United Nations Development Programme

Government of the Russian Federation

Terminal Evaluation of UNDP/GEF Project: TRAnsforming the Market for Efficient Lighting (TRAMEL)

(GEF Project ID: 3658; UNDP PIMS ID: 4160)

Terminal Evaluation Report

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SYNOPSIS

Title of UNDP supported GEF financed project: Russia: Transforming the Market for Efficient Lighting

UNDP Project ID: PIMS 4160

GEF Project ID: 3658

Evaluation time frame: April 8, 2010 to March 17, 2017

CEO endorsement date: April 7, 2010

Project implementation start date: April 8, 2010

Project end date: April 30, 2017

Date of evaluation report: May 28, 2017

Region and Countries included in the project: Russian Federation

GEF Focal Area Objective: SP-1 (for GEF-4): Promoting energy efficiency in residential and commercial buildings

Implementing partner and other strategic partners: Ministry of Energy (MoE)

Evaluation team members: Mr Roland Wong, International Consultant
Mr. Alexei Zakharov, National Consultant

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EXECUTIVE SUMMARY

This report summarizes the findings of the Terminal Evaluation Mission conducted during the March 2-17, 2017 period for the UNDP-GEF Project entitled: "*Russia: Transforming the Market for Efficient Lighting*" (hereby referred to as the TRAMEL Project or the Project) that received a US$ 7.02 million grant from the Global Environmental Facility (GEF) in April 2010.

Project Summary Table

Project Title:	*Russia: Transforming the Market for Efficient Lighting* (TRAMEL Project)			
GEF Project ID:	3658		*at endorsement (Million US$)*	*at completion (Million US$)*
UNDP Project ID:	4044	GEF financing:	7.020	7.020
Country:	Russian Federation	IA/EA own:	0	0
Region:	Europe and the CIS	Government:	40.900	76.020
Focal Area:	Climate Change	Other:	24.830	23.044
FA Objectives, (OP/SP):	SP1 for GEF 4: Promoting energy efficiency in residential and commercial buildings	Total co-financing:	65.730	99.064
Executing Agency:	Ministry of Energy (MoE)	Total Project Cost:	72.750	106.084
Other Partners involved:		ProDoc Signature (date project began):		10 April 2010
		(Operational) Closing Date:	Proposed: 10 April 2015	Actual: 30 April 2017

Project Description

The TRAMEL Project was prepared in 2009 amidst an ongoing global movement towards energy efficient lighting. At this time, the Russian Federation remained largely outside this movement notwithstanding that more than 14% of the country's electricity consumption was attributed to lighting, in the order of 137.5 TWh in 2009. This finding was supported by baseline lighting surveys of Russia in 2009 that indicated the predominant use of inefficient lighting standards throughout the country. With rapid technological advances towards energy efficient lighting technology, market transformation of the Russian Federation energy efficient lighting market represented a unique opportunity to realize a significantly large potential for energy savings and GHG emission reductions. To facilitate transformation of the energy efficient lighting (EEL) market in the Russian Federation, the TRAMEL Project was formulated to remove the following barriers:

- the lack of a supportive policy and regulatory framework to establish standards and labelling scheme and minimum energy performance standards (MEPS);
- lack of capacity amongst local lighting manufacturers to increase their supply of high-quality EEL products;
- low level of awareness amongst consumers of EEL products and their benefits; and
- the lack of visible EEL demonstrations along with credible information on the energy saved.

Project Results

Table A provides a summary of actual outcomes achieved on TRAMEL Project in comparison with intended outcomes.

Table A: Comparison of Intended Project Outcomes from the Inception Report to Actual Outcomes

Intended Outcomes in April 2010 ProDoc	Actual Outcomes as of March 2017
Project Objective: To transform the Russian market towards efficient lighting technologies and the phase-out of inefficient lighting	**Actual achievement of Project Objective**: The Russian market for efficient lighting technologies has been transformed through the increased sales and usage of efficient lighting devices since 2011. The sales have increased due to the adoption of a number of Government decrees facilitating the phase-out of inefficient lighting devices in the Russian Federation, and to a smaller extent, the piloting of efficient street lighting in the Volga Federal District and indoor lighting in schools in the Moscow region and the Vladimir Oblast. As a result, the TRAMEL Project has exceeded its GHG emission reduction and energy savings targets by a factor of 2.5.
Outcome 1: Improved efficient lighting standards and policy framework.	**Actual Outcome 1**: Efficient lighting policy framework and standards for the Russian Federation have improved along with the setup of functional working groups of lighting experts to provide relevant policy advice to the Government, and improved test laboratory capacity.
Outcome 2: Supply chain for energy-efficient lighting is strengthened	**Actual Outcome 2**: The supply chain for LED lighting devices in the Russian Federation has been strengthened through increased confidence of local lighting manufacturers to produce locally manufactured LED lamps that are compliant with international standards, Russian Federation MEPS for public procurement and proposed MEPS for all market participants.
Outcome 3: Penetration of energy-efficient lighting increases in Moscow homes and buildings, and local EE lighting initiatives are replicated	**Actual Outcome 3**: Penetration of energy-efficient lighting has increased through large cities in the Russian Federation including Moscow, with local EE lighting initiatives in several regions throughout Russia having been replicated after 2015. Moreover, these pilots and replications have generated strong interest amongst municipal personnel, school districts and the general public in the continuation of increasing the use of LEDs for indoor lighting.
Outcome 4: Energy-Efficient street lighting is adopted in the Volga Federal District (capital Nizhny Novgorod) and local EEL initiatives are replicated elsewhere.	**Actual Outcome 4**: Energy efficient street lighting is adopted in several oblasts in the Volga Federal District, with replications of EE Street lighting implemented in several other oblasts in Russia.

Recommendations and Lessons

Action 1 (to UNDP): Project management teams for UNDP GEF projects should pay more attention to monitoring of project activities based on indicators and targets as set in the Project strategic results framework.

Action 2 (to Government of Russia): Adoption of MEPS for efficient lighting by the Ministry of Energy is the immediate priority to sustain current market transformation momentum of the efficient lighting market.

Action 3 (to Government of Russia): Transfer the results of the TRAMEL Project to the development of the regulatory framework within the Eurasian Customs Union. This would include the market surveillance system, a monitoring system for the lighting market in Russia, and the established Federal Energy Efficient Lighting Council (FEELC) in a technical advisory capacity whose knowledge and expertise would be useful in tweaking market surveillance and market monitoring in harmony with a new ECU regulatory regime.

Action 4 (to UNDP and Government of Russia): The Ministry of Energy team should continue its linkages with the other UN projects in other countries with similar targets to scale-up local LED production. With 6 lighting companies out of an estimated 600 lighting companies in Russia having benefitted from the Project and transformation into quality LED lighting products, challenges still remain in the upgrading of the remaining 594 lighting companies in their roles in becoming a part of the supply chain for EE lighting in Russia. Depending on the capacity of a particular lighting company, their transformation may involve a company being involved in only certain aspects of LED manufacturing, assembly or supply of certain parts. The experience of other countries in dealing with scaled-up domestic LED production using existing capacities would serve as useful knowledge to the Ministry of Energy and the Ministry of Industry and Trade (who will be overseeing ECU technical regulations when they are approved).

Best practice: Design of a market transformation project needs to include all elements required to facilitate the transformation on the basis of strong baseline information.

Best practice: Effective engagement with implementing partner. The conduct of UNDP interactions with MoE can be viewed as a best practice. The nature of TRAMEL Project assistance to the Ministry of Energy was frequent communication between the Project team and the NPD, and assisting them with tasks that reduced day-to-day work load of Ministry personnel.

Best practice: Effective and early engagement of key stakeholders on a market transformation project by providing a forum for creating an environment of common interests and compromise. This was demonstrated by the Project with the successful formation of the EELC to ensure steady engagement of all key stakeholders to dialogue on policies, regulations and standards that would be supportive of increasing the use of efficient lighting in the Russian Federation; proactive responses to suggestions by key stakeholders for sustainable capacity outcomes (such as the MoE advice for switching to LEDs); and providing strategically timed key inputs by international consultants that supports continual progress and sustained interest of all stakeholders involved in formulation of policies and work plans.

Evaluation Ratings[1]

1. Monitoring and Evaluation	*Rating*	2. IA & EA Execution	*Rating*
M&E design at entry	6	Quality of Implementation Agency - UNDP	6
M&E Plan Implementation	6	Quality of Execution - Executing Entity (MoE)	6
Overall quality of M&E	6	Overall quality of Implementation / Execution	6
3. Assessment of Outcomes	**Rating**	**4. Sustainability[2]**	**Rating**
Relevance[3]	2	Financial resources	4
Effectiveness	6	Socio-political	4
Efficiency	6	Institutional framework and governance	4
Overall Project Outcome Rating	6	Environmental	4
		Overall likelihood of sustainability	4

[1] Evaluation rating indices (except sustainability – see Footnote 2, and relevance – see Footnote 3): 6=*Highly Satisfactory (HS)*: The project has no shortcomings in the achievement of its objectives; 5=*Satisfactory (S)*: The project has minor shortcomings in the achievement of its objectives; 4=*Moderately Satisfactory (MS)*: The project has moderate shortcomings in the achievement of its objectives; 3=*Moderately Unsatisfactory (MU):* The project has significant shortcomings in the achievement of its objectives; 2=*Unsatisfactory (U)* The project has major shortcomings in the achievement of its objectives; 1=*Highly Unsatisfactory (HU):* The project has severe shortcomings in the achievement of its objectives.

[2] Sustainability Dimension Indices: *4 = Likely (L):* negligible risks to sustainability; *3 = Moderately Likely (ML):* moderate risks to sustainability; *2 = Moderately Unlikely (MU):* significant risks to sustainability; and *1 = Unlikely (U):* severe risks to sustainability. *Overall rating is equivalent to the lowest sustainability ranking score of the 4 dimensions.*

[3] Relevance is evaluated as follows: 2 = Relevant (R); 1 = Not relevant (NR)

ABBREVIATIONS

Acronym	Meaning
APR-PIR	Annual Project Report - Project Implementation Review
BAU	Business-as-usual
CDM	Clean Development Mechanism
CFL	Compact Fluorescent Lamp
CLASP	Collaborative Labeling and Appliance Standards Program
CO	UNDP Country Office
CO_2	Carbon Dioxide
CP	Country Programme
CPAP	Country Programme Action Plan
EBRD	European Bank of Reconstruction and Development
EC	Energy Conservation
ECU	Eurasian Customs Union
EE	Energy Efficiency
EEL	Energy Efficient Lighting
ENES	International Forums on Energy Saving and Energy Efficiency
EOP	End-of-Project
ER	Emission reduction
ESCO	Energy service company
FEELC	Federal Energy Efficient Lighting Council
FY	Fiscal Year
GDP	Gross Domestic Product
GE	General Electric
GEF	Global Environment Facility
GoR	Government of the Russian Federation
GHG	Greenhouse gas
GOST	Russian government standards
GWh	Gigawatt-hours
IEA	International Energy Agency
JI	Joint implementation (under CDM)
kWh	kilowatt hour
kt	kilotonne
LED	Light-Emitting Diode
MDG	Millenium Development Goals
MEPS	Minimum Energy Performance Standard
MoCH	Ministry of Construction and Housing
MoE	Ministry of Energy
MoIT	Ministry of Industry and Trade
MTE	Mid-Term Evaluation
MV&E	Monitoring, verification and enforcement
NRDC	Natural Resources Defense Council
NEELP	National Energy Efficient Lighting Platform
NEX	National Execution
NGO	Non-governmental organization
NIM	National Implementation Modality
NPC	National Project Coordinator
NPD	National Project Director
NPL	National Platform for Lighting

Acronym	Meaning
PIMS	UNDP/GEF Project Information Management System
PM	Project Manager
PMO	Project Management Office
PoA	Programme of Activities
PPG	Project Preparatory Grant (GEF)
ProDoc	UNDP Project Document
PSC	Project Steering Committee
PSO	Project Support Office (for UNDP Russia)
R&D	Research and Development
RCU UNDP	Regional Coordination Unit
RTA	Regional Technical Advisor
RUSEFF	EBRD's Russian Sustainable Energy Finance Facility
SanPiNs	Sanitary norms of the Russian Federation
SMART	Specific, Measurable, Attainable, Relevant and Time-bound
SNiP	Construction Norms and Regulations of the Russian Federation
SRF	Strategic Results Framework
SSCO	South-South Cooperation
tCO2	Tonne of Carbon Dioxide
TE	Terminal Evaluation
ToR	Terms of Reference
TPES	Total primary energy supply
TR-CU	Eurasian Customs Union standards
TRAMEL	TRAnsforming Market for Efficient Lighting Project
TWh	Terawatt-hours
UMO	Russian State Council of Higher Education Institutions
UN	United Nations
UNDAF	UN Development Assistance Framework
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCCC	UN Framework Convention on Climate Change
UNDP	UN Development Programme
UNEP	United Nations Environmental Programme
UNIDO	United Nations Industrial Development Organization
USD	United States dollar (= 58 Russian Rubles)
U4E	United for Efficiency
VNISI	Russian Lighting Research Institute

1. INTRODUCTION

1. This report summarizes the findings of the Terminal Evaluation Mission conducted during the March 1-17, 2017 period for the UNDP-supported GEF-financed Project entitled: "**Russia: TRAnsforming Markets for Efficient Lighting**" (hereby referred to as the TRAMEL Project or the Project), that received a USD 7.02 million grant from the Global Environmental Facility (GEF).

2. The Project goal was to reduce GHG emissions from energy consumption related to lighting in Russia, while the Project objective was to transform the Russian market towards efficient lighting technologies and the phase-out of inefficient lighting.

1.1 Purpose of the Evaluation

3. In accordance with UNDP and GEF M&E policies and procedures, all full and medium-sized UNDP support GEF financed projects are required to undergo a Terminal Evaluation (TE) upon completion of implementation of a project to *provide a comprehensive and systematic account of the performance of the completed project by evaluating its design, process of implementation and achievements vis-à-vis GEF project objectives and any agreed changes during project implementation.* As such, the TE for this Project serves to:

   - promote accountability and transparency, and to assess and disclose levels of Project accomplishments;
   - synthesize lessons that may help improve the selection, design and implementation of future GEF activities;
   - provide feedback on recurrent issues across the portfolio, attention needed, and on improvements regarding previously identified issues;
   - contribute to the GEF Evaluation Office databases for aggregation, analysis and reporting on effectiveness of GEF operations in achieving global environmental benefits and on the quality of monitoring and evaluation across the GEF system.

4. This TE was prepared to:

   - be undertaken independent of Project management to ensure independent quality assurance;
   - apply UNDP-GEF norms and standards for evaluations;
   - assess achievements of outputs and outcomes, likelihood of the sustainability of outcomes, and if the Project met the minimum M&E requirements;
   - report basic data of the evaluation and the Project, as well as provide lessons from the Project on broader applicability. This would include an outlook and guidance in charting future directions on sustaining current efforts by UNDP, the Government of the Russian Federation, and their donor partners to transforming markets towards efficient lighting.

1.2 Scope and Methodology

5. The scope of the TE for the TRAMEL Project was to include all activities funded by GEF and activities from parallel-financing. The Terms of Reference (ToRs) for the TE are contained in Appendix A. Key issues addressed on this TE include:

- Design of the TRAMEL Project and its effectiveness in achieving the stated aims of reducing GHG emissions from energy consumption related to lighting and remove barriers that prevent increases in the use of energy-efficient lighting devices and proper disposal of inefficient lighting devices;
- Assessment of key financial aspects of the Project, including the extent of co-financing planned and realized;
- The effectiveness of the TRAMEL project in the strengthening policy framework to encourage increased use of efficient lighting, and the supply chain for efficient lighting in the Russian Federation;
- Strengths and weaknesses of the TRAMEL implementation, monitoring and adaptive management and sustainability of Project outcomes including the Project exit strategy;
- Results and impacts of the implemented Project activities including views from TRAMEL Project focal points (and other relevant stakeholders) on the impacts of the TRAMEL Project activities implemented and their recommendations on the future activities on transformation of the market for efficient lighting; and
- Recommendations, lessons learned, best practices from implementing this Project that could be used on other similar GEF projects.

6. Outputs from this TE will provide an outlook and guidance in charting future directions on sustaining current efforts by UNDP, and the Government of the Russian Federation, to sustaining progress of full market transformation of the market towards efficient lighting devices.

7. The methodology adopted for this evaluation includes:

- Review of project documentation (i.e. APR/PIRs, meeting minutes of Project Steering Committee or multipartite meetings) and pertinent background information;
- Interviews with key project personnel including the current and former Project Managers, technical advisors (domestic and international), and Project developers;
- Interviews with relevant stakeholders including other government agencies, appliance manufacturers and appliance retail outlets; and
- Field visits to selected Project sites and interviews with beneficiaries.

A detailed itinerary of the Mission is shown in Appendix B. A full list of people interviewed and documents reviewed are given in Appendix C and Appendix D respectively. The Evaluation Mission for the UNDP-GEF project was comprised of one international expert, and one national expert.

8. The Project was evaluated for overall results in the context of:

- *Relevance* – the extent to which the outcome is suited to local and national development priorities and organizational policies, including changes over time;
- *Effectiveness* – the extent to which an objective was achieved or how likely it is to be achieved;
- *Efficiency* – the extent to which results were delivered with the least costly resources possible; and
- *Sustainability* - The likely ability of an intervention to continue to deliver benefits for an extended period of time after completion.

9. All possible efforts have been made to minimize the limitations of this independent evaluation. Notwithstanding that 10 days were spent in Moscow and the Vladimir Region by the evaluation team to collect and triangulate as much information as possible, follow-up interviews and Skype conversations by the evaluation team were also made after the Russian mission.

1.3 Structure of the Evaluation

10. This evaluation report is presented as follows:
    - An overview of Project activities from commencement of operations in April 2010 to the present activities of the TRAMEL Project;
    - An assessment of Project results based on Project objectives and outcomes through relevance, effectiveness and efficiency criteria;
    - Assessment of sustainability of Project outcomes;
    - Assessment of monitoring and evaluation systems;
    - Assessment of progress that affected Project outcomes and sustainability; and
    - Lessons learned and recommendations.

11. This evaluation report is designed to meet GEF's "Guidelines for GEF Agencies in Conducting Terminal Evaluations, Evaluation Document No. 3" of 2008: http://www.thegef.org/gef/sites/thegef.org/files/documents/Policies-TEguidelines7-31.pdf

12. The Evaluation also meets conditions set by:
    - the UNDP Document entitled "UNDP GEF – Terminal Evaluation Guideline": http://web.undp.org/evaluation/documents/guidance/GEF/UNDP-GEF-TE-Guide.pdf;
    - the UNDP Document entitled "Handbook on Planning, Monitoring and Evaluating for Development Results", 2009: http://www.undp.org/evaluation/handbook/documents/english/pme-handbook.pdf; and
    - the "Addendum June 2011 Evaluation": http://www.undp.org/evaluation/documents/HandBook/addendum/Evaluation-Addendum-June-2011.pdf

2. PROJECT DESCRIPTION AND DEVELOPMENT CONTEXT

2.1 Project Start and Duration

13. The TRAMEL Project officially commenced implementation on April 8, 2010, the date when the signature from the Government of the Russian Federation for the Project document (ProDoc) was obtained. The Project duration originally was planned for 5 years ending in April 2015. In January 2013, the Mid-Term Review recommended that an extension for the Project for another 2 years, 2 months ending in June 2017. Requests for the extension of the TRAMEL Project were approved on July 9, 2015 (to extend the Project to December 31, 2015) and on March 12, 2016 (to extend the Project again to its current terminal date of the TRAMEL Project is April 30, 2017).

2.2 Problems that TRAMEL Project Sought to Address

14. The TRAMEL Project Document (ProDoc) was prepared in 2009 providing details on the problems that the Project sought to address. In 2009 amidst an ongoing global movement towards energy efficient lighting, the Russian Federation largely remained outside this movement notwithstanding that more than 14% of the country's electricity consumption can be attributed to lighting, in the order of 137.5 TWh in 2009. Baseline lighting surveys of Russia in 2009 indicated the predominant use of inefficient lighting standards throughout the country. With rapid technological advances in lighting technology towards energy efficiency, market transformation of the Russian Federation energy efficient lighting market represented a unique opportunity to realize a significantly large potential for energy savings and GHG emission reductions.

15. To facilitate transformation of the energy efficient lighting (EEL) market in the Russian Federation, the TRAMEL Project was formulated to address the following problems:

- the lack of a supportive policy and regulatory framework to establish standards and labelling scheme and minimum energy performance standards (MEPS);
- lack of capacity amongst local lighting manufacturers to increase their supply of high-quality EEL products;
- low level of awareness amongst consumers of EEL products and their benefits; and
- the lack of visible EEL demonstrations along with credible information on the energy saved.

2.3 Goal and Objective of TRAMEL Project

16. The goal of the TRAMEL Project was to "reduce GHG emissions from energy consumption related to lighting in Russia", while its objective was to "transform the Russian market towards efficient lighting technologies and the phase-out of inefficient lighting". The TRAMEL Project strategic results framework (SRF) from April 2010 is contained in Appendix G.

2.4 Baseline Indicators Established

17. Objective-level baseline indicators of the TRAMEL Project includes:

- estimated quantity of energy saved (EOP target of 4 TWh per year including direct and indirect savings);

- estimated quantity of energy saved (which is actually an EOP target of 2.0 million tonnes of CO_2 reduced).

The baseline value for all these indicators at the start of the TRAMEL Project was zero (though the baseline value provided in the SRF was the actual electricity consumption for lighting in 2009 which was 137.5 GWh per year or 14% of the electricity consumption in the Russian Federation).

18. Outcome-level baseline indicators for the TRAMEL Project includes:

- Outcome 1: Improved efficient lighting standards and policy framework:
  - establishment of the Federal Energy Efficient Lighting Council (FEELC);
  - establishment of new policies imposing maximum consumption of energy for non-residential indoor lighting and regulations on maximum permissible mercury contents in CFLs by EOP (target: adopted policies and 2.5-4 Wh/m^2 per 100 lx)
  - establishment of a national EEL platform;
  - drafted testing procedures for EEL products (EOP target: final drafts for standards proposed submitted to national normalization body);
  - testing lab capacity improved (EOP target: plan of modernization of national metrology laboratories implemented);

- Outcome 2: Supply chain for energy-efficient lighting is strengthened:
  - National phasing out program for inefficient lighting planned and adopted;
  - Annual monitoring of market (EOP target: available national database with market data);
  - lighting specifiers have increased awareness of the benefits of EEL (EOP target: 2 or 3 additional institutions offers lighting oriented curricula for training);
  - lighting specifiers understand new standards (EOP target: available and fully operational toolboxes for lighting specifiers)
  - support to development of new EEL products and modernization of the national lighting industry (EOP target: one fully operational production line with LEDs or CFLs marketed);

- Outcome 3: Penetration of EELs increases in Moscow homes and buildings, and local EEL initiatives are replicated:
  - efficiency of current lighting stock in the health and education sector (EOP target: 40 lighting systems of schools/hospitals fully upgraded with energy savings of 4.6 GWh per year or GHG reductions of 230,000 CO_2 per year);
  - penetration of CFLs in the residential sector: (EOP target: 370,000 flats or 10% of total flats upgrades to incandescent bulbs to 2-20 W CFLs , with energy savings of 48.4 GW hours per year or GHG emission reductions of 24,200 tonnes CO_2 per year);
  - recycling rate of domestic CFLs (EOP target: CFL recycling rate at 70%);
  - number of communities in which similar projects are replicated (EOP target: 2 replications in Moscow, and 5 municipalities outside of Moscow);

- Outcome 4: Energy-efficient street lighting is adopted in Nizhny Novgorod region and local EEL initiatives are replicated elsewhere:
  - efficiency of installed street lighting (EOP target: 20,000 fixtures replaced with energy savings of 16 GWh per year or GHG emission reductions of 8,000 tonnes CO_2);

- number of municipalities that have installed EEL products or plan to install EEL products based on Nizhny Novgorod pilot (EOP target: 2 replications in Nizhny Novgorod Oblast, and 5 municipalities outside of Nizhny Novgorod Oblast).

Baseline values for all indicators at the start of the TRAMEL Project can be found in Appendix G.

2.5 Main Stakeholders

19. The main stakeholder of the TRAMEL Project is the Ministry of Energy (MoE). The MoE have also involved with the Ministry of Industry and Trade, Rosstandart (under MoIT), Moscow City Government, Government of the Moscow Region, Government of Vladimir Region, Regional Government of Nizhny Novgorod oblast, key representatives of the local lighting manufacturers association, and the private sector as key stakeholders of this Project. A complete listing of all stakeholders who have participated on the TRAMEL Project is provided in Section 3.2.2 (Paras 46-52).

2.6 Expected Results

20. To achieve the specific TRAMEL Project objective of "transforming the Russian market towards efficient lighting technologies and the phase-out of inefficient lighting", the TRAMEL Project was designed for the removal of barriers with the following expected **Project outcomes** (from the 2010 SRF):

- Outcome 1: Improved efficient lighting standards and policy framework;
- Outcome 2: Supply chain for energy-efficient lighting is strengthened;
- Outcome 3: Penetration of energy-efficient lighting increases in Moscow homes and buildings, and local EEL initiatives are replicated;
- Outcome 4: Energy efficient street lighting is adopted in Nizhny Novgorod region and local EEL initiatives are replicated elsewhere.

3. FINDINGS

3.1 Project Design and Formulation

21. Design of the TRAMEL Project was conducted during the period of 2008-2009 by the current TRAMEL Project manager who has been involved with the Project from its Inception Phase. The Project was designed with a number of governmental decrees and laws to increase energy efficiency (including lighting) in the Russian Federation:

- Decree № 889 on "Certain Measures for Improvement of Energy and Ecological Efficiency of the Russian Economy" was signed in May 2008 and named energy efficiency as one of the eight priorities for the future development in Russia;
- The Federal Law No. 261 of November 2009 on "Saving Energy and Increasing Energy Efficiency, and Amendments to Certain Legislative Acts of the Russian Federation" was adopted introducing a number of concrete measures, incentives and mechanisms to promote energy and ecological efficiency in all sectors of the economy. With respect to efficient lighting, this Law stated that from 1st January 2011:
  - Incandescent lamps 100W and greater are forbidden in Russia;
  - Procurement of incandescent lamps of any power is not permitted for state and municipal requirements; and
  - Banning of sales of 75W and greater by 1st January 2013, and 25W and greater by 1st January 2014.
- Building Code SNiP[4] 23-05-95 (Paragraph 7.21) with amendment "natural and artificial lighting" approved by the Resolution of Gosstroy (State Construction Committee) on May 29, 2003 where Para 44 stipulates that "for the purpose of general lighting of premises, the most efficient electric-discharge lamps with the minimum luminous flux of 55 lm/W shall be used" and that the "use of incandescent lamps for general-purpose lighting is allowed only to meet architectural highlighting requirements and in premises with explosion hazards".

22. To implement and enforce these legislative measures, the TRAMEL ProDoc identified a number of barriers including:

- regulatory and institutional barriers that includes:
  - the need to strengthen the SNiP 23-05-95 (7.5.1: lighting of public, residential and service buildings) which only sets the maximum level of energy consumption for lighting at 7 - 10 $W/m^2/100$ lx. There are, however, no other regulations that impose limits for the luminous efficacy of lighting systems;
  - the lack of requirements within SNiP and other laws to ensure compliance of lighting system energy consumption when the building is being commissioned;
  - absence of mandatory testing or certification for lighting systems to verify their energy performance and luminous qualities;
  - absence of institutional coordination for lighting activities that could serve to advise other institutions on the need for compliance to lighting standards;
- awareness barriers that includes:
  - low level of awareness of the environmental and economic benefits of energy efficient lighting (EEL) products amongst Russian consumers;

[4]Russian Federation "Construction Norms and Regulations"

  - low level of awareness of the advantages of EEL products in the industrial and commercial sectors;
- market barriers that include:
  - a predominance of low quality lighting products on the market that are difficult to distinguish from higher-quality CFLs;
  - high prices for quality EEL products that are not affordable to most consumers;
  - difficulties for foreign companies with high-quality EEL products to set up local production lines in part due to the high initial investments required.

23. The strategy of the TRAMEL Project to overcome barriers to widespread use of efficient lighting (at the time the ProDoc was prepared in 2009, the preferred technology was compact fluorescent lamps or CFLs) included assistance to:

- establish a national coordination body dedicated to strengthening the linkage between government and lighting stakeholders in the private sector as well as an adjoining National Platform for Lighting (NPL) that can serve as a knowledge centre for lighting expertise in Russia;
- revise SNiP to introduce maximum permissible requirements for specific energy consumption for lighting installations in buildings and street lighting, and other requirements consistent with the best international practices;
- setup programs for the safe disposal of CFLs and limit the transfer of mercury into the environment;
- drafting and adopting quality testing procedures for EEL products and the strengthening of testing laboratory capacities for EEL products;
- setup and implement a plan to phase-out inefficient lighting;
- conduct research and monitoring into the lighting market of Russia;
- develop tools and credible information for lighting specialists to comply with new regulations on EEL;
- support the development of new EEL products and the modernization of the national lighting industry;
- setup and implement EEL indoor lighting schemes in residential and public buildings in Moscow, both pilot and replication projects; and
- set up and implement EEL street lighting schemes in Nizhny Novgorod, both pilot and replication projects.

3.1.1 Analysis of Project Planning Matrix

24. The strategic results framework (SRF) for the TRAMEL Project provides 17 indicators (1 objective level and 16 outcome level) to guide implementation of the Project towards its objective of "reducing GHG emissions from energy consumption related to lighting in Russia". The wording of *most of the indicators and targets meets SMART criteria*[5]. Specific SRF comments includes:

- All outcomes and targets are specific in describing future conditions of a particular indicator at the mid-term and end of project (EOP) milestones of the Project;
- Overall design of the TRAMEL Project is satisfactory and logical as indicated in the SRF. With additional details of the baseline as well as the Project activities in the ProDoc, there is sufficient information to develop a *Theory of Change* for the TRAMEL Project;

[5]Specific, Measurable, Attainable, Relevant and Time-bound

- Although the SRF has been sufficient in detail to successfully guide implementation of the TRAMEL Project, the language used in the SRF could have been more economical to avoid any ambiguity of the description of the future condition, baseline and EOP targets. For example, the column of "indicator" should have been used to describe a unit for a particular output, such as "number of policies established for indoor residential lighting" with the baseline being "0" and the EOP target being "1", or for the objective of the Project, indicators could read "TWh/yr of energy saved" with an EOP target of "4".

25. In calculating the business-as-usual (BAU) GHG emission scenario, the ProDoc provides the 2009 scenario of the lighting market including an estimate of the energy demand for lighting in Russia at 137.5 TWh/yr that could be reduced by 57 TWh/yr through the conversion of incandescent light bulbs to CFLs. In a BAU scenario, only 5% of this 57 TWh/yr potential would be realized.

26. The GHG emission targets for the Project were calculated on the basis of energy saved through the plans for implementing pilot projects for indoor lighting (Outcome 3) and for street lighting (Outcome 4) and the indirect energy savings resulting from Project influence over policy and regulatory changes supportive of increased utility of efficient lighting (Outcome 1). Indirect energy savings from this market transformation are summarized in the ProDoc on Table 12 (pg 77) consisting of estimates of the numbers of inefficient lights within various sectors (including street lighting, commercial, schools, hospitals and public buildings, residential, agriculture and rural communities), and estimates of efficient lighting replacements of each of the sectors including CFLs and T8s for indoor applications, and sodium high pressure and metal halide lamps for outdoor applications. A causality factor (as prescribed through GEF GHG calculation methodologies) was not apply to this calculation; however, the ProDoc explains that the indirect energy savings and GHG emission reductions estimated would only result in the capture less than 5% of the Russian potential for energy savings (which would result in a causality factor of less than 0.1).

3.1.2 Risks and Assumptions

27. The primary risks identified in the ProDoc includes:

- Weak government support that may lead to ineffective implementation of policies and regulations;
- Low participation levels of the private sector to invest in EEL production lines;
- Low level of involvement of regional authorities that may delay implementation of pilot projects;
- Promotional campaigns for EEL products do not generate the desired impact with targeted audiences.

Given the outcomes of the TRAMEL Project, this listing of risks appears complete. There are no other risks that would have resulted in delays on the Project or impeded its progress to achieve the desired outcomes and outputs of this Project.

3.1.3 Lessons from Other Relevant Projects Incorporated into TRAMEL Project Design

28. The ProDoc of the TRAMEL Project does not list any other relevant projects into its design.

3.1.4 Planned Stakeholder Participation

29. To catalyse market transformation for efficient lighting in the Russian Federation, the TRAMEL Project had planned to engage a wide variety of stakeholders to participate. This was summarized in Annex 4 of the ProDoc in the Stakeholder Involvement Plan which provides a thorough analysis of public, private, academia and NGO stakeholders. The ProDoc contains a lengthy list of all potential stakeholders on the TRAMEL Project. However, the keys to effective participation of these stakeholders was built into the design of the TRAMEL Project by specifying:

- the establishment of a Federal Energy Efficient Lighting Council (FEELC) to serve as an interface between government and private sector lighting stakeholders, and to strengthen adaptive management of the Project; and
- the establishment of a national platform for efficient lighting to strengthen networking amongst academia and the private sector on issues related to energy efficient lighting. This would include energy efficiency centres in other countries through the GEF Global Umbrella Energy Efficiency Lighting Project (see Para 32). This was designed to accelerate transfers of information on best international practices on EEL into the Russian Federation.

3.1.5 Replication Approach

30. The Project design envisaged a primary replication approach by conducting well-managed pilot schemes for indoor and outdoor applications using Project resources. These pilots would provide lessons on successful implementation of energy efficient lighting installations including energy savings and reduced efforts for operation and maintenance of EE lighting systems. Through dissemination of this positive information, replication of these energy efficient lighting applications would be catalyzed within the Russian Federation.

3.1.6 UNDP Comparative Advantage

31. UNDPs comparative advantage to other donor agencies is its focus on policy-based and cross-sectoral developmental approaches that includes building local capacities through effective collaboration with a wide range of local stakeholders, and supporting pilot projects to serve as examples of best practices and technologies. This would include collaborations with both the public and private sectors as well as technical experts, civil society and grassroots level organizations. These approaches are strongly applicable on lighting energy efficiency projects such as the TRAMEL Project. Given UNDP's long track record on a wide variety of energy efficiency projects, UNDP is suited as an implementing agency for this Project.

3.1.7 Linkages between TRAMEL Project and Other Interventions within the Sector

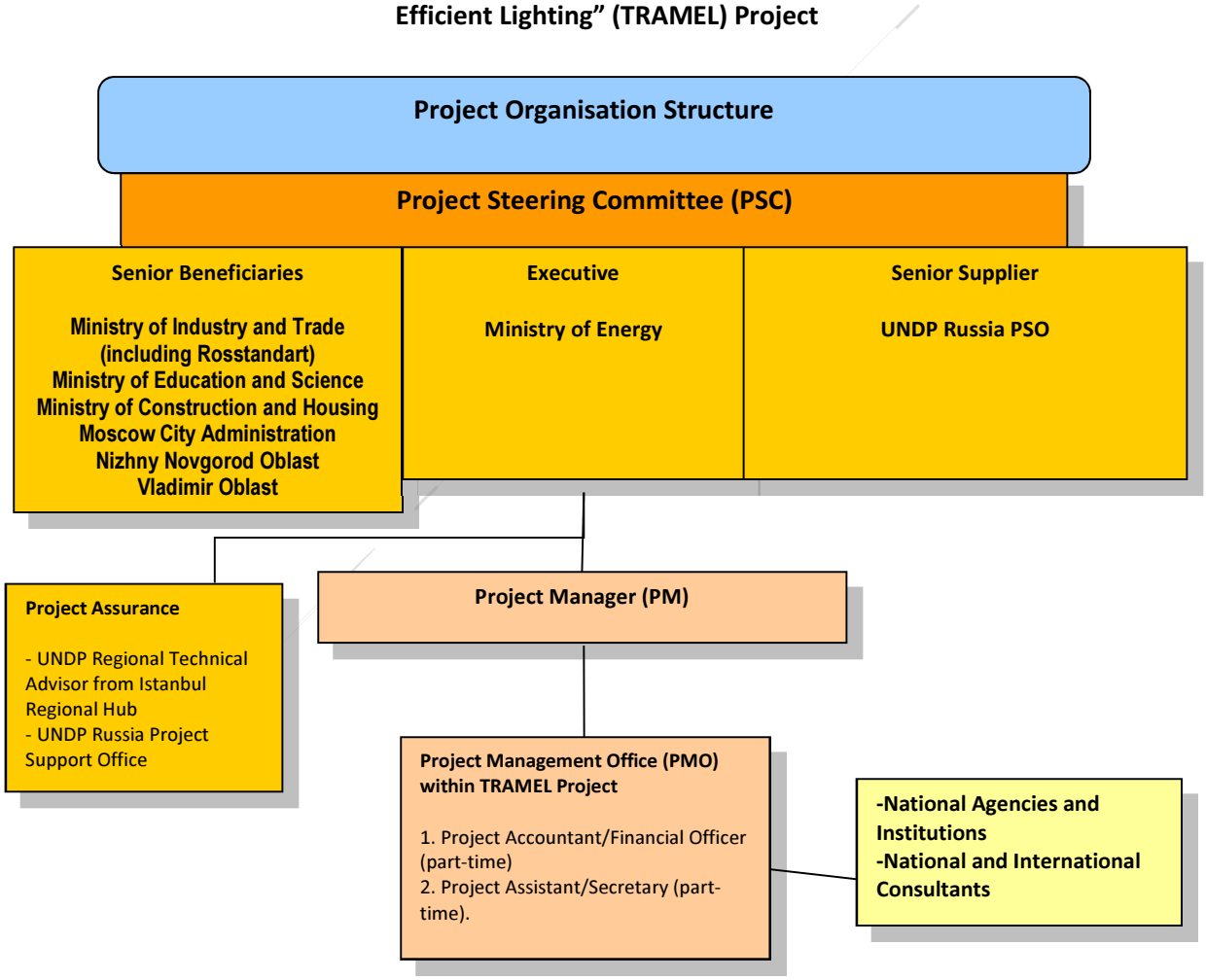
32. The ProDoc specifies close cooperation of the TRAMEL Project with the GEF/UNEP/UNDP-initiative "Global Market Transformation for Efficient Lighting" and GEF/UNDP/EBRD/UNIDO Umbrella program "Energy Efficiency in Russia". Synergies with these projects were to be developed and account for global strategies with energy efficient lighting that would be of benefit to national energy efficiency programs in the Russian Federation, as well as energy efficiency strategies of local governments in Moscow, Nizhny Novgorod Region, and other regions where replication projects may occur.

3.1.8 Management Arrangements

33. An organogram of the TRAMEL Project implementation arrangements is provided on Figure 1.

34. In the ProDoc, UNDP would provide Project implementation support to MoE by managing the budget and Project expenditures, contracting Project personnel, executing actions for procurement, and implementing the day-to-day management and monitoring of the Project operations. An added layer of Project disbursement approvals in working with the Government of Russia is the requirement for the Project to register with the Commission for International Technical Assistance and Humanitarian Cooperation (CITAHC), which makes all Project expenditures VAT exempt. According to the Ministry of Energy, any donor project needs to be registered with this commission first before implementation. More details of this arrangement from a financial perspective is provided in Para 57.

Figure 1: Current Management Arrangements for the UNDP-GEF Project "Transforming the Market for Efficient Lighting" (TRAMEL) Project



35. The implementing partner of the TRAMEL Project is the Ministry of Energy in accordance with UNDP's National Implementation Modality (now referred to as National Execution or NEX modality). NIM modality tasks MoE with responsibility for certifying work plans and approved budgets, reporting on procurement, coordinating and tracking co-financing, terms of reference for contractors and tender documentation, and chairing the Project Steering Committee (PSC). The Chair of the PSC was to be the National Project Director (NPD) from MoE.

3.2 Project Implementation

36. The following is a compilation of key events and issues of TRAMEL Project implementation in chronological order:

- The TRAMEL Project was approved by the GEF CEO on April 7, 2010;
- The TRAMEL ProDoc was signed by the Government on April 8, 2010 marking the official start of the TRAMEL Project;
- The Inception Workshop for the TRAMEL Project was conducted in late April 2010. This involved the first TRAMEL Project manager, and the nomination of members to the Project steering committee (PSC)[6];
- Between 2010 and 2012, TRAMEL Project resources were used to develop a textbook entitled "Energy Efficient Lighting" that contains a technical and scientific approach to energy efficient lighting design prepared by a number of academics from a number of well-respected technical institutes in the Russian Federation. In addition to adoption by a large majority of the technical institutes and universities in the country, this textbook would serve as a basis for regulations and standards for energy efficient lighting in the Russian Federation;
- Energy efficient lighting pilots were implemented during 2011 and 2012 in 3 municipalities in the Volga Federal District. The cost-benefit information generated from these pilots catalysed interest in energy efficient street lighting in other cities including Sochi;
- The TRAMEL midterm evaluation (MTE) was conducted in November 2012 with a report issued in January 2013 that observed satisfactory progress on most activities. However, the MTE also made recommendations on improving the progress towards the latter half of the Project including development of testing procedures for EE lighting in parallel with testing lab modernization, and preparation and dissemination of awareness raising information on EE lighting technical issues that targets both the private and public sectors;
- International inputs were provided to the Project in mid-2013 on best practices for implementing phase-out and promotion programs to support implementation of Federal Law No 261-FZ;
- Decision made by the PSC to shift EE lighting pilots to LEDs in February 2014. This shift was made in response to the continuing decline of CFL sales and increased availability of LED lamps globally;
- Substantial progress made on Moscow region EE lighting pilots in 2015 especially with the decision to switch the Project's lighting technology towards LEDs;
- A Project extension to December 31, 2015 was approved on July 9, 2015;
- Decree #898 was promulgated by the Government on July 1, 2016 specifying MEPS for EE lighting devices for public procurement;

[6]The PSC was made up of representatives of the Ministry of Energy, Ministry of Economic Development, Ministry of Regional Development, Ministry of Education and Science and other key ministries and agencies, the Moscow City and Volga Federal District Administrations, NGOs and energy efficiency centres, national and international producers of lighting technologies.

- Agreements completed for the installation of LEDs in the Vladimir, Ulyanovsk and Moscow Regions. These pilot projects were selected based on the basis of strong collaboration with the Regional Governments including agreements to provide co-financing. These pilots were completed in late-2016;
- A formal request to extend the project until April 30, 2017 was approved on March 12, 2016.

3.2.1 Adaptive Management

37. Adaptive management is discussed in GEF terminal evaluations to gauge the project Performance in its ability to adapt to changing regulatory and environmental conditions, common occurrences that afflict the majority of GEF projects. Without adaptive management, GEF investments would not be effective in achieving their intended outcomes, outputs and targets. Based on the positive outcomes of the TRAMEL Project, there are several examples of adaptive management of the TRAMEL Project towards achieving intended Project outcomes and objectives as described in the following paragraphs, information obtained from PSC meeting notes and interviews with relevant Project personnel and contractors.

38. During the TRAMEL Inception Workshop of October 14, 2010, number of adaptive management changes were adopted to implement the project including:

- the inclusion of LEDs as one of the key technologies for promotion given their rate of market penetration;
- expansion of the area for pilot street lighting from Nizhny Novgorod oblast to all communities under the entire Federal District of Volga as a means to overcome the difficulties of attracting co-financing and increasing the likelihood of finding municipalities willing to co-finance lighting pilot projects[7]; and
- the inclusion of carbon finance as a means to leverage co-financing for pilot projects for efficient lighting in residential buildings[8].

39. In light of the emergence of the Eurasian Customs Union and their mandate to harmonize standards and technical regulations on energy efficiency of energy consuming devices (including energy efficient lighting), the Project had to add to its ongoing activities on standards and technical regulations in Outcome 1, and closer collaboration with the Ministry of Industry and Trade (MoIT) and its subordinate organization, Rosstandart. This was necessary to synchronize Project efforts on amendments to technical regulations in line with the ECU[9]. This adaptive management strategy initiated in the November 2011 PSC meeting, was carried on throughout the duration of the Project.

40. A mid-term evaluation of the Project was completed in January 2013 with 2 key recommendations of the MTE report to: 1) modernize national testing laboratories and develop a plan for the gradual

[7] A key condition for Project participation is that beneficiary municipality provides a minimum of 70% of the cost of the pilot project.

[8] PSC proposed the use of carbon financing mechanisms in 2011 such as the use of JI (similar to CDM in developing countries or "Annex B" countries) to assist governments to achieve increased CFL sales in Moscow. Project resources were used to prepare carbon documents as an additional activity for the Project. Unfortunately for the Project, this effort was terminated after the collapse of global carbon prices in 2013.

[9] MoIT is the Ministry in charge of setting technical regulations (including EE regulations covering efficient lighting) at the level of the Eurasian Customs Union (ECU).

abandonment of inefficient lighting sources, and 2) implementing pilot projects in Moscow. UNDP adaptive management responses to the MTE were completed by Feb 2014. Their actions (that were responsive to the MTE recommendations) involved intensifying Project efforts to modernize the national testing laboratories (during 2015 and 2016), implementing a plan for the gradual phase-out of inefficient lighting sources, and stronger efforts to implement pilot projects in the Moscow region.

41. In 2014, the Project switched its lighting technology focus to LEDs on the basis of lighting market research by the Russian Energy Agency in 2013 under the Ministry of Energy (indicating a decline in the availability of quality CFL lighting on the Russian market)[10], the global trend of declining LED prices, and a potential loss of business opportunities to the Russian market in the domestic manufacture of LEDs. As such, the Project adaptively changed its activities to support a new state policy and program "Energy Efficiency and Energy Development" headed by the Ministry of Economy and the Ministry of Industry and Trade. Pilot activities to implement this policy and program would be developing LED applications for schools and industry. This decision was also bolstered by support from Project experts and representatives from lighting products manufacturers who prepared proposals for amendments in energy efficiency requirements for LED lighting products into Russian standards (GOST), and TR-CU for the Eurasian Customs Union.

42. In 2014, the Project placed stronger efforts to engage with the MoIT (responsible for implementing some of the actions listed in the “Government Plan of Actions to Phase-Out Incandescent Lamps in Russia and to Promote Demand for Energy Efficient Lighting Sources") on how the Project could assist in harmonizing EE lighting technical regulations with the ECU. Strategic assistance was to include introducing separate codes of the Customs Union for LED products, plans for a gradual phase-out of inefficient lighting devices, and developing tax and state program incentives to stimulate development of high efficiency lamp production lines.

43. In Feb 2014, Project engaged with the Svetotekhnika magazine, the most authoritative publication in the field of lighting in Russia, to augment initial market surveillance of efficient lighting products on the Russian market, a strategy not originally envisaged in the ProDoc. The magazine served as a platform for information support for implementing state policy on energy-efficient lighting; accessing public expertise and comments on draft normative policy documents, publishing resolutions and technical standards of the Government of the Russian Federation; and organizing public discussion. The journal targets a wide audience from scientists and representatives of manufacturers to government officials, leading to a stronger outcome of increased awareness of required lighting specifications and lighting MEPS of the government.

44. In conclusion, UNDP’s efforts to adaptively manage the TRAMEL Project were ***satisfactory*** in consideration of the successful outcomes of this Project.

3.2.2 Partnership Arrangements

45. Partnership arrangements by the TRAMEL Project included the following categorizations:
    - government stakeholders;
    - organizations representing lighting professionals and specialists;
    - academia and NGOs;

[10] The Russian Energy Agency forecast that by 2017-2018, the cost of LED lamps will be equal to the cost of CFL, thus allowing LEDs to leapfrog CFLs as full replacements for incandescent lamps.

- manufacturers of efficient lighting products in Russia; and
- other donor projects.

46. *Government stakeholders*: The relationship of the TRAMEL Project with the Federal Ministry of Energy was observed to be strong. In particular, MoE has mentioned how the TRAMEL Project has assisted in augmenting MoE efforts to transform the lighting market towards energy efficiency. With the support of the MoE, the Project has also forged strong dialogue with key stakeholders at the federal level, notably the Federal Ministry of Industry and Trade (MoIT), as mentioned in Para 41 who are responsible for implementing some of the actions under the Government's plan to phase-out incandescent light bulbs, amendment of technical regulations for EE lighting, setting standards for testing of EE lighting devices on the market (with Rosstandart under MoIT), and dialogue with the Eurasian Customs Union on harmonizing such technical regulations throughout member countries. Partnerships were also forged with the Ministry of Construction and Housing (MoCH) in amending SNiPs for the purposes of specifying more energy efficient lighting.

47. At the local Government level, the TRAMEL Project also forged strong relationships with various regional governments in Nizhny Novgorod, Vladimir, Ulyanovsk and Moscow Oblasts. The strong relationships were necessary to implement pilot projects for street lighting as well as indoor lighting for schools and other public buildings, and to obtain commitments from these governments to co-finance these EE lighting pilot projects. A number of mayors of some of the cities with pilot projects were also part of a global partnership "Energoeffectivny gorod" (translated as "Energy efficient city"), where the Project developed cooperation strategies with these partnership cities to ensure successful replication of pilot projects.

48. *Organizations representing lighting professionals and specialists:* The Project organized working groups to amend policies and standards in the regulation of transforming energy efficient lighting markets in the Russian Federation. In addition to key government personnel involved with energy efficiency, the Project engaged the Russian Lighting Research Institute (VNISI)[11] to prepare and review EE lighting policies and regulations that resulted in the drafting of Government decrees and standards. VNISI has a 60-year history in developing high-performance lighting fixtures, notably for the military and space programs.

49. *Academia and NGOs*: The Project engaged with the Association "Russian Quality" (established by business associations and consumer protection NGOs) which used funding for testing of lighting devices (MoIT financing allocated for this NGO for compliance testing was USD 3 million in 2015). The Project engaged with the NGO "Association of Enterprises Dealing with Waste Collection and Disposal" with the aim of establishing incandescent and CFL recycling programs in Moscow, and limiting the amount of mercury introduced into the open environment in landfills. In addition, they also formed partnerships with Nizhny Novgorod State Technical University, the Moscow Power Engineering Institute, and the All-Russian research Institute of optical and physical measurements to contribute to textbooks and other information booklets under the TRAMEL Project.

50. *Manufacturers of efficient lighting products in Russia:* In addition to cooperation with some of the largest light manufacturers in Russia (including OSRAM, PHILIPS, GE, Optogan, Svetlana Optoelectronics), the Project placed more emphasis on cooperation with companies based in Russia

[11] www.vnisi.ru

interested in strengthening their production lines for LED devices. This was accomplished through agreements to cooperate with the "*Association of Suppliers and Manufacturers of Lighting Products "ChestnayaPozitsia (Honest Position)"* [12], the Non-Commercial Partnership of LED Producers, and the Russian Light Association "Russkiy Svet". These organizations represent the interests of the Russian and international lighting industry, where the Project has cooperated with them to promote their gradual transition to production of innovative lighting products including LEDs.

51. *Other donor projects:* The project established a strong relationship with the UNEP/GEF "en.lighten initative" (http://www.enlighten-initiative.org/) and its partners, OSRAM and Philips, to develop global standards in energy efficient lighting and to disseminate best global practices and information between countries on development of MEPS, development of appropriate energy efficient labelling, collection and disposal of inefficient lamps, and the monitoring, verification and enforcement of standards. With the main objective of the Project to eliminate incandescent lamps by 2016, the UNEP/GEF Project provided assistance to the TRAMEL Project to assess the capacity of Russian testing centres for electric lamps. This was done through using the Beijing Energy Efficient Lighting Center as a reference laboratory to assess the extent of capacity building for a network of Russian testing centres for EE lighting. The Project also continued its partnership with the UNEP/GEF Project to finalize guidelines for a program in lighting market quality control, and strengthening template agreements between municipalities and the Project on obligations of both parties for pilot projects.

52. The Project also engaged EBRD to strengthen its activities on carbon financing to stimulate demand for energy efficient lighting in Moscow. The partnership with EBRD on its RUSEFF program (www.ruseff.com) involved agreements with the Ministry of Economy to improve energy efficiency in public and residential buildings, and private individuals through consumer loans through 3 selected Russian banks. EBRD had developed voluntary energy efficiency standards for certain types of equipment including energy efficient lights that was supported by the programs credit lines. Unfortunately, with falling global carbon prices after 2013, this partnership did not reach its full potential.

53. In conclusion, the TRAMEL Project efforts to form partnership arrangements were **highly satisfactory** in consideration of effective partnerships with appropriate stakeholders that contributed to the achievement of the Project objectives.

3.2.3 Feedback from M&E Activities Used for Adaptive Management

54. Feedback for M&E activities was provided primarily through *PIRs from 2010 to 2016* as well as minutes from the PSC meetings which provided feedback from invited stakeholders on Project activities and results, from meeting attendees on proposed corrective actions and strategies. In evaluating the quality or support of actions feedback provided by PIRs and the PSC meeting minutes, the evaluation team noted:

- The PIRs reported on progress of EE pilot projects for indoor lighting (Outcome 3 for pilots in Moscow and their replications), and street lighting (Outcome 4 for pilots in the Volga Federal District and their replications) that included estimates of annual energy savings and GHG emission reductions. Clarity is required in these PIRs on distinguishing pilot projects and replications as per the targets and indicators in the SRF. For example, the PIRs should have

[12] A union of manufacturers of incandescent lamps and of other classical types of lighting products

reported that indoor LED lights installed at the Dimitrovgrad schools in the Volga Federal District (in the Ulyanovsk region) were pilot projects in place of those specified for Moscow schools as per targets set in Outcome 3;

- All PSC meeting minutes contain a resolution requesting all PSC meeting participants to provide within 2 weeks any further feedback on topics discussed at the PSC meeting for the purposes of fine-tuning the work plans of that particular year;
- The PSC minutes discussed tactics in moving forward as quickly as possible with pilot projects, notably the Moscow pilots (after 2013) which were in need of sources of co-financing. Much effort was spent on developing carbon finance with the regional Government of Moscow, which unfortunately was discontinued in 2013 due to falling global carbon prices. After the MTE made recommendations stressing the importance of implementing the Moscow pilots, the Project moved forward with the Moscow pilots in 2014 with plans to install indoor LED lighting in the Khimki School District, northwest of Moscow;
- The PSC also invited representatives from the private sector on the supply of LEDs for various pilot projects[13] including the pilot project in Moscow aimed to encourage the use of domestic LED products in households using federal subsidies. This pilot project included a voucher scheme in 2015 that permitted applicants to receive high-quality LED household lamps (with E14 and E27 bases) at 30% of their cost in eligible retail outlets. The scheme was discontinued due to lack of interest[14].
- During the February 2014 PSC meeting, a representative of VNIIS (Institute of Certification) reported on its activities on the development of technical regulations. Their explanations on the two-stage process of developing these regulations informed PSC members of the need to provide sufficient time and effort for the coordination of expert inputs into the regulations, followed by public discussion. Such discussions provide valuable feedback into preparing work plans, thus increasing the likelihood of timely delivery of technical regulation outputs.

55. In conclusion, feedback from PIRs and PSC meeting minutes of the Project was **highly satisfactory** for informing TRAMEL Project staff and the PSO in adapting work plans and improving progress of the Project.

3.2.4 Project Finance

56. The TRAMEL Project had a GEF budget of USD 7.02 million that was disbursed over a 7-year duration. Expenditure profiles of the TRAMEL Project as shown in Table 1 indicate that:

- only 21% of the budget was spent by the end of 2012, 2.5 years into a scheduled 5-year project, and at the time when the MTE was conducted;
- Project expenditures increased after 2013 peaking in 2015 and 2016 with implementation of the indoor pilot lighting projects in Moscow (in 2015), and the procurement of lab testing equipment for 6 Rosstandart laboratories (in 2016);
- there were only a few deviations of original ProDoc outcome expenditures including:

[13] From the company "Mosenergosbyt" Kuregyan S.P.

[14] This lack of interest stemmed from price parity of high-quality LED lamps with cheap no-name LED lamps (which had not yet been rejected by consumers for poor performance) and a low level of awareness of the significant impact of price on LED product quality and performance characteristics. The Project responded by discontinuing these efforts until the consumer (and the community of producers) are fully equipped with reliable information from testing labs on performance of LED of different price brackets. The year of 2015 was the first when such efforts were made by the Project. The testing of hundreds of products and publicizing test results in trusted industry publications (such as Svetotekhnika magazine) continued in 2016.

- A 26% increase on expenditures for Outcome 1 (improved lighting standards and policy frameworks); and
- A 13% decrease on expenditures for Outcome 4 (street lighting pilots for Volga Federal District).

57. Project expenditures through the NEX modality were screened through an Inter-Governmental Commission as well as the MoE. In particular, this applied to justification of expenditures to pilot projects to be implemented by regional governments. Plans for the disbursement as well as the disbursement were scrutinized by this Commission. The TRAMEL Project was registered under the Government of Russia's Commission of International Technical Assistance and Humanitarian Cooperation (which makes the Project VAT exempt). While this provides another layer of bureaucratic delays to implementing the Project, this process does ensure that Project funds were to be utilized as intended.

58. Project co-financing was USD 99.064 million, 50% more than the ProDoc estimate of USD 65.73 million. One of the reasons for exceeding the co-financing estimates was the inclusion of successfully implemented ESCO contracts for street lighting in the Vladimir region, totalling USD 9.66 million. Co-financing details can be found on Table 2.

59. Overall, the cost effectiveness of the TRAMEL Project has been **highly satisfactory** in consideration of the achievement of the energy savings and GHG emission reduction targets, and delivery of almost all of the intended outputs and outcomes, including the replication of efficient lighting pilots for indoor and street lighting as further detailed in Sections 3.3.8 and 3.3.9.

3.2.5 M&E Design at Entry and Implementation

60. The M&E design (as covered in Paras 126 to 157 in the TRAMEL Project ProDoc) is thorough and follows standard M&E design seen in many UNDP GEF ProDocs. The design thoroughly covers all M&E activities including:

- the Project inception workshop and inception report;
- measurement of means of verification for project indicators, progress and performance;
- quarterly status reviews and reports;
- annual Project reviews and project implementation reports (APRs/PIRs);
- steering committee meeting minutes;
- technical reports and project publications;
- independent evaluations that includes the Midterm Evaluation as well as the Final Evaluation;
- terminal report and lessons learned report by the Project team;
- audit reports; and
- visits to field sites by UNDP staff.

As such, *the M&E design is rated as **highly satisfactory***.

Table 1: GEF Project Budget and Expenditures for Russia TRAMEL Project (in USD as of December 31, 2016)

TRAMEL Outcomes	Budget (from Inception Report)	2010[27]	2011	2012	2013	2014	2015	2016[28]	Total Disbursed	Total to be expended in 2017
OUTCOME 1: Improved efficient lighting standards and policy frameworks	1,435,000	31,305	116,690	95,179	142,738	208,947	713,652	231,722	1,540,234	273,600
OUTCOME 2: Supply chain for energy efficient lighting is strengthened	1,270,000	51,001	120,533	114,657	113,723	147,370	176,917	248,879	973,081	220,500
OUTCOME 3: Energy efficient lighting is increased in Moscow residential and public buildings	1,955,000	57,458	129,709	239,546	129,645	140,367	453,959	618,912	1,769,596	128,298
OUTCOME 4: Energy efficient street lighting is adopted in Nizhny Novgorod region	1,805,000	69,164	106,704	164,000	226,468	88,755	33,091	762,955	1,451,137	125,000
Project Management	555,000	28,949	82,997	74,307	75,970	86,034	67,593	69,680	485,530	52,000
Total (Actual)	7,020,000	237,878	556,634	687,689	688,544	671,473	1,445,211	1,932,149	6,219,578	799,398
Total (Cumulative Actual)	7,020,000	237,878	794,512	1,482,201	2,170,745	2,842,218	4,287,429	6,219,578		
Annual Planned Disbursement (from ProDoc)[29]		1,095,000	2,038,000	1,892,000	1,262,000	733,000	0	0		
% Expended of Planned Disbursement		**22%**	**27%**	**36%**	**55%**	**92%**				

[27] Commencing April 8, 2010 - the Project Document signed by the Government of Russian Federation on April 8, 2010
[28] Up to December 31, 2016
[29] Up to terminal date of TRAMEL Project of April 30, 2017

Table 2: Co-Financing for Russia TRAMEL Project (as of December 31, 2016)

Co-financing (type/source)	UNDP own financing (million USD)		Government (million USD)		Partner Agency (million USD)		Private Sector (million USD)		Total (million USD)	
	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual	Planned	Actual
Grants [30]										
Loans/Concessions										
• In-kind support			44.750	66.360[31]		0.084[32]	20.980	22.960[33]	65.730	89.404
• Other				9.660[34]					0.000	9.660
Totals	**0.000**	**0.000**	**44.750**	**76.020**	**0.000**	**0.084**	**20.980**	**22.960**	**65.730**	**99.064**

[30] Includes all cash contributions

[31] Includes Shumerlya Administration (Chuvash Republic, Volga Federal District) – US$ 370,000, Sarov Administration (Nizhny Novgorod Region, Volga Federal District) - US$330,000, Moscow Region Government (Central Federal District) – US$310,000, Moscow City Government – US$7,206,000, Ministry of Energy of the Russian Federation – US$57,850,000, Republic of Bashkortostan Test Laboratory under Rosstandart – US$90,000, Krasnoyarsk Test Laboratory under Rosstandart – US$90,000, Rostest-Moscow Test Laboratory under Rosstandart – US$60,000, Test St.-Petersburg Laboratory under Rosstandart – US$25,000, Nizhny Novgorod Test Laboratory under Rosstandart – US$20,000, and Samara Test Laboratory under Rosstandart – US$9,000

[32] Includes Non-Commercial Organization "Dom Sveta" – US$25,000, LLC Philips/LLC Nissan/LLC Cool Connections/Moscow City Government – US$39,000 Professional Magazine "Svetotekhnika"- US$20,000

[33] Includes LLC "OSRAM" – US$19,950,000, LLC "Messe Frankfurt RUS" – US$160,000, Public Corporation "Vystavochny Pavilion Elektrifikatsia" – US$2,800,000, LLC "Lighting Business Consulting" – US$30,000, and Association of Suppliers and Manufacturers of Lighting Products - US$20,000

[34] Includes Ulianovsk Region (Volga Federal District) through ESCOs – US$1,410,000, and Vladimir Region (Central Federal District) through ESCOs – US$8,250,000

61. The M&E plan was generally well executed. The evaluation team had access to all reports listed in para 60. These reports provide a reasonable picture of project progress as well as the issues being dealt with during implementation. Given the outcomes of the Project and the delivery of most of the outputs, *M&E plan implementation is rated as* ***highly satisfactory***. Ratings according to the GEF Monitoring and Evaluation system[35] are as follows:

- *M&E design at entry - 6;*
- *M&E plan implementation - 6;*
- *Overall quality of M&E - 6.*

3.2.6 Performance of Implementing and Executing Entities

62. The performance of the implementing partner (formerly known as an Executing Agency) of the TRAMEL Project, Ministry of Energy (MoE), can be characterized as follows:

- Strong leadership on approaches to regulatory developments, most importantly identifying the need for government to set mandatory minimum energy performance standards (MEPS) required to transform the efficient lighting market and encourage Russian-based lighting companies to manufacture and supply more efficient lighting devices for the Russian market;
- Strong leadership in 2014 of the need for the Project to shift to LEDs as the preferred lighting technology given the advantages of the reduction of global LED prices being competitive with CFLs and with longer service life;
- Support for Project working groups to develop new public policy measures to improve energy efficiency of lighting devices and the capacities of testing laboratories for testing LED lamps as well as opening dialogue with the Eurasian Customs Union to harmonize EE technical regulations of lighting devices amongst all member states;
- Support to diversify membership of the PSC in the form of the Energy Efficient Lighting Council (EELC) in Outcome 1 bringing in other government ministries such as MoIT and Rosstandart and MoCH (on amending building codes to support EE lighting), and stakeholders representing lighting manufacturers and suppliers;
- Effective dissemination of the results of early market surveillance activities in 2014 of LEDs which resulted in improved quality of locally supplied LEDs;
- Overall performance of MoE is assessed as **highly satisfactory**.

[35] 6 = HS or Highly Satisfactory: There were no shortcomings;
5 = S or Satisfactory: There were minor shortcomings;
4 = MS or Moderately Satisfactory: There were moderate shortcomings;
3 = MU or Moderately Unsatisfactory: There were significant shortcomings;
2 = U or Unsatisfactory: There were major shortcomings;
1 = HU or Highly Unsatisfactory
U/A = Unable to assess
N/A = Not applicable.

63. The performance of UNDP (the Implementing Agency) can be characterized as follows:
    - Early struggles by UNDP to identify pilot projects that had adequate co-financing, and could trigger interest in efficient lighting for public buildings and other municipal assets[36]. UNDP provided support to the Project during its early stages in the identification of 3 municipalities with pilot lighting projects in the Volga Federal District. This was a difficult task during the 2010-2013 period when there were shortages of public financing. UNDP attempted to mitigate these circumstances through developing carbon financing options as a means of leveraging co-financing;
    - Through adaptive management, guidance from UNDP regional and the PSO, and clear direction from MoE in 2014 on LEDs as a technology choice for efficient lighting, the Project made good progress after 2014 with pilot project implementation and with the development of technical regulations for efficient lighting;
    - With support from MoE, the Project had effective outreach to local lighting manufacturers and suppliers who were willing to undertake risks and change their energy efficient lighting production lines to LEDs;
    - In response to the 2013 MTE recommendations, UNDP provided support to the Project on implementing indoor lighting pilot projects in Moscow. These efforts resulted in the development of EE lighting pilot projects in the Moscow Region and pilot projects in the Vladimir Region and in the Ulyanovsk region ;
    - Through UNDP, the Project managed to establish effective cooperation with international organizations and other lighting projects in other CIS countries, in which it serves as a resource of expertise. This evolution of the Project is a desired outcome for the Government of Russia in improving its capacity to transfer knowledge, technology and experience to other countries;
    - Strong support for the execution of market surveillance activities that included outreach to prominent lighting journals in Russia publishing the results of the LED lighting devices tested. This resulted in the improvement of the quality of locally supplied LEDs from 2014 to 2016. The improved supply of quality LEDs has increased the confidence of ESCOs in Russia and the number of ESCO contracts with both public and private sector clients;
    - Overall performance of UNDP on the TRAMEL Project can be assessed as being **highly satisfactory**.

64. A summary of ratings of the implementing and executing entities of the TRAMEL Project are as follows:
    - *Implementing Partner (Ministry of Energy)* - 6;
    - *Implementing Entity (UNDP*) - 6;
    - *Overall quality of implementation/execution (UNDP/Ministry of Energy)* - 6.

[36] Initially, the Project expected Nizhny Novgorod region to co-finance the measures. In 2011, the region approved funding for 2012 and beyond for co-financing. However, 2012 saw first ESCO tenders in street lighting. As the number of ESCO contracts in the country grew, the region moved public funds to those expenditure items that would not be co-financed by ESCOs to permit ESCO-financing into more commercially viable projects, such as street lighting. The Project therefore had to become acquainted with the ESCO legal framework and reached out to ESCOs, consuming valuable time. Concurrently, school lighting retrofit projects were not yet being implemented as LEDs were banned at that time for use in schools while fluorescent technologies did not present commercially viable retrofit opportunities. Project funds were considered on doing "pilots" but in the end, these funds were rechanneled into efforts on: a) creation of the normative environment for penetration of high-quality LEDs into the educational institutions; and b) working more with ESCOs with LEDs in street lighting applications. These are good examples of adaptive management despite initial set-backs and disbursement delays.

65. A effectiveness and efficiency, country ownership, mainstreaming, sustainability, and impact of the TRAMEL Project. In addition, evaluation ratings for overall results, effectiveness, efficiency and sustainability are also provided against the revised April 2010 Project SRF (as provided in Appendix G)[37]. For Tables 6, and 8 to 14, the "status of target achieved" is color-coded according to the following color coding scheme:

Green: Completed, indicator shows successful achievements	Yellow: Indicator shows expected completion by the EOP	Red: Indicator shows poor achievement – unlikely to be completed by project closure

3.2.7 Overall Results

66. A summary of the achievements of TRAMEL at the Project Objective level with evaluation ratings are provided on Table 3.

67. Direct energy savings and GHG emission reductions were calculated from:
- indoor lighting pilots in schools in Moscow in the Khimki District as well as replication projects in schools in the Vladimir Oblast and the Volga Federal District (as detailed on Table 8); and
- street lighting pilots in 3 municipalities in the Volga Federal District as well as replication projects for street lighting in the Vladimir Oblast (as detailed on Table 10).

Table 3: Project-level achievements against TRAMEL Project targets

Intended Outcome	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating[38]
Project Objective: To transform the Russian market towards efficient lighting technologies and the phase-out of inefficient lighting	Estimated quantity of energy saved	Lighting electricity consumption: 137.5 GWh per year (14% of total national electricity consumption)	Approximately 2 Mtn CO_2 less per year	*Reduction of CO_2 emissions is 5.55 Mt/yr.*	See Paras 67-69	6
			4 TWh/yr (includes direct and indirect savings)	*Direct energy savings resulting from pilot projects on street lighting are 15.4 GWH/yr, and indoor school lighting are 0.7 GWH/yr Indirect savings from market transformation and phase-out of incandescent lamps are 10.1TWh/yr.*	See Paras 67-69	6
Overall Rating – Project-Level Targets						**6**

68. Direct energy savings and GHG emission reductions from pilot projects, however, are very small compared to the estimates of indirect energy savings and GHG emission reductions resulting from improved efficient lighting standards, policies and regulations, areas that received assistance from the TRAMEL Project[39]. Due to TRAMEL Project successes in setting up market monitoring

[37] Evaluation ratings are on a scale of 1 to 6 as defined in Footnote 35.
[38] Ibid 35.
[39] This would include Government Decree #602 "On approval of the Requirements to Lighting Devices and Electric Lamps Used in Alternating Current Circuit for Illumination" and Governmental Decree #898 which came into force on July 1, 2016 listing the requirements for procurement of higher efficiency lighting products for the public sector.

mechanisms for lighting sales, estimates for indirect energy savings and GHG emission reductions from new policies and regulations could be based on actual sales data for various efficient lamp types from these market surveys (see Outcome 2 for further details of the market monitoring mechanisms). Table 4 provides a summary of estimated energy saved and GHG emissions reduced from the replacement of incandescent, T8 fluorescent lamps and arc discharge mercury lamps used in street lighting. These estimates were based on actual data from lighting use surveys between 2011 and 2016. During the early stages of the TRAMEL Project between 2010 and 2013, many of these inefficient lamps were replaced by intermediate technologies such as compact fluorescent lamps,T8 (3 phosphate) fluorescent lamps as well as sodium and metal halide lamps for street lighting. The number of LEDs that are used for replacements of inefficient lamps has been increasing steadily since 2014 with a gradual decline in the use of intermediate lighting technologies. Current trends indicate that within 4 to 6 years, all inefficient lamps will be replaced by LEDs. Further details on the calculation of energy savings and GHG emission reductions from improved efficient lighting standards, policies and regulations can be found in Appendix E.

Table 4: Summary of GHG emission reductions (ERs) generated by the TRAMEL Project

Type of light being replaced by LEDs and intermediate technologies	2010	2011	2012	2013	2014	2015	2016
Energy saved in million kWh							
- incandescent	0	0	2,621	2,056	3,590	4,843	5,491
- fluorescent	0	0	1,031	758	1,644	1,795	1,662
-arc discharge					2,218	2,812	2,937
Total	***0***	***0***	***3,652***	***2,814***	***7,452***	***9,450***	***10,090***
GHG emission reductions in thousand tonnes CO_2							
- incandescent	0	0	1,441	1,131	1,975	2,664	3,020
- fluorescent	0	0	567	417	904	987	914
-arc discharge					1,220	1,547	1,615
Total	***0***	***0***	***2,008***	***1,548***	***4,099***	***5,198***	***5,549***

69. Based on the aforementioned reasoning, the TRAMEL Project-Level targets are rated as **highly satisfactory.** Details of the GHG emission reductions from the TRAMEL Project are summarized on the GEF Tracking Tool as provided in Appendix F.

3.2.8 Outcome 1: Improved efficient lighting standards and policy framework

70. Activities under Outcome 1 were intended to "improve efficient lighting standards and regulations to become more stringent as well as their enforcement which can bring systemic changes in the efficiency of energy used for lighting in Russia". Project resources would be used to:

- Strengthen linkages between the government and private sector lighting stakeholders through the establishment of a Federal Energy Efficient Lighting Council (FEELC);
- Assist in the drafting of energy performance and product quality standards along with implementation of enforcement mechanisms;
- Establish an NPL to serve as a knowledge centre for energy efficiency lighting in Russia and to undertake specific activities requested by FEELC; and

- Strengthen the capacity of lighting testing labs including the drafting of testing procedures on the quality of EE lighting devices.

A summary of the actual achievements of Outcome 1 with evaluation ratings are provided on Table 5.

71. To commence the TRAMEL Project in a meaningful way, the PSC established the FEELC as an extension to the PSC during the April 2010 PSC meeting. The actions of the PSC were to include key stakeholders to facilitate market transformation of the efficient lighting market to include academia and the private sector. This interim arrangement would function well with the PSC serving as the interface between the public agencies and the private sector and academia (as intended in the ProDoc). Information was transferred between PSC members concerning improvements of the regulatory environment for energy efficient lighting, stimulation of LED introduction, and promoting performance contracts in lighting systems, amongst other issues.

72. The Project submitted a proposal to the Ministry of Energy to upgrade the status of FEELC as a permanent consultative body under the Ministry of Energy in March 2013. In January 2014, this proposal was approved for an "Energy Efficient Lighting Consultative Council" (EELC) to serve as a working group on efficient lighting under the Ministry of Energy. The EELC includes representatives from the MoE, Ministry of Industry and Trade (including Rosstandart, Rospotrebnadzor, and Rostest), the Ministry of Economy, the Ministry of Construction and Housing as well as the private sector and academia.

73. Since 2014, the EELC has undertaken numerous discussions on topics to advance the use of efficient lighting in Russia including:

- improvements to the regulatory and policy framework for energy-efficient lighting;
- development of "Government Plan of Actions to Phase-Out Incandescent Lamps in Russia and to Promote Demand for Energy Efficient Lighting Sources";
- improvements of the building codes (SNiPs) related to lighting;
- issues related to the quality control of lighting products; and
- regulatory issues related to ESCOs in lighting;
- the phase-out of inefficient lighting technologies; and
- improving MEPS within the framework of draft technical regulations of the Eurasian Customs Union.

74. With the EELC in place, the TRAMEL Project has also made substantial progress in formulating more stringent policies supportive of efficient lighting. At the commencement of the TRAMEL Project, building codes (otherwise referred to as SNiPs) were being updated in 2011 to improve the efficiency of lighting in industrial premises. This included a new SNiP 23-05-95 which came into effect on May 20, 2011 under the Decree of the Ministry of Regional Development #783 (dated 27.12.2010). This SNiP imposed more stringent and specific electric capacity for lighting of industrial premises at the level of $4W/m^2$ per 100 lux.

Table 5: Outcome 1 achievements against targets

Intended Outcome	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating [40]
Outcome 1: Improved efficient lighting standards and policy framework.	Establishment of the Federal Energy Efficient Lighting Council (FEELC)	None exists	FEELC becomes a legal body.	This target was changed at the "Inception Workshop and Kick-off Meeting of the Project Steering Committee" (PSC) held at the end of April 2010, to extend the PSC to include representatives of business and academia as observers to FEELC. Their role on the FEELC would be to provide policy and advisory support along with project management oversight. As such, the PSC serves as a facilitative interface between market participants and regulators.	See Paras 72-74	6
	Establishing new policies imposing maximum consumption of energy for lighting for non-residential indoor lighting, regulations on the maximum permissible mercury contents in CFL	7-10 W/m^2 per 100 lx (SNiP)	Policies adopted, imposing 2.5-4W/m^2 per 100 lux and mercury content no more than 5 mg mercury per lamp	By late 2016, an amendment to a SNiP was approved by the Ministry of Construction and Housing for a standard of 2.0-4.0W/m^2 per 100 lx. Since January 2013, Government Decree #602 has been in force stipulating the maximum level of mercury in CFLs to be 2.5 mg.	See Paras 75-77	6
	Establishment of a national EEL platform	None exist	Participants wish to continue platform beyond end of program, and it is financially sustainable	National Energy Efficient Lighting Platform (NEELP) was established in 2011, has been very active in the discussion of national EE lighting technical issues with the Energy Saving Council of the Russian State Duma, and has become financially sustainable through support from the energy savings Council and the Non-Commercial Partnership Energy Efficient City.	See Paras 78-81	6
	Testing procedures for EEL products drafted	None exist	Final set of drafts for standards proposed to national normalization body	An international LED expert has been providing technical assistance on strengthening LED testing methodologies	See Paras 80-81	5

[40] Ibid 35

Intended Outcome	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating [40]
				according to the latest international practices. In 2016, the Project has submitted draft Technical Regulations for lighting devices for the countries of the Eurasian Customs Union including proposals for parameters to be tested and a list of national and international test methods. This Draft has been approved by all line ministries (MoIT, MoCH and Ministry of Economy) and submitted in March 2017 to the Government of Russia for approval.		
	Testing lab capacity improved	Obsolete metrology laboratories exist	Plan of modernization of national metrology laboratories is being implemented (Several national metrology laboratories modernized)	A total of 6 federal laboratories have been modernized and put into operation	See Paras 82-83	6
Overall Rating – Outcome 1						**6**

75. With the Project targeting a similar standard of 2.5-4W/m^2 per 100 lux, the Project at that time agreed to assist the Government in further tightening of this standard. Between 2012 and 2017, the Project conducted a number of strategic activities in support of the drafting and eventual adoption of this standard[41]:

- In 2013, the Project developed an "Atlas of Typical Technical Designs for Lighting in Schools (and public buildings)"using a more stringent standard of 3-4 W/m^2/100 lux. The Atlas was submitted to the Centre of Energy Saving at the Ministry of Education and Science and the Department of Education of Moscow City Government for implementation of efficient lighting projects in schools in Moscow and across the country;
- In 2013, a concept for further improvement of lighting energy-efficiency standards was developed by the Project with the Russian Energy Agency and submitted to MoE. These more stringent requirements for energy consumption and quality of lighting were shared with regional authorities for consideration and inclusion in regional regulatory documents. This included a set of standard technical solutions already developed for outdoor lighting systems and tested in street lighting demo projects in Sarov and Chuvash Oblasts[42];
- In October 2013, improvements to SNiPs and sanitary norms (SanPiNs) related to lighting(as prepared by the Project) are approved as a part of the "Government Plan of Actions to Phase-Out Incandescent Lamps in Russia" and to promote demand for energy efficient lighting sources[43];
- In early 2014, the Project developed with MoE amendments to the SNiP with electric capacity of under 2.0-4.0W/m^2 per 100 lx. This new SNiP was approved by MoCH and came into effect in November 2016.

76. With regards to developing limits to the mercury content in CFLs, the Project provided technical assistance in 2011[44] to develop Government Decree #602 "On approval of the Requirements to Lighting Devices and Electric Lamps Used in Alternating Current Circuit for Illumination" that stipulated the maximum content of mercury in a CFL would be 2.5 mg. This decree has been in force since January 2013. This low level of mercury content in a CFL was mandated to curb any further production or sales of CFLs in the Russian Federation. Moreover, the Ministry of Energy viewed this Decree and others as essential in accelerating the transformation of the efficient lighting market. There were attempts made by the majority of the local lighting manufacturers[45] requesting the Government to instead focus on EE lighting technical regulations of the ECU; since development of technical regulations of the ECU involves consensus amongst several countries, the completion of the ECU process could take several years. As such, requests to first develop ECU technical regulations were viewed by the MoE as "stall tactics" by the local industry stakeholders resisting regulatory reform.

[41]Adoption was agreed upon by the Ministry of Energy (MoE) and the Ministry of Construction and Housing (MoCH)

[42] These standards are now mandatory for public procurement (from July 1, 2016) and were submitted by MoE in March 2017 to the Government to become overarching national MEPS (only after agreements from all line ministries (MoIT, Ministry of Economy).

[43] Prepared by I.A. Shmarov of the Institute of Structural Physics. His report proposed amendments to building standards and regulations on lighting, introducing norms of specific power, and revising construction norms and rules for lighting that are consistent with plans of the Ministry of Construction and Housing.

[44]There was preparatory work carried out by an international expert, Mr. Steve Coyne, on global analysis of current standards and norms for the energy efficiency of lighting equipment.

[45]The MoE estimates that over 600 companies are producing inefficient lighting standards in Russia

77. The National Energy Efficient Lighting Platform (NEELP) was established early in the project in early 2011. Serving as a technical arm to the FEELC, NEELP members are comprised of representatives from leading scientific (universities, research institutes) and public organizations involved with lighting projects. The NEELP has been active since 2011 with a number of activities including:

- preparation of new energy efficiency standards for CFLs and the preparation of Government Decree #602 in 2011;
- discussions of the disposal of mercury-containing lamps and lighting market monitoring in 2012;
- strengthening linkages in 2012 with theUNEP/GEF en.lighten initiative which has recognized the NEELP as a source of information on lighting issues in Russia[46];
- opening discussions in 2013 on monitoring design of the lighting market as a means of sustaining quality control of lighting devices on the market, public procurement of energy efficient lighting products, and developing ESCOs for energy efficient lighting in Russia;
- energy efficient lighting advocacy activitiescommencing in 2013 with the Energy Saving Council of the Russian State Duma (Parliament) on phasing-out incandescent lamps, ESCO prospects in Russia, and raising consumer awareness. Many of these activities with Parliament are provided in articles of the "Energosovet" magazine;
- preparation of recommendations in 2014 for draft Technical Regulations by Project experts related to energy efficiency of lighting products, which were submitted to the Eurasian Customs Union;
- drafting of a new SanPiNs for lighting in public buildings in 2014 to encourage energy efficient lighting in close collaboration with representatives of the Federal Service for Supervision of Consumer Rights Protection and Human Welfare (Rospotrebnadzor);
- internal discussions in 2015 on the harmonization of standards for the measurement of service life for LED devices, identification of problems with ESCOs in efficient lighting contracts, and introducing compliant systems for energy efficient lighting in Russia;
- internal discussions in 2016 on the growth of energy-efficient lighting in Russia, technical requirements for lighting fixtures for schools, approaches to verification of claimed parameters of lighting products[47] that would include publication of actual results in the Svetotechnika magazine, a highly respected professional journal in Russia;
- internal discussions on MEPS for the Russian market and the results of verification of lighting products distributed at the national market; and
- NEELP changed to the Research and Development Board of "Svetotechnika" on April 17, 2017, and as a successor to NEELP, will continue to function in the field of energy efficient lighting.

78. By 2014, the NEELP had positioned itself as a very strong advocacy group. As a result, the NEELP received financial support for its sustained operation and meeting locations from the "Non-Commercial Partnership Energy Efficient City" and the Energy Saving Council of the Russian State Duma (Parliament).

79. The Project also undertook early efforts beginning in 2011 to update EE lighting testing procedures using EU testing procedures (for EU Regulation 245/2009). These were translated into Russian and submitted to MoE. In addition, the Project provided technical assistance to develop a new national

[46] http://www.enlighten-initiative.org/portal/CountrySupport/GlobalPolicyMap/tabid/104292/Default.aspx
[47] With a focus onthe most popular models of lamps and lighting fixtures) distributed at the national market

standard GOST-R 54350-2011 "Lighting appliances. Requirements and testing procedures" that was based on best international practices. The new standard came into force in 2012.

80. After 2012, the Project continued development of testing procedures for energy efficient lighting. Key activities included:

- transposition of best international practices (minimum energy performance standards) to Russia with assistance from an Australian international expert in 2013;
- launching of a system of test procedures for lighting products in 2014 with the assistance of an international expert to identify relevant European directives for translation, which were submitted to the Ministry of Energy for consideration;
- discussions in 2015 on resolving the absence of methodologies for testing the service life of LED products. Again, the Project sought the assistance from an Australian international expert to investigate methodologies used internationally;
- the development of draft Technical Regulations in 2016 for lighting devices for the countries of the Eurasian Customs Union that included proposals for parameters to be tested and a list of national and international test methods. This Project effort was in collaboration with leading scientific lighting institutions such as VNISI. *These regulations were submitted to the Ministry of Energy.*

81. With regards to the modernization of testing labs for lighting equipment, the Project was linked to the UNEP/GEF en.lighten initiative for technical assistance to determine the extent of upgrading required for Russian laboratories to meet international standards for testing labs for energy efficiency, safety and other parameters. Four leading Russian laboratories participated in round robin tests in 2013 using the Beijing National Lighting Test Centre as a reference lab to assess the capacity of these laboratories and provide recommendations to upgrade them to international standards.

82. By early 2014, a plan for the modernization of test laboratories including an indicative budget and a list of required equipment was completed with the assistance of an international expert (Mr. Steve Coyne), and approved for implementation by the Ministry of Industry and Trade. By 2015, the modernization of a state test laboratory in Saransk, Mordovia was completed and equipped with modern testing devices and deals in place for the testing of lighting products[48]. With the cooperation with Rosstandart (Federal Agency on Metrology and Technical Regulation), the Project continued with the modernization plan with the completion modernization of 6 federal laboratories in 2016 (Rostest Moscow, St. Petersburg center, Nizhniy Novgorod center, Samara center, Ufa center, Krasnoyarsk center). Current work load of the labs for lighting is light with roughly a 50-50 split in public and private sector clients wanting testing of various lighting devices, mainly LEDs. While there are only mandatory MEPS for EE lighting for public procurement, mandatory MEPS for all of Russia as well as the ECU will increase the work load of these Rosstandart labs.

83. In conclusion, the results of Outcome 1 can be rated as **highly satisfactory** based on the TRAMEL Project managing to achieve all intended outputs, and meeting the intended outcomes of improved

[48] The Project supported modernization of the 6 federal laboratories including the procurement and installation of the sphere, Gonio photometer, spectrometer, radiometer, mobile and stationary luminosity meters, power meters, and processing computers.

efficient lighting standards and policy framework as well as government capacities to test for compliance of new standards for energy efficient lighting. Adding to this achievement is the adoption of products from this Component to other UNDP-GEF lighting projects in other countries such as Armenia where in April 2017, the Armenian government adopted artificial and natural lighting standards that were a direct transposition of the Russian lighting standard introducing EU level EE requirements for lighting devices[49]. This involved TRAMEL personnel travelling to Armenia for presentations to responsible ministries within their government. TRAMEL personnel were also involved with the preparation of a brochure for the UNDP-GEF lighting project in Kazakhstan.

3.2.9 Outcome 2: Supply chain for energy efficient lighting is strengthened

84. Activities under Outcome 2 were intended to "strengthen the supply chain" for energy-efficient lighting devices manufactured and sold in Russia. Project resources would be utilized to develop and adopt phase-out plans for inefficient lighting devices, increased awareness of EE lighting standards to key stakeholders, support to development of new EE lighting products and modernization of the national lighting industry, and annual market monitoring. A summary of the actual achievements of Outcome 2 with evaluation ratings are provided on Table 6.

85. Federal Law #261 "On Energy Conservation" was adopted in 2009 and contained a plan for phasing out inefficient lighting. To implement a phase-out plan, Decree #602 "On approval of the Requirements to Lighting Devices and Electric Lamps Used in Alternating Current Circuit for Illumination" was developed with active participation of Project experts in 2011, coming into force in January 2013, as detailed in Para 77.

86. The Project also provided assistance to the governments on behalf of the MoE in developing, adopting and implementing the "Government Plan of Actions to Phase-Out Incandescent Lamps in Russia" and to "Promote Demand for Energy Efficient Lighting Sources". Development of this plan commenced as early as 2013 through the setup of an interagency Working Group under the Ministry of Economy, and consisted of activities to phase-out inefficient lighting sources, stimulate the production of energy-efficient substitutes, improve the regulatory framework supportive of a phase-out, and setup a network of test laboratories. In 2014, these plans were also included in the draft document of Technical Regulations of the Eurasian Customs Union (pertaining to lighting energy efficiency), which is still under review by all member countries.

87. These efforts culminated in the adoption of Governmental Decree #898 which came into force on July 1, 2016 listing the requirements for *procurement of higher efficiency lighting products for the public sector*; this would serve as a key feature of a national phase-out programme, ensuring that public tenders for lighting devices had to meet criteria for MEPS compliance as well as lowest price. The Project had undertaken efforts for the development of this Decree with the Ministry of Economy, Ministry of Energy, Ministry of Justice, and leading professionals in the lighting field in Russia. The decree includes market surveillance mechanisms for compliance, a listing of lighting devices to be phased out[50], and a detailed implementation plan and indicative budget. With Government Decree

[49] Available on: http://www.arlis.am/DocumentView.aspx?DocID=112988. These standards define the stringent EE requirements per sq.m of of the surface to be lit essentially phase out the fluorescent lamps from the indoor lighting and all the mercury-content lamps (MV, HPS-LPS) from outdoor installation

[50] Includes the phase out of high pressure mercury lamps, fluorescent lamps of the first and the second generation with low light output, electromagnetic ballasts, CFLs, fluorescent fixtures and street lighting fixtures for mercury lamps.

Table 6: Outcome 2 achievements against targets

Intended Outcome	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating [51]
Outcome 2: Supply chain for energy-efficient lighting is strengthened	National Phasing out Program for Inefficient Lighting planned and adopted	Existing legislation on Energy Savings	Inefficient light source phase-out is being implemented	*Inefficient light source phase out is being implemented as a part of Governmental Decree #898 that came into effect on July 1, 2016 regarding public procurement of efficient lighting devices.* *In addition, there is currently a Draft Governmental Decree listing the MEPS of lighting products for the Russian market that has agreement amongst the relevant ministries. Adoption is expected before the end of 2017* *Further evidence of implementing the phase-out includes the testing of more than 100 samples of the most popular lighting products, the results of which have been submitted to relevant federal ministries and published in prominent magazines. Continuation of this sampling program is being financed by a number of the suppliers of lighting devices in Russia.*	See Paras 86-89	6
	Annual monitoring of market	Some partial data exist today	National database with market data is available	*A national database using market data from the largest lighting companies in Russia became operational in 2014. The information from this database has been published by the Project, and provided to the Ministry of Energy and market participants (according to Governmental Decree dated December 18, 2014 #1412 "On preparation and distribution of annual state report on energy saving and energy efficiency improvement in the Russian Federation"). Further dissemination of database information has been made the*	See Paras 90-93	6

[51] Ibid 35

Intended Outcome	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating [51]
				International Forums on Energy Saving and Energy Efficiency (ENES) in 2015 and-2016.		
	Lighting specifiers have increased awareness of the benefits of EE lighting	None to basic	2 or 3 additional institutions offers lighting oriented curricula for initial and life-long training	*In late 2013, the Project developed a textbook on energy efficient lighting which has been passed to 13 Russian technical universities and other universities in Armenia (through UNDP Armenia) and Kazakhstan (through UNDP Kazakhstan) for use in specialized courses in lighting design and technology.*	See Paras 94-95	6
	Lighting specifiers understand the new standards	None (new standards do not yet exist)	Fully operational toolboxes are available to lighting specifiers via web or under license system	*With educational and information materials developed by the Project and approved by the Ministry of Energy, several learning events and learning tools were supported including:* • *Ministry of Energy organized training courses for 30,000 energy efficiency specialists and lighting designers across Russia;* • *webinars on LEDs and lighting products testing with the participation of Beijing Global Lighting Test Centre in September 2014;* • *posting of lighting publications and textbooks on the web portal:* http://www.undp-light.ru/info/print/ that will be transferred to an FEELC website in mid-2017*;* • *manual on designing of LED lighting in schools for the Ministry of Construction and Housing*	See Para 96-97	6
	Support to the development of new EE lighting products and modernization of national lighting industry.	Main production of national industry is incandescent lamps	One production line fully operational and products marketed (LEDs or CFLs)	*The Project has stimulated 6 LED production lines since 2011 through provided consultation support.*	See Para 96	6
Overall Rating – Outcome 2						**6**

#898 coming into force, the Project developed in cooperation with the Ministry of Industry and Trade and the Ministry of Energy documentation on voluntary system of certification of lighting products with the intent on accelerating the phase-out of inefficient lamps. With the participation of the Association of Suppliers and Manufacturers of Lighting Products[52] ("Chestnaya Pozitsia" translated as "Honest Position Group"), a programme to test more than 100 popular lighting products on the Russian market[53] was conducted to identify inferior and low quality products available on the market, to inform market participants of improvements required to meet MEPS (of Decree #898)and other standards of a new lighting regulatory regime. This monitoring, verification and enforcement (MV&E) system was based on best international practices prepared by an international expert, Mr. Chris Evans from the United Kingdom. The Project assisted with these tests focusing mainly on LEDs with a number of test results becoming available in December 2016. A report with the results of the programme was submitted to relevant federal agencies and published in all-Russia magazine "Svetotekhnika". The Ministry of Energy intends to repeat this test program on an annual basis.

88. With regards to Chestnaya Pozitsia, they made a declaration in 2016 to comply with Minimum Testing Standards in absence of mandatory MEPS[54]. In this declaration, the members of this group consisting of 55 companies have signed a joint statement to conduct ethical work in the market for electrical lighting devices, out of which 14 importing companies and domestic manufacturers will work on a regular basis to ensure continual improvements to the quality of electrical lighting devices sold in Russia[55]. Participants in this working group reached an agreement for:

- the testing of LED lights with a power of more than 15W are included, with the exception of spotlights during the first stages of the program;
- suppliers and manufacturers bringing LED lamps in line by February 1, 2017;
- complete termination of the sale of non-compliant products by distributors by April 1, 2017 bearing in mind that under the Law of the Russian Federation, distributors bear the equal responsibility with the producer for the quality of the services and products provided;
- a list of minimum requirements and parameters of luminaires to which testing will be carried out. All requirements are determined by the legislation of the Russian Federation and must be observed by all market participants without fail;
- mass testing of the quality of light devices of all market participants will begin from April 1, 2017. The products of the companies participating in the Working Group will be tested first;
- creation of supporting documents including regulations for the interaction of market participants, regulations on the working group of the project, testing procedures, additional agreements with compliance requirements were recommendations have been developed on the demand for quality parameters of the products and their provision by the manufacturer.

[52] This Group represents an estimated 60% of LED sales in Russia. The other 40% who are not affiliated with the Group produce a lower standard of LED. To join the Chestnaya Pozitsia, the prospective member must upgrade their LEDs to a voluntary standard of the Group. Their Group also subjects itself to testing of their own LEDs by Rostestas feedback on whether or not their products need improvements in quality to best international standards.

[53] The testing programme was also co-financed by the market players and professional associations such as retail outlets and LED suppliers.

[54] In a letter dated March 02, 2016 to a Working Group of the largest producers of lamps from S.V. Gvozdev-Karelin, Executive Director of the Association Honest position.

[55] According to Ministry of Energy estimates, there are over 600 Russian-based lighting manufacturers producing inefficient lighting standards

89. In March 2017, a Draft Governmental Decree listing the MEPS of lighting products for the Russian market was developed and agreed by relevant ministries. The MEPS on this Decree also impose the phase-out of inefficient lighting devices similar to those listed in Decree #898. The phase-out is to be implemented in 2 stages:

    - 1st stage (starting on Jan 1, 2018):
    – a phase out of most CFLs with E14 and E27 base;
    – a total ban on all halo-phosphate lamps;
    – a ban on all electro-magnetic drivers;
    – a ban on all mercury HID lamps of >250W; and

    - 2nd stage (coming into effect on Jan 1, 2020):
    – a phase –*out of all CFLs* with E14 and E27 base
    – a ban on all MV HID lamps regardless of their installed capacity
    – a ban on all inefficient sodium HID lamps (with luminous efficacy < 75-85 lm/W – depending on whether these are for indoor or outdoor use)

    A translation of this decree is provided in Appendix J.

90. Efforts to develop a market monitoring plan for efficient lighting devices commenced early in the Project in 2011. By 2012, the Project had established communication channels to gather key information and data on the lighting market from some of the largest lighting companies operating in Russia [56]. Moreover, the Project also developed key cooperation agreements with these companies, and data collection forms and protocols that included submission procedures and confidentiality requirements for proprietary reasons. By 2014, a national database on the lighting market in Russia became operational with monitoring data are published by the Project and provided to the Ministry of Energy and market participants.

91. These efforts have created a plethora of monitoring activities and reports on the lighting market in Russia:

    - In 2015, a national system of monitoring the luminaires market was established in response to Governmental Decree date December 18, 2014 #1412 "On preparation and distribution of annual state report on energy saving and energy efficiency improvement in the Russian Federation". The Project publishes this monitoring data that is then provided to the Ministry of Energy and distributed among market participants;
    - In 2015, the Project assisted the Ministry of Energy and the Ministry of Industry and Trade to organize a competition to choose the best lighting products and energy efficiency projects. The competition identified the best energy efficient light sources and luminaries available on the Customs Union market. The winners were announced at the 4th International Forum on Energy Saving and Energy Efficiency ENES-2015. Market report comprising data on Russian market and Customs Union market was developed, published, and officially presented at4thInternational Forum on Energy Saving and Energy Efficiency ENES-2015. A similar competition was held in 2016;

[56] Includes Osram, Philips, GE, Kosmos, Optogan, and Navigator

- Annual poll on "attitude of Russians to EE lighting technologies and policy on EE lighting" that polled regional Russian attitudes to tariff policies, availability of information on lighting, lighting designs, and lighting preferences amongst other survey questions. This annual poll had commenced in 2015;
- Annual report (since 2015) on the "State of the lighting market" outlining the state of lighting markets globally as well as the state of public procurement for lighting in Russia;
- Lighting Technology magazine which recently provided an article on test results of Russian lighting products in January 2016. The lighting technology magazine is an international bimonthly magazine containing market surveillance information from several lighting markets globally.

92. The Project has produced several textbooks serving as useful references to the lighting industry and Russia:

- "Energy Efficient Lighting" by Moscow Power Engineering University in 2013 covering lighting design theory for universities, and serving as a reference on which lighting designs contribute to lighting policies and regulations;
- "Photometry and Colorimetry of Energy Efficient Lighting" by the Photometry Research Institute in 2015 which provides guidance on the types of equipment required for testing equipment for EE lighting. This contributed to EE lighting labs identifying equipment in line with best practices; and
- Guidelines for maintenance staff for retrofitting of EE lighting in 2015.

93. The "Energy Efficient Lighting" textbook has been adopted for students at the State Council of Higher Education Institutions (UMO) with energy in their curricula. The textbook has also been accepted by and used in leading technical universities of Russia (Moscow Power Engineering Institute, Nizhny Novgorod State Technical University). An electronic version of the text book has also been transferred to Kazakhstan (as cooperation between UNDP-GEF projects on lighting) as it was to be adopted by a large majority of the technical institutes and universities in the country. In 2013, the textbook was transferred to Astana and Almaty Universities by UNDP Kazakhstan, to Yerevan University by UNDP Armenia for publishing and distribution to other universities. In 2014, the textbook was transferred to another 13 Russian technical universities. In summary, several educational institutions in Russia as well as Kazakhstan and Armenia have adopted textbooks on energy efficient lighting which are now being taught in several courses throughout Russia.

94. The Project has supported a number of learning events and web tools to upgrade the knowledge and technical skills of lighting designers and technicians including:

- monthly one-day courses to upgrade the knowledge and technical skills of lighting designers and technicians at the "Dom Sveta" in Moscow. These one day courses utilized user-friendly, internet-based and highly-rated lighting design tools for industry professionals, e.g. DIALUX 4.10;
- joint development with the Russian Energy Agency in 2012 of the project's website to post information and training materials on EE lighting for specialists and the public. This includes the

posting of an electronic version of the "energy efficient lighting" text book for use by students and Russian lighting companies to develop new lighting products[57];
- joint development with the Ministry of Energy and with the support of the Ministry of Education and Science of a federal information web-portal on energy savings (www.energourok.ru) to post information and training materials for schoolchildren and general public;
- development of educational and information materials that were used by the Ministry of Energy for training courses in 2013 and 2014 for 30,000 energy efficiency specialists and lighting designers across Russia;
- webinars on various topics such as LED design and testing of lighting products using educational and information materials developed by the Project;
- a webinar seminar in September 2014 on lighting product testing and round robin testing in collaboration with Rosstandart laboratory personnel and the Beijing Global Lighting Test Centre; and
- development in 2016 of designs for LED lighting in schools for the Ministry of Construction and Housing.

95. Since 2011, the Project has provided technical consultations to Russian lighting producers with the intention of stimulating demand for nationally manufactured energy-efficient lighting equipment. Recommendations were developed on utilization of nationally manufactured energy-efficient lighting equipment during pilot projects to modernize lighting systems in schools and streets, and passed to potential consumers, namely municipalities targeted for pilot projects by the Project. With Project efforts to facilitate cooperation with Korean lighting companies in the area of LED manufacturing, there were a number of Russian lighting companies willing to make investments into new LED production lines including:

- "Optogan" Company where the Project first provided expert consultations for its specialists in 2013;
- Elektrovypryamitel (Chuvash Republic);
- Dalpribor (Far East);
- Intesso (Rostov Region);
- Tekhsvet company (Nizhny Novgorod Region) in 2015 which was provided with consultation support for preparation and launch of LED luminaries production line. Tekhsvet's products are used in projects on modernization of lighting in public, communal housing and industrial sectors across Russia;
- Lisma plant (Saransk) in 2015 that was catalyzed into investing due to the policy of phasing out inefficient lighting products promoted by the Project.

96. In conclusion, the results of Outcome 2 can be rated as **highly satisfactory** based on the TRAMEL Project utilizing its UNDP funds to strengthen the capacity of academic institutes and LED manufacturers on best practices and other technical issues of LED manufacturing.

[57] At the time of writing of this report, the Project's website www.undp-light.ru was still functional and regularly updated with the Project's publications, tenders announced, results of works. All publications produced by the Project were posted on the http://www.undp-light.ru/info/print/ but were to be transferred in April 2017 to the website of the Federal Efficient Lighting Council.

3.2.10 Outcome 3: Penetration of energy efficient lighting increases in Moscow

97. Activities under Outcome 3 were intended to "increase the penetration of energy-efficient lighting in Moscow homes and buildings, resulting in the replication of local EE lighting initiatives". TRAMEL Project resources were to be utilized to upgrade the lighting systems of schools and hospitals as well as residential flats, and to implement the recycling of domestic CFLs. Completion of these pilot projects in Moscow would result in catalysed interest for the replication of the implementation of these pilots around Moscow and in other similar communities. A summary of the actual achievements of Component 3 with evaluation ratings are provided on Table 7. A summary of the actual indoor lighting pilots are provided on Table 8.

98. Delays were experienced in implementing pilot projects for schools specifically in the Moscow region until 2015 and 2016:

- Moscow has had an energy conservation program in place since 2010 under Moscow Government Resolution #1012, a programme that was aimed at achieving the objectives of Federal Law No. 261. By 2011, the Moscow region had developed energy audits of 10 typical school buildings, and feasibility studies and business plans for energy efficient modernization. In 2012, Project design documentation for 3 Moscow schools were developed along with agreements signed with the school administration on modernizing their lighting systems and monitoring of energy saving results. By 2014, a Memorandum agreement was signed between the Ministry of Energy, the Moscow Region Government and Project to prepare and implement pilot projects on lighting modernization in the public sector and on replication. This agreement included the completion of technical audits, and preparation of documentation for modernization of lighting in 9 schools in the Moscow Region. A final hurdle was cleared in March 2015 when the PSC minutes reported that the Ministry of Energy in cooperation with the experts of the Project, developed new energy efficiency requirements for lighting equipment for public procurement;
- Moscow Region government saw 3 executive regimes during TRAMEL: one regime from 2010 to early 2012, a second regime from early 2012 to early 2013 with the arrival of a new governor, and the incumbent regime. However, the incumbent regime only took 1.5 years to start their pilot projects;
- Until the collapse of oil prices in 2014, all regions focused on subsidization of EE projects rather than on identification of co-financing opportunities;
- LEDs were banned from the use in public schools until permitted in October 2012 by Consumer Surveillance Agency (letter No. 01/11157-12-32) while the use of modern fluorescent technologies were no longer economical;
- To meet targets for indoor pilot lighting schemes using LEDs, pilots were implemented within Moscow as well as regions outside of Moscow such as Ulyanovsk with a focus mainly on schools. This included 7 schools the Khimki School District in the Moscow Region in late 2015 through a lighting supplier to supply and install new lighting systems in the schools. By 2016, pilot projects for the modernization of lighting systems were also completed for another 3 schools in the Ulyanovsk Oblast (in Dimitrovgrad) and 5 schools in the Vladimir Oblast.

Table 7: Outcome 3 achievements against targets

Intended Outcome	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating[58]
Outcome 3: Penetration of energy-efficient lighting increases in Moscow homes and buildings, and local EE lighting initiatives are replicated	Health and education sector: efficiency of current lighting stock	Existing lighting schemes of the 10 selected schools and hospitals: 800 fixtures/ building with 100W installed power per fixture, operating 2000 h/yr = 1.6 GWh/yr	Lighting systems of 10 schools/ hospitals fully upgraded Energy savings: 0.7 GWh/yr or 0.35 ktn CO_2 less per year	*By June 2016, modernization of lighting systems in 15 schools was completed (7 schools in the Moscow Region) with 8,156 LED lighting fixtures installed and control systems introduced.* *Energy savings about 0.7 GWh/yr or 0.38 kt CO_2 reduced each year*	*See Paras 99-101*	6
	Residential sector: penetration of CFLs	CFL penetration rate is 0.3% Average lamps per flat in Moscow: 20 (75 W-GLS) Installed power for lighting 1.5 kW/flat	370,000 flats (10%) upgrade 2 GLS to 2 - 20W CFLs Energy savings: 48.4 GWh/yr or 24.2 ktn CO_2 less per year	*Residential campaign in collaboration with the Ministry of Energy and other partners leads to the increased adoption of energy saving lamps in homes: the campaign assessment in 2015-16 claims that more than 2.6 million Moscow households have been purchasing an average of 4 energy saving lamps per household.* *The Ministry of Energy allocated funding for providing residents with 70,000 LED lamps at a subsidized cost. In 2016, the in the Moscow region residents of Pushkino town received about 4,000 vouchers providing discounts for buying LED lamps (discounts of 70%, 50%, 30%). In 2015-2016, the Project expanded its monitoring of penetration of energy saving lamps in households throughout the Russian Federation that revealed an average of 4 energy saving lamps per household is used which over 52 million households, would total approximately 200 million energy efficient lamps installed with an energy savings of 12 GWh per year.*	*See Paras 102-104*	5
	Recycling rate of domestic CFLs	Zero	Domestic CFL recycling rate of at least 70%	*Decision was taken that the Project will not deal with CFL recycling and disposal as the amount of CFLs is constantly reducing on the Russian market due to their gradual replacement by LED technologies. Besides Russia adopted the Minamat Convention on Mercury in 2014 which additionally stipulates phase-out of CFLs and other mercury-containing lamps from*	*See Paras 106-107*	5

[58] Ibid 35

Intended Outcome	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating[58]
				the market. Additionally, CFLs and other mercury-containing lamps are being banned through MEPS and associated draft regulations which will soon be adopted by the Government.		
	Replication: Number of communities in which similar projects are replicated	Zero	Pilots have been replicated twice in Moscow, and in 5 municipalities outside Moscow	*Due to delays in implementing the Moscow pilots, the project prepared and implemented indoor lighting pilots in schools outside of Moscow using florescent lamps and CFL's. After 2014 when LEDs were permitted to be installed in schools, the Project proceeded with LED pilot projects around Moscow, specifically in the Khimki School District. The success of these pilots in Khimki facilitated approval of federal government allocations for the replication of these pilots.*	*See Paras 100-101*	5
Overall Rating – Outcome 3						**5**

Table 8: Details of pilot projects for indoor efficient lighting

Project	Number of lighting pieces	Power (kW)		Saved power (kW)	Assumed operational time (hr/yr)	Energy savings (kWh/yr)	GHG emissions reductions (tCO2)	Works performed
		Before	After					
Khimki, schools, UNDP	2,846	261	98	163	1 600	260,800	143	Pilot Project: replacement of luminaires and cabling, installation of control systems, installation of luminaires for decorative lighting (territory and facades)
Dimitrovgrad, schools, UNDP	2,392	224	76	148	1 350	200,205	110	Pilot Project: replacement of luminaires and cabling, installation of control systems, installation of luminaires for decorative lighting (territory and facades)
Vladimir, schools, UNDP	2,918	248	105	143	1 600	228,768	126	Pilot Project: replacement of luminaires and cabling, installation of control systems, installation of luminaires for decorative lighting (territory and facades)
Total:	**8,156**			**454**		**689,773**	**379**	

99. As shown on Table 8, this involved the installation of 8,156 LED lighting fixtures complete with control systems. Energy savings at EOP was estimated to be 0.7 GWh/yr in 2017. Co-financing of school initiatives was in the order of USD 3.0 million. Replication targets for EE lighting in other oblasts will be met through a 2016 federal government allocation of USD 835,000 (50 million roubles) for the construction and modernization of schools. Implementation of the Moscow pilots for schools in Khimki did not involve ESCO contracts. Discussions were underway within the Project and the Moscow region on future ESCO contracts to include other energy efficiency measures (such as heating, ventilation and water supply) to spread technology risk and possibly decrease the payback period of the investments.

100. As an adaptive management action by the Project to delays for indoor EE lighting in Moscow, the Project did work on modernization of indoor lighting systems (using best international practices) for public buildings between 2011 and 2014 in more than 30 regions within the framework of the Federal Programme on Energy Savings. This included Project assistance to prepare technical solutions using efficient fluorescent lamps in the Lipetsk (12 schools), Nizhniy Novgorod (1 school) and Tver (7 schools). By 2014, LEDs were permitted for installation in schools as detailed in Para 100. All the documents were submitted to the Ministry of Construction and the Ministry of Education and Science.

101. Efforts by the Project to increase adoption of EE lighting within the residential sector started with CFLs as the targeted EE lighting technology. To increase the affordability of energy saving lamps, the Project in 2011 studied the possibilities of using carbon finance under a Program of Activities (PoA) under Joint Implementation (JI) mechanisms involving Moscow City Government (as well as the Government of the Republic of Bashkortostan) to reduce prices of CFLs for the benefit of marginal income families in Moscow. In addition, the Project assisted in the preparation of a pilot project (under JI) in the Moscow region in collaboration with the Department of Fuel and Energy and the State Power Company "Energetika", where ordinary citizens would be able to purchase LED lamps for household use at affordable prices with federal subsidies. However, with the crash of global carbon prices, these efforts were abandoned in 2013.

102. Notwithstanding the setback, the Project carried out CFL replacement programmes in 100 flats to monitor and assess energy savings, with some flats having special measuring equipment installed to monitor the quality of electricity and lighting. The information from the CFL replacement program was used as a basis for awareness raising campaign targeting Moscow citizens and schoolchildren coupled with a demonstration of the benefits of LED lamps in 2013. Campaign results were published with an assessment that more than 2.6 million Moscow households have been purchasing an average of 4 LED lamps per household. In 2012, brochures for the general public on advantages and benefits of energy saving lamps were developed that were to be distributed by the Energy Distribution Company Smolenskenergosbyt and Information Centre of the Moscow Power Engineering Institute.

103. By 2015, using the results of market monitoring and the monitoring of lamps in residential sector, the Project prepared and developed a pilot project of energy saving lighting technologies (lamps and fixtures) in the residential sector of the Moscow Region using LED lamps. As a result of this pilot project proposal, the Ministry of Energy allocated funding for implementing the pilot project, equivalent to 70,000 LED lamps provided at a subsidized cost to residents. This was implemented in 2016 with the residents of Pushkino town who received about 4,000 vouchers providing discounts between 30 and 70% for buying LED lamps. In 2015-2016, the Project extended the monitoring and

survey of energy saving lamps penetration into all households in the Russian Federation with the All-Russia Public Opinion Research Center (VTSIOM). These surveys were organized as a questionnaire poll in Russia's largest cities including Moscow, and established that an average of 4 energy saving lamps per household was used. Extrapolating the energy savings over Russia's 52 million households, the more than 200 million energy efficient lamps were estimated to save Russia 12 GWh per year and reduce its GHG emissions by 6.6 million tonnes CO_{2eq} annually.

104. The Moscow pilots generated an opportunity for the Project to raise awareness on energy efficient lighting. This would include lessons on energy saving that was organized for Moscow schoolchildren for the distribution of EELs. Educational materials containing a special lesson on energy saving for children was passed to the Moscow Department of Education. In 2015, the Project in cooperation with the Ministry of Education and Science, Ministry of Energy, Ministry of Foreign Affairs and UNESCO developed a concept of All-Russia lesson on energy saving in lighting within the frames of the International Year of Light and held in more than 10,000 schools in December 2015. In 2017, All-Russia competition of schoolchildren work on energy saving in lighting was organized. The winners were announced at the 5th International Forum on Energy Saving and Energy Efficiency ENES-2016. Materials from these activities were posted on the Ministry of Energy's website: www.energourok.ru. Materials on the Project's website (www.undp-light.ru) was to be transferred after the EOP to the MoE website as well as the website of the Federal Energy Efficient Lighting Council[59].

105. With regards to the Project target of recycling 70% of the used CFLs, the Moscow Government adopted a decree in 2011 on domestic CFL collection and recycling. In 2012, the Project facilitated cooperation with the Association of Enterprises Dealing with Waste Collection and Disposal. Mercury-containing lamps disposal discussed within EEL Platform activities, and prepared consolidated reviews for the Ministry of Natural Resources and Ecology on the "Problems of utilization and disposal of mercury-containing energy saving lamps". This review contained an analysis of the collection and disposal of mercury-containing lamps in Russia, under which the Project was designated as a contributing member to state Technical Committee #409 "Protection of the Environment".

106. In 2013, Project also contributed to development of a draft law 584399-5 on "amendments to the Federal Law on Industrial and Household Waste and to other Russian Federation Laws on Economic Stimulation of Waste Management Activities", a draft law that deals with the introduction of a fee for the collection of lamps for disposal and recycling as well as enforcement measures for importers and manufacturers. By 2014, however, the Project made the decision not to deal anymore with CFL recycling due to the continual reduction of CFL usage in Russia. In addition, Russia adopted the Minamat Convention on Mercury in 2014 which additionally stipulates phase-out of CFLs and other mercury-containing lamps from the market.

107. In conclusion, the results of Outcome 3 can be assessed as **satisfactory** in consideration of the projects long involvement in setting up pilot projects for florescent lamps, CFL's and gradually LED's in several regions including Moscow, the raised awareness of the benefits of EE lighting throughout the Russian Federation (including the overall general satisfaction of the school beneficiaries of LED

[59] Ibid 56

lighting), and national surveys indicating significant market penetration of EELs in large cities in Russia.

3.2.11 Outcome 4: Energy efficient street lighting is adopted in the Volga Federal District

108. Activities under Outcome 4 were intended to implement energy efficient street lighting as a means to demonstrate its benefits including reduced municipal operating costs, improved safety and security, and increased attractiveness of urban areas. Project resources were to be utilized to implement a pilot energy efficient street lighting scheme in various regions within the Volga Regional District that includes Nizhny Novgorod. A summary of the actual achievements of the Outcome 4 with evaluation ratings are provided on Table 9. Table 10 provides a summary of pilot projects completed in the Volga Federal District and in the Vladimir Oblast.

109. The Project involvement in the Volga Federal District lighting pilots includes:

- Early establishment of criteria for the selection of pilot street lighting towns that included mandatory co-financing of energy efficient lighting projects in that particular municipality or region;
- Energy audits of street lighting in three towns completed in 2011 followed by the development of related feasibility studies and business plans. This included Sarov town located in the Nizhniy Novgorod Oblast who officially approved plans in 2011 to install more than 800 energy efficient street lights;
- Street lighting modernization was completed in 2014 in Sarov resulting in 300 LED streetlights funded by the Project and 632 co-financed by the municipal authorities. Municipal authorities also financed the installation of control systems for street lighting that will reduce their operating cost of the system. While the Project made a USD 100,000 investment in Sarov, the municipality responded with a USD 500,000 investment into modernizing their street lighting;
- Outdoor lighting modernization was completed in 2015 in Shumerlya in the Chuvash Republic that included the installation of 1,336 LED outdoor and street lights and 16 control cabinets with an automatic control system. The Project financed the installation of 267 LED lighting fixtures;
- Energy audits and technical documentation for a street lighting modernization program in Dzerzhinsk (Nizhny Novgorod Oblast) to cover 6 settlements around the town itself. The municipality financed the development of project design documentation and the installation of 1,000 LED outdoor light fixtures involving ESCOs in 2015.

110. The Project has also made efforts augment implementation of these pilot projects on modernizing street lighting and architectural outdoor lighting in public buildings within the Volga Federal District and other regions of the Russian Federation. Efforts include:

- preparation of feasibility studies or modernizing street lighting in eight cities of the Volga Federal District;
- development of a road map for modernization of street lighting in the cities and towns in the Republic of Bashkortostan with support from the Ministry of Energy and the Government of Bashkortostan;
- cooperation with more than 20 regions across Russia for pilot replication opportunities;

Table 9: Outcome 4 achievements against targets

Intended Outcome	Performance Indicator	Baseline	Target	Status of Target Achieved	Evaluation Comments	Rating[60]
Outcome 4: Energy-Efficient street lighting is adopted in the Volga Federal District (capital Nizhny Novgorod) and local EEL initiatives are replicated elsewhere	Efficiency of installed street lighting	10 000 light fixtures with 250 W lamps operating 4000 h/yr = 10 GWh/yr	10 000 fixtures replaced Energy savings: 4 GWh/yr or 2 ktonnes CO_2	*31,257 LED fixtures have been installed in various regions, outdoor and street lighting.* *The estimated direct energy savings and GHG emission reductions from pilot projects is 15.4 GWH/yr and 8.5 kt CO_2/yr.*	See Para 112 and Table 10	6
	Number of municipalities that have installed EE or plan to install lighting based on the Volga Federal District pilot	Zero	Replication has begun 2x within the Volga Federal District, and in 5 other Federal Districts	*In 2012-14 within the programme of the Ministry of Energy, replications with HID technologies occurred in about 30 regions.* *In 2016-17 replications with LEDs applications and ESCO schemes started in Krasnodar, Chelyabinsk, Stavropol, Yekaterinburg and Ufa.*	See Paras 113-115 and Table 10	5
Overall Rating – Outcome 4						**6**

[60] Ibid 35

Table 10: Details of Volga Federal District pilot projects of Street Lighting and replications

Project	Number of lighting pieces	Power (kW)		Saved power (kW)	Assumed operational time (hr/yr)	Energy savings (kWh/yr)	GHG emissions reductions (tCO2)	Works performed
		Before	After					
Dimitrovgrad, streets, UNDP	285	13.41	4	9.41	3 800	35,758	20	replacement of luminaires and cabling, switchboards
Dimitrovgrad, streets, ESCOs	7,673	1,926.04	557.12	1,368.92	3 800	5,201,896	2,861	architectural lighting with EE lamps
Sarov, streets	932	300.32	133.96	166.36	3 800	632,168	348	replacement of luminaires, arms, control systems, new cable lines in 2012 (UNDP funded 632 of these lamps)
Shumerlya, streets	1,231	302.61	119.38	183.23	3 800	696,274	383	replacement of luminaires, control systems, new switchboards, cable line repairs (UNDP funded 265 of these lamps)
Kovrov, streets, UNDP	360	99	27.36	71.64	3 800	272,232	150	replacement of old luminaires, installation of new lighting points in newly lit streets, recabling for architectural lighting
Kovrov, streets, ESCOs	3,536	824.6	310.85	513.75	3 800	1,952,250	1,074	
Gus-Khrustalny, streets, UNDP	370	101.75	28.12	73.63	3 800	279,794	154	replacement of luminaires, old arms, 370 control relays
Gus-Khrustalny, streets, ESCOs	2,287	571.75	163.35	408.4	3 800	1,551,920	854	
Vladimir, streets, UNDP	500	135	50	85	3 800	323,000	178	replacement of luminaires
Vladimir, streets, ESCOs	13,705	1,994.19	822.37	1,171.82	3 800	4,452,916	2,449	
Vladimir, schools, UNDP	161	13.85	13.85	0	3 800	0	0	installation of luminaires for lighting of facades and squares, recabling, switchboards
Vladimir, architectural lighting	217	16.79	7.15	9.64	3 800	36,617	20	replacement of luminaires, recabling (works only), switchboards
Total:	**31,257**					**15,434,825**	**8,489**	

- a seminar held In 2013 to acquaint 17 municipalities of the Yaroslavl Region with the experience of the pilot projects in Nizhny Novgorod Oblast including project development concepts for regional development of street light modernization;
- feasibility studies prepared in 2014 to modernize street lighting in Volzhsky of the Volgograd Oblast, South Federal District; and
- successful launching of pilot lighting projects in the Vladimir Oblast in 2015 which already had commitments from federal and private investments and ESCOs viewing this oblast as lower risk.

111. In 2016 and 2017, the Project completed implementation of pilot projects in several towns of the Vladimir Region, a region that had already had federal and private investments commitments including ESCOs. To date, the number of LED fixtures installed in the Vladimir region is 21,136 LED fixtures with an estimated co-financing of USD 8.25 million (as shown on Table 2). As shown on Table 10, direct energy savings of the aforementioned implemented pilot projects is 15.4 GWH/yr, and CO_2 emission reductions are 8.5 kt/yr.

112. The Project also made strong efforts to support these pilot projects to ensure their function as a demonstration for energy savings is well served. These efforts included:

- consultative assistance to other regions for launching of ESCO projects using the "Atlas of Typical Documentation". This contains an example of performance contract, terms of reference for projects in lighting of building, verification methodology, which was distributed in several regions and posted on the web site of the Russian Association of Energy Service Companies (RAESCO). This material was instrumental, amongst others, in:
  - the modernization of school lighting in Nizhny Novgorod financed by a third party;
  - modernization of lighting implemented in 12 schools of Lipetsk Region financed by a third party;
  - modernization of lighting implemented in 4 schools and 3 kindergartens of Tver region financed by a third party ; and
- development of an updated methodology for calculating energy savings from energy performance contracts at the request of the Ministry of Energy.

113. In conclusion, the results of Outcome 4 can be assessed as **highly satisfactory** in consideration of the meeting and exceeding the targets for installed energy efficient street lighting, meeting the replication targets, the high level of satisfaction of the general public and city administrators with improved outdoor lighting, and the high level of interest generated by these pilot energy efficient lighting projects in other regions of the Russian Federation.

3.2.12 Relevance

114. The TRAMEL Project is relevant to the development priorities of the Russian Federation, notably Federal Law № 261-FZ of November 23, 2009 (and the new amended Law No. 426 of 12 December 2011 (para. 1, Art. 10)), that stipulates that Russian Federation goods must contain information in the documentation about their energy efficiency class. To facilitate implementation of Federal Law № 261-FZ, a work plan was developed and adopted by Government Order #1830-r dated December 1, 2009 on *"Approval of the Work Plan of Activities on Energy Conservation and Energy Efficiency Improvement in the Russian Federation"* that outlines a number of measures to be undertaken including amendments to policies and regulatory acts related to the removal of barriers to the

introduction of modern energy-saving lighting sources and support to the development of new LED industries. In addition, the Russian government also adopted more than 30 secondary legislative acts and draft secondary laws in support of implementing Federal Law № 261-FZ. These are listed in Section 3.2 of the Project's Inception Report.

3.2.13 Effectiveness and Efficiency

115. The effectiveness of the TRAMEL Project has been **highly satisfactory**, in consideration that most of the outcomes have been achieved, and in some cases exceeded. Moreover, the TRAMEL Project objective of "transforming the Russian market towards efficient lighting technologies and the phase-out of inefficient lighting" is underway, noting that GHG emission reduction targets have been achieved, with a higher number of local lighting manufacturers having invested in upgrading their production lines to produce LEDs for the Russian lighting market.

116. Pilot projects for indoor lighting in schools did generate considerable interest with schools, especially with respect to the quality of lighting, the reduction of energy bills, and the lessons that could be imparted to its students of the environmental benefits of EE lighting.

117. The efficiency of the TRAMEL Project has been **highly satisfactory**. This rating is in consideration of the Project being able to meet its objectives in transforming the Russian lighting market towards energy efficiency within the GEF grant budget of USD 7.02 million and within a Project duration of 7 years, a Project duration which falls within the norms of other GEF projects globally (in comparison with the original Project duration of 5 years). This has been accomplished through Project assistance in developing a regulatory environment with mandatory MEPS (for public procurement), and giving more confidence to local lighting manufacturers and suppliers to upgrade their capacities to supply more LEDs to the Russian lighting market.

3.2.14 Country Ownership and Drivenness

118. The TRAMEL Project is consistent in supporting the Russian Federation on its national policies on energy saving and energy efficiency (notably), and in the adoption of Presidential Decree № 889, of June 2008, on "Certain Measures for Increasing Energy and Ecological Efficiency of Russia's Economy" and with theFederal Law № 261-FZ on "Law on Energy Conservation and Energy Efficiency Improvement" of November 2009. More recently, the Russian government has also adopted Government Decree № 602 of 20 July 2011 "On Approval of the Requirements to Lighting Devices and Electric Lamps used in Alternating Current Circuits for Illumination" specifying requirements for electric lamps and lighting devices for both outdoor and indoor lighting that encourages the use of energy efficient lighting as a priority. To implement these policies, the Government developed regulations during the Project to implement a gradual phase-out of inefficient lighting and for the collection and recycling of CFLs considering the high mercury content of these lighting devices.

119. Further to the ownership of the TRAMEL Project by the Russian Federation is the adoption of a new SNiP (Construction Norms and Regulations) № 23-05-95 on "Natural and Artificial Lighting", that came into force on 20 May 2011 and included specific minimum energy performance requirements of lighting systems in commercial buildings, new residential construction, street lighting, and industrial lighting.

120. In terms of the drivenness of the Russian Federation of the TRAMEL Project, the Ministry of Energy has made comments appreciative of Project efforts on bringing in relevant technical assistance to the lighting market in Russia (the joint work of the Project with the Beijing Energy Efficient Lighting Center in cooperation with the UNEP Global Lighting Project as an example of South-South cooperation or SSCO), on sharing TRAMEL Project experiences with other similar projects in the CIS countries, as well as providing advisory support to municipalities in Russia, not directly related to the Project. The MoE has in past stressed that the TRAMEL Project is a project of the Russian Federation under the auspices of the Ministry of Energy, and implemented in partnership with the GEF and UNDP. As such, the Government has stressed the importance of Project benefits on current and future scientific and technical cooperation that improves the ability of the Russian Federation to assist other countries within the framework of the Eurasian Customs Union. This was evident in TRAMEL work on lighting legislative improvements being shared with UNDP-GEF Lighting projects in Armenia and Kazakhstan (as elaborated in Para 84).

3.2.15 Mainstreaming

121. The TRAMEL Project conforms to the development goals and priorities of the Russian Federation as captured in the report "Russia in 2015: Development Goals and Policy Priorities"[61]. In particular, this Project has mainstreamed the development priorities in the context of MDG Goals, with Goal 7 (Ensuring Environmental Sustainability) being addressed. On page 115 of this report, a priority of the Government of Russia is to reduce its energy intensity as a means of meeting goals of economic growth and GHG emission reductions targets. This priority is strongly linked to the objectives of the TRAMEL Project to transform the market for energy efficient lighting.

3.2.16 Sustainability of Project Outcomes

122. In assessing sustainability of the TRAMEL Project, the evaluators asked "how likely will the Project outcomes be sustained beyond Project termination?" Sustainability of these objectives was evaluated in the dimensions of financial resources, socio-political risks, institutional framework and governance, and environmental factors, using a simple ranking scheme:

- *4 = Likely (L):* negligible risks to sustainability;
- *3 = Moderately Likely (ML):* moderate risks to sustainability;
- *2 = Moderately Unlikely (MU):* significant risks to sustainability; and
- *1 = Unlikely (U):* severe risks to sustainability; and
- *U/A = unable to assess*.

Overall rating is equivalent to the lowest sustainability ranking score of the 4 dimensions.

123. *The overall TRAMEL Project sustainability rating is likely (L).* This is primarily due to:

- Strong support resulting in growth in the production of LEDs in Russia by local private sector lighting manufacturing companies;
- Financial resources being in place to continue all activities for all outcomes of this Project, notably private sector investment into LED production lines as the business case for LED sales is becoming stronger in Russia;

[61] Accessible on: http://hdr.undp.org/sites/default/files/russian_federation_2005_en.pdf

- Strong government support at the federal and local levels to ensure compliance to Federal Law #261 and other Government decrees for efficient lighting.

Details of sustainability ratings for the TRAMEL Project are provided on Table 11.

3.2.17 Impacts

124. The impact of the TRAMEL Project has been significant as it has catalyzed interest in energy efficient lighting on a larger scale within the Russian Federation. This has increased the involvement of relevant government personnel at the federal and local levels to support and implement energy efficient lighting programs. The pilot programs for energy efficient lighting have demonstrated significant energy savings for schools and municipalities, thus providing benefits of reduced operating budgets.

125. The impact of the TRAMEL Project to the beneficiaries of LED lighting have also been significant to the public. This includes teachers and pupils at schools who have described the benefits of indoor LED lighting as providing more illumination for classrooms, and providing an opportunity for teachers to teach younger children the benefits of energy efficiency and its environmental benefits. Informal solicitation of public opinion on LED street lighting also mentioned that the benefits of LED street lighting includes improved illumination of outdoor areas that improves pedestrian security and safety.

Table 11: Assessment of Sustainability of Outcomes

Actual Outcomes (as of March 2017)	Assessment of Sustainability	Dimensions of Sustainability
Actual Outcome 1:Efficient lighting policy framework and standards for the Russian Federation have improved along with the setup of functional working groups of lighting experts to provide relevant policy advice to the Government, and improved test laboratory capacity	• *Financial Resources:* Lighting manufacturers and government agencies pay testing labs for testing of selected lighting devices on the market for compliance to MEPS for public procurement as well as those set voluntarily by the lighting industry (in anticipation of these becoming mandatory based on recent drafts of MEPS to be approved by the Ministry of Energy by late 2017); • *Socio-Political Risks*: Low risks due to actions by the local lighting manufacturing association (honest position group) to support government efforts for mandatory MEPS and to improve the quality of locally supplied LEDs that meet international standards; • *Institutional Framework and Governance:* Both MoE and MoIT (through Rosstandart) have been proactive in supporting the framework for a strong market surveillance program, most importantly by focusing on the setting of MEPS, and driven by the need to contribute and harmonize with technical regulations for EE lighting with the Eurasian Customs Union; • *Environmental Factors:* Activities in this outcome strongly support the creation of a regulatory environment to encourage increased usage of energy efficient lighting in the Russian Federation. ***Overall Rating***	4 4 4 4 **4**
Actual Outcome 2: The supply chain for LED lighting devices in the Russian Federation has been strengthened through increased confidence of local lighting manufacturers to produce locally manufactured LED lamps that are compliant with international standards, Russian Federation MEPS for public procurement and proposed MEPS for all market participants.	• *Financial Resources:* Local lighting manufacturers have the financial resources available to upgrade their production lines to produce quality LEDs for the Russian market; • *Socio-Political Risks:* Low risks since local lighting manufacturers have expressed interest in upgrading their production lines to produce LED lamps for the Russian market, especially knowing Government intentions on the standards of LEDs to be produced; • *Institutional Framework and Governance:* Local lighting manufacturers have representation on the FEELC that provides the private sector with a platform on which to conduct policy dialogue with government policymakers on government policies and regulations for energy efficient lighting; • *Environmental Factors:* Activities in this outcome strongly support local production of energy efficient LEDs that have environmental benefits for the Russian Federation. ***Overall Rating***	4 4 4 4 **4**
Actual Outcome 3: Penetration of energy-efficient lighting has increased through large cities in the Russian	• *Financial Resources:* While financial resources are currently not available for replications in public buildings such as schools in Moscow and in other regions of the Russian Federation,	4

Table 11: Assessment of Sustainability of Outcomes

Actual Outcomes (as of March 2017)	Assessment of Sustainability	Dimensions of Sustainability
Federation including Moscow, with local EE lighting initiatives in several regions throughout Russia having been replicated after 2015. Moreover, these pilots and replications have generated strong interest amongst municipal personnel, school districts and the general public in the continuation of increasing the use of LEDs for indoor lighting. .	there are federal programs in place to assist the regions in the procurement of LEDs for public buildings and schools; • *Socio-Political Risks:* The Government of the Moscow region have allocated US$17 million for lighting retrofits in public (mostly educational facilities) buildings for ESCOs to implement. These programs will also provide funds to reduce the cost of LEDs for marginal income households in Moscow as well as other oblasts outside of Moscow; • *Institutional Framework and Governance:* Regional governments and municipalities are supportive of energy efficient lighting programs in Russia, as it assists them in compliance with the federal Energy Efficiency Law #261; • *Environmental Factors:* Activities in this outcome strongly demonstrate the energy savings and environmental benefits of energy-efficient lighting. ***Overall Rating***	4 4 4 **4**
Actual Outcome 4: Energy efficient street lighting is adopted in several oblasts in the Volga Federal District, with replications of EE Street lighting implemented in several other oblasts in Russia.	• *Financial Resources:* Financial resources are in place through federal programs to assist municipalities in the conversion of inefficient street lighting to LED street lighting; • *Socio-Political Risks:* Regional governments and municipalities are supportive of energy efficient lighting programs in Russia, as it assists them in compliance with the federal Energy Efficiency Law #261; • *Institutional Framework and Governance:* Regional governments and municipalities are supportive of energy efficient lighting programs in Russia, as it assists them in compliance with the federal Energy Efficiency Law #261; • *Environmental Factors:* Activities in this outcome strongly demonstrate the energy savings and environmental benefits of energy-efficient lighting. ***Overall Rating***	4 4 4 4 **4**
	Overall Rating of Project Sustainability:	**4**

4. CONCLUSIONS, RECOMMENDATIONS AND LESSONS

126. The early engagement of key Project stakeholders both in government and the private sector was a key to the success of the TRAMEL Project achieving almost all of its intended targets. One of the key successful outputs of the TRAMEL Project has been the formation of the Federal Energy Efficient Lighting Council (FEELC) that served as a useful forum for both government and private sector to dialogue on policies supportive of the transformation of the market of efficient lighting in the Russian Federation. In addition, the Project also facilitated the setup of the National Energy Efficient Lighting Platform (NEELP) that served as a technical advisory group to the EELC, and provided credible peer reviewed technical information to improve LEDs produced for the Russian market.

127. With these supportive policy entities in place, the TRAMEL Project through the EELC was also instrumental in assisting the Federal Ministry of Energy in the preparation and adoption of several key policy decisions to promote energy efficient lighting including:

- SNiP (Construction Norms and Regulations) No. 23-05-95 on “Natural and Artificial Lighting”, (in force since 20 May 2011) specifying minimum energy performance requirements of lighting systems in commercial buildings, new residential construction, street lighting, and industrial lighting (see Para 77);
- Government Decree #602 "On approval of the Requirements to Lighting Devices and Electric Lamps Used in Alternating Current Circuit for Illumination" (in force since January 2013) designed to curb any further production or sales of CFLs in the Russian Federation (see Para 79); and
- Governmental Decree #898 which came into force on July 1, 2016 listing the MEPS requirements for *procurement in the public sector of higher efficiency lighting products (see Para 89)*; and
- a draft governmental decree currently sitting with the Ministry of Energy specifying MEPS for all lighting devices with all market participants. Adoption of this draft of the decree is expected before the end of 2017.

128. This EELC has also been key to involving key stakeholders to assist the Ministry of Energy and the Ministry of Industry and Trade to become better informed for policy dialogue with the Eurasian Customs Union on supra-national technical regulations covering EE lighting in the Russian Federation as well as ECU member countries.

129. These actions and policies by MoE and MoIT with the assistance of the TRAMEL Project have been backed by the setup of a proper market surveillance system for efficient lighting. This included the setup of a network of 6 testing laboratories with equipment necessary for testing efficient lighting devices according to EU testing standards. The delivery of Government decrees and the proper market surveillance system has boosted the confidence of local lighting manufacturing associations in the Government’s commitment to transforming the market for efficient lighting. As a result, Project efforts to assist several local lighting manufacturing companies in upgrading their production lines for LED production in Russia has resulted in investment commitments with at least 6 Russian-based lighting companies during implementation of the TRAMEL Project.

130. The TRAMEL Project has also contributed to stronger demonstrations of the Government’s commitment to support pilot projects and replications of LEDs with indoor and street lighting applications. With pilot projects for street lighting implemented early in the TRAMEL Project in various oblasts in the Volga Federal District, replications of these pilots were completed in several

other oblasts around Russia, such as the Tver and Lipetsk oblasts. All participating municipalities on the pilot and replication projects were very positive on their opinions of LED indoor and outdoor lights, citing energy savings and improved illumination of outdoor areas as primary benefits. As a result of information disseminated on these positive pilot projects and replications, many of which were implemented by ESCOs, several other municipalities have expressed interest in embarking on similar LED lighting initiatives involving ESCOs.

4.1 Corrective actions for the design, implementation, monitoring and evaluation of the project

131. *Action 1 (to UNDP): Project management teams for UNDP GEF projects should pay more attention to monitoring of project activities based on indicators and targets as set in the Project strategic results framework.* In particular on this Project, documentation of pilot LED installations and energy savings could have been improved to include details of the types of LEDs installed, the energy characteristics of the lamps they are replacing, and the hours of usage of these lamps. The writing in the PIRs could also be improved so that progress is reported directly in terms of the actual indicator and target. Such assistance to improve this writing could be done from the Regional level. In addition, Project teams should also focus on not only direct project investments (where GEF funds are used for "investment" purposes) but also on co-financed lighting installations where the Project should receive credit for generating GHG emission reductions from energy efficient lighting pilots and replications.

4.2 Actions to follow up or reinforce initial benefits from the project

132. *Action 2 (to Government of Russia): Adoption of MEPS for efficient lighting by the Ministry of Energy is the immediate priority to sustain current market transformation momentum of the efficient lighting market.* The Project recently helped in drafting of the new technical regulations for mandatory MEPS (as an update to the 2008 MEPS) for all types of lighting (indoor and outdoor) which were then submitted to the Ministry of Energy for adoption by a Government Decree expected to be in force by late 2017. The adoption of mandatory MEPS is crucial to the transformation of the market for efficient lighting. Without mandatory MEPS, the uptake of efficient lighting amongst consumers would not accelerate, and would create uncertainty amongst many of the local lighting manufacturers of LEDs in the Russian Federation. Moreover, adoption of these MEPS will increase progress in the harmonization of such technical regulations within the framework of ECU; if not, the Russian Ministry of Energy will use them as a national "interim" standard until ECU MEPS and technical regulations are approved.

4.3 Proposals for future directions underlining main objectives

133. *Action 3 (to Government of Russia): Transfer the outputs of the TRAMEL Project to the development of the regulatory framework within the Eurasian Customs Union*. The outputs of the TRAMEL Project should be used for compliance oversight to a new system of technical regulations under the ECU when they are approved. This would include the market surveillance system, a monitoring system for the lighting market in Russia, and the FEELC in a technical advisory capacity whose knowledge and expertise would be required for tweaking market surveillance and market monitoring in harmony with a new ECU regulatory regime.

134. *Action 4 (to UNDP and Government of Russia): The Ministry of Energy team should continue its linkages with the other UN projects in other countries with similar targets to scale-up local LED production*. With 6 lighting companies out of an estimated 600 lighting companies in Russia having benefitted from the Project and transformation into quality LED lighting products, challenges still remain in the upgrading of the remaining 594 lighting companies in their roles in becoming a part of the supply chain for EE lighting in Russia. Depending on the capacity of a particular lighting company, their transformation may only involve certain aspects of LED manufacturing, assembly or supply of certain parts. The experience of other countries in dealing with scaled-up domestic LED production using existing capacities would serve as useful knowledge to the Ministry of Energy and the Ministry of Industry and Trade (who will be overseeing ECU technical regulations when they are approved). The evaluation team suggests that the Ministry of Energy to maintain or strengthen its linkages with (if it has not already done so):

- The United for Efficiency (U4E) platform is a GEF-funded UNEP-UNDP joint initiative with the International Copper Association (ICA), the environmental and energy-efficiency NGO CLASP, and the Natural Resources Defense Council (NRDC) as well as private sector partners from the appliance manufacturers industry including OSRAM and Philips. With its mandate to accelerate the transition to efficient lighting worldwide by promoting the leapfrogging of high-efficiency product categories such as motors, refrigerators, air conditioning and transformers. The participation of the Russian Ministry of Energy with U4E's knowledge dissemination events with its private and public sector partners would be useful in the context of understanding how other countries deal with scaling up of high efficiency products such as LEDs;
- The Global Efficient Lighting Partnership Programme under en.lighten where the Russian Federation can have access to expertise representing over 30 organizations from 46 countries, provides targeted technical expertise to support the development of these policies in a manner that maximizes the time and resources required to implement viable National or Regional Efficient Lighting Strategies and coordinated regional activities; and
- Other UNDP-GEF projects involved with scaled up domestic LED production. This may include a GEF funded project in Viet Nam entitled "Local Development and Promotion of LED Technologies for Advanced General Lighting" (GEF ID. 5555) which was intended to strengthen local capacities for manufacturing LED lighting devices for sale to the domestic market at prices that would be competitive with inefficient lighting devices. Through contact with these other projects, the Ministry would have exposure as to how other countries are dealing with demands to scale up domestic LED production. One of the issues has been the difficulties in accessing qualified technical assistance to improve the quality of LED production, given the issues of the protection of intellectual property and proprietary information. Information on the experiences of other countries in LED production would be useful for the preparation of a road map to scaled-up LED production in the Russian Federation.

4.4 Best and worst practices in addressing issues relating to relevance, performance and success

135. *Best practice: Design of a market transformation project needs to include all elements required to facilitate the transformation on the basis of strong baseline information.* The design of the TRAMEL Project addresses all the critical barriers preventing the widespread use of efficient lighting in the Russian Federation. This included, most importantly:

- stronger legislation to implement a phase-out of inefficient lighting devices;
- defining minimum energy performance standards of efficient lighting devices allowed into the Russian market;
- understanding, working with and strengthening the capacities of stakeholders involved in the supply chain of efficient lighting devices in the Russian Federation; and
- raising awareness of the general public as well as policymakers on the benefits of efficient lighting.

The inclusion of these critical activities and the successful implementation has led to the completion of a successful efficient lighting project in the Russian Federation.

136. *Poor practice: Pilot projects should be located in jurisdictions where the probabilities for success and timely implementation are higher.* In the case of the Moscow indoor lighting pilots, the Project experienced unforeseen difficulties in implementing these projects due to regulatory complexities within the Moscow regional Government. One of difficulties was not being able to use ESCOs for installing efficient lighting due to legal complexities, and higher labour costs in Moscow contributing to a longer payback period for ESCO implemented pilots within Moscow, and making ESCO contracts less attractive. In comparison, street lighting and indoor lighting projects were implemented in regions outside of Moscow (such as in the Vladimir region) where ESCO contracts for efficient lighting were approved and successfully executed. Future projects considering pilot projects should implement them in jurisdictions where there are less barriers, thereby increasing their probability of being successfully implemented.

137. *Best practice: Effective engagement with implementing partner*. The conduct of UNDP interactions with MoE can be viewed as a best practice. The nature of TRAMEL Project assistance to the Ministry of Energy was frequent communication between the Project team and the NPD, and assisting them with tasks that reduced day-to-day work load of Ministry personnel. During interviews with the Ministry of Energy personnel, they mentioned the benefits of the project in undertaking actions that were very useful in advancing at an increased pace, legislative reform for MEPS and policies and standards aligned with best international practices.

138. *Best practice: Effective and early engagement of key stakeholders on a market transformation project by providing a forum for creating an environment of common interests and compromise*. The early and successful formation of the EELC can be viewed as a best practice including:

- The EELC ensuring steady engagement of all key stakeholders to dialogue on policies, regulations and standards that would be supportive of increasing the use of efficient lighting in the Russian Federation. Interactions with members of the EELC, the TRAMEL Project team and the MoE included frequent, proactive and focused communication, as well as contributions from UNDP on solutions to integrate project inputs with the priorities of the MoE, as well as bringing in required technical assistance including international and national personnel;
- Proactive responses to suggestions by key stakeholders for sustainable capacity outcomes such as the MoE advice for switching to LEDs, and supporting “Honest Position Group” in building the capacity of test labs for EE lighting to ensure compliance of the groups LED products to upcoming MEPS and other international standards;
- Providing strategically timed key inputs by international consultants that included design of a phase-out program for inefficient lighting devices, a market surveillance system and testing

standards for lighting devices aligned with the EU. Such inputs support continual progress and sustained interest of all stakeholders involved in formulation of policies and work plans.

139. *Best practice: A project team should have a person with intimate knowledge of the project's subject matter.* In the case of the TRAMEL Project, it was fortunate enough to be led by a project manager who had intimate knowledge of the lighting industry in the Russian Federation. Moreover, to fill in gaps of his knowledge on best international practices for efficient lighting, international technical assistance was provided at strategic times during TRAMEL Project that increased the pace of progress.

APPENDIX A – MISSION TERMS OF REFERENCE FOR TRAMELPROJECT TERMINAL EVALUATION

Objective and scope

This Terminal Evaluation will be conducted according to the guidance, rules and procedures established by UNDP and GEF as reflected in the UNDP Evaluation Guidance for GEF Financed Projects.

The objectives of the evaluation are to assess the achievement of project results, and to draw lessons that can both improve the sustainability of benefits from this project, and aid in the overall enhancement of UNDP programming.

Mid Term Review
The Project mid-term evaluation (MTE) took place in late 2012 (final report submitted in early 2013) and its main concerns regarding the achievement of project objectives were related to "Testing Laboratories" component within Activity 1 and "Moscow pilot projects in public building" component within Activity 3. The final evaluation should assess the extent to which the recommendations of the mid-term review have been taken into account by the project.

Final Review – Terminal Evaluation
The terminal evaluation will explore in detail five major criteria:
(i) Relevance: the extent to which the activity is suited to local and national development priorities and organizational policies, including changes over time.
(ii) Effectiveness: the extent to which an objective has been achieved or how likely it is to be achieved.
(iii) Efficiency: the extent to which results have been delivered with the least costly resources possible.
(iv) Results: the positive and negative, and foreseen and unforeseen, changes to and effects produced by a development intervention. In GEF terms, results include direct project outputs, short- to medium-term outcomes, and longer-term impacts including global environmental benefits, replication effects and other local effects.
(v) Sustainability: the likely ability of an intervention to continue to deliver benefits for an extended period of time after completion. Projects need to be environmentally as well as financially and socially sustainable.

Project Goal: to reduce GHG emissions in Russia by improving energy efficiency related to lighting.

Project Objective: to transform the lighting market in Russia through promotion of energy-efficient lighting technologies and systems, and phasing-out inefficient lighting with a goal of a reduction in energy consumption of 4 TWh/yr (includes direct and indirect savings) or approximately 2 Mtn CO_2 less per year.

The Project was designed with 4 outcomes, as follows:

1. Improved standards and policy framework for promotion of energy efficient technologies. At the federal level, instruments and policy frameworks will be introduced to initiate and facilitate a market transformation, including establishing the Federal Energy Efficient Lighting Council, designing and introducing standards for lighting products, and updating existing regulations (SNiPs) to include specific minimum energy performance requirements of lighting systems in commercial and new residential buildings, in street and industrial lighting;

2. Chain for manufacturing and supply of efficient lighting products is strengthened**.** This support will consider different options, including international joint ventures and improved domestic production;
3. Efficiency of lighting is increased in Moscow residential and public buildings, including hospitals and schools. This kind of demonstration projects will be actively replicated elsewhere in Russia;
4. Energy efficient street lighting demonstration projects will be implemented and further replicated elsewhere in Russia.

Evaluation approach and method

An overall approach and method[62] for conducting project terminal evaluations of UNDP supported GEF financed projects has developed over time. The evaluation will be carried out by a lead international consultant and supported by a national consultant. The final evaluation should include a mixed methodology of document review, interviews, and observations from project site visits, at minimum, and the evaluators should make an effort to triangulate information. The evaluator is expected to frame the evaluation effort using the criteria of relevance, effectiveness, efficiency, sustainability, and impact, as defined and explained in the UNDP Guidance for Conducting Terminal Evaluations of UNDP-supported, GEF-financed Projects. A set of questions covering each of these criteria have been drafted and are included with this ToR. The evaluator is expected to amend, complete and submit this matrix as part of the evaluation inception report, and shall include it as an annex to the final report.

The evaluation must provide evidence-based information that is credible, reliable and useful. The evaluator is expected to follow a participatory and consultative approach ensuring close engagement with government counterparts, in particular the GEF operational focal point, UNDP Project Office, project team, UNDP GEF Technical Adviser based in the region and key stakeholders. The evaluator is expected to conduct a field mission to project sites jointly identified with the Project Manager. Interviews will be held with the following organizations at a minimum: UNDP Istanbul Regional Hub, UNDP-Russia Projects Support Office, Ministry of Energy of the Russian Federation, Ministry of Industry and Trade of the Russian Federation, Government Office of the Russian Federation, Russian Energy Agency, Ministry of Energy of the Moscow Region, local governments of the Volga Federal District municipalities, state and private test laboratories (Rostest, Archilight, etc.), Association of Manufacturers of Electric Appliances RATEK, Russian Association of Energy Service Companies RAESCO, Non-Commercial Partnership of Manufacturers of LEDs and LED-Based Systems, Non-Commercial Partnership “Energoeffectivnygorod” [Energy efficient city], main research and education institutions (All-Russia Research Institute of Lighting VNISI, Moscow Power Engineering Institute, Nizhny Novgorod State Technical University, etc.), UNDP supported projects on lighting in Kazakhstan and Armenia.

The evaluator will review all relevant sources of information, such as project document, project reports – including Annual APR/PIR, project budget revisions, midterm review, progress reports, GEF focal area tracking tools, project files, national strategic and legal documents, and any other materials that the evaluator considers useful for this evidence-based assessment. A list of documents that the project team will provide to the evaluator for review is included in this Terms of Reference.

[62] http://web.undp.org/evaluation/evaluations/handbook/english/documents/pme-handbook.pdf

Evaluation criteria & ratings

An assessment of project performance will be carried out against expectations set out in the Project Logical Framework/Results Framework, which provides performance and impact indicators for project implementation along with their corresponding means of verification. The evaluation will at a minimum cover the criteria of: relevance, effectiveness, efficiency, sustainability and impact**.** Ratings must be provided on the following performance criteria:

1. Monitoring and Evaluation (M&E design at entry, M&E Plan Implementation, Overall quality of M&E);
2. IA& EA Execution (Quality of UNDP Implementation, Quality of Execution - Executing Agency, Overall quality of Implementation / Execution);
3. Assessment of Outcomes (Relevance, Effectiveness, Efficiency, Overall Project Outcome Rating)
4. Sustainability (Financial resources, Socio-political, Institutional framework and governance, Environmental, Overall likelihood of sustainability).

The completed table must be included in the evaluation executive summary.

Project finance/Co-finance

The Evaluation will assess the key financial aspects of the project, including the extent of co-financing planned and realized. Project cost and funding data will be required, including annual expenditures. Variances between planned and actual expenditures will need to be assessed and explained. Results from recent financial audits, as available, should be taken into consideration. The evaluator(s) will receive assistance from the Project Office and Project Team to obtain financial data in order to complete the co-financing table, which will be included in the terminal evaluation report.

Impact

The evaluators will assess the extent to which the project is achieving impacts or progressing towards the achievement of impacts. Key findings that should be brought out in the evaluations include whether the project has demonstrated: a) verifiable improvements in ecological status, b) verifiable reductions in stress on ecological systems, and/or c) demonstrated progress towards these impact achievements.

Conclusions, recommendations & lessons

The evaluation report must include a chapter providing a set of conclusions, recommendations and lessons. Conclusions should build on findings and be based on evidence. Recommendations should be prioritized, specific, relevant, and targeted, with suggested implementers of the recommendations. Lessons should have wider applicability to other initiatives across the region, the area of intervention, and for the future.

Evaluation timeframe

The total duration of the evaluation will be 25 days during the calendar period of 2 months (1 February – 31 March 2017). The following tentative timetable is recommended for the evaluation, however, the final schedule will be agreed upon in the beginning of the assignment:

- Preparation - 3 days;
- 1st Evaluation Mission - 7 days;
- Draft Evaluation Report - 7 days;
- 2nd Evaluation Mission - 3 days;
- Final Report - 5 days.

Evaluation deliverables

The evaluation team is expected to deliver the following:

- Inception Report - Evaluator provides clarifications on timing and method no later than 2 weeks before the evaluation mission and submits the report to the UNDP PSO;
- Presentation - Initial findings at the end of the 1st evaluation mission presented to the project management, UNDP PSO and UNDP Regional Technical Advisor;
- Draft Final Report - Full report (per annexed template) with annexes within 3 weeks of the 1st evaluation mission sent to UNDP PSO, reviewed by RTA, PSO and Project team;
- Final Report - Revised report within 1 week of receiving UNDP comments on draft and upon completion of the 2nd evaluation mission sent to PSO for uploading to UNDP ERC. When submitting the final evaluation report, the evaluator is required also to provide an 'audit trail', detailing how all received comments have (and have not) been addressed in the final evaluation report.

Evaluation ethics

Evaluation consultant will be held to the highest ethical standards and is required to sign a Code of Conduct upon acceptance of the assignment. UNDP evaluations are conducted in accordance with the principles outlined in the UNEG 'Ethical Guidelines for Evaluations'

Payment instalments:
10% Following submission of a detailed workplan/inception report prior to the 1st mission;
55% Following submission and approval of the 1st draft terminal evaluation report;
35% Following submission and approval (UNDP-PSO and UNDP RTA) of the final terminal evaluation report.

Competencies

Corporate Competencies:

- Demonstrates integrity by modeling the UN's values and ethical standards;
- Promotes the vision, mission, and strategic goals of UNDP;
- Displays cultural, gender, religion, race, nationality and age sensitivity and adaptability.

Functional competencies:

- Strong interpersonal skills, communication skills and ability to work in a team;
- Ability to plan and organize work, efficiency in meeting commitments, observing deadlines and achieving results;
- Openness to change and ability to receive/integrate feedback;
- Ability to work under pressure and stressful situations;
- Strong analytical, research, reporting and writing abilities.

Qualification requirements

Education
A Master's degree in environmental sciences, climate change mitigation, lighting engineering or other closely related field; PhD will be considered as an advantage.

Relevant experience:

- Minimum 10 years of relevant professional experience inclimate change mitigation and energy efficiency;
- Experience in results-based monitoring and evaluation methodologies;
- Knowledge of UNDP and GEF evaluation procedures is an advantage;
- Work experience in Europe & CIS region and/or Russian Federation is an advantage.

Language skills

Excellent English (both oral and written); Russian language will be considered as an advantage.

Evaluation procedure

Individual consultants will be evaluated based on a cumulative analysis taking into consideration the combination of the applicants' qualifications and financial proposal. The award of the contract shall be made to the individual consultant whose offer has been evaluated and determined as:

- Responsive, compliant, acceptable;
- Having received the highest score out of a pre-determined set of technical and financial criteria specific to the solicitation.

APPENDIX B – MISSION ITINERARY (FOR MARCH 2017)

#	Activity	Stakeholder involved	Place
March 1, 2017 (Wednesday)			
	Arrival of Roland Wong in Moscow		
March 2, 2017 (Thursday)			
1	Meeting with Mr. Anton Inyutsyn, *National Project Director,* and Mr. *Dmitry Melnikov, Deputy National Project Director at MoE offices*	Ministry of Energy	Moscow
2	Meeting with Anatoly Shevchenko, *Project Manager* and Project Team at UNDP offices	UNDP	Moscow
March 3, 2017 (Friday)			
3	Meeting with Mr. Leonid Neganov, *Minister of Energy of the Moscow Region at UNDP Offices*	Moscow Regional Government	Moscow
4	Skype meeting with Mr. Armen Gulkanyan, *Project Manager UNDP-GEF Project on Lighting in Armenia*	UNDP	Moscow
5	Skype meeting with Mr. Syrym Nurgaliev, *Project Manager UNDP-GEF Project on Lighting in Kazakhstan*	UNDP	Moscow
6	Meeting with Vitaly Kovalchuk, *Energy Efficiency Advisor* near GoR offices in Moscow	Office of the Government of the Russian Federation	Moscow
March4-5, 2017 (Saturday-Sunday)			
	Work on Evaluation Report		
March6, 2017 (Monday)			
7	Skype meeting with Alexander Bogdanov, Technical Director of Roselektronika Corporation, Board Member and Responsible for Standards and Regulations	Non-Commercial Partnership of Manufacturers of LEDs and LED-Based Systems	Moscow
8	Meeting with Sergey Gvozdev-Karelin, Executive Director in UNDP Offices	Association of Suppliers and Manufacturers of Lighting Products “ChestnayaPozitsia” (Honest Position Group)	Moscow
March7, 2017 (Tuesday)			
9	Meeting with Ms. Anna Shakhparunyants, and her team at VNISIS Offices in Moscow	*All-Russia Research Institute of Lighting VNISI*	Moscow

#	Activity	Stakeholder involved	Place
10	Meeting with Sergey Nikiforov, *Head of Archilight Test Laboratory, Chief Editor*	*"PoluprovodnikovayaSvetotekhnika" [LED Lighting Technologies] Magazine*	Moscow
March 8, 2017 (Wednesday)			
	Work on Evaluation Report		
March 9, 2017 (Thursday)			
	Travel by train to Vladimir		
	Visits to the pilot sites (street lighting) in Vladimir with local administrations	Vladimir Region	Vladimir
March 10, 2017 (Friday)			
11	Meeting with Ms. Lydia Smolina, *First Deputy Governor, Ms.* Elena Semenova, *Deputy Head of Housing and Utilities Department*	Vladimir Region	Vladimir
	Travel to Kovrov		
12	Meeting with Mr. Alexander Bobrov and Mr. Igor Nekrasov of Kovrov Municipality	Kovrov Municipality	Kovrov
	Travel to Suzdal		
	Visits to the pilot sites (street lighting) in Suzdal, meetings with Mr. Konstantin Frolov of the Suzdal local administration	Suzdal Municipality	Suzdal
	Return to Moscow by train		
March 11-12, 2017 (Saturday-Sunday)			
	Work on Terminal Evaluation Report		
March 13, 2017 (Monday)			
13	Meeting with Ms. Natalia Morzhova of GFK Russia at UNDP offices	GFK Russia	Moscow
14	Meeting with Mr. Anton Shalaev, Deputy Head of Rosstandart at UNDP Offices	Rosstandart (under MoIT)	Moscow
March 14, 2017 (Tuesday)			
15	Meeting with Ms. Olga Oleynik, *UNDP-Russia Communications Analyst*	UNDP	Moscow
16	Meeting with Mr. Vyacheslav Ilyinykh, *Commercial Director of "Leader Light" Company at UNDP Offices*	LED Manufacturer in Russia	Moscow
March 15, 2017 (Wednesday)			

#	Activity	Stakeholder involved	Place
	Visit to Khimki School District in Moscow Region	Moscow Regional Government	Khimki Municipality
March 16, 2017 (Thursday)			
17	Debriefing of TRAMEL Evaluation with PMO at UNDP Offices	UNDP PSO	Moscow
March 17, 2017 (Friday)			
	Departure of Mr. Roland Wong from Moscow		
March 22, 2017 (Wednesday)			
18	Skype meeting with Mr. Chris Evans	International MV&E consultant to TRAMEL	Vancouver
March 23, 2017 (Thursday)			
19	Skype meeting with Mr. Steve Coyne	International consultant to TRAMEL on Programs for Inefficient Lighting Phase-Out, Promotion, Compliance and Test Laboratories Programs	Vancouver

Total number of meetings conducted: 19

APPENDIX C – LIST OF PERSONS INTERVIEWED

This is a listing of persons contacted in Moscow and Vladimir (unless otherwise noted) during the Terminal Evaluation Period only. The Evaluator regrets any omissions to this list.

1. Mr. John O'Brien, Regional Technical Advisor on Climate Change Mitigation, Istanbul Regional Hub;
2. Ms. Natalia Olofinskaya, Regional Technical Specialist - Adaptation to Climate Change, Istanbul Regional Hub, Head of UNDP Russia PSO;
3. Mr. Anatoly Shevchenko, TRAMEL Project Manager;
4. Ms. Olga Martynenko, TRAMEL Project Associate;
5. Ms. Olga Oleynik, UNDP-Russia Communications Analyst;
6. Mr. Steve Coyne, Director, Light Naturally, Australia;
7. Mr. Chris Evans, S2E4 Limited, United Kingdom;
8. Mr. Anton Inyutsyn, National Project Director, Deputy Minister of Energy of the Russian Federation;
9. Mr. Dmitry Melnikov, Deputy National Project Director, Deputy Minister's Office;
10. Mr. Anton Shalaev, Deputy Head of Rosstandard;
11. Mr. Leonid Neganov, Minister of Energy of the Moscow Region;
12. Mr. Vitaly Kovalchuk, Energy Efficiency Advisor, Office of the Government of the Russian Federation;
13. Ms. Lydia Smolina, First Vice-Governor, Vladimir Regional Administation;
14. Ms. Elena Semenova, Deputy Head of Housing and Utilities Department, Governor's Office, Vladimir Regional Administation;
15. Mr. Alexander F. Bobrov, First Deputy Head of City Administration on Economy and Finances, Kovrov Municipality;
16. Mr. Igor Nekrasov, Head of Division on Municipal Facilities and Housing Management, Coordinator Street Lighting, Kovrov Municipality;
17. Mr. Konstantin Frolov, Head of Department of Education, Coordinator Public Buildings Indoor Lighting, Suzdal Municipality;

18. Mr. Alexander Bogdanov, Technical Director of Roselektronika Corporation, Board Member and Responsible for Standards and Regulations at the Non-Commercial Partnership of Manufacturers of LEDs and LED-Based Systems;

19. Mr. Sergey Gvozdev-Karelin, Executive Director of the Association of Suppliers and Manufacturers of Lighting Products “Chestnaya Pozitsia” (Honest Position Group);

20. Dr. Anna Shakhparunyants, General Director, Head of All-Russia Research Institute of Lighting VNISI, Moscow;

21. Mr. Pavel Fedorishchev, Head of international and Public Relations Department, VNISI;

22. Ms. Julia Glorio, Manager of international and Public Relations Department, VNISI;

23. Mr. Evgenii Rozovskii, Leading Researcher, VNISI;

24. Dr. Alexei Bartsev, Head of Mesuring Center, VNISI;

25. Dr. Dmitry Yushkov, Scientific Secretary;

26. Mr. Vladislav Terekhov, Marketing Director, BL Trade, Moscow;

27. Mr. Sergey Nikiforov, Head of Archilight Test Laboratory, Chief Editor of “Poluprovodnikovaya Svetotekhnika” (LED Lighting Technologies) Magazine;

28. Mr. Vyacheslav Ilyinykh, Commercial Director of “Leader Light” Company;

29. Ms. Natalia Morzhova, Deputy Country Manager, Consumer Choices, GFK, Moscow.

APPENDIX D – LIST OF DOCUMENTS REVIEWED

1. UNDP Project Document for the "Transforming the Market for Efficient Lighting" (TRAMEL Project);
2. UNDP-GEF Mid-Term Review Report for the TRAMEL Project by Suresh Harry, January 2013;
3. UNDP Management Response on TRAMEL, October 2014;
4. TRAMEL Quarterly Progress Reports from 2010 to 2016;
5. TRAMEL Project Implementation Reports from 2010 to 2017;
6. TRAMEL Project Steering Committee meeting minutes from 2010 to 2016;
7. Draft of "Introduction of new MEPS to phase-out inefficient lighting technologies in Russia (draft Government decree developed by UNDP-GEF Project and agreed with the key federal Ministries: of Energy, of Economic Development and of Industry and Trade)";
8. TRAMEL Report by Steve Coyne on "Efficient Lighting Promotion and Compliance Program - Phase-out and promotion programs", September 2013;
9. TRAMEL Report by Steve Coyne on "Efficient Lighting Promotion and Compliance Program - National Test Laboratories and Compliance Program", February 2014;
10. TRAMEL Report by Chris Evans on "Report 1 – Overview of International Best Practice on Monitoring, Verification & Enforcement", December 2015;
11. TRAMEL Report by Chris Evans on "Report 2 – Proposals for the establishment of MVE systems in the Russian Federation", April 2016;
12. TRAMEL Project websites: www.energourok.ru and http://www.undp-light.ru/info/print/.

APPENDIX E – GHG EMISSION REDUCTION CALCULATION REPORT

E.1 Lighting market analysis

Table E.1: Russian market capacity in 2011-2015[63]

Lamp type	Quantity, mln pcs				
	2011	2012	2013	2014	2015
Incandescent	560.154	503.540	518.182	488.356	462.247
Halogene	58.532	80.759	51.231	49.961	41.462
CFLs	103.978	110.082	117.408	101.262	57.571
LED	9.441	16.986	44.916	111.555	110.078
Fluorescent (2 bases)	108.208	118.190	129.141	84.747	69.134
Sodium	1.767	2.400	2.212	2.028	1.745
Mercury	9.312	10.432	8.684	5.377	4.510
Metal halide	1.476	1.510	1.194	1.293	0.666
Market capacity	**852.868**	**843.899**	**872.967**	**844.579**	**747.413**

Changes to the market structure have taken place due to the following regulatory influences:

- ban by Federal Law #261 «On energy saving» of incandescent lamps of 100 W and above since 2011;
- ban by Federal Law #261 «On energy saving» of any incandescent lamps in public buildings since 2011;
- adoption in 2011 of Government Decree #602 "On requirements to lighting devices and electric lamps used for lighting in alternating current circuits";
- adoption in 2015 of Government Decree #898 on banning for state procurement low efficiency discharge lamps and luminaries.

E.2 Calculation of GHG emissions reductions for lighting market with regard to energy efficiency requirements to lighting products

GHG emissions reductions can be viewed from two perspectives:

- Direct reductions related to demo projects in public buildings and street lighting;
- Indirect reductions due to the implementation of national programs on phasing-out inefficient lighting source.

Direct reductions have been obtained due to the introduction of LED technologies.

Indirect reductions are closely related to the Russian lighting market transformation and replacement of incandescent lamps, mercury lamps and CFLs by more energy efficient technologies.

[63] Analysis of the technological potential of the lighting industry in the Russian Federation in 2016.

Calculation of indirect GHG emissions reductions is based on the analysis of baseline scenarios of market development.

Scenario 1 (without taking into account the impact of technical regulations) is based on the assumption that the lighting market would have changed without the adoption of regulatory documents:

- incandescent lamps market is shrinking because of the low light output while the incandescent lamps remain dominant on the market;
- fluorescent lamps with two bases (T12) are gradually replaced by T8 and T5 lamps and later by LED lamps;
- arc discharge mercury lamps market is gradually shrinking because of transition to the sodium lamps and later to LED lamps.

Scenario 2 (actual variant taking into account the impact of technical regulations) – the lighting market capacity depends on the adopted regulations related to banning certain types of lamps with low energy efficiency since a certain period of time:

- growth of CFL and LED lamps market due to partial ban of incandescent lamps;
- sharp shrinking of fluorescent lamps (with 2 bases) market due to the ban of halophosphate lamps;
- sharp shrinking of high pressure mercury lamps market due to their ban in public sector.

E.3 Methodology of calculating GHG emission reduction

This work uses "Calculating Greenhouse Gas Benefits of the Global Environment Facility Energy Efficiency Projects Version 1.0" which is the best for calculating emissions reductions in lighting sector. Its advantages are as follows:

- Simple in application;
- Availability and simplicity of initial data;
- Applicability to projects on energy efficiency and markets transformation
- Consistency in calculating GHG emissions throughout GEF-funded projects.

The basis for calculating GHG emissions reductions due to projects on energy savings in lighting is the value of specific GHG emissions during electric energy production (g CO2/kW*hr). However, these data vary in various respected Russian and foreign sources. For instance, according to the data from a statistical compendium "Environment projection in Russia in 2016" and from the "Russian National cadaster of anthropogenic emissions of GHG gases that are not regulated by the Montreal Protocol" the specific GHG emissions value for energy sector has been 533 r g CO2/kW*hr in 2012 and 393 g CO2/kW*hr in 2013[64].

In accordance with the Analytical Report "Risks of Implementation of the Paris Climate Agreement for Russian Economy and National Security" [3 p.52] the specific GHG emissions value for energy sector has been 1.08 kg eq. CO2/kW*hr in 1990, 0.96 kg eq. CO2/kW*hr in 2000, and 0.78 kg eq. CO2/kW*hr in 2013. Because of the large difference between the specific GHG emissions values in this work we have taken the carbon ratio of 0.55 mln t CO2/ 1 bln kW*hr. This value was taken from the project document and falls well under the above mentioned values.

[64] Main indicators of environmental protection. Statistical Bulletin 2015

E.3.1 Initial data for calculation of GHG emissions reductions

Calculations were done for the two following scenarios:

- Scenario 1 (without taking into account the impact of technical regulations). The curve for possible lamps number was created by extrapolation and drawing the trend line on the basis of actual data for lamps market until 2011.
- Scenario 2 (taking into account the impact of technical regulations). Lamps number was taken from available statistical data.

The following lighting sources were taken into account: incandescent lamps, CFLs, fluorescent lamps with two bases, mercury lamps, sodium and metal halide lamps, LED lamps.

E.3.2 Replacement of lamps in indoor lighting systems

Outdated incandescent lamps have been replaced since 2011 by CFLs and since 2015 by LEDs. Outdated halophosphate lamps have been replaced by energy efficient modern technologies (CFLs and LEDs).

Table E.2: Initial data for calculation of replacement of incandescent lamps by CFLs and LEDs

Lamp type	Scenario 1	Scenario 2	
	Incandescent	CFLs	LEDs
Power, W	65	13	7
Light output, lm/W	10	50	90
Running time[65], hr/yr	900	900	900

Table E.3: Initial data for calculation of replacement of fluorescent lamps

Lamp type	Scenario 1	Scenario 2	
	T8 (halophosph)	T8 (3 phosph)	LEDs
Power, W	18	18	
Light output - lamp, lm/W	70	90	
Light output - luminary, lm/W	50	65	90
Running time[66], hr/yr	3,000	3,000	,3000

Arc discharge mercury lamps of low energy efficiency have been replaced first by sodium and metal halide lamps and gradually by LEDs.

Table E.4: Initial data for calculation of replacement of arc discharge mercury lamps

Lamp type	Scenario 1	Scenario 2		
	Arc discharge	Sodium	Metal halide	LED
Power, W				
Light output, lm/W	55	110	100	120
Running time[67], hr/yr	4000	4000	4000	4000

[65] running time is taken from expert data for residential sector
[66] Running time is taken from expert data for public and commercial sector
[67] Running time is taken from expert data for industrial sector and street lighting

E.3.3 Results of calculations of energy savings and GHG emissions reductions

Results of calculations of energy savings and GHG emissions reductions are presented in Table E.5 for incandescent lamps, Table E.6 for fluorescent lamps, and Table E.7 for arc discharge mercury lamps. Table E.8 contains summary data for public institutions. Figure E.1 shows the tendency of GHG emissions reductions for incandescent lamps, Figure E.2 for fluorescent lamps, and Figure E.3 for arc discharge mercury lamps.

Table E.5: Results of energy savings and GHG emissions reductions for incandescent lamps

Parameter	2010	2011	2012	2013	2014	2015	2016
	Number of lamps, mln pcs						
Scenario 1		560	559	556	552	548	544
Scenario 2							
Incandescent		560	503	518	488	462	448
CFLs		0	56	38	10	10	0
LEDs		0	0	11.40	6.4	10.3	19
	Total power, mln W						
Scenario 1		36,400	36,335	36,140	35,880	35,620	35,360
Scenario 2							
Incandescent		36,400	32,695	33,670	31,720	30,030	29,120
CFLs		874	728	104	125	134	0
LEDs				82	46	75	139
	Energy consumption, mln kW*hr						
Scenario 1		**32,760**	**32,702**	**32,526**	**32,292**	**32,058**	**31,824**
Scenario 2		**32,760**	**30081**	**30,470**	**28,702**	**27,215**	**26,333**
Incandescent		32,760	29,426	30,303	28,548	27,027	26,208
CFLs		0	655	93	112	121	0
LEDs		0	0	74	42	67	125
Difference			**2,621**	**2,056**	**3,590**	**4,843**	**5,491**
	GHG emissions, thousand tonnes CO_2						
Scenario 1		18,018	17,986	17,889	17,761	17,632	17,503
Scenario 2		0	16,544	16,759	15,786	14,968	14,483
Difference		**0**	**1,441**	**1,131**	**1,975**	**2,664**	**3,020**

Figure E.1: Changes in GHG emissions (th t CO2) due to the replacement of incandescent lamps (scenario 1 – blue curve, scenario 2 – orange curve, difference – red curve)

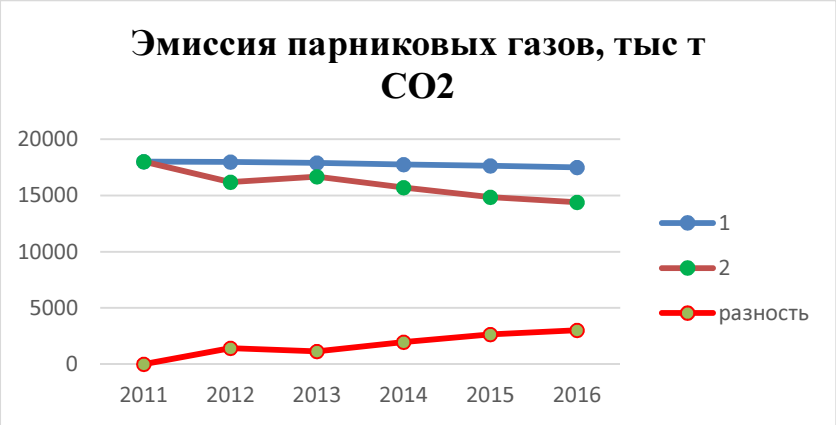


Table E.6: Results of energy savings and GHG emissions reduction for fluorescent lamps

Parameter	2010	2011	2012	2013	2014	2015	2016
	Number of lamps, mln pcs						
Scenario 1		108.2	118.2	121.7	118.0	108.0	100.0
Scenario 2							
- halophosph		108.2	35.5	60.85	16.94		
- 3 phosph			82.7	60.9	67.8	69.1	64.0
- LEDs					33.3	38.9	36.0
	Total power, mln W						
Scenario 1		1,948	2,127	2,191	2,124	1,944	1,800
Scenario 2							
- halophosph		1,948	638	1,095	305	0	0
- 3 phosph			1,146	843	938	957	886
- LEDs					333	389	360
	Energy consumption, mln kW*hr						
Scenario 1		5,843	6,382	6,572	6,372	5,832	5,400
Scenario 2		5,843	5,351	5,814	4,728	4,037	3,738
- halophosph		5,843	1,915	3,286	915	0	0
- 3 phosph		0	3437	2,528	2,815	2,870	2,658
- LEDs		0	0	0	999	1,167	1,080
Difference		**0**	**1,031**	**758**	**1,644**	**1,795**	**1,662**
	GHG emissions, th t CO_2						
Scenario 1		3,214	3,510	3,614	3,505	3,208	2,970
Scenario 2		3,214	2,943	3,197	2,601	2,221	2,056
Difference		**0**	**567**	**417**	**904**	**987**	**914**

Figure E.2: Changes in GHG emissions (th t CO2) due to the replacement of fluorescent lamps (scenario 1 – blue curve, scenario 2 – orange curve, difference – green curve)

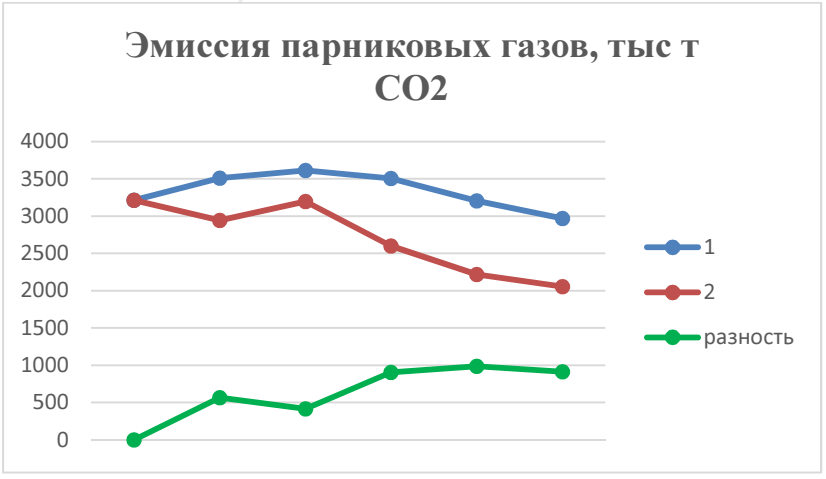


Table E.7: Results of energy savings and GHG emissions reduction for arc discharge mercury lamps

Parameter	2010	2011	2012	2013	2014	2015	2016
	Number of lamps, mln pcs						
Scenario 1				8.684	8.15	7.89	7.63
Scenario 2							
- arc discharge				8,684	5,38	4.51	4.10
- sodium					2.22	1.35	1.41
- metal halide					0.55	0.68	0.71
- LEDs						1.35	1.41
	Total power, mln W						
Scenario 1				3,474	3,260	3,156	3,052
Scenario 2							
- arc discharge				3,474	2,151	1,804	1,640
- sodium					444	270	282
- metal halide					111	135	141
- LEDs					0	243	254
	Energy consumption, mln kW*hr						
Scenario 1				13,894	13,040	12,624	12,208
Scenario 2				13,894	10,822	9,812	9,271
- arc discharge				13,894	8,603	7,216	6,560
- sodium					1,775	1,082	1,130
- metal halide					444	541	565
- LEDs					0	973	1,017
Difference				0	2,218	2,812	2,937
	GHG emissions, th t CO_2						
Scenario 1				7,642	7,172	6,943	6,714
Scenario 2				0	5,952	5,397	5,099
Difference				7,642	1,220	1,547	1,615

Figure E.3: Changes in GHG emissions (t CO2) due to the replacement of arc discharge mercury lamps (scenario 1 – blue curve, scenario 2 – orange curve, difference – green curve)

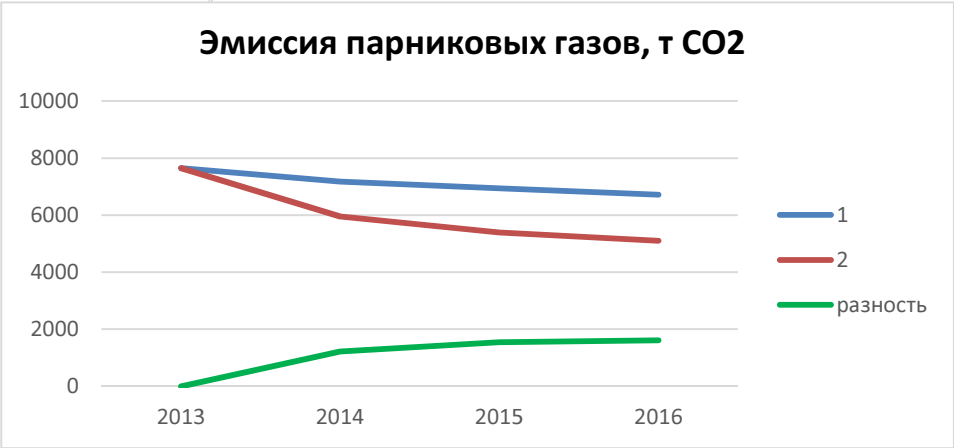


Table E.8 shows summary data for energy consumption reduction and GHG emissions reductions in lighting sector after implementation of the regulations.

Table E.8: Reduction of energy consumption and GHG emissions

Parameter	2010	2011	2012	2013	2014	2015	2016
	Energy consumption, mln kW*hr						
- incandescent	0	0	2,621	2,056	3,590	4,843	5,491
- fluorescent	0	0	1,031	758	1,644	1,795	1,662
-arc discharge					2,218	2,812	2,937
Total	0	0	3,652	2,814	7,452	9,450	10,090
	GHG emissions, th t CO_2						
- incandescent	0	0	1,441	1,131	1,975	2,664	3,020
- fluorescent	0	0	567	417	904	987	914
-arc discharge					1,220	1547	1,615
Total	0	0	2,008	1,548	4,099	5,198	5,549

E.4 Calculation of GHG emissions reductions due to the implementation of demo projects on modernization of lighting systems

E.4.1 Modernization of lighting systems in schools

Projects on modernization of indoor lighting were implemented in 15 schools (Moscow, Vladimir and Ulyanovsk Regions). The projects dealt with the following:

- replacement of active fluorescent lighting fixtures for general lighting in classrooms, corridors, recreation areas and other rooms by LEDs;
- replacement of lighting fixtures (fluorescent and mercury/sodium) by LEDs;
- installation of automated management systems for lighting;
- installation of outdoor lighting fixtures.

The implemented projects have led to 50-65 per cent reduction of electric power consumption while the required level of illumination remained unchanged.

E.4.2 Modernization of street lighting systems in cities

Projects on modernization of street lighting were implemented in six cities (Ulyanovsk, Nizhny Novgorod, Vladimir Regions and Chuvash Republic). The projects dealt with the replacement of outdated lighting fixtures with mercury lamps and incandescent lamps.

In projects implemented until 2014 (Sarov and Shumerlya cities) lighting fixtures with sodium and metal halide lamps were used. In other projects LEDs were used.

The implemented projects have led to 60-65 per cent reduction of electric power consumption and significantly improved the quality of street lighting.

Results of energy savings and GHG emissions reduction are shown in Table 9 – for outdoor lighting and Table 10 – for schools.

Table E.9: Reduction of energy consumption and GHG emissions for outdoor lighting

Project	Amt of lighting sources, pcs	Power, kW		Released power, kW	Running time, hr/yr	Energy savings, kW*hr/yr	GHG emissions reductions, t CO_2
		before	after				
Dimitrovgrad, streets, UNDP	285	13.41	4.00	9.41	3,800	35,758	20
Dimitrovgrad, streets, ESCOs	7,673	1,926	557	1,368.92	3,800	5,201,896	2,861
Kovrov, streets, UNDP	360	99.00	27.36	71.64	3,800	272,232	150
Kovrov, streets, ESCOs	3,536	824.60	310.85	513.75	3,800	1,952,250	1,074
Gus-Khrustalny, streets, UNDP	370	101.75	28.12	73.63	3,800	279,794	154
Gus-Khrustalny, streets, ESCOs	2,287	571.75	163.35	408.40	3,800	1,551,920	854
Vladimir, streets, UNDP	500	135.00	50.00	85.00	3,800	323,000	178
Vladimir, streets, ESCOs	13,705	1,994	822	1,172	3,800	4,452,916	2,449
Vladimir, schools, UNDP	161	13.85	13.85	0.00	3,800	0	0
Vladimir, architectural lighting	217	16.79	7.15	9.64	3,800	36,617	20
Sarov, streets	932	300.32	133.96	166.36	3,800	632,168	348
Shumerlya, streets	1,231	302.61	119.38	183.23	3,800	696,274	383
Total:	**31,257**			**4,061.80**		**15,434,825**	**8,489**

Table E.10: Reduction of energy consumption and GHG emissions for lighting in schools

Project	Amount of lighting sources, pcs	Power, kW		Released power, kW	Running time, hr/yr	Energy savings, kW*hr/yr	GHG emissions reductions, t CO_2
		before	after				
Khimki, schools, UNDP	2,846	260.70	97.70	163.00	1,600	260,800	143
Dimitrovgrad, schools, UNDP	2,392	224.00	75.70	148.30	1 ,350	200,205	110
Vladimir, schools, UNDP	2,918	248.03	105.05	142.98	1,600	228,768	126
Total:	**8,156**			**454.28**		**689,773**	**379**

E.5 Reduction of potential mercury emissions due to efficient lighting

All gas discharge lamps contain mercury vapors. Mercury is a highly toxic metal and is very dangerous for the environment. Due to the replacement of mercury containing lamps by more energy efficient lamps mercury emissions have been reduced.

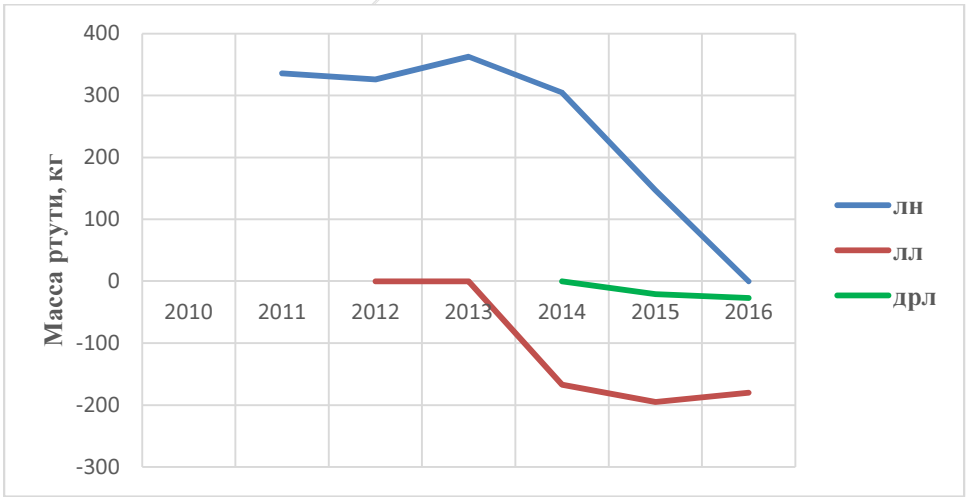
Halophosphate fluorescent lamps of T8 and T12 type contain in average 5 mg of mercury per lamp, CFLs contain 3 mg per lamp, while arc discharge mercury lamps – 30 mg per lamp.

An EEA report contains values of hazardous substances emissions during electric energy production[68]. Concentration of emissions depends on fuel characteristics (concentration in fuel, ratio of inorganic components) and on technological characteristics (mode of operation, type of boiler). Average value for mercury emissions during electric energy production is 0.0009 mg/kW*hr. Table E.11 presents results of calculations of mercury emissions reductions due to the transition to energy saving lighting sources.

Table E.11: Changes in mercury amount

Parameter	2010	2011	2012	2013	2014	2015	2016
	Mercury amount , t						
- incandescent	0	0	+280	+40	+48	+52	0
- fluorescent	0	0	0	0	-290	-195	-180
-arc discharge				0		-41	-42

Figure E.12: Reduction of mercury emissions due to transition to energy saving lighting sources (incandescent lamps – blue curve, fluorescent lamps – orange curve, arc discharge mercury lamps – green curve)



[68] EMEP / EEA emission inventory guidebook. General guidelines for the preparation of national inventories of emissions. EEA Technical Report No. 12/2013. Energy industries. Burning in the processing industries of the energy industry. - 2013. - 118s.

APPENDIX F – COMPLETED TRACKING TOOL

Tracking Tool for Climate Change Mitigation Projects (For Terminal Evaluation)

Special Notes: reporting on lifetime emissions avoided

Lifetime direct GHG emissions avoided: Lifetime direct GHG emissions avoided are the emissions reductions attributable to the investments made **during the project's supervised implementation period**, totaled over the respective lifetime of the investments.
Lifetime direct post-project emissions avoided: Lifetime direct post-project emissions avoided are the emissions reductions attributable to the investments made outside the project's supervised implementation period, but supported by financial facilities put in place by the GEF project, totaled over the respective lifetime of the investments. These financial facilities will still be operational after the project ends, such as partial credit guarantee facilities, risk mitigation facilities, or revolving funds.
Lifetime indirect GHG emissions avoided (top-down and bottom-up): indirect emissions reductions are those attributable to the long-term outcomes of the GEF activities that remove barriers, such as capacity building, innovation, catalytic action for replication.
Please refer to the Manual for Calculating GHG Benefits of GEF Projects.

Manual for Energy Efficiency and Renewable Energy Projects
Manual for Transportation Projects

For LULUCF projects, the definitions of "lifetime direct and indirect" apply. Lifetime length is defined to be 20 years, unless a different number of years is deemed appropriate. For emission or removal factors (tonnes of CO2eq per hectare per year), use IPCC defaults or country specific factors.

General Data	Results at Terminal Evaluation	Notes
Project Title	Transforming the Market for Efficient Lighting	
GEF ID		
Agency Project ID	72576	
Country	Russia	
Region	ECA	
GEF Agency	UNDP	
Date of Council/CEO Approval		**Month DD, YYYY (e.g., May 12, 2010)**
GEF Grant (US$)	7,020,000	
Date of submission of the tracking tool		**Month DD, YYYY (e.g., May 12, 2010)**
Is the project consistent with the priorities identified in National Communications, Technology Needs Assessment, or other Enabling Activities under the UNFCCC?	0	**Yes = 1, No = 0**
Is the project linked to carbon finance?	0	**Yes = 1, No = 0**
Cumulative cofinancing realized (US$)	99,064,000	
Cumulative additional resources mobilized (US$)	33,334,000	**additional resources means beyond the cofinancing committed at CEO endorsement**

Objective 2: Energy Efficiency		
Please specify if the project targets any of the following areas		
Lighting	1	Yes = 1, No = 0
Appliances (white goods)		Yes = 1, No = 0
Equipment		Yes = 1, No = 0
Cook stoves		Yes = 1, No = 0
Existing building		Yes = 1, No = 0
New building		Yes = 1, No = 0
Industrial processes		Yes = 1, No = 0
Synergy with phase-out of ozone depleting substances		Yes = 1, No = 0
Other (please specify)		
Policy and regulatory framework	5	0: not an objective/component 1: no policy/regulation/strategy in place 2: policy/regulation/strategy discussed and proposed 3: policy/regulation/strategy proposed but not adopted 4: policy/regulation/strategy adopted but not enforced 5: policy/regulation/strategy enforced
Establishment of financial facilities (e.g., credit lines, risk guarantees, revolving funds)	0	0: not an objective/component 1: no facility in place 2: facilities discussed and proposed 3: facilities proposed but not operationalized/funded 4: facilities operationalized/funded but have no demand 5: facilities operationalized/funded and have sufficient demand
Capacity building	4	0: not an objective/component 1: no capacity built 2: information disseminated/awareness raised 3: training delivered 4: institutional/human capacity strengthened 5: institutional/human capacity utilized and sustained
Lifetime energy saved	183,402,000,000	MJ (Million Joule, IEA unit converter: http://www.iea.org/stats/unit.asp) Fuel savings should be converted to energy savings by using the net calorific value of the specific fuel. End-use electricity savings should be converted to energy savings by using the conversion factor for the specific supply and distribution system. These energy savings are then totaled over the respective lifetime of the investments.
Lifetime direct GHG emissions avoided	28,000,000	tonnes CO2eq (see Special Notes above)
Lifetime direct post-project GHG emissions avoided		tonnes CO2eq (see Special Notes above)
Lifetime indirect GHG emissions avoided (bottom-up)		tonnes CO2eq (see Special Notes above)
Lifetime indirect GHG emissions avoided (top-down)		tonnes CO2eq (see Special Notes above)

APPENDIX G – PROJECT LOGFRAME MATRIX FOR TRAMEL PROJECT (FROM APRIL 2010)

Project Strategy	Indicator	Baseline	Mid-term target	End of project Target	Sources of verification	Risks and Assumptions
Goal	Reduce GHG emissions from energy consumption related to lighting in Russia					
Objective of the project: To transform the Russian market towards efficient lighting technologies and the phase-out of inefficient lighting	Estimated quantity of energy saved	Lighting electricity consumption: 137.5 GWh per year (14% of total national electricity consumption)	1 GWh/yr (direct savings from demonstration projects) plus 0.5 TWh/yr from indirect actions	4 TWh/yr (includes direct and indirect savings) or approximately 2 Mtn CO_2 less per year	Measurements in the demonstration projects and extrapolation based on market monitoring	Standards and related legislation will be responsible for the larger part of this saving
Outcome 1: Improved efficient lighting standards and policy framework.	Establishment of the Federal Energy Efficient Lighting Council (FEELC)	None exists	Ministerial decree for FEELC establishment.	FEELC becomes a legal body.	FEELC minutes and official documents	Ministry refuses to recognize FEELC
	Establishing new policies imposing maximum consumption of energy for lighting for non-residential indoor lighting, regulations on the maximum permissible mercury contents in CFL	7-10 W/m^2 per 100 lx (SNiP)	Policies drafted	Policies adopted, imposing 2.5-4W/m^2 per 100 lx and mercury content no more than 5 mg mercury per lamp	Legislative record	Inability to update existing SNiP or inability to impose effective enforcement mechanisms
	Establishment of a national EEL platform	None exists.	Platform established (members selected and action plan adopted)	Participants wish to continue platform beyond end of program, and it is financially sustainable	Platform minutes	Assumes local stakeholders will be willing to work together on the platform
	Testing procedures for EEL products drafted	None exist	Internationally accepted procedures are applied in Russia	Final set of drafts for standards proposed to national normalization body	Normalization body official records	Inability to transpose international standards

Project Strategy	Indicator	Baseline	Mid-term target	End of project Target	Sources of verification	Risks and Assumptions
						Extremely high investment costs or inability to provide high qualified staff
	Testing lab capacity improved	Obsolete metrology laboratories exist	Plan of modernization of national metrology laboratories	Plan of modernization of national metrology laboratories is being implemented (Several national metrology laboratories modernized)	Register of qualified and accredited laboratories	
Outcome 2: Supply chain for energy-efficient lighting is strengthened	National Phasing out Program for Inefficient Lighting planned and adopted	Existing legislation on Energy Savings	National Roadmap for phase-out adopted	Inefficient light source phase-out is being implemented	Government decisions and application degrees	National industry of GLS lobbying
	Annual monitoring of market	Some partial data exist today	Market monitoring procedure designed, tested and adopted	National database with market data is available	Number of data and periodicity of monitoring	Private companies or retailers do not share market data
	Lighting specifiers have increased awareness of the benefits of EE lighting	None to basic	One university or institute creates/modernizes a lighting oriented curricula for initial training	2 or 3 additional institutions offers lighting oriented curricula for initial and life-long training	Number of trainees, training follow-up questionnaire	Inability to create lighting oriented curricula
	Lighting specifiers understand the new standards	None (new standards do not yet exist)	A web based beta version tool is offered for training and validation from lighting specifiers	Fully operational toolboxes are available to lighting specifiers via web or under license system	Number of trainees, training follow-up questionnaire	Inability to develop user-friendly and attractive tools for lighting specifiers; Lighting specifiers ignore standards and refuse use proposed tools

Project Strategy	Indicator	Baseline	Mid-term target	End of project Target	Sources of verification	Risks and Assumptions
	Support to the development of new EE lighting products and modernization of national lighting industry.	Main production of national industry is incandescent lamps	One high technology EEL pilot production line inaugurated (LEDs or CFLs)	One Production line fully operational and products marketed (LEDs or CFLs)	Number of EEL products developed or manufactured in Russia	No private investment available
Outcome 3: Penetration of energy-efficient lighting increases in Moscow homes and buildings, and local EE lighting initiatives are replicated	Health and education sector: efficiency of current lighting stock	Existing lighting schemes of the 10 selected schools and hospitals: 800 fixtures/building with 100W installed power per fixture, operating 2000 h/yr = 1.6 GWh/yr	Lighting system of 3 schools/ hospitals fully upgraded Energy savings: 0.2 GWh/yr or 0.1 kton CO_2 less per year	Lighting systems of 10 schools/ hospitals fully upgraded Energy savings: 0.7 GWh/yr or 0.35 ktn CO_2 less per year	Lighting energy audit of a sample of buildings	Pilot realization and construction delays
	Residential sector: penetration of CFLs	CFL penetration rate is 0.3% Average lamps per flat in Moscow: 20 (75 W-GLS) Installed power for lighting 1.5 kW/flat	Survey completed on penetration of energy efficient lamps (CFLs and LEDs) A communication and promotion strategy designed	370,000 flats (10%) upgrade 2 GLS to 2 20W CFLs Energy savings: 48.4 GWh/yr or 24.2 ktn CO_2 less per year	Survey of energy efficient lamp (CFL and LED) penetration Measurements in specifically equipped flats	Low quality of certain products on the market give CFLs and/or LEDs overall a bad reputation; high price as compared to incandescent lamps remains a barrier
	Recycling rate of domestic CFLs	Zero	Domestic CFL recycling rate of at least 30%	Domestic CFL recycling rate of at least 70%	Reports from waste lamp recyclers or respective	

Project Strategy	Indicator	Baseline	Mid-term target	End of project Target	Sources of verification	Risks and Assumptions
					municipal structures	
	Replication: Number of communities in which similar projects are replicated	Zero	Zero	Pilots have been replicated twice in Moscow, and in 5 municipalities outside Moscow	Information provided by project partners	Assumes results of pilot are compelling enough and well enough communicated that project will be replicated
Outcome 4: Energy-Efficient street lighting is adopted in the Volga Federal District (capital Nizhny Novgorod) and local EEL initiatives are replicated elsewhere	Efficiency of installed street lighting	10 000 light fixtures with 250 W lamps operating 4000 h/yr = 10 GWh/yr	2 000 fixtures replaced Energy savings: 0.8 GWh/yr or 0.4 kton CO_2 less per year	10 000 fixtures replaced Energy savings: 4 GWh/yr or 2 kton CO2	Post-installation measurements and information from municipalities	Pilot construction delays
	Number of municipalities that have installed EE or plan to install lighting based on the Volga Federal District pilot	Zero	Zero	Replication has begun 2x within the Volga Federal District, and in 5 other Federal Districts	Completed EE lighting projects, or letters of commitment, purchase orders, etc from towns.	Assumes results of pilot are compelling enough and well enough communicated that project will be replicated

APPENDIX H: EVALUATION QUESTIONS

Evaluative Criteria Questions	Indicators	Sources	Methodology
Relevance: How does the project relate to the main objectives of the GEF focal area, and to the environment and development priorities at the local, regional and national levels?			
A. How did the project support the GEF focal area and strategic priorities? Please, fill out the GEF Climate Change Tracking Tool below.	• Energy savings and GHG emission reduction targets	• PIRs • Consulting reports on energy savings and emission reductions	• Desk work
B. How did the project support the energy efficiency/energy saving and climate objectives of the Russian Federation?	• Targets on legislative improvements • Targets on stakeholder engagement at the federal level (including academia and the private sector) • Targets on engagement of the private-sector on investments into improved lighting manufacturing production lines • Targets on public awareness raising	• PIRs • Consulting reports (strategic planning from international consultants) • Stakeholders	• Desk work • Stakeholder interviews
C. How did the project support the needs of relevant stakeholders and has the implementation of the project been inclusive of all relevant stakeholders?	• Targets on stakeholder engagement at the federal level (including academia and the private sector) • Targets on engagement of the private-sector on investments into improved lighting manufacturing production lines • Targets on public awareness raising	• PIRs • Stakeholders	• Desk work • Stakeholder interviews
D. Are there logical linkages between the expected results of the project (log frame) and the project design (in terms of project components, choice of partners, structure, delivery mechanism, scope, budget, use of resources, etc.)?	• Baseline information on the state of the lighting market and lighting manufacturing in the Russian Federation	• ProDoc • Stakeholders familiar with the lighting manufacturing sector	• Desk work • Stakeholder interviews
Effectiveness: To what extent have the expected outcomes and objectives of the project been achieved?			
A. Has the project been effective in achieving its expected outcomes: • Outcome 1: Improved efficient lighting standards and policy framework; • Outcome 2: Supply chain for energy efficient lighting is strengthened;	• Delivery of outputs within each outcome • Sustainability assessments	• PIRs • Stakeholders	• Desk work • Stakeholder interviews

Evaluative Criteria Questions	Indicators	Sources	Methodology
• Outcome 3: Energy efficient lighting is increased in residential and public buildings in Moscow City/Moscow Region; • Outcome 4: Energy-efficient street lighting is adopted and replicated in the Volga Federal District			
B. What lessons have been learned from the project regarding achievement of outcomes?	• Targets on replication of pilot projects • Stakeholder opinions on targeted Project assistance	• PIRs • Consulting reports • Stakeholders	• Desk work • Stakeholder interviews
C. What changes could have been made (if any) to the design of the project in order to improve the achievement of the project's expected results?	• Targets on replication of pilot projects • Stakeholder opinions on targeted Project assistance	• PIRs • Consulting reports (strategic planning from international consultants) • Stakeholders	• Desk work • Stakeholder interviews
Efficiency: Was the project implemented efficiently, in line with international and national norms and standards?			
A. Were progress reports produced accurately, timely and responded to reporting requirements?	• Number and frequency of PIR issuance • Quality of PIR and other progress reports	• PIRs • QPRs	• Desk work
B. Were the accounting and financial systems in place adequate for project management and producing accurate and timely financial information?	• Annual disbursements versus achievements	• PIRs • Financial reports and audits report	• Desk work
C. Did the leveraging of funds (co-financing) happen as planned? Were financial resources utilized efficiently? Could financial resources have been used more efficiently?	• Annual disbursements versus achievements • Private sector investments • Sales of EELs	• PIRs • Financial reports and audits report • Private sector stakeholders • Public awareness surveys	• Desk work • Stakeholder interviews
D. Was procurement carried out in a manner making efficient use of project resources?	• Annual disbursements versus achievements • Private sector investments	• PIRs • Financial reports and audits report • Beneficiaries	• Desk work • Interviews with beneficiaries
E. To what extent partnerships/linkages between institutions/ organizations were encouraged and supported? What was the level of efficiency of cooperation and collaboration arrangements?	• Number of partnerships with national and international institutions • Number of adopted best practices for EEL manufacturing, testing and usage	• PIRs and QPRs • Consulting reports • International consultants	• Desk work • Interviews with beneficiaries and international consultants

Evaluative Criteria Questions	Indicators	Sources	Methodology
F. Was an appropriate balance struck between utilization of international expertise as well as local capacity?	• Number of partnerships with national and international institutions • Number of adopted best practices for EEL manufacturing, testing and usage	• PIRs and QPRs • Consulting reports • International consultants	• Desk work • Interviews with beneficiaries and international consultants
Sustainability: To what extent are there financial, institutional, socio-economic, and/or environmental risks to sustaining long-term project results?			
A. How well were risks, assumptions and impact drivers for financial, institutional, social and economic changes managed?	• Pace of output delivery • Quality of PIRs reporting on risk management	• PIRs • QPRs	• Desk work
B. Has the experience of the project provided relevant lessons for other future projects targeted at similar objectives?	• Adoption of project outputs and practices by other projects	• Project materials from other projects • Project personnel from similar projects	• Desk work • Interviews with beneficiaries from other projects
Impact: Are there indications that the project has contributed to, or enabled progress toward, reduced environmental stress and/or improved ecological status?			
A. Has the project adequately taken into account the national/international realities, both in terms of institutional and policy framework towards the transformation of the Russian lighting market?	• Adoption of MEPS for EELs • Adoption of testing procedures from EU	• PIRs • MoE personnel	• Desk work • Interviews with MoE personnel and consultants involved with the preparation of the legislation
B. Are there any indicators that the project has contributed towards the transformation of the Russian lighting market and improving energy efficiency in the lighting sector?	• % increase in the number of EELs in usage in the Russian Federation	• Marketing surveys	• Desk work • Interviews with survey personnel

APPENDIX I – RESPONSES TO COMMENTS RECEIVED ON DRAFT TE REPORT

To the comments received on April 224 and May 15, 2017 from the Terminal Evaluation of "Russia: Transforming the Market for Efficient Lighting" (UNDP *PIMS 4160)*

The following comments were provided in track changes to the draft Terminal Evaluation report; they are referenced by institution ("Author" column) and track change comment number ("#" column):

Author	#	Para #/ Comment Location	Comment/Feedback on Draft TE Report	TE team response and action taken
Olga Martynenko		Exec. Summary: Table A – Project Objective row under "Actual Outcomes"	The correct statement should be "Project has exceeded its GHG emission reduction and energy saving targets by a factor of 2.5"	The evaluation team accepts this comment and has made the corrections in Table A
Anatoly Shevchenko		Exec. Summary: Table A – Outcome 3 row under "Actual Outcomes"	Penetration exceeds target level by a factor of 2. Pilot projects implemented successfully (target levels exceeded), consumers' interest increased, the Government acknowledges priority of lighting for energy saving (lighting has the greatest potential of energy saving).	Moscow demos were underreported. I need documentation or specific information from Moscow city that there has been significant penetration of Moscow lighting market….specifically with LEDs – see Section on Outcome 3.
Olga Martynenko			As evidence that the penetration exceeds the target level see the attached report of All-Russia Public Opinion Research Centre (VTSIOM). The research was carried out in big cities including Moscow. The Ministry of Energy insisted on promotion of efficient lighting all around Russia (not just Moscow). Thus the scope of the Outcome 3 was wider than Moscow (e.g. all-Russia lesson on energy efficient lighting, all-Russia festival Together Brighter, etc. activities)	The evaluation team accepts this comment and has made the corrections in Table A.
Anatoly Shevchenko		Exec. Summary: Action 4 and Para 134	It's not quite clear. Please elaborate.	Clarifications have been made to Action 4 in the Exec Summary and Para 134 on scaling-up the production of LEDs for the more than 600 lighting manufacturers in Russia

Author	#	Para #/ Comment Location	Comment/Feedback on Draft TE Report	TE team response and action taken
Anatoly Shevchenko		Para 61	All quarterly status reviews and reports are available. We prepared them on a regular basis and submitted to the Ministry of Foreign Affairs and the GEF via PSO. During the final evaluation we haven't received any request to provide them.	The evaluation team has received he QPRs and has upgraded the M&E feedback rating
Anatoly Shevchenko		Para 63	The results exceed the target levels set in ProDoc. UNDP has played a leading role in successful development of lighting projects in the countries of the CIS. We think it should be HS.	The evaluation team agrees with this comment and has upgraded the agency rating.
Anatoly Shevchenko Olga Martynenko		Table 7, row on "Residential sector: penetration of CFLs"	In 2015-2016 the Project conducted monitoring of penetration of energy saving lamps in households at the territory of the Russian Federation. The monitoring was organized in the form of a poll in big cities, including Moscow. The monitoring established that an average of 4 energy saving lamps per household is used. In the Russian Federation there are about 52 million households, respectively more than 200 million energy efficient lamps are installed that result in energy saving of 12 milliard kWh per year . We think it should be 5. Estimated GHG reduction is 6.6 million ton. The survey of All-Russia Public Opinion Research Center VTSIOM has been published. Its main findings are attached to the e-mail.	12 GWh/yr energy savings from 52 million households – what is the estimated GHG reduction? Is this survey published, and can we get more details on what this figure is based on? Increased LED sales or CFLs in Moscow? We would give a 5 if we can get more details as requested. Comments from the PMO have been accepted by the evaluation team, and adjustments have been made to the status of target achieved in Table 7 and Paras 102-104.
Anatoly Shevchenko		Table 7, row on "Replication: Number of communities in which similar projects are replicated"	1) A special brochure listing recommendations for efficient lighting in schools (available on http://www.undp-light.ru/info/print/) published in 2011 and widely distributed around the country and abroad (published in Kazakhstan, attached). The brochure is used in trainings organized for specialists by Dom Sveta and Ministry of Energy (a Minenergo's letter attached). 2) Project design documentation for typical schools developed in 2011-2012 (see 2012 PIR).	We need to distinguish that a pilot project precedes a replication project. Regarding the comments of Pg 40, these are termed as replications "implemented in more than 30 regions within the frames of Federal Programme on Energy Saving", implemented in 2013 and 2014. When and where were the pilot projects from which these replications came from? If there were none, could we understand what was the TRAMEL project's contribution to these

Author	#	Para #/ Comment Location	Comment/Feedback on Draft TE Report	TE team response and action taken
			3) The "Atlas of Typical Technical Designs for Lighting in Schools" developed in 2012 by the Project and passed to regional administrations and project partners (e.g. Yaroslavl Region, Tver Region, Lipetsk Region, Nizhny Novgorod Region, Chuvash Republic, Moscow Region). For example, modernization of Nizhny Novgorod school #110 in Nizhny Novgorod carried out with full financing by a third party. About 600 energy efficient luminaries installed and an automatic control and monitoring system mounted. Energy savings amounted to 30% (see 2012, 2013 and 2014 PIRs). On the basis of typical technical solutions with application of fluorescent lamps replications were implemented in the Lipetsk (12 schools), Nizhniy Novgorod (1 school) and Tver (7 schools) regions. Additionally, in 2011-2014 modernization of lighting systems of public buildings was implemented in more than 30 regions within the frames of Federal Programme on Energy Saving. In 2014 LEDs were allowed for application in schools. The Project implemented pilot projects (15 schools), developed typical technical solutions with LEDs application, developed technical requirements for purchase of LED fixtures for schools and recommendations for ESCO. All the documents were submitted to the Ministry of Construction and the Ministry of Education and Science. In 2016 the Government of the Russian Federation allocated 50 million rubles for construction and modernization of schools. We think it should be 5. In 2011 technical solutions were developed by the Project on the basis of the best practices These	replications? Contracts? Trainings? If these questions cannot be answered, then these 2013 and 2014 activities are not replications. The PIRs and the quarterly reports only mention indoor lighting pilot projects being implemented in 2015 and 2016 anyway We would disagree – the project did not do any pilots indoor pilots until 2015-16 – so how can the Project claim any replications done in 2011-14? The allocation of 50 mill roubles is good….so 4 is appropriate.
Olga Martynenko				

Author	#	Para #/ Comment Location	Comment/Feedback on Draft TE Report	TE team response and action taken
			were accepted by Project partners and used in indoor projects with luminescent lamps. As an example and evidence, attached is a letter from a project partner where he writes how many projects he implemented in schools and kindergartens using the technical solutions developed by the Project.	The information forwarded by the PMO is acceptable. Edits have been made to the status of target achieved as well as Paras 100-101.
Anatoly Shevchenko		Table 9, row on "Number of municipalities that have installed EE or plan to install lighting based on the Volga Federal District pilot"	1) Typical project design for street lighting was developed in 2011 by the Project and widely used afterwards (was passed to the Ministry of Energy). 2) Regarding Sarov, this is incorrect. Sarov was completed in early 2012 and served as a best practice for other regions. Monitoring results and technical solutions of this project were passed to the Ministry of Energy who provided assistance to the regions and promoted these solutions to the regional level within the framework of Federal Program on energy efficiency (a Minenergo's letter attached).	On pg 44, Table 9 states that "In 2012-14 within the programme of the Ministry of Energy, replications with HID technologies occurred in about 30 regions". I have to remove this is an achievement since these are not replications as they were implemented before any of the outdoor pilot projects including Sarov. The information provided by the Evaluation Team is acceptable. Edits have been made in Table 9 and Paras 113-115.

APPENDIX J: ENGLISH TRANSLATION OF DECREE #898

GOVERNMENT OF THE RUSSIAN FEDERATION
P O S T A B A N E S Eon August 28, 2015 № 898
MOSCOW

On amendments to paragraph 7 of the Regulation establishing the requirements of the energy efficiency of goods, works, and services in procurement for state and municipal needs.

The Russian government decides:
1. Approve the attached changes made in paragraph 7Rules establish the requirements of energy efficiency products, works and services in procurement for state and municipal needs, approved by the Government Resolution Russian Federation dated December 31, 2009 № 1221 "On approval of the Rules establish the requirements of energy efficiency products, works and services in procurement for state and municipal needs "(Collection of legislation of the Russian
Federation, 2010, № 5, p.525;2014, number 50, Art.7093).
2. This Decision shall enter into force on 1 July 2016

Prime Minister
Russian Federation
Medvedev

APPROVED
Resolution of the Government
Russian Federation on August 28, 2015 № 898

Changes, which are brought in item 7 of the Rules establishing requirements the energy efficiency of goods, works and services in procurement for state and municipal needs:

1. Subparagraph "a" after the words "energy efficiency classes" add the words "(except electric household lamps)."

2. Supplement the subparagraphs "f" and "g" as follows: "f) for electric lamps, operating from the mains 220 V AC In: the presence of a class of energy efficiency is not lower than the first two good quality, in respect of which the authorized federal executive authority defined energy classes efficiency; a ban on the acquisition of Double capped fluorescent lampsdiameter26 – 38 mm from phosphor galofosfat calcium and a color rendering index of at least 80 socket G13;a ban on the purchase of arch mercury fluorescent lamps; a ban on the purchase of fluorescent lamps with integrated ballast (compact fluorescent lamps), for except when lighting in accordance with the sanitary rules and regulations that establish requirements for artificial and mixed lighting cannot be used LED sources Sveta;
g) for outdoor lamps and lighting fixtures for lighting of residential and public buildings, as well as ballasts device: a ban on the purchase of non-electronic ballasts machines for tubular fluorescent lamps; a ban on the purchase of mercury arc lamps fluorescent lamps; a ban on the purchase of luminaires for double-ended fluorescent lamp socket the G13, with the exception of cases when Lighting in accordance with the sanitary rules and regulations, establishing requirements for the artificial and mixed coverage may not apply LED light sources".

APPENDIX K - EVALUATION CONSULTANT AGREEMENT FORM

Evaluator 1:

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

Evaluation Consultant Agreement Form[69]

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

Name of Consultant: Roland Wong

Name of Consultancy Organization (where relevant)**:** _____

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

Signed at *Surrey, BC, Canada* on *May 28, 2017*

[69] www.unevaluation.org/unegcodeofconduct

Evaluator 2:

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

Evaluation Consultant Agreement Form[70]

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

Name of Consultant: Alexei Zakharov

Name of Consultancy Organization (where relevant)**:** _____

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

Signed at *Moscow, Russia* on *May 28, 2017*

[70] www.unevaluation.org/unegcodeofconduct