Energy Planning and Policy Analysis

Software name:	Long-range Energy Alternatives Planning System (LEAP)
Application:	Energy policy analysis and climate change mitigation assessment
Current users:	Government agencies, academics, NGOs, energy utility companies, consulting companies
Distribution:	Distributed free of charge to academic, governmental and not-for-profit organisations based in the developing world. Materials are available for download at the COMMEND website (www.energycommunity.org)

Introduction

The Long-range Energy Alternatives Planning System (LEAP), developed by the Stockholm Environment Institute, is a widely-used software tool for energy policy analysis and climate change mitigation assessment.

Hundreds of organisations in more than 150 countries worldwide have adopted LEAP. Its users include government agencies, academics, non-governmental organisations, consulting companies, and energy utilities. It has been used at many different scales ranging from cities and states to national, regional and global applications, especially in the developing world.

The United Nations recently announced that more than 85 countries have chosen to use LEAP as part of their commitment to report to the U.N. Framework Convention on Climate Change (UNFCCC).

Integrated 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.

Flexibility and ease-of use

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.

Photo: Richard Clay

Modelling methodologies

LEAP is a tool that can be used to create models of different energy systems. It supports methodologies on both the demand side (for example, stock-turnover) and the supply side (for example, capacity expansion planning). 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.

Timeframe

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. It is also possible to split a year into different user-defined "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.

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. Policy makers 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.

Policy impacts

LEAP has had a significant impact in shaping energy and environmental polices worldwide. For example:

In China, the Chinese Energy Research Institute (ERI) has used LEAP to explore how China could achieve its development goals while also reducing carbon intensity. These studies have helped to influence national energy policies and plans.

In the US, the Natural Resources Defense Council (NRDC) uses LEAP to analyse national fuel economy standards and advocate for policies that encourage clean vehicles and fuels.

In Rhode Island, LEAP has been the main tool for analysing and monitoring the State's award-winning GHG mitigation process, in which multiple stakeholders are guiding the State's efforts to meet its GHG emission reduction goals.

In the Philippines, LEAP is used by the Department of Energy to help develop its National Energy Plans.

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.

Training and capacity building

For over twenty years LEAP has been an important tool in training and capacity building programmes. SEI has created a range of training materials designed to support national and international institutions across the globe. These are available in 6 languages, including Spanish, Portuguese and French, and have been used by SEI and its partners in seminars and training workshops worldwide. The training materials are designed to draw out typical energy-environment policy dilemmas, and to encourage trainees to think about the trade-offs inherent in different policy options.

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