# The Situation of Renewable Energy Policy and Planning in Developing Countries

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## Abstract

*Developing countries generally do not have elaborate policies to support development of renewable energy technologies. They lack plans and strategies, laws and regulatory frameworks, market mechanisms, financial tools, and incentives. However, some have already developed comprehensive plans and policies amongst these are, Chinese Renewable Energy Plan; India's Renewable Energy Programme; Korea's Basic Plan for Renewable Energy Technology Development and Dissemination, Thailand's Small Power-producer Program, Argentina's Renewable Energy and Rural Markets Program, Morocco's Global Rural Electrification Programme; and Chile's Rural National Electrification Program. Certain international development programs for developing countries are designed to promote renewable energy with the active role of bilateral andmultilateral assistance-agencies, international financial instititutions (IFIs) or private foundations.*

**Keywords:** *Renewable Energy Policy, Planning, Developing Country, Technology, Utilization*

## I. Introduction

Affordable commercial energy is a necessity of life, when integrated with the developmental activity, to improve water-supply, agriculture, education, health, and transport. The broad policy to encourage sustainable energy-systems can greatly help in the economic development of the third- world countries. Key components of the overall strategy for this include : improving efficiency of fuels, making electricity available in rural, as well as in urban areas for economic development, providing de-centralized energy-option, financing rural energy-production, and developing new institutional structures and public and the very important private partnership. Many Renewable Energy Technologies are today at, what may be called, the "take-off" stage. Therefore, it is highly important to undertaklong-term planning, with effective policy-measures. These may be broadly grouped under the following heads: (1) International, (2) National Assessment & Planning, (3) Public/private participation and financial Investments.

## II. Methods and Materials

### II A. International

In order to accelerate application adaptation, and transfer of the mature technologies to the developing countries viz energy for mutual benefit to all, taking into account their special needs of the following measures are required on an international level :

a) Identify and keep under review, with respect to mature technologies, the utilization of new and renewable sources of energy, their role within sectoral programmes and, where appropriate, establish or strengthen institutional arrangements to promote their application;
b) Strengthen / establish measures to promote and facilitate the accelerated transfer of technology on new and renewable sources of energy, especially from developed to developing countries, in order to enhance the contribution of these sources to the total energy-supply of developing countries;
c) Support measures to increase economic and technical cooperation among developing countries, including the undertaking of joint programmes of activities;
d) Develop national capabilities to undertake, inter alia, the manufacture, adaptation, management, repair and maintenance of devices and equipment related to technologies for the assessment and utilization of new and renewable sources of energy;
e) Strengthen the ability of developing countries to make financial and technical evaluations of the different elements of the technologies, thereby enabling them to better assess, select, negotiate, acquire and adapt technologies required to utilize new and renewable sources of energy;
f) Formulate innovative schemes for investments in the area of manufacturing equipment for new and renewable sources of energy, especially the establishment of joint industrial programmes among interested

countries, for the manufacturing and commer- cialization of relevant capital goods;

g) Strengthen national capacity to review and assess domestic, fiscal, regulatory, sociocultural and other policy-aspects, required to accelerate the introduction of technologies related to new and renewable sources of energy;

h) Support, as appropriate, demonstration-projects related to the application of new and renewable sources of energy and technologies, prior to a decision on commercial operation and widespread implementation.

All the above measures would require sizeable investments. These can be ensured, provided each country decides to invest an appropriate percentage (from 5% to 10%) of its energy-expenditure on short and medium-term development of renewable energy technologies. This will need public consensus, followed by appropriate legislation.

**II.B National energy assessment and planning:**

The role of energy, especially that of new and renewable sources of energy, in meeting the needs of countries, can best be determined in the context of national energy-planning, an essential element of which is national energy-assessment. It is an especially acute problem with respect to the data-infrastructure pertaining to energy-demand and resource- inventories, as well as the impact on the ecology, which can provide the basis for assessing the possible future role of new and renewable-energy sources and related technologies, as well as developing national energy- policy and plans. Action plan is required as follows :

a) Map, survey and undertake other appropriate activities to determine the full range of physical resource-endowment, using, whenever possible, standardized methodologies for collecting data, processing and storaging as well as for dissemination;

b) Determine, in a dynamic way, energy-supply and demand and energy balances, and projections of future energy-requirements;

c) Identify, and keep under review, mature and near-term promising energytechnologies, as well as ongoing research, development and demonstration activities, and carefully assess their economic, socio-cultural and environmental cost, potential and benefit;

d) Strengthen and/or establish institutional infrastructure to collect, maintain, analyze, classify and disseminate information on all the above, as well as information pertaining to the policy, programme and project decision-making process, the legislative framework and related procedures (and their impact on energy supply and usepatters), and the availability of financing.

The strengthening of national capacities should embrace elements such as :

a) Establishment or strengthening of appropriate national institutional arrangements;

b) Adequate research and development programmes, to support the scientific and technical capacity to develop, choose and adapt technologies, including testing and demonstration facilities and research focal-points in new and renewable sources of energy;

c) Specific programmes, to promote the exploration, development and utilization of new and renewable sources of energy, taking into account (as appropriate) social, economic and environmental considerations;

d) Programmes to encourage the efforts of national, public and private entities in interested countries (as appropriate) to expand the development and utilization of new and renewable sources of energy.

e) Mobilization of adequate resources;

f) Develop qualified personnel, for specialized education and training programmes, equally accessible to men and women.

g) Development and strengthening of industrial capacity to manufacture adapt, repair and maintain energy-related equipment.

**II.C Financial investment and public/private partnership**

Based on experience[1] (World Bank/GEF and other international and national agencies) derived from Chapter-5, the following are general and financial principles that should be adopted in formulation of energy policies and action-plans.

1. Governments must create enabling environment, to provide choice of Alternate/Renewable Energy to its population;
2. Reduction of Governmental subsidy on fossil fuels;
3. Promotion of environment-friendly alternative/renewable energy- sources, through

demonstration;

4. Promotion of Financial for renewable energy;
5. Regulate law, tax-exemption investment, which can attract local and foreign partnership for investment;
6. Emphasize participation and Institutional-Development.

Based on these principles, specific policies for incorporating renewable energy within the power-sector re-structuring can be implemented in many developing countries. One of the important challenge is that international agencies and developing countries may work together, to develop national energy-policies and action-plans, using experience, suitable to their own situation. This can be summarized[2] as under :

a) **Encourage Independent Power Producer** : Private-sector involvement and investment in the renewable-energy power-sector are greatly facilitated by establishing a transparent and stable regulatory framework. Establishing these conditions can assist in promoting and developing renewable-energy market development. In many countries, utility regulatory frameworks exist that allow fair competition.

b) **Reduce Subsidies on Fossil-Fuels:** Most of the developing countries provide subsidies on fossil fuel, which should be reduced, to create a more "LEVEL" playing field. This will make renewable-energy technologies more competitive in the market.

c) **Environmental Standards** : Environmental standards should be implemented on both old and new plants. This will help to promote environment-friendly renewable technologies; improve emission standards, monitoring requirements and other aspects, which can further strengthen the power-sector.

d) **Renewable Energy Quotas** : All developing countries should set minimum percentage of renewable energy power consumed / produced on the total national energy-requirement. The national plan should provide further encouragement with a "renewable energy year." These programmes have been adopted in some European countries, viz. Denmark, Italy and Netherland, and are being proposed e.g in Japan, India and Portugal. Netherlands does have a national target to produce from renewable sources, 17% of all electricity produced from energy in 2020.

e) **Guaranteed Market** : One of the effective ways to facilitate and encourage the use of renewable energy products by governments is to provide subsidies that can be reduced over time. This would allow renewable-energy products to find a foothold in the market and expand to create a stable economic market of their own. For this to be made entirely successful it is important for governments to buy renewable energy products themselves. This will not only help to establish a guaranteed market but will also provide the required "demonstration effect" to win the trust of other buyers. Building the public sector as well as organizations encourage implementation of renewable energy technologies for demonstration and help to increase the marketability (market size).

As a whole, European policy calls for 12% of energy supply from renewables by 2010. China and India also have national goals : in China, renewables should account for 5% of annual energy being added by 2010, and in India this percentage is 10% by 2012, and in order to achieve this goal every country needs to set aside an appropriate percentage of national expenditure on energy-sector for relevalent research, development and extension. Every country/region should set its own goal and adopt appropriate resources for achieving this.

## III. Results and Discusion

There are a number of specific ways for incorporating renewable- energy in the energy mix, which can boost its use in many countries:

**Fossil-Fuels Subsidy:** In developing countries, most of the fossil- fuels are subsidized. These subsidies may be reduced gradually, to make renewable-energy marketable with cost competitiveness.

**Access to Transmission:** An open-access transmission-system may allow power-heeling between buyer and seller that provides open access to customers. Transmission-services should not discriminate against, or give unfair advantage to, specific ownership or certain types of generation. For example, in India open-wheeling policies have been credited with helping catalyze the wind-energy industry; industrial firms may even produce their windpower in regions with good wind-resources and transfer the power over the transmissionsystem for the use in their own facilities – or for sales to a third party. Similarly, in Brazil, reduction of fees for transmission-wheeling has been credited with promoting and giving boost to the small-hydro industry.

**Environmental Policy :** Emissions standards, monitoring requirements, and other aspects of environmental policy can be integrated to strengthen power-sector changes. For example, enforced emission- monitoring can promote "green power" markets. Major power-sector changes occur using political leverage, to incorporate environment friendly policies. Advocates of renewable energies should anticipate this opportunity.

**Renewable-Energy Pricing :** The electricity feed-in laws in Germany, and similar policies in other European countries in the 1990s, required purchase of renewable-energy power at a fixed price. For instance, in Germany, power producer could sell the utility at 90% of the retail market price. Feed-in laws led to a rapid increase in installed-capacity and development of commercial renewable-energy markets in particular in Germany and Spain. Partly because retail prices have been falling with competition, making renewable-energy producers and financiers more wary, the new German Renewable Energy Law now change pricing to that based on production-costs, rather than retail prices. One of the criticisms of historical feedin approaches was that they had not encouraged cost- reductions or innovation; this new German law includes provisions for regular adjustments to prices, in response to technological and market developments (Shepherd4 1998; Wanger5 2000; Sawin6 2001).

**Distributed Energy Systems :** Renewables are likely to play a larger role in power-systems, dominated by the distributed model than the central station paradigm. However, successful deployment of distributed renewables in an unbundled system, requires that at least one player can capture system-benefits. Some of the ways that distributed energy can be supported are :
-Financing mechanisms for renewable energy
-Common interconnection standards
-Standard power-purchase agreements and tariffs
-"Net metering" schemes for residential consumers
-Reduced bureaucratic procedures for grid-connections and/or metering
-upgrades energy tariffs in distribution-system
Distribution change system can substantially change the economics of generation of distributed renewable-energy. Solar-photovoltaic power, is perhaps the most significant. Although only about 20% of global PV production was used on grid in 1998 (mostly for government-sponsored rooftop markets). Such policies can enhance PV application at individual, community, regional and national levels.

## IV Conclusions

We may summarize the immediate needs, as follows:

1. Development of National Policy Framework
2. National Plan indicating priority-projects for demonstration.
3. Fund Allocation
4. Private - Public Participation
5. Regulatory measures :

a. Incentives
b. Financing System for Private Sector
c. Market Development (Economic Size)

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