

## 終了時評価調査結果要約表（英文）

<b>Outline of the Project</b>	
<b>Country:</b> Republic of Serbia	<b>Project title:</b> The Project for Assistance of Enhancement of Energy Management System in Energy Consumption Sectors
<b>Issue/Sector :</b> Energy	<b>Cooperation scheme:</b> Technical Cooperation Project
<b>Division in charge:</b> Electric Power Division I, Natural Resources and Energy Group, Industrial Development and Public Policy Dept.	<b>Total cost:</b> (As of October 2016) 2.2 million US dollars
<b>Period of Cooperation:</b> (R/D)                March 2014 to March 2016 (1st Extension)    March 2016 to April 2017 (2nd Extension)    May 2017 to December 2017	<b>Partner Country's Implementing Organization:</b> Ministry of Mining and Energy (MOME) and Training Organization (Mechanical Faculty of Belgrade University: MFBU)
	<b>Supporting Organization in Japan:</b> Tokyo Electricity Power Company Holdings, Inc. and YSK Consultants Co., Ltd.
<b>Related Cooperation:</b> Technical Cooperation for Development Planning: 'Study for introduction of energy management in energy consumption sectors in Serbia' (2009~2011), Technical Cooperation: 'Capacity Development Project on Nationally Appropriate Mitigation Actions (NAMAs)' (2010~2013), 'Project for Science and Technology Research Partnership for Biomass Energy Utilizing Livestock Waste' (2011~2013), and Country-focused Training 'Measures of Energy Efficiency and Conservation Training'(2010)	
<b>1-1 Background of the Project</b> <p>In Serbia, more than 50 percent of primary energy supply is covered by domestic coal production. However, 79 percent of oil (as of 2009) and 90 percent of natural gas (as of 2009) supplies mainly rely on imports from Russia. Therefore, import dependence accumulates up to approximately 40 percent of total primary energy supply. From a viewpoint of energy security, there is a strong need to diversify energy sources and to enhance energy efficiency and conservation.</p> <p>In addition, Serbia is required to make efforts to fulfill the EU Directive 2012/27 in Energy Efficiency in order to be an EU member country after accession to Energy Community Treaty in 2006. The Energy Efficiency Directive stipulates numerous target of energy reduction rate as 20 % (year 2012 ratio) in EY member countries and requires member countries to set out mid-term goal in energy reduction in energy consumption in each national action plan.</p> <p>Under this circumstance, JICA conducted the development study "Study for Introduction of Energy Management in Energy Consumption Sectors in Serbia" from 2009 to 2011. This study identified a significant amount of energy efficiency potential in the industry sector by revealing that the industry sector accounts for 25 percent of total final consumption, and energy intensity in the industry sector is four times</p>	

greater than that of Japan. With the outcome of this study, in developing an outline of the energy management system, the “Law on Efficient Use of Energy (i.e. Energy Efficiency Law)” was enacted in March 2013. Under the Energy Efficiency Law, the formulation of the energy management system and energy audit system is an urgent issue, and human resource development for energy managers and energy auditors is essentially required.

The Government of Serbia requested the Government of Japan for the technical cooperation project “The Project for Assistance of Enhancement of Energy Management System (EMS) in Energy Consumption Sectors in the Republic of Serbia” in 2010. One of the preconditions for the Project, namely the establishment of the Energy Efficiency Law has been realized, therefore JICA decided to step forward for formulation of the Project.

Following the survey, the Project was launched in March 2014 for the period of three (3) years in order to introduce and implement the energy management system in energy consumption sectors and to improve training capacity on the energy management system of Mechanical Faculty of Belgrade University as appointed Training Organization. Project outputs are to establish the scheme design of EMS, to formulate and implement both classroom and practical trainings for energy managers and energy auditors, to institutionalize the qualification and examination system for the EMS, and to strengthen the MOME’s capacity of implementing the energy management and energy audit system.

In accordance to the request above, JICA conducted Detailed Planning Survey and launched the Project in March 2014. Terminal Evaluation Survey was conducted 6 months prior to project termination in order to aim to verify the progress of the Project activities, evaluate the results of the Project, review the duration and contents of the Project, and draw lessons learned to other similar projects.

## **1-2 Project Overview**

The Project aims to introduce and implement energy management system (EMS) in Serbia by scheme design of the EMS, trainings and qualification for trainers for energy managers (EM) and energy auditors (EA), and strengthening of capacity development of implementing agency and thereby to contribute to energy efficiency in energy consumption sectors.

### **(1) Overall Goal**

Energy efficiency in designated organizations (DOs) under the Energy Management System will be promoted.

### **(2) Project Purpose**

Energy management system is introduced and implemented.

### **(3) Expected Outputs**

Output 1: Scheme design of energy management and audit system is established.

Output 2: Classroom training program of energy managers and auditors is established.

Output 3: Practical training program of energy managers and auditors are established.

Output 4: Qualification and examination system of Energy Managers and Auditors are institutionalized.  
 Output 5: Capacity of MOME to implement energy management and audit system is strengthened.

(4) Inputs (As of September 2016)

Japanese side: (Total 235,085,952 JPY)

- 1) Short-term Experts: 12 Experts Total 22.59 Man Month
- 2) Equipment: 32,280,504 JPY (Local procurement: Contract amount of Local Currency: 61,519,958 RSD. Procurement in Japan: 4,042,105 JPY)
- 3) Local Cost: 9,025,448 JPY (78,859.39 EUR and 142,849.15 RSD)

Serbian side:

- 1) Counterpart Personnel: currently 29 persons
- 2) Building and Facilities:
  - Office spaces for JICA experts were allocated.
  - Rooms and spaces for installation and storage of the Equipment were secured.
- 3) Local Cost: 13,133,019 JPY (14,289,000.00 RSD) (incl. plan up to 2017)

**2. Joint Evaluation Team**

<b>Members</b>	1. Ms. Miomira Lazović (Serbian Team Leader), Head of Group for Creating Conditions for Improvement of Energy Efficiency, Department of Energy Efficiency, MOME 2. Mr. Rastislav Kragić (Evaluator), Senior Advisor, Department of Renewable Energy, MOME 3. Mr. Hiroyuki Hayashi (Team Leader), Senior Advisor to the Director General (Energy), Industrial Development and Public Policy Department, JICA 4. Ms. Yukiko Maeda (Evaluation Planning), Assistant Director, Team 1, Energy and Mining Group, Industrial Development and Public Policy Dept., JICA 5. Ms. Risako Imai (Evaluation Analysis), Consultant, Kokusai Kogyo Co., Ltd.	
<b>Period of Evaluation</b>	2 October 2016 to 16 October 2016	<b>Type of Evaluation:</b> Terminal Evaluation

**3. Results of Evaluation**

**3-1 Current Achievement of the Project**

**(1) Likelihood of Achievement of the Project Purpose**

By the end of April 2017, the Project Purpose is unlikely to be achieved unless the adequate period is extended. At the time of the Terminal Evaluation, the EMS has not been launched.

First extension of the Project for 13 months was approved in March 2015 at the time of 1st JCC. Through a series of discussions between Joint Evaluation Team and the Project, the adequate period of extension was proposed and approved to be 8 months (by the end of December 2017).

**(2) Current Achievement of the Outputs**

As to Output 1 regarding establishment of scheme design of EMS, approximately 70% were achieved.

By October 2016, 7 secondary legislations out of total 13 (Indicator 1-1) were published (1 decree, 5 rulebooks and 1 decision)\* and the remaining 6 rulebooks have been drafted and are expected to be published by November 2016. Identification of designated organizations (Indicator 1-2) was 30% finished and establishment of EMS database (Indicator 1-4) was completed, however the EMS guidebook (Indicator 1-3) is in process in concordance with the completion of all the intended secondary legislations. Regarding Energy Efficiency Fund (Indicator 1-5) aiming to provide incentive to designated municipalities has not been initiated at the moment. Output 2 has been partially achieved. Trainings of candidate trainers (Indicator 2-1) were conducted and 70 out of 240 designated organizations (tentative) attended the classroom training (Indicator 2-2). Classroom training for EM candidates (Indicator 2-3) are expected to be carried out after the relevant secondary legislation is published. Almost half of Output 3 was achieved. Training facility and equipment with measuring tools procured by Japanese side were installed properly (Indicator 3-1) and the opening ceremony of EMS training center was held in October 2016. In addition, practical trainings were completed for 9 candidate trainers such as MFBU assistant professors and lectures from MFBU (Indicator 3-2). The trainings for 100 EM candidates are planned to be conducted by February 2017 (Indicator 3-3 and 3-4). All the items under Output 4 (including Indicator 4-1 and 4-2) are yet to be achieved as the rulebooks regarding institutionalization of EM/EA qualification have not been published. Output 5 aiming to strengthen capacity of MOME in monitoring and reviewing of EMS has been achieved approximately 40 %. There were 2 seminars conducted by MOME for municipalities and private sectors in April 2016 (Indicator 5-1), however only monitoring and reviewing of EMS (Indicator 5-2 and 5-3) will be achievable after the EMS is launched.

### **3-2 Summary of Evaluation Results**

#### **(1) Relevance**

Relevance of the Project is high and it is expected to be the same until the end of the Project.

The Project is consistent with ‘National Sustainable Development Strategy’ (2007) and ‘Energy Sector Development Strategy by 2025 with Projections 2030’ (2013) and “Law on Efficient Use of Energy (i.e. Energy Efficiency Law)” enacted in March 2013 together with development needs of MOME/MFBU for EMS implementation, and Japanese ODA policy for Serbia prioritizing in environmental conservation. Thus design and approach of the Project were appropriate. In the context of Serbian prospects for membership in EU, there is an urgent need to address to fulfill the environmental standards set in EU member state.

#### **(2) Effectiveness**

At the time of the Terminal Evaluation, effectiveness of the Project is observed to be moderate.

Although it was delayed in activities under Output 1 such as support for preparation of secondary legislations (a decree, rulebooks, and a decision), all the outputs other than Output 4 and a part of Output 5 have been almost achieved after the first extension of 13 months (March 2015 to April 2016). However

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\* Decree 2: ‘Decree on defining planned energy savings on annual level and threshold for DO and application form for energy consumption’, five rulebooks on EM and EA training and institutionalized qualifications, and Decision 8: ‘Decision of the organization authorized for training and examination for EM and EA’ were published.

it should be said that ‘Energy Management System is introduced and implemented’ will not be achieved unless the Project duration is extended.

For the remaining period of the Project, the Project both Serbian and Japanese side should keep time consciousness to push the project activities forward. Output 1 should be carried out as scheduled and also Output 4 and rest activities for Output 5 should be completed with utmost efforts by both sides. At the time of Terminal Evaluation, there was no external factor which would possibly impede the Project.

### **(3) Efficiency**

Examining performance of the Project, efficiency of the Project is moderate.

The Project was initially designed to be implemented for two years, thus the time schedule of the Project was originally tight compared to the number of activities under 5 outputs. In addition, due to the emergency need for Serbia in establishment of EMS, the Project was agreed to be with inclusion of publishing secondary laws that should have been completed by March 2014 as a precondition by Serbian side. It took more time than expected for MOME to draft secondary legislations and coordinate with relevant government institutions for obtaining opinions and approvals. To address the above-mentioned delays, it was agreed to extend 13 months of duration of the Project by Serbian and Japanese sides at the first JCC meeting in May 2015.

By the time of the Terminal Evaluation, the inputs by the both sides of Japan and Serbia other than Output 4 (Institutionalization of qualification of Energy Managers and Energy Auditors) and Output 5 (Capacity development of MOME to implement energy management and audit system) were mostly conducted as planned in 2nd JCC of March 2016. For the Japanese side, quality, quantity and timing of dispatch of the Japanese experts are mostly fair to conduct the activities and to produce the outputs as planned. For the Serbian side, personnel, facilities, and budget for the Project have been allocated as planned. However, the Project was affected by the delay in preparation of drafting the secondary legislations, which resulted in loss in cost and time efficiency. The intended Outputs in PDM will not be achieved unless the Project period is extended.

### **(4) Impact**

#### **1) Achievement of Overall Goal**

The Overall Goal is an intended outcome brought by the Project and expected to be achieved within three to five years after completion of the Project. At this moment, the Overall Goal will be partially achievable if the Project would have produced the intended outputs set in the PDM with the extension of the Project period. Verifiable indicators of the Overall Goal were amended in 1st JCC in May 2015 in order to clarify the target duration. Two indicators set for Overall Goal will be achievable if the project purpose is completed with the extension of the project period till December 2017.

#### **2) Positive impacts**

- Results of the interviews revealed that MFBU is being recognized as high technology training institute with excellent trainers that were/to be trained under Japanese technology and know-hows.

It is obvious that MFBU training center will gain high reputation after the implementation of the

Project. This gives confidence to the EM/EA trainers in MFBU training center as a sole training institute where trainees can learn the EMS and be licensed in Serbia.

- During the Terminal Evaluation, it is notable that an opening ceremony of EMS training center was held in 11 October 2016 in Serbia by MOME/MFBU and Japanese Expert Team inviting development partners, stakeholders and media so as to disseminate the outcomes of the Project and advertise the EMS training center that is equipped with the latest instruments and equipment.
- The Project has accelerated Serbia to accede to EU and boosted up the standards of energy efficiency and conservation in terms of mitigation of climate change through promotion of energy efficiency in Serbia, which gives a great positive impact to Serbia.

### 3) Negative impacts

At the time of the Terminal Evaluation, there was no negative impact identified.

## **(5) Sustainability**

Sustainability of the Project effects is predicted to be moderate from the following aspects.

### 1) Policy /institutional aspect

Energy efficiency policy will remain prioritized in Development Plan of Serbian is not predicted any policy or institutional change that may affect the sustainability of MOME/MFBU. “Energy Sector of the Republic of Serbia for the Period by 2025 with projections by 2030 (2016)” and “Energy Efficiency Law ” established in 2013 are expected to be continued.

### 2) Organization aspect

MOME will remain the same as an implementing and monitoring agency to deliver EMS and be anticipated to be well functioned after accession to EU. Then MFBU is an only organization to provide qualified EMS trainings in Serbia and roles of MFBU will remain the same as stipulated in the secondary legislation. Although there might be some internal organization change and personnel transfers, there will not be a drastic change to MOME/MFBU. Assignment for personnel in energy efficiency department is, however, insufficient at this moment, though tasks for MOME are expected to increase after implementation of energy efficiency policy and EMS introduction.

### 3) Technical aspect

Technical level of MOME to implement EMS is seen high with in-depth knowledge on energy efficiency and conservation. However, it is required for MOME that at least two permanent staff in EMS Group shall be allocated for monitoring EMS, providing technical advice to EMs and EAs, and reviewing the secondary legislations in accordance with updated situation in Serbia after the commencement of EMS. As to EMS Training organization, MFBU will maintain the technical level after the project terminates since candidate trainers assistant professors and lecturers are all expertise in mechanical engineering in MFBU.

### 4) Financial aspect

As mentioned above, it is required to allocate at least two experts in technical and legal areas in EMS Group, Division of Energy Efficiency in MOME although there is a legal constraint on increasing number of staff. In 3rd JCC during the terminal evaluation, it was announced that the allocation of two

staffs could be arranged for Serbian FY 2017, however, it is early to foresee the financial situation for the long term in the future after the Project completion. On the other hand, there is possibility for MFBU to be financially sustainable if they shall put 'SEEC Business Plan and Annual Action Plan 2017-2019' into execution.

### **3-3 Promoting Factors**

#### **(1) Project Design**

Although the precondition of the project to complete secondary legislations had not been fulfilled by MOME, the component of support for establishment of secondary legislations under Energy Efficiency Law was added during the Project since there was an urgent need to accelerate the accession to EU by introduction of EMS and fulfilling the EU standards of energy efficiency. From the viewpoint of project designing, the Project was the first one to assist not only the procurement of training facilities and equipment and provision of trainings but also development of legal systems in technical cooperation in the area of energy efficiency, which made a great contribution to sustainability of the Project effects as a legal system of EMS in Serbia.

#### **(2) Implementation Process**

One promoting factor led in dedicated commitment by MFBU in implementation process of the Project was that major motivation to MFBU in order to become a higher level academic institution that equipped with the latest technology in energy auditing provided by Japan and to be appointed as an only institute to qualify EMs and EAs in Serbia, which will consequently contribute to raising academic ranking and obtaining higher reputation from the public. In addition, the opening ceremony was successfully carried out and disseminated to the public with the upmost efforts by MFBU and the Project team, which motivated C/P and shall produce stronger project ownership by Serbian side for the remaining period of the Project.

### **3-4 Hindering Factors**

#### **(1) Project Design**

As mentioned in 3-3(1), in order to complete the Project activities as scheduled, it should have been considered that 1) time framework of the Project shall be adjusted for adequate period at the time of detailed design study and 2) involve and invite stakeholders related to secondary legislations to the discussions on the time required from drafting legislations until approval so that the Project would be implemented in a planned time schedule.

#### **(2) Implementation Process**

Several impeding factors are found in process of establishing secondary legislations by Serbian side. In order to fulfill the EU standards of energy efficiency and conservation, MOME is required to meet the high demand of work to accelerate the EU accession; on the contrary, there is a legal constraint in limiting number of civil servant since 2015. This law impeded the project activities in component of secondary

legislations, therefore the Project took measures to increase human resource inputs by hiring local experts both Technical and Legal advisors. Another impeding factor that affected the Project activities was that two times of elections indirectly delayed the schedule of secondary legislations by time-consuming cabinet makings and organizational restructures of MOME, causing the frequent adjustment of the Project schedule.

### **3-5 Conclusion**

It is concluded that the Project Purpose will not be achieved by the end of the Project, April 2017 unless the duration of the Project is extended by approximately 8 months. Result of five evaluation criteria is judged as medium for this project.

The relevancy of the Project is high, since the Project is consistent with the development plan, needs of MOME and the Japanese ODA policy. Effectiveness of the Project is moderate as the Project Purpose will not be achieved unless the Project period is extended in order to conduct the remaining project activities. Although the Project experienced the delay in preparation for secondary legislation by Serbian side, it is expected that efficiency of the Project is moderate and would be fully covered by the extension of the Project period. First extended period made possible for MOME to have adequate time to create the rulebooks as well as textbooks for the newly installed equipment with better guidance from Japanese experts. Positive impacts are high and ripple effects are expected to be higher 5 years after the project termination. At this moment, sustainability of the Project effects is moderate and unlikely to be assured for the near future unless the Project Purpose would be fulfilled with intended Outputs by extension of the Project period.

### **3-6 Recommendations**

(1) For the Project

#### **1) Extension of the Project Period**

There are a couple of factors that delayed the schedule of implementation of the Project as mentions in ‘2-6. Implementation Process’. Besides there were 2 times of elections in 2014 and 2016, which resulted in delays in cabinetmaking and eventually the Project activities were affected and took more time than the Project expected in approving process from other relevant ministries. In 1st JCC, the request of 13 months extension of the project was approved since the start of EMS was postponed from 2015 to 2016. Although construction of training center and installation of the equipment procured by Japanese side were mostly as scheduled, activities after completion of secondary legislations were push backward in the schedule. In order to catch up on the intended activities, it is suggested that the adequate time of extension shall be 8 months, until the end of December 2017, ‘Serbian FY 2017’.

Since this will be the second extension, it is recommended that the following conditions shown in (2) and (3) below shall be fulfilled by the Project in order to make an extension of 8 months.

#### **2) Revision of PDM and PO**

It is recommended to amend current PDM-2 and PO-2 in order to make a concordance with the



actual situations such parts as duration of project, clearly specifying MOME as C/P, important assumptions to Overall goal, additional activities for securing sustainability of the project effects described in (2) and (3) in the following.

(2) For MOME

**Strengthening of Training Evaluation and Monitoring System**

Strengthening of Training Evaluation and Monitoring System

At the time of the Terminal Evaluation, it was revealed that the allocation of ‘2 Advisors for Establishing and Monitoring of EMS’ under ‘Group of Energy Management System’ is difficult even though it is necessary. From the sustainable point of view as mentioned in 3-3 (2), it is still required for MOME to put this group into operation so as to monitor the EMS continuously and implement activities under responsibility of the MOME after the Project terminates. Therefore the following condition is drawn from the result of the Terminal Evaluation.

(MOME) To secure the human resources to ‘Group of Energy Management System’ and put this into execution.

(3) For MOME/MFBU

**Submission and Approval of SEEC Business Plan and Annual Action Plan for 2017 to 2019**

It is recommended that MFBU shall prepare and submit the following plans to MOME in order to secure the sustainability of the Project effects.

(MFBU) To prepare and submit ‘SEEC Business Plan (Special Account)’ to MOME

To prepare and submit ‘Annual Action Plan for 2017, 2018 and 2019’ to MOME

(MOME) To approve Annual Action Plan (2017-2019 respectively)

The above activities shall be added as Activity 5-9 and Activity 5-10 in both PDM-3 and PO-3.

(4) For JICA

**Verification of the Progress and Facilitation of Stakeholders**

From the viewpoint of sustainability of the Project effects, it is necessary for JICA to assist a smooth takeoff of Energy Management System in Serbia by 1) verifying the progress of the Project especially on budgeting two necessary advisors for EMS implementation after the project terminates and 2) facilitating the Project activities whenever the necessity arises.

**3-7 Lessons Learned**

**(1) Adequate Time Estimation in Formulation of Secondary Legislation**

The Project experienced complicated and time-consuming procedures to get approval for secondary legislations from relevant ministries, which resulted in the delays during the first stage of the Project implementation. Therefore adequate time for formulating secondary legislations should be counted at the time of project formulation. In addition to this, it is recommended to count and include human resource

inputs such as legal advisor by both parties.

**(2) Participation of Development Partners into the JICA Project Activities**

It is noted that MOME contributed to organizing and managing the financial supports from other development partners such as UNDP/GEF and Norway for the Project activities. It has not often been seen that JICA project collaborated with other development partners in one project. This kind of collaboration might produce synergy effects and increase aid efficiency.