
UNIT 6 ENERGY POLICY

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6.1 INTRODUCTION

In recent years, both developed and developing countries have become increasingly concerned about managing economic growth without depriving future generations of a sound base of natural resources and a healthy environment. It is clear that sustainable development depends upon the implementation of energy policies which incorporate environmental needs while at the same time providing for social and economic growth.

The key to meeting this challenge is to optimise world energy use and supply options, including renewable energy. This requires careful planning and formulation of coherent and suitable energy policy that fulfils national goals without compromising the environment and the international commitments to safeguard it in a sustainable development paradigm. In fact, national energy policy affects us every day in ordinary activities like turning on the lights at home, filling up the tank at the petrol pump, adjusting a thermostat in the office, and starting a motor on the assembly line. You may wonder: How is energy policy involved in these activities? When we turn on the lights, we need not know whether the electricity is produced from coal, nuclear power, natural gas, or wind power. However, the electricity tariffs we pay and the quality of the air we breathe is a result of certain policies that influence the electric utility's choice of fuels, generating technologies, and investments in pollution controls. That is why it is important that we know about the energy policy and exercise our right in shaping it.

We begin this unit with a discussion about what the general objectives of a sustainable energy policy should be for developing countries like ours, and the issues that need to be addressed by them. We then examine the role of energy policy in relation to environment and development. Next, we describe how the concerns for sustainable energy generation and use figure in the international environmental policies. Finally, we discuss the concerns about energy policy in the SAARC Region. In the next unit, we continue this discussion by focussing on planning for sustainable energy use.

Objectives

After studying this unit, you should be able to:

- discuss the goals of sustainable energy policy;
- analyse the concerns that figure in energy policy formulation; and
- describe the policies on energy and environment at the international and SAARC level.

6.2 ENERGY POLICY: AN INTRODUCTION

You have studied in the earlier courses that sustainable development is about improving the quality of life, for people today and for future generations. It covers a whole spectrum of issues, which may affect people's quality of life, and it relates to almost every sector of economy including energy. You have also learnt in Unit 1 that energy is a crucial input in developing economies for three main reasons: **energy fuels a competitive economy, energy utilisation affects the environment, and energy use may affect national security.**

We rely on energy in almost all sectors of our economy. Therefore, sustainable energy production and use should form an integral part of the sustainable development paradigm. As our experience with several energy crises and our ongoing concerns for the environment attest, the future does not always take care of itself. We need appropriate energy policy and planning that is in tune with both economic and environmental considerations. In the context of developing countries, this implies the need for

- formulating long-term assessments of the energy sector,
- evaluating the relationship between energy consumption and the environment,
- creating a safe, stable and favourable environment for investment, and
- developing a workable energy policy in which the policy objectives, structures and systems of implementation, particularly, the systems of incentives and taxes, are transparent.

Of course, each country must adopt policies suited to its own particular circumstances. Smart policy decisions can make a difference in how well we realise our national goals. However, certain general principles should guide the formulation of the energy policy of a nation. This is what we now discuss.

6.2.1 Energy Policy Guidance

We begin with the questions: **What should the key objectives of a sustainable energy policy be? How could these be met?** Let us first set down the goals of energy policy.

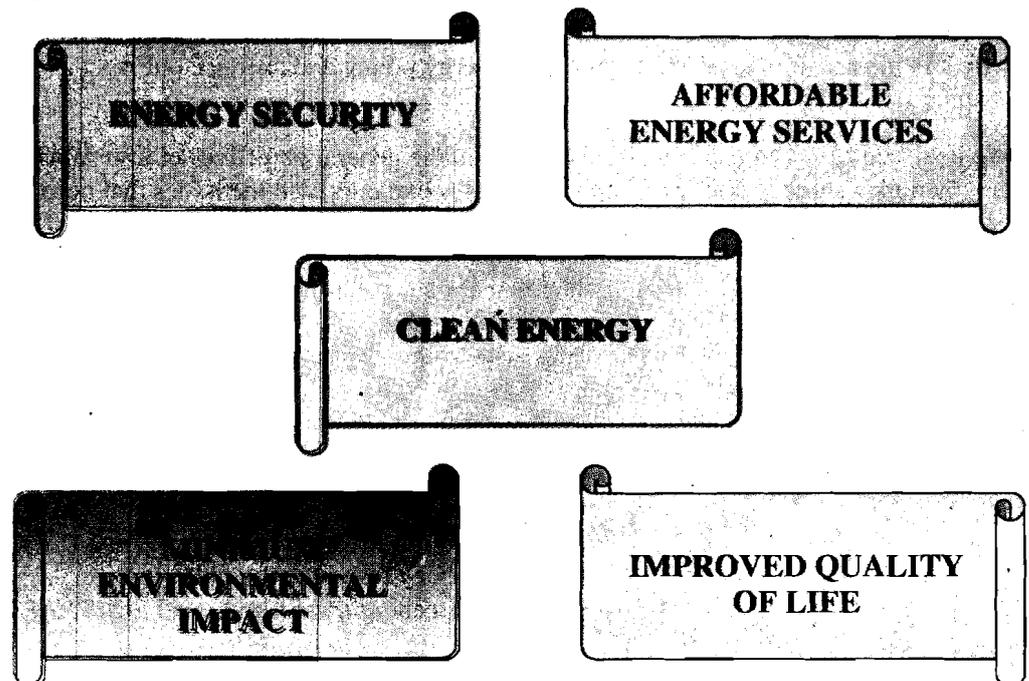


Fig.6.1: Key goals of energy policy

Key Objectives of Energy Policy

- To provide energy security and to work towards the eradication of fuel poverty so as to meet the goals of sustainable economic development;
- To ensure reliable and affordable energy services and commodities required to fuel stable economic growth;
- To encourage cleaner, more efficient forms of energy supply, and the use of renewable energy sources;
- To limit the adverse environmental impacts associated with energy production, distribution and use from the available energy supply options;
- To maximise energy productivity and improve the quality of life.

Let us elaborate these ideas further.

Providing an environmentally acceptable and assured energy supply is one of the key requirements for economic growth and improving living standards. Problems of poverty and environmental degradation in developing countries compound the difficulties of making progress on this front. The issue is further complicated by international concerns over the increasing use of non-commercial fossil fuels in developing countries, the consequent environmental impacts and emerging pressures for developing countries to share the burden of containing trans-boundary and global environmental problems.

For example, during the past decade, the rate of deforestation in Asia and the Pacific has increased by 70% from 1.8 million ha/y to 3 million ha/y. While, in theory, trees can be grown to provide a sustainable yield, in practice the regeneration rate is much less than the harvest rate. The energy balance for fuel wood is highly negative for India and to a lesser extent for Pakistan, Nepal and Bangladesh. Some studies predict that at current rates of harvesting, timber reserves in Asia will last for less than 40 years.

As you know, there are many other adverse environmental impacts associated with the use of traditional fuels such as localised air pollution (including particulate matter and carcinogens), exposure to carbon monoxide poisoning in households and net additions to greenhouse gas emissions resulting from biomass depletion. You have studied about these issues in detail in Unit 4.

All these factors need to be mitigated and certainly add to the difficulties of policymakers in the South Asian region in addressing the issues of energy availability and security.

The objective of enhancing energy supply also requires significant investments in energy facilities so that a range of energy commodities and services better suited to a growing economy are made available. It implies supplying appropriate fuels for industrial and commercial use. Cleaner energy sources are also to be provided for household use.

Another important requirement is greatly expanded production of electricity. Electricity is a clean form of energy at the point of end-use and will increasingly be required by industry and households. It is an essential input to information technology and telecommunications, which are now the mainstay of global economic growth. The dilemma facing developing countries is that currently they generate most of their electric power using fossil fuels, which will exacerbate the greenhouse problem.

Till such time as other alternatives are available, policies and incentives will be needed to limit fossil fuel consumption and greenhouse gas emissions.

These policies can be expected to impact, for example,

- rates of extraction of fossil fuels such as coal and petroleum,
- design, construction and operation of fossil-fuel power plants,
- evaluation of energy sources other than fossil fuels,
- consideration of biomass as a source of fuel and as a carbon sink,
- trade in energy products, etc.

These measures could also affect the structure of the energy system and the economy as a whole. Policymakers face a major challenge in reversing the adverse environmental impact of energy production and use. In this respect, one of the most important issues currently faced by South Asian countries is whether it is wise to rely on fossil fuels for power generation or whether other forms of power generation may, especially in the longer term, be a wiser policy option for supplying sustainable energy.

This would involve the introduction of appropriate technology and significant investments in infrastructure. Solutions at a local and decentralised scale will have to be facilitated. A viable option for achieving sustainable energy supplies lies in promoting renewable energy resources such as solar energy, biomass (e.g., forests managed in a sustainable manner and other forms which may be used in direct combustion, the production of liquid fuels, biogas and electric power generation, etc.). It will involve implementing policies to encourage restoration of the natural resource base, e.g., improved management of natural forests and encouragement of “social forestry”. Geothermal, wind and hydro power may also be feasible, depending on specific local conditions.

Privatisation of energy generation and distribution is being advocated as a preferred solution in developing countries. However, if the environmental impact of commercialisation of energy (reliance on market forces) is not addressed simultaneously, the energy policy may be self-defeating.

Where large-scale conventional thermal, hydro or nuclear power stations are used – for example, to supply large amounts of electricity to industry and urban areas – they should be subjected to rigorous environmental controls. For example, coal-based power plants must be made to comply with strict emission standards. New and emerging thermal power technologies (e.g., combined cycle gasification, fluidised bed combustion, co-generation, etc.) could be promoted to improve generation efficiency.

You have studied that energy use creates many other environmental problems such as problems of solid waste disposal, especially from coal and biomass. Where waste ash is not properly handled, the quality of land use and surface water runoff may be adversely affected. Controlling energy-related environmental problems in urban areas can be expected to emerge as one of the most difficult tasks facing policymakers in the South Asian region.

In sum, we must understand that the developing countries of South Asia are in a state of transition from traditional to commercial energy supply. The challenges lie in

- bringing the non-commercial energy sector into a more commercial mode of operation,
- generating monetary incomes,
- providing appropriate pricing signals, and
- achieving a more efficient balance between the use of traditional fuels with other energy products supplied from commercial sources, and renewable energy sources.

Pricing is an important part of energy policy – prices are frequently distorted through government policies in developing as well as developed countries. **Low energy prices discourage indigenous energy development and encourage unnecessary**

consumption. Ways will have to be found for reducing fuel poverty, ensuring equity in energy supply and at the same time preventing wasteful use of energy.

You may like to reflect on the implications of these ideas in your own setting.

SAQ 1

Make a list of your daily activities or events around you involving energy use or its environmental impact. Link them with the goals of energy policy. For example, if there are huge power cuts, then the goal of energy security is relevant. If you use polluting transport, safeguarding the environment becomes important, and so on.

In order to meet the challenges outlined so far, an appropriate **energy strategy needs to be put in place** involving mechanisms for **restructuring energy demand**, and **promoting clean energy**. Energy planning has to be done keeping in view specific national priorities. Therefore, we discuss this aspect for India in Unit 8.

Energy strategy

The overall energy strategy should be based on

- a realistic long-term assessment of energy needs in all sectors of economy,
- targets for producing sufficient energy,
- restructuring and reducing energy demand, and
- increasing the role of cleaner, more efficient and renewable methods for generating/supplying it.

The first step obviously is to investigate the patterns of energy use and generation. Systems need to be set up to monitor all aspects of energy use by households, communities, other organisations and economic sectors. This information can be used to provide feedback to people about their consumption of energy and about progress towards realisation of local targets for reduction. The strategy also needs to examine the possibility of creating **Energy Services Companies (ESCOS)**.

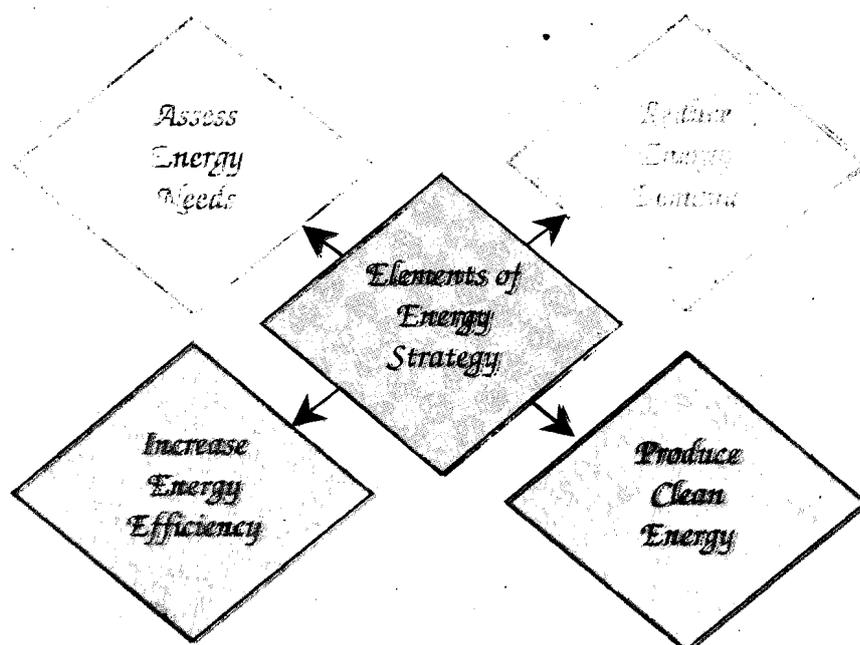


Fig.6.2: Some elements of energy strategy

We now discuss some of these aspects.

Restructuring and Reducing Energy Demand

There are many ways of managing and reducing energy demand at the individual, community and national levels. A comprehensive energy advice service may be created to help households, businesses and other organisations to minimise the energy they consume for various purposes such as heating, lighting and in other activities or appliances. We need to actively manage and reduce the use of energy in all public places.

This can be done through awareness, training and promotional programmes aimed at raising the awareness of people about their role in helping to do this. For example, the use of dimmers and sensors for lighting appliances could be promoted.

Use could be made of visits, information and marketing techniques to inform people, local businesses, offices, etc. about the benefits of energy efficiency. Other forms of support (e.g., economic incentives) could be provided to encourage them to invest in energy efficiency.

Information, marketing methods and practical support such as energy surveys, improvement grants and fiscal incentives could be used to help people increase energy efficiency in their homes. This may well be preceded by putting forth a suggestive list of more energy efficient appliances. We will discuss more about how this can be done in the next block.

Some measures that may be considered are to:

- Develop rate incentives, which are part of the electricity market. Different rate incentives should be developed for different groups of customers, including industrial, large commercial, small commercial and residential customers.
- Encourage Green Power Agreements where customers agree to pay for green power.
- Include some of the cost of environmental impacts into the costs of using non-renewable fuels.

The goal of reducing energy use should be fully incorporated into the other sectors of economy, e.g., transport, agricultural or industrial sectors.

The principles of energy efficiency should be incorporated early in the planning stage when siting and designing new buildings, industries and other infrastructure. For example, houses could be located near public transport services and other facilities (like markets, schools, medical facilities, work places, etc.); and buildings could be oriented to maximise solar gain and incorporate efficient heating systems and appliances, as well as high standards of insulation.

Households experiencing fuel poverty can be helped to meet their energy needs affordably by improving the availability of energy as well as the standards of energy efficiency at home. For example, replacing incandescent bulbs by Compact Fluorescent Lamps (CFLs) can lead to significant energy savings. You will learn more about these aspects in the next unit.

Clean, Efficient and Renewable Energy Generation

If new energy generating capacity is needed, or existing capacity has to be replaced, the implementing agencies could:

- Consider developing Combined Heat and Power (CHP) schemes and deliver energy efficiently. These may range from the small scale, such as for a single house, to larger schemes supplying electricity and hot water for an entire housing complex, villages or small towns.

- Use planning and other strategies to favour the cleanest, most efficient and, if possible, renewable options.
- Challenge any proposals, which do not meet these criteria.
- Use any influence, which they may have with the Government, or with energy providers, to lobby for investment in cleaner, more efficient energy generation.
- Adopt a favourable attitude to small-scale off-grid energy generating schemes, which meet local needs cleanly and efficiently, without the transmission losses often associated with supply to the national grid.
- Investigate the potential for renewable energy schemes in the area by commissioning a full survey (It may well be a socio-economic survey) and use this information to develop a Renewable Energy Strategy for the area.
- Hold a dialogue with the local community to find out people's views about renewable energy, and to help guide the development of the most appropriate – and well-supported – local schemes.
- Set up meaningful partnerships to help realise the potential for renewable energy use in the area, through pilot projects or full scale schemes.
- Raise awareness of the benefits and the local potential for renewable energy.
- Help those wanting to develop appropriate renewable energy sources, by directing them towards sources of advice and financial assistance.

You may like to build in your own ideas and experiences into the discussion. Do the following exercise.

SAQ 2

- What measures can you suggest in your local context to meet the goals of the energy policy?
 - Does your area have any presence of a Renewable Energy System? If so, list its key features.
 - What is your level of interaction within the community with regard to energy use? How can you help in raising awareness about the issues discussed so far?
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So far, you have learnt about the objectives of energy policy and the challenges developing countries face in meeting these objectives. We now discuss certain factors that need to be kept in view while formulating the energy policy.

6.2.2 Considerations underlying Energy Policy Formulation

National self-interest is paramount in Energy Policy formulation. The interests of a nation-state should be kept at the forefront in formulating its energy policy. For example, the responses of different countries to international energy crisis in the latter part of the 20th century were determined by their own interests.

Factors that shape national interests include:

- public concerns and public pressure on decision makers,
- dramatic instances of environmental problems,
- awareness and scientific understanding of the key issues, and
- interests of dominant groups.

That is why national preferences and policies differ from each other. For example, though western industrialised countries have been the main pushers in the international negotiations to curb the emissions of greenhouse gases, they have not

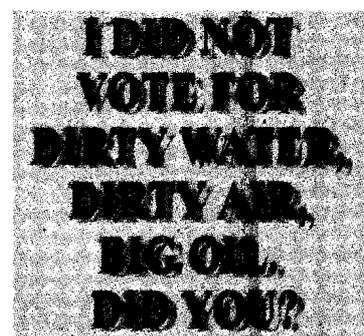


Fig.6.3: The public matters!

acted as a unified group. The United States has referred to scientific uncertainties as well as high abatement costs and has tended to drag its feet on curbing unsustainable use of energy (e.g., in the transport sector). Most developing countries have been sceptical about the need to act on climate change, but the judgment has not been shared by the small island nations that are particularly vulnerable to the potential rise in sea level and to greater incidences of tropical storms. Many nations have established regional mechanisms to facilitate cooperation among them.

In sum, the main actor responsible for energy and environmental policy is the nation-state, whose preferences may be influenced by many factors.

However, even though the nation-state is regarded as the main actor in energy policy, **international cooperation** to meet its goals is desirable. The success of efforts in this direction would depend to a great extent on whether nations perceive shared interests or not apart from their readiness to get involved. Whereas in the case of stratospheric ozone depletion, there has been a sufficient degree of shared interests to enable nations to agree on the protection of the ozone layer, we witness a greater diversity of state interests in the case of climate change. The reason perhaps is the wavering attitude of the key GHG contributor – the USA.

Economic Development and Scientific and Technological Prospects

The promotion of sustainable development will not be possible unless economic objectives relating to technological development, competitiveness and growth are reconciled with societal goals. This challenge must be met in the context of significant structural and demographic changes, and globalisation of the economy. Enormous potential exists for global collaboration, strengthening economic cooperation and creating new jobs.

South Asian developing countries depend critically on the adoption of appropriate technology as a basis for expanding and improving their energy systems. Many of the technologies that could be usefully applied by developing countries are cost-prohibitive, despite the fact that they might also bring significant environmental gains. The wider adoption of some of the bio-fuels and solar technologies is currently hampered by bottlenecks in R&D. Adoption rates for energy technologies will thus depend on further advances in innovation, economies of scale in production and economies of “learning by doing”.

Developing countries can undertake joint ventures with companies from advanced countries to establish and operate energy facilities. This could help to overcome the problems of capital shortage, limited technical skills and patent protection mentioned earlier. Such ventures may also be undertaken for environmental reasons. It is well known, for example, that it may be more cost effective for advanced countries to invest in environmental controls in less developed countries rather than attempt to do so in their own situation at higher costs. Japan, for example, has expressed strong interest in assisting China with its coal mining operations and installation of modern electricity and industrial plants to combat potential problems of trans-frontier acid precipitation.

In this context, energy technology cooperation and transfer for sustainable economic development becomes very important.

You have learnt that one of the prerequisites for economic development and one of the key goals of energy policy is assured energy availability and energy security. In the context of developing countries this implies that the energy policy facilitate technology transfer from the developed to the developing nations and promote greater cooperation between them.

It should spell out measures for improving the effectiveness of cooperation, technology transfer efforts, and facilitate all such programmes:

Of course, the transfer of technologies to improve the effectiveness and efficiency of energy systems can be best attained by using available technologies, sound management, and customised training on employing and maintaining these technologies. Market prices are a critical component as these reflect the costs and benefits within a given economic system and provide incentives for developing newer technologies and energy supplies.

Impediments to technology transfer include a lack of engineering skills, shortages of investment funds, inadequate evolution of commercial energy markets and retention of intellectual property rights or patents by energy companies in the industrialised world.

Therefore, a number of key elements must be put in place in order to assure the overall success of the technology transfer process.

Specifically,

- overall government policies (e.g., those regarding movement of personnel and availability of foreign exchange for purchase of equipment) must support the process,
- both parties in the process must be competent,
- adequate time must be allowed for training,
- technical updating must be continuous,
- financial assistance must be provided in key areas such as infrastructure equipment and training, and
- skilled "people" infrastructure must be created as it is equally important for successful technology transfer.

Some general recommendations can be made to guide policies aimed at fostering technology cooperation and transfer. These are as follows:

- **Sound overall economic, energy pricing, trade and investment policies should be put in place to support technology transfer.** For this,
 - ◆ International institutions and bilateral aid agencies should focus primarily on creating the proper overall economic policy environment,
 - ◆ The interest of the people and the markets (not political or economic ideology) should dictate technology choice.
 - ◆ New policies on investment approaches to increase the foreign investment in the energy sector may be formulated.
 - ◆ Cooperative R&D programmes involving developing and developed countries and the private sector should be increased.
 - ◆ Efforts should be made to better coordinate international technology transfer programmes, well supported by awareness about the Operation and maintenance (O&M) mechanisms.
- **The technology transfer process should be comprehensive and focus on all aspects** of the technology transfer process including
 - ◆ improvements within all phases of the system from **energy extraction to conversion and end-use.**
 - ◆ the **energy supply and consumption sectors** with the highest potential economic and environmental benefits for a nation.
- Cooperation between multilateral development banks, donor agencies, developing country agencies and utilities should be facilitated to expand the use of integrated resource planning methods and ensure optimum investment throughout energy systems. For example, a special program could be created by the Global Environment Facility (GEF) in cooperation with national donor agencies to

facilitate the introduction of cleaner energy technologies in China, India and other developing countries.

- An intensive and coordinated attention should be given to improving the managerial and technical capabilities in recipient countries. Training should be provided on a long-term basis together with the technology being transferred. Technical management programs should be expanded, placing particular emphasis on public/private partnerships. Entrepreneurship development skills should be cultivated as well. The message thus is to **invest in people**.

Some other considerations to be taken into account while energy policy formulating are described below.

Alternative Energy Futures

The trends that are shaping the developing nations' energy future suggest that we face substantial challenges in meeting economic, environmental, and national security goals. These trends also indicate that these nations have to find ways to improve energy productivity, prevent pollution, and enhance national security.

The energy policy should not be predicated on a single projection of energy future. Instead, it should take into account multiple scenarios based on an appraisal of risks and opportunities evident in current patterns of energy development, and focus on areas where the opportunities to reduce risks are greatest.

The major risks that threaten the attainment of national goals include rapid growth in global energy demand, unstable world oil supplies vulnerable to fluctuating oil prices, growing recognition of international environmental threats, and a slowdown in investments to develop and deploy new energy technologies. These trends could lead to the following scenarios:

- Growth in the U.S. and world energy demand could strain the capacity of energy suppliers to expand production, resulting in sustained energy price increases. Midrange projections of growth in world energy demand generally assume that economic growth continues at about 2 percent annually in industrialised countries, with non-industrialised countries growing about 3 to 4 percent annually. But growth during 1993 and 1994 exceeded these rates in most parts of the world. If such growth persists, world energy supplies could become choked within the next decade.
- International conflict or social turmoil in unstable oil-producing regions could disrupt global oil markets and rapidly increase oil prices. Continuing political and social upheaval in the Middle East, Central Asia, and Africa could lead to significant and prolonged disruptions in the ability or willingness of the countries in these regions to supply oil to the international market. Resulting high oil prices, combined with inadequate monetary and fiscal policy responses in industrialised nations, could impair global economic growth.
- Clear evidence of significant global climate changes or other energy-related environmental problems could precipitate widespread public demand for more stringent measures to reduce greenhouse gas emissions or other environmental risks from energy production and use. Many scientists believe that stronger evidence could emerge in the next decade or two indicating that human-induced climate changes would result in large adverse impacts. Although it is difficult to forecast how the international community would respond, nations that are less dependent on carbon-intensive fuels or that have developed and begun to deploy the technologies needed to reduce such dependence are likely to have an advantage.
- Reduced investments in developing and deploying advanced energy technologies could place a country at a competitive disadvantage in global energy technology

markets. Such a trend could result from the relatively low overall rate of private savings and investment or from less research and development (R&D) investment in the energy sector.

These risks are evident in current trends, but are not forecasts of future events. Plausible scenarios of energy futures bracket a range of possibilities. Scenarios can be envisioned in which energy risks threaten economy, environment, and national security, while equally plausible scenarios emphasise the positive trends that could reduce risks over time. By focusing on the most prevalent risks, the energy policy can enhance the prospects for a clean, competitive, affordable, and secure energy future.

Social Objectives

Society is making increasing demands for better living conditions, better safety, and better use of vital and scarce resources including secure and economic energy supplies and services. These key societal issues will only be solved if in addition to developing technologies, the socio-economic context is appropriately analysed and taken into account in the energy policy. The social indicators are as important as the technical indicators. We will take these issues in detail in Units 7 and 8.

You may now like to attempt an exercise to apply these ideas to the Indian context.

SAQ 3

Which of the factors outlined so far should be considered while formulating the Indian energy policy? Justify your answer.

6.2.3 Energy Policy vis-à-vis Environment and Development

You have studied in the previous section that the energy policy is motivated by the goals of economic productivity, environmental quality, and national development. In this section, we discuss the economic, environmental, and national security implications of the current path of energy development, and explain how risks and opportunities define the scope and intent of the energy policy.

Energy and Economic Development

Reliable and competitively priced energy supply is a critical need for economic development. **Energy supply markets** and **demand markets** have changed considerably over the past 25 years. On the supply side, greater competition has led to expanded production of coal, natural gas, and renewable energy under conditions of stable or even falling energy prices.

On the demand side, as technology has become more efficient and the economy has shifted away from energy-intensive industry, the amount of energy to produce one dollar's worth of GDP – the energy intensity of the economy – has declined, as it has in most other industrialised economies. This trend of GDP growth outpacing energy use is expected to continue for at least the next 15 years in the developed nations.

The increased demand for energy services has been partially offset by more efficient use of energy in all major end-use sectors. The net result of this mix of the technology trends has been relatively stable or slowly growing energy demand in most sectors of developed economies.

However, you have studied in Unit 2 that the rapidly expanding economies of Asia and the developing world will increase their energy consumption. Thus, energy is going to be a critical input in their economic progress.

Energy and the Environment

You have studied in Unit 4 that energy transformation and consumption are the primary sources of most harmful air pollutants and greenhouse gases. Although considerable progress has been made over the past two decades in limiting or reducing

air pollutants, significant air-quality problems persist in some areas. Because the environmental regulatory system in most developing countries tends to focus on individual technologies, more progress is made reducing the pollution produced per unit of energy use (or per unit of energy service delivered) as compared with the slower pace of reducing overall levels of pollution.

The global climate changes likely to result from increasing concentrations of greenhouse gases pose another potentially serious environmental problem related to the production and use of energy. Unlike the case with several other energy-related air pollutants, emissions of carbon dioxide (the principal greenhouse gas) from energy use have been generally rising over the past 10 years and are expected to continue to rise. Although many uncertainties remain regarding the magnitude, timing, and regional effects of such global climate changes, there is mounting evidence that climate changes could begin to occur early in the next century and that, if current trends continue, these changes could ultimately have significant harmful effects on economic growth, human health, and the stability of vital ecosystems besides health related problems.

You have also studied that energy production and use have other important impacts on the environment, such as energy-related water pollution, including oil spills; nuclear, toxic, and other waste disposal problems; and disruption of sensitive land and natural ecosystems besides health related problems.



Fig.6.4: Some features of energy policy related to the environment

Existing environmental laws and regulations help reduce the adverse effects of many of these energy-related environmental impacts. However, some pollutants are not controlled, and progress toward a cleaner environment has been accompanied by increasing costs. Because these high costs could limit further progress, the energy policy should also focus on the development of new technologies and new approaches to environmental regulation that will help minimise the costs of pollution reductions. In particular, it has to catalyse a shift toward more performance-based regulation that can achieve environmental goals at a lower cost by giving industries more flexibility in selecting compliance strategies. This also indicates a strong need for performance monitoring, fiscal incentives and a holistic evaluation.

Including the cost of pollution mitigation and cleanup in the cost of energy could be an option. Financial incentives could be given to both utilities and consumers for direct reduction or sequestering of emissions and for improving efficiency of energy generation and use. These financial incentives could be through lowering of costs resulting from efficient methods and equipment or regulation by penalties. Tax benefits could be given for using more efficient fuels and conserving energy minimising transmission and distribution losses developing and using energy efficient appliances.

So far we have discussed the general framework of energy policy. We now examine policies at the international and SAARC and level. We first discuss how energy figures in the international environmental policies.

6.4 INTERNATIONAL ENVIRONMENTAL AND ENERGY POLICIES

Energy has been a major international policy issue for a very long time. It gained great attention in the 1970s as a result of the 1973 and 1979 oil price shocks. The vulnerability of all economies to energy price and supply fluctuations became evident to government policy makers and consumers alike. Oil importing countries confronted serious balance of payments problems, and in some cases, debt traps. The UN Conference on the Development and Utilisation of New and Renewable Sources of Energy held in Nairobi in 1981 stressed the importance of alternative, renewable sources of energy to offset oil dependence. The hopes raised and plans formulated floundered, however, with the reduction of international oil prices. In parallel, acidification and global greenhouse gas emissions were taking on new international significance as were the health concerns related to emissions. However, an integrated approach linking energy, environment and development soon emerged and was reflected in several global agreements arrived at under the UN auspices.

Energy and the Major United Nations Conferences

You have learnt in other courses that, during the 1990s, the United Nations convened a series of major Conferences on global issues including the 1992 Conference on Environment and Development (UNCED) in Rio de Janeiro, the 1993 Conference on Human Rights in Vienna, the 1994 Conference on Population and Development in Cairo, the Global Conference on the Sustainable Development of Small Island Developing States, the 1995 World Summit for Social Development in Copenhagen, the 1995 Fourth World Conference on Women in Beijing, the 1996 Conference on Human Settlements (Habitat II) in Istanbul, and the World Summit on Food Security in Rome.

At each of these Conferences, Member States agreed on objectives, principles and action programmes pertaining to environment and sustainable development. Energy issues have been present at all of the Conferences. In the Platforms and Programmes for Action emanating from the Conferences there are texts, which clearly discuss the role of energy. The negative impact on human health and the environment are explicitly recognised in these documents. Statements supporting the objectives of providing more energy-efficient technologies and utilising renewable sources of energy are adopted. In addition, there are also three Conventions closely linked to energy: the UN Framework Convention on Climate Change (UNFCCC), the 1979 Convention on Long Range Trans-boundary Air Pollution and the Convention to Combat Desertification.

However, there has not been a focused examination of the role of energy for an overall sustainable socio-economic development and actions called for concerning sustainable energy have not been integrated into development strategies.

The message from the Conferences with respect to energy is that a new approach to energy is required to meet the societal objectives agreed upon by the community of nations. The impact of poverty on the natural resource base was recognised at the 1992 Earth Summit in Rio. Designing and implementing environmental protection and resource management measures to take into account the needs of people living in poverty and vulnerable groups has been repeatedly highlighted at all major United Nations Conferences since 1992. In spite of this, however, the necessary changes are not reflected in the overall trends in energy as observed in the 1990s. Present trends in

energy pose serious barriers to the goals of sustainable development and poverty eradication.

In its resolution 47/190 the United Nations General Assembly decided to convene not later than 1997 a special session for the purpose of an overall review and appraisal of Agenda 21. The same resolution urged organisations and programmes of the United Nations to take the necessary actions to give effective follow-up to the Rio Declaration on Environment and Development and Agenda 21.

Agenda 21 programme areas, activities and objectives from the Rio Conference describe numerous links between sustainable development and energy issues. These are reflected in the Agenda 21 on Promoting Sustainable Human Settlement Development, Health, Integrating Environment and Development in Decision-making, Protection of the Atmosphere, Combating Deforestation, Combating Desertification and Drought, Sustainable Mountain Development, and Promoting Sustainable Agriculture and Rural Development. **Energy efficiency, new and renewable energy, dissemination of modern, clean technologies for conventional fuels, supporting policy frameworks and capacity building are pivotal to this issue.**

The Programme of Action adopted at the United Nations Conference on Population and Development emphasises the need to integrate population concerns into all aspects of economic and social activity. It addresses the interrelationships between population, sustained economic growth and comprehensive sustainable development, particularly for the implementation of effective population policies and meeting basic human needs.

The United Nations Conference on Human Settlements HABITAT II statement "Sustainable Human Settlements Development in an Urbanising World" explicitly deals with sustainable energy use. The use of energy is essential in urban centres for transportation, industrial production, and household and office activities. Current dependence in most urban centres on non-renewable energy sources can lead to climate change, air pollution and consequent environmental and human health problems, and may represent a serious threat to sustainable development. Sustainable energy production and use can be enhanced by encouraging energy efficiency, by such means as pricing policies, fuel switching, alternative energy, mass transit and public awareness and importantly, the safe energy practices. Human settlements and energy policies should be actively co-ordinated. The promotion of efficient and sustainable energy use and actions for Governments, the private sector, non-governmental organisations, community-based organisations and consumer groups to solve many of the crucial social and economic requirements of sustainable development are recommended.

The implementation and follow-up of recommendations related to health, education, safe food, potable water and sanitation, transportation, employment and poverty eradication, afforestation as well as the needs of special groups such as the ageing, handicapped, victims of natural disasters, children, refugees and the displaced, will all require a substantial increase in energy services.

The Beijing Conference Platform for Action, Objective K "Women and the Environment" refers to women's numerous roles in the management and use of natural resources, as providers of sustenance for their families and communities, as well as women's needs and requirements as users, consumers, managers and decision-makers. It stresses the need to integrate gender concerns and perspectives in all programmes for sustainable.

The World Food Summit in its Rome Declaration on World Food Security noted that "unless governments and the international community address the multifaceted causes underlying food security, the number of hungry and malnourished people will remain very high in developing countries, particularly Africa south of the Sahara and sustainable food security will not be achieved". The importance of energy in

agricultural production, food preparation and consumption is clear. Therefore, various elements of food chain supply need to be examined at length.

SAQ 4

Describe how energy concerns figure in international environmental agreements and policies.

6.5 ENERGY POLICIES IN THE SAARC REGION

SAARC has come a long way in elevating the importance of energy sector under its ambit of multi-dimensional programmes. Energy, which was one of the sectoral elements, has now been moved to a full working group at SAARC. It is functional under the purview of SAARC integrated program of action. Modalities for doing so were set rolling at the 12th SAARC summit held in January, 2004.

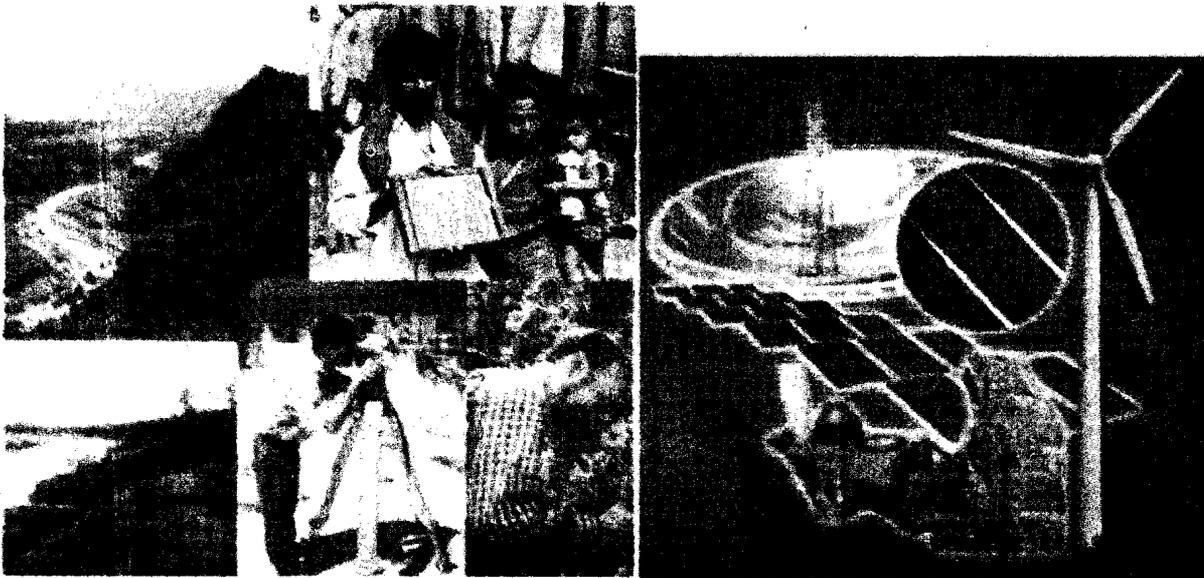


Fig.6.5: Strengths of the SAARC region: Hydropower in Nepal, renewable energy technologies in India (Source: www.vigyanprasar.com/), rural energy cooperatives in Bangladesh

SAARC countries offer tremendous scope for mutual cooperation and growth in the energy sector owing to the rich diversity of their natural energy sources. For example, Nepal and Bhutan in particular have significant hydropower sources, which if optimised fully could serve the energy interest of the whole SAARC region. Likewise, India has much to offer on the renewable energy (RE) front owing to its enriched experience of RE use and Operation and Maintenance structure. The twenty fifth session of the SAARC Council of Ministers approved the report of the first meeting of the working group on energy (WORGEN) and recommended that the following energy policy initiatives be taken in the region:

- Possibility of establishing SAARC energy centre.
- Detailed study concerning the available options, benefits and constraints of forging an energy trade in the region.
- Regular exchange of energy information.
- Joint strategies for the wholesome development of Renewable Energy (RE) within the member states.
- Examining the institutional and energy pricing reforms.

- Investigating the scope for setting up of trans-national energy lines (electricity, oil and gas) with an aim to make SAARC energy sufficient.
- Focus on the energy development linkage in rural areas besides setting up of a regional fund for energy development.

India is currently negotiating with Iran to bring a gas pipeline via Pakistan by the year 2010. This may well be a test case of cooperation between two key member countries of SAARC region. Many such initiatives may well crop up within SAARC later on. For example, the Indian experience with the use of CNG in transport sector may be replicated elsewhere. Similarly, member countries could learn from smoothly functioning rural energy cooperatives in Bangladesh. In brief, each member country can benefit from the other rather than squabbling about various issues. Ultimately the SAARC energy group may become a force to reckon with at the global level too.

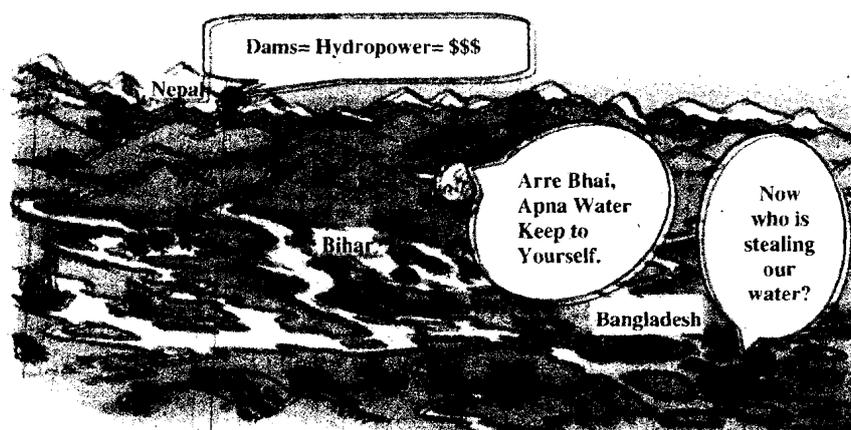


Fig.6.6: A lot more needs to be done! (Source: www.gobartimes.org/, a supplement of Down to Earth)

In this unit, we have discussed the energy policy, in general, including its objectives, key elements of the energy strategy and the concerns that help in shaping the energy policy. We hope that while you were studying the general principles, you would have been evaluating their applicability to the Indian situation. Let us now summarise the contents of the unit.

6.7 SUMMARY

- The **goals of energy policy** should be to provide energy security, to ensure reliable and affordable energy services, to encourage cleaner, more efficient forms of energy supply, and the use of renewable energy sources, to limit the adverse environmental impacts associated with the energy sector and to maximise energy productivity and improve the quality of life.
- The overall **energy strategy** should be based on a realistic long-term assessment of energy needs in all sectors of economy, targets for producing sufficient energy, restructuring and reducing energy demand, and increasing the role of cleaner, more efficient and renewable methods for generating/supplying it.
- The main **concerns underlying energy policy formulation** include national self interest, economic development, social equity, technology transfer and capacity building, environmental impact.
- Energy figures as a key concern in many international agreements. In the SAARC region, a working group on energy has recommended many energy policy initiatives such as establishment of SAARC energy centre, regular exchange of energy information, and joint strategies for the wholesome development of Renewable Energy (RE) within the member states.

6.8 TERMINAL QUESTIONS

1. Discuss the measures that can help in achieving the goals of energy policy.
2. Outline the avenues for greater collaboration in the energy sector in the SAARC region.
3. Discuss the concerns that shape the energy policy of a nation.
4. Analyse the role of energy policy in dealing with the environmental impact of energy generation, production and use.