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Review Article

Energy, Security Planning and Dematerialization

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Abstract

The imperative for energy security is paramount for global, national and internal stability and development. Using an indicator-based approach, the present study develops a framework for sustainable energy security of India. First, it presents the energy supply and demand situation in the country under different scenarios. Then it conceptualizes the notion of energy security and quantifies it for India with the help of different indicators for energy security available in the literature. Both the supply and demand side views and both micro and macro dimensions are considered in assessing how secured India as a country is with respect to its energy future. The dimensions that include energy security are: economic, environmental, social and institutional. This will help planners and policy makers to understand India's energy scene better and design policies to develop sustainable technologies and practices to ensure energy resources last long.

Keywords: Energy Management, Energy Security, Dematerialization, Urbanization.

Introduction

Dematerialization encourages reducing the use of energy in the countries, but a lot also depends upon the level of industrialization and financial gain of those countries. Dematerialization means extending the sheer or relative reduction in the amount of material used to develop a unit of economical output. In its relative resolution of tonnes or books of material used per unit of GDP, dematerialization has happened over various decades in many lands (1).

This shift has added to structural exchanges in industry-particularly in energy intensive areas such as chemicals and structure materials. Counts of draws that cause dematerialization are:

1. As incomes rise, consumer preferences shift towards services with lower ratios of material content to price.

2. As savings mature, there is less necessity for new infrastructure (buildings, bridges, roads, railways, factories), reducing the need for steel, cement, non-ferrous metals, and other basic materials.

3. Material use is more efficient-as with thinner car sheets, thinner tin cans, and lighter paper for print media.

4. Cheaper, lighter, more perendurable, and sometimes more suitable materials are substituted-as with the replacement of plastics for metal and glass, and fiber optics for copper.

5. Reprocessing of energy-intensive textiles (steel, aluminium, glass, paper, plastics, and asphalt) leads to less energy-intensive production.

6. Reprocessing may be confirmed by environmental regulation and taxes.

7. Reuse of productions, longer lifetimes of products, and intensified use decrease new material requirements per unit of service.

8. Nations with high energy imports and energy prices tend to decrease their domestic production of bulk materials, where imagination-rich nations try to incorporate the first and second product steps of bulk materials into their domestic industriousness’s.

Nevertheless this case is more apparent in industrialized countries. But most underdeveloped countries, like India, are also experiencing some of the drivers of enhanced material use per capita.

Enhancing urbanization, mobility, and incomes increase necessitate for material-intensive substructure, buildings, and products. Smaller households, the increasing importance of suburban communities and shopping center, and second homes produce extra mobility(2).

The impress from repair has to substitute of products and trends towards throwaway products and packaging work against higher material efficiencies and hence, against energy efficiency and sustainable development. Lots of developing countries energy use is repelled by industrialization, urbanization, increasing road transfer, and increasing incomes.

Wide income differences in many areas are also reflected in energy consumption patterns. Often a small assign of the population accounts for most commercial energy necessitate(3).

When disposable income increases, energy consumption by households in developing countries, like India, shifts from traditional to commercial fuels. This trend has significant implications for energy efficiency in households. Afterwards the technological efficiencies of cooking appliances using commercial fuels are higher than those of biomass, complex energy consumption per family tends to fall(2, 4).

A typical example is The move from a fuel wood stove with a technical efficiency of 12-18 percent to a kerosene kitchen stove with an efficiency of 48 percent, or to .a liquefied petroleum gas stove with an efficiency of 60 percent(5).

Then again, the replacement of commercial for established fuels raises ratios of commercial-grade energy to GDP, because conventional energy is generally not included when such ratios are calculated. In addition, electrification in rural areas and increasing income and quality in urbanizing areas gain energy use. Nations also endure due to the use of obsolete and energy ineffective engineering which encourage spark the gain in energy usage(6).

India’s energy security, at its broadest level, is primarily about ensuring the continuous availability of commercial energy to affirm its economic growth. India faces redoubtable challenges in assembling its energy needs and providing adequate and varied energy of hoped quality to users in a sustainable manner(7).

This paper presents the improving on the energy planning by expanding, enlarging or refining of a sustainable energy security index that describes the performance of India from various perspectives like:
1. Economic,
2. Environmental,
3. Social and
4. Institutional.
India’s heightening dependency on natural gas and petroleum fuels makes it vulnerable to supply disruptions and price spikes. The various attributes of sustainable development are primarily concerned with reduction of disbursement on energy, infrastructure investment and providing clean and able to accomplish a purpose; functioning effectively energy systems. To gain with effort this, existing resources should be used efficiently and a wide range of resources should be brought under control and put to use in the achievement of these objectives(8).

Until now low concentrates on some features of the environment to the (relative) exclusion of others has been paid to the linkages between the social and the economic dimensions of energy security(9). The essence of sustainable development lies indicating exactness or preciseness at the interfaces and trade-offs between the contravening objectives of economic and social development and environmental protection(10).

Hence, the country should design elaborate and systematic plan of action to secure supply sources and reduce energy demand. Diversification will remain the serving as an essential component starting principle of energy security for fossil fuels. It also demands developing a new generation of “clean coal” and low carbon technologies advocating a growing role for a variety of renewable energy sources admitting hydrogen fuel as they become more competitive. A move towards more sustainable technologies and fuel types is needed to meet future challenges(11). Investment in energy-efficient as well as renewable energy or energy generated without using up limited resources such as fossil fuels technologies and infrastructure will require contributing economic and environmental policies(12).

In a world of becoming greater or larger interdependence, energy security will depend much on how countries manage their mutual dealings or connections or communications with one another(13).

**Conclusion**

Letting down the energy intensity of GDP increase through higher energy efficiency is important for assembling India's energy challenge and checking its energy security. In this context, energy designing through demand side management is one of the most viable, feasible and cost effectual options that exist for our country. That is why energy security will be one of the main challenges for India’s foreign policy in the years to come. The energy security policies of the country need to be oriented to sustainable development as the primary goal and climate mitigation as its byproduct.

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