The Application of the LEAP Software Tool to Energy Sector Analysis in the Far East: Progress Report

Victor Kalashnikov,

Alexander Ognev and Ruslan Gulidov

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Background of RFE LEAP Application

- **Work on RFE LEAP modeling has been suspended after April 2002**
- **Previous student left the Project**
- **New student recruited this year**
- **Lack of experience of work with LEAP**
- **Some LEAP activities have been undertaken**

Need of and Reasons for LEAP Application to the Far East

- **poor situation with a long-term energy planning in the Far East**
- **poor planning results in poor vision of the prospects**
- **limited long-term planning exists only in the electric power sector**
- **inadequate approach to setting general objectives for energy development. More exact, there is no decomposition of the general objectives to the level of quantitative assessment**
- **Energy Security is popular, but still remains an abstract and qualitative idea**
- No good examples of ES comprehensive quantitative estimation

Need of and Reasons for LEAP Application to the Far East

- **Federal and local governments do not refer to long-term energy planning to assess the efficiency of possible policy decisions**
- **A comparative approach is not applied**
- **Federal and local governments usually dispose of fairly generalized assessments of the impact of international energy cooperation in Northeast Asia**

Essential Questions on Regional Energy Development

- **What is a reasonable energy demand by sector and by sources of energy?**
- **What is energy efficiency potential in the region's economy?**
- **What is the "cost" of energy saving in the region?**
- **Which energy infrastructure decisions are economically vital to meet energy demand?**
- **What effects could the region have from developing international energy trade?**
- **What could be global implications of the decisions in the energy infrastructure?**
- **What could be joint actions in the NEA region as a whole?**

Basic Principles of LEAP Application to the Far East

- **Energy planning should be determined by local priorities of the Far East energy development**
- **Energy planning should be oriented towards optimization of the energy policy measures**
- **Optimization should by guided by the comparative approach**

General Algorithm for Selecting Energy Policy

- identifying external (uncontrollable) assumptions for the development
- identifying internal (controllable) assumptions for the development
- assigning alternative priorities in energy development
- assigning alternative energy Scenarios
- optimizing alternative decisions on energy production and consumption under each Scenario
- differences in the Scenarios' effects is a basis for the selection of an effective energy policy

BAU and Alternative Key Assumptions (uncontrollable)

- **population dynamics**
- **economic growth dynamics**
- **real incomes of the population**
- **ruble exchange rate**
- **general tax conditions**
- **dynamics of world prices for oil**
- **tendencies of energy demand in NEA countries**
- **general principles of structural reforms in the electricity sector, gas industry, heat** sector

BAU and Alternative Key Assumptions (controllable)

Assumptions	BAU	Alternative
Energy Development Priorities	▪Sufficient Energy Supply ▪Minimal Supply Costs ▪Mitigation of Local Environmental Impact	**▪Sufficient Energy Supply** **▪Energy Independence & Diversification** **▪Energy Efficiency** **▪Mitigation of Local Environmental Impact** **▪Global Environmental Obligations** **▪Acceptable Prices for Energy Supply**

BAU and Alternative Key Assumptions (controllable)

Assumptions	BAU	Alternative
Structural reforms	Restrained	Advanced
Investment restrictions	Strict (shortage)	Becoming soft

BAU and Alternative Key Assumptions (controllable)

Assumptions	BAU	Alternative
Institutional infrastructure of cooperation in NEA in the electricity, oil & gas sectors	Underdeveloped	Expanded and advanced
Development of major international energy projects	Sakhalin-1 & 2	Sakhalin-1, 2, 3, Chayandinskoye gas field, International PNG infrastructure; International electricity infrastructure

BAU and Alternative Key Assumptions (controllable)

Assumptions	BAU	Alternative
Energy Efficiency Policy	Passive	Aggressive (focused on electric & heat generation, residential, commercial and industrial sectors)
Environmental Policy	Soft	Becoming Strict Global Climate Change Targets

Favorable Implications for NEA Issues

- **“*Setting up Russian section of energy resources production in NEA*” aimed at enhancing the region's self-sufficiency (primarily oil and natural gas)**
- ***"Building up a new market for PNG"* through the formation of international gas pipeline infrastructure**
- **"*Developing hydropower resources of the Far East*" as renewable energy sources**
- **"*Interconnection of electric power systems of NEA countries"* (multiple effect of parallel operation, encouragement of competition)**

RFE LEAP Data set Collection

The LEAP methodology determined general structure of RFE data set:

- **Energy Demand Data set**
- **Energy Supply Data set**
- **Driving variables data set**

Energy Supply Data Set (developed)

- **reserves of energy**
- **coal industry**
- **oil and gas production**
- **oil refining**
- **electric power industry**
- **heat generation**
- **oil & gas pipeline infrastructure**
- **power network infrastructure**

Energy Demand Dataset

- **There are 2 *problems encountered in gathering data*:**
- ***Firstly*, since 1990 registration of energy balance of the Far East has been suspended**
- **The core problem is that statistical registration of the final energy consumption by sectors has been stopped since 1990. There is statistical registration by sectors only for electricity**
- ***Secondly*, great changes have occurred in energy consumption over 10 years (because of profound economic recession). Possibility of using recent trends is limited, and the trends should be treated with care**

Energy Demand Data Collected

- **The data on the production of fuels and fuels trade**
- **The data on total fuels consumption in the region**
- **Electricity balance**
- **Data on the amount of residential and public buildings**
- Limited data on energy intensity in the residential & commercial sector

Energy Demand Data Collected

- **Activity data for transport sector**
- **Limited data on energy intensity in the transport**
- **Limited activity data for industry**
- **Limited data on energy intensity in the industrial sector**

Energy Demand Data Collected

By now we have available statistics for the mentioned data sets for 2000, 2001, 2002.

More rational for the Far East to use the year of 2002 as a base year (instead of 2000). Due to economic recession, the year of 2000 cannot be demonstrative