Long-range Energy Alternatives Planning System Training for EU4Climate Project

Final Report

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Abbreviations

GHG	Greenhouse gas
LEAP	Long-range Energy Alternatives Planning system
LEDS	Low greenhouse gas emission development strategy
SEI	Stockholm Environment Institute
UNDP	United Nations Development Programme
UNFCCC	United Nations Framework Convention on Climate Change
USB	Universal Serial Bus

Introduction

This report provides summary documentation on a workshop that the Stockholm Environment Institute (SEI) delivered for the EU4Climate Project during 12-13 December 2019. On 14 December 2019, practical sessions were continued and facilitated solely for LEDS team members by the local experienced expert to enhance their user skills and discuss further possibilities on applying LEAP modelling tool while developing LEDS. Entitled *Climate Change Mitigation Modeling with the Long-range Energy Alternatives Planning system (LEAP)*, the workshop provided training on LEAP, a software application for energy and air emissions modeling produced by SEI.[1] The event was held in Baku with support from EU4Climate and the United Nations Development Programme's office in Azerbaijan (UNDP Azerbaijan). Participants were selected from the team preparing Azerbaijan's long-term low greenhouse gas emission development strategy (LEDS) under the Paris Agreement. This report describes the workshop's objectives and agenda, the materials provided to participants, and the activities undertaken by participants over the workshop's two days. A brief assessment of participants' progress with LEAP and possibilities for further developing their LEAP capacity is also included.

Workshop objectives and agenda

The purpose of the workshop was to provide an introduction to the LEAP tool and how it can be used in long-term climate change mitigation analyses. Within this rubric, the workshop sought to demonstrate several LEAP techniques and features that are relevant to the terms of reference for the LEDS team, including:

- Linking macroeconomic, demographic, and other exogenous variables to projections of future energy demand, energy supply, and greenhouse gas (GHG) emissions
- Developing projection scenarios, particularly business-as-usual and GHG emission mitigation scenarios
- Generating and analyzing scenario results
- Comparing scenarios and identifying impacts of mitigation measures
- Conducting cost-benefit analyses of scenarios and mitigation measures

UNDP Azerbaijan was able to reserve two days for the workshop, and SEI prepared an agenda targeting the above objectives (Table 1). Going into the workshop, UNDP Azerbaijan and SEI recognized that a two-day event would not be sufficient to develop deep LEAP expertise among the LEDS team. Becoming a LEAP expert requires at least several months of study and experience with the tool, and most of the workshop participants had not used LEAP before.

[1] LEAP is among the most widely used tools in the world for climate change mitigation analysis, development of nationally determined contributions to the Paris Agreement, and reporting to the United Nations Framework Convention on Climate Change (UNFCCC). For more information on LEAP, see https://energycommunity.org/.

However, the intent was to educate participants about possibilities with LEAP and to establish a foundation that later work may build on.

Table 1: Workshop agenda

Day 1		
10:00 - 10:10	**Welcome and workshop opening**	EU4Climate
10:10 - 10:20	**Orientation** Participant introductions and review of the workshop's goals and agenda.	SEI
10:20 - 11:15	**LEAP: A first look** Overview presentation of the Long-range Energy Alternatives Planning system, including an explanation of key terms and concepts and a demonstration using a sample data set. Installation and activation of LEAP on each participant's computer.	SEI
11:15 - 11:30	**Coffee break**	
11:30 - 12:30	**Hands-on exercise: Getting started with LEAP** Initial exploration of the LEAP interface and modeling energy demand, energy supply, and pollutant emissions with LEAP. Implementation of multiple scenarios within a LEAP model.	SEI
12:30 - 13:30	**Lunch**	
13:30 - 15:30	**Hands-on exercise: Introduction to LEAP** *(continued)*	SEI
15:30 - 15:45	**Coffee break**	
15:45 - 16:45	**Hands-on exercise: Introduction to LEAP** *(continued)*	SEI
16:45 - 18:00	**Hands-on exercise: Energy modeling** Closer examination of LEAP's energy demand and supply modeling capabilities, including useful energy analysis, transformation module configuration, and representing natural resources.	SEI
Day 2		
9:00 - 10:30	**Hands-on exercise: Cost-benefit analysis** Application of LEAP's cost-benefit accounting features and analysis of costs and benefits of several climate change mitigation scenarios.	SEI
10:30 - 10:45	**Coffee break**	
10:45 - 12:30	**Hands-on exercise: Cost-benefit analysis** *(continued)*	SEI
12:30 - 13:30	**Lunch**	

13:30 - 15:30	**Hands-on exercise: Non-energy emissions** Exploration of multiple techniques for modeling non-energy emissions in LEAP. Simulation of a mitigation measure that reduces both energy and non-energy emissions.	SEI
15:30 - 15:45	**Coffee break**	
15:45 - 17:00	**Hands-on exercise: Non-energy emissions** *(continued)*	SEI
17:00 - 17:45	**LEAP modeling for Azerbaijan's low emission development strategy** Discussion of applying LEAP in the development of Azerbaijan's low emission development strategy. Questions from participants and answers and advice from the trainer.	SEI
17:45 - 18:00	**Workshop closure**	EU4Climate and SEI

On the day 3rd day, 14 December 2019, practical sessions on LEAP modelling were facilitated by the experienced local expert for the LEDS team members to develop various scenarios and discuss the future plans on application of LEAP modelling tool for LEDS development.

Workshop materials

SEI supplied participants with the following materials for the workshop:

- Workshop agenda (in English and Azerbaijani[2])
- Installation files for the LEAP software (32-bit and 64-bit variants, LEAP version 18.0.1.32)
- Two presentations – one for the session titled "LEAP: A first look," and one with guidance for the hands-on exercises
- A step-by-step manual for the hands-on exercises including supplemental exercises for self-study after the workshop
- A supporting spreadsheet for Exercise 5 in the step-by-step manual

These resources were provided in electronic format and distributed by internet and Universal Serial Bus (USB) drive during the workshop. Copies of all workshop materials can be downloaded at https://tinyurl.com/taqmsnc.[3]

[2] SEI developed the agenda in English, and UNDP Azerbaijan kindly prepared the Azerbaijani translation.

[3] This URL will remain active for at least a month after the submission of this report.

Workshop activities

The execution of the workshop largely followed the plan laid out in the agenda. UNDP Azerbaijan opened the event, and SEI proceeded to review the workshop's goals and agenda and to facilitate a round of participant introductions. SEI then made the first presentation, which gave an overview of LEAP – what it is, where it came from, how it is accessed and used, what features it offers, and what modeling methods it supports. The presentation included an orientation to the LEAP interface and key concepts in LEAP analyses such as scenarios and expression inheritance. During this session, SEI also helped participants install and activate the LEAP software on their computers.

After the initial presentation, SEI guided participants through a series of hands-on exercises with LEAP. Referring to the step-by-step manual, SEI led the group in exercises involving the creation of a new LEAP model; modeling of energy demand, energy supply, and GHG emissions from energy and non-energy sources; configuration and simulation of a baseline scenario and a scenario for a GHG emission mitigation measure; and analysis of scenario results. Along the way, SEI introduced and reinforced important concepts using slides in the second presentation.

The hands-on exercises took the rest of the workshop's first day and most of the second. While working on the exercises, participants were encouraged to ask any questions that arose, and SEI responded to them. The last activity on the second day was an open question-and-answer session in which the group considered how LEAP could be used in the modeling for the LEDS. Participants agreed LEAP would be a good tool for this purpose, and they were interested in using it. However, they thought further training and technical support would be necessary in order to apply LEAP most productively. SEI observed that Azerbaijan is currently developing a LEAP model for its Fourth National Communication to UNFCCC, and that this model could be an ideal starting point for the LEDS analysis. The LEDS team agreed this possibility merited further exploration. Following this discussion, UNDP Azerbaijan and SEI closed the workshop.

Assessment of participants' LEAP capacity

SEI's overall assessment of the workshop is that it met its goal of introducing the LEDS team to LEAP. Participants left the workshop with a basic understanding of what LEAP is and can do, as well as major concepts in LEAP analyses (e.g. elements of the LEAP interface, model years and scope, ways to enter data into and obtain results from LEAP, expression syntax, activity analysis, and transformation calculations). This knowledge should help them identify areas for further study should they decide to continue working with the tool.

At the same time, participants are not prepared to conduct a significant LEAP analysis on their own (such as for the LEDS). Put simply, they have not spent enough time with the tool to master its core functions and to develop an ability to solve new problems with the software. These are critical requirements for independent use. It is possible that some participants may progress to this level through self-study, particularly with the exercise manual that SEI delivered. However, a more certain way to develop the team's LEAP competency would be to provide additional training and support. SEI advises focusing these efforts on team members who showed promise

and interest in LEAP during the workshop.[4] These members could be designated the modeling leads for the LEDS team and tasked with developing an appropriate LEAP model. To enable them to carry out this work, SEI recommends a few activities:

- A follow-on training workshop (five days) to complete the exercises in the step-by-step manual as well as initial demonstration exercises with the Fourth National Communication model (assuming it can be made available to the LEDS team).[5] This workshop could be conducted in Baku or at the seat of SEI's Energy Modeling Program in the United States. If the latter, the workshop could include participants from other countries (organized by SEI), and the costs for the trainer could be shared among multiple projects.
- A program of technical support for the team as they develop the LEDS model. Through this mechanism, SEI would provide focused assistance with key steps in the modeling, including structuring the model, selecting appropriate modeling methods, developing default data from international sources, quality assuring model inputs, and interpreting model outputs. The support would mostly be remote (by web conference, email, and telephone) but would include two intensive one-week joint modeling sessions. The first would focus on baseline modeling and the second on modeling the LEDS scenario. In each session, SEI and the LEDS team would actively construct the model together. As with the five-day workshop, the joint modeling sessions could be held in Baku or at SEI in the United States.

SEI has provided similarly structured support to teams developing LEDS and national mitigation strategies in a number of other countries. The approach has worked well when a core group of capable, interested experts has been identified and allowed to engage continuously in the project. Of particular note is that the capacity building results are substantially better than those obtained through training workshops alone. Joint model development with SEI experts solidifies knowledge introduced in training workshops, providing an opportunity to practice over a longer period with data and questions that are relevant in the national context.

[4] SEI suggested some such members to UNDP Azerbaijan in a meeting after the workshop.

[5] These exercises would include Exercise 4 in the manual on cost-benefit analysis. SEI intended to cover this exercise in the December workshop, but time did not allow it.

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