## Annex 1: Success Story: Power systems planning software handed over to EDL and MEM

On March 28, 2024, USAID Country Representative Mr. Michael Ronning handed over IT equipment and the PLEXOS Power System Planning Software License, worth over US$900,000, to the Ministry of Energy and Mines (MEM), and the Control Department of Electricité du Laos (EdL), in Vientiane, Laos. This handover marked the culmination of nearly a year of planning and preparation under the USAID Laos Energy Security (LES) project.

PLEXOS is a simulation software designed for energy market analysis and power systems planning. Through this software, users can consider the existing power purchase agreement, determine the seasonal fluctuations in supply and demand situations, and identify the demand profile forecast giving a historical profile, annual demand and peak demand figures, and renewables profiles. The IT equipment and the power system planning software licenses will be used to support the ministry (MEM) and electric utility service (EdL) to conduct market modeling and power development planning and portfolio optimization.


MEM and EDL representatives train on the PLEXOS software at the Xcelerate 2024 Energy Modeling and Simulation Summit in Melbourne

Beginning in June 2023, LES facilitated a two-month trial period of the PLEXOS software for EdL with Energy Exemplar, the maker of PLEXOS. The development of the PLEXOS model involved not only a data migration from existing models but also the creation of advanced hydrological and load models, enhancing the efficiency of their planning processes. An initial PLEXOS software training equipped the EdL team with the necessary skills to operate this sophisticated software as well as understand the data requirements. The trainer who led LES efforts commented, "This series of strategic initiatives marks a significant milestone with the potential to transform EdL's system planning capabilities." The intervention strengthened coordination between EdL's Power System Planning and the National Control Center, resulting in a more unified approach towards planning and operational analyses. LES completed the evaluation of the trial period in mid-August 2023, which concluded that PLEXOS would be a useful tool to improve EdL's power system planning and operations capacity.

USAID committed to purchasing the PLEXOS software provided that EdL agreed to commit the time and personnel resources to the training and engagement required to successfully integrate PLEXOS into their power system planning process. For the next three months, LES engaged with EdL and Energy Exemplar to agree on the purchase details and secure EdL's signature on the PLEXOS end user license agreement (EULA), which they completed at the end of December 2023.

LES established the PLEXOS Users' Group in late January 2024, comprised of MEM and EdL civil servants, to work on completing and validating the Lao power system model. USAID LES then supported six representatives to attend hands-on training at the Xcelerate 2024 Energy Modeling and Simulation Summit in Melbourne in March, which provided valuable training and networking

opportunities, enhancing their skills in PLEXOS modeling and laying the groundwork for integrating PLEXOS into power system planning and operations processes. Deputy Head of the Power Development Plan Unit, commented, "We acquired essential skills in modeling power system structures, enabling us to conduct analyses on production sources, load, consumption patterns, and electricity market dynamics." Upon completion of the training, the Lao PLEXOS delegates will leverage their knowledge and expertise to develop useful analyses and case studies on system validation.

Finally, LES purchased approximately US$75,000 worth of IT equipment requested by EdL to run PLEXOS. The technical staff will receive ongoing technical assistance and support, expanding use case and data flow, model co-development, training facilitation, and internal capacity building and evaluation of insight to ensure that MEM and EdL can optimize hydro generation to meet their own and neighboring countries' demand. Following the handover ceremony, Deputy Head, Power System Planning, added, "Plexos will enable me to collaborate more seamlessly with regional partners and stakeholders, enhancing coordination and ensuring a more robust approach to power system planning."

Results narrative on PLEXOS in APR (FY24 Q4):

**Lao power system planning analyzed through PLEXOS case study.** USAID supports the Ministry of Energy and Mines (MEM) to use the PLEXOS power system planning software, designed to further develop the national electrical utility's (EdL) power system analysis and planning capabilities. Building on previous work, this quarter the PLEXOS Users Group analyzed a case study focused on optimizing water reservoir management within the PLEXOS model. The team worked on integrating actual water input data, which improved the accuracy of power generation and water resource management. This was particularly crucial for dams like Xe Pian Xe Nam Noy and Don Sahong, where accurate water flow data led to better production planning and alignment with real-world scenarios. **So what?** By enhancing the energy planning capabilities of EdL and MEM through the implementation of PLEXOS and the validation of the Lao power system model, USAID has laid the groundwork for more informed and strategic energy management in Laos. This effort directly supports the development of accurate models that reflect real-world conditions, enabling EdL and MEM to optimize generator operations, improve load flow management, and refine export strategies. As a result, Laos is better equipped to navigate complex power trade scenarios, such as with Cambodia, and strengthen its overall energy security and regional influence.