

# Energy Management For Economic Growth And Environmental Sustainability In East Asia

## Conservation and Diversification: An Integrated Approach to Energy Management in East Asia

### The Members:

Rivana Mezaya	Indonesia
Yoshimi Takahashi	Japan
R. Rena Rajadorai	Malaysia
Nicole Marie R. Villarojo	Philippines
Sim Siang Tze Victor	Singapore
Dol Suebsantikul	Thailand
Nguyen Thi Huyen Trang	Vietnam

### Abstract

As the fastest growing region in the world, East Asia's energy demand is increasing tremendously. The biggest challenge is to balance the 3Es: Economic growth, Energy consumption, and Environmental sustainability, which are all closely connected with the energy supply and demand issues. This paper proposes conservation as well as diversification of energy sources. The objective of energy conservation is to maintain the availability of current energy sources, thus focusing on the efficiency of energy use. Diversification, on the other hand, aims to develop the use of alternative energy sources. In this sense, feasible alternative energy options are given to be applied in the region. Furthermore, a means of cooperation within the region is also recommended. Finally, the paper suggests short-term and long-term strategies for energy management.



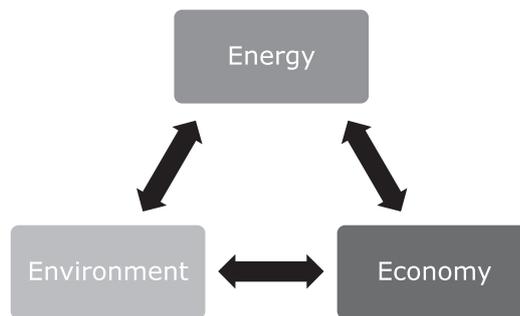
### Introduction

The world's energy demand continues to increase as the growing population and industries depend heavily on energy for heat, transportation, and production. Because of this, energy has evolved to become a crucial need for improving people's standard of living.

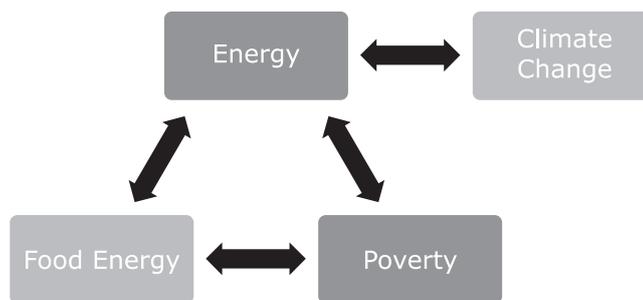
The majority of energy needs are derived from fossil fuels, particularly oil. The current increasing energy demand is leading to the increase of oil usage around the world. The International Energy Agency, which acts as energy policy adviser to 26 member countries, forecasted oil demand at 85.9 million barrels a day in 2008, much higher compared to the 84.5 million in 2007. Since oil is the primary source of energy in most countries, the sky-rocketing price of oil places a stress on society and slows down economical growth.

However, the oil problem goes beyond its rising price. In various phases of energy operations such as exploration, refining, transportation and distribution, the protection of the environment remains a crucial issue as emissions resulting from oil burning releases 16 million tons of carbon dioxide into the atmosphere every day. It is obvious that the matters of "energy", "environment" and "sustainable economic development" are closely interconnected. Hence, our solutions in this paper must tackle these three different-yet-interconnected areas in order to be effective as a whole.

In the regional context, it is recognized that there are at least four interrelated issues. In this paper, however, the focus will be on two issues: food prices and poverty.



Rising energy prices lead to two major issues—the subsequent rise in food prices as well as an aggravated poverty situation. Rising energy prices affect costs for both the production and transportation of food. At the same time, when the prices of both energy and food begin to rise, this becomes a barrier for economic development and improvement of living standards. Additionally, inefficient use of energy resources inevitably leads to global climate change.

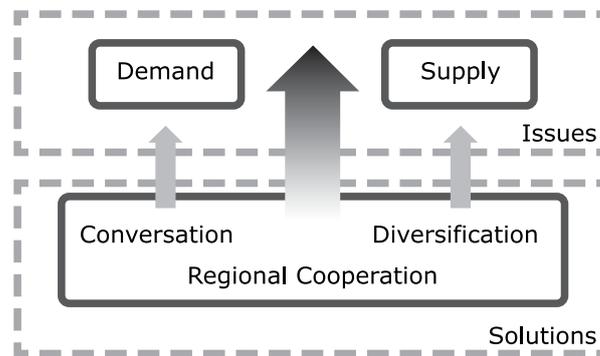


## Regional Situation

The East Asian countries are facing these common issues.

No.	Issue	Countries	Current Situation
1.	Subsidies	Indonesia, Malaysia, Thailand, Vietnam, Philippines	Heavy fuel subsidies slow down the exploration of alternative energies.
2.	Electricity/ petroleum shortages	Indonesia, Vietnam, Japan (only in summer)	Electricity demand has been increasing steadily, which leads to a situation where countries have to import energy from overseas to sustain their livelihood.
3.	Inflation	Every country ( except the country in the middle east)	Inflation causes prices to escalate, specifically energy prices and food prices. This situation currently affects the standard of living and thus causes a negative effect on each country's economy.
4.	Conversion of food products to energy products	Indonesia, Malaysia, Thailand	Food sources are increasing in competition with the need for biofuels. This leads to food scarcity and hence higher global food market prices. In addition, deforestation and crop plantations switching to more economically rewarding energy crops are on the rise.

It is clear that all seven countries mentioned above share similar energy-related problems which can be broken down into two sub-issues: energy demand and supply. To overcome these issues, we propose conservation and diversification followed by regional cooperation as an integrated approach.



## Energy Demand

Energy demand includes four aspects: inefficiency (particularly in public transportation systems), industrial and household use, lack of information and awareness as well as lack of demand for alternative energy.

First, we consider inefficiency. A successful public transportation system ought to ensure the following: comfort, convenience and cost. Public transportation can create efficiency in energy consumption as well as in the use of roads—to avoid congestion and reduce pollution. However, most countries' current public transportation systems fail to accommodate comfort, convenience and cost thus leading to a rapid increase in the use of private automobiles.

Though the transportation sector accounts for the largest energy use, residential and industrial sectors heavily demand energy as well. These sectors consume both electricity and fuel for their daily functions with a large tendency to be quite exploitative.

There is much wastage of energy use due to the lack of information and awareness of people regarding how much energy is being consumed. It becomes problematic when there is no inculcation of good environmental habits at an early age. There is a lack of concern among the major populace regarding the economical use of energy.

In addition, one of the major obstacles to the development of alternative energy is the subsidization of conventional fossil fuels.

## Energy Supply

With the rapid increase of crude oil prices, Japan, Singapore and the Philippines are just some of the countries in the region which are having difficulty mitigating the adverse impact of this rise in oil prices.

Electricity and transportation are essential costs of production. As such, any increases in these costs translate into higher prices of economic goods.

Countries have tried abating this cost by diversifying their sources of energy. Some notable examples in the region are below:

- Singapore has already switched to natural gas for 80% of its electricity generation due to the cheaper price and a more environmentally friendly approach.
- Japan already meets 30% of its energy requirements by using nuclear energy.
- Malaysia is at the forefront of using palm oil for its bio-diesel.





However, these developments aren't without their problems. In Malaysia, for instance, deforestation is becoming a large problem because of the need for plantation areas for palm trees. Japan's vulnerability to earthquakes makes the consequences of having nuclear power plants more alarming. China's construction of the dam on the Mekong River has become highly controversial because of the considerable damage to the eco-system as well as the great depletion of the water supply to the Indo-china region.

An analysis on the various issues surrounding energy demand and supply was done. The paper provides recommendations which focus on conservation and diversification.

## Conservation

We as young leaders recognize that the use of fossil fuel can never be completely eradicated; but more importantly, we realize the need to efficiently use this conventional energy resource. This paper therefore provides a series of methods we feel can greatly contribute to the conservation of existing resources:

### A. Short Term

- **Use of efficient technologies**

These types of technology are necessary in mitigating the negative effects of increasing energy consumption. They may be employed through the use of energy efficient lighting and heating systems. A labeling scheme should also be implemented through the EEL (Energy Efficient Label) method which enables consumers to make a better choice on energy efficient products.

- **General Public Awareness**

#### Media Campaign

The media plays a critical role in forming society's mindset and behavior. Therefore, all of the media should take part in giving sufficient information and suggestions for energy efficiency. Governments can also take part in this by offering incentives for the media such as tax reduction on advertising.

#### Green Activities

The media campaign should be accompanied by activities related to energy efficiency at all levels so that society can take part in active learning regarding efficient energy use. This could include acoustic energy concerts, eco-parks, and bicycle-days.

### B. Long term

- **Eco-friendly infrastructure**

Modern society requires a balance between the level of comfort and energy consumption in the operation of electrical consumer appliances. Given the assessment done earlier, it has become equally important to initiate early adoption of energy efficient technologies through awareness and incentive programs as well as to carry out energy audits to improve and retrofit existing buildings. Governmental buildings and education institutions shall be eco-friendly. New buildings shall comply with the standardized EEL for eco-friendly infrastructure.

- **Mandating energy auditing**

Ideally, this practice should be enacted through a law passed by the government. This can considerably reduce cost and the amount of energy used in both industries and households. For companies, introduction of taxation on inefficient energy practices through the further implementation of the EEL scheme helps companies to create higher barriers of entry and situates them to be energy efficient.

- **Education of youth**

Much difficulty arises from having to change habits regarding sound environmental practices, most especially consumption. It is recommended that at an early age, a lifelong learning process regarding environmental awareness is done through the integration of environmental sustainability in both formal and informal education.

- **Improved public transportation system**

A rather large part of our energy consumption is taken up solely by the transportation system. Fortunately, public transportation costs less per person mile both in terms of energy and the amount of money spent. Governments should therefore begin to invest heavily in infrastructure, particularly for mass transportation.

## Diversification

We recommend each country to accelerate their development of alternative energy sources in accordance with their country's potential. The table below summarizes the alternative energy options to diversify the supply side. This is ranked in order of the importance of considerations, from left to right based on the order of impact on the 3Es mentioned: Energy, Environment and Economy.

Alternative Energy Options		Considerations		
Bio Energy**	Efficient environmental assessment towards usage of land area to implement bio energy.	Diversify natural resources that are used in the process of implementing bio energies.	Capital investment and affordability of the government to develop this project and social acceptance.	Amount of energy generated from bio energy alone is not sufficient to support general consumption.
Solar	Availability of technology. It is important to have sufficient technology to develop this energy practice.	Capital investment and affordability of the country to develop this project	Adequate sunlight due to the 10 – 20% efficiency of current solar photovoltaic cells can only capture from the cell.	
Nuclear*	3S – Safety, Safe guard, Security. This is a crucial element in considering nuclear energy as a source.	Capital investment and affordability of the government to develop this project and social acceptance.	Environmental & social acceptance	Availability of a nation's technology to support and maintain the operation
Wind Power	Consistent strength of wind	Specific locations to place windmills	Capital investment and affordability of the country to develop this project and social acceptance.	Availability of a nation's technology to support and maintain the operation
Geothermal	Capital investment and affordability of the country to develop this project and social acceptance.	R&D is required to make it more feasible	Volcanic activity and stability are important to ensure the success of geothermal energy.	
Hydrogen Energy (Fuel Cells)	Capital investment and affordability of the country to develop this project	R&D is required to make it more feasible		

Alternative Energy Options		Considerations		
Hydro Electric • Large	Capital investment and affordability of the country to develop this project and social acceptance.	River geography is crucial in selecting the appropriate river to be used for hydro power.	Environmental degradation.	Socio value of the community that lives in the area of hydro power development is crucial and has to be taken into consideration.
Hydro Electric** • Micro & Mini	River geography plays an important part in order to get the ideal head	Environmental degradation is a factor to be considered, especially in the catchments area.	Continuity of the water flow.	

\* All requirements for nuclear energy options are equally important.

\*\* Options for community-based development that can be done in the short term.

The development of these alternative energy sources is hampered by the lack of demand due to its uncompetitive price compared to conventional energy sources, e.g. oil and coal. It is recommended to gradually decrease price subsidies on fossil fuels and to provide minimum levels of energy consumption which would dictate exemptions from payment for the poor. As a result, savings from the eradication of price subsidies can be allocated to more public services such as education and health.



## Regional Cooperation

### Public Sector

Funding should be made available for students to participate in policy making for energy management in the region. Student dialogue will be incorporated in Asian inter-ministry or inter-department meetings. Selected university students can present their recommendations to ministers and engage in discussions regarding government policies.

Inter-country competitions will be held to encourage students to bring forward their innovative “green ideas” or inventions. Winners of these competitions can have their inventions or proposals sponsored by the government.

### Private Sector

Tax rebates or other incentives should be available for companies doing Corporate Social Responsibility (CSR) activities, especially for the environment. The companies should work through education channels when doing CSR. For example, the Hitachi Young Leaders Initiative allows students to take part in social transformation through the workshops and papers. Doing this type of CSR will not only help the community but also help create a stronger brand.

R&D must be initiated by the private sector especially for new green infrastructure or technology with a higher rate of return.

## Conclusion

An integrated approach to conservation and diversification followed by regional integration is crucial in tackling the issues regarding energy management which include energy supply and demand issues.

We do not prescribe a single solution for all the countries in the region; however, it is the purpose of this paper to provide opportunities and potential areas for growth.