowing/providing training to their employees, as well as opting to increase the stock and variety of energy efficient lighting products.

The sector that benefitted most from the project's activities and provided the strongest outcomes has been municipal and local governments. They enthusiastically participated in pilots, audits and utilized other technical assistance from the project. For example, recommendations for procurement and technical specifications for the EE lighting were placed in the Handbooks titled "Energy Efficient Street Lighting, Building and Development" and "Energy Efficient Lighting" disseminated among municipalities (see details under Output 5.2). It resulted in adoption by 15 municipalities of respective regulations for procurement and tender process that provided them with turn-key EE lighting solutions. The municipal and city governments also supported and adopted the draft decree on the phasing out of inefficient lamps, helping to provide forward progress in this area when the central government could not.

### 3.3.5. Mainstreaming and Sustainability

The sustainability of project interventions was incorporated into the project's design for mainstreaming and replication potential based on international experience. These included certain project implementation practices, contributions, and outcomes that can have wide-reaching long term implications for private and public sectors as well as the consumers to continue switching to energy efficient lighting, including outputs such the National Roadmap, legislations on energy efficiency, standards and labeling, waste collection and handling, as well as quality assurance/control mechanisms and institutional framework.

A number of sub-contracts awarded by the project to various public and private stakeholders, specifically the Maxus Fund, schools, test laboratories, as well as agreements with retailers, have resulted in capacity building of these organizations for future support for energy efficient lighting activities. Demonstrations, pilots, technical assistance, development of guidelines, standards and building norms, have also contributed to a wide array of documents on energy efficient lighting. It is expected that this information will be replicated or built upon by the implementing sub-contractors or beneficiaries, e.g. the use of building norms or guidelines and adoption of decrees. However, for the project to ensure long-term replicability and sustainability of these efforts, it will be important to have a plan to deliver the suite of information developed by the project to all potential individual and organizational stakeholders, including researchers, academics, entrepreneurs, policy makers, and consumers, etc.

Considering the policy support, positive response of the local and municipal governments, technological shifts, and the global trends in IL phase-out, the Evaluation Team concludes that the TMEL project is **Moderately Likely** to be sustainable.

# **3.3.6.** *Impacts*

Activities by this project were expected to effectively double the growth of EE lighting market penetration, increasing the annual growth rate to 25% year on year during the project period. Based on this increase, the project was projected to contribute a net CO2 reduction over its lifetime of 4.15 million tons from 2011 to 2015 from direct reduction in electricity consumption. For the municipal sector, project activities aimed to provide municipalities with technical resources and access to financing for large EE lighting renovations in order to achieve compliance with CMU Order #1337-rr by 2020. The projected CO2 reduction was estimated to be 900,000 tons for this sector by the end of the project.

The project has commissioned a spreadsheet tool to track the impacts of the project goals using GEFdeveloped methodologies.<sup>43</sup> Based on the tool's calculations, the project's activities will result in direct greenhouse gas emission reductions during the project's implementation period of five years totaling 3,308,750 tons of CO2. Using the GEF bottom-up methodology, indirect emission reductions attributable to the project are estimated to be 9,926,249 tons of CO2.<sup>44</sup> Based on these estimates, the project has had **Significant** impact on its emission reduction goal.

<sup>&</sup>lt;sup>43</sup> Manual for Calculating GHG Benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects. GEF 2008

<sup>&</sup>lt;sup>44</sup> Using the GEF bottom-up methodology, indirect emission reductions attributable to the project are 9 926 249 tonnes of CO2. This figure assumes a replication factor of 3.0. Using the GEF top-down methodology. In addition, indirect emission reductions attributable to the project are 37 011 750 tonnes of CO2. This figure assumes that total technological and economic potential for GHG emission reductions over 10 years is 46 264 687 tonnes of CO2, and a project causality factor of 80 percent.

**Note:** the estimation of direct emissions reduction by the project included demonstration projects and lamp distribution, while indirect reductions are from increased penetration of EE lighting in the market. In this case, the direct emissions estimates included projects in areas that are no longer under government control, and therefore may over estimate the impacts. However, this is balanced by the indirect estimates, which used a bottom-up methodology and represent an underestimation of the impacts. The GEF tool also produced an estimated CO2 savings from a top-down approach of nearly 37 million tons, due to increased product penetration rates.



#### Figure 4. Estimated Project CO2 Impacts

# 4. CONCLUSIONS, RECOMMENDATIONS & LESSONS

# 4.1. Conclusions

In general, a case can be made that the TMEL project was able to deliver most of its planned activities and outputs. However, for the project's full outcomes to be achieved in the final stages of implementation, challenges remain due to the various external factors, and the Ukraine Government's willingness in adopting and implementing the key project outputs.

To reiterate – over the course of its implementation, the TMEL project experienced significant challenges, including:

- Changing national political and economic conditions, including a change in government,
- Worsening security situations in some areas of the country (armed conflict in the eastern areas),
- A collapsed international (and national) carbon market, and
- Rapid technological shifts towards more advanced and efficient lighting products (and corresponding price reduction of LEDs).

Along with these external challenges, the project also experienced some internal challenges. The project was managed by three different project managers over the span of six years, and was advised by at least two International Consultants/Technical Advisors, neither was engaged from the outset, nor were they fully utilized by the project, as envisioned by the project document.<sup>45</sup> The challenges experienced by the project represented the range of risks that all market transformation projects can face.

Despite these challenges, the TMEL project was able to exercise adaptive management, achieved a majority of its outputs, and delivered on a number of areas not covered by the project document, including close coordination with municipalities and cities to effect the phase out of inefficient lamps at the local levels. However, even with initial interest and commitment by the Ukrainian Government and the project's delivery on key outputs, not all desired outcomes were achieved. A case in point: although the project has developed detailed draft legislations supporting a number of important energy efficient lighting topics, as well as cultivated a working relationship with an Ukrainian Member of Parliament, these proposed legislations have yet to be adopted.

The project suffered from inconsistent delivery and delays in outputs initially, and during transition periods, perhaps due to the scale and ambition of the project's objectives. But, the project was also able to respond to a number of recommendations from the MTR, and was able to use the additional time from the extension effectively. In terms of operational issues, the project's external implementation arrangements relied on existing organizational structures in the lighting industry, as well as NGOs that are typical in other markets. However, this was not entirely applicable, as the lack of a strong lighting industry association and a viable independent consumer organization, as well as non-existent market surveillance and enforcement infrastructure made it difficult to promote a product quality assurance and quality control framework.

<sup>&</sup>lt;sup>45</sup> From what the Evaluation Team could discern, the first International Consultant was only involved with the preparation of specific tasks, such as the Roadmap. The second IC was more engaged, but mostly on technical aspects of the project, such as Component 2. In fact, the TOR of the CTA calls for broad project engagement.

Internally, factors contributing to reduce operational effectiveness included inconsistent administrative support and changes in key staff. In addition, the size of the project team, as well as composition and skillsets of the team may not have been optimal and resulted in reduced cost effectiveness for the project, as pointed out by the MTR (the Evaluation Team concurs with those findings by the MTR). In addition, we noted that the team responsible for Partnerships and Relations with Government and National Authorities had a separate reporting structure. While this structure recognized the importance and sensitivity of this team's tasks, it may have allowed for less coordination between the team leader and project manager, and less interactions with the CTA and the project team on matters related to product testing, quality assurance framework, as well as international outreach, among others.

As pointed out earlier, the initial lack of consistent progress could be due to the fact that TMEL was the first full-scale, market transformation project in Ukraine, with ambitious goals and complex, interlinked outputs, while having less actual MT implementation experience to draw from locally. This lack of local implementation experience could have been partially alleviated with available international experience, especially if an experienced international CTA was available and involved with all aspects of the project from the outset. Without the CTA, the project conducted extensive research on its own on a wide array of topics rather than building from, and coordinating with, internationally available work, as specified under Output 4.4. Because of this, the project had not fully taken advantage in coordination with, or shared information with the UNEP's en.lighten program or other lighting programs operating concurrently, as originally intended. The conduction of these studies also delayed needed activities, and reduced overall project cost effectiveness.

With respect to project expenditures and budget management, it is understood that the project exercised adaptive management and was able to redirect spending from the originally planned budget. As has already pointed out by the MTR, the refocus on increasing awareness and market penetration has shown good results. However, the fact that spending on pilots and demonstrations was much less than originally planned (6% actual vs. 28% planned) was a significant shift. It also indicated that the project needed better feedback mechanisms for using market intelligence. As pointed out by the MTR and confirmed through the Evaluation Team's meetings with municipal and city governments, there remains a high level of interest for public demonstrations and pilot projects, and additional spending could have been justified.

Finally, regarding the project's informational campaigns – they were one of the project's bright points, and resulted in the creation of a number of highly visible messages for consumers on energy efficient lighting. However, it must also be noted that the project invested significant resources for general awareness raising, and continued to do so even after it has achieved significant gains, possibly to compensate for lack of progress in other output areas – against the advice offered by the MTR. In terms of message longevity and project sustainability, it may have been more effective to create some linkages with other aspects of the project outputs and desired outcomes, such as quality control mechanisms or framework, or connecting the characteristics of energy labels and product performance with the need for testing and verification, as its own extensive research should have shown. This is especially important since the technological shift to light-emitting diode (LEDs) occurred much faster than

anticipated, resulting in increased availability, penetration, and more competitive pricing, but also issues of quality, and how to properly measure project impacts in this area.

In conclusion, the Evaluation Team has determined that the TMEL project design has remained highly relevant to the development context of Ukraine and the priorities of various stakeholders, including GEF, UNDP, municipal governments, cities, schools, laboratories, and the private sector, and its combined outputs have met the GEF's guidelines for a **Moderately Satisfactory** project (the project incurred some moderate shortcomings, including lack of output progress on certain components, and inconsistent project progress, resulting in the need for an extension).

# 4.2. Lessons Learned

Based on consultations with key stakeholders and the conclusions drawn by the Evaluation Team, some key lessons learned from the TMEL project design and implementation include:

- Interest/support by the appropriate government agency(ies): The project has demonstrated that full support by Recipient Country Government (GOC) and cooperation between relevant ministries/departments are necessary to achieve the intended outcomes, especially where legislative actions, building norms or product standards may be concerned (for example, the need for more than one government ministries to cooperate and coordinate on legislation support);
- **Private sector engagement**: Engagement with private sector is necessary for achieving marketrelated goals (for example, working with Epicentre on product promotion, including training of sales staff to realize increased penetration and awareness of efficient lighting products at retail);
- **Support awareness with availability**: In medium and small cities and rural areas, having products available to consumers in conjunction with awareness campaigns can significantly increase market share of EE lighting in these areas.
- Interests also remain high among local and municipal governments for pilots and demonstrations.
- Update project objectives: Projects may take longer than expected to be approved, as are
  proposed legislation, and technological or political developments may happen almost overnight.
  These situations can cause the project objectives or outcomes to be outdated, or no longer
  needed. Such situations may require the project plans to be modified to address new market or
  political realities.
- Active engaged, and comprehensive PSC: An active and engaged PSC representing a wideranging group of stakeholders can help to more appropriately address the challenges and risks, as well as determining when to revise or adopt new objectives based on changing market or political conditions.
- Better feedback mechanisms for using market intelligence: A high level of interest for public demonstrations and pilot projects existed during the course of the project implementation, yet this level of interest was not reflected in the annual planning process, which could help to increase focus additional spending for pilots in place of awareness raising activities.

- Administrative communication and coordination: Communication and coordination arrangements are essential to support project planning and implementation, especially under changing market and political situations;
- Administrative support: Projects starting up may require staffing adjustments or other administrative support, such as development of tenders or securing short-term consultants. A good relationship between the project administration and implementation teams can be valuable in helping a project to achieve its initial successes;
- **Comprehensive M&E**: An M&E system that focuses on all key project aspects, including cofinancing, sub-contracts, and impact indicators is essential to assessing a project's progress and impacts;
- Team composition and skillsets are important factors: It is important to match the team member skillsets with the project requirements. Market transformation programs, for example, tend to require team members with entrepreneurial traits, who can understand or adapt quickly to changing market situations. Technically-focused projects, on the other hand, can require team members with deep technical knowledge and experience.
- **Clear reporting structure**: A clear reporting structure should be apparent to all team members, and opportunities for coordination and cooperation cross-sector/objectives should be encouraged.
- Adaptive management practices should be encouraged: Projects tend to experience market shifts, but a few may be affected by more than one "game-changing" factors, including significant political or technological changes, or even both. In these cases, projects are forced to adapt in order to remain relevant. Such examples, where available, should be shared and reviewed to learn from, if possible.
- Technical support by international experts: For projects that aim to transform the market for products or services, especially to pioneer an approach that can be used by other projects, it is essential to secure the services of an experienced international expert from the outset. (The project had this in the form of the RTA's input on implementation and cost management). However, an expert should have experience in technical issues as well as previous hands-on experience in market transformation implementation. UNEP should be able to draw on available experts with successful track records in implementation support, not just document production.
- Draw from international best-practice from the outset: Securing the services of experienced international experts can also provide projects with access and understanding to best-practices internationally. While project evaluation and other documentation available from UNDP and elsewhere can provide useful information, finding and accessing them can be a challenge to new project teams learning novel approaches, and understanding this information without the help of an international expert can add another layer of complexity.
- **Market research**: International best-practice information can be further supplemented with research focusing on the local market's particular characteristics or cultural preference, which can increase effectiveness and reach.

#### 4.3 Recommendations

Based on the above conclusions and the lessons learned, the Evaluation Team recommends the following actions:

- Replication and Up-Scaling: The project has made significant contributions to the awareness of energy efficiency and energy efficient lighting in Ukraine's consumer, local and municipal governments. To ensure the sustainability of this contribution, it will be important for the private and public sectors to continue to support the replication of these activities. The outputs of the project in this area need to be maintained and continue to be disseminated. The conversion of retailers and manufacturers to energy efficient lighting, as well as adoption of decrees by municipal and city governments need to be further promoted and adopted by others.
- 2. Documentation and Dissemination of Results: The project has made significant contributions to the development of the EE lighting industry and lighting knowledge by undertaking consumer research, developing pilots, and facilitating technology transfer, etc. For future efforts and projects to fully utilize these products as well as the lessons learned in the implementation of the TMEL project, it is important that the project can document and disseminates its results, achievements, and lessons learned in market transformation. In this regard, UNDP should consider keeping the project website or transfer it to the maintenance of another project that also addresses market transformation. Hosting and maintenance rights should be retained. Instead, hosting rights for 10 years should be purchased and the information mentioned above as well as any other results the projects should be posted on the website to benefit future projects/efforts. The website could also be linked to other key national and international EE lighting initiatives.
- 3. **Stakeholders Collaboration**: To ensure effective planning and implementation, it is important to have open communication lines between key stakeholders. To avoid delays in implementation in the future, the UNDP and PMO need communicate openly to address issues related to implementation, such as unfamiliar approach or time-sensitive activities.
- 4. **Tracking Co-Financing**: Due to changing political situations and other challenges, the PMO was not able to fully track and justify project co-financing. This situation should be addressed in other future projects.
- 5. Attainment of Outcomes: Given the multiple challenges faced by the TMEL project during the implementation process which may be unlikely to be faced by another project we suggest that UNDP take these conditions into consideration, and consider the development of a more exhaustive listing of risks for Ukraine, as well as more detailed risk mitigation strategies for design of projects, and consider ways for active involvement by the PSC in these cases to help address any required changes in project designs or outputs in a more timely manner. This approach may also be documented for regions that may experience rapid changes for other projects to reference should they encounter the same situations.

Specific to the desired legislative and QA framework outcomes, we suggest that the project and UNDP explore all venues for cooperation with the Ministry of Regional Development, Construction, Housing and Community Services so that these objectives can be sustained. Given that the project has provided all of the necessary legislative outputs and National Roadmap, as well as support for the QA framework, it would be beneficial for all involved if the MRDCHCS can be persuaded to continue to pursue these important outcomes.

# Annexes

- Annex A: List of Documents Reviewed
- Annex B: Interview Guides
- Annex C: Detailed TE Mission Schedules & Interviews
- Annex D: PSC Members and Meetings
- Annex E: Letter of submission
- Annex F: TE Report Outline
- Annex G: List of Research Studies & Summary Evaluation of Major Studies Commissioned by the Project
- Annex H: Lessons Learned from RTA

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## **Annex A: List of Documents Reviewed**

#### **General documentation**

- UNDP Programme and Operations Policies and Procedures
- UNDP Handbook for Monitoring and Evaluating for Results
- GEF Monitoring and Evaluation Policy
- GEF focal area strategic program objectives

#### **Project documentation**

- GEF approved project document and Request for CEO Endorsement
- Project Inception Report
- Project Mid-Term Evaluation Report
- Annual work plans (PIRs)
- Financial audit reports
- Project Steering Committee meeting minutes
- Updated risk log

### Other relevant documentation

- Reports on market monitoring of lighting products
- Results of Outreach Campaigns
- Market Surveys
- Textbooks for specialists
- Promotion materials
- Press articles
- Website

### **Annex B: Interview Guides**

Staff, Key Consultants & Main Stakeholders

Date:

Name(s):

Position(s)/Role(s) in Project:

Contact Info:

### QUESTIONS

- I. PROJECT DESIGN & MANAGEMENT
- 1. Were you involved or aware of the project design process? Can you provide some details? (e.g. who was on the design team, which stakeholders were consulted? Are there linkages to similar UNDP or international projects, etc?
- 2. Has the project design and logframe been relevant across the project duration? Or have there been changes to the original project design/Log Frame?
- 3. The project experienced significant challenges in goals set by the prodoc before the MTR and also after the MTR. Does this mean that the project design document underestimated the challenges of the project?
- 4. Due to the challenges, could/should goals be changed or should other activities added to the project?
- II. EXTENSION
- 1. What factors led to the extension of project closure from 2015 to 2016?
- 2. What measures were taken by key stakeholders to avoid any further delays?
- 3. How beneficial has it been to extend the project to 2016?
- III. MONITORING & EVALUATION
- 1. Does the project have an M&E Framework/Plan? If yes, what are the key elements for your respective are of responsibilities/Objectives?
- 2. What are the tools used to track progress on project goal, outcome, and output levels?
- 3. How helpful/effective has the M&E plan been in helping the Project to meet its Goals/Objectives?
- 4. Was the ProDoc or the logframe used for M&E, and Reporting?
- 5. Was the risk assessment and management matrix being updated annually? If yes, how and by whom? Copy of all reviewed matrices
- IV. PROGRESS, OUTPUTS & ACTIVITIES
- 1. Are any there any outstanding project outputs or activities at this time? If yes, what are the reasons?
- 2. When will these activities close out?
- 3. To what extent have the recommendations of the MTR been implemented? If some were not implemented, what was the reason?

### V. SUBCONTRACTS & CONSULTANTS

- 1. How many sub contracts and consultancies have been issued under each project component (year, topic, and budget)? Were they based on ProDoc? MTR?
- 2. Have all sub contracts been completed? If no, which ones are outstanding? When are they expected to complete? What are the reasons for delay?
- 3. What was the general process of selecting the sub-contractors and consultants?
- 4. Were there problems with managing the contractors?
- 5. Which of the contracts have contributed most positively to the project's outcomes/goals? What were the contributions?
- 6. Which of the contracts had the least contribution or were ineffective? Why?
- VI. TRAINING, CAPAPCITY BUILDING, COMMUNICATIONS & OUTREACH
- 1. List of various training and outreach activities (including budget, and people reached) under each of the project components
- 2. Was there a process to select participants?
- 3. Is there a process to assess the impacts of the training/outreach? What have been the outcomes?
- 4. What were some key challenges faced by the training/outreach programs?How were they addressed?
- 5. What are the key elements of the website?
- 6. How often is the site updated?
- 7. Who accesses the website? Is there a tracking/counting mechanism?
- 8. Is the website promoted among project stakeholders/participants?
- 9. Is there a project newsletter? If yes, how often and to whom is it distributed? Is there feedback from those receiving newsletter?
- 10. Have the intellectual products of the project (e.g. studies, research, etc.) been saved (in digital format) so that they can be accessible and for other projects to build on the project's lessons?
- VII. PERSONNEL & STAFFING
- 1. How is the PMO/PMU organized? Is this clear to all?
- 2. Has the project faced any staffing/resource challenges? What are they?
- 3. How have these staffing/resources been resolved?

### VIII. PARTNERSHIPS

- 1. Who are the key stakeholders under the different outcomes and what is their role? When were they added to the project?
- 2. Which stakeholders under each component have made the most productive contribution towards the project goal?
- 3. Which stakeholders have made the least productive/ least active contribution?
- 4. What is the liaison mechanism between the Project and other institutional stakeholders?
- 5. What challenges have been faced with managing the partnerships?
- 6. How does the Project interact with the various stakeholders and partners to ensure communication and linkages between their respective activities?
- IX. UNDP/GEF

- 1. What support was provided by UNDP Ukraine?
- 2. Were key stakeholders successful in collaborating with each other?
- 3. Did the PSC met regularly?
- 4. How effective has been the PSC been performing its duties of oversight (e.g. review of Annual Work Plans, Annual Progress Reports)?

## X. FINANCE

- 1. Have there been any delays or problems faced with the project's financial disbursements from the different stakeholders?
- 2. Have regular project financial audits been undertaken? Were these audits satisfactory?

### XI. EFFECTIVENESS

- 1. To what extent has the project achieved its goals and objectives?
- 2. What key Government policies/strategies were the project able to contribute to? How?
- 3. What factors have been critical for the success of the project to achieve its goals and objectives?
- 4. What have been the project's key successes?
- 5. What have been the project's key challenges?

### XII. IMPACTS

- 1. What measures have been undertaken to assess the project's impact?
- 2. What have been the results of these measures?
- 3. Which of the project activities/components have had the highest impact? Why?
- 4. Which of the project activities/components have had the least impact? Why?
- 5. Has the GHG reduction calculation methodology been finalized based on empirical results gathered during the project implementation and be evaluated in the Terminal Evaluation? The same for reduction in growth rate of CO2 emissions

### XIII. SUSTAINABILITY

- 1. What have been the key measures of sustainability/replicability embedded in the project design and delivery?
- 2. Which elements/results of the project are particularly sustainable? Why?
- 3. Which elements/results of the project are least sustainable? Why?
- 4. What potential challenges can the project's sustainability face?
- 5. What is the project's exit strategy? Has this been documented?

### XIV. LESSONS & RECOMMENDATIONS

- 1. What have been some of the project's key lessons?
- 2. What are your recommendations for the sustainability of project interventions?
- 3. What are you recommendations for design of similar future projects for Ukraine?

### SUBCONTRACTORS/OTHERS KEY PARTNERS

Date:

Name of Interviewee:

Organization Name:

Contact Info:

Title:

## BACKGROUND

- 1. Date and duration of your involvement in the Project?
- 2. What particular role/mandate does your organization play with the project?
- 3. In your opinion, what have been the key successes of the project? Why?
- 4. In your opinion, what have been the key challenges of the project? Why? Could they be mitigated?

# STAKEHOLDER COLLABORATION

- 1. Which project stakeholders do you deal with directly?
- 2. What is the mechanism for collaboration with the project?
- 3. In your opinion, which stakeholders have played a key role in the project?
- 4. What were the opportunities/positive outcomes in working with stakeholders?
- 5. What were some of the challenges in regard to collaboration among stakeholders?

# STEERING COMMITTEE

- 1. Are you aware of PSC?
- 2. If yes, what is your impression of the PSC's effectiveness in performing its duties of oversight (e.g. review of Annual Work Plans, Annual Progress Reports), and guidance

# RELEVANCE

- 1. What is the key role that your organization has played in the project's activities and its success?
- 2. How does the project fit into the strategic priorities of your organization?
- 3. How can/will the project's successes/activities feed into future strategy or activities of your organization?
- 4. What other EE or lighting programs has your agency been involved in?
- 5. If yes, how would you rate the comparative contributions and challenges of TMEL with these other programs?

# CAPACITY BUILDING & SUPPORT

- How have the project activities contributed to building the capacity of your organization? (e.g. training of personnel, technology transfer, policy support, market mapping, etc)
- 2. Are you satisfied with the level of administrative and technical support provided by the project to your organization or to other stakeholders? Please give details
- 3. Were there problems faced by your organization in receiving support from the project? How were these problems resolved?

# **REPLICATION& UP-SCALING**

1. Are there any mechanisms put in place by the project for the up-scaling of the activities implemented by the project?

- 2. The project has implemented a number of successful pilots. Have these pilots been replicated by other stakeholders?
- 3. What are the potential opportunities for further activities?
- 4. What are the potential challenges?

SUSTAINABILITY

- 1. Will there be opportunity for the project stakeholders from the business and/or public sector to continue collaboration after project end?
- 2. Can the project institutionalize such collaboration platforms before it closes?
- 3. Are there key project activities sustainable in the medium and long term?
- 4. What can be done to increase the chances of sustainability of some of these activities?

# LESSONS LEARNED & RECOMMENDATIONS

- 1. What are key lessons learned from the project from your perspective?
- 2. Based on the project implementation experience, what are your suggestions for improvements in future projects?

# **Annex C: Detailed TE Mission Schedules & Stakeholders Interviewed**

# Evaluation Mission Programme GEF funded UNDP Implemented Project: " Transforming the Markets for Efficient Lighting" January 23 – February 03, 2017

International Evaluator: Mr. My Ton National Evaluator: Mr. Petro Pavlychenko

Date	Day	Time	Activity	Participants	Venue
1/22/17		13:15	Arrival		
1/23/17	Monday	16:00	Meeting with Project team (optional)	MT, PP	Project Office
		9:30	Meeting with Vadim Pozharskiy (ex NPD, ex GEF Focal point)	MT, PP, AB	Lipskaya 10
1/24/17	Tuesday	11:00	Meeting with Lesya Karnaukh (Head of Department of Ministry of Ecology and Natural Resources)	MT, PP, AB	MENR
		12:00	Meeting with Marketing company USP - project subcontractor	МТ, РР, ОВ	Project Office
		15:00	Maxximum Media Communications Group - project subcontractor	МТ, РР, ОВ	Dmitrievskaya 48-D
1/25/17	Wednesday	all day	Trip to Mykolayiv (meetings with: Oleksandr Omelchuk, Deputy city Mayor, City Council; Yuriy Kharitonov, Dean of the National University of Shipbuilding, Chair of the Energy and infrastructure; Anatoliy Shiyaniuk, Director of the Municipal Service Company "Institute of Social-Economic Development of the City")	MT, PP, AB, IC	Mykolayiv, tbd
1/26/17	Thursday	all day	Trip to Odessa region (meetings with: Oblast Authorities, visiting cities of demo projects); Meeting with Sergei Leivikov, Independent consultant, former Director of the Municipal Service Company" Enargysaving and Energyefficiency"; Meeting with Volodymyr Levytskyi, Director of the Department of Infrastructure, Housing and Utilities Development of Odessa Regional State Administration	MT, PP, AB, IC	Odessa, tbd
		10:00	Meeting with Roman Radchenko (representative of Ministry of Regional Development)	МТ, РР	Project Office
1/27/17	Friday	11:30	Meeting with Oleg Nedava, Member of Parliament, Deputy Head of Committee	МТ, РР	MPs Office
		12:30	Meeting with Oleksandr Severin (Project staff)	MT, PP	MPs Office

		15:00	Meeting with Andrii Rybalochka (Head of Semiconductor Lighting Testing Center, National Academy of Sciences of Ukraine,Light testing laboratory in Kyiv)	МТ, РР	Laboratory at Nauki 44
		10:00	Meeting with Tatiana Tymochko Head of All-Ukrainian Environmental League (NGO)	МТ, РР	Project Office
1/30/17	Monday	11:30	Meeting with Svetlana Nigorodova (GEF- UNDP Small grants program) - Project partner	MT, PP	UNDP office
		16:00	Meeting with Econica (Recycling company) - Project subcontractor/partner	MT, PP	Project Office
1/31/17	Tuesday	all day	Trip to Sumy (meetings with Mayor, City Council)	MT, PP, IC	Sumy, tbd
2/1/17	Wednesday	all day	Trip to Poltava (meeting with Natalia Smirnova, Head of Light testing Laboratory)	МТ, РР	Poltava, tbd
2/2/17	Thursday	all day	Report drafting		
2/2/17	Thursday	14:00	UNDP Ukraine: Briefing		
2/3/17	Friday	5:35	departure day		

# Annex D: List of Project PSC Members & Meeting Schedules

### **PSC Members**

(As of March, 2017)

- 1. Mr. Janthomas Hiemstra, Country Director, UNDP in Ukraine
- 2. Mr. Sergei Volkov, Senior Programme Manager, UNDP in Ukraine
- 3. Ms. Alla Tynkevych, Programme Associate
- 4. Ms. Anna Vronska, Minister of Ecology and Natural Resources a.i.
- 5. Mr. Oleg Nedava, People's Deputy
- 6. Mr. Andriy Buryakovskyy, Project Manager, Transforming the Market towards the Efficient Lighting Project

### **PSC Meetings Held**

- 7 December 2012,
- 7 February 2014,
- 26 February 2016

Annex E: Letter to Ministry of Justice for Registration of Project Output

# **Annex F: TE Report Outline**

Opening page:

- Title of UNDP supported GEF financed project
- UNDP and GEF project ID#s.
- Evaluation time frame and date of evaluation report
- Region and countries included in the project
- GEF Operational Program/Strategic Program
- Implementing Partner and other project partners
- Evaluation team members

### Acknowledgements

**Executive Summary** 

- Project Summary Table
- Project Description (brief)
- Evaluation Rating Table
- Summary of conclusions, recommendations and lessons

#### Acronyms and Abbreviations

#### 1. Introduction

- Purpose of the evaluation
- Scope & Methodology
- Structure of the evaluation report

#### 2. Project description and development context

- Project start and duration
- Problems that the project sought to address
- Immediate and development objectives of the project
- Baseline Indicators established
- Main stakeholders
- Expected Results

### 3. Findings

- (In addition to a descriptive assessment, all criteria marked with (\*) must be rated )
- 3.1 Project Design / Formulation
  - Analysis of LFA/Results Framework (Project logic /strategy; Indicators)
  - Assumptions and Risks
  - Lessons from other relevant projects (e.g., same focal area) incorporated into project design
  - Planned stakeholder participation
  - Replication approach
  - UNDP comparative advantage
  - Linkages between project and other interventions within the sector
  - Management arrangements

3.2 Project Implementation

- Adaptive management (changes to the project design and project outputs during implementation)
- Partnership arrangements (with relevant stakeholders involved in the country/region)
- Feedback from M&E activities used for adaptive management
- Project Finance:
- Monitoring and evaluation: design at entry and implementation (\*)
- UNDP and Implementing Partner implementation / execution (\*) coordination, and operational issues

3.3 Project Results

- Overall results (attainment of objectives) (\*)
- Relevance(\*)
- Effectiveness & Efficiency (\*)
- Country ownership
- Mainstreaming
- Sustainability (\*)
- Impact

4. Conclusions, Recommendations & Lessons

- Corrective actions for the design, implementation, monitoring and evaluation of the project
- Actions to follow up or reinforce initial benefits from the project
- Proposals for future directions underlining main objectives
- Best and worst practices in addressing issues relating to relevance, performance and success

Annexes

TMEL Terminal Evaluation Report – 31 March 2017

Nr.	Title	Purpose	Output#	Date	Completed by	Cost (USD)
1	Strategy for Mercury contained wastes handling // original in Ukrainian: «Стратегія поводження з відходами, що містять ртуть» [https://drive.google.com/file/d/0BzITNjcOQ wWuVnZ2RkpIZWFrQWo5Y2V0MW00aVF2Z nMtOTVj /view]	<ul> <li>Purpose - Analysis of the legal framework and practice of handling the mercury contained wastes in EU, USA and Russian Federation. Proposals to the national strategy.</li> <li>1. For implementation of output 1.4.</li> <li>2. Results were used for development of National Strategy on Hazardous Waste Handling</li> <li>3. Submitted to MinEnv at Jun 2015</li> <li>4. Strategy now is in public hearings stage and can be reached by MinEnv site http://menr.gov.ua/ // Component#1</li> </ul>	1.4	Nov, 2014	TOV "MittalServis" – Strategy on hazardous waste handling	\$47,147
2	Draft Law On the handling of used mercury containing lighting equipment (fluorescent lamps)// original in Ukrainian: «Про поводження з відпрацьованими ртуть вміщуючими освітлювальними приладами (люмінесцентними лампами)» [https://drive.google.com/file/d/0B06VW9Er Mx4EakliSIJuaHhEeVU/view]	<ul> <li>Purpose –</li> <li>1. For implementation of output 1.4.</li> <li>2. Developed for Government and registered in VR (№3374), it has passed all respective VR committees and is included on lists for the first reading http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=5689 3s // Component#1</li> </ul>	1.4	Oct, 2014	Vygovska Ganna Pavlivna	\$4,890
3	Draft Law On amending legislative acts // Original in Ukrainian «Проект Закону про внесення змін до деяких законодавчих актів України (щодо поліпшення енергоефективності в освітленні)» [http://w1.c1.rada.gov.ua/pls/zweb2/webpr oc4_1?pf3511=56712]	Purpose – 1. For implementation of output 1.3 2. Developed for Government and registered in VR (№3345), it has passed all respective VR committees and is included on lists for the first reading BPY http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=5671 2//Component #1	1.3	Dec, 2014	LEBEDEVA Alina Volodymyrivna	\$4,920

# Annex G (Part 1): Commissioned Research Activities by the TMEL Project

4	Study of existing Labelling schemes of lighting sources, their implementation and outcomes, proposing suitable for Ukraine //original in Russian «Отчет исследования национальных и международных норм, стандартов, способствующих внедрению энергоэффективных технологий в освещении» [https://drive.google.com/file/d/0BzITNjcOQ wWuRjJQcmNEc2d2Z2VkaUVFZXNULTEyeF9 2aUhV/view]	<ul> <li>Purpose -</li> <li>1. For implementation of output 1.4.</li> <li>2. The study contains the recommendation on Improvement of Technical regulation on Energy Labelling.</li> <li>3.Submitted to MinEnv (letter №2645 dt 15.01.2015) 4.Adopted by CMU resolution #340 27.05.2015)/ Component #1</li> </ul>	1.4	Oct, 2013	Legal firm Lex Plus	\$23,870
5	Report on Review of the national and international legislation on utilization and recycling of fluorescent lamps // original in Ukrainian «Звіт Дослідження національного та міжнародного законодавства щодо утилізації та переробки флуоресцентних ламп» [https://drive.google.com/file/d/0BzITNjcOQ wWucXhadXFhNmttVW1RejB3TFRaOEFuWG 9XRG93/view]	<ul> <li>Purpose –</li> <li>1. For implementation of output 1.4.</li> <li>2. The materials was used to design Draft Law on CFL disposal</li> <li>3. Draft Law is in VR//Component #1</li> </ul>	1.4	Nov, 2012	Legal firm Lex Plus	\$20,619
6	Report on Review of the national and international norms, standards and legislation on promotion energy-efficient lightning technologies// original in Ukrainian «Звіт Дослідження національних та міжнародних норм, стандартів і законодавства, що сприяють енергоефективним технологіям освітлення» [https://drive.google.com/file/d/0BzITNjcOQ wWub25SNmZZczBsR1ZtaGIZX21YVjVOTIgxS EpF/view]	<ul> <li>Purpose –</li> <li>1. For implementation of output 1.1</li> <li>2. Study was used to establish a baseline in the sphere of EE legislation and to support the design of Road-Map//Component #1</li> </ul>	1.1	Dec, 2012	Legal firm Lex Plus	\$8,345

7	IC on Road Map – [ https://drive.google.com/file/d/0B0ENyYqfz 4jeSkZoUjdTY0hIM0E/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 1.1.</li> <li>2. Road-map developed for the Government to include in Ukrainian strategic documents. 3. Submitted to MinEnv (letter № 2645 dt 30.06.2015)//Component #1</li> </ul>	1.1	Dec, 2014	Lighting Business Consulting, Ltd.	\$24,800
8	IC on EU Law analysis – original in Ukrainian "Аналіз законодавства Європейського Союзу та міжнародного досвіду його імплементації в частині, що стосується поетапної відмови від ламп розжарювання і впровадження енергоефективного освітлення в Україні" [https://drive.google.com/drive/folders/0B0 ENyYqfz4jeZ1NHR0RpVTg4ZzQ]	<ul> <li>Purpose</li> <li>1. For implementation of output 1.3. (create a law for total phase out of IBs)</li> <li>2. The study contains the best practices and recommendations for Ukraine on bulb phase-out.</li> <li>3. Results submitted to MP at 12.12.2016 //Component #1</li> </ul>	1.3	Nov, 2016	Samborska Yuliia Leonidivna	\$6,800
9	IC on Budget impact of ILC phase-out - original in Ukrainian "Аналіз економічної ефективності, отриманої від поетапної відмови від ламп розжарювання, включаючи вплив на державний бюджет України "[https://drive.google.com/drive/folders/0B 0ENyYqfz4jeZ1NHR0RpVTg4ZzQ]	<ul> <li>Purpose</li> <li>1. For implementation of output (create a law for total phase out of IBs) 1.3</li> <li>2. Study contains the assessment of budget impact of total IB phase-out</li> <li>3. Results submitted to MP at 12.12.2016 //Component #1</li> </ul>	1.3	Nov, 2016	Danchuk Anna	\$8,600
10	IC on Financing for Lighting - original in Ukrainian "Аналіз ефективності різних форм фінансування для комплексної модернізації освітлення" [https://drive.google.com/drive/folders/0B0 ENyYqfz4jeZ1NHR0RpVTg4ZzQ]	<ul> <li>Purpose</li> <li>1. For implementation of output 1.3. (create a law for total phase out of IBs)</li> <li>2. The study contains the analysis of different financial tools for EEL and recommendation for Ukraine,</li> <li>3. Results submitted to MP at 12.12.2016 //Component #1</li> </ul>	1.3	Nov, 2016	Danchuk Igor	\$13,000
11	Electricity supply analysis - original in Ukrainian "Разработка новых технических норм по качеству электроснабжения" [https://drive.google.com/file/d/0B0ENyYqfz 4jeb2RIdWQzM2UxUW8/view?usp=sharing]	Purpose <ol> <li>For implementation of output 1.2.</li> <li>The study showed that one of the major issue with EEL is lack</li> </ol>	1.2	Aug, 2014	NT-Project, Ltd	\$175,324

		of quality for electricity supplied which creates a bad promotion of EEL technologies. 3. Based on this study the study of legislation on protection of consumer rights were made //Component #1&2				
12	Street lighting analysis - original in Ukrainian "Оцінка якості енергоефективних вуличних ламп і світильників доступних на ринку україни" [https://drive.google.com/file/d/0B0ENyYqfz 4jedzU2Q1l6YTIwWHM/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 2.2</li> <li>2. The study showed the presence of sub-par quality products on Ukrainian market</li> <li>3. its results were presented in 2015 on international conference "Change the Bulb - Change the World"//Component #2</li> </ul>	2.2	Jul, 2015	SGS Ukraine	\$526,935
13	Review on Development of the Strategies on implementation of economically viable energy-saving lightning technologies in Ukraine//original in Ukrainian – Дослідження «Розробка стратегій впровадження економічно доцільних енергозберігаючих технологій освітлення в Україні» [https://drive.google.com/file/d/0BzlTNjcOQ wWuYndYUHpnekFtc2c/view]	<ul> <li>Purpose</li> <li>1. For implementation of outcome 4</li> <li>2. This baseline study showed the sectors in which respective technologies have the best potential to decrease of electricity consumption</li> <li>3. This was used during PR campaigns and pilots //Component #4</li> </ul>	4.2	Oct, 2014	IK "Sfera Plus"	\$9,577
14	Consumer market analysis - original in Ukrainian "ЗВІТ з дослідження споживачів ринку продукції енергоефективного освітлення України" [http://lampochki.org.ua/wp- content/uploads/2015/11/Report-on- consumer-market-research-2012.pdf]	<ul> <li>Purpose</li> <li>1. For implementation of output 4.3</li> <li>2. The study showed the baseline of EEL consumers market</li> <li>3. it was used to formulate ToR for 1st Promotional Campaign//Component #4</li> </ul>	4.3	Apr, 2012	IK "Sfera Plus"	\$15,992
15	Producer market analysis - original in Ukrainian "Проведення дослідження товарного ринку енергоефективного освітлення України та факторів впливу на його розвиток"	Purpose <ol> <li>For implementation of output 4.3</li> <li>The study showed the baseline of EEL producers market 3. it</li> </ol>		Nov, 2012	Kviten V.S. Ltd.	\$7,722

	[http://lampochki.org.ua/wp- content/uploads/2015/11/Report-on- product-market-research-2012.pdf]	was used to formulate ToR for 1st Promotional Campaign//Component #4				
16	Analysis of impact of Awareness Campaign - original in Ukrainian "Проведення дослідження впливу проведеної всеукраїнської інформаційної кампанії з енергоефективного освітлення на інформаційний рівень населення україни та його відношення до енергозберігаючих ламп" [http://lampochki.org.ua/wp- content/uploads/2015/11/2013-Report-on- assessment-efficiency-of-a-Campaign1.docx]	<ul> <li>Purpose</li> <li>1. For implementation of output 4.3</li> <li>2. The study showed the results of 1st awareness Campaign 3. It was used to formulate ToR for second Campaign//Component #4</li> </ul>	4.3	Dec, 2013	Kviten V.S. Ltd.	\$11,854
17	Study on Standards in the sphere of lighting - original in Ukrainian "Разработка санитарных норм и правил освещения жилых и общественных зданий»" [https://drive.google.com/file/d/0B0ENyYqfz 4jedEVIX2t5X1BDR28/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 1.3.</li> <li>2. The study contains some recommendation to supplement implementation of DBN "Artificial and natural lighting"</li> <li>3. Submitted to MinEnv at Jun 2015//Component #1</li> </ul>	1.3	Dec 2015	TOV "MittalServis"	\$122,366
18	IC on design of ToR for Road-map creation	<ul> <li>Purpose –</li> <li>1. For implementation of output 1.1.</li> <li>2. The ToR for IC on Road-map design is drafted and tender was conducted // Component#1</li> </ul>	1.1	Nov 2013	Rachuk Oleg Oleksandrovych	\$4,100
19	Support of Draft Law on Phase-out in Parliament	<ul> <li>Purpose –</li> <li>1. For implementation of output 1.3.</li> <li>2. An expert has been hired to support the Draft Law 3345 in VR</li> <li>2. The independent assessments of draft law was acquired: 1.</li> <li>From NAS 2. Governmental office on Euro integration.</li> <li>3.Committe of VR on Euro integration // Component#1</li> </ul>	1.3	Feb 2017	Sydorenko Svitlana Victorivna	\$4,990

20	Study of legislation on protection of consumer rights at electricity market - original in Ukrainian "Остаточний звіт про дослідження щодо українського та міжнародного законодавства з якості електроенергії, що постачається" [https://drive.google.com/file/d/0B0ENyYqfz 4jebVFORWpOTFhCbVk/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 1.2.</li> <li>2. Recommendations on legislation improvement was acquired and submitted to MinEnv 4. The VR has approved in first reading the Law "On Electricity supply (Http://w1.c1.rada// Component#1.gov.ua/pls/zweb2/webproc4_2?pf3516=4493&amp;sk l=9). // Component#1</li> </ul>	1.2	May 2015	UPF "Gryshchenko ta Partnery"	\$12,040
21	Publishing of EU EE legislation Compendium	<ul> <li>Purpose</li> <li>1. For implementation of outputs 1.2, 1.3, 1.4.</li> <li>2. Compendium on EU legislation in EE submitted to governmental and local authorities and science// Component#1</li> </ul>	1.2, 1.3, 1.4	Oct 2016	Vydavnych.dim Tsentr Uchbovoi literatury	\$4,444
22	Translation of EU Directives	<ul> <li>Purpose</li> <li>1. For implementation of output 1.3.</li> <li>2. The translation of EU directives for Governments conducted and is included in Compendium // Component#1</li> </ul>	1.3	Dec 2015	FOP Timachov Sergiy Mykhailovych	\$777
23	Proofreading of translation of EU Directives	<ul> <li>Purpose</li> <li>1. Technical verification of EU Directives translation before publishing.</li> <li>2. To conduct definition verification after translation // Component#1</li> </ul>	1.3	Feb 2016	Pavliuk Sviatoslav Kostiantynovych	\$370
24	IC for development of Technical regulation toward utilization of MCLS in Ukraine	<ul> <li>Purpose</li> <li>1. For implementation of output 1.4.</li> <li>2. Designed Draft Technical Regulation and submitted to MinEnv (letter №2645, 30.06.15) // Component#1</li> </ul>	1.4	Oct 2014	Kozachenko Tetyana Petrivna	\$4,770
25	Design of 1st edition of DBN "Artificial and Natural" lighting - original in Ukrainian "пр ДБН В.2.5-28:2016 Природне і штучне	Purpose 1. For implementation of output 1.3.	1.3	Dec 2014	TOV KiyvPromElektroPro ekt	\$4,259

	освітлення"	<ol> <li>2. 1st edition of DBN "Artificial and natural lighting" is designed</li> <li>3. Submitted to MinRegion for assessment and approval (letter from PromElektroKomplekt 06.12.16) // Component#1</li> </ol>				
26	Design of 2nd edition of DBN "Artificial and Natural" lighting - original in Ukrainian "пр ДБН В.2.5-28:2016 Природне і штучне освітлення" [http://dbn.at.ua/load/normativy/dbn/dbn_ v_2_5_28_2015/1-1-0-1188]	<ul> <li>Purpose</li> <li>1. For implementation of output 1.3.</li> <li>2. 2nd edition of DBN "Artificial and natural lighting" is designed</li> <li>3. Submitted to MinRegion for assessment and approval (letter from PromElektroKomplekt 06.12.16) // Component#1</li> </ul>	1.3	Aug 2015	TOV KiyvPromElektroPro ekt	\$5,000
27	Project CTA	Purpose CTA shared with Project his recommendations on further implementation // Component#1,2,3,4,5,6		Mar 2017	Gelami PTY LTD ATF SJC TRUST	\$60,000
28	Technical assessment of the Bulb Eater device	<ul> <li>Purpose</li> <li>1. For implementation of output 2.4</li> <li>2. The Bulb Eater was interesting device for safe disposal of CFLs</li> <li>3. However assessment showed that it hasn't capabilities in demercurization // Component#2</li> </ul>	2.4	Jul 2012	Specialne Byuro z Eksperementalnum Vyrob	\$1,296
29	Assessment of quality of household EE lighting source - original in Ukrainian "Порівняльне тестування побутових енергоефективних джерел освітлення" [https://drive.google.com/file/d/0B0ENyYqfz 4jeam1MU0pUZGxFelk/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 2.2</li> <li>2. The study showed the presence of sub-par quality products on Ukrainian market</li> <li>3. Its findins are available on well-known consumer rights organization TEST // Component#2</li> </ul>	2.2	Dec 2014	Fundatsiya Rozvytku Eko. i Energ. Rynkiv	\$43,942
30	Inter-laboratory comparison test	Purpose <ol> <li>For implementation of output 2.2</li> <li>This assessment will allow Ukrainian labs to be internationally</li> </ol>	2.2	Mar 2017	National Lighting Test Centre	\$76,189

		recognized a to build up their capacities in lamp testing // Component#2				
31	Organizing of mercury containing bulbs disposal points in cities of Kyiv, Rive, Lviv, Cherkasi, Vinnitsa - original in Ukrainian "Організація пунктів збору від населення відпрацьованих енергоефективних освітлювальних продуктів, що містять ртуть (таких як КЛЛ, ТЛЛ, тощо), з метою подальшого відпрацювання механізму їх утилізації та переробки у містах: Київ, Рівне, Львів, Черкаси, Вінниця" [https://drive.google.com/file/d/0B0ENyYqfz 4jeR0ZhV3BCYmxsMTg/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 2.4 and 4.1</li> <li>2. The grantee organised collection points and disposed CFLs</li> <li>3. The activity demonstrated possibilities in bottom-up scheme of organizing household CFL disposal // Component#2</li> </ul>	2.4, 4.1	Nov 2016	Klub VAVILON, GO	\$45,255
32	Organizing of mercury containing bulbs disposal points in cities of Ivano-Frankivsk, Poltava, Sumy, Lutsk, Zhitomyr - original in Ukrainian "Організація пунктів збору від населення відпрацьованих енергоефективних освітлювальних продуктів, що містять ртуть (таких як КЛЛ, ТЛЛ, тощо), з метою подальшого відпрацювання механізму їх утилізації та переробки у містах: Івано-Франківськ, Полтава, Суми, Луцьк та Житомир" [https://drive.google.com/file/d/0B0ENyYqfz 4jeZ0R5bDNwVEozRU0/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 2.4 and 4.1</li> <li>2. The grantee organised collection points and disposed CFLs</li> <li>3. The activity demonstrated possibilities in bottom-up scheme of organizing household CFL disposal // Component#2</li> </ul>	2.4, 4.1	Nov 2016	Zalenyi Parus, GO	\$45,585
33	Organizing of mercury containing bulbs disposal points in cities of Kharkiv, Odessa, Dnipro, Kherson, Zaporozhe, Mykolaiv, Khmelnitskiy, Chernivtsi - original in Ukrainian "Організація пунктів збору від населення відпрацьованих енергоефективних освітлювальних продуктів, що містять ртуть (таких як КЛЛ, ТЛЛ, тощо), з метою подальшого відпрацювання механізму їх утилізації та переробки у містах Харків, Одеса, Дніпропетровськ, Херсон, Запоріжжя,	<ul> <li>Purpose</li> <li>1. For implementation of output 2.4 and 4.1</li> <li>2. The grantee organised collection points and disposed CFLs</li> <li>3. The activity demonstrated possibilities in bottom-up scheme of organizing household CFL disposal // Component#2</li> </ul>	2.4, 4.1	Nov 2016	Ts. ek. usv. batk-va "Dzherela radosti"	\$45,530

	Миколаїв, Хмельницький, Чернівці" [https://drive.google.com/file/d/0B0ENyYqfz 4jeREt1b19zdEJFWEE/view?usp=sharing]					
34	Consultant on evaluation of CO2 emissions reductions by the GEF methodology [https://drive.google.com/file/d/0B0ENyYqfz 4jeRDFIaUw1cHZuNzA/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 3.3 and global Project target</li> <li>2. The report received negative feedback from RTA and study will be conducted one more time in 2017 // Component#3</li> </ul>	3.3	Mar 2015	GROZA levgenii Georgiiovych	\$5,555
35	Energy audit of the implemented pilot projects - original in Ukrainian "Проведення енергоаудити пілотних проектів" [https://drive.google.com/file/d/0B0ENyYqfz 4jeRnloZzNCQTJ5WFU/view?usp=sharing]	<ul> <li>Purpose</li> <li>1. For implementation of output 3.3</li> <li>2. The study showed that lighting management systems create best opportunities in terms of electricity consumption decrease // Component#3</li> </ul>	3.3	Mar 2015	NTUU KPI	\$2,629
36	Analysis of Ukrainian lighting market 2014	Purpose 1. For implementation of output 4.3 2. The study showed the development of EEL market in Ukraine in 2014 // Component#4	4.3	Nov 2014	RBK-UKRAINE, TOV	\$300
37	Analysis of Ukrainian lighting market 2015	Purpose 1. For implementation of output 4.3 2. The study showed the development of EEL market in Ukraine in 2015 // Component#4	4.3	Sep 2015	TOV "Ukraiinskyi Biznes tehnologii"	\$500
38	Analysis of impact of Awareness Campaigns 2013-2016 - original in Ukrainian "Дослідження ринку енергоефективного освітлення побутового призначення в україні за 2014 — і півріччя 2016 років" [http://lampochki.org.ua/wp- content/uploads/2015/11/2016-Report-on- EEL-market.pdf]	<ul> <li>Purpose</li> <li>1. For implementation of output 4.3</li> <li>2. The study showed the development of EEL market in Ukraine and Project impact during 2012-2016</li> <li>3. It will be used to calculate indirect CO2 reductions caused by awareness rising activities // Component#4</li> </ul>	4.3	Nov 2016	Smerichevska Svitlana Vasylivna, FOP	\$4,500

39	Design of TextBook on EEL - original in Ukrainian	<ul> <li>Purpose</li> <li>1. For implementation of output 4.2</li> <li>2. The TextBook is aimed on students and teachers of relevant study courses</li> <li>3. It was shared with educational institutions // Component#4</li> </ul>	4.2	Apr 2015	PISTUN Yevhen Pavlovych	\$1,500
40	Design of Guidebook on EE streetligthing	<ul> <li>Purpose</li> <li>1. For implementation of outputs 3.1 3.2, 5.2 and 5.4</li> <li>2. The guidebook contains the valuable lessons learnt on EEL implementation during from Project experience</li> <li>3. It was shared with municipal authorities, science and city lighting management structures // Component#5</li> </ul>	3, 5	Oct 2015	Patrul Yevgenii Valeriiovych, FOP	\$1,925
41	Mid-Term Review	Purpose 1. MTR conducted review and provided the recommendations on further Project implementation // Component#6		Feb 2014	HURRY Suresh	\$24,468
42	Project Audit	Purpose <ol> <li>The audit showed that finance side of the Project hasn't major issues // Component#6</li> </ol>		Apr 2015	Audytorska Kompaniia PSP Audyt, TOV	\$1,200
43	Project Audit	Purpose <ol> <li>The audit showed that finance side of the Project hasn't major issues // Component#6</li> </ol>		Mar 2016	Audytorska Kompaniia PSP Audyt, TOV	\$1,200

Nr.	Title	Purpose/In support of Component# & Relevance	Date	Completed by	Economic	Impact
					effect	
1	Strategy for handling wastes containing Mercury // original in Ukrainian: «Стратегія поводження з відходами, що містять ртуть» (126 pages) [https://drive.google.com/fil e/d/0BzITNjcOQwWuVnZ2R kpIZWFrQWo5Y2V0MW00a VF2ZnMtOTVj /view]	<ul> <li><u>Purpose</u>: Providing basics for the Strategy of handling the mercury containing wastes in Ukraine. Analyses of the legal framework and methods, technologies, practice of handling the mercury containing wastes in EU, USA and Russian Federation. Analysis of Ukrainian legislation on collection of used fluorescent lamps, on financial penalties for non-compliance with legislation on their collection and utilization, on costs for services on collection, transportation and utilization of CFLs.</li> <li><u>Component</u> #1; for output 1.4//</li> <li><u>Relevance:</u> Proposals to the National strategy are developed based on assessment and comparison of the political and legal, environmental, economic and social factors. The conclusion made on topicality to adopt special law in collection and utilization of the mercury containing wastes in the residential sector, as current tariffs established by local self-government bodies and non-liability for individuals do not stimulate for separate collection and utilization of the FL in residential sector. This is a serious shortcoming in current national legislation and practice. Proposals to the Structure of the Strategy, its monitoring instruments, financial resources and means of enforcement are made as well. The study is highly relevant and topical.</li> </ul>	Nov, 2014	TOV "MittalServis" – Strategy on hazardous waste handling (UAH 1 272 970)	Sufficient	This work has sufficient potential for further application and use in process of development and adoption the National Strategy On Waste Treatment managed now by the MENR. Also, arguments made in the Strategy can be used for further improvement of relevant legislation, in particular, one that regulates treatment of the mercury containing wastes in the residential sector.
2	Draft Law "On the handling of used lighting equipment containing mercury (fluorescent lamps)"// original in Ukrainian: «Про поводження з	<ul> <li><u>Purpose</u>: To ensure detailed regulation of the proper treatment of the FL. It should mitigate shortcoming of current legislation.</li> <li><u>Component</u> #1; for output 1.4</li> <li><u>Relevance</u>: Currently the issue is regulated only by general</li> </ul>	Oct, 2014	Vygovska Ganna Pavlivna	Sufficient	The impact is limited by political will or non-willingness to promote EE lightning. It may be a reasonable explanation of the fact that proposed Draft law was not registered as it is, but

# Annex G (Part 2): Summary Evaluation of Major Studies Commissioned by the TMEL Project

	відпрацьованими ртуть вміщуючими освітлювальними приладами (люмінесцентними лампами)» (15 pages) [https://drive.google.com/fil e/d/0B06VW9ErMx4EakliSIJ uaHhEeVU/view]	norms of Article 34 of the Law on Wastes that led to misuse of authority by local self-governments, non-proper utilization of FL and absence of liability of individuals in residential sector for non-compliance to law. Proposed Draft law introduces utilization fee, system of separate collection of FL and establishment a Special Fund for FL utilization. Only some provisions, mostly regarding so-called "passport on waste treatment" of proposed draft were used in another Draft law modified and registered in the Parliament (№3374). It has passed all respective VR committees and is included on lists for the first reading <u>http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=5689</u> <u>3s</u>		(USD 4 890)		only some provisions are used to improve Law on Wastes in force. If proposed Draft law is registered and then enacted it will promote proper handling of used FL and promote use of LED technologies.
3	Draft Law "On amending legislative acts of Ukraine (regarding improvement of the energy-efficiency in lighting)" Original in Ukrainian «Проект Закону про внесення змін до деяких законодавчих актів України (щодо поліпшення енергоефективності в освітленні)» (19 pages) [http://w1.c1.rada.gov.ua/pl s/zweb2/webproc4_1?pf351 1=56712]	<ul> <li><u>Purpose:</u> To bring national legislation in line with European standards in energy efficiency, creating conditions for phasing out of incandescent lamps, as well as promotion of transition to energy efficient lamps and lighting use in municipalities and households. These measures will lead to reduced energy consumption, ensure economical use of energy resources and will improve the state of the environment by reducing CO2 emissions, also will improve living standards due to reduced costs for energy. Draft law is to introduce into national legislation definitions regarding energy saving and energy-efficiency in lighting, stimulate energy-efficiency my energy labeling and define as one of a state policy principle reducing greenhouse gas emissions into the atmosphere through the implementation of the energy-efficiency policy.</li> <li><u>Component</u> #1; for output 1.3</li> <li><u>Relevance</u>: This draft law proposes amendments to the Law "On Energy Saving". In particular, it proposes:</li> </ul>	Dec, 2014	Lebedeva Alina Volodymyrivn a (USD 4 920)	Sufficient	When adopted this law will have extremely positive impact on promoting energy-efficiency policy in the country, reducing CO2 emissions and ensuring compliance to respective EU policy.

		energy-efficiency, lighting equipment, energy intensity, eco-design, improvements of energy-				
		<ul> <li>efficiency. It also extends definition of the energy saving in legislation;</li> <li>To introduce some provisions of the Directive 2009/125/EU, and Directive 2012/27/EU;</li> <li>To establish that one of the basic principles of the state policy on energy saving is the introduction of energy labeling of household electric appliances by class (A+++, A++, A+, A, B, C, D, E, F, G);</li> <li>To introduce a new principle of state policy of energy security - "reducing greenhouse gas emissions into the atmosphere as a result of energy saving policy";</li> <li>To create a legal basis for energy saving policy in housing and public sector;</li> <li>All of the above currently missing in Ukrainian legislation, thus proposed draft is highly relevant.</li> <li>The Draft law was developed for Government and registered in the Parliament (№3345), it has passed all respective VR committees hearings and is included into the list of the drafts for the first reading (http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=567 12)</li> </ul>				
		(http://w1.c1.rada.gov.ua/pls/zweb2/webproc4_1?pf3511=567 12)				
4	Report on study of existing	- Purpose: To provide with background information in order to	Oct,	Legal firm Lex	Sufficient	Recommendations are used in
	labeling of lighting sources,	promote labeling of lighting sources in line with Directive	2013	Plus		the Technical Regulations for
	their implementation and	2010/30/EU.				energy labeling of light bulbs
	outcomes, proposing					and units adopted by the CMU

5	suitable for okraine. Orginal in Russian «Отчет исследования национальных и международных норм, стандартов, способствующих внедрению энергоэффективных технологий в освещении» (15 pages) [https://drive.google.com/fil e/d/0BzITNjcOQwWuRjJQcm NEc2d2Z2VkaUVFZXNULTEy eF92aUhV/view]	<ul> <li><u>Component</u> #1; for output 1.4</li> <li><u>Relevance</u>: This study contains the recommendations on Improvement of Technical Regulations on Energy Labeling based on EU requirements and previous Ukrainian experience. It also argues for voluntary labeling.</li> <li><u>Purpose</u>: To provide overview of the best examples of</li> </ul>	Νον.	(UAH 644 515)	Moderately	27.05.2015
2	National and International Legislation on Utilization and Recycling of Fluorescent Lamps. Original in Ukrainian «Звіт Дослідження національного та міжнародного законодавства щодо утилізації та переробки флуоресцентних ламп» (14 pages) [https://drive.google.com/fil e/d/0BzITNjcOQwWucXhadX FhNmttVW1RejB3TFRaOEFu WG9XRG93/view	<ul> <li><u>Purpose</u>: To provide overview of the best examples of international legislation and practices on FL collection and recycling that may be replicated to the Ukrainian realm.</li> <li><u>Component</u> #1; for output 1.4//</li> <li><u>Relevance</u>: The Report summarized good practices and legislation from USA, EU countries and Russian Federation. In absence of sufficient legislation and operating instruments for collection and utilization of FL from households, this review might become an extremely relevant study to propose efficient model for this.</li> <li>The review suffers from bad structure, absence of the references to the sources of information, non-comprehensiveness of materials presented, absence of analysis of comparative advantages of various models, as well as structured recommendations.</li> </ul>	2012	(UAH 556 731)	sufficient	the information from Report was used to design Draft Law "On the handling of used mercury containing lighting equipment (fluorescent lamps)" The materials presented in the Report were not used in mentioned Draft law to full extent, in particular description of various instruments for collection and utilization of the FL. It may be explained by weakly structured information in the Report and absence of clear conclusions and recommendations.

C	Depart on Deview of the	Durnasa, Studu was undertaken te establish a baseline in the	Dec	Logal firm Law	Madarataly	The recommendations were
0		- <u>Purpose</u> . Study was undertaken to establish a baseline in the	Dec,		would allely	
	National and International	sphere of legislation on Energy-efficiency.	2012	Plus	sufficient	used in process of design of
	Norms, Standards and	Component #1. for output 1.1				Draft phase-out program for
	Legislation on Promotion of					Ukraine and overall roadmap as
	Energy-efficient Lighting	- Relevance: Proposed recommendations on basics for		(ПАН		described under #7 of this table
	Technologies. Original in	development National programs for promotion EE lighting				
	Ukrainian «Звіт	technologies, including MEDS standards, labeling, financial and		225 337)		
	Дослідження національних					
	та міжнародних норм,	tax stimulus, public procurement policy, awareness raising				
	стандартів і законодавства,	policy, partnerships. Policy recommendations are made as well.				
	що сприяють					
	енергоефективним					
	технологіям освітлення»					
	(10 pages)					
	[https://drive.google.com/fil					
	e/d/0BzlTNjcOQwWub25SN					
	mZZczBsR1ZtaGIZX21YVjVOT					
	lgxSEpF/view]					
7	Development of the	- Purpose <sup>,</sup> To propose is to provide with analysis of international	Dec	Lighting	Sufficient	Road-map proposed for the
	roadman towards nhasing-	experience and recommendations to Likraine regarding	2014	Business	Sumerent	Government to be included into
	out energy inefficient	development the roadman towards phasing-out energy	2014	Consulting		Ukrainian policy planning
	lighting in Likraine	inefficient lighting and promotion of FE lighting		Ltd		documents
				2.0.		
	(141 pages)	- <u>Component</u> #1; for output 1.1		(USD		
	[https://drive.google.com/fil	- <u>Relevance</u> : The report consist of three parts, in particular, 1.		24 800)		
	e/d/0B0ENyYqfz4jeSkZoUjdT	Phase-out compliance program and promotion programs, 2.				
	YOhIMOE/view?usp=sharing]	Compliance program, 3. National test laboratories. Based on				
		international experience this review presents the idea that as				
		soon as alternative to traditional and more EE technologies are				
		available in the market, the transition strategy has to be				
		developed to speed up the process of phasing-out of inefficient				
		lighting products used in a country. The energy savings are not				



8	EU Legislation and	- Purpose: To evaluate efficiency of the process of Ukrainian	Nov,	Samborska	Sufficient	This analysis provides with up-
	international experience	legislation adaptation to EU as required by Ukraine-EU	2016	Yuliia		dated information on the EU
	analysis on phase out of	Association Agreement, identify problems and evaluate level of		Leonidivna		legislation on the subject matter
	incandescent lamps and	compliance at current stage.				that have been changed since
	promotion of EE lighting in			(USD		2012, thus recommendations
	Ukraine. Original in	- <u>Component</u> #1; for output 1.3		C 000)		made in this study may serve as
	Ukrainian "Аналіз			6 800)		a roadmap for legislators to
	законодавства	- <u>Relevance</u> : The document developed is topical. It provided:				amend Ukrainian legislation
	Європейського Союзу та	critical review of Ukrainian legislation together with				accordingly and comply with EU
	міжнародного досвіду	identification of shortcomings and outdated norms;				norms and requirements.
	його імплементації в	comparative analysis of Ukrainian legislation regarding energy-				
	частині, що стосується	efficiency, energy labeling, emissions etc. from the perspective				The analysis also was submitted
	поетапної відмови від	of phasing out IL; Recommendations for adaptation and				to MP at 12.12.2016 in order to
	ламп розжарювання і	implementation of legislation; description of best practices and				support process of adoption of
	впровадження	recommendations for Ukraine on IL phase-out.				already registered Drafts Law.
	енергоефективного	Poviou of relevant ELL Directives in particular 2002/01/ELL				
	освітлення в Україні"					
		2000/28/E11 - 2012/27/E11 with description of their relevance				
	(59 pages (235 together	threats for implementation and perspective ways to implement				
	with annexes)	is undertaken. The technical regulations on lighting EN 12464-1				
		and EN 15102, 1 are reviewed as well impact of provisions of				
	[https://drive.google.com/d	the EU Directives 2006/22/EC, 2000/72/EU and 2000/72/EU on				
	rive/folders/0B0ENyYqfz4jeZ	anorgy solving colculation is considered. National energy				
	1NHR0RpVTg4ZzQ]	effergy saving calculation is considered. National energy-				
		enciency action plans and reports are proposed as instrument				
		to national policy making process. Respective USA experience is				
		considered as well. An issue of misinterpretation of some				
		standard terms of law in national legislation is discussed and				
		proposals to tackle the issue are made.				
		An approach to promote energy-efficient lighting equipment				
		through adoption relevant legislation on Eco-design is proposed.				
		Detailed recommendations on legislation development,				
		technical regulations improvement, creation new instruments				
		for electricity trading are proposed.				

9	Evaluation of Budget impacts of ILC phase-out. Original in Ukrainian "Аналіз економічної ефективності, отриманої від поетапної відмови від ламп розжарювання, включаючи вплив на державний бюджет України "[https://drive.google.com/ drive/folders/0B0ENyYqfz4j eZ1NHR0RpVTg4ZzQ]	<ul> <li><u>- Purpose</u>: 1. For implementation of output (create a law for total phase out of IBs) 2. Study contains the assessment of budget impact of total IB phase-out 3. Results submitted to MP on 12.2016</li> <li><u>- Component</u> #1: for output 1.3</li> </ul>	Nov, 2016	Danchuk Anna USD 8600		
10	Research on Financing for Lighting. Original in Ukrainian "Аналіз ефективності різних форм фінансування для комплексної модернізації освітлення" [https://drive.google.com/d rive/folders/0B0ENyYqfz4jeZ 1NHR0RpVTg4ZzQ]	<ul> <li><u>Purpose</u>: 1. For implementation of output 1.3. (create a law for total phase out of IBs) 2. The study contains the analysis of different financial tools for EEL and recommendation for Ukraine, 3. Results submitted to MP at 12.12.2016.</li> <li><u>Component</u> #1: for output 1.3</li> </ul>	Nov, 2016	Danchuk Igor USD 13 000		
11	Development of a New Technical Standard on Electric Power Quality. Original in Russian "Разработка новых технических норм по качеству электроснабжения" (156 pages)	<ul> <li><u>Purpose</u>: The purpose of this study is not defined in the report. Based on the content, the conclusions may be drawn that main subject matter of study is: (i) definition of quality parameters for electric power; (ii) definition of the ways to control a quality of electric power; (iii) criticism of current State Standard and proposing new one that supposed to ensure sufficient control over quality of electric power for promotion new energy- efficient technologies.</li> <li><u>Component</u> #1; for output 1.2</li> <li><u>Relevance:</u></li> </ul>	Aug, 2014	NT-Project, Ltd (USD 175 324)	Non- sufficient	Majority of the information presented in the study regarding problem with quality of electric power in the grid in Ukraine can be found in open sources of information. Evaluation of the innovative character and relevance of the text of proposed new State Standard (FOCT) requires specific knowledge and skills.

[https://drive.google.com/fil	In the context of this report a brief description of the main		In case this new State Standard
e/d/0B0ENyYqfz4jeb2RIdW	problems with the quality of electric power supply and control is		is innovative, it should have a
QzM2UxUW8/view?usp=sha	provided. A plan of action on improvement of the quality of		positive impact (when adopted)
ring]	electric power is proposed. It suggests improvement of technical		on ensuring quality control over
	characters of the current by issuing recommendations for		electric power supply and on
	consumers and for housing and communal services;		promotion new EE technologies
	improvement of the regulatory environment; public hearings.		
	The report on public hearing held in 2014 on quality control with		
	participation of representatives from Vatra, Iskra, Philips, Maxus		
	and Ukrtest is provided. Resolution of this hearing is that		
	current State Standard (FOCT 13109-97) is in compliance with		
	International Standards (MƏK 868, MƏK 1000—3—2, MƏK 1000-		
	3-3, МЭК 1000-4-1, МЭК 1000-2-1, МЭК 1000-2-2) but since		
	year 1997 on EU level and international level new standards		
	were adopted that national ones don't comply to full extend.		
	The 29 Records on measuring quality of the electric power in		
	electric grid are presented. These protocols demonstrated the		
	non-compliance. Considered electric power as commodity with		
	certain set of characteristics of quality. The Law On Electric		
	Power Industry is considered, as well as Technical Regulations as		
	basic normative acts to ensure quality control of electric power		
	in Ukraine. Current factors that negatively impact the quality of		
	electric power in Ukraine are briefly considered.		
	Methodological, organizational and technical measures are		
	proposed to tackle the problem of non-stable quality of electric		
	power. As one of instrument to resolve the issue, the system of		
	permanent measurement/monitoring of the quality of electric		
	power is proposed. The device is proposed to be incorporated in		
	parallel with the electric supply meter on the entities. It will		
	comply with the ISO 9000 requirements as authors consider.		
	Data collected in process of quality measurement can be used		
	for energy audit of enterprises. Authors argued for placement of		
	the hub/group quality correction equipment rather than		
	individual ones.		

		As a result, authors consider that current State Standard (FOCT 13109-97) is not sufficient to ensure quality of electric power in grid, thus they proposed new State Standard (FOCT 13109-14) called "Electric energy. Electromagnetic compatibility of technical equipment". Power quality limits in public electrical systems". The current State Standard should be replaced by proposed new one that is in line with requirements of relevant international standards (MЭK 868, MЭK 1000–3–2, MЭK 1000-3-3, MЭK 1000-4-1; MЭK 1000-2-1, MЭK 1000-2-2). The text of new proposed standard is integral part of the study.				
12	Final Report on Testing for Assessment of Quality of Energy Efficient Street Lamps and Luminaires Available on the Market of Ukraine. Original in Ukrainian "Оцінка якості енергоефективних вуличних ламп і Світильників доступних на ринку України" (73 pages) [https://drive.google.com/fil e/d/0B0ENyYqfz4jedzU2Q1I 6YTIwWHM/view?usp=shari ng]	<ul> <li>-Purpose: To undertake assessment based on testing results of street lamps and luminaires available on Ukrainian market in order to facilitate the transition to energy-efficient lighting market and to promote energy efficiency lighting, as well as ensuring compliance with new standards. The testing was held in the period of 21.12.2014 - 24.04.2015.</li> <li>- <u>Component #2</u>; for output 2.2</li> <li>- <u>Relevance:</u></li> <li>This testing was held for discharge lamps (mercury arc lamps of high pressure, sodium lamps of high pressure, metal-halide lamps) of five market brands and LED luminaires of four brands for lighting the streets and roads. Total number of tested lamps is 1500 pcs, of luminaires - 200 pcs.</li> <li>Lamps of Optima, DeLux, Iskra, Osram, Philips were tested against standards: ДСТУ EN 60662-2001; ДСТУ IEC 60062-2005; ДСТУ IEC 60662-2001; ДСТУ EN 61167:2014; ДСТУ IEC 60188:2003, as well as luminaires of Bellson, Philips, CETO and HIB «Paqiň» against standards: ДСТУ EN 15:2007; ДСТУ IEC 61000-3-2:2004; ДСТУ EN 61000-3-3:2004; ДСТУ IEC 61547-2001).</li> </ul>	Jul, 2015	SGS Ukraine (USD 526 935)	Non- sufficient	Results of testing may serve as guidelines for consumers on quality of some lamps and luminaires presented on Ukrainian market. (results look similar to the ones represented under Report#23, but less universal)

		<ul> <li>Final summary on compliance of these lamps and luminaires to selected standards is presented. Also, proposal is made to undertake periodical amendment of the Resolution of CMU № 992, dated 15.10.2012 in order to ensure its update according to European (EN) and international standards (IEC).</li> <li>The study is relevant, even it's not comprehensive and it shows that products of below established parameters are presented on Ukrainian market. The results of this testing were presented in 2015 on international conference "Change the Bulb - Change the World"</li> </ul>				
13	Review on Development of the Strategies on Implementation of Economically Viable Energy- Saving Lighting Technologies in Ukrainian – Дослідження «Розробка стратегій Впровадження економічно доцільних енергозберігаючих технологій освітлення в Україні»(254 pages)[https://drive.google.com/fil e/d/0BzlTNjcOQwWuYndYU HpnekFtc2c/view]	<ul> <li><u>Purpose</u>: To demonstrate advantages of the LED technologies promotion to Ukrainian market comparing to ordinary light sources such as incandescent, halogen, fluorescent and discharge lamps. The review proposes econometric models for Ukrainian market development till 2030 based on comparing energy consuming, saving of energy and price differences.</li> <li><u>Component #4</u>; for output 4.2.</li> <li><u>Relevance</u>:</li> <li>This review presents an analysis of Ukrainian lighting market dynamics; analysis of the legal framework; review of technology development and improvement of LED lighting; prognosis of the electric energy saving presented by sectors (households, street lighting, industry) based on the modeling approach.</li> <li>The summary of results may be presented as following: assuming that LED lamps and luminaries meet their expected efficacy, lifetime, and price targets the LED lighting will gain significant market penetration. By 2020, LED lighting is expected to represent 36 percent of lumen-hour sales on the general illumination market. By 2030, it is expected to grow to 74 percent of lumen-hour sales. In 2030, the annual energy savings due to the increased market penetration of LED lighting is estimated to be approximately 30 terawatt-hours, or the</li> </ul>	Oct, 2014	IK "Sfera Plus", (UAH 258 600)	Sufficient	The results of this review were used during awareness campaigns and in process of pilots implementation

		equivalent annual electrical output of about five 1,000- megawatt power plants. At today's energy prices, that would equate to approximately \$3 billion in energy savings in 2030 alone. Assuming the current mix of generating power stations, these energy savings would reduce greenhouse gas emissions by 21 million metric tons of carbon. The total electricity consumption for lighting would decrease by roughly 46 percent relative to a scenario with no additional penetration of LED lighting in the market. Over the 20-year analysis period, spanning 2011-2030, the cumulative site energy savings are estimated to total approximately 2700 terawatt-hours representing approximately \$25 billion at today's energy prices. Assuming the electric power plant generating mix is held constant over the next two decades, these savings would reduce greenhouse gas emissions by 180 million metric tons of carbon the residential and commercial sectors provide the greatest opportunity for energy savings. The former is primarily composed of inefficient incandescent lamps, to which LEDs provide a cost-effective alternative. The commercial sector contributed 60 percent of lighting service in the Ukraine in 2011, thus presents an opportunity for significant energy savings. By 2030, the commercial sector energy savings potential will be 35 percent of the baseline energy consumption.			
		the Ukraine in 2011, thus presents an opportunity for significant energy savings. By 2030, the commercial sector energy savings			
		potential will be 35 percent of the baseline energy consumption.			
14	Consumer Market Analysis.	Purpose: The study established the baseline of EEL consumers	Apr,	IK "Sfera	
	Original in Ukrainian "ЗВІТ з	market.	2012	Plus", TOV (114H	
	ринку продукції	<u>Component #4</u> : for output 4.3 2.		431 800)	
	енергоефективного	-Purnose: the study was used to formulate ToR for 1st			
	освітлення України"	Promotional Campaign//Component #4			
	(527 pages).				

	[http://lampochki.org.ua/wp content/uploads/2015/11/R eport-on-consumer-market- research-2012.pdf]				
15	Producer market analysis - original in Ukrainian "Проведення дослідження товарного ринку енергоефективного освітлення України та факторів впливу на його розвиток" [http://lampochki.org.ua/wp - content/uploads/2015/11/R eport-on-product-market- research-2012.pdf]	<ul> <li><u>Purpose</u>: The study established the baseline of EEL consumers market.</li> <li><u>Component #4</u>: for output 4.3 2.</li> <li><u>-Purpose:</u> the study was used to formulate ToR for 1st Promotional Campaign//Component #4</li> </ul>	Nov, 2012	Kviten V.S.,Ltd (UAH 208 516)	
16	Analysis of impact of Awareness Campaign - original in Ukrainian "Проведення дослідження впливу проведеної всеукраїнської інформаційної кампанії з енергоефективного освітлення на інформаційний рівень населення україни та його відношення до енергозберігаючих ламп" (482 pages)	<u>Purpose</u> : The study established the baseline of consumer awareness as a result of the first consumer awareness campaign. <u>Component #4</u> : for output 4.3 2. <u>-Purpose</u> : the study was used to formulate ToR for 2st Promotional Campaign//Component #4	Dec, 2013	Kviten V.S.,Ltd (UAH 320 066)	

	[http://lampochki.org.ua/wp - content/uploads/2015/11/2 013-Report-on-assessment- efficiency-of-a- Campaign1.docx]					
17	Report on Development of Sanitary Standards/Codes and Rules for Lighting in Residential and Public Buildings. Original in Russian "Разработка санитарных норм и правил освещения жилых и общественных зданий»" (86 pages) [https://drive.google.com/fil e/d/0B0ENyYqfz4jedEVIX2t5 X1BDR28/view?usp=sharing]	<ul> <li><u>Purpose</u>: The purpose is not identified in the report.</li> <li><u>Component #1</u>; for output 1.3.</li> <li><u>Relevance</u>:</li> <li>The relevance is difficult to define, as no goal of the study is identified and no comparison for standards of sanitary code is presented. The 42 pages of report present the google map photos of the buildings chosen to measure level of illumination.</li> <li>Also the authors proposed new edition of the Sanitary code with two tables reflecting: (i) indexes for natural, artificial and combined lighting in residential buildings, and (ii) indexes of natural, artificial and combined lighting in public buildings.</li> </ul>	Dec, 2015	TOV "MittalServis" (USD 122 366)	Non- sufficient	Project reported that "the study contains some recommendation to supplement implementation of DBN "Artificial and natural lighting", but no proven records for this are provided. The information of very general character that is available from open sources is presented in the report. No sources of verification that this report was used during process of development DBN is provided.
18	Support of Draft Law on Phase-out in Parliament	<ul> <li><u>- Purpose:</u> An expert was hired to support the Draft Law 3345 in VR.</li> <li><u>- Component #1</u>: for output 1.3.2</li> <li><u>- Relevance</u>:</li> <li>Support for Governmental Office on Euro Integration and Committee of VR on Euro Integration.</li> </ul>	Feb 2017	Sydorenko Svitlana Victorivna USD 4990		
19	The Final Report of the Study on the Ukrainian and International Legislation on the Quality of Electricity Supplied. Original in Ukrainian "Остаточний звіт про дослідження щодо українського та міжнародного законодавства з якості електроенергії, що постачається" (32 pages) [https://drive.google.com/fil e/d/0B0ENyYqfz4jebVFORW pOTFhCbVk/view?usp=shari ng]	<ul> <li><u>Purpose:</u> To provide recommendations on the strengthening accountability of energy service providers, protect consumer rights with regard of electricity power quality.</li> <li><u>Component #1</u>; for output 1.2</li> <li><u>Relevance</u>:</li> <li>The analysis Ukraine legislation on the protection of consumer rights and liability of supplier for inadequate quality of electricity in the light of existing practice is undertaken. A consideration of legislation and practices to ensure protection of consumer rights on supply of electric power of defined quality is made based on experience of some selected EU member states.</li> <li>Conclusion made that in Ukraine only some provisions of EU legislation on subject matter are enforced. Respective recommendations for legislation improvement are proposed.</li> <li>Analysis of the current practice in Ukraine shows that it's possible to implement: (i) voluntary enforcement of the decisions adopted by NKREKP when it adopts legally binding decision to the parties on dispute regarding quality of electric power supplied; and (ii) adoption of legal acts to ensure approximation of national standards to European ones under requirements of the Third Directive.</li> </ul>	May, 2015	UPF "Gryshchenko ta Partnery" (UAH 325 080)	Marginally sufficient	The recommendations are not comprehensive Recommendations on legislation improvement were submitted to MENR The Parliament has approved in first reading the draft Law "On the market of Electric Power" (http://w1.c1.rada.gov.ua/pls/z web2/webproc4_2?pf3516=449 3&skl=9). //
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20	Technical Support for Development of Technical Regulations Toward Utilization of MCLS in Ukraine	<ul> <li><u>- Purpose</u>: To provide recommendations on regulations for MCLS.</li> <li><u>- Component #1</u>; for output 1.4</li> <li><u>Relevance</u>:</li> <li>Designed Draft Technical Regulation and submitted to MENR (letter №2645, 30.06.15)</li> </ul>	Oct 2014	Kozachenko Tetyana Petrivna -USD 4 770		

21	Design of 1st edition of DBN "Artificial and Natural Lighting." Original in Ukrainian "пр ДБН В.2.5- 28:2016 Природне і штучне освітлення"	<ul> <li><u>Purpose</u>: To provide recommendations on lighting standards.</li> <li><u>Component #1</u>; for output 1.3</li> <li><u>Relevance</u>:</li> <li>1st edition of DBN "Artificial and natural lighting" designed and submitted to MRDCH for assessment and approval (letter from PromElektroKomplekt 06.12.16).</li> </ul>	Dec 2014	TOV KiyvPromElek troProekt - UAH 115 000		
22	Design of 2nd edition of State Construction Regulations (DBN) "Artificial and Natural Lighting. Original in Ukrainian "пр ДБН В.2.5-28:2016 Природне і штучне освітлення" ( 136 pages) [http://dbn.at.ua/load/norm ativy/dbn/dbn_v_2_5_28_2 015/1-1-0-1188]	<ul> <li><u>Purpose</u>: To draft State Construction Regulations that incorporate requirements for the EE lighting/</li> <li><u>Component #1</u>; for output 1.3</li> <li><u>Relevance:</u></li> <li>Full text of the State Construction Regulations on subject matter is drafted</li> </ul>	Aug, 2015	TOV KiyvPromElek troProekt (UAH 135 000)	Sufficient	2nd edition of DBN "Artificial and Natural lighting" is designed and submitted to Ministry of Regional Development, Construction, Housing and communal services for assessment and approval (letter from PromElektroKomplekt dated 06.12.16)
23	Assessment of Quality of Household EE Lighting Sources. Original in Ukrainian "Порівняльне тестування побутових енергоефективних джерел освітлення" [https://drive.google.com/fil e/d/0B0ENyYqfz4jeam1MU0 pUZGxFelk/view?usp=sharin g]	<ul> <li>Purpose: purpose is not identified.</li> <li><u>Component #2</u>; for output 2.2</li> <li><u>Relevance:</u></li> <li>Bulbs of following brands: Iskra, Nasha Syla, Eco Energy, Global, Lexman, Maxus, Osram, Philips, Raflight, Visson, Eurolamp, SLS, Uniel, Electrum, Jazzway, ELM, Lummax, Extra, were tested against 21 parameters.</li> <li>The study provided with comparative characters for bulbs tested and some of them doesn't meet required standards</li> </ul>	Dec, 2014	Fundatsiya Rozvytku Eko. i Energ. Rynkiv (UAH 1 186 446)	Results of tests are presented in one Excel table, thus it's impossible to measure economic effect, in particular whether this testing	Results of testing may serve as guidelines for consumers on quality of the some lamps and luminaires presented on Ukrainian market. (results looks similar to the ones represented under Report#12, but more universal)

		The table (as the report of study shows that the testing was held by Center of Expertise TEST (Центр Экспертиз TECT (www.test.org.ua) in period March, 2014 – March, 2015			should cost equivalent of USD 78800	
24	Energy audit of the implemented pilot projects// original in Ukrainian «Проведення енергоаудиту пілотних проектів в рамках проекту ПРООН/ГЕФ «Трансформація ринку в напрямку енергоефективного освітлення» (63 pages) [https://drive.google.com/fil e/d/0B0ENyYqfz4jeRnloZzN CQTJ5WFU/view?usp=sharin g]	<ul> <li><u>Purpose</u>: The main purpose of work performed was to conduct an energy audit, in particular, to evaluate technical parameters of the pilot projects launched by UNDP/GEF Project, as well as determine the efficiency of pilot projects launched and identify feasibility of their further replication.</li> <li><u>Component #3</u>; for output 3.3</li> <li><u>Relevance:</u></li> <li>Practical recommendations developed have high relevance for further promotion of the approach proposed by the project. The study showed that lighting management systems create best opportunities in terms of electricity consumption decrease.</li> </ul>	Mar, 2015	NTUU KPI (UAH 71 002)	Sufficient	Five cities and two villages installed EE street lighting and gained advantages and economic effect as result of implementation pilot projects
25	Analysis of Ukrainian lighting market 2014	Purpose - 1. For implementation of output 4.3 2. The study showed the development of EEL market in Ukraine in 2014 // Component#4	Nov 2014	RBK- UKRAINE,TOV -UAH 1500		
26	Analysis of Ukrainian lighting market 2015	Purpose - 1. For implementation of output 4.3 2. The study showed the development of EEL market in Ukraine in 2015 // Component#4	Sep 2015	TOV "Ukraiinskyi Biznes tehnologii" - UAH 2300		

27	Research on the market for	- Purpose: To collect information and undertake an analysis and	Nov,	Smerichevska	Sufficient	The results were used to
	energy- efficient lighting for	evaluation of the dynamics of the market the EE lighting for	2016	Svitlana		calculate indirect CO2
	domestic purposes in	household (CFLs and LED lamps) in Ukraine for 2013-2015 and		Vasylivna,		reductions caused by awareness
	Ukraine in years 2014-2016.	the first half of 2016 compared to 2013. This research is also		FOP		rising activities.
	Original in Ukrainian	supposed to make an analysis of the dynamics of public				
	"Дослідження ринку	awareness about the benefits of EE lighting, but also evaluation				
	енергоефективного	of the efficiency of the All-Ukrainian public awareness		<i></i>		
	освітлення побутового	campaigns held by the project in years 2014-2016. The main		(UAH		The conclusion made on
	призначення в Україні за	research methods were: a) collection of information and Desk		121 800)		efficiency of awareness
	2014 — і півріччя 2016	review of secondary information on the current state and		121 800)		campaigns held require
	років"	dynamics of EE lighting market in Ukraine, as well as b) analysis,				additional sources of verification
		evaluation and interpretation of information from secondary				
	(121 pages)	sources on current state and development of EE lighting market				
	[http://lampochki.org.ua/wp	in Ukraine.				
	- content/uploads/2015/11/2	- <u>Component #4;</u> for output 4.3				
	016-Report-on-EEL-	- <u>Relevance</u> :				
	market.pdf]					
		Evaluation of nationwide information campaign held in				
		framework of the project and analysis of the market of energy-				
		efficient household lighting held in Ukraine in course of 2014 -				
		2016 showed the following results:				
		(i) Number of effective contacts during All-Ukrainian educational				
		campaign in schools on energy-efficient lighting reached				
		8534298 persons (or 55,3%) of target audience of				
		schoolchildren, their parents and teachers;				
		(ii) 2nd stage of All-Ukrainian information campaign on energy-				
		efficiency held in year 2015 was focused on adults aged 17+				
		years. This campaign reached 17955663 persons representing				
		56.6% of target audience;				
		(iii) 3-rd stage of the campaign was conducted on promotion				
		LED lamps in the nationwide retail network "Epicenter K";				
		(iv) All together these three stages of information campaign				

	resulted in the level of awareness on EE lighting of 74,8% of the			
	population of Ukraine aged 17/18 + and 55.3% of population			
	aged 6-17/ 18;			
	(v) In case if market prices on CFL and LED are declined, the			
	commodity market for EE lighting technologies will demonstrate			
	growth and increase of the sales in volume;			
	(vi) The share among major players on Ukrainian EE lighting			
	market as of 2016 are listed as following: MAXUS with a market			
	share of 18,0%, EUROLAMP - 16,4%, ELECTRUM - 14,3%, OSRAM			
	- 12,3%, FERON - 10,5%, PHILIPS - 10.1%, SVETKOMPLEKT - 9.0%,			
	ESTARES - 3.3%;			
	(VII) Low quality products are available on the market; (VIII) Since			
	year 2013 to 2016 a significant reduction in prices for domestic			
	LED lamps is observed. Prices declined in 2016 compared to			
	2013 from USD 43.8 to USD 5.8 per unit in segment of high			
	prices, from USD 22.5 to USD 2.3 in segment of medium prices			
	and from USD14.4 to USD1.3 in segment of low prices. This fact			
	stands significant incentive to increase demand for LED lamps as			
	the most energy-efficient ones;			
	(viii) In 2014 there was a decline in demand for EE lamps			
	compared to year 2013 by 16.6% due to a sharp increase in			
	inflation. At the same time, in 2015 the sales of EE lamps have			
	increased by 53.5% compared to year 2014. In 2016, the volume			
	of domestic sales of CFL and LED lamps will increase by 11.4%			
	compared to the year 2015, and by 42.6% compared to year			
	2013 and by 53.3% compared to the year 2012;			
	(ix) In actual sales plus forecast for year 2016 a share of EE			
	lamps for household is 72.6% (that demonstrates increase on			
	20.5% comparing to year 2013 and 22.5% to 2012), while the			
	incandescent lamps had share of 27.4% (20.5% less than in 2013			
	and 22.5% than in 2012); (xi) Demand for LED lamps increased			
	sharply, thus the market share of these lamps in kind increased			
	· · · · · · · · · · · · · · · · · · ·			

	in 2014 and 2015 compared to previous years by 1.9% and			
	27.2% respectively. At the same time, in comparison with year			
	2013 the share of sales for this lamps increased in 2015 on			
	29.1%, and forecast for year 2016 is 38.9%;			
	(x) Compared to year 2013 the sales of household EE lamps			
	increased in-kind in 2015 and 2016 respectively on 28% and			
	42.6%. The demand for these lamps grew by 53.3% in 2016			
	compared to the year 2012.			
	Overall conclusion is made that: the demand on consumer and			
	commodity market of EE household lighting in Ukraine was			
	stimulated due to:			
	LINDR and GEE information compaigns on EE lighting:			
	- ONDP and GEF information campaigns on EE lighting,			
	- decrease in retail prices for household EE lamps.			
	- increased inflation,			
	<ul> <li>reducing the solvency of the population,</li> </ul>			
	- raising tariffs to pay for electricity consumption,			
	- high level of competition in the market of household FF lamos			
	ingritevel of competition in the market of household LE lamps.			

## Annex H: Summary of Lessons Learned from the Regional Technical Advisor

## TWO MAIN LESSONS LEARNED

(1) Lessons Learned #1 - In order not to received the best strategic guidance and remain on track the project should have hired a strong technically qualified international CTA with regular visits to Ukraine (once per month) from the outset back in 2011 or 2012. What happened was that no international CTA was hired until one year after the 2014 mid term review, in early 2015, for the last two years of the project. The project did hire a strong technically qualified international CTA but it was too little and too late with only infrequent visits to Ukraine for a few days at a time and very little time to go. As a result activities that should have happened at the start of the project (e.g - inter lab testing) happened right at the end of the project and adaptive management happened only very late in this project. The lesson learned here is clear. All UNDP GEF projects need strong technically qualified international CTA on board from the start with regular visits.

(2) Lesson Learned # 2 - the project team on this project was clearly too large as identified by the midterm review (but not fixed) and clearly having multiple component leaders or full time staff who prepare ToRs and supervise works without actually implementing the works or performing technical analysis themselves is not what the project document had envisaged and it leads to a very high overall project management cost which was also unforeseen. The lesson learned here is that the full-time project team needs to be smaller and more compact (say maximum 4 to 5 full time staff including the project manager) and rely more on experts and short term consultants such as an international CTA, to help the project and all project team needs to be selected by and report to the project manager. Having staff on the project who do not report to the Project Manager and staff who report to another person on the project who is not the Project Manager is not a good approach and should be avoided in future at all costs.