

Development of Hydro Electric Potential in North Eastern Region & Sikkim

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Status of Development of HE Potential

Region/ State	Identified Capacity as per re-assessment study) 1978-87	Capacity Developed		Capacity under Construction		Capacity Developed + Under Development		Capacity yet to to be developed	
		(MW)	%	(MW)	(%)	(MW)	(%)	(MW)	%
NORTH EASTERN									
Meghalaya	2394	185	7.7%	84	3.5%	269	11.2%	2125	88.8%
Tripura	15	15	100.0%	0	0.0%	15	100%	0	0.0%
Manipur	1784	105	5.9%	0	0.0%	105	5.9%	1679	94.1%
Assam	680	275	40.4%	100	14.7%	375	55.1%	305	44.9%
Nagaland	1574	99	6.3%	0	0.0%	99	6.3%	1475	93.7%
Arunachal Pd	50328	416	0.8%	2600	5.2%	3016	6.0%	47313	94.0%
Mizoram	2196	0	0.0%	60	2.7%	60	2.7%	2136	97.3%
Total (NER)	58971	1095	1.9%	2844	4.8%	3939	6.7%	55032	93.3%
Sikkim	4286	84	2.0%	609	14.2	693	16.2%	3593	83.8%

Preliminary Ranking Studies-2001

CATEGORY Region/State	A		B		C	
	Nos	MW	Nos	MW	Nos	MW
Sikkim	10	1982	11	1371	-	-
NORTH EASTERN						
Meghalaya	2	178	16	1316	4	665
Tripura	-	-				
Manipur	3	135	5	335	3	1771
Assam	3	247	3	108	1	33
Nagaland	2	111	4	251	4	1031
Arunachal Pd	31	5047	55	38999	3	5080
Mizoram	-	-	3	194	3	1870
Total (NER & Sikkim) :	51	7700	97	42574	18	10450³

50,000 MW Hydro Initiative (2004)-

Projects in

North Eastern Region and Sikkim

Details of Schemes under 50,000 MW initiative in NE Region and Sikkim for which PFRs Prepared

S.No.	Name of State	No. of schemes	Installed Capacity (MW)
1	Arunachal Pradesh	42	27293
2	Manipur	3	362
3	Meghalaya	11	931
4	Nagaland	3	330
5	Mizoram	3	1500
	Total(NER) :	62	30416
6	Sikkim	10	1469
	Total (NER+Sikkim)	72	31885

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Preparation of Bankable DPRs Under 50000 MW Initiative Low Tariff Schemes upto Rs. 2.50/Kwh

S.N	State	No. of Schemes	Capacity (MW)
1	Arunachal Pradesh	19	21800
2	Meghalaya	6	582
3	Sikkim	4	835
	Total	29	23217

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**Preparation of Bankable DPRs
Under 50000 MW Initiative
Low Tariff Schemes upto Rs. 2.50/Kwh**

S.No.	Status	No. of Schemes	Capacity (MW)
1	DPR Prepared	4	725
2	Under S&I	13	7542
3	Held Up due to MoEF Problem, Change in Executing Agency, Conversion from storage to RoR etc.	12	14950
	Total	29	23217 ₇

**NE REGION (including Sikkim)
Hydro Capacity additions- 10th Plan**

	Central	State	Private	Total
Original Programme	595	264	-	859
Comm. 2002- 06	25	-	-	25
Commissioned 2006-07 upto Dec.06	-	-	-	-
Expected Jan.07-Mar.07	-	100	-	100
10th Plan Commissioned . + Expected Jan.07-3/07	25	100	-	125 ₈

10th PLAN –PROJECTS IN N.E. REGION (including Sikkim)

S.N .	Name of Project, State & Capacity	Executin g Agency	Org. Target	Actual/Now anticipated	Reasons for slippages
1.	Kopili , Meghalaya 1x25=25 MW	NEEPCO	2001-02	31.12.2003 (Actual)	-
2.	Karbi Langpi Assam 2x50= 100 MW	ASEB	1987-88	Feb. 2007	Frequent change in executing agency
3.	Turial Mizoram 2x30=60MW	NEEPCO	2005-07	Work held up	Work held up since 06/2004 due to law and order problem

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10th PLAN –PROJECTS IN N.E. REGION (including Sikkim)

S. N.	Name of Project, State & Capacity	Executin g Agency	Org. Target	Actual/ Now anticipated	Reasons for slippages
4.	Myntdu , Meghalaya 2x42=84MW	MeSEB	2006-07	2008-09	Delayed award of work Dam & HRT- 03/2004 Power House-07/2005 E&M works -07/2006
5.	Bairabi Mizoram 2x40= 80 MW	Power Deptt. Mizoram	-	-	Investment decision yet to take place
6.	Teesta st.V Sikkim 3x170=510MW	NHPC	Feb2007	Sept.2007	Bad geology encountered in HRT & Lower Surge Gallery

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Hydro Electric Schemes in XI Plan (Tentative) North Eastern Region & Sikkim

State	No. of schemes	Benefit during XI Plan Period (MW)
Ar. Pradesh	2	2600
Meghalaya	2	124
Sikkim	5	1331
Total	9	4055

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XI Plan (Tentative) Hydro Schemes in N.E. Region

	NE Region	Sikkim	Total
Central	2600	510	3110
State	124	-	124
Private	-	821	821
Total:	2724*	1231**	4055

*2684 MW is under execution

** 609 MW is under execution

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SCHEMES IN NER & SIKKIM IDENTIFIED FOR BENEFITS DURING 11th PLAN (Tentative)										
SI N	NAME OF SCHEME	STATE	AGENCY	IC (MW)	Benefit s 11th Plan	Year of Comm'n' g	DPR	TEC/State Govt. Apr' val	Investment Decision	Award of Contract
1	TEESTA III	SIKKIM	Athena Projects	1200	600*	2011-12	Ready	Done	3/07	3/07
2	TEESTA V	SIKKIM	NHPC	510	510	2007-08	Ready	Done	Done	Done
3	CHUJACHEN	SIKKIM	GATI	99	99	2009-10	Ready	Done	Done	Awarded
4	BHASMEY	SIKKIM	GATI	51	51	2010-11	Ready	Done	6/07	9/07
5	SADA MANDER	SIKKIM	GATI	71	71	2009-10	Ready	June'05	3/07	6/07
6	SUBANSIRI LOWER	Ar.P	NHPC	2000	2000	2010-11	Ready	Jan'2003	9.9.03	19.12.03
7	KAMENG	Ar.P	NEEPCO	600	600	2009-10	Ready	30.4.1991	2.12.04	8.12.04
8	MYNTDU SI-I	MEGH.	MeSEB	84	84	2008-09	Ready	20.09.1999	9.6.2003	Mar'04
9	NEW UMTRU	MEGH.	MeSEB	40	40	2010-11	Ready	Done	Done	3/07
				TOTAL	4055					13

**Action Plan for
Hydro Electric Schemes in
North Eastern Region and
Sikkim
in XII Plan (Tentative)**

Details of Schemes in Central Sector in Arunachal Pradesh for which MOU signed on 21.9.2006 in the presence of Hon'ble MOP

S.NO.	NAME OF THE SCHEME	Installed Capacity (MW)	River	Distt.	Type	Construction Period (years)
NHPC						
1	TAWANG-I	750	Tawang	Tawang	R.O.R.	6
2	TAWANG-II	750	Tawang	Tawang	R.O.R.	6
3	SUBANSIRI MIDDLE	1600	Kamla	Lower Subansiri	Storage	7
4	SUBANSIRI UPPER	2000	Subansiri	Upper Subansiri	Storage	7
5	DIBANG MPP (Joint Venture with Govt.of Ar.P.)	3000	Dibang	Dibang	Storage	8
NTPC						
6	ETALIN	4000	Dibang	Dibang	R.O.R.	8.0
7	ATTULNI	500	Dibang	Dibang	R.O.R.	7.5
NEEPCO						
8	BHARELI-I	1120	Kameng	West Kameng	R.O.R.	6
9	PARE	110	Dikrong	Papumpare	R.O.R.	5
	TOTAL	13830				15

**Hydro Electric Schemes in XII Plan (Tentative)
North Eastern Region & Sikkim**

State	No. of schemes	Benefit during XII Plan Period (MW)
Ar. Pradesh	18	19080
Assam	2	210
Meghalaya	3	181
Manipur	1	1500
Total (NER)	24	20971
Sikkim	14	3390
Grand Total	38	24361

Status of XII Plan (tentative) Hydro Schemes in N.E. Region

S. No.	Category	No.	MW
1	CEA Concurrence/ State Govt. Clearance	1	1500
2	DPR Ready	6	5930
3	Under Investigation	17	13541
	Total	24	20971

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Status of XII Plan (tentative) Hydro Schemes in Sikkim

S. No.	Category	No.	MW
1	CEA Concurrence/ State Govt. Clearance	4	1256
2	DPR Ready	3	496
3	Under Investigation	7	1638
	Total	14	3390

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HYDRO PROJECTS IDENTIFIED FOR BENEFITS DURING 12th PLAN (TENTATIVE)

S.N	Scheme (Category)	IC (MW)	Benefit in 12th Plan	Agency	DPR Schedul e	TEC	Investm ent decision	Award of contract	Year of Commis sioning
	Arunachal Pradesh								
1	Attunli (A)	500	500	NTPC	9'08	12/08	6/09	6/09	2015-16
2	Siang Middle (Siyom)(B1)	1000	1000	IPP	Ready	6/07	9/07	3/08	2014-15
3	Dibbin (A)	100	100	To be decided	3/07	6/07	9/07	3/08	2012-13
4	Badao (A)	60	60	To be decided	Ready	3/07	6/07	3/08	2012-13
5	Kapak Leyak (A)	160	160	To be decided	6/07	12/07	3/08	6/08	2012-13
6	Talong (A)	160	160	To be decided	Ready	3/07	6/07	3/08	2012-13
7	Etalin (A)	4000	4000	NTPC	9'08	12/08	6/09	6/09	2016-17

HYDRO PROJECTS IDENTIFIED FOR BENEFITS DURING 12th PLAN (TENTATIVE)

S N	Scheme (Category)	IC (MW)	Benefit in 12th Plan	Agency	DPR Sched ule	TEC	Invest ment decisi on	Award of contrac t	Year of Commis sioning
8	Nyamjunchhu St-I (A)	98	98	IPP	3/08	6/08	12/08	3/09	2012-13
9	Nyamjunchhu St-II (A)	97	97	IPP	3/08	6/08	12/08	3/09	2012-13
10	Nyamjunchhu St-III (A)	95	95	IPP	3/08	6/08	12/08	3/09	2012-13
11	Dibang (Joint venture) (A)	3000	3000	NHPC	Ready	3/07	6/07	12/07	2015-16
12	Tawang-II (A)	750	750	NHPC	3'08	6/08	12/08	3/09	2015-16

HYDRO PROJECTS IDENTIFIED FOR BENEFITS DURING 12th PLAN (TENTATIVE)									
S N	Scheme (Category)	IC (MW)	Benefit in 12th Plan	Agency	DPR Schedule	TEC	Invest ment decision	Award of contract	Year of Commissioning
13	Tawang-I (A)	750	750	NHPC	3'08	6/08	12/08	3/09	2015-16
14	Pare @	110	110	NEEPCO	Ready	1/07	6/07	6/07	2012-13
15	Subansiri Middle (B1)*	1600	1600	NHPC	Ready	9/07	6/08	6/08	2016-17
16	Subansiri Upper (B1)*	2000	2000	NHPC	Ready	9/07	6/08	6/08	2016-17
17	Lohit(B1)	3000	3000	To be decided	3/07	6/07	9/07	3/08	2014-15
@ 110 MW can give benefit in 11 th plan with best efforts * To be updated/submitted after Supreme Court Order									21

S.N	Scheme (Category)	IC (MW)	Benefit in 12th Plan	Agency	DPR Sched ule	TEC	Inves tmen t decisi on	Awa rd of contr act	Year of Commiss ioning
18	Siang Lower (B1)	1600	1600	IPP	3/08	6/08	9/08	12/08	2016-17
	Assam								
19	Lower Kopili (A)	150	150	AGENCO	2/07	4/07	10/07	3/08	2013-14
20	Upper Borpani (A)	60	60	AGENCO	3'07	6/07	12/07	3/08	2013-14
	Manipur								
21	Tipaimukh (A)	1500	1500	NEEPCO	Ready	done	3/07	3/07	2015-16

HYDRO PROJECTS IDENTIFIED FOR BENEFITS DURING 12th PLAN (TENTATIVE)

S.N	Scheme (Category)	IC (MW)	Benefit in 12th Plan	Agency	DPR Sche dule	TEC	Investmen t decisi on	Award of contract	Year of Commiss ioning
	Meghalaya								
22	Umiam Umtru-V (A)	36	36	MeSEB	3/07	6/07	9/07	3/08	2012-13
23	Ganol (A)	25	25	MeSEB	1/07	3/07	6/07	3/08	2012-13
24	Mawhu (A)	120	120	NEEPCO	3/07	6/07	3/08	3/08	2012-13
Total (NER)- 24 Schemes		20971							

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HYDRO PROJECTS IDENTIFIED FOR BENEFITS DURING 12th PLAN (TENTATIVE)

S. No	Scheme (Category)	IC (MW)	Benefit in 12th Plan	Agency	DPR Schedule	TEC	Invest ment decisi on	Award of contra ct	Year of Commiss ioning
	Sikkim								
1	Panan (A)	280	280	IPP	Ready	1/07	4/07	7/07	2012-13
2	Dikchu (A)	96	96	IPP	Ready	6/07	9/07	9/07	2012-13
3	Rolep (A)	60	60	IPP	Ready	Done	6/07	12/07	2012-13
4	Rangit-II (A)	60	60	IPP	1/07	3/07	6/07	10/07	2012-13
5	Rangit-IV (A)	120	120	IPP	Ready	3/07	6/07	12/07	2012-13
6	Lachen (A)	210	210	NHPC	3/08	6/08	3/09	3/09	2014-15
7	Rangyong (A)	80	80	IPP	12/07	3/08	9/08	9/08	2012-13
8	Rukel (A)	33	33	IPP	3/08	6/08	9/08	3/09	2013-14

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HYDRO PROJECTS IDENTIFIED FOR BENEFITS DURING 12th PLAN (TENTATIVE)

S.N	Scheme (Category)	IC (MW)	Benefit in 12th Plan	Agency	DPR Schedule	TEC	Invest ment decision	Award of contract	Year of Commissioning
9	Rongnichu (A)	96	96	IPP	Ready	Done	9/07	3/08	2013-14
10	Teesta St.-I (A)	280	280	IPP	3/07	6/07	9/07	12/07	2014-15
11	Teesta St.-II (A)	480	480	IPP	3/07	6/07	9/07	12/07	2012-13
12	Teesta St.-IV (A)	495	495	NHPC	3'07	6/07	3/08	3/08	2013-14
13	Teesta-VI (A)	500	500	IPP	Ready	Done	6/07	7/07	2013-14
14	Teesta-III * (A)	1200	600	IPP	Ready	Done	3/07	3/07	2012-13
Total (Sikkim)			3390						
Total (NER+Sikkim)- 38Schemes			24361						25
* 600 MW can give benefit in 11 th plan with best efforts									

GOI POLICY/ Guidelines

- **Hydro power upto 100 MW can be taken up in MOU Route**
- **As per tariff Policy January, 2006 procurement of power by distribution companies to be made only through competitive bidding. Special dispensation for State / Central projects on cost plus tariff to be determined by Regulator till January, 2011.**
- **12% free power to home state**
- **Estimation of Completion Cost taking into account the Geological and Hydrological risks ,cost escalation and natural occurrence of land slides,rock falls etc.**

POLICY ISSUES

- **Govt of Arunachal Pradesh and Sikkim allocating projects to IPPs on conditions other than tariff based competitive bidding on the basis of:**
 - Upfront Premium
 - Free power > 12% after certain years
 - Equity participation without actual payment of upfront equity and to be adjusted against the proceeds of sale of free power
 - Project development on BOOT basis
 - Agreement period 35 years / 40 yrs. From COD.

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POLICY ISSUES

- Hydro power has many uncertainties during construction due to adverse geological condition, delay in land acquisition, R&R issues etc. difficulty in tariff based competitive bidding especially as DPRs are not ready.
- State Govts want same dispensation to IPP as applicable to Central/ state projects given in tariff policy i.e. tariff determination on cost plus basis by appropriate Regulator.
- MOP is reviewing its Hydro Policy

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INFRASTRUCTURE

- Construction / strengthening of roads, bridges
- Availability of telecommunication facility
- Stable construction power

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TRANSMISSION SYSTEM

- Surplus power from these projects to be supplied to deficit states in Other regions.
- 400 KV pooling points in each river valley in Arunachal Pradesh Planned.
- 800 KV HVDC system proposed for transmission of power from NE Region to Other regions.
- For implementation of transmission system, allocation of power to beneficiary states need to be firmed up.

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ENVIRONMENTAL ISSUES

- Delay in getting MOEF clearance.
- Net Present Value (NPV) of forest area submerged is to be added to project cost. NPV cost is substantial which could make the hydro energy more costly.
- 6 hydro projects with total capacity 7100 MW in Subansiri basin are held up due to MOEF issues (Supreme court order).
- 2 hydro projects with total capacity 1720 MW in Kameng basin are held up due to Wild Life issues.

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CONVERSION OF STORAGE SCHEMES TO ROR PROJECTS

- Arunachal Pradesh Govt has decided to develop storage hydro projects namely Hutong(3000 MW), Kalai(2600 MW) , Kameng Dam(600 MW) and Demwe (3000 MW) as ROR instead of Storage.
- Arunachal Pradesh has split two storage projects namely Hutong and Kalai into four ROR projects. Out of these, Hutong-II(1250 MW) and Kalai-I (1450 MW) have been allotted to IPP for development.

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STORAGE PROJECTS IN N.E. REGION					
Sl No	Scheme	Installed Capacity (MW)	Live Storage (Mcum)	Submergence Area (ha)	Villages
Arunachal Pradesh					
1	Demwe*	3000	1120	2500	Negligible
2	Duimukh	150	67.21	565	Negligible
3	Hutong*	3000	908.57	1519.76	15
4	Kalai*	2600	909.739	1296.7	8
5	Kameng Dam*	600	1177.3	3764	2
6	KurungI&II	330	574	2025	Negligible
7	Talong*	300	203	1006	Negligible
8	Tenga	600	96.55	281.96	Negligible
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- *Being Proposed as ROR scheme by State Government					

STORAGE PROJECTS IN N.E. REGION					
Sl No	Scheme	Installed Capacity (MW)	Live Storage (Mcum)	Submergence Area (ha)	Villages/ persons affected
Arunachal Pradesh					
9	Siang Upper	11000	3910	Yet to be investigaed	
10	Siang Intermediate				
11	Siang Lower	1600	380	DPR to be prepared	
12	Subansiri Lower	2000	442	3350	2/NA
13	Subansiri Middle	1600	1163	2867	3 / 235
14	Upper Subansiri	2000	754	2220	21 / 1656
15	Lohit(MPP)	3000	616	1336	2/NA
16	Dibang	3000	3858	4000	5/243
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STORAGE PROJECTS IN N.E. REGION					
Sl No	Scheme	Installed Capacity (MW)	Live Storage (Mcum)	Submergence Area (Ha)	Villages/ persons affected
Manipur					
1	Tipaimukh	1500	9000	29150	8 villages/ 238 Families
Assam					
2	Upper Borepani	60	185	DPR Awaited	

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To realise the benefits, following issues need to be adequately addressed
<ul style="list-style-type: none"> • Projects allotted to IPPs to be closely monitored w.r.t. their schedules of DPR preparation, clearances, execution etc. • Periodical review meetings to be convened by State Authorities in which CWC/GSI also to be invited. • Scope of S&I activities to be properly checked during review meetings. • IPPs to be suitably facilitated with requisite guidance in S&I, execution of the projects. • Development of identified projects in a basin to be taken up simultaneously so that infrastructure and other facilities could be shared.
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Thank you!



PROPOSED DIVERSION OF BRAHMAPUTRA WATERS BY CHINA

- There is urgent need to develop hydro power in Arunachal Pradesh not only for ensuring energy security of the country but also to protect our right to existing uses of water from Brahmaputra basin considering that China is developing water resources projects in the upstream, which may involve diversion of water.
- Lower Siang Project (1600 MW) which has been investigated by NHPC but now allotted to IPP needs to be taken up to establish our right of existing uses.

Schemes allotted to Private Sector in Arunachal Pradesh

S.No.	Name of Scheme	Agency	I.C (MW)
1	Naying	D.S. Constructions Ltd., New Delhi	1000
2	Tato-II	Reliance Energy Ltd., Mumbai	700
3	Hirong	Jaiprakash Associates Ltd, New Delhi	500
4	Siang Lower*	Jaiprakash Associates Ltd, New Delhi	1600
5	Siang Middle(Siyom)*	Reliance Energy Ltd., Mumbai	1000
6	Kameng-II(Bhareli-II)	Mountain Falls (India) Ltd.	600
7	Hutong-II	Mountain Falls (India) Ltd.	1250
8	Kalai-I	Mountain Falls (India) Ltd.	1450
9	Nyamjunchhu-I	Bhilwara Energy Ltd.	98
10	Nyamjunchhu-II	Bhilwara Energy Ltd.	97
11	Nyamjunchhu-III	Bhilwara Energy Ltd.	95
		TOTAL	8390
	*For these projects NHPC has prepared the DPR		39

Schemes allotted to Private Sector in Sikkim

S.N	Name of Scheme	Agency	I.C(MW)
1	Teesta-I	Himalayan Green Energy Pvt. Ltd., New Delhi	280
2	Teesta-II	Him Urja Pvt. Ltd., New Delhi	330
3	Teesta-III	Teesta Urja Ltd., New Delhi	1200
4	Teesta-VI	Lanco Energy Pvt. Ltd., New Delhi	500
5	Panan	Himgiri Hydro Energy Pvt. Ltd., Hyderabad	280
6	Rangyong	GVK Industries Ltd. , Hyderabad	117
7	Rongnichu	Madhya Bharat Power Corporation Ltd.	96
8	Sada Mangder	Gati Infrastructures Ltd., Hyderabad	71
9	Bhasmey	Gati Infrastructures Ltd., Hyderabad	32
10	Rolep	Amalgamated Transfer India Ltd., New Delhi	36
11	Chakhungchu	Amalgamated Transfer India Ltd., New Delhi	50
12	Ralong	Amalgamated Transfer India Ltd., New Delhi	40

Schemes allotted to Private Sector in Sikkim

S.No.	Name of Scheme	Agency	I.C(MW)
13	Rangit-II	Sikkim Ventures Pvt. Ltd,Mumbai	60
14	Rangit-IV	Jal Power Corporation Ltd., Hyderabad	120
15	Dikchu	Sneha Kinetic Power Projects Ltd., Hyderabad	96
16	Jorethang Loop	DANS Energy Pvt.Ltd, New Delhi	96
17	Lingza	Punj Llyod Ltd., New Delhi	120
18	Thangchi	Lachung Power Pvt. Ltd. , New Delhi	40
19	Bimkyong	Teesta Power Pvt. Ltd., New Delhi	99
20	Bop	Chungthang Power Pvt. Ltd, New Delhi	90
21	Ting Ting	SMEC Pvt. Ltd., New Delhi	70
22	Rateychu - Bakchachu	Coastal Projects Pvt. Ltd.	40
		Total	3863