

# PERU

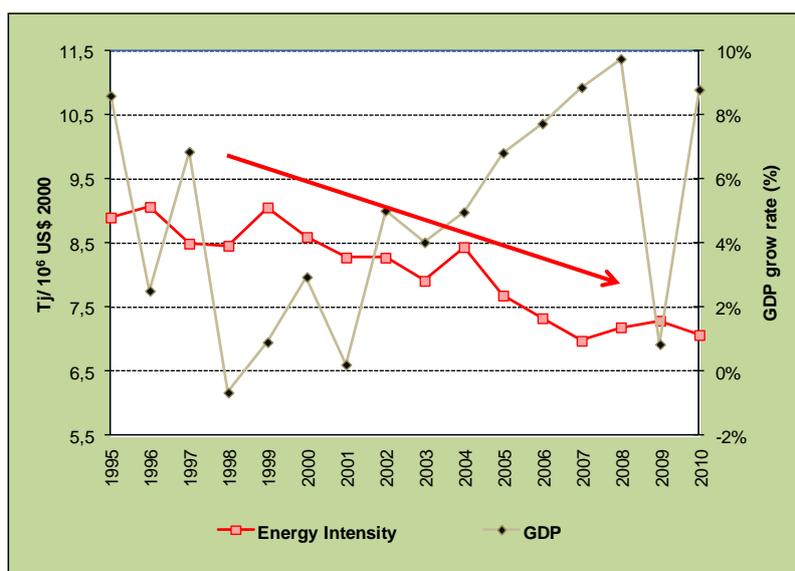
## 1. GOALS FOR EFFICIENCY IMPROVEMENT

### 1.1. Overall Energy Efficiency Improvement Goals

#### a) Key indicator

The energy intensity is the indicator which gives the idea of the energy system performance. The energy intensity and the Gross Domestic Product (GDP) grow rate of Peru is shown in Figure 1.

**Figure 1. Peruvian Energy Intensity and GDP**

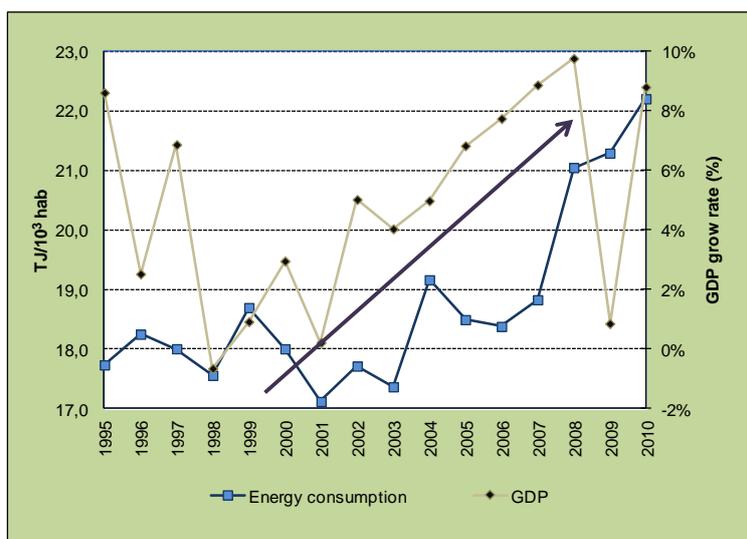


Source: Energy Balance of Peru 2010/Ministry of Energy and Mines/Central Reserves Bank of Peru

In the period 1995 – 2010, the energy intensity decreased from 8.90 TJ/10<sup>6</sup> (at US\$ 2000) to 7.07 TJ/10<sup>6</sup> (at US\$ 2000), the tendency is to decrease.

The other important indicator is the energy consumption per capita as shown in Figure 2.

**Figure 2. Peruvian Energy Per Capita Consumption**

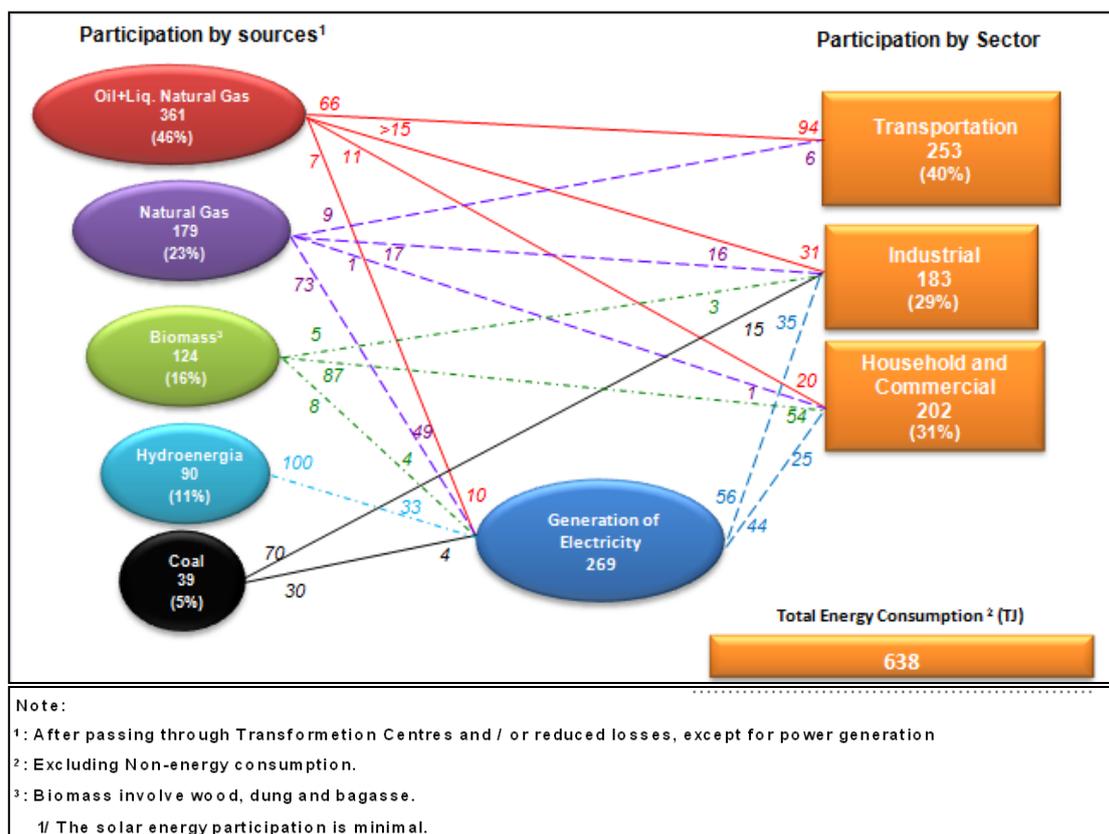


Source: Energy Balance of Peru 2010/Ministry of Energy and Mines/Central Reserves Bank of Peru

The energy consumption per capita increased from 17.7 TJ/Thousand people to 22.2 TJ/Thousand people. It is important to highlight that despite the fact that the GDP growth rate was reduced in 2009, the energy consumption per capita grew.

The energy matrix for 2010 is shown in Figure 3.

**Figure 3. Energy Matrix of Peru 2010**



Source: Energy Balance of Peru 2009/Ministry of Energy and Mines

Peru's energy matrix is still led by oil and natural gas liquids which represent 46% in the power supply. On the demand side, the transport sector has the largest share due to increased automotive fleet, which results from Peru importing diesel from other countries to meet demand, another important sector in Peru is the residential and commercial sector, finally the industrial sector which includes mining and metallurgical sector, has the lowest share since Peru is not an industrialised country.

#### b) Goals

Develop energy efficiency programs and promote renewable energy.

#### c) Base year

2010

#### d) Goal year

2040

## Description

The Ministry of Energy and Mines has developed a strategic review of energy for Peru, with a horizon of 30 years, aimed at supporting the formulation of sector policies and the adequacy of the regulatory framework to serve as a reference for all stakeholders in the Peruvian Energy Sector. The study was developed by the Ministry of Energy and Mines with the support of the Inter-American Development Bank and the Ministry of Economy and Finance. Two important results of this work are the New Sustainable Energy Matrix for Peru (NUMES) and Strategic Environmental Assessment (SEA).

This study also updated the Referential Plan of Efficient use of the Energy 2009-2018 which was developed according to the Law of Promotion for the Efficiency Use of Energy (Law No. 27345).

The study of NUMES was developed based on the Energy Policy of Peru 2010-2040, approved with DS 064-2010-MS, which has nine policy objectives, with the vision for 2040 of having energy system that meets the national energy demand in a reliable, regular, continuous and efficient, to promote sustainable development and supported by the planning and ongoing research and technological innovation.

## 1.2. Sectoral Energy Efficiency Improvement Goals

### a) Sectors

As mentioned before, the Referential Plan for the Efficient Use of Energy 2009-2018 was updated with NUMES study. The referential plan contemplates goals in four sectors and one which considers coordinated work. The sectors to be considered are:

- Residential
- Industry (productive and service)
- Commercial and Public
- Transportation
- Other plans, joint sectors

### b) Goals

The Peruvian government has established the goal of achieving 15% of energy savings among the residential, industry (productive and services), commerce and public, transportation and other sectors from a 2010 baseline. To achieve this goal, all action plans will be implemented in each sector as proposed in the referential plan.

### c) Base Year

2010

### d) Goal year

2040

The reduction of energy demand implementing energy efficiency programs in each sector from 2010 to 2040 is shown in Table 1.

**Table 1. Reduction of energy demand by sectors**

Sector	Total (PJ)
Residential	621
Industry (Manufacturing & Services)	518
Commercial and Public	8
Transportation	1051
Other plans and sectors	1203
<b>TOTAL</b>	<b>3401</b>

Source: NUMES.

The implementation of the Energy Efficiency Plan requires an investment of 25.9 billion US dollars, and the total savings generated could amount to 94.797 billion US dollars.

### 1.3. Action Plans for Promoting Energy Efficiency

#### 1.3.1 Action Plans or Strategies for Promoting Energy Efficiency

##### a) Name

The current instrument in energy efficiency matter for the Peruvian Energy Sector is the Referential Plan for the Efficient Use of Energy 2009-2018 approved in October 2009 by The Ministry of Energy and Mines.

##### b) Objectives

To promote and disseminate the features and benefits of energy efficiency at all levels through visual media, print media, and so on.

##### c) Applicable sectors

The Referential Plan for the Efficient Use of Energy in Peru contemplates goals in four sectors, and energy efficiency improvements were taken from the energy demand point of view. The sectors are:

- Residential
- Industry (manufacturing and services)
- Public
- Transport.

##### d) Outline

The Peruvian government has actively pursued energy efficiency since the 1980s and 1990s, through the creation of the Energy and Environment Centre (CENERGIA) in 1986 and Energy Conservation Program (PAE) in 1994. The Government Decree regulating the Law for the Promotion of Efficient Use of Energy, which requires MINEM to formulate an energy efficiency policy (as part of the economy's energy policy), was established in 2000. As a result of this policy, the government elaborated the Referential Plan for the Efficient Use of Energy 2009–2018, which is the current legal disposition to achieve the official energy efficiency goals through the action plans described as follows in the four sectors considered:

*Residential sector:* There are several proposals in order to achieve the energy saving goals in the sector; however, only four projects have been taken into account which could have high impact within the sector:

- 1) Modernisation of lighting
- 2) Improved energy consumption habits of people
- 3) Replacement of electric water heaters with solar water heater systems
- 4) Replacement of traditional wood stoves with improved wood stoves.

*Industry sector (productive and service sector):* According to the Efficient Use of Energy and Energy Diagnosis Guidelines of 2008, equipment with high energy demand includes motors, heaters and lighting equipment. For this reason, the action plans are focused on these. Four major impact projects are considered:

- 1) Replacement of conventional motors with efficient electric motors
- 2) Optimisation and modernisation of high-pressure heaters
- 3) Modernisation and improvement of lighting
- 4) Implementation of cogeneration projects.

*Public sector:* According to the Efficient Use of Energy and Energy Diagnosis Guidelines of 2008, higher electricity demand comes from lighting and computers, as well as air conditioners in buildings. One of the principal projects here is the Efficient Lighting in the Public Sector.

It is worth to mention that building sector was one of the most dynamic sectors in the last years, on which cause there is a coordinated work among the Ministry of Energy and Mines and the Ministry of Housing.

The Referential Plan for the Efficient Use of Energy includes some issues regarding this sector: Efficient building, energy efficiency labelling, efficient house appliances, among others.

*Transport sector:* In Peru, most of the energy consumption in transport sector is related to road transport (80%), which is the sub-sector where energy efficiency improvements should be developed. Two of the most important projects that have been quantified in the Referential Plan are Efficient Driver Project and One Day without a Car Project.

#### **e) Financial resources and budget allocation:**

So far the biggest obstacle is that there is no budget allocated for new action plans. However, the Peruvian Government is working to establish a financing mechanism for the energy efficiency measures. In case of the programs in industry (production and service sectors), the mechanisms are:

- Promotion of finance mechanisms for medium- and large-size companies through commercial banks
- Implementation of a trust fund for the promotion of the efficient use of energy (Fideicomiso para la Promoción del Uso Eficiente de Energía).
- Financing programs from International Technical Cooperation for medium- and small-size enterprises.

#### **f) Method for monitoring and measuring effects of action plans:**

In the framework of Law No. 27345 (Ley de Promoción del Uso Eficiente de la Energía) of 8 September 2000, and its Supreme Decree No. 053-2007-EM of 2007, the Peruvian Government designated Energy Consumption Indicators as a Ministerial Resolution, which was published as RM No. 038-2009-MEM/DM on 21 January 2009. The purpose of the Energy Consumption Indicators is the development of a fundamental tool to achieve the economy's goals on energy efficiency.

**Activities for monitoring and reporting**

On 1 January 2009, the Peruvian Government published the Ministerial Resolution (or Supreme Decree) No. 038-2009-MEM/DM, which approves the Energy Consumption Indicators and monitoring methodology for key economic sectors.

**Departments/agencies for monitoring and reporting**

Currently, the General Directorate of Energy Efficiency of the Ministry of Energy and Mines (MINEM) is responsible for the energy efficiency and renewable energy policies and monitoring activities.

**Outputs of monitoring**

The Supreme Decree on Energy Consumption Indicators and its Monitoring Methodology will establish disaggregated indicators for each sector with the purpose of developing Energy Action Plans encouraged by the Ministry of Energy and Mines (MINEM) in the coming years.

Several energy indicators have been developed for residential, industry and commercial sectors, as well as the public and transport sectors. Also, global indicators have been identified to be followed.

**Outcomes of monitoring**

The Supreme Decree was approved recently, as well as the management application.

**Financial resources and budget allocation for monitoring**

Will be developed with the National Government Budget

**Description**

The goal is to become acquainted through sectoral indicators with the necessary considerations to establish directives or guidelines in the Referential Plan of the Efficient Use of Energy.

**g) Expected results**

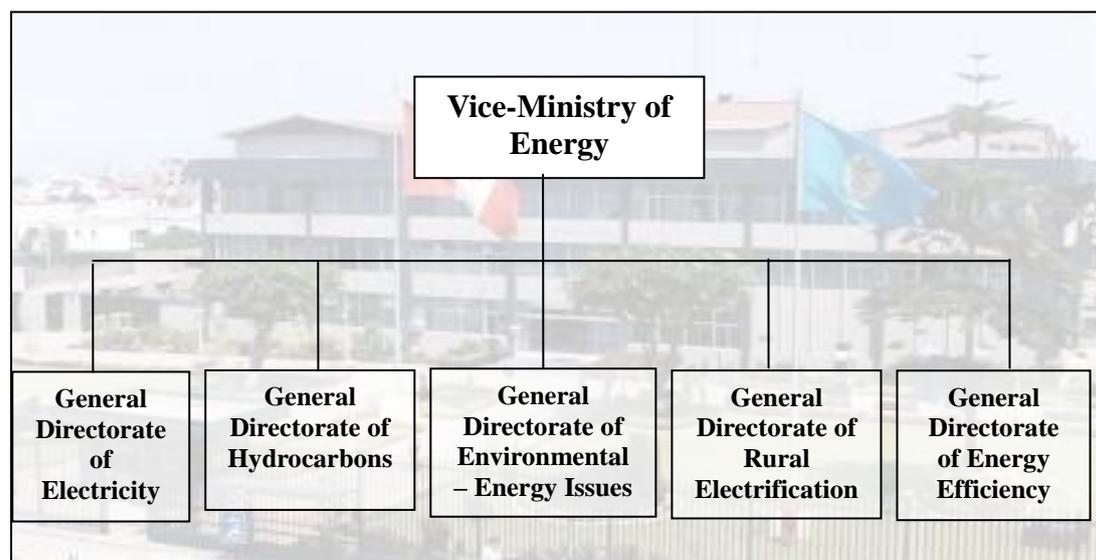
To achieve the goals outlined in Section 1.2

**h) Future tasks**

The current Referential Plan will provide the goals and will be regularly revised and updated according to recent available data.

**1.4. Institutional Structure****1.4.1 Central Institutional Structure****a) Name of organisation**

On May 28 2010 with the passing of Supreme Decree N° 026-2010-EM , the Ministry of Energy and Mines changed its organization. In this sense, the Energy Vice Ministry added the Energy Efficiency Directorate; resulting in the new structure shown in Figure 4.

**Figure 4. Organization of the Vice-Ministry of Energy, Peru****b) Status of organisation**

Government

**c) Roles and responsibilities**

The General Directorate of Energy Efficiency is in charge of:

- Propose the Energy Policy.
- Propose the Energy Efficiency Policy.
- Promote the culture of rational and efficient use of the energy.
- Design and propose energy efficiency programs.
- Incentive the energy efficiency and renewable energy market.
- Others indicated in DS N° 026-2010-EM.

**d) Covered sectors**

All economic sectors

**e) Established date**

Starting point 2010

**f) Number of staff members**

In the General Directorate of Energy Efficiency, there are three areas related to the following issues: Energy Planning and Policy; Energy Efficiency and Renewable Energy and Promotion, Training and International Cooperation.

**1.5. Information Dissemination, Awareness-Raising and Capacity-Building****a) Information collection and dissemination**

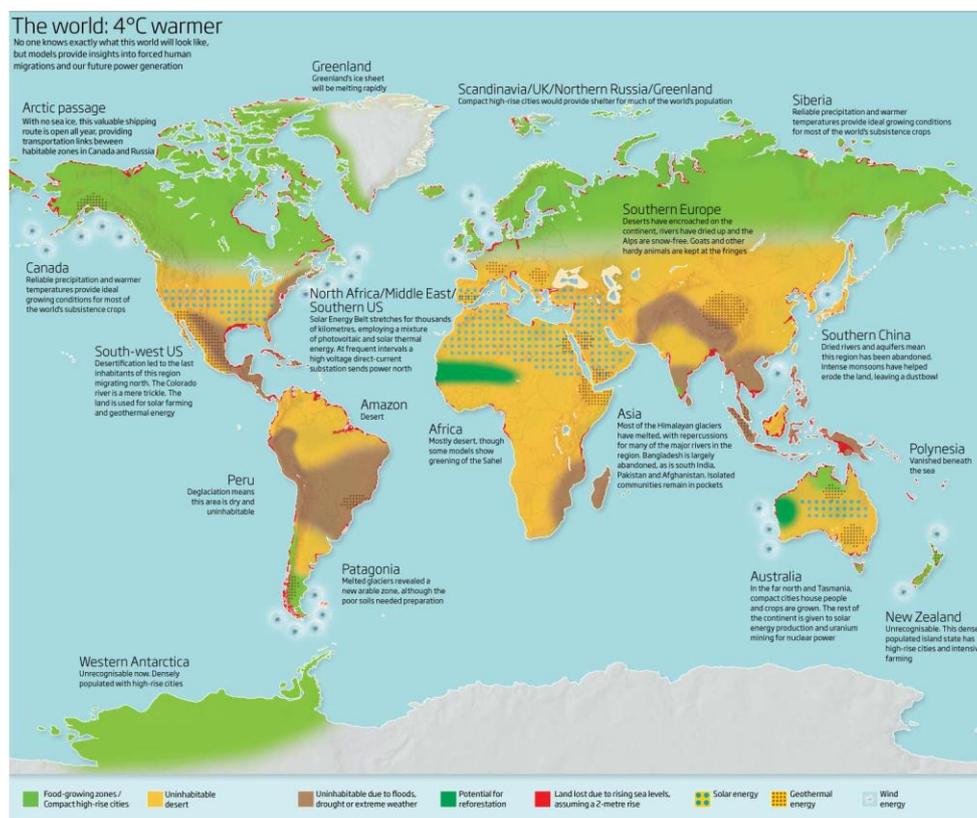
The General Directorate of Energy Efficiency is also in charge of coordinate, supervise and consolidate statistic information of the energy sector, as well as, elaborate and keep the data base updated in coordination of the others General Directorates of the Vice-Ministry of

Energy. In this matter, the General Directorate of Energy Efficiency is working to implement a data base of energy efficiency and renewable energy.

### b) Awareness-raising

Peru is vulnerable to climate change, as shown in the Figure 5.

**Figure 5. Climate change vulnerability**



The Peruvian Government is aware of climate change and its effects in the economy, hence public institutions such as Ministry of Energy and Mines, Ministry of Agriculture, Ministry of Environment and others are working together, meeting with private companies and international organizations in this subject.

As the national energy policy is based on energy efficiency and renewable energy, the Ministry of Energy and Mines has signed an inter-institutional agreement with the Ministry of Education to implement in the study programs of primary and secondary students topics such as sustainable development, efficient and responsible use of the renewable and non-renewable energy, electric security and environment protection. This agreement also includes the inclusion of “National Energy Saving Day”, in the school calendars, every year on October 21 to incentive the energy efficiency culture to pupils, teachers, parents and the whole community.

### c) Capacity-building

The professionals of this directorate periodically participate in training programs in Peru and abroad.

## 1.6. Research and Development in Energy Efficiency and Conservation

### 1.6.1. Specific Policies on Energy Efficiency RD&D

The Peruvian government does not have a specific program on research, development and demonstration (RD&D), however, the National Energy Plan might implement it according to the Law of Promotion of the Energy Efficiency (Law No. 27345) statements and its Regulations.

### 1.6.2. Programs on Energy Efficiency RD&D

Same as above.

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## 2. MEASURES FOR ENERGY EFFICIENCY IMPROVEMENTS

### 2.1. Government Laws, Decrees, Acts

#### a) Name

Promotion Law of Efficient Use of Energy (Law No. 27345), released on September 8 2000.

#### b) Purpose

National involvement of the energy efficiency promotion to guarantee the energy supply, protect the final consumer, encourage the competitiveness of the national economy and mitigate negative environmental impacts from energy consumption.

#### c) Applicable sectors

All economic sectors

#### d) Outline

The Law No. 27345 gave power to the Ministry of Energy and Mines to be responsible of energy efficiency issues in Peru and:

- Promote the establishment of a culture directed to employ the efficient use of the energy resources in order to propel the sustainable development of the country looking for equilibrium between environment conservation, social and economic development.
- Promote the creation of Energy Service Companies (ESCOs).
- Coordinate with the rest of sector and public and private entities to develop energy efficiency policy.
- Others applicable.

According to the Law No. 27345 all the equipment sold in Peru must include energy consumption information (promotion of eco-labelling), under responsibility of producers and importers.

Currently the General Directorate of Energy Efficiency is responsible for Energy Efficiency and all matters indicated in the Law No. 27345.

#### e) Financial resources and budget allocation

The Law No. 27345 does not mention any kind of financial resource; this issue has to be specified in the regulations.

**f) Expected results**

Utilization of energy efficiency to contribute to secure energy supply, improve the national competitiveness, mitigate environmental impacts, protect the energy consumer and raise people's awareness in this subject.

**2.2. Regulatory Measures****2.2.1. Energy Efficiency - Regulatory measures.****a) Name**

Regulatory Measures of Law No. 27345, Law for the Promotion of the Efficient Use of Energy—Supreme Decree No. 053-2007

**b) Purpose**

The objective of these regulatory measures is to promote the energy efficiency in order to secure the energy supply in the long-term, improve the national competitiveness in all sectors, mitigate the environmental impact on energy productions and demand, protect the energy users and raise awareness regarding the efficient use of energy.

**c) Applicable sectors**

The measures are applicable to the production, transport, transformation, distribution, trading and consumption of energy. It also involve the economic sectors.

**d) Outline**

To develop the culture of efficient use of energy, the Ministry of Energy must organize activities to promote a culture of efficient use of the energy, in coordination with public and private institutions. These actions are developed at all educational levels, including teachers' formation.

The Ministry organizes activities to create consciousness in the different segments of the population in the regions about the energy efficiency with every October 21 considered "National Saving Energy Day". The Ministry of Energy and Mines is yet to coordinate with Peruvian universities about the dictation of pre and post-graduate courses related to energy efficiency and the development of programs about scientific and technologic research applied to energy efficiency.

Energy efficiency has to be applied in four main sectors:

- *Household sector:* Programs to improve habits towards efficient consumption and efficient equipment use. Release publicity; organize informative and demonstrative campaigns related to energy efficiency getting information conducting surveys and other mechanisms.
- *Productive Sector and Services:* Promote the creation of energy efficiency market. Form energy service companies ESCOs. Elaborate energy efficiency indicators. Establish energy efficiency limits by productive activity in order to avoid obsolete technology.
- *Public Sector:* Approve the criteria to develop energy audits in public entities with bills over 4 UIT (Tributary Unit). In regions where there is natural gas for vehicles; public vehicles have to shift fuel from gasoline to natural gas. Develop energy indicators in the sector to evaluate the best practices of the energy efficiency uses.
- *Transportation sector:* Incentive best practices and capacitating programs for energy efficient use in vehicles. Promote training and updating in driving, engines and fuel use to taxi, public transport and truck drivers. Improve traffic management.

The Ministry of Energy and Mines will implement these actions in coordination with the regional governments.

**e) Financial resources and budget allocation**

According to the Law No. 27345, the Article states that the Ministry of Energy and Mines will coordinate funding with participant national and international entities in the development of energy efficiency projects. Furthermore, the Law allows the Ministry to gather donations and international cooperation on energy efficiency and renewable energy issues.

**f) Expected results**

Energy Efficiency culture improvement.

### 2.2.2. Promotion of the electricity production with renewable energy

**a. Name**

Promotion of electricity generation with renewable energy through Legislative Decree No. 1002.

**b. Purpose**

The objective of this Legislative decree is to promote the energy renewable resources to generate electricity in order to improve the health quality of the population and protect the environment.

**c. Applicable sectors**

All energy sectors.

**d. Outline**

Declare as national interest the participation of renewable energy in the electricity generation matrix. The Ministry of Energy establishes every five years the share (percentage) for the electricity generated from renewable resources with this percentage being fixed on 5% for the first five years. Renewable resources to be considered include biomass, wind, solar, geothermal and tidal energy. As for hydro energy, it is only considered for power plants whose capacity is equal or inferior to 20 MW. Electricity from renewable energy has priority in the daily electric dispatch planned by COES (Operator of the Electric System) and its variable cost is considered to be zero.

**e. Financial resources and budget allocation**

In order to sell total or partially its electricity production, owners have to offer the energy in the short term market with its price plus a premium (in case the marginal cost results minor than the tariff determined by OSINERGMIN, the regulator body of the system). The tariff and premiums are determined in the way to guarantee the profitability established in the Concessions Law (Law No. 25844).

**f. Expected results**

The National Council of Science and Technology (CONCYTEC) in coordination with the Ministry of Energy and Mines and the regional governments will encourage research projects. The Ministry of Energy will develop the Referential Plan of Renewable Energy to get the optimum percentage of electricity got from renewable energy, improving the human health and protect the environment.

### 2.2.3. Minimum Energy Performance Standards and Labelling

The Law for the Promotion of the Efficient Use of Energy (Law No. 27345 of 2000) requires mandatory energy efficiency labelling of energy consuming equipment and appliances. This requirement has been confirmed by Supreme Decree No. 053-2007-EM of 23 October 2007 regulating Law No. 27345/2000. The Ministry of Energy of Mines (MINEM) has the goal to develop and implement energy efficiency standards and labelling for a wider range of end-use appliances and to develop and implement a comprehensive market transformation strategy, based on mandatory energy efficiency labelling, minimum energy performance standards (MEPS), and the development of testing infrastructure and procedures and consumer awareness. The proposed project will build on the achievements so far and provide support in developing and implementing all those measures that are necessary to overcome the institutional, technical and awareness-related barriers that prevents the implementation of this strategy, in particular:

- 1) Increase the awareness and strengthen technical and managerial capacities of government and other key public and private agents
- 2) Carry out a market study in order to establish a comprehensive and detailed data base of energy end-uses and end-use technologies
- 3) Develop a market transformation strategy for the introduction and dissemination of energy efficiency standards and labelling
- 4) Design and implement market transformation instruments (additional technical and energy efficiency labelling standards, MEPS)
- 5) Foster the development of the required infrastructure and procedures for product testing and certification, in particular test laboratories
- 6) Develop and implement an enabling legal and regulatory framework, in particular government regulations for mandatory energy efficiency labelling and MEPS
- 7) Develop a consumer communication strategy including awareness campaigns, incentives to consumers and training of equipment sales personnel
- 8) Develop and implement an appropriate monitoring and evaluation system.

Furthermore, the establishment of the Regional Energy Efficiency Standards and Labelling Committee and the Regional Energy Efficiency S&L Information System will foster exchange of experience and coordination of economy-wide programs with other economies in the region.

### 2.2.4. Voluntary Measures

#### 2.2.5. Energy Efficiency Labelling

##### a) Name

Guideline for Labelling

##### b) Level

Central

##### c) Purpose

To gather information on energy efficiency of households and their minimum performance standards with the goal of promote the culture on energy efficient consumption

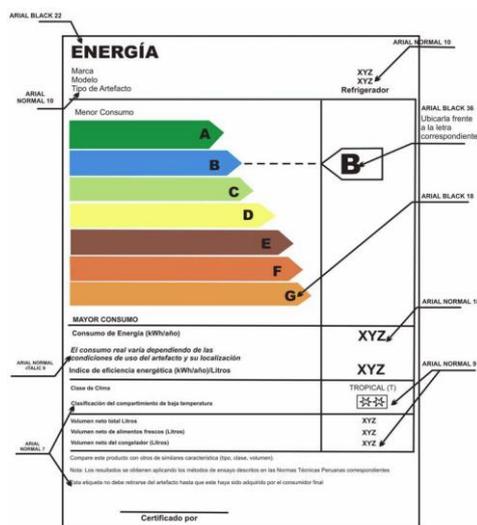
##### d) Applicable sectors

All economic sectors.

##### e) Outline

The development of test procedures and energy efficiency labelling standards in Peru begun in 1996 by the Technical Committee of Standardization for Rational and Efficient Use of Energy (CTNUREEE) and its respective subcommittees, with the participation of relevant public and private agents. So far, energy efficiency test procedures have been developed for refrigerators and freezers, lighting equipment (lamps and ballasts), electric motors, electric water heaters, industrial boilers and solar thermal and photovoltaic systems. Energy efficiency labelling standards are in place for refrigerators and freezers, household lamps and electric motors, in addition to minimum efficiency performance standards for CFLs.

**Figure 6. Energy efficiency label for appliances.**



It is a voluntary measure, and it came into effect in January 2009.

### 2.2.6. Energy Saving in the Public Sector

#### a) Name

Supreme Decree on Energy Savings in Public Sector; D.S. No. 034-2008-EM.

#### b) Level

Central.

#### c) Purpose

To induce the public sector to reduce its energy demand through energy efficiency campaigns and promotes the use of more efficient equipment.

#### d) Applicable sectors

All economic sectors.

#### e) Outline

Mandatory measure, which was published in June 2008.

#### f) Financial resources and budget allocation

Funding comes from the Ministry of Energy and Mines.

#### g) Expected results

In the next years, this activity should be implemented as it is part of the Law on Promotion of Energy Efficiency and its Regulations, legal dispositions approved in 2007.

### 2.2.7. Technical Norms (Standards) on Energy Efficiency

**a) Name**

Technical Standards on Energy Efficiency (Essays, Limits, and Labels).

**b) Level**

Central.

**c) Purpose**

To provide the minimum energy efficiency standards, (especially norms, limits, and labels) for lighting, water heaters, heater boilers, motors, solar energy, etc.

**d) Applicable sectors**

All economic sectors.

**e) Outline**

There are 47 voluntary norms (standards), which have been approved and published from 2000 to the present.

**f) Financial resources and budget allocation**

Funding comes from the Ministry of Energy and Mines.

**g) Expected results**

No information available.

## 2.3. Financial Measures Taken by the Government

### 2.3.1. Tax Scheme

No information available.

### 2.3.2. Low-Interest Loans

The Financial Corporation for Development (COFIDE) is implementing the “Bio-business Program” with a 65 million Euro capital funded from the German Kreditanstalt für Wiederaufbau (KfW) institution. This Program aims to foster energy efficiency and renewable energy projects by giving low-interest loans to project promoters and developers. All sectors are included. The loans will be given through Peruvian commercial banks.

### 2.3.3. Subsidies and Budgetary Measures

No information available.

### 2.3.4. Other Incentives

No Information available.

## 2.4. Energy Pricing

Pricing is electricity market based in form of marginal cost.

## 2.5. Other Efforts for Energy Efficiency Improvements

### 2.5.1 Cooperation with Non-Government Organisations

There is no financial support for NGOs.

### 2.5.2 Cooperation through Bilateral, Regional and Multilateral Schemes

Peru undertakes cooperation through bilateral schemes with international organisations such as:

- Japan International Cooperation Agency (JICA)
- German Technical Cooperation (GTZ)
- United Nations Development Program (UNDP)
- Inter-American Development Bank (IADB)
- The Global Environment Facility Trust Fund (GEF) of the UNDP.
- United States Agency for International Development (USAID)

### **2.5.3 Other Cooperation/Efforts for Energy Efficiency Improvements**

The General Directorate of Energy Efficiency is promoting the project “Peruvian sustainable universities to slow down climate change”. This project aims to foster energy efficiency projects and the use of renewable energy in university campuses, by means of the application of the ESCO methodology and other relevant methodologies. Universities must sign a long-term Climate Neutrality Commitment before they can take advantage of the benefits. Up to 2012, 14 universities have already signed the Commitment.

The Ministry of Housing is elaborating the “Standard for Bioclimatic Building with Energy Efficiency”. The Ministry of Energy and Mines and other relevant stakeholders participate in this effort. The aim of the new standard is to increase comfort, to save energy, and to mitigate GHG emissions by designing according to local climate and using local construction materials. The Peruvian Bioclimatic Map foresees nine bioclimatic regions and is already developed.

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