Economic cost avoided by the use of renewable energy

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The Ceylon Electricity Board purchase power from the private sector for meeting the increasing electricity demand of the country. This is in addition to generating power from CEB's own hydro and thermal power plants. The Public Utilities Commission of Sri Lanka (PUCSL); the power sector regulator has announced cost reflective tariffs for purchasing power from all private Independent Power Producers (IPPs). Some of the power producers generate power from oil-fired power plants whereas others generate power from renewable energy sources such as hydro, wind, and biomass. The power purchase agreements of the CEB with these IPPs are for a fixed period. The CEB purchase power from the oil IPPs at a negotiated tariff where as for the renewable energy power producers it is a technology specific government declared tariff.

Unlike with oil IPPs for which the tariff varies with each power plant, the cost reflective technology specific renewable energy tariff is calculated for a typical case. The renewable energy power purchasing tariff was originally announced by the Ministry of Power and Energy; however, since the enactment of the Sri Lanka Electricity Act no. 20 of 2009, the task is now with the Public Utilities Commission of Sri Lanka. Originally there was no transparent process for determining the renewable energy tariff and it was determined entirely at the discretion of a few officials and an energy sector consultant. During that time there were allegations against the committee, claiming that it favored certain technologies over others. The process is far more transparent now, with the PUCSL conducting a public consultation process that sort feedback from the private sector and civil society on the estimates of the officials before finalizing the tariff system for renewable energy.

However, there is a widespread myth that renewable energy is expensive and the tariff is very high. We need to analyze this.

Let us consider the estimated power purchasing tariff of oil IPPs for the year 2011. (Table 1) The unit price varies from Rs. 15 to Rs. 50. The renewable energy tariff announced in 2011 is as in the Table 2. The unit price in this case varies from Rs. 6.64 to Rs. 22.02.

Even at the current rates, the tariffs for most of the renewable energy technologies are lower than those for oil fired power plants. The CEB and the private oil power producers get oil at a subsidized price. Thus, despite the fact that the market price for heavy fuel oil is Rs. 60 per liter, it is supplied for power generation at Rs. 40. This translates into the fact that there is a hidden subsidy of about Rs. 4.50-6.00 for each unit of electricity produced by power plants fired by heavy fuel oil.

Oil for power generation needs to be imported whereas renewable energy is indigenous. The economic difference between an imported item and a local product is reflected by the import tax. There is no import tax however for the oil supplied for the power plants. Considering a typical 10% import tax the unit price of electricity generated from an oil power plant would be about Rs. 1.30/kWh.

Further, it is important to recognize what changes may take place during the next 20 years as the renewable energy power purchasing tariff is fixed for a 20-year period. All the renewable energy technologies other than biomass has no fuel cost involved. Hence there will be no price increase during the next 20 years. This, however, is not case for oil fired power plants. The private power producer for oil plant is not bound to sell electricity at a fixed rate. Thus, when the oil price increases the unit prices of electricity supplied by the oil power producers will also increase by a reciprocal margin. It is quite clear that oil prices will continue to rise during the next 20 years and that too, at

an alarming rate. Hence it is necessary to consider the possible oil price increase before coming to a conclusion on the real costs of oil against renewables. In 2010 the world oil price increased from 75 USD/b to 89 USD/b, an increase of 19%. Considering a conservative annual oil price increase of about 5% during the next 20 years, the net present unit electricity price of an oil power plant will be increased by Rs. 5.20/kWh.

On the other hand if the government plans properly it is possible for renewable power plants to claim carbon credits from developed countries as these avoid emitting carbon to the atmosphere. While there is a high possibility that carbon prices will increase with worsening climate change issues, even if one assumes that current carbon prices prevail for a 20-year period it is possible to earn about Rs. 1.00/kWh for every single unit of renewable power generated by the country. This should be considered as a negative cost to renewable energy power plants.

In conclusion the true economic cost of a typical oil fired power plant would be about 30 Rs./kWh for a 20 year period. The economic costs of renewable energy power plants (Rs/kWh) are lower than Rs. 30. This comparison clearly shows that renewable energy is very much cheaper than oil power. Considering the most conservative estimates, the government can save at least 10 Rs/kWh by purchasing renewable energy electricity from all technologies except mini-hydro power where the benefit would be as high as 18 Rs/kWh.

Table 1: Oil IPP Plant	**Estimated Unit price (Rs/kWh) for the year 2011 (energy charge + capacity charge)**
AES CCP	49.59
Asia Power	19.22
Lakdhanavi	18.48
Kerawalapitiya CC	17.58
Matara	16.57
Embilipitiya	16.15
Horana	16.16
BARGE	15.34
Heladhanavi	15.05

Table 2: Renewable Energy Technology	**All inclusive rate (LKR/kWh) over a 20 year period**
Waste Heat Recovery	6.64
Mini-hydro	13.04
Mini-hydro - Local	13.32
Biomass (Agricultural & Industrial Waste)	14.53
Wind	19.43
Wind - Local	19.97
Biomass (Dendro)	20.70
Municipal Waste	22.02