



## Bio Energy – The Ignored Indigenous Renewable Energy Resource

It is that kind of time again. I used this phrase as far back as 2012 in an article titled “ Are you ready for the next blackout ? ” However, for Sri Lanka history repeats itself by lamenting on shortage of power and fear of power cuts, as the dry season approaches. Obviously those in authority have forgotten or unaware of the simple advice given in the nursery rhyme on the ants working hard to collect food to last them during the rainy periods.

“ආයතා කාලේදී රැ දවල් මහන්සිවී කන්න දේ රැස් කරන් කුඹියෝ”

Although this must be applied in reverse in case of our energy needs, the message is that those in charge of the electricity supply, do not have the intelligence of even the lowly ants. The year 2019 was an exceptionally wet year with floods in many areas and one would have expected whatever measures necessary to have been taken to ensure that the hydro reservoirs to be kept full up to the end of December. It is of no doubt that the intensity of rain has been very high. Thereby we have allowed many millions of cubic meters of water to drain to the sea having wrought havoc by flooding en-route. The fact that the next three months are dry is not a secret. It is also obvious that no action was taken to either to expect this bounty of nature or to institute necessary action to store to be used in the dry season on one hand, and to prevent such deluges to create the untold tragedies observed. We could recall earlier times

when more intelligent and far seeing engineers were in charge, under such circumstances attempts were made to erect flash boards on the dams of reservoirs to temporarily enhance the storage capacities and thus save as much water as possible. One wonders if any attempt has been made to even de-silt the reservoirs to reach the original storage capacity.

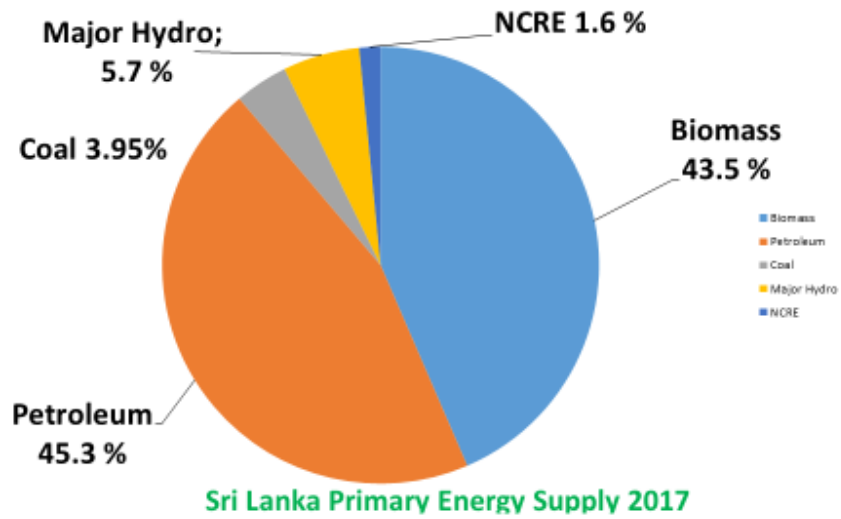
What this phenomenon highlights is the importance of storage to avoid the periodic shortages of energy. However, the accent has been for use of imported fossil fuels, which has stored the solar energy of the pre historic era as chemical energy. This has proven to be a disastrous choice with many negative impacts on national economy, balance of payments and the environmental and health issues not to mention the impact on the security of supply of energy as seen these days.

In this context it is also obvious that all state authorities and politicians in power and those in power till recently, appear to see only Wind and Solar as the alternative sources of energy to reduce the use of fossil fuel and overcome the shortage of hydro power. The fact that both these sources are intermittent and none firm provides a ready excuse for those who are responsible for creating the present problem to say that these are not viable and will not solve the problem and thus deceive the none technical officials and politicians that these renewable resources are not a viable alternative. The fact that necessary technologies are already proven commercially, is willfully withheld by the engineers of the CEB. Therefore it will be some time before these two huge indigenous and renewable resources are fully made use of for the benefit of the country.

However, it is unfortunate that the traditional source of firm energy Viz: bio mass, which has been the main contributor to service near 50% of the country's total energy needs, and has the potential to provide the CEB with their desired quantum of firm energy, is being ignored completely.

The many interviews and comments by the minister in charge too, in recent weeks has never cited biomass as a alternative source of indigenous renewable energy.

# National Energy Resources



2/8/2020

**Energy is Not Electricity Only !!!**

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## Percentage Contribution of Bio Mass

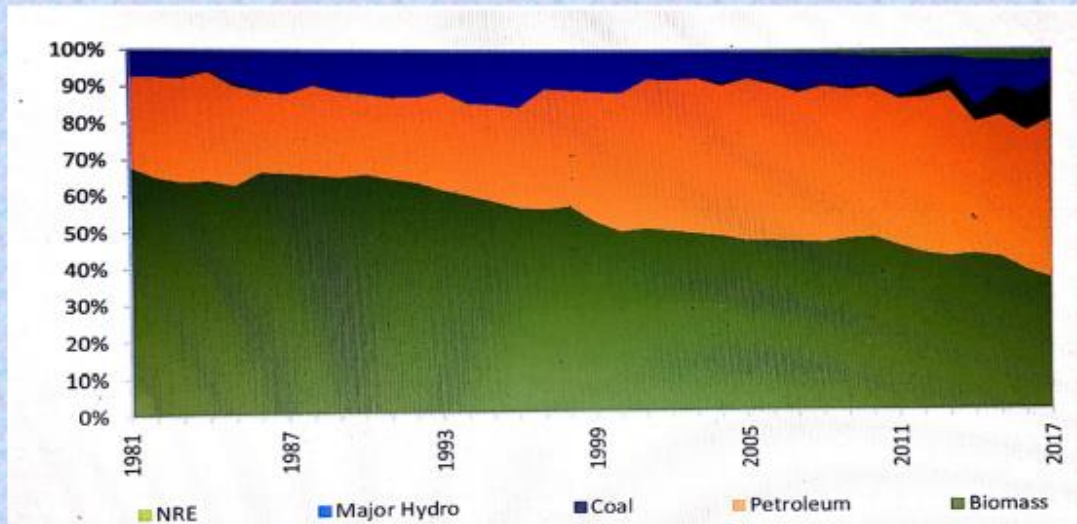


Figure 3.2 – Percentage Share of Primary Energy Supply



Biomass Energy derived from trees and agricultural waste, releases the solar energy absorbed through Photosynthesis and stored as chemical energy. This natural storage is energy form solar absorbed over the last year or two, unlike the millions years that were required to store the solar energy in the form of fossil fuels, be it natural gas, coal or oil, and is therefore truly renewable and does not contribute to global warming. In Sri Lanka the technology is already proven for the sustainable generation of short rotation coppicing trees such as Gliricidia , Ipil Ipil and Bamboo as well as several agricultural wastes as the fuels for bio energy. Thus the carbon dioxide released during the power generation is reabsorbed in the next batch of trees within two years. Also any accusations of destruction of forests for this resource is totally unfounded.

## Gliricidia to Electricity



The Cabinet of Ministers declared Gliricidia as the Fourth national Plantation Crop after tea , rubber and coconut in June 2005, in recognition of its many attributes not limited as a source of renewable energy and approved a number of initiatives for its development. However absolutely nothing has been done to follow up on these decisions to date. This once more displays Sri Lanka's inability to harness one more of the bounties of nature bestowed on us, but go on its subservience and dependence on external resources.

### **The SLSEA and Its Mandate**

The establishment of the Sri Lanka Sustainable Energy Authority in 2008 for the development of Non Conventional Renewable Energy resources ( NCRE ) and the adoption of the Technology Specific cost reflective tariff system for the electricity generated form such resources , provided a platform at long last for the development of these resources. The current contribution of 880 MW of NCRE by year 2015 was the result of these progressive initiatives. However, Bio Energy was slow to take off due to the fact that

unlike Mini Hydro and Wind Power and later Solar PV, Bio energy requires a source of fuel, and the reluctance of the lending agencies to accept the viability of the distributed source of bio mass fuels. There was no attempt by the government to follow up on the above cabinet decisions which would have removed this barrier. The lack of any proactive intervention by the SLSEA instead of just taking up the role of a regulator is regrettable. However, in spite of these difficulties some intrepid developers succeeded in contributing 31.5 MW of bio mass energy to the grid by year 2015.

However, this is the time the CEB decided to block any further development of all renewable energy projects, particularly Bio Energy and Mini Hydro, citing a doubtful legal opinion on a clause in the Electricity Act No 31 of 2013. Since then no projects including those whose approval process was willfully blocked by the CEB, have moved forward. Thus over 100 MW of bio energy projects are pending approval at various stages over the past five years

Total lack of interest by different ministers and the secretary to the ministry of power and energy over the past five years to resolve this unreasonable and anti-national attitude of the CEB, has resulted in a loss of over US \$ 200 Million annually by the import of the equivalent amount of oil since year 2015. A saving of US\$ 217 Million annually has already been possible with the projects implemented prior to this blockage in 2015.

The number of projects excluding Solar and Wind which have been blocked as per the SLSEA records are as follows

<b>Technology</b>	<b>Grid Concurrence withheld by CEB MW</b>	<b>Stuck at Provisional Approval MW</b>	<b>Extension of LOI refused by CEB MW</b>	<b>SPPA not signed by CEB MW</b>	<b>Total Projects blocked MW</b>
Dendro Energy	54.00	34.96	19.50	11.50	
Agri Waste	17.70				
MSW	14.70	35.50	10.40	13.40	
Mini Hydro	264.70	53.15	80.67	16.75	
Total Firm Energy					666.73
Wind	672.76				
Solar	2028.42				

Source : SLSEA release dated 27<sup>th</sup> March 2019

The input of even 50% the contribution of these projects ( excluding the Solar and Wind Projects ) amounting to over 300 MW of firm power that the CEB is craving for, from the projects awaiting approvals would have relieved the present power crisis and avoided the need for highly expensive emergency power.

### **The Direct Loss to the Economy**

The potential savings that would accrue by the avoidance of the use of oil is over US \$ 200 Million every year as shown below.

Type	Projects Blocked by CEB			Energy Gen MWh per year	Equit Oil replaced BBL	Potential for F E Saving annually US \$
		MW	Plant Factor %			
Small Hydro		415.27	40%	1,455,106	1,818,883	109,132,956
Dendro		119.96	80%	840,680	1,050,850	63,050,976
Agro Waste		17.7	80%	124,042	155,052	9,303,120
Municipal Waste		74	70%	453,768	567,210	34,032,600
Total Potential Annual Savings m US \$						215,519,652
Notes		Litres per BBL	BBL/MWh	Price per BBL US\$		
	Oil per kWh litres	0.25	200	1.25	60	

It is indeed ironical that the CEB blocked this development by claiming that such projects should be subject to open tendering. The meanest intelligence would realize that it is impossible to offer for open tendering process, a resource which is owned privately. This is the case with bio mass energy, where the fuel comes from a large number of private small scale farmers or mini hydro projects based on a water stream running through private lands. The NCRE process adopted by the SLSEA was expressly designed recognizing these circumstances and targeting a national resources which has already paid rich dividends to the country, until the CEB chose to block any further development.

With the multitude of benefits which can be derived from bio mass resources such as Gliricidia listed below, and the ADB's estimation of 2400 MW potential , it is indeed unfathomable why this valuable resource is being ignored

- Firm power with Plant factor exceeding 80%
- Entirely indigenous fuel supply
- Massive cash inflows to the rural economy **@ Rs 50 Million per MW** annually
- Multiple Social , environmental and economic benefits
- Path opened for organic fertilizer and milk production
- The One Billion Gliricidia Tree program would have supported 500 MW
- Totally firm and dispatchable electricity

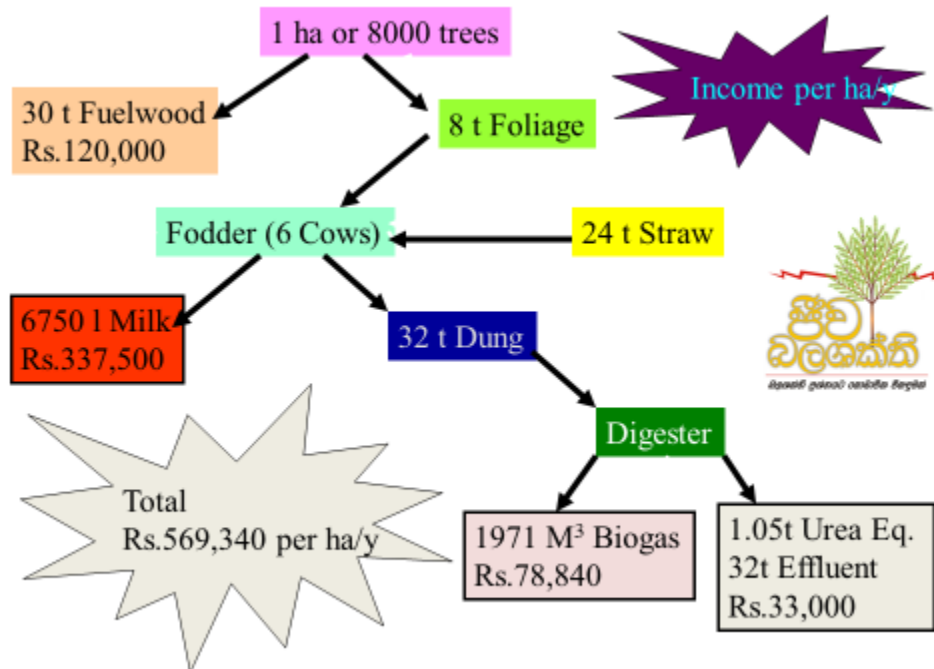
The typical overall benefits to the rural economy is many fold. At the basic level the income to a household or small farmer would be by sale of fuelwood and dried leaves for fodder for the livestock farmers large and small, who are desperate for animal feed during the drought periods, or as green fertilizer for their own farms or gardens. The typical income for a family which can have 2000 Gliricidia trees would be. It is to be noted that there are no input costs and very little labor requirement for both these activities.

Sale of Fuel wood @ Rs 4.00 per kg - Rs 48,000.00

Sale of dried Leaves @ Rs 30.00 per kg - Rs 60,000.00

The fertilizer value would be enhanced significantly by generating “Jeewamurtha” in the farm itself to be rid of chemical fertilizer forever. Please visit [www.bioenergysrilanka.lk](http://www.bioenergysrilanka.lk) for more details.

For those with greater ambition willing to engage in livestock farming themselves, the returns are more attractive as illustrated below



The numbers have been proven by actual performance at the Coconut Research Institute

<https://www.bioenergysrilanka.lk/sustainable-development-and-application-of-bio-energy-in-coconut-plantations/>

### Recommendations

**The most urgent need is to remove the blockage created by the engineers of the CEB. This is easily done by the Hon Minister by seeking the Cabinet approval for same as was done in case of the roof top Solar PV development under the Surya Bala Sangraamaya. Thus over 200 MW of Solar PVC had been added to the national grid.**

The Land Use Policy Planning Division of the Ministry of Lands has completed a study on the present land use pattern in Sri Lanka. Accordingly over 500,000 hectares of our land is classified as “Scrub”. The government should introduce a policy to convert most of these lands into Agro-Forestry-Energy Plantations. This, if offered to the investors on Dendro projects on an acceptable basis will enhance the feasibility and access for funding to ensure fast track development of such projects. Such a move will result in the following benefits:

1. Generation of adequate woody biomass to generate 1250 MW of dendro power plants operating at 80% plant factor supplying reliable uninterrupted power to the national grid.

2. Generate adequate cattle feed to increase our milk production from 20% to 100%.
3. Increase the Forest cover by 500,000 hectares.
4. Increase the production of organic fertilizer in the country.
5. Increase the productivity of rural agricultural workers.

This is in addition to the equal amount that can be generated by small scale farmers who will gain the multiple benefits as illustrated above.

Under these circumstances the true intention of the CEB engineers in blocking these projects is highly questionable. They claim this is their commitment to adhere strictly to the rule of law as per the provisions of the Electricity Act. It appears that this laudable commitment is applied selectively to this issue of approval of the renewable energy projects only , whereas the Electricity Act is violated blatantly as publicly documented in the PUCSL web page, the latest being the unilateral decision to impose power cuts. On the other hand the lack of interest by the very Ministry which had the sobriquet of Power and Renewable Energy is also lamentable. Now with the new ministry has reverted back to Power and Energy one is left to wonder if anything has changed at all, in spite of His Excellency the President in many public fora, declaring his goal that Sri Lanka would reach 80% penetration of Renewable Energy by year 2030

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