

### 1.3 Sustainable Design and development:

- Sustainable technology in the energy sector is based on utilizing renewable sources of energy such as solar, wind, hydro, bioenergy, geothermal, and hydrogen. The plan must justify energy demand and supply and assess the actual costs and benefits to the local, regional, and global environments
- Sustainable design will reduce or remove negative environmental impacts through thoughtful design. The basic objectives of sustainability are to reduce consumption of non-renewable resources, minimize waste, and create healthy, productive environments.

Sustainable design principles include the ability to:

- optimize site potential;
  - minimize non-renewable energy consumption;
  - use environmentally preferable products;
  - protect and conserve water;
  - enhance indoor environmental quality; and
  - Optimize operational and maintenance practices.
- Utilizing a sustainable design philosophy encourages decisions at each phase of the design process that will reduce negative impacts on the environment and the health of the occupants, without compromising the bottom line. It is an integrated, holistic approach that encourages compromise and tradeoffs. Such an integrated approach positively impacts all phases of a building's life-cycle, including design, construction, and operation and decommissioning.

#### 1.3.1 A UTILITY-LED EFFICIENT LIGHTING PROGRAM IN BANGALORE, INDIA

The Bangalore Electric Supply Company (BESCOM), a distribution company that serves the Bangalore metropolitan area in the state of Karnataka recently partnered with the International Institute for Energy Conservation to implement a program to replace inefficient incandescent light bulbs with compact fluorescent lights (CFLs).

### POLICIES AND ACTIONS

The energy challenges that developing countries face are significant and increasing. Further, it is clear that developing countries will be unable to avoid the potentially large and adverse consequences without concerted policy interventions by developing and developed countries alike

### **I. ENERGY EFFICIENCY**

Energy efficiency can be especially important in rapidly industrializing countries as a way to manage rapid demand growth, improve system reliability, ease supply constraints and allow energy the production and distribution infrastructure to ‘catch up.’

Efficiency standards or codes for buildings, especially commercial buildings, are extremely important because of the long useful life of most structures. However, to be effective, countries will need to educate architects and builders and develop the means to monitor performance and enforce compliance with the codes. By setting a floor or baseline for energy efficiency, minimum standards can ensure that there will be substantial energy savings in the future.

### **II. SUBSIDY REFORM**

Fossil fuel subsidies are not restricted to developing countries. They are provided in many countries. They are also addictive and those who benefit from them are usually unwilling to give them up. Thus, analysts may conclude that subsidies should be eliminated or phased out.

Where there is concern that poor households will be unable to access basic energy services if they are required to pay the full market price, it might be feasible to provide subsidies of up to only a certain level of consumption. This is more likely to be practicable for electricity than for portable fuels like petrol or kerosene. For example, low-income households could be offered reduced electrical rates for the first increments of consumption.

### **III. INDIGENOUS SUSTAINABLE RESOURCES**

Many developing countries have abundant renewable energy potential and could benefit from the positive economic spillovers generated by renewable energy development, especially in underserved rural areas where decentralized, small-scale renewable energy technologies are likely to be competitive with conventional alternatives.

However, government involvement is needed even more in the early stages of research and development (R&D). Not surprisingly, developed countries have historically taken the lead in energy R&D spending because they have had the resources to do so. This will likely continue. However, this does not mean that there is no role for developing countries. Some of the larger developing countries have sufficient resources to permit them to invest significantly in technology. Others can participate by targeting investments and/or working cooperatively with other countries or institutions to ensure that their R&D efforts address the specific opportunities and constraints that apply in developing countries. Investment in energy R&D can also be seen as a way to build indigenous human capital in science and engineering. Brazil, for example, has nurtured a viable domestic biofuels industry through all stages of technology development, deployment and commercialization.

#### **IV. TECHNOLOGY TRANSFER AND DEVELOPMENT OF HUMAN AND INSTITUTIONAL CAPACITY**

In summary, successful technology transfer and a worldwide expansion of the human and institutional capacities needed to implement sustainable technologies are essential elements of an effective global response to the energy challenges that we face. To meet these challenges, developed countries will need to follow through on current commitments and work closely with developing countries to make the most effective use of scarce resources. Developing countries must not be passive bystanders in that process. They have everything to gain by leveraging future investments to build their indigenous human and institutional capacities and by taking the lead in adapting and improving sustainable energy technologies to suit their particular needs.

#### **V. CLEAN, EFFICIENT COOK STOVES**

Improved cook stoves are worth mentioning, however, because they offer enormous public health and welfare benefits at a relatively low cost. It has been estimated that exposure to indoor pollution from the use of fuels like wood and dung for cooking and space heating causes as many as 1.6 million deaths annually throughout the world, primarily women and young children (WHO, 2002). In addition, the need to gather fuel can cause local environmental degradation and take up great amounts of time, particularly for women and girls that might otherwise be available for more productive activities. A shift away from traditional fuels for cooking could marginally increase demand for commercial fuels like propane, natural gas or electricity

The situation in developing countries is in many ways more difficult than that for developed countries. Not only are there obvious resource constraints, but also a significant part of the population may lack access to basic energyservices. et, developing countries also have some advantages. They can learn from past experience, avoid some of the policy missteps of the last half century and have an opportunity to “leapfrog” directly to cleaner and more efficient technologies. Fortunately many essential elements of a sustainable energy transition can be expected to mesh well with other critical development objectives, such as improving public health, broadening employment opportunities, nurturing domestic industries, expanding reliance on indigenous resources and improving a country’s balance of trade.

