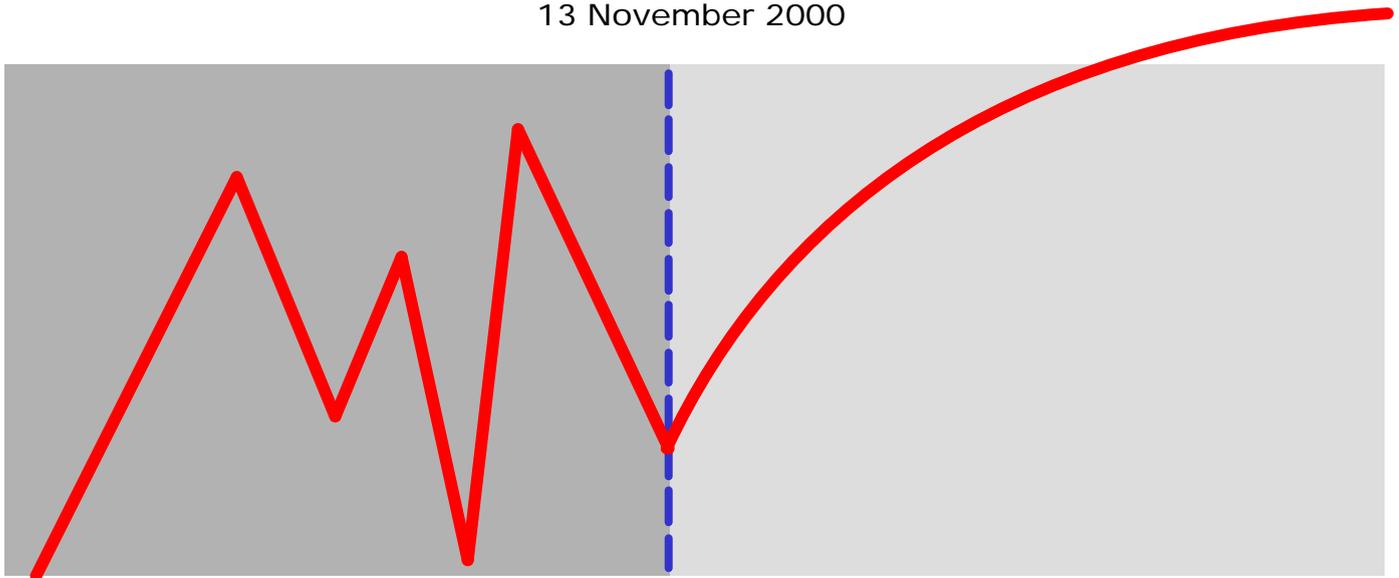




# UNIDO ROUND TABLE - MARGINALIZATION VERSUS PROSPERITY

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**Panel 1:  
Sustainable energy futures**

**Industrial Energy-Efficiency Branch, Sectoral  
Support and Environmental Sustainability Division**

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## ***I. Introduction***

This paper seeks to identify some of the key issues for energy in the context of sustainable development, industrialization and poverty alleviation. It will also review the programmes and activities of UNIDO related to various aspects of energy and sustainable industrial development in the developing countries.

In 1987, the UN Commission on Environment and Development defined the concept of sustainable development as *Development that meets the needs of the present without compromising the ability of future generations to meet their own needs*. Today, sustainable development has become broader and more complex. The general issue of environmental protection remains high on the agenda with the growing concern about climate change. At the same time, sustainability has come to include the need for high and stable levels of economic growth and employment, especially in the developing countries.

## ***II. Major Issues***

### **Access to Energy**

Energy is a prerequisite for economic and social development, however, the accessibility to reliable and affordable energy is very unevenly distributed, both between countries and within countries. The World Energy Council estimates that slightly more than one billion people in the industrialized countries consume nearly 60% of total energy supply whereas, the five billion people in developing countries consume the other 40%. When world energy demand is unable to be satisfied economic growth suffers but as we have seen recently with \$36/barrel oil the economies of the developing countries suffer most. To make matters worse, it is estimated that one third of the world's population (two billion people) most of whom live in the rural areas of developing countries do not have access to electric power or other modern energy services.

At the international level there is a very uneven distribution of energy resources. The poorer developing countries are also at a disadvantage in gaining access to fuel on the world market, especially when market prices are high. In the short term developing countries with little or no reserves of fossil fuels have little choice than to import high-priced fuels. With the further development of renewable energy, this dependency on local fossil fuel reserves should be reduced as well as a reduction in green house gases. At the international level UNIDO is establishing centres of excellence on renewable energy which promote research and development, application and awareness building and financing.

### **Rural energy - Energy for the poor**

A situation where one third of the world's population does not have access to electricity is obviously not sustainable in terms of overall economic and social development. The provision of energy is a necessary condition for industrial development although it is not a sufficient condition. The problem is that the poor in rural areas do not have the income to pay the relatively high costs of extending the electricity grids or the investments for stand-alone energy systems and therefore in many cases cannot pay the real costs

associated with electric power or other modern energy systems. Clearly, the international community and governments have a major role to play, in terms of the application of policies to provide reliable and affordable modern energy services to the poor in rural areas. Rural energy development must be seen as an integral part of an overall rural development including income and employment generation. The rural poor use traditional forms of energy mainly fuel wood which leads to deforestation and the sequence of environmental problems at local level and contributes again to the global problem of climate change. Where rural energy demand is small the cost of extending the electricity grid are high and it is in these areas that a variety of renewable energy technologies, wind, solar, small hydro power, make most sense and once developed there are clear examples that they stimulate the local economy.

Providing energy, especially electric power to the rural areas in developing countries is going to require massive financing. However, if market forces alone are used for the allocation of resources, the rural populations will never benefit from electric power and will therefore never break out of poverty. Innovative policies, at the national and international level are needed. These include providing public funding for rural electrification programmes in decentralized renewable energy systems with financing mechanisms; provision of incentives for the private sector to cater for the energy needs in rural areas; promote the use of energy for income generating activities for the poor.

### **Increase in Renewable Energy**

A sustainable energy scenario requires an extensive increase in renewable energy from the current share of 14% of global energy. The emphasis has, however, moved from concern about the depletion of fossil fuels with the limits to growth debate in the late 1970s to one of concern about environment and especially climate change. The World Energy Council in their recent world energy assessment has indicated that renewable share of total energy could rise to 27% in the year 2020 if appropriate policies are taken and it would need to reach as high as 50% by the year 2060 to meet the international targets on the prevention of climate change. With an ever increasing demand for energy renewable energy should be viewed as complementary to fossil fuels but has a special role in addressing the energy needs of the two billion people mainly in the rural areas of developing countries who are without access to modern energy services. Constraints in renewable energy application in developing countries include limited research and development, lack of institutional capacity, high capital costs and limited access to financial and technological resources.

UNIDO's programmes on the promotion of renewable energy technologies focus on expanding renewable energy applications in commercial or near commercial markets where they are cost competitive with fossil fuel energies. Another major area is cost reduction of renewable through large scale manufacture and deployment. UNIDO is also working to build local capabilities in developing countries for the fabrication, installation, maintenance and after sales service for renewable energy technologies. In doing this, it is critically important to build long-term public-private partnerships.

### **Clean Energy Technology**

Currently energy from hydro carbon sources accounts for 80% of the world's energy use and these fuels will continue to play a major role in the foreseeable future, therefore there is an urgent need for the

promotion, research, development and application of advanced and cleaner fossil fuel technologies. Coal is still a major energy source for many developing countries and is the most carbon intensive of the fossil fuels and therefore has the most damaging effects on climate change as well as a local impact from air pollution. However, with the application of advanced technology, the efficiency of use can be greatly enhanced and the level of harmful pollutants greatly reduced. For example fluidized bed combustion and IGCC. Much of the research and development work on advanced fossil fuel technologies is being carried out in the industrialized countries and clearly mechanisms need to be found for the fruits of this research to be applied worldwide through joint ventures and technology transfer.

As advanced fossil fuel technologies have a widespread and immediate cost and environmental benefit, UNIDO has been working on a number of projects for speeding up the deployment of new technologies for higher efficiency power production cycles. Recognizing that coal will still play an important role in the energy balance of a number of developing countries, UNIDO is working on improved technologies for its cleaner production, transformation and use. In carrying out these programmes, the experience gained from industrialized countries is being transferred to developing countries.

### **Energy Efficiency**

At the global level, only 37% of primary energy is converted to useful energy. This is wasteful in terms of energy resources, harmful in terms of pollution and costly for users. Therefore, energy efficiency is an important part of sustainable global energy policy. Many of the industrialized countries have shown dramatic improvements in energy efficiency over the last several decades and it is now clear that energy efficiency can be an ongoing process rather than a one time event. The potential for improvements in energy efficiency in the developing countries is high and it has been estimated that the economic energy efficiency potential for the developing countries is approximately twice that of the industrialized world. For these energy efficiency improvements to occur new technologies will have to be applied and capital investments made. Energy efficiency improvements made in industrialized countries cannot be considered automatically applicable in developing countries because of existing infrastructure and level of technology development and so technology adaptation will be needed.

UNIDO has an extensive programme on energy efficiency. These activities include: Conducting projects focusing on the demonstration of innovative energy-efficient processes in energy-intensive industries. Another area of UNIDO's intervention is accelerating progress on next generation, cross cutting technologies to promote energy efficiency in production cycles, taking into account use of raw materials, reduction of emissions. The conducting of energy audits in manufacturing plants is a key element of UNIDO's energy efficiency programme, as well as establishing an energy audit capacity in developing countries.

### **UNIDO Strategy**

Recognizing the major issues on sustainable energy, UNIDO aims to help its clients in developing countries to solve two fundamental problems by de-linking economic growth and increase use of energy and by reducing the environmental damage from increasing energy use. The UNIDO energy strategy

has three components: formulation of energy policies aiming at reducing green house gases and therefore climate change; increasing energy efficiency on both the supply and demand side and promoting the application of alternative energies. Its programmes and projects in the energy area cover institutional capacity building, the identification and removal of barriers to the introduction of energy efficient and renewable energy technologies; developing and transfer of technology. The Organization participates in the worldwide efforts to avert climate change. It assists developing countries in increasing awareness about the Kyoto Protocol in general and a cleaner development mechanism in particular.

UNIDO has a unique place and role in the UN with its capability and organizational structure to address the issues of industrial energy use in the developing countries, utilizing both global fora and technical cooperation programmes. Its clients in the developing countries include governmental agencies, energy institutions and enterprise, academic institutions and NGOs. In order to fulfil its task, UNIDO works in partnership with many other organizations at the international regional and national level in both the public and private sector.

### III. UNIDO Energy Programme

Programme area	Strategic objectives	Operational areas
<p><b>Industrial energy efficiency</b></p> <p>Greater energy efficiency in industry reduces costs, enhances competitiveness and conserves energy resources. UNIDO's industrial energy efficiency programme aims at assisting industries in developing countries and economies in transition to achieve sustainable and efficient use of energy. Recognizing that the uses of energy, and by reflection its production and distribution, are sources of pollution and waste, the Programme has also been designed to address the environmental damage of energy use, particularly that associated with fossil fuel consumption. Transfer of energy-efficient and environmentally-friendly technologies and related capacity building are the main pillars of the Programme.</p>	<ul style="list-style-type: none"> <li>! Increase efficiency in the use of power and fuel by industry;</li> <li>! Reduce emissions of greenhouse gases and other atmospheric pollutants responsible for local, regional and global pollution;</li> <li>! Promote the local manufacture of appropriate energy equipment through transfer of technologies and creation of capacities.</li> </ul>	<ul style="list-style-type: none"> <li>! Assessment of the current situation and analysis of the performance of the existing energy-intensive equipment and machinery and introduction of appropriate measures;</li> <li>! Introduction of new technologies and process options;</li> <li>! Enhancement of energy-efficiency measures through industrial associations, promotion of voluntary agreements with local beneficiaries and authorities, harmonization of national technical standards and demonstration of proven technologies;</li> <li>! Utilization of GEF support for removing barriers and reducing technology costs for energy efficiency</li> </ul>
<p><b>Renewable energy technologies and rural development</b></p> <p>Energy is essential to economic and social development and improved quality of life. Therefore, many developing countries face the urgent need to provide adequate energy services to millions of people in rural areas. UNIDO's Programme aims at providing sustainable access to energy in rural areas, through increased use of renewable energy sources. Increasing the current efficiency of energy use in rural areas is also a target. The Programme supports the local manufacture of energy equipment for rural use through transfer of technologies and creation of capacities.</p>	<ul style="list-style-type: none"> <li>! Increase energy use in rural areas;</li> <li>! Increase use of renewable energy sources in rural areas;</li> <li>! Increase efficiency of energy use in rural areas;</li> <li>! Promote the local manufacture of appropriate energy equipment for rural use through transfer of technologies and creation of capacities;</li> <li>! Increase the number of fundable rural energy development projects.</li> </ul>	

<p><b>Capacity building for the Climate Convention and Kyoto Protocol Mechanism</b></p> <p>To become operational the Climate Convention and its Kyoto Protocol Mechanisms will require a solid institutional footing and human resource capacities at the national level. Without technically competent and efficiently managed institutions capable of applying methodologies for project identification and formulation and of conducting the review and approval of industrial projects in an efficient and transparent manner, transaction costs will be prohibitive, institutions will have to evolve to support market development and reduce these costs and to be in a position to manage the processes of technology transfer and utilization.</p>	<ul style="list-style-type: none"> <li>! Increase awareness about the Kyoto Protocol in general and Common Development Mechanism (CDM) in particular</li> <li>! Develop and implement GEF projects aiming at reducing GHGs;</li> <li>! Foster substitution by renewable energy and other low-carbon technologies.</li> </ul>	<ul style="list-style-type: none"> <li>! Utilize GEF support for removing barriers and reducing technology costs for energy efficiency and renewable energy</li> <li>! CDM activities</li> <li>! Priority areas are energy efficiency, fuel switching, high efficiency/clean coal, biomass, mini-hydro and solar.</li> </ul>
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#### ***IV. Points for discussion***

- ! Does US\$36/barrel oil stimulate the development and use of renewable energy technology?
- ! Does US\$36/barrel oil depress the world economy?
- ! Are developing countries winners or losers with US\$36/barrel oil?
- ! Does sustainability in energy environment terms mean the same for developed and developing countries?
- ! In regard to sustainable energy futures, the question arises as to whether the growth of world energy demand if met by fossil fuels is compatible with the environment, especially global climate change. This is a global question which is being addressed by many institutions. For UNIDO, the question focuses on the developing countries where two billion people have no access to electric power and are therefore effectively excluded from any industrial/economic development. How long will it take to change this inequitable situation? And what is the cost? What further actions can UNIDO take to play the most effective role in bringing energy for industrial development?
- ! Renewable energy currently only account for 14% of total energy. How can it reach 50% in the next 50 or 60 years? What actions need to be taken by whom? What funding will be required? What are the consequences of renewable energy remaining a marginal player in world energy supply in the next 50 years? How can UNIDO do more to promote renewable energies, for example capacity building in developing countries, promoting research and development, encouraging large scale manufacturing of renewables and cost reduction and stimulating local manufacturing in developing countries.
- ! One controversial issue hotly debated is whether advances in fossil fuel technology making them cleaner is the right approach. One school of thought argues that reducing the environmental emission from fossil fuels just delays the inevitable switching to non hydro carbon sources. The other more pragmatic approach is that cleaning up fossil fuels is a necessary strategy for energy/environmental compatibility. Can UNIDO become a clearing house for the transfer of clean energy technology from the industrialized to the developing countries?
- ! There appears to be no opponents to energy efficiency as it appears to be a win-win-win situation - reduction in resources used, reduction in pollutants and reduction in costs. Are we all agreed? Or is there still the specter of energy efficiency standards being used as a non-tariff barrier to trade? What additional programmes and strategies can UNIDO undertake for improvements in industrial energy efficiency?
- ! With so many institutions involved in the sustainable energy question how can they be effectively coordinated and integrated so that energy in the right form and without environmental problems is available for development without damaging the environment?