

**Kakkayam SHEP**  
**(Details to be published in the website of KSEB)**

Kakkayam SHEP is a run of the river small hydro electric project proposed to be implemented by KSEB as a CDM project of UNFCCC. This document is published for the public and stakeholders to submit their doubts, suggestion etc. either to the Chief Engineer (Corporate Planning), Vidyuthi Bhavanam, Thiruvananthapuram or to the Chief Engineer (Civil Construction) North, Vidyuthi Bhavanam, Gandhi Road, Kozhikode in person or by post before 30.07.2010. The public/ stakeholders can also attend the stakeholder consultation meeting scheduled to be held at the Kuttiyadi H.E.P. Government L.P. School, Kakkayam at 10.30 A.M. on 17.07.2010 to clarify their doubts, if any and to submit their suggestions. The important details of the scheme are as follows.

**I SALIENT FEATURES**

**LOCATION**

State : Kerala  
District : Kozhikode  
Taluk : Koyilandy

**ACCESS**

Road : 55Km from Kozhikode  
Railway : 40Km from nearest Railway Station  
[ Koyilandy ]  
Airport : Kozhikode

**GEOGRAPHICAL DISPOSITION**

Weir  
Latitude : Between 11<sup>o</sup> 32' 45" and 11<sup>o</sup> 33"  
Longitude : Between 75<sup>o</sup> 53' 42" and 75<sup>o</sup> 54'

**HYDROLOGY**

Catchment area : Tail race Scheme of  
Kuttiyadi Addl. Extension (2 x 50MW)  
Scheme.

**COMPONENT STRUCTURES**

**DIVERSION STRUCTURE**

**WEIR**

Type of structure : Concrete gravity weir  
Length of weir : 12.70 m  
Crest level of overflow section : 88.29

Full Supply level	:	88.95
Upstream apron level	:	87.00
D/s apron level	:	86.00
Head over crest	:	1.10 m
Height of weir	:	3.29 m
Gates	:	3 nos. (2.70 x 0.70 m)

### **POWER CHANNEL**

Length of channel	:	320.50 m
Shape	:	Rectangular
Type	:	RCC Rectangular channel (Box type & open type)
Design discharge	:	21.38 m <sup>3</sup> /sec
Width	:	4.70m
Depth	:	3.35 m
Bed level at inlet	:	+86.62
FSL at inlet	:	+88.95
Bed level at outlet	:	+86.30
FSL at outlet	:	+88.63
Bed slope	:	1 in 1000

### **FORE BAY TANK**

Type	:	RCC Circular shaped
Dimension	:	22.00 m dia
Height	:	14.54 m
FSL of tank	:	+88.63
MDDL	:	+81.63m
Bottom level tank	:	+ 75.16 m
Top of tank	:	+89.70 m

### **PENSTOCK**

Length	:	61.30 m
No. of lines	:	one, bifurcating into 2nos. near PH
Diameter	:	2.15 m & 1.65 m after bifurcation
Shell thickness	:	10 mm

### **POWERHOUSE**

Type	:	Surface
Size of structure	:	19 m x 16m
Net head available	:	18.36 m
Installed capacity	:	3000 KW
No. of units	:	2 nos. (2 x 1500 KW)
Type of Turbine	:	Horizontal shaft Kaplan
Centre line of Generator	:	+68.80 m
Crest level of Tail race weir	:	+68.00m
Average Annual generation	:	10.39 Mu.

## **GENERATION AND COST**

Average Annual generation	: 10.39 Mu
Total cost of the project	: Rs.2826 lakhs
Cost per MW installed	: Rs.942 lakhs
Tariff on the 1 <sup>st</sup> year after Commercial operation	: Rs.4.62 /unit
Levellised Tariff	:Rs.3.68/unit

## **POWER EVACUATION**

The Power generated at Kakkayam Small Power Station is proposed to step up from 3.30KV to 11KV and conveyed to 11KV bus of Kuttiyadi Power House at Kakkayam which is 0.60 Km away from the power station by double circuit 11KV line.

## **II. SCOPE OF THE PROJECT**

The project is proposed to utilize the tail water available after power production of KAES of 2 x 50 MW. A concrete gravity overflow type diversion weir of height 3.29m, and gates at the tailrace channels are to be constructed as the diversion structures. The water is then diverted to a fore bay tank through a power channel of length 320.50 m and then to powerhouse by a penstock of length 61.30 m.

The Project Comprises of:

1. A concrete gravity type diversion weir of 3.29m height and 12.70 m length with three gates.
2. An inter connecting channel of length 30 m with regulating arrangements is proposed for diverting water from Kuttiyadi Hydro Electric Schemes (3 X 25 MW & 1 X 50 MW) to this scheme as per the availability. However the discharge that can be diverted is limited to 21.38 m<sup>3</sup>/sec, that is the maximum tail race discharge of Kuttiyadi Additional Extension Scheme (2x50 MW),
3. A rectangular power channel of length 320.50m, base width 4.70m and depth 3.35 m, with surplus arrangements.
4. A circular shaped RCC Fore bay tank of 22.0 m dia and 14.54 m height is proposed.
5. Penstock of 61.30 m length, 2.15 m inside diameter, 10mm thick shells, bifurcated to 1.65 m inside dia near power house,
6. A powerhouse of size 19 m x 16 m for housing 2 turbines of 1.5 MW capacity each.
7. RCC tailrace channel of 126 m length and 10 m width.

8. Two replacement roads of total length 380 m.
9. A switch yard of size 20 x 15 m.

### **III. Clean Development Mechanism (CDM) Benefits**

The Clean Development Mechanism (CDM) is a component of the Kyoto Protocol, an international treaty designed to facilitate a global reduction in greenhouse gas emissions. The Kyoto Protocol imposes specific emission reduction targets on Annex 1 parties to the treaty, which are binding under international law. These reductions must be achieved during the Protocol's first commitment period (2008-2012). The emission reduction targets stipulated in the Kyoto Protocol are adapted to the unique circumstances of individual Annex 1 (industrialized) countries, enabling each to accept a target considered achievable. The average reduction required across Annex 1 Parties is 5.2% below 1990 emission levels over the first commitment period.

The CDM is designed to simultaneously benefit both developing and industrialized countries and it has two primary goals: (i) to promote sustainable development objectives in the host countries (developing, non-Annex I countries), and (ii) to assist Annex I (industrialized) countries in reaching their emission reduction targets as cost effectively as possible.

Kerala State Electricity Board (KSEB) has proposed to develop the Kakkayam Small hydroelectric project as CDM project to avail the CDM benefits from the project activity. The project activity is expected to generate a significant amount of Certified Emission Reductions that can be sold into international carbon markets, improving the financial viability of the project.