Overview

LEAP, the Long range Energy Alternatives Planning System, is a powerful, versatile software system for integrated energy planning and climate change mitigation assessment developed in SEI's U.S. Center.

LEAP has been adopted by thousands of organizations in nearly 190 countries worldwide, including government agencies, academics, nonprofits, consulting companies and energy utilities. It can be used at a wide range of scales, from cities and states to national, regional and even global applications. LEAP is fast becoming the *de facto* standard for countries undertaking integrated resource planning and GHG mitigation assessments, especially in the developing world, and for creating Low Emission Development Strategies (LEDs).

LEAP and its associated training materials and documentation are available free of charge to qualified academic, governmental and not-for-profit organizations based in the developing world and to students worldwide. Consulting companies, utilities and other businesses can access LEAP through affordable licensing arrangements.

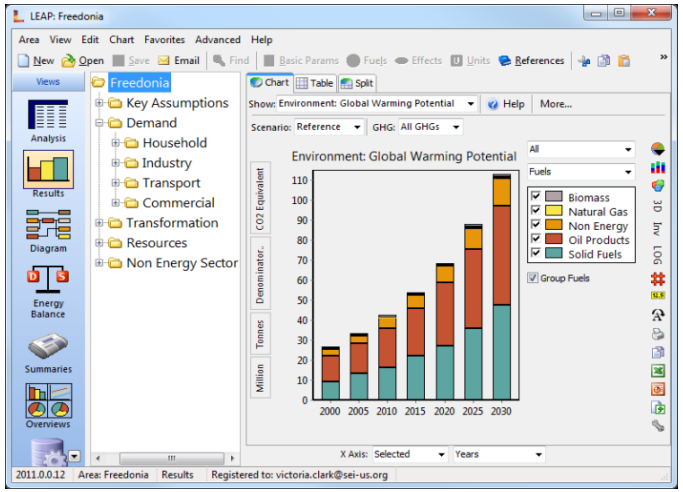
LEAP is distributed and supported through SEI's COMMEND program, an online initiative to foster a community among developing country energy analysts.

An integrated approach to planning

LEAP is an integrated modelling tool that is used to track energy consumption, production and resource extraction in all sectors of an economy. It can be used to account for both energy sector and non-energy sector greenhouse gas (GHG) emission sources and sinks. In addition to tracking GHGs, LEAP can also be used to analyse emissions of local and regional air pollutants, making it well-suited to studies of the climate co-benefits of local air pollution reduction.

A powerful decision support system

LEAP is more than just a model: it is a full decision support system providing extensive data management and reporting capabilities. It can serve as both a historical database showing the evolution of an energy system and a forward-looking, scenario-based tool. LEAP provides powerful data



management tools, including full importing and exporting to Microsoft Excel, Word and PowerPoint, and a rich graphical environment for visualising data and results.

LEAP presents complex energy analysis concepts in a transparent and intuitive way. It is flexible enough for use by users with a wide range of expertise: from leading global experts who wish to design policies and demonstrate their benefits to decision-makers, to trainers who want to build capacity among young analysts who are learning to understand the complexity of energy systems.

Support for multiple methodologies

LEAP is not a model of a particular energy system, but rather a tool that can be used to create models of different energy systems, where each requires its own unique data structures. It supports a wide range of modelling methodologies on both the demand side (from bottom-up, end-use accounting, to top-down macroeconomic modelling, to stock-turnover), and on the supply side (for example, capacity expansion planning). LEAP provides powerful modelling capabilities, but is also flexible and transparent enough to easily incorporate data and results from more specialized models.

LEAP's modelling capabilities operate at two basic conceptual levels. At the first level, LEAP's built-in calculations handle 'non-controversial' energy, emissions and cost-benefit accounting. At the second level, users can enter specific time-varying data or create a wide variety of sophisticated multi-variable models.

Flexible time frames

LEAP is intended as a medium to long-term modelling tool. Most of its calculations occur at yearly intervals, but can be extended for an unlimited number of years. Most studies use a forecast period of between 20 and 50 years. Years can also be split into "time slices" to represent seasons, types of days or even representative times of the day. Studies typically include both a historical period, in which the model is run to test its ability to replicate known statistical data, as well as multiple forward looking scenarios.

A focus on scenario analysis

LEAP is designed around the concept of long-range scenario analysis. Using LEAP, policy analysts can create and then evaluate alternative scenarios by comparing their energy requirements, their social costs and benefits, and their environmental impacts. Policymakers can use LEAP to assess the marginal impact of an individual policy as well as the interactions that occur when multiple policies and measures are combined.

Low initial data requirements

As LEAP relies on simple accounting principles, and because many aspects of LEAP are optional, its initial data requirements are relatively low. This means that users can rapidly create a simple initial analysis, before adding complexity when data is available and where the added detail provides further useful insights into the issue. In this way energy and environmental forecasts can be prepared before any cost data have been entered.

National starter data sets

SEI now offers national-level "starter"' data sets for LEAP, which combine historical energy balance data provided by the International Energy Agency with data from other sources, e.g. emission factors from the Intergovernmental Panel on Climate Change, population projections from the United Nations, development indicators from the World Bank, non-energy sector GHG sources and sinks from the World Resources Institute and energy resource data from the World Energy Council. It should be noted that these data sets are not meant to provide forecasts, but to provide a starting point for analysts to develop their own more detailed analyses. Currently, there are data sets covering more than 100 countries.

What's new for LEAP2014?

The latest version of LEAP includes a new interactive scenario explorer that makes it easier to share and discuss modelling results with non-technical audiences and examine the implications of different policy choices, using "slider bars" directly connected to key parameters in models as shown below.

For example, a Low Emission Development Strategy (LEDS) might be modeled in LEAP, based on numerous separate Nationally Appropriate Mitigation Actions (NAMAs) in areas such as energy efficiency, fuel switching or renewables. Each NAMA can be individually modeled in LEAP as a scenario. These can be combined to explore which overall strategy is preferable with respect to costs, emissions reduction potential, energy security and national development objectives.

COMMEND and LEAP training

COMMEND (COMMunity for ENergy environment & Development) is an international initiative, managed by SEI, and designed to foster a community among energy analysts working on energy for sustainable development.

COMMEND provides a forum for communication and collaboration for analysts around the world. Its website, **www.energycommunity.org**, includes discussion forums, extensive LEAP materials, and a wealth of related resources.

Training on the use of LEAP is available from SEI and partner organizations around the world at reasonable cost. Contact SEI for details.

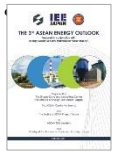
Widely applied, with direct policy impact

LEAP is helping shape energy and environmental policies worldwide, through both government-sponsored and independent studies. Dozens of countries have used LEAP to prepare GHG mitigation assessments for their national communications to the United Nations Framework Convention on Climate Change (UNFCCC), and many are using LEAP to guide their domestic policy-making.

Recent applications include:

- Reinventing Fire: China, an in-depth look at the top energy-producing and -consuming sectors to spotlight the multiple benefits of deploying renewables and energy efficiency technologies in China.

- *Energy for a Shared Development Agenda:* An SEI global scenario study to 2050 of the UN's 'Energy for All' goal, considering two goals: basic energy access, and a "shared development agenda" to raise global living standards;
- *Mexico:* SEI helped update the country's GHG emission scenarios to inform national climate mitigation policy;



- *ASEAN Energy Outlook* (2012): a collaboration of the Institute of Energy Economics, Japan and national teams, examines energy savings and mitigation goals in the ASEAN 10 member states;
- *Getting to Zero: A Pathway to a Carbon Neutral Seattle* (2011), an SEI study commissioned by the City of Seattle.

For more information

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Long-range Energy Alternatives Planning System

A tool for energy policy analysis and climate change mitigation assessment

LEAP2014 released in August 2014

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