GOVERNMENT OF ARUNACHAL PRADESH
DEPARTMENT OF ENVIRONMENT, FORESTS & CLIMATE CHANGE
ITANAGAR

No.FOR.657/Cons/2016/3760-63 Itanagar, dated. The 29th **August'2024**

To

The Deputy Director General of Forests (Central),
Sub Office, Guwahati (under Regional Office, Shillong)
4th Floor, Housefed Building, Rukminigaon
Guwahati- 781022

Sub: **Proposal for diversion of 6.005 ha of forest land for construction of Denzi Small Hydro Electric Project (10 MW) by M/s Buru Energy Private Limited in West Kameng District of Arunachal Pradesh-Reg.**

Ref: Your letter F. No. 3-AN C/168/2023/GHY/75-76 Dated 9th may'2024

Madam,

With reference to above letter on the subject, as requested I am enclosing herewith a copy of cumulative impact assessment to assess the carrying capacity of the river basin in respect of the proposal for diversion of 6.005 ha of forest land for construction of Denzi Small Hydro Electric Project (10 MW) by M/s Buru Energy Private Limited in West Kameng District of Arunachal Pradesh submitted by user agency for examination and further necessary action please.

Enclosed: as stated above

Yours faithfully,

(S. S. Kandpal)
Addl. PCCF (Cons) & NO (FCA)

Copy to:

1. The Director, Buru Energy Pvt. Ltd., C/o-Bamang Tago, Yara Tabang Complex, ESS Sector, Near Govt. High School, District-Papum Pare, Itanagar-791111, Arunachal Pradesh, e-mail: buruenergypvtltd2022@gmail.com, Mb.No.7005799319 for information and necessary action.
2. The Chief Conservator of Forest, WAC, Banderdewa for information.
3. The Divisional Forest Officer, Shergaon Forest Division for information.

29/8/24

(S. S. Kandpal)
Addl. PCCF (Cons) & NO (FCA)

O/C

(595)

CIN U[illegible]209AR2022PTC013737

BURU ENERGY
PRIVATE LIMITED

Ref. No. BE/HP/WKD/Dengzi/Forest=01/2021-22/ Date: 30.07.2024

To,

The Addl. PCCF (CONS) & NO (FCA)
Department of Environment, Forests and Climate Change
Itanagar, Arunachal Pradesh.

Subj: Proposal for diversion of 6.005 ha. of forest land for construction of Dengzi small hydro electric project (10 MW) by Buru Energy Private Limited in West Kameng District of Arunachal Pradesh-Regarding.

Ref: 1. FOR.657/CONS/2016/3068-70 dated 24th June 2024
2. IRO, Guwahati letter No. F.No.3 AN C/168/2023/GHY/75-76 dated 9th May 2024.

Dear Sir,

With reference to your subject letter regarding our upcoming Dengzi Small Hydro Project (10 MW) in the West Kameng District of Arunachal Pradesh, our point wise reply and clarifications are as below

Your query pertaining to cumulative impact assessment to access the carrying capacity of basin, wild life/Environment management and catchment area treatment plan (Wherever required). In this regard, we have asked the desired information from the office of Chief Engineering (Monitoring), Department of Hydro Power Development, Itanagar, Arunachal Pradesh through our letter No.BE/HP/WKD/Forest-01/2021-22/348 dated 02.07.2024.

In response to our request department has shared the Cumulative impact statement and carrying capacity study of Kameng River basin in Arunachal Pradesh through their letter No.HPD(M)-12/27/2021-O/o. CE(M)/Comp.No.18887/114 dated 23.07.24.

The recommendation of the basin study is self-explanatory and Dengzi SHP is in the recommended list for further development.

For your kind attention and further necessary action.

Enclosed: Cumulative impact assessment to access the carrying capacity.

OFFICE OF THE PRINCIPAL C.E.F.
No.
Date 29/7/24
A.P. ITANAGAR

Yours faithfully,
BURU ENERGY PRIVATE LIMITED
DIRECTOR
(Bamang Tago)
Director
Buru Energy Private Ltd.

BURU ENERGY PRIVATE LIMITED
C/O BAMANG TAGO,
YARA TABANG COMPLEX
ESS SECTOR, NEAR GOVT. HIGH SCHOOL, DIST PAPUM PARE, ITANAGAR,
ARUNACHAL PRADESH, INDIA, 791111
E-mail : buruenergypvtltd2022@gmail.com
Ph.: 0360-2217283, M: 7005799319

HPD(M)-12/27/2021-O/o, CE(M)-HPD-O/O CHIEF ENGINEER(MONITORING), HPD
880927/2024/O/O CHIEF ENGINEER(MONITORING), HPD

F. No. 2011/22/2013-IA-I
Government of India
Ministry of Environment, Forest & Climate Change
(IA-I Division)

Indira Paryavaran Bhawan
Jor Bagh Road, New Delhi-3

Dated: 28th July, 2017

Dy. No. 2764 Dtd. 14/08/17
Commissioner (Power) Cell

To

The Secretary,
Ministry of Power
Government of India

CE(M)

The Secretary,
Ministry of Water Resources, River Development & Ganga Rejuvenation
Government of India

The Chief Secretary
Government of Arunachal Pradesh
Itanagar, Arunachal Pradesh

Office of the Chief Secretary
Dy. No. 1224
Date 11/8/17

Subject: Cumulative Impact Assessment & Carrying Capacity Study of Kameng River Basin in Arunachal Pradesh for Development of Hydroelectric Power Projects (HEPs)- approved recommendations-Reg.

Sir / Madam,

The recommendations of the above study report, as explained in annexure have been approved by Ministry of Environment, Forest & Climate Change (MoEF&CC). The recommendations as accepted are required to be considered as road map for development of HEPs in Kameng River Basin. The report outlines recommended capacity, size and location of HEPs commensurate with the carrying capacity conforming to the accepted cumulative impacts. However, EIA/EMP shall have to be carried out for individual projects as per provision of EIA Notification 2006 and its subsequent relevant amendments. Modifications in design in HEPs or re-arrangements wherever recommended need to be incorporated. The major approved recommendations of the Study Report as outlined below may kindly be considered for further necessary action for development of HEPs in Kameng River Basing by all concerned.

Country (Border)

SE (M)

16/8

The major approved recommendations of the Study report are as below:

(i) A total of 44 HEPs with Cumulative installed capacity of 4898.9 MW have been considered in the Kameng River Basin Study. List of Projects is attached at **Annexure-I.**

(ii) Out of total 44 HEPs, 37 HEPs with Cumulative installed capacity of 2561.9 MW have been recommended in the basin. The list of these projects is attached at **Annexure-II.** The recommended E-Flow of these 37 HEPs is attached at **Annexure-III.**

(iii) Seven Projects namely Kameng-I, Kameng-II, Pakke, Seba, Pasar, Bichom ST-I and Bichom-II with installed capacity of 2337 MW have been recommended to be dropped in the basin.

(iv) The executive summary of the Basin Study report is attached as **Annexure-IV.**

(v) On the other free stretches of main river as well as tributaries, no further HEPs should be planned/allotted in the entire Kameng basin even if they are of smaller capacity (less than 25 MW) and do not fall under the purview of EIA Notification, 2006.

Yours faithfully

28/07/17

(Gyanesh Bharti)
Joint Secretary

Copy to:

1. DG (Forest), 4th Floor, Jal Block, Indira Paryavaran Bhawan, New Delhi for information and necessary action with regard to issue of FC in respect of HEPs pending for Kameng Basin Study report.
2. Inspector General (FC), 5th Floor, Jal Block, Indira Paryavaran Bhawan, New Delhi for information and necessary action with regard to issue of FC in respect of HEPs pending for Kameng Basin Study report.
3. Chairman, Central Electricity Authority, Ministry of Power, Sewa Bhawan, Sector-I, R.K.Puram, New Delhi-110066
4. Chairman, Central Water Commission, MOWR, RD & GR, Room No. 313 S, Sewa Bhavan, Sector 1, RK Puram, New Delhi, Delhi 110066

HPD(M)-12/27/2021-O/o, CE(M)-HPD-O/O CHIEF ENGINEER(MONITORING), HPD
886527/2024/O/O CHIEF ENGINEER(MONITORING), HPD

Annexure-I

List of hydroelectric projects covered in Kameng Basin Study (excluding Bichom River basin)

S. No	Name of Project	River	Installed Capacity (MW)
1.	Kameng-II	Kameng	600.00
2.	Saskangrong	Saskangrong	45.00
3.	Phudung	Kharchlem	24.00
4.	Digin	Sangti	46.00
5.	Meyong	Tim Kong Rong	38.00
6.	Khuitam	Digen	66.00
7.	Tenga	Tenga	12.00
8.	Denzi	Norgum	18.00
9.	Lower Ngorgun	Norgum	18.00
10.	Upper Ngorgum	Norgum	9.00
11.	Ankaling	Norgum	9.50
12.	Dikshi	Phudung	24.00
13.	TalongLonda	Kameng	225.00
14.	Kameng Dam	Kameng	480.00
15.	Phachung	Pachi	45.00
16.	Papu	Papu	90.00
17.	Pichang	Kaya	12.00
18.	Sepla	Pacha	21.00
19.	Tarang Warang	Pacha	36.00
20.	Marijingla	Kameng	46.0.
21.	Pachuk-I	Pachuk	95.00
22.	Pachuk-II	Pachuk	61.00
23.	Pakke Bung-I	Pakke Bung	48.00
24.	Pakke Bung-II	Pakke Bung	16.00
25.	Pachuk-II Lower	Pakke Bung	51.00
26.	Marjingla Lower	Kameng	39.00
27.	Badao	Kameng	66.00
28.	Para	Para	45.00
29.	Rebby	Para	20.00
30.	Lachung	Pachi	41.00
31.	Papu Valley	Papu	48.00
32.	Pakke Bung-III	Pakke Bung	32.00
33.	Pakke Bung-IV	Pakke Bung	12.00
34.	Pacha	Pacha	18.00
35.	Debra (1.5 MW), Dipre (6.2 MW), Ditchi (2.5 MW), Dibri (3.2 MW) HEPs	Bishum	13.40
36.	Kameng-I	Kameng	1120.00
37.	Bichom ST-I	Gongri	190.00
38.	Bichom-II	Bichom	205.00
39.	Chanda	Kameng	110.00
40.	Kimi	Bichom	535.00
41.	Pakke	Pakke	110.00
42.	Pasar	Papu	32.00
43.	Satuk	Pachuk	47.00
44.	Seba	Pakke	80.00
		Total	**4898.9 MW**

HPD(M)-12/27/2021-O/o, CE(M)-HPD-O/O CHIEF ENGINEER(MONITORING), HPD
886927/2024/O/O CHIEF ENGINEER(MONITORING), HPD

Annexure-II

List of hydroelectric projects recommended after Kameng Basin Study (excluding Bichom River basin)

S. No	Name of Project	River	Installed Capacity (MW)
1.	Saskangrong	Saskangrong	45.00
2.	Phudung	Kharchlem	24.00
3.	Digin	Sangti	46.00
4.	Meyong	Tim Kong Rong	38.00
5.	Khuitam	Digen	66.00
6.	Tenga	Tenga	12.00
7.	Denzi	Norgum	18.00
8.	Lower Ngorgun	Norgum	18.00
9.	Upper Ngorgum	Norgum	9.00
10.	Ankaling	Norgum	9.50
11.	Dikshi	Phudung	24.00
12.	TalongLonda	Kameng	225.00
13.	Kameng Dam	Kameng	480.00
14.	Phachung	Pachi	45.00
15.	Papu	Papu	90.00
16.	Pichang	Kaya	12.00
17.	Sepla	Pacha	21.00
18.	Tarang Warang	Pacha	36.00
19.	Marijingla	Kameng	46.0.
20.	Pachuk-I	Pachuk	95.00
21.	Pachuk-II	Pachuk	61.00
22.	Pakke Bung-I	Pakke Bung	48.00
23.	Pakke Bung-II	Pakke Bung	16.00
24.	Pachuk-II Lower	Pakke Bung	51.00
25.	Marjingla Lower	Kameng	39.00
26.	Badao	Kameng	66.00
27.	Para	Para	45.00
28.	Rebby	Para	20.00
29.	Lachung	Pachi	41.00
30.	Papu Valley	Papu	48.00
31.	Pakke Bung-III	Pakke Bung	32.00
32.	Pakke Bung-IV	Pakke Bung	12.00
33.	Pacha	Pacha	18.00
34.	Debra (1.5 MW), Dipre (6.2 MW), Ditchi (2.5 MW), Dibri (3.2 MW) HEPs	Bishum	13.40
35.	Chanda	Kameng	110.00
36.	Kimi	Bichom	535.00
37.	Satuk	Pachuk	47.00
		Total	**2561.9 MW**

HPD(M)-12/27/2021-O/o, CE(M)-HPD-O/O CHIEF ENGINEER(MONITORING), HPD
886827/2024/O/O CHIEF ENGINEER(MONITORING), HPD

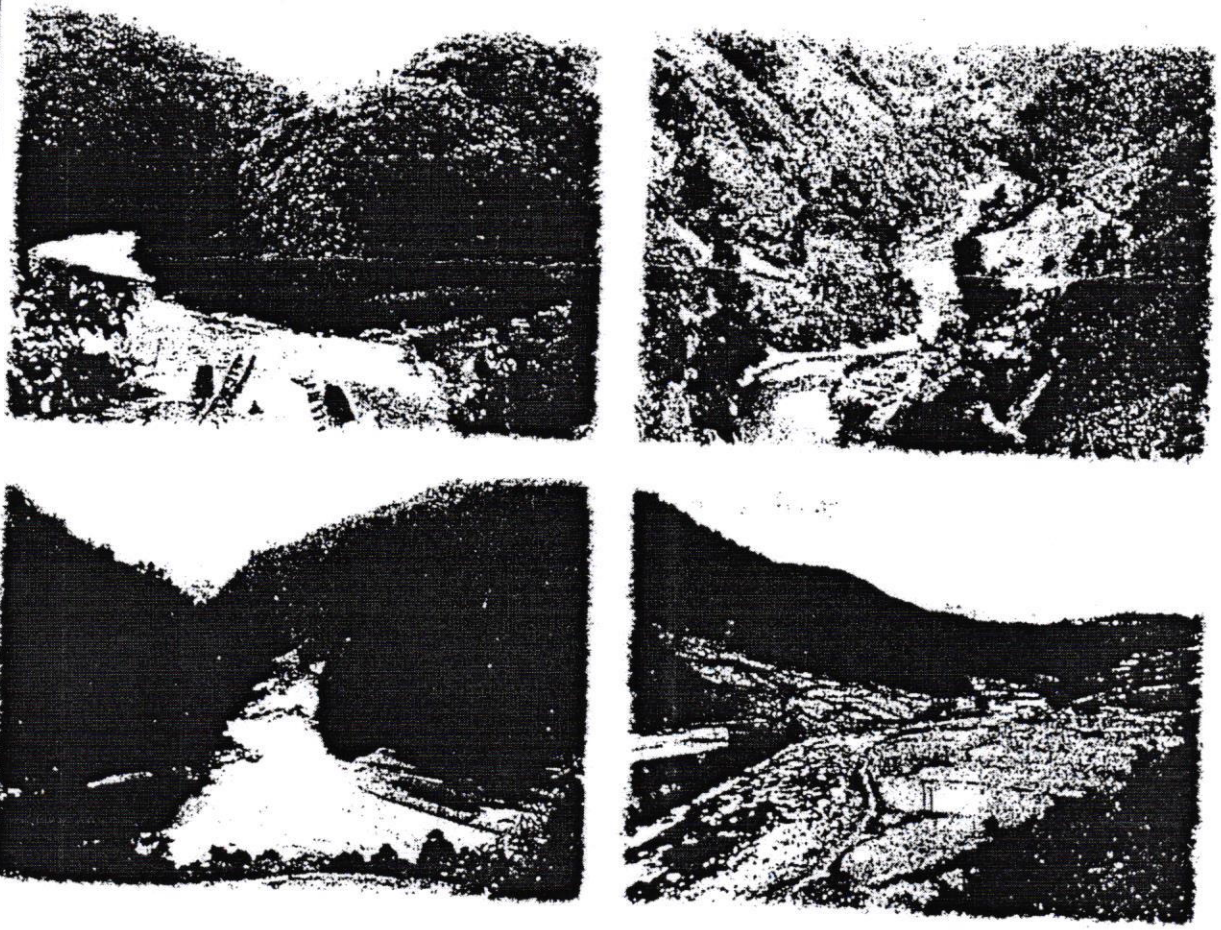
Annexure-III

Recommended Environmental Flows (Percentage and its Value) for HEPs in Kameng River Basin

S.No	Name of the HEP	Monsoon (June to Sep.)		Non-monsoon Non Lean Season (Oct. to Nov.)		Non-monsoon Non Lean Season (April to May)		Lean Season (Dec. to Mar.)	
		% age	Value (m^3/s)	% age	Value (m^3/s)	% age	Value (m^3/s)	% age	Value (m^3/s)
1	Saskangrong	20%	8.96	20%	4.79	20%	2.02	18%	1.46
2	Phudung	30%	2.72	25%	1.69	25%	0.46	20%	0.48
3	Meyong	20%	17.24	20%	9.21	20%	3.89	18%	2.81
4	Khuitam	20%	21.45	20%	11.46	20%	4.17	18%	3.50
5	Upper Nargum	20%	1.55	20%	0.54	20%	0.62	16%	0.27
6	Dikshi	30%.	8.84	25%	5.66	25%	3.20	20%	2.28
7	TalongLonda	20%	63.70	20%	34.03	20%	14.37	15%	8.65
8	Pachung	20%	7.21	20%	3.85	20%	1.40	16%	1.06
9	Papu	30%	13.32	20%	4.74	20%	1.73	16%	1.29
10	Sepla	30%	10.40	25%	3.20	25%	5.13	20%	1.42
11	TarangWarang	30%	6.14	25%	1.89	25%	3.03	20%	0.83
12	Marjingla	20%	21.11	20%	5.36	20%	8.98	15%	2.93
13	Pachuk-I	20%	23.09	20%	15.87	20%	4.35	15%	3.00
14	Pachuk-II	20%	22.01	20%	15.87	20%	4.35	15%	3.00
15	Pakke Bung-I	20%	3.88	20%	1.23	20%	1.13	16%	0.60
16	Pakke Bung-II	20%	3.88	20%	1.23	20%	1.13	16%	0.60
17	Pachuk II Lower	20%	20.36	20%	13.99	20%	3.84	15%	2.80
18	Marjingla Lower	20%	28.44	20%	7.22	20%	12.10	15%	3.95
19	Badao	20%	16.49	20%	8.81	20%	3.21	15%	2.24

S.No	Name of the HEP	Monsoon (June to Sep.)		Non-monsoon Non Lean Season (Oct. to Nov.)		Non-monsoon Non Lean Season (April to May)		Lean Season (Dec. to Mar.)	
		% age	Value (m^3/s)	% age	Value (m^3/s)	% age	Value (m^3/s)	% age	Value (m^3/s)
20	Rebby	30%	6.12	25%	1.91	25%	1.16	20%	0.74
21	Lachung	20%	7.84	20%	2.93	20%	1.79	16%	1.15
22	Pappu Valley	30%	8.07	20%	2.87	20%	1.05	16%	0.78
23	Pakke Bung-III	20%	2.26	20%	0.71	20%	0.66	16%	0.35
24	Pakke Bung-IV	20%	2.29	20%	0.58	20%	0.60	16%	0.25
25	Pacha	30%	6.83	25%	1.11	25%	2.85	20%	0.72
26	Debra	30%	0.72	25%	0.26	25%	0.24	20%	0.11
	Dipre	30%	0.72	25%	0.26	25%	0.24	20%	0.11
	Ditche	30%	0.56	25%	0.23	25%	0.17	20%	0.08
	Divri	30%	1.26	25%	0.45	25%	0.42	20%	0.19
27	Chanda	20%	12.75	20%	4.08	20%	3.93	15%	1.58
28	Digin	20%	90% dependable year flow series was not available	20%	90% dependable year flow series was not available	20%	90% dependable year flow series was not available	18%	90% dependable year flow series was not available
29	Tenga	30%		25%		25%		20%	
30	Denzi	20%		20%		20%		16%	
31	Lower Nargum	20%		20%		20%		16%	
32	Ankling	20%		20%		20%		16%	
33	Kameng Dam	20%		20%		20%		15%	
34	Pichang	30%		25%		25%		20%	
35	Para	30%		25%		25%		20%	
36	Kimi	30%		25%		25%		20%	
37	Satuk	20%		20%		20%		15%	

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE, GOVERNMENT OF INDIA



CUMULATIVE IMPACT AND CARRYING CAPACITY STUDY FOR KAMENG SUB BASIN IN BRAHMPUTRA RIVER VALLEY

Executive Summary

वाप्कोस लिमिटेड
WAPCOS LIMITED
(भारत सरकार का उपक्रम - जल संसाधन, नदी विकास और गंगा संरक्षण मंत्रालय)

WAPCOS LIMITED

(A Government of India Undertaking)

76 C, Sector 18, Gurgaon - 122015, Haryana, INDIA

Tel. +91-124-2397396,

email: environment@wapcos.co.in

JUNE 2017

KAMENG BASIN STUDY

1. GENERAL

The Study of Kameng sub basin in Arunachal Pradesh was initiated at the instance of Ministry of Environment & Forests, Government of India. After series of discussions, Expert Appraisal Committee recommended the TOR for conduct environmental impact assessment studies for Kameng basin (excluding Bichom) in Arunachal Pradesh, due to development of Hydro Electric projects in Kameng sub basin and its effect on downstream of the river in Brahmaputra basin in Assam in 68th EAC meeting for River Valley and Hydroelectric Projects and 23rd – 24th September, 2013. Subsequently, Basin Study for Kameng sub basin was awarded to WAPCOS Limited. The scope of this study covered the hydroelectric projects for entire Kameng Basin (excluding Bichom).

The Basin Study will focus on the various impacts resulting from implementation of hydro power projects in entire Kameng basin (excluding Bichom). A total of 44 hydroelectric projects are proposed to be developed on the Kameng basin. The Kameng Basin map is enclosed as Figure-1. The list of the hydroelectric projects covered under Kameng Basin Study is given in Table-1.

Table-1: List of hydroelectric projects covered in Kameng Basin Study

S. No.	Name of Project	River	Project Proponent	Installed Capacity (MW)
1.	Kameng-II	Kameng	M/S Mountain Fall India Pvt. Ltd.	600.00
2.	Saskangrong	Saskangrong	M/S Patel Engineering Ltd.	45.00
3.	Phudung	Kharchlem	M/S Patel Engineering Ltd.	24.00
4.	Digin	Sangti	M/S Patel Engineering Ltd.	46.00
5.	Meyong	Tim Kong Rong	M/S Patel Engineering Ltd.	38.00
6.	Khuitam	Digen	M/S Adishankar Power Pvt. Ltd.	66.00
7.	Tenga	Tenga	M/s ECI Engineering & Construction Co.Ltd.	12.00
8.	Denzi	Norgum	M/s Satyam (North East) Hydro Power Ltd.	18.00
9.	Lower Ngorgun	Norgum	M/s Satyam (North East) Hydro Power Ltd.	18.00
10.	Upper Ngorgum	Norgum	M/s Satyam (North East) Hydro Power Ltd.	9.00
11.	Ankaling	Norgum	M/s Devi Energies Pvt. Ltd.	9.50
12.	Dikshi	Phudung	M/s Devi Energies Pvt. Ltd.	24.00
13.	TalongLonda	Kameng	M/s GMR Energy Ltd.	225.00
14.	Kameng Dam	Kameng	M/S KSK Energy Ventures Ltd.	480.00
15.	Phachung	Pachi	CESC Limited	45.00
16.	Papu	Papu	CESC Limited	90.00
17.	Pichang	Kaya	M/S India Bulls Real Estate Ltd.	12.00
18.	Sepla	Pacha	M/S India Bulls Real Estate Ltd.	21.00
19.	TarangWarang	Pacha	M/S India Bulls Real Estate Ltd.	36.00
20.	Marijingla	Kameng	M/S Energy Development	46.0.

CONTENTS

S. No.	Name of Project	River	Project Proponent	Installed Capacity (MW)
			Co.Ltd.	
21.	Pachuk-I	Pachuk	M/S Energy Development Co.Ltd.	95.00
22.	Pachuk-II	Pachuk	M/S Energy Development Co.Ltd.	61.00
23.	Pakke Bung-I	Pakke Bung	M/S Energy Development Co.Ltd.	48.00
24.	Pakke Bung-II	Pakke Bung	M/S Energy Development Co.Ltd.	16.00
25.	Pachuk-II Lower	Pakke Bung	M/S Energy Development Co.Ltd.	51.00
26.	Marjingla Lower	Kameng	M/S Energy Development Co.Ltd.	39.00
27.	Badao	Kameng	Coastal Projects Pvt. Ltd	66.00
28.	Para	Para	Coastal Projects Pvt. Ltd	45.00
29.	Rebby	Para	Coastal Projects Pvt. Ltd	20.00
30.	Lachung	Pachi	Coastal Projects Pvt. Ltd.	41.00
31.	Papu Valley	Papu	M/s Vensar Constructions	48.00
32.	Pakke Bung-III	Pakke Bung	M/s Boom Systems Private Limited	32.00
33.	Pakke Bung-IV	Pakke Bung	M/s Boom Systems Private Limited	12.00
34.	Pacha	Pacha	M/S SMJ Energy Pvt. Ltd.	18.00
35.	Debra (1.5 MW), Dipre (6.2 MW), Ditchi (2.5 MW), Dibri (3.2 MW) HEPs	Bishum	M/s Kameng Horizon Pvt. Ltd.	13.40
36.	Kameng-I	Kameng		1120.00
37.	Bichom ST-I	Gongri		190.00
38.	Bichom-II	Bichom		205.00
39.	Chanda	Kameng		110.00
40.	Kimi	Bichom		535.00
41.	Pakke	Pakke		110.00
42.	Pasar	Papu		32.00
43.	Satuk	Pachuk		47.00
44.	Seba	Pakke		80.00

The list of projects in Kameng Basin excluding Bichom is requiring Clearance from SEIAA is given in Tables-2 and 3 respectively.The list of Category–C (Capacity < 25 MW: Hydroelectric projects (Category–C) in Kameng Basin Study which do not require Environmental Clearance is given in Table-4.

Table-2: Category-A Hydroelectric projects in Kameng Basin (Capacity >50MW)

S.No.	Name of Project	' River	Project Proponent	Installed Capacity (MW)
1.	Kameng-II	Kameng	M/S Mountain Fall India Pvt. Ltd.	600.00
2.	Khuitam	Digen	M/S Adishankar Power Pvt. Ltd.	66.00

S.No.	Name of Project	' River	Project Proponent	Installed Capacity (MW)
3.	Talong Londa	Kameng	M/s GMR Energy Ltd.	225.00
4.	Kameng Dam	Kameng	M/S KSK Energy Ventures Ltd.	480.00
5.	Papu	Papu	CESC Limited	90.00
6.	Pachuk-I	Pachuk	M/S Energy Development Co.Ltd.	95.00
7.	Pachuk-II	Pachuk	M/S Energy Development Co.Ltd.	61.00
8.	Pachuk-II Lower	Pachuk	M/S Energy Development Co.Ltd.	51.00
9.	Badao	Kameng	Coastal Projects Pvt. Ltd	66.00
10.	Kameng-I	Kameng		1120.00
11.	Bichom ST-I	Gongri		190.00
12.	Bichom-II	Bichom		205.00
13.	Chanda	Kameng		110.00
14.	Kimi	Bichom		535.00
15.	Pakke	Pakke		110.00
16.	Seba	Pakke		80.00

Table-3: Category-B Hydroelectric projects in Kameng Basin (Capacity between 25 MW and 50MW)

S.No.	Name of Project	River	Project Proponent	Installed Capacity (MW)
1.	Saskangrong	Timkong Rong	M/S Patel Engineering Ltd.	45.00
2.	Digin	Sangti	M/S Patel Engineering Ltd.	46.00
3.	Meyong	Tim Kong Rong	M/S Patel Engineering Ltd.	38.00
4.	Phachung	Pachi	CESC Limited	45.00
5.	Tarang Warang	Pacha	M/S India Bulls Real Estate Ltd.	36.00
6.	Marijingla	Kameng	M/S Energy Development Co.Ltd.	46.00
7.	Pakke Bung-I	Pakke Bung	M/S Energy Development Co.Ltd.	48.00
8.	Pakke Bung-III	Pakke Bung	M/s Boom Systems Private Limited	32.00
9.	Marjingla Lower	Kameng	M/S Energy Development Co.Ltd.	39.00
10.	Para	Para	Coastal Projects Pvt. Ltd	45.00
11.	Lachung	Pachi	Costal Projects Pvt. Ltd.	41.00
12.	Papu Valley	Papu	M/s Vensar Constructions	48.00
13.	Pasar	papu		32.00
14.	Satuk	Pachuk		47.00

Table-4: Category-C Hydroelectric projects in Kameng Basin (Capacity<25 MW)

S. No.	Name of Project	' River	Project Proponent	Installed Capacity (MW)
1.	Phudung	Phudung	M/S Patel Engineering Ltd.	24.00
2.	Tenga	Tenga	M/s ECI Engineering & Construction Co.Ltd.	12.00
3.	Denzi	Nargum	M/s Satyam (North East) Hydro	18.00

S. No.	Name of Project	' River	Project Proponent	Installed Capacity (MW)
			Power Ltd.	
4.	Lower Ngorgun	Nargum	M/s Satyam (North East) Hydro Power Ltd.	18.00
5.	Upper Ngorgum	Nargum	M/s Satyam (North East) Hydro Power Ltd.	9.00
6.	Ankaling	Nargum	M/s Devi Energies Pvt. Ltd.	9.50
7.	Dikshi	Phudung	M/s Devi Energies Pvt. Ltd.	24.00
8.	Pichang	Kaya	M/S India Bulls Real Estate Ltd.	12.00
9.	Sepla	Pacha	M/S India Bulls Real Estate Ltd.	21.00
10.	Pakke Bung-II	Pakke Bung	M/S Energy Development Co.Ltd.	16.00
11.	Pakke Bung-IV	Pakke Bung	M/s Boom Systems Private Limited	12.00
12.	Pacha	Pacha	M/S SMJ Energy Pvt. Ltd.	18.00
13.	Reby	Para	Costal Projects Pvt. Ltd	20.00
14.	Debra (1.5 MW), Dipre (6.2 MW), Ditchi (2.5 MW), Dibri (3.2 MW) HEPs	Bishum	M/s Kameng Horizon Pvt. Ltd.	13.40

The status of Environmental Clearance of projects of category "A" and "B" hydroelectric projects in Kameng Basin excluding Bichom requiring Environmental Clearance from MOEF&CC is given in Table-5 and Table-6 respectively.

Table-5: Status of Environmental Clearance of Category A Hydroelectric projects in Kameng Basin

S.No.	Name of Project	River	Installed Capacity (MW)	Status
1	Kameng-II	Kameng	600.00	-
2	Khuitam	Digen	66.00	• ToR of 29 MW was accorded in November 2008 • ToR of 66 MW was accorded in January 2010 • EC recommended in December 2010 in 45th EAC Meeting • EC granted vide letter no. J-12011/49/2009-IA.I dated 28.01.11 by MoEF&CC
3	Talong Londa	Kameng	225.00	• ToR for 160 MW was accorded on 23rd March 2007 • ToR for 225 MW was accorded on 17 July 2010 • Extension of validity of ToR

S.No.	Name of Project	River	Installed Capacity (MW)	Status
				was accorded on 12 October 2012 • Extension of validity of ToR was accorded on 23 September 2013 • EC recommended by EAC in 80th meeting held on 11th December 2014
4	Kameng Dam	Kameng	480.00	• ToR for 480 MW was considered in 57th EAC meeting in 27-28th April, 2012 • Committee did not accept the proposal • Possibility for site changes to be explored .
5	Papu	Papu	90.00	• Applied for TOR on 1st February 2013 but EAC did not considered • ToR was accorded on 22 March 2013 in 65th EAC Meeting • Extension of ToR was accorded on 26th October 2015 in 88th EAC Meeting.
6	Pachuk-I	Pachuk	95.00	• Applied for ToR on 15th July 2011 but EAC gave comment for reconsideration • ToR was accorded on 26th December 2011
7	Pachuk-II	Pachuk	61.00	• Applied for ToR on 15th July 2011 but EAC gave comment for reconsideration • ToR was accorded on 26th December 2011
8	Pachuk-II Lower	Pakke Bung	51.00	-
9	Badao	Kameng	66.00	• TOR accorded on 7th October 2010
10	Kameng-I		1120.00	-
11	Bichom ST-I		190.00	Project falls in Gongri/Dogri river, the tributary of Bichom river at downstream of Khuitam HEP (66 MW) & upstream of Dinchang HEP (252MW). The TWL of Khuitam 1173m and FRL of Dinchang HEP is 1138m. Thus, there is a level difference of 35m only in

S.No.	Name of Project	River	Installed Capacity (MW)	Status
				between these projects. Therefore, the project location as proposed may not be viable.
12	Bichom-II		205.00	Project is located at longitude 92°37'00"E & latitude 27°18'00"N. As such the project falls in Bichom river and located at downstream of Nafra HEP (120 MW) & upstream of Bichom Dam of Kameng HEP(600 MW). The TWL of Nafra HEP is 796.20m and FRL of Bichom Dam is 770m. Thus, there is a level difference of 26.2m only in between these projects. Thus, the location as proposed may not be viable.
13	Chanda		110.00	-
14	Kimi		535.00	Conceptual Stage
15	Pakke		110.00	Conceptual Stage
16	Seba		80.00	Conceptual Stage

Table-6: Status of Environmental Clearance of Category B Hydroelectric projects in Kameng Basin

S.No.	Name of Project	River	Installed Capacity (MW)	Status
1	Saskangrong	Timkong Rong	45.00	• TOR accorded by SEAC and ToR extended in SEAC meeting Feb, 2014.
2	Digin	Sangti	46.00	• TOR accorded by SEAC and ToR extended in SEAC meeting Feb, 2014
3	Meyong	Tim Kong Rong	38.00	• TOR accorded by SEAC in SEAC meeting September, 2014
4	Phanchung	Pachi	45.00	• Granted EC by SEIAA on the basis of MOM on 19-21st March,2016
5	Tarang Warang	Pacha	36.00	-
6	Marijingla	Kameng	46.00	• Applied for ToR on 15th July 2011 but EAC did not

S.No.	Name of Project	River	Installed Capacity (MW)	Status
				considered.
7	Pakke Bung-I	Pakke Bung	48.00	• TOR accorded on 18th -20th September 2014 by SEAC on MOM
8	Pakke Bung-III	Pakke Bung	32.00	• TOR accorded on 18th -20th September 2014 by SEAC on MOM
9	Marjingla Lower	Kameng	39.00	• TOR accorded on 18th -20th September 2014 by SEAC on MOM
10	Para	Para	45.00	• TOR accorded on 7th October 2010
11	Lachung	Pachi	41.00	-
12	Papu Valley	Papu	48.00	• EC granted vide letter no. FOR(Env-18/2010/EIAPVHEP/58-63 dated 23.07.13 by SEIAA • EC revoked vide letter no. FOR(Env-18/2010/EIAPVHEP/191-98 dated 26.09.14 by SEIAA
13	Pasar		32.00	Conceptual Stage
14	Satuk		47.00	Conceptual Stage

2. DATA AVAILABILITY

DPR & PFR and conceptual details for all hydroelectric projects were collected from the various sources like Project Proponents, State Government, & CEA etc. for Kameng Basin Study.

3. PROTECTED AREAS

The state of Arunachal Pradesh is unique in having traditional rights of various tribes over land, water and forest within their jurisdiction. Each tribe as a community exercises control over the natural resources within their surrounding habitation. They sustainably use the resources for shelter, cultivation, food and various day to day uses. This rich bio-diverse area however does have threats associated with biodiversity loss. Some of the major causes for biodiversity loss being deforestation, *jhum*cultivation, forest fires, unscientific methods of harvesting and to some degree poaching and hunting of wildlife.

There are a total of Nine wildlife sanctuaries and two national parks covering an area of 9246 km² (11 % of the state) in the state of Arunachal Pradesh (Refer Figure-8.1), of which three sanctuaries i.e. Eagle Nest, Sesa Orchid and Pakhui are situated in the Kameng river basin. Most of the area of these eco-sentive zones are present in the Eastern Sub Basin. A

small part of the area is present in Western sub basin towards right bank of Tenga sub basin of Bichom.

The combined forests of Eagle's Nest Wild Life Sanctuary, Pakke Tiger Reserve, Sessa Orchid Sanctuary and Nameri National Park (in Assam) along with surrounding reserved forests, cover an area of more than 2500 sq. Km form one of the largest protected regions of North East India as predicted in Map. These forest belts are adjacent to the over 4500 m high forests and alpine meadows of the massive Sela Ridge and its spurs. This region presents a fascinating birding opportunity - Imagine birding a range extending from the lush lowland evergreen forests, located in the foothills through the sub-tropical and temperate forests, to the high altitude alpine meadows of Sela ridge at 4500m. The area is known for its avi-fauna and more than 500 species are reported from the area. These include ward's trogon, wedge-billed and rufous-throated wren-babblers, rufous-necked, great and wreathed hornbills, black-necked crane, beautiful nuthatch, emerald cuckoo, three tragopans, blood pheasant, monal, ibisbill, purple cochoa, long-tailed and collared broadbills, blue-naped pitta, vivid niltava, long-billed plover and black-headed shrike-babbler etc.

The location of various hydroelectric projects coming in Kameng basin and Pakke Tiger Reserve is shown in Figure-2.

4. ENVIRONMETAL FLOWS

To assess environmental flow requirements, a flow simulation study shall be carried out using one dimensional mathematical model HEC-RAS version 4.1.0 developed by Hydrologic Engineering Center of U.S. Army Corps of Engineers. HEC-RAS is an integrated system of software, designed for interactive use in a multi-tasking environment. The system is comprised of a graphical user interface, separate hydraulic analysis components, data storage and management capabilities, graphics and reporting facilities. The present version of HEC-RAS system contains three one-dimensional hydraulic components for:

- Steady flow surface profile computations
- Quasi-unsteady flow simulation
- Unsteady flow simulation

The water depth requirements in various seasons for Mahaseer and Trout Zones is given in Table-7.

Table-7: Water depth requirements in various seasons for Mahaseer and Trout Zones

S. No.	Season	Depth Requirement (m)	
		Mahaseer Zone	Trout Zone
1.	Monsoon season	1.2 – 1.4	1.0
2.	Lean Season	0.5	0.4

3.	Non-monsoon Non-lean season	0.9 – 1.0	0.65 – 0.70

Source: Literature Review/Siang Basin Study Report

5. RECOMMENDATION

The summary of Environmental Flows for key hydroelectric projects is given in Table-8. The summary of recommended Environmental Flows for HEPs in various sub-basins of Kameng river basin is given in Table-9.

Table-8: Recommended Environmental Flows for key hydroelectric projects

S. No.	Name of HEP	Name of River	Percentage of Environmental Flows			
			Monsoon (June to September)	Non-monsoon Non Lean Season (October to November)	Non-monsoon Non Lean Season (April to May)	Lean Season (December to March)
1	Kameng-II	Kameng	20%	20%	20%	15%
2.	Sakangrong HEP	Timkong Rong	20%	20%	20%	18%
3.	Phudung HEP	Phudung	30%	25%	25%	20%
4	Upper Ngorgum HEP	Norgum	20%	20%	20%	16%
5	Badao HEP	Kameng	20%	20%	20%	18%
6.	Talong Londa HEP	Kameng	20%	20%	20%	15%
7	Phachung HEP	Pachi	20%	20%	20%	16%
8.	Tarang Warang HEP	Pacha	30%	25%	25%	20%
9.	Pachuk-I HEP	Pachuk	20%	20%	20%	15%
10.	Pakke Bung-I HEP	Pakke Bung	20%	20%	20%	16%
11.	Para HEP	Para	30%	25%	25%	20%
12.	Pappu Valley HEP	Pappu	30%	20%	20%	16%
13	Seba HEP	Pakke	20%	20%	20%	15%

Table-9: Summary of recommended Environmental Flows for HEPs in various sub-basins of Kameng River Basin

S. No	Name of the river	Name of the Hydroelectric projects	Percentage of Environmental Flows			
			Monsoon (June to September)	Non-monsoon Non Lean Season (October to November)	Non-monsoon Non Lean Season (April to May)	Lean Season (December to March)
1.	Kameng	Kameng Dam, Talong Londa, Marjingla, Marjingla Lower,	20%	20%	20%	15%

S. No	Name of the river	Name of the Hydroelectric projects	Percentage of Environmental Flows			
			Monsoon (June to September)	Non-monsoon Non Lean Season (October to November)	Non-monsoon Non Lean Season (April to May)	Lean Season (December to March)
		Badao, Chanda				
2.	Timkong Rong	Saskangrong, Meyong	20%	20%	20%	18%
3.	Sangti	Digin	20%	20%	20%	18%
4.	Gang	Khuitam	20%	20%	20%	18%
5.	Bishum	Debra, Dipre, Ditchi, Dibri	30%	25%	25%	20%
6.	Kaya	Pichang	30%	25%	25%	20%
7.	Phudung	Phudung, Dikshi	30%	25%	25%	20%
8.	Tenga	Tenga	30%	25%	25%	20%
9.	Bichom	Kimi	30%	25%	25%	20%
10.	Nargum	Denzi, Lower ngorgun, upper ngorgun, Ankaling	20%	20%	20%	16%
11.	Pacha	Sepla , Tarang warang, pacha	30%	25%	25%	20%
12.	Pachi	Pachung, lachung	20%	20%	20%	16%
13.	Papu	Papu, Papu valley	30%	20%	20%	16%
14.	Pachuk	Pachuk-I, pachuk-II, Pachuk-II Lower, Satuk	20%	20%	20%	15%
15.	Pakke Bung	Pakke Bung-I, Pakke Bung-II, Pakke Bung-III, Pakke Bung-IV,	20%	20%	20%	16%
16.	Para	Para, Rebby	30%	25%	25%	20%

Note:

M – Monsoon Season
NMNL1 – Non Monsoon Non Lean Season (October & November)
L – Lean Season
NMNL2 – Non Monsoon Non Lean Season (April & May)

The recommended percentage of Environmental Flows and its value for HEPs in Kameng River Basin is given in Table-10.

Table-10: Recommended percentage of Environmental Flows and its value for HEPs in Kameng River Basin

S.No.	Name of the Hydroelectric projects	Percentage of Environmental Flows				Environmental Flows(m^3/s)			
		Monsoon (June to September)	Non-monsoon Non Lean Season (October to November)	Non-monsoon Non Lean Season (April to May)	Lean Season (December to March)	M	NMNL-1	NMNL-2	L
1	Saskangrong	20%	20%	20%	18%	8.96	4.79	2.02	1.46
2	Phudung	30%	25%	25%	20%	2.72	1.69	0.46	0.48
3	Meyong	20%	20%	20%	18%	17.24	9.21	3.89	2.81
4	Khuitam	20%	20%	20%	18%	21.45	11.46	4.17	3.50
5	Upper Nargum	20%	20%	20%	16%	1.55	0.54	0.62	0.27
6	Dikshi	30%	25%	25%	20%	8.84	5.66	3.20	2.28
7	Talong Londa	20%	20%	20%	15%	63.70	34.03	14.37	8.65
8	Pachung	20%	20%	20%	16%	7.21	3.85	1.40	1.06
9	Papu	30%	20%	20%	16%	13.32	4.74	1.73	1.29
10	Sepla	30%	25%	25%	20%	10.40	3.20	5.13	1.42
11	Tarang Warang	30%	25%	25%	20%	6.14	1.89	3.03	0.83
12	Marjingla	20%	20%	20%	15%	21.11	5.36	8.98	2.93
13	Pachuk-I	20%	20%	20%	15%	23.09	15.87	4.35	3.00
14	Pachuk-II	20%	20%	20%	15%	22.01	15.87	4.35	3.00
15	Pakke Bung-I	20%	20%	20%	16%	3.88	1.23	1.13	0.60
16	Pakke Bung-II	20%	20%	20%	16%	3.88	1.23	1.13	0.60
17	Pachuk II Lower	20%	20%	20%	15%	20.36	13.99	3.84	2.80
18	Marjingla Lower	20%	20%	20%	15%	28.44	7.22	12.10	3.95
19	Badao	20%	20%	20%	15%	16.49	8.81	3.21	2.24
20	Rebby	30%	25%	25%	20%	6.12	1.91	1.16	0.74
21	Lachung	20%	20%	20%	16%	7.84	2.93	1.79	1.15
22	Pappu Valley	30%	20%	20%	16%	8.07	2.87	1.05	0.78

S.No.	Name of the Hydroelectric projects	Percentage of Environmental Flows				Environmental Flows(m^3/s)			
		Monsoon (June to September)	Non-monsoon Non Lean Season (October to November)	Non-monsoon Non Lean Season (April to May)	Lean Season (December to March)	M	NMNL-1	NMNL-2	L
23	Pakke Bung-III	20%	20%	20%	16%	2.26	0.71	0.66	0.35
24	Pakke Bung-IV	20%	20%	20%	16%	2.29	0.58	0.60	0.25
25	Pacha	30%	25%	25%	20%	6.83	1.11	2.85	0.72
26	Debra	30%	25%	25%	20%	0.72	0.26	0.24	0.11
	Dipre	30%	25%	25%	20%	0.72	0.26	0.24	0.11
	Ditche	30%	25%	25%	20%	0.56	0.23	0.17	0.08
	Divri	30%	25%	25%	20%	1.26	0.45	0.42	0.19
27	Chanda	20%	20%	20%	15%	12.75	4.08	3.93	1.58
28	Digin	20%	20%	20%	18%	90% dependable year flow series was not available			
29	Tenga	30%	25%	25%	20%				
30	Denzi	20%	20%	20%	16%				
31	Lower Nargum	20%	20%	20%	16%				
32	Ankling	20%	20%	20%	16%				
33	Kameng Dam	20%	20%	20%	15%				
34	Pichang	30%	25%	25%	20%				
35	Para	30%	25%	25%	20%				
36	Kimi	30%	25%	25%	20%				
37	Satuk	20%	20%	20%	15%				

6. DROPPING OF PROJECTS

The list of projects falling within or on the boundary of Pakke Tiger Reserve is given in Table-9. The total installed capacity of these projects is 1942 MW. It is recommended to drop these projects.

Table-11:List of projects falling within or on the boundary of Pakke Tiger Reserve

S.No.	Project Name	River	Capacity (MW)
1	Kameng-I HEP	Kameng	1120
2	Kameng-II HEP	Kameng	600

3	Pakke HEP	Pakke	110
4	Sebu HEP	Sebu	80
5	Pasar HEP	Papu	32
	Total		**1942**

The Bichom Storage-I (190 MW HEP, a CEA identified project and located at longitude 92°30"30' & latitude 27°20"22'. As such the project falls in Gongri/Dogri river, the tributary of Bichomriver at downstream of Khuitam HEP (66 MW) & upstream of Dinchang HEP (252MW). The TWL of Khuitam 1173m and FRL of Dinchang HEP is 1138m. Thus, there is a level difference of 35m only in between these projects. Therefore, the project location as proposed may not be viable.

The Bichom-II (205 MW) HEP, a CEA recommended project is located at longitude 92°37'00" & latitude 27°18'00". As such the project falls in Bichom river and located at downstream of Nafra HEP (120 MW) & upstream of Bichom Dam of KamengHEP(600 MW). The TWL of Nafra HEP is 796.20m and FRL of Bichom Dam is 770m. Thus, there is a level difference of 26.2m only in between these projects. Thus, the location as proposed may not be viable.Thus, it is proposed to drop Bichom Storage-I (190 MW) HEP and Bichom-II (205 MW) HEP. The total capacity of these projects to be dropped is (1942+205+190) 2337 MW.

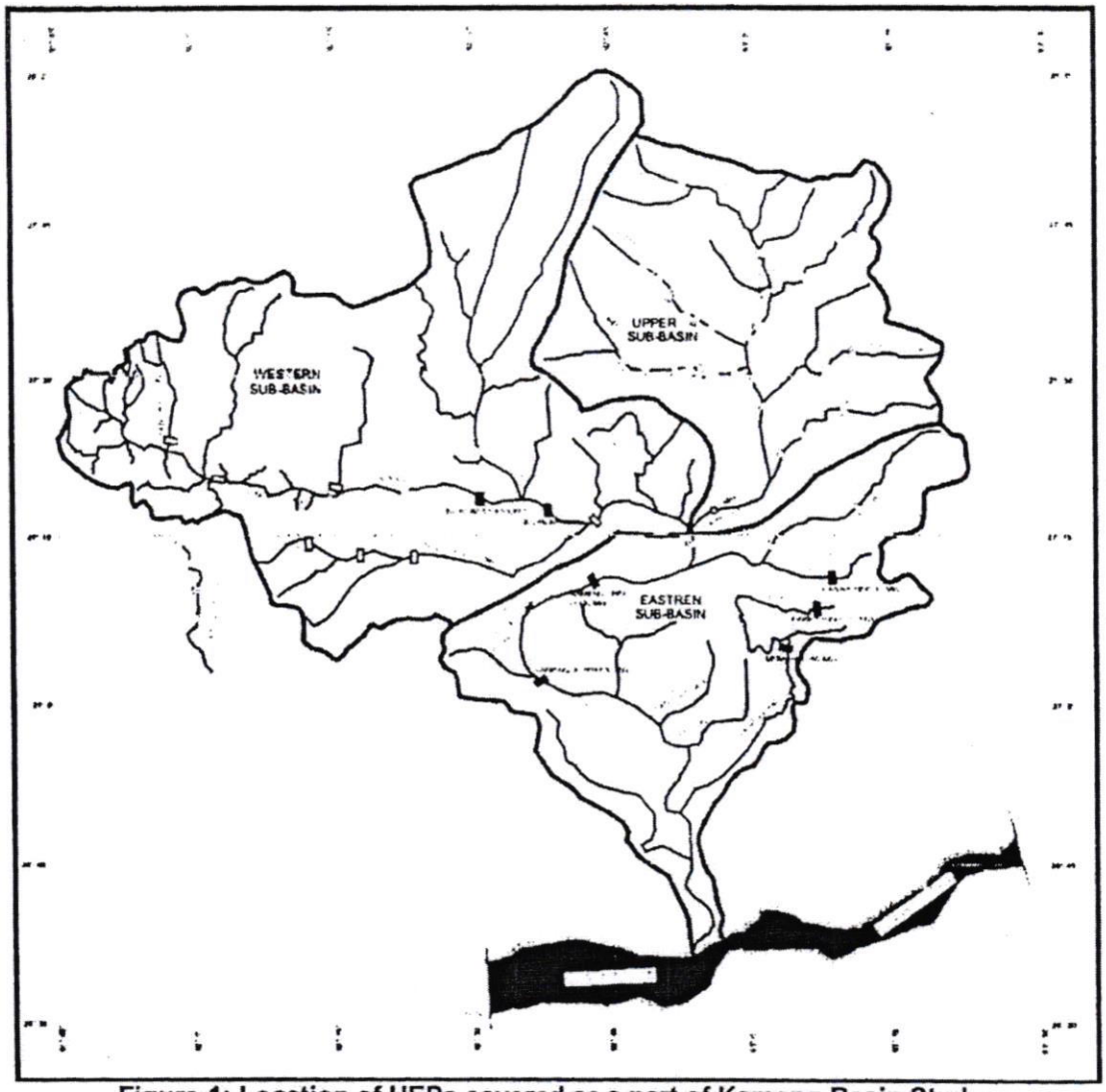


Figure-1: Location of HEPs covered as a part of Kameng Basin Study

7. OTHER RECOMMENDATIONS

The other recommendations are given as below:

- In some of the projects based on the approved hydrology the months considered for assessment for Environmental Flow for various season needs to be relooked.
- A site specific study shall be carried out for Pakke Bung-I, Pakke Bung-II, Pakke Bung-III and Pakke Bung-IV HEPs to provide stretch of 1 km and change of project layouts.

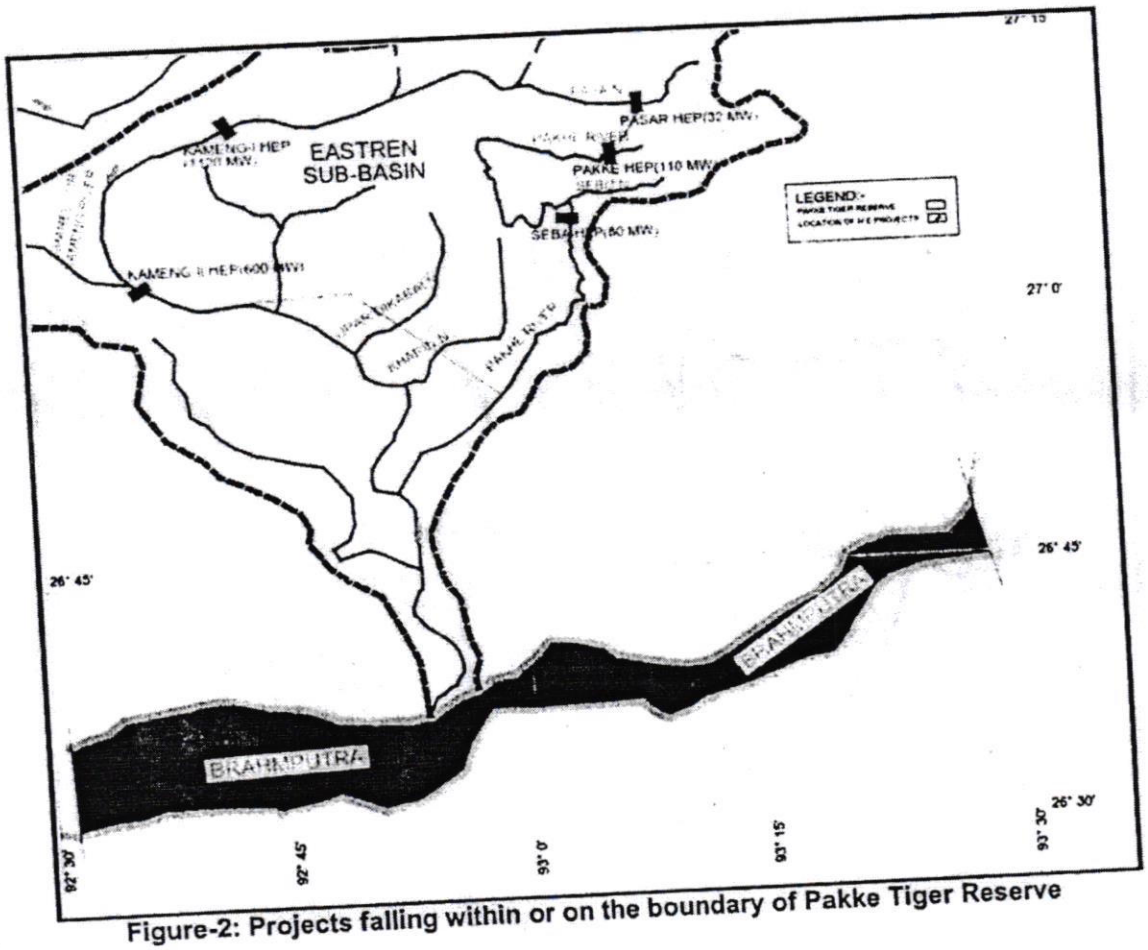


Figure-2: Projects falling within or on the boundary of Pakke Tiger Reserve

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