

Purchase of Electricity to the National Grid under Small Power Purchase Agreements (SPPA)

Explanatory notes to the Non Conventional Renewable Energy Tariff Announcement dated 24th April 2009

1. General

- 1.1 These tariffs will be applicable to new SPPAs signed with Ceylon Electricity Board (CEB) from 24th April 2009 onwards.
- 1.2 The tariffs are cost-based and technology-specific. The technology applicable would be the "Type" of project stated in the "Permit" issued by the Sri Lanka Sustainable Energy Authority (SLSEA).
- 1.3 Before signing the SPPA, the applicant should obtain the Permit from SLSEA for the relevant site and resource. Please see the Renewable Energy Project Approval Process in www.energy.gov.lk.
- 1.4 Once the SPPA is signed, tariffs stated therein shall apply. Subsequent tariff announcements shall have no effect on the SPPAs already signed.

2. Future Tariff Announcements

- 2.1 Any future revisions to tariffs payable to NCRE for new SPPAs will be based on technology-specific factors and financial parameters, and the affordability of the tariffs from the points of view the Government, CEB, SLSEA and the electricity customer.
- 2.2 There is no specific date to revise the tariffs. Any future tariff revision may cause an increase or decrease in tariffs for SPPAs signed from the date of such revisions onwards.

3. Principles of Tariff Fixing

- 3.1 **Profits to developers from first year:** The cost-based, tiered tariffs provide pre-defined cash flows to developers. This provides the maximum returns to developers as most Small Power Projects (SPPs) enjoy at least a five-year tax holiday under Board of Investment concessions.
- 3.2 **Benefits to Electricity Consumers in the long-term:** This tiered tariffs provide benefits to the developers and the electricity customers through (a) predictability of the tariff and (b) lower-cost energy from Non-conventional Renewable Energy (NCRE) in the long term, respectively.
- 3.3 **Principles of tariff structure:**
 - (a) renewable energy should in the long-term produce electricity at prices below the cost of fossil fuel power plants.
 - (b) renewable energy, which is a natural resource, belongs to the State. Developers opting for the tiered tariffs are provided with a high tariff to cover their expenses and to earn reasonable profits for an adequately long period. Thereafter, the benefit of the resource should flow to the electricity customers.

4. Capacity Limit of SPPs

The SPPAs will continue to be limited to NCRE-based power plants with installed capacity up to 10 MW. Projects larger than 10 MW will not qualify for these tariffs or the SPPA, and they will be entertained through a separate process.

5. Implementation of SPP Tariffs

The SPPA contains a schedule of tariffs applicable over the 20-year period. Commencement of the year one in the tariff schedule of the SPPA shall be the Commercial Operation Date.

The escalation rates for operation and maintenance costs for all types of power plant, and fuel costs for biomass and agricultural/industrial waste power plants, will be re-calculated and announced every year.

6. Key Inputs to this SPP tariff announcement

6.1 General guidelines: This section gives the benchmarks used to develop the tariffs. These benchmarks provide guidance to the investments, other costs and parameters to be expected by developers of NCRE projects. SLSEA provides this information only as benchmarks, to indicate what information has been used to derive the tariffs. The actual costs, other financial parameters and plant factor achieved at a specific site would be based on the specific design of a power plant. After careful consideration of the characteristics of the renewable energy resource allocated to them under the Permit, developers are encouraged to optimise the design of their power plant, its capacity, investment, financing strategy, annual plant factor, fuel and maintenance expenses, to ensure optimum financial benefits from the developer's point of view. The sources of income the developers may consider are (a) income from the sale of electricity based on the tariffs stated in this announcement (b) credits under the Cleaner Development Mechanism (CDM).

6.2 Capital costs and annual plant (capacity) factor: The capital costs and the plant (capacity) factor used for the calculation of tariffs are as follows:

Type of SPP	Capital Costs LKR million/MW	Annual plant (capacity) factor
Mini-hydro	190	42%
Wind	230	32%
Biomass	217	80%
Agricultural and industrial waste	217	80%
Municipal Waste	313	80%
Waste Heat	217	67%

6.3 Debt: equity ratio and interest rates: A debt:equity ratio of 60:40 has been assumed. An annual interest rate of $0.5 \times (\text{AWDR} + \text{AWFDR}) + 5.5\%$ has been used as the interest rate on debts, repayable in equal installments over six years. The Average Weighted Deposit Rate (AWDR) and the Average Weighted Fixed Deposit Rate (AWFDR) were taken to be the average rate of six

months ending 31st December 2008 published by the Central Bank of Sri Lanka. The interest rate so calculated and used for the calculation of tariffs was 19.22% per year.

6.4 Annual Return on Equity (AROE): In tariff calculations, a pre-tax annual return on equity of 22% has been allowed every year for a period of 15 years.

6.5 Discount rate: The discount rate used to levelise tier 1 and tier 2 tariffs as well as to calculate the 20-year levelised tariffs is the Weighted Average Cost of Capital (WACC) as calculated below:

$$\text{WACC} = \frac{\text{debt \%} \times \text{interest rate\%} + \text{equity\%} \times \text{Annual ROE\%}}{100}$$

As the debt:equity ratio assumed is 60:40, interest rate is 19.22%, annual return on equity is 22%,

$$\text{Discount rate} = \text{WACC} = \frac{60 \times 19.22 + 40 \times 22}{100} = 20.33\%$$

6.6 Operations and Maintenance (O&M) Rate (base value): The annual O&M cost was defined as a per cent of the capital costs. The resulting base rates payable are the following:

Type of SPP	Annual O&M Cost as a percent of capital cost	Calculated O&M Base Rate* (LKR/kWh)	
Mini-hydro	3.0%	1.55	throughout
Wind	3.0%	2.46	throughout
Biomass	4.0%	1.24	years 1-15
	5.0%	1.55	year 16 onwards
Agricultural and industrial waste	4.0%	1.24	years 1-15
	5.0%	1.55	year 16 onwards
Municipal Waste	7.0%	3.13	throughout
Waste Heat	1.33%	0.49	throughout

* see below for escalation rates

6.7 Escalation of O&M

Note: For new SPPAs, these notes provide guidance to how the escalation rates will be calculated in the future, once their projects are operational. For SPPs already operational as of 31st December 2008, these notes provide the calculation of the escalation rate applicable to the O&M rates paid from 1st January 2009.

The annual escalation rate for O&M shall be the average of the rates of change of Colombo Consumer Price Index (CCPI) and the LKR/USD rates of change, for the five preceding years. The escalation rate in percent will be taken to two decimal places. The annual escalation rate announced for any year will be applied to all operational SPPs on the cost-based, three-tier tariff. In the year of achieving Commercial Operation, the base value of O&M stated in 6.6 above will apply, until 31st December of that year. Thereafter, O&M paid as of 31st December will be escalated by the annually announced O&M escalation rate.

The five-year average CCPI for the period 2004-2008 was 13.70% and the average depreciation of LKR against the USD was 2.41% over the same period. Therefore, the escalation rate for O&M rate would be 8.06% for projects which were in operation before 1st January 2009.

6.8 Fuel cost escalation for biomass and agricultural/industrial waste: The fuel cost of biomass SPPs payable on the Commercial Operation Date shall be the base rates stated in this tariff announcement. They will be escalated at a rate of 2/3 of the O&M escalation rate calculated in 6.7 above, starting from the 1st day of January occurring after the Commercial Operation Date.

6.9 Third Tier: The base rate paid from year 16 onwards will be 1.62 LKR/kWh. From the 1st day of January occurring after the Commercial Operation Date and on each 1st first day of January thereafter, this third tier rate will be escalated at a rate of 2/3 of the O&M escalation rate stated in 6.6 above. The escalations will be computed and compounded for fourteen years until the fifteenth anniversary of the Commercial Operation Date, and paid from year 16 onwards.

7 Tariff offered for SPPAs signed on or after 24th April 2009 will be as follows.

7.1 Two tariff options are offered. The selection between options 1 and 2 shall be at the discretion of the developer, at the time of signing the SPPA.

Option 1: Three-tier Tariff

This will consist of a fixed rate, operations and maintenance (O&M) rate and a fuel rate.

Type	Escalable	Escalable	Non-escalable fixed rate		Escalable Year 16+ Base rate	Royalty to Govt, paid direct by the power purchaser Year 16+
	Base O&M Rate	Base Fuel rate	Year 1-8	Year 9-15		
Mini-hydro	1.55	None	14.18	5.16	1.62	10% of total tariff
Wind	2.46	None	22.53	8.19	1.62	10% of total tariff
Biomass (dendro)	1.24 (1-15 years) 1.55 (16 th year onwards)	7.14	8.50	3.09	1.62	No royalty
Agricultural & Industrial Waste	1.24 (1-15 years) 1.55 (16 th year onwards)	3.56	8.50	3.09	1.62	No royalty
Municipal Waste	3.13	None	12.26	4.46	1.62	No royalty
Waste Heat Recovery	0.49	None	10.15	3.69	1.62	No royalty
Escalation rate for year 2009	8.06%	5.37%	None	None	5.37%	
Note 1:	Escalation of O&M rate and fuel rate shall commence from the 1 st day of the month of January immediately after the commercial operation date.					
Note 2:	The applicable O&M escalation rate for each subsequent year shall be the rate announced for that particular year.					
Note 3:	To compensate for the higher tariffs in tier 1, developers will be required to deliver					

	in tier 2, an average amount of energy at least equal to that delivered in tier 1. This obligation will be stipulated in the SPPA, with corresponding penalties for non-delivery in tier 2.
Note 4:	Biomass (Dendro) means sustainably grown firewood.

Option 2: Flat Tariff

Technology	All inclusive rate (LKR/kWh) for years 1-20
Mini-hydro	14.58
Wind	23.07
Biomass (Dendro)	18.56
Agricultural & Industrial Waste	13.88
Municipal Waste	15.31
Waste Heat Recovery	9.55

Note 1:	The flat tariff will not be escalated for any reason over the entire 20-year period.
Note 2:	Extensions after the 20th year will be at the same rate as for an option 1 project.

7.1 Interpretation of the 3-tier tariff

The progression of the three-tier tariffs would be as follows. It should be noted that the following is only an example to demonstrate the application of escalation rates, where the escalation rates announced for year 2009 have been applied every year throughout the 20-year period of the SPPA.

TIER 1

Type	Year of operation	All inclusive Tariff for SPPAs signed after 24th April 2009 (LKR/kWh)							
		1	2	3	4	5	6	7	8
(1) Mini-hydro	Non-escalable	14.18	14.18	14.18	14.18	14.18	14.18	14.18	14.18
	Escalated O&M	1.55	1.67	1.81	1.95	2.11	2.28	2.47	2.66
	Total	15.73	15.85	15.99	16.13	16.29	16.46	16.64	16.84
(2) Wind	Non-escalable	22.53	22.53	22.53	22.53	22.53	22.53	22.53	22.53
	Escalated O&M	2.46	2.66	2.87	3.11	3.36	3.63	3.92	4.23
	Total	24.99	25.19	25.40	25.63	25.88	26.15	26.45	26.76
(3) Biomass (dendro)	Non-escalable	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
	Escalated Fuel	7.14	7.52	7.93	8.35	8.80	9.27	9.77	10.30
	Escalated O&M	1.24	1.34	1.45	1.56	1.69	1.82	1.97	2.13
	Total	16.88	17.36	17.88	18.42	18.99	19.60	20.25	20.93
(4) Agricultural & Industrial waste	Non-escalable	8.50	8.50	8.50	8.50	8.50	8.50	8.50	8.50
	Escalated Fuel	3.56	3.75	3.95	4.16	4.39	4.62	4.87	5.13
	Escalated O&M	1.24	1.34	1.45	1.56	1.69	1.82	1.97	2.13
	Total	13.30	13.59	13.90	14.23	14.58	14.95	15.35	15.77
(5) Municipal Waste	Non-escalable	12.26	12.26	12.26	12.26	12.26	12.26	12.26	12.26
	Escalated O&M	3.13	3.38	3.65	3.94	4.26	4.61	4.98	5.38
	Total	15.39	15.64	15.91	16.21	16.52	16.87	17.24	17.64
(6) Waste Heat	Non-escalable	10.15	10.15	10.15	10.15	10.15	10.15	10.15	10.15
	Escalated O&M	0.49	0.53	0.57	0.62	0.67	0.72	0.78	0.85
	Total	10.64	10.68	10.73	10.77	10.82	10.88	10.93	11.00

TIER 2

Type	Year of operation	All inclusive Tariff for SPPAs signed after 24th April 2009 (LKR/kWh)						
		9	10	11	12	13	14	15
(1) Mini-hydro	Non-escalable	5.16	5.16	5.16	5.16	5.16	5.16	5.16
	Escalated O&M	2.88	3.11	3.36	3.63	3.93	4.24	4.58
	Total	8.04	8.27	8.52	8.79	9.08	9.40	9.74
(2) Wind	Non-escalable	8.19	8.19	8.19	8.19	8.19	8.19	8.19
	Escalated O&M	4.58	4.94	5.34	5.77	6.24	6.74	7.28
	Total	12.77	13.14	13.53	13.96	14.43	14.93	15.47
(3) Biomass (dendro)	Non-escalable	3.09	3.09	3.09	3.09	3.09	3.09	3.09
	Escalated Fuel	10.85	11.43	12.05	12.69	13.38	14.09	14.85
	Escalated O&M	2.30	2.49	2.69	2.90	3.14	3.39	3.66
Total	16.24	17.01	17.83	18.69	19.61	20.58	21.61	
(4) Agricultural & Industrial waste	Non-escalable	3.09	3.09	3.09	3.09	3.09	3.09	3.09
	Escalated Fuel	5.41	5.70	6.01	6.33	6.67	7.03	7.41
	Escalated O&M	2.30	2.49	2.69	2.90	3.14	3.39	3.66
Total	10.80	11.28	11.79	12.33	12.90	13.51	14.16	
(5) Municipal Waste	Non-escalable	4.46	4.46	4.46	4.46	4.46	4.46	4.46
	Escalated O&M	5.81	6.28	6.78	7.33	7.92	8.56	9.25
	Total	10.27	10.74	11.24	11.79	12.38	13.02	13.71
(6) Waste Heat	Non-escalable	3.69	3.69	3.69	3.69	3.69	3.69	3.69
	Escalated O&M	0.91	0.99	1.07	1.15	1.25	1.35	1.45
	Total	4.61	4.68	4.76	4.84	4.94	5.04	5.15

TIER 3

Type	Year of operation	All inclusive Tariff for SPPAs signed after 24th April 2009 (LKR/kWh)				
		16	17	18	19	20
(1) Mini-hydro	Escalated base rate	3.55	3.74	3.94	4.15	4.38
	Escalated O&M	4.95	5.35	5.78	6.25	6.75
	Total	8.50	9.09	9.73	10.40	11.13
(2) Wind	Escalated base rate	3.55	3.74	3.94	4.15	4.38
	Escalated O&M	7.87	8.50	9.19	9.93	10.73
	Total	11.42	12.24	13.13	14.08	15.11
(3) Biomass (dendro)	Escalated base rate	3.55	3.74	3.94	4.15	4.38
	Escalated Fuel	15.65	16.49	17.38	18.31	19.29
	Escalated O&M	4.95	5.35	5.78	6.24	6.75
Total	24.15	25.58	27.10	28.71	30.42	
(4) Agricultural & Industrial waste	Escalated base rate	3.55	3.74	3.94	4.15	4.38
	Escalated Fuel	7.80	8.22	8.66	9.13	9.62
	Escalated O&M	4.95	5.35	5.78	6.24	6.75
Total	16.30	17.31	18.39	19.53	20.74	
(5) Municipal Waste	Escalated base rate	3.55	3.74	3.94	4.15	4.38
	Escalated O&M	10.00	10.80	11.67	12.61	13.63
	Total	13.55	14.54	15.61	16.76	18.00
(6) Waste Heat	Escalated base rate	3.55	3.74	3.94	4.15	4.38
	Escalated O&M	1.57	1.70	1.84	1.98	2.14
	Total	5.12	5.44	5.78	6.14	6.52

All escalations shown above use the year 2009 rates of 8.06% (for O&M) and 5.37% (for fuel, and for tier 3 rate), only for the purpose illustration. The actual escalation rate will be calculated and announced every year.

8. **Legal Provision to Guarantee operation in the second tier:** To ensure that the SPP operates in the second tier and deliver power amounting to at least the average power delivered in tier 1, appropriate legal provisions are included in the SPPA.
9. **Mandatory SPPA period:** Non-delivery of energy will not carry any penalty (except non-delivery in years 9-15 for those opting to the three-tier tariff). SPPAs will have a mandatory period of 20 years. If the energy delivered in any month is zero or if the power plant has not operated within a given billing period (usually one month), the SPPA will be extended by the same number of months. If at any time during the 20 year SPPA or the extended period stated above, the cumulative number of billing period (months) of non-operation reaches 12 months, then such power plant will lose the escalation on O&M and fuel costs (in case of biomass and

agricultural/industrial waste) for that year. Similarly, the escalation provided for the third-tier will also be reduced by one year.

10. Extensions after the 20th year: Extensions of the SPPA shall be by mutual agreement.

10.1 For an SPP on the three-tier tariff: The tariff from the 21st year onwards shall be at the same rate as in the 20th year in the three-tier tariff, escalated similarly.

10.2 For an SPP on the flat tariff: The tariff shall be the same as for an SPP on the three-tier tariff option. There will be no flat tariff option for extensions beyond the 20th year.

11 Power Plant replacement and new SPPAs after the 20th year: Power plant equipment can be replaced or improved any time within the 20-year SPPA at the discretion of the developer, at his own cost. There will be no additional compensation offered through tariffs for such replacements. Complete de-commissioning and redevelopment as a new power plant at the same site, qualifying for a new Permit and a new SPPA, will be on the following basis:

Type	Minimum period of operation from the first commercial operation date, before a new Permit and a SPPA is issued to the same site
Mini-hydro	30 years
Wind	20 years
Biomass	20 years
Agricultural & Industrial Waste	20 years
Municipal Waste	20 years
Waste Heat Recovery	20 years

The tariffs for such a re-developed SPP on a new SPPA would be based on the policies prevailing at that time.

12. SPPAs signed prior to October 2006: These Agreements are valid for a period of 15 years from their respective Commercial Operation Date, and would continue to be paid on the basis of the avoided cost tariffs until the end of their term. At the end of the term of these Agreements, a new SPPA shall be offered. The tariff applicable shall be the third tier of the tariff in force for SPPAs signed on the date of expiry of the previous SPPA.

For example, if an SPPA for a mini-hydro power plant reached the end of its term of 15 years on 31st July 2009, then the tariff payable in LKR/kWh from 1st of August 2009 shall be

TIER 3

Period	Tier Tariff	O&M rate
From 1 st August 2009 to 31 st December 2009	1.62	1.55
From 1 st January 2010 to 31 st July 2010	1.62	1.55 x (1+r%)
From 1 st August 2010 to 31 st December 2010	1.62 x (1+0.667r%)	1.55 x (1+r%)

Escalation rate announced for year 2010 = r%

For further clarifications, contact:

Sri Lanka Sustainable Energy Authority

3G 17 BMICH

Bauddhaloka Mawatha

Colombo 00700.

e-mail : info@energy.gov.lk

web : www.energy.gov.lk