

IS RENEWABLE ENERGY COMPLETELY CLEAN

We all know that energy can neither be created, nor be destroyed. It can only be transformed from one form to another. That's what we have been doing all these years. Burn the fossil fuels and convert the chemical energy of these fuels into heat / electrical energy. But due to the growing danger of global warming and the accelerated threat of extinction of fossil fuels, we have now started focusing on the renewable aspects of energy generating fuels. The most common of these are Solar, Wind and Biomass.

But are these sources of energy generation completely clean – that is the question. Let's look at some data. The approximate electricity generation capacity through Solar PV module today in India is 1 GW (however, it is pertinent to note that only 1/4th of it is usable as per the availability of sufficient sunlight throughout the day which is for approximately 6 hours). Assuming the standard of 60 solar cells per 235 W solar module (for a VOC of 36 V and size of 156x156 mm²/solar cell), the total number of solar cells used would have been somewhere of the order of 255.32 million for 1 GW energy generation capacity. Now, imagine the energy required to produce 255.32 million solar cells followed by manufacturing of solar modules followed by installation at solar farms and so on. Where does the energy come from to produce and install all of these? I am sure; none of the solar cells or solar module manufacturers would be using energy produced only from renewable sources for manufacturing their products.

Therefore, it is evident that energy consumed for these activities would be through grid supply which is heavily dominated by thermal based power plants. Similarly, the installation of solar parks wouldn't be possible without diesel generators. Same is the case with Wind farms. The manufacturing of blades and other equipments followed by installation of wind farms is dependent heavily on coal, crude oil and natural gas. Again generation of energy through wind is dependent on the wind speeds (both minimum and maximum). Therefore, out of the total generation capacity of approximately 18 GW through wind energy in India, 100% usability is not guaranteed. Talking of biomass / biogas energy, we all know that it is a carbon neutral energy and considering the miscellaneous work to install and make it work (as discussed for solar and wind energy), it would be a touch below its neutrality.

So, where am I getting to? No, I am not recommending an increased use of fossil fuels. Nor am I discouraging the increased use of renewable sources of energy. What I am trying to question is, 'Is Renewable Energy Completely Clean'. What I am trying to indicate is that if the dominance of electricity produced by fossil fuels has to get down from 66% (as per the table below), why not think of a system or a model where the energy consumption by the equipment manufacturers of renewable energy equipments be through renewable sources rather than grid or diesel generators, dominated by fossil fuels.

Power Generation Capacity of India (As on 30-04-2012)		
Fuel	MW	%age
Total Thermal	133363.18	66.14
Coal	113,782.38	56.42
Gas	18,381.05	9.11
Oil	1,199.75	0.59
Hydro (Renewable)	38,990.40	19.33
Nuclear	4,780.00	2.37
RES** (MNRE)	24,503.45	12.15
Total	2,01,637.03	100.00

Renewable Energy Sources (RES) include SHP, BG, BP, U&I and Wind Energy

SHP= Small Hydro Project, BG= Biomass Gasifier, BP= Biomass Power

Source: Adapted from http://www.powermin.nic.in/JSP_SERVLETS/internal.jsp

I admit that there may be no readymade solution to this indication, but if the learned and researchers dedicate some percentage of their grey cells usage towards this area, you never know. I may be typing my next article on a solar powered laptop sitting in a green building whose relevant equipments would have been produced using only renewable energy.

(Vishal Agarwal)
PMP, Energy Manager & Auditor