

STRATEGY
FOR
POST 2012 KYOTO PROTOCOL AGREEMENT

Prepared by:

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1.0 **INTRODUCTION:**

‘Sustainable Development’ is the key principle in deciding long term strategies of all the major businesses and Governments in the emerging competitive global market place.

If one reads recent annual reports and Chairmen’s speeches for any of reasonable size company in any part of the world, one would invariably find a mention about the need for ‘Sustainable Development’ as a virtue.

The first phase of Kyoto Agreement is already operational and is valid till 2012. USA is the only major country which has not signed this treaty and hence not accepted obligations under it. Their main contention is that developing economies like India and China, also, need to accept emission cuts as legally binding obligations as they are significant emitters. The developing economies have argued that they need to grow rapidly to improve quality of life of their people and this will lead to increased emissions from these countries and if they try to cut emissions their growth will be hampered or their economies will not be globally competitive.

This is the impasse on which further discussions are held up amongst signatories to Kyoto Protocol. Willingness of USA to be involved in such discussions is seen as a positive sign and recent G-8 meeting held in Italy has made a significant commitment to contain global temperature rise to less than 2 degree Celsius.

However, negotiators are struggling to come up with a road map which will meet with expectations of both developed and developing economies and yet achieve the most important end result of reduction in absolute emissions of Carbon dioxide at global level.

We, at Ethical Energy-Petrochem Strategies, have been actively engaged in strategic planning for achieving ‘Sustainable Development’ and are fully committed to this cause. **We have thought about this major global problem and thought about a possible strategy which could effectively address the concerns of all stake holders and yet achieve reduction in emissions.**

This paper briefly outlines the elements of our proposed strategy. If the negotiators meeting during Copenhagen meeting, planned in December,2009, adopt this strategy, we could possibly have an effective road map for tackling the issue of ‘Global warming’ and ‘Climate change’.

2.0 EMISSIONS AND ENERGY SECTOR:

Carbon dioxide emissions are mainly generated in a fossil fuel based power plant. Such emissions account for almost 75% of overall emissions. In developing economies they are very significant as these countries mainly try to use coal for power generation which has the highest emission intensity.

Hence any strategy to reduce GHG emissions has to be focused on power generation technology.

Developing economies like India and China aspire to grow at a rate in the range of 5-10 % p.a. They would accordingly need very huge additional power generation facility to be created to meet with the requirements of this growth rate. They will use mainly coal for generating this power as, under current environment of costs and obligations, it appears to be cheapest option for them.

In such a scenario, the additional emissions from developing economies will far exceed the emissions reductions to be achieved by developing economies even if very aggressive targets are set for them.

Reduction in CO₂ emissions from an existing economic activity is not possible overnight and it needs a well thought long term strategy.

There are four possible strategies of reducing CO₂ emissions from an economy:

- Reduce absolute level of energy consumption for a given level of economic activity i.e. improve energy efficiency
- Change energy-mix to increase share of cleaner fuel like gas as well as share of non-fossil based energy
- Capture CO₂ at major emitting centres and inject it back into earth for a possible application like enhanced oil recovery

- Increase area under forest to provide natural sink for emissions

All the four strategies have relevance in the context of challenge faced by the world and all the four need to be considered.

As far as afforestation is concerned there are limitations as to sequester 1 million tonne of carbon dioxide you need to bring about 100,000 hectares of area under forest.

The technology for sequestration and underground storage is under intense study but as of now its cost effectiveness and sustainability are not established beyond doubt.

As regards the other options of energy efficiency and fuel switch, it is possible to adopt these strategies by leveraging the CDM mechanism to fund part of the costs related to these measures and thereby maintaining the international competitiveness of the economic activities in developing economies. This mechanism is currently working and it needs to be continued to encourage measures of energy efficiency and fuel switch.

However, the challenge of ensuring total emissions below current levels despite rapid growth of developing economies can be handled only if nonfossil based power generation technologies are to contribute in a very major way for creation of additional power generation capacity in developing economies.

3.0 SOLAR ENERGY AS STRATEGIC SOLUTION:

Developments in solar energy technologies have been quite rapid and very encouraging. Solar energy is available in abundance and helps in generating power without any emissions.

Hence, if a mechanism can be worked out to ensure that developing economies create new power generation capacity mainly based on solar energy then the target of capping total global emissions can be achieved.

However, economics of solar power are currently not competitive with respect to thermal power and any strategy planned to use solar energy needs to find a mechanism to address this constraint.

4.0 SUGGESTED STRATEGY:

The developed economies have always indicated that they are willing to provide financial support to developing economies if they are willing to adopt emission reduction measures with respect to business as usual. CDM is one of the mechanisms under Kyoto Protocol to do this.

However, for post 2012 regime, we believe, that if developed economies agree to fund development of solar power projects in developing economies, in a manner whereby solar power becomes competitive with fossil fuel based power, we could have a win-win situation and an agreement could be reached whereby overall emission cap can be achieved.

It is felt that the developed economies should commit funds to ensure creation of about 300,000 MW of solar power generation capacity by 2020 in developing economies.

Based on available information on current status of various solar technologies and their costs, it is felt that investments required would be of the order of US\$5 million per MW of installed capacity and such investments could have partial storage solutions so that plant utilization factor of 60% could be achieved.

If we use these estimates, then it is possible to consider power generation from solar power projects to be competitive with fossil fuel based generation (with estimated power generation cost of the order of US\$0.06 per kwh) if funds are made available, as longterm debt, on following basis:

- Quantum-----80% of project cost
- Repayment period-----25 years from first year of operation
- Interest rate-----1%p.a. to meet with administration expenses

In this manner, developing economies will have no objections to commit to add capacity for power generation mainly (say not less than 80% of total addition) on the non-fossil fuel based technologies as the competitiveness of their economies will not be affected.

5.0 ESTIMATES OF FUNDS REQUIREMENT:

Total funding requirement on this basis will be of the order of US\$ 1200 BILLION over a period of about 10 years, say from 2011 to 2020. Thus, average yearly funding requirement will be app. US\$120 billion per year.

Though the fund requirement is substantial, it is a very insignificant percentage (about 0.3%) of world GDP and far less than the estimates of possible costs to various economies if consequences of severe climate change are to be faced by the world.

Developed economies should commit to create a corpus of this order of funds by contributing, for a period of 10 years from 2011 to 2020, in proportion of their absolute emissions in the base year.

The funds could be managed through a special window of a multilateral institution like World Bank/ IMF etc. These institutions already have expertise in debt funding and usual appraisal process for project feasibility.

6.0 BENEFITS OF PROPOSED STRATEGY:

The strategy will result in a proposition which would be acceptable to all concerned in view of following major benefits:

- Developing economies can grow as per their current aspirations without compromising their economic competitiveness
- There would be effective cap on global emissions. In this manner, by 2020, global emissions would be reduced by about 1 billion tones per year compared to scenario of developing economies creating same coal based power generation facilities.
- The cost burden on developed economies will be manageable

- The solar energy industry globally will get a huge boost due to very high demand and will help it to rapidly achieve economies of scale and thereby become more competitive.
- Majority of the initial supplies will come from developed economies and thereby it will become a very effective stimulus to revive depressed economies of such countries
- Creation of such a large market will develop enough competitive pressures in the global market and thereby help in development of more efficient technologies to reduce costs. This will ensure that most probably solar power technology would be competitive to fossil fuel based power generation by 2020, without any specific financing package like one proposed in this strategy, and hence future developments will be possible without any serious threat of increase in concentration of GHGs in environment.
- The scheme will result in a revolving fund (as repayments against initial disbursements may start by 2013 or 2014) which will be self sufficient, after 2020, to tackle any major climate change related global initiatives thereafter.
- Geopolitical equations will change and possibilities of resource rich countries threatening the world with high costs and/or limited supplies will be reduced to a great extent.

7.0 OUTLINE OF PROPOSED MECHANISM:

Broad contours of the international understanding that can be arrived at shall be as follows:

- USA shall become signatory to KYOTO AGREEMENT
- All Annex-1 countries will agree to create a corpus of US\$1200 billion over a period of 2011-2020 by contributing 10 equal yearly installments to this fund.
- Amount to be contributed by Annex-1 countries shall be in proportion of their total GHG emissions in base year
- The fund shall be managed by a mutually agreed multilateral agency and will be used to fund solar power projects in non Annex-1 countries. The fund would also be made available to utilities and transmission companies if they have to develop

new transmission corridors for evacuating power from such planned solar projects.

- Annex-1 countries shall make special efforts to encourage solar power plant equipment manufacturers to enhance their capacities or promote new companies for this purpose so that adequate supplies are available to meet with potential demand for non Annex-1 countries.
- Annex-1 countries should agree to take obligations to reduce emissions in the range of 20-30% with respect to base year by 2020
- Non Annex-1 countries shall not be required to take any legally binding obligations to reduce emissions with respect to base year but they will commit that atleast 80% of additional power generation capacity to be established shall be non-fossil fuel based, subject to availability of technology and equipment supply as well as funding as proposed in this scheme.
- Non Annex-1 countries shall allow development of such power projects in private sector or in public/private partnership model and promoters of such projects would be eligible to get funding from proposed fund.
- Governments of non Annex-1 countries will be required to identify sites for locating possible solar projects and earmark such land for developing 'Solar parks'.(There are well established methodologies available to do this and with the help of technology and satellite imagery data available, this can be done very quickly). Ideally such land should be with good insolation and would involve least amount of displacement (preferably no displacement, if possible).
- Within 'Solar parks' land shall be subdivided in plots of land with each plot capable of generating atleast 250 MW of power.
- Information on such land availability shall be widely publicized by the local Governments and interested promoters shall be required to register their requirements with designated nodal agency of each Government.
- Interested promoters wanting plots of land shall be required to make commitments to start project execution in less than a year after land allotment (failing which there would be financial penalties) and shall be eligible to draw debt fund only after they

have invested atleast 10% of project cost by way of their equity contribution.

- Fund would be available for solar projects of 250 MW or more capacity at special terms as follows:
 1. Quantum-----80% of project cost
 2. Repayment-----25 years from first year of operation
 3. Interest -----1%p.a. to meet with administration cost
- Projects funded in this manner shall be obliged to enter into long term power purchase agreement with state utilities, if the utilities or local Governments so desire, to supply upto 75% of the power at US\$0.06 per kwh for 25 years. Project developers will have freedom to sell balance power at market determined price (Depending on the local regulatory regime in that country).
- Projects funded in this manner shall not be eligible to earn CERs as per CDM mechanism under KYOTO AGREEMENT.
- CDM mechanism will be continued beyond 2012 as per current guidelines and all other projects (including solar projects with smaller capacity or projects not funded from this fund) shall be eligible to earn CERs as per current guidelines.

We believe if this framework is considered, with necessary modifications if required, at Copenhagen in December,2009, there is a very good chance of having an agreement about post 2012 regime amongst all signatories of KYOTO PROTOCOL.