

Central Electricity Authority
System Planning & Project Appraisal Division
Sewa Bhawan, R.K. Puram, New Delhi - 110066.

No. 26/10/2009-SP&PA/

Date: 17th Sep., 2009

To

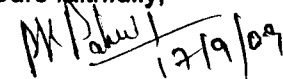
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|----|--|----|--|
| 1 | The Member (PS),
Central Electricity Authority,
Sewa Bhawan, R. K. Puram,
New Delhi-110066 | 8 | Shri M.L Jadhav, Chief Engineer (Trans),
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Fax 022-25993570 |
| 2 | The Member Secretary,
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Fax 0124-2410201 |
| 3 | The Director (Projects),
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Fax 95124-2571760 | 10 | The Chief Engineer,
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| 4 | Chairman and Managing Director,
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Fax 0761 2665593 | 11 | Executive Engineer (Projects)
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| 5 | Member (Transmission & Distribution),
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| 7. | Director (Operation),
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Sub: Minutes of the 29th meeting of the Standing Committee on Power System Planning in Western Region held on 10th Sept 2009 at Ahmedabad

Sir,

The minutes of the 29th meeting of the Standing Committee on Power System Planning of Western Region held on 10th Sept 2009 at Ahmedabad are available on CEA website (www.cea.nic.in at the following link: Home page-Power Systems-Standing Committee on Power System Planning-Western Region).

Yours faithfully,


(P. K. Pahwa)
Director, SP&PA

भारत सरकार
केन्द्रीय विद्युत प्राधिकरण
प्रणाली योजना एवं परियोजना मूल्यांकन प्रभाग
सेवा भवन, रामकृष्णपुरम, नई दिल्ली 110066

क. सं. : 26/10/2009-प्र. यो. प. मू./

दिनांक: 17.09.2009

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|---|--|----|--|
| 1 | सदस्य (विद्युत प्रणाली),
केन्द्रीय विद्युत प्राधिकरण,
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| 4 | अध्यक्ष एवं प्रबन्ध निदेशक,
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फोन नं. 0260-2250889, 2254745 |
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| 7 | निदेशक (प्रचालन),
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फ़ैक्स 022-26390383 / 26595258 | | |

विषय :- पश्चिमी क्षेत्र की विद्युत प्रणाली योजना पर, 10 सितम्बर 2009 को अहमदाबाद में आयोजित की गयी, स्थाई समिति की 29वीं बैठक का कार्यवृत्त।

महोदय,

पश्चिमी क्षेत्र की विद्युत प्रणाली योजना पर, 10 सितम्बर 2009 को अहमदाबाद में आयोजित की गयी, स्थाई समिति की 29वीं बैठक का कार्यवृत्त केन्द्रीय विद्युत प्राधिकरण की वेबसाइट www.cea.nic.in पर लिंक (Home page - Power Systems-Standing Committee on Power System Planning-Western Region) पर उपलब्ध है।

संलग्न - ~~संलग्न~~

पी. के. पाहवा
17/9/09
(पी. के. पाहवा)
निदेशक

Minutes of the 29th meeting of the Standing Committee on Power System Planning in Western Region

The 29th meeting of the Standing Committee on Power System Planning was held on Thursday the 10th Sept 2009 at Ahmedabad. The list of participants is at Annex-1.

Member (PS), CEA welcomed the participants to the meeting and thanked POWERGRID for making arrangements for the meeting at short notice. He also welcomed Shri S Jagadeesan, Principal Secretary (Energy), Gujarat and Chairman GETCO and WRPC who joined the meeting. He congratulated Shri I.S. Jha for assuming charge of Director (Projects) in POWERGRID and stated that this meeting was convened so that the transmission system finalized and agreed during this meeting could be put up to the WRPC for endorsement during the forthcoming WRPC meeting scheduled for 25th September 2009. He stated that in the changed scenario with decentralization of generation to encourage competition, a large number of project developers were setting up IPPs in different parts of the country. Also the states were free to source their requirements from any of the IPPs and hence there was a need to have flexibility in planning process. Due to large generation capacity addition program envisaged during 11th and 12th Plan a large number of IPPs would be coming up in relatively shorter time frame there was a need to move at a faster pace in planning of transmission requirements. The agenda items were thereafter taken up.

1. Confirmation of the minutes of 28th meeting of the Standing Committee on Power System Planning in Western Region held on 6th December 2008 at Aurangabad and Special meeting of the Standing Committee on Power System Planning in Western Region held on 18th April 2009 at Mumbai .

- 1.1 Director (SP&PA), CEA stated that minutes of the 28th meeting of the Standing Committee Meeting on Power System Planning in Western Region were issued vide CEA letter No.26/10/2002-SP&PA/15-26 dated 23rd December 2008. MPTRANSCO vide their letter no 04-01/PSP/N-171/1417 dated 7th Feb 2009 had stated that Madhya Pradesh and Chhattisgarh had not agreed to share 25 % transmission charges for Narendra- Kolhapur HVDC back to back and had requested for amendment to para 3.1 of the minutes to reflect the same. The minutes of the 28th meeting were thereafter confirmed with the following amendment.

Para 3.1 on page no.3 of the minutes of the 28th SCM (“.....*WR constituents agreed to share only 25% transmission charges*

“.....*WR constituents (except Madhya Pradesh and Chattisgarh) agreed to share only 25% transmission charges*

- 1.2 Director (SP&PA) stated that the minutes of the Special meeting of the Standing Committee on Power System Planning in Western Region held on 18th April 2009 were issued vide letter No.26/10/2009-SP&PA/ dated 5th May, 2009. NTPC vide their letter dated 26.05.2009 had intimated that Rihand-III and Vindhyachal-IV were central sector PPA based regional generation projects and the transmission lines emanating from the above projects should not be considered generation specific dedicated lines. Subsequently, corrigendum to the minutes was issued vide CEA letter no.26/10/2009/SP&PA/518-529 dated 8th June 2009. No comments had been received from any other constituent

The minutes of the Special meeting along with corrigendum issued were thereafter confirmed.

2.0 Review of Progress on Earlier Agreed Transmission Schemes

- 2.1 Director (SP&PA) stated that WRSS-II scheme was approved in 2004 but progress was very slow and had still not been completed.
- 2.1.1 Director (Projects), POWERGRID stated that part B&C of the scheme WRSS-II were through IPTC route and part A&B were under implementation by POWERGRID. Some of the transmission elements to be implemented by them were linked with the implementation through IPTC route hence there was delay on this account.
- 2.1.2 Member (PS), CEA informed that the transmission licensee had been issued Section 164 in July 2009 for part B & C and now they could go ahead with the implementation. GETCO and MAHATRANSCO representatives desired that the transmission licensee should be invited in the next SCM meeting to apprise the members the progress of the scheme. After discussions it was decided that Member (PS), CEA would convene a separate meeting to review the progress of this scheme wherein the transmission licensee, POWERGRID, GETCO and MAHATRANSCO would be invited.
- 2.2 Regarding availability of land for substation at Mumbai New location, POWERGRID informed that they had identified land for new substation near Kalhar (Bhiwandi) but there were ROW constraints in the corridor for laying transmission lines. Managing Director (GETCO) suggested that 400 kV cables could be used in Mumbai area wherever there was a constraint. Member (PS), CEA stated that availability of land for setting up substation and ROW for laying transmission lines in urban areas was a constraint. The members had already agreed for GIS substation during the 28th meeting of SCM wherever availability of land was a constraint. He further suggested that for overcoming constraints in laying transmission lines, POWERGRID should adopt latest technologies in transmission tower like tubular pole structure etc to reduce ROW requirement. He opined that wherever ROW constraints were faced in small sections of the line, for speedy implementation of projects the implementing agency should be given a free hand to adopt the best feasible solution. Director (Projects), POWERGRID stated that the state Government should provide corridors for laying transmission lines in congested areas. It was decided that MSETCL will assist POWERGRID in this regard.
- 2.3 POWERGRID informed that for early commissioning of Akola - Aurangabad 400 kV D/c line they intended to use the cable trench of MSETCL for laying of cables at Aurangabad. But as per MSETCL there were space constraints. It was decided that MSETCL and POWERGRID would sort out the issue at site. An officer from CEA would also be deputed to view the site and give his recommendation.
- 2.4 Member (PS), CEA stated that a large number of inter-state transmission schemes had been agreed recently and many of them were under implementation. The State Transmission Utilities should plan the underlying network well in advance and ensure that implementation matches with the implementation of CTU network so that transmission assets built were not stranded. He further suggested that for building state transmission infrastructure the State Transmission Utilities could also adopt competitive tariff based bidding route on similar lines as was being undertaken for some of the inter-state transmission network, as this would help in overcoming the constraints faced in resource mobilization.

3.0 Transmission system associated with IPPs located in Orissa, Jharkhand, West Bengal, Madhya Pradesh and Chattishgarh.

- 3.1 Member (PS), CEA stated that broad contours of the transmission plan associated with Tilaiya UMPP (4000 MW), Nabinahgar (1000 MW) of Railways and NTPC, Barh-II (1320 MW), Rihand-III (1000 MW) Vindhyachal-IV (1000 MW) and Mauda (1000 MW) of NTPC and IPPs in Jharkhand, Orrissa, MP Chhattisgarh and Maharastra was discussed and agreed during the 28th meeting of the SCM of WR held on 6th December 2008. From the evolved

transmission system, transmission elements to be associated with Vindhyachal-IV and Rihand-III were subsequently agreed during the Special meeting of the SCM held on 18th April 2009. It was also decided that based on latest status of various IPP projects, phasing of transmission works would be worked out.

- 3.2 Member (PS), CEA stated that review of progress of various IPPs in Chhattisgarh was done in a meeting at Raipur convened by Government of Chhattisgarh in July 2009. Subsequent to this meeting a review meeting with various IPPs of Chhattisgarh was held at CEA in August 2009. Based on the review meetings a list of 12 no IPPS in Chhattisgarh who had made some progress and were likely to materialize during 11th plan/early 12th plan had been drawn. The total installed capacity of these twelve (12) no. IPPs were 15485 MW out of which 7 no. IPPs with capacity 8540 MW were located near Raigarh complex and 5 no. IPPs with capacity 6945 MW were located near Jhangir-Champa complex. The target beneficiaries as indicated by these IPPs were 11143 MW to WR and 3742 MW to NR.
 - 3.2.1 For IPP projects of Madhya Pradesh and Chhattisgarh (connected to Bilaspur pooling station) the total installed capacity was 3870 MW and the target beneficiaries indicated by these IPPs was 2375 MW for WR and 1095 for NR.
 - 3.2.2 For Orissa IPPs he informed that based on various review meetings with the project developers, OPTCL, CEA and POWERGRID had assessed and drawn a list of seven (7) projects with total capacity 10,090 which are likely to materialize by end of 11th Plan/ early 12th plan. The target beneficiaries indicated by these IPPs was 2340 MW to WR and 3315 MW to NR and balance to ER/SR.
 - 3.2.3 For Jharkhand and West Bengal (WBSEDCL) generation projects based on review the total installed capacity works to about 5465 MW. The target beneficiaries indicated by these IPPs was 1470 MW for WR and 2964 MW for NR and balance to ER.
 - 3.2.4 Thus the total installed capacity of IPP projects in Chhattisgarh, Madhya Pradesh, Orissa, Jharkhand and West Bengal for which transmission system was under consideration was of the order of 35,000 MW.
 - 3.2.5 There were certain modifications with respect to the network evolved and discussed in the 28th SCM of WR. The modifications mainly were 765 kV 2XD/C lines instead of 400 kV links upgradable to 1200 kV in future between Raipur-Wardha-Aurangabad, interlinking of Champa pooling station in Chattishgarh with Dharamjaygarh instead of Bilaspur pooling station.
- 3.3 POWERGRID made a presentation to the Principal Secretary (Energy), Gujarat and Chairman GETCO and WRPC on the procedure/methodology being followed by them for processing and grant of Long term Open Access Application. The presentation also highlighted the various high capacity transmission corridors under consideration for transfer of power from various IPP projects to beneficiaries in NR and WR.
 - 3.3.1 For evacuating power from 12 no. of IPPs projects in Chattishgarh it was proposed to pool power at 3 no 765/400 kV pooling stations at Raigarh (Kotra), Raigarh (Tanmar) and Champa. These three pooling stations would be interconnected through Raigarh (Kotra)-Champa 765 kV S/C and Raigarh (Kotra)- Raigarh(Tamnar) 765 kV D/C line. For onward transfer of power it was proposed to further pool power at another intermediate Raipur pooling station. Raigarh Pooling station (Kotra) would be connected to Raipur pooling station through 765 kV D/C line. Similarly Champa would be connected to Raipur through 765 kV D/C lines. To provide an alternate path Champa pooling station would also be connected to Dharamjaygarh where power from other IPP projects in Orrisa, Jharkhand and W.Bengal would also be coming. For transfer of power beyond Raipur within WR, Raipur-Wardha- Aurangabad 765 kV 2xD/c lines are proposed. Beyond Aurangabad power is proposed to be transferred through 765 kV Aurangabad-Padghe 765 kV D/C and

Aurangabad- Dhule-Vadodra 765 kV S/C. For further dispersal of power at 400 kV, Aurangabad-Khargar 400 kV D/C (quad), Vadodra-Asoj 400 kV D/C (quad), Dhule – Nasik 400 kV D/C (quad), Dhule – Malegaon 400 kV D/C (quad) had been proposed. Also interconnection at 400 kV between the new proposed 765 kV substations at Dhule, Padghe, Vadodara, Raipur pooling stations, Raigarh (Kotra) Pooling Stations to the existing substations was proposed. Also for bulk transfer of power from eastern part of Western Region to western part of Western Region a \pm 600 kV, 4000 MW HVDC bipole between Raigarh pooling station (Kotra) to Dhule was proposed and for bulk transfer of power to NR \pm 800 kV, 6000 MW HVDC bipole between Champa pooling station and around Kurushetra in Haryana was proposed with 3000 MW, 800 kV HVDC terminals at Champa and Kurushetra with provision to upgrade the terminals to 6000 MW.

- 3.3.2 POWERGRID stated that for evacuation of power from IPP projects in Orissa it was proposed to pool power from various IPPs located in Orissa at three number 765/400 kV pooling stations at Jharsuguda, Dhenkanal and Angul. The proposed pooling stations would be interconnected through 765 kV 2xS/C ring network and for onward transfer of power to NR and WR it was proposed to inject power at new pooling station at Dharamjaygarh in Chhattisgarh through Jharsuguda pooling- Dharamjaygarh 765 kV 2x D/c lines. In the phased development of transmission pooling stations at Jharsuguda and Angul were proposed to be set up along with the initial set of IPPs likely to materialise in Orissa which were located near to these two pooling stations. These two pooling stations were initially proposed to be interconnected through 765 kV, 2x S/C line. Subsequently, when more IPP projects materialize in Orissa, Dhenkanal pooling station could be established with 765 kV interconnections with between pooling stations. Out of the 2 no. 765 kV D/C lines from Jharsuguda to Dharamjaygarh one D/C line is proposed to be associated with Orissa IPP projects who had sought open access for transfer to WR/NR and the 2nd D/C line is proposed with IPP projects in SR who would had sought open access for selling power to NR/WR. From Dharamjaygarh power is proposed to be transferred to Jabalpur pooling station through 765 kV 2xD/C lines. Of the two D/c lines one D/C is proposed to be associated with Orissa IPPs and the 2nd D/C line is proposed as part of transmission system associated with Jharkhand IPPs and West Bengal projects who had sought open access for transfer of power to NR/WR. From Jabalpur pooling station onwards power would be transferred to NR through the proposed Jabalpur-Bina- Gwalior- Jaipur- Bhiwani 765 kV line. For transfer within WR Jabalpur-Bhopal-Indore- Vadodra 765 kV 1x S/C lines were proposed. From Vadodra a 400 kV D/C quad line was proposed up to Pirana. The 765 kV Jabalpur-Bhopal-Indore section of lines were proposed to be covered with Orissa IPPs and 765 kV Indore-Vadodra section and Vadodra- Pirana 400 kV quad were proposed to be covered with Madhya Pradesh generation projects and Chhattisgarh generation projects (pooled at Bilaspur). For IPP projects in Jharkhand and West Bengal in addition to the existing Ranchi-Sipat 400 kV and Ranchi-Sipat 765 kV S/c under construction a 765 kV Ranchi-Dharamjaygarh S/C line and a 765 kV Dharamjaygarh-Jabalpur 765 kV D/C line were proposed. For MP and Chhattisgarh projects which are proposed to be pooled at Bilaspur pooling station Indore-Vadodra 765 kV S/C and Vadodra –Pirana 400 kV D/C quad lines were proposed.
- 3.4 Member (PS), CEA stated that two pooling stations Raigarh (Kotra) and Raigarh (Tanmar) pooling stations had been planned and interconnected to reduce the ROW requirements as there was difficulty in laying transmission lines for projects located towards northern part of Raigarh. At present only Jindal Power project was planned to be connected to Raigarh (Tanmar). Jindal Power was yet to get coal linkage, therefore the implementation of Raigarh(Tanmar) pooling station should be linked with the progress of works at Jindal Power.
- 3.5 Member (PS) stated that POWERGRID had proposed to \pm 600 kV, 4000 MW HVDC from Raigarh to Vadodra in Gujarat. However based on his discussions and interaction with GETCO it is understood that GETCO had signed MOU with number of IPPs for setting up generation projects in their state. The location of HVDC station at Vadodra indicated in

agenda note would not be appropriate and hence the same had been reviewed and is now proposed at Dhule which was a major load centre.

- 3.6 Principal Secretary (Energy), Govt of Gujarat and Chairman GETCO and WRPC informed that many IPPs had signed MOUs with Gujarat Government for setting up projects in their state. He stated that there was a need to sort out the IPPs from the list which are likely to materialize and for evacuating power from these stations a strong National grid needs to be built so that beneficiaries are able to source their requirement from the IPP projects without constraint.
- 3.7 Member (PS), CEA endorsed Principal Secretary (Energy) views the need for segregating the serious IPPs from the non serious ones and stated that except for Videocon, none of the IPPs in Gujarat had approached the CTU for Open Access in Inter-state transmission. He stated that inter-state transmission requirements would be worked out after the IPPs seek Open Access in line with what had been done for IPP projects in other states.
- 3.8 Director (SP&PA) stated that the beneficiaries of Chhattisgarh IPP project had indicated WR and NR as their target beneficiaries and the common WR and NR transmission system included pooling stations along with their interconnections. It would be appropriate that pooling stations along with their interconnections be shown as specific to group of IPPs who would be getting connected to these pooling stations to avoid ambiguity in case at a later date the final beneficiaries are in the regions other than WR and NR. It was decided to indicate the pooling stations along with the interconnection as specific to a group of IPPs.
- 3.9 Member (PS), CEA stated that out of the proposed transmission works Jabalpur pooling station - Bhopal- Indore 765 kV S/C along with 765/400 kV substation at Bhopal, one D/C out of two Dharamjaygarh- Jabalpur 765 kV D/C, Aurangabad – Dhule - Vadodra 765 kV S/C along with 765/400 kV substation at Dhule and 400 kV connectivity to Dhule (MSETCL) were proposed for implementation through private sector under tariff based competitive bidding route. He further stated phasing of transmission works for Chhattisgarh had been done based on the commissioning schedule of various IPPs in Chhattisgarh and also interim arrangement for connectivity for those IPPs which are likely to come prior to availability of the network had been evolved . This temporary arrangement along with its restoration would be at the cost of the project developer. He requested the members to give their views on the proposed network.
- 3.10 Chhattisgarh representative was in agreement with the planned transmission system.
- 3.11 MAHATRANSCO representative while concurring with the planned network stated that connectivity between Aurangabad –Khargar 400 kV D/C line needs to be reviewed in to as Khargar was not a major load centre. It was decided that CEA, POWERGRID and MAHATRANSCO would jointly sort this out in a separate meeting and in case any change/modification of the terminal station at Dhule or connectivity to Khargar was required the same would be intimated to the members.
- 3.12 MD, GETCO concurred with the proposed network and stated that Gujarat was facing low voltage problems in Saurashtra area and desired CTU network may be extended to that area. Member (PS), CEA clarified that with Mundra (Adani) -Varsana 400 kV D/C line under implementation by GETCO the voltage levels in Saurashtra region would improve.
- 3.13 MPTRANSCO agreed with the proposed transmission network and stated that they were facing high voltage problems in MP area due to large number of CTU lines passing through MP. Member (PS), CEA clarified that line and bus reactors wherever required were already installed at CTU substations. To avoid over voltage problems there was need for MPTRANSCO to plan for more intra-state transmission network to increase their drawal from the CTU network.

- 3.14 The representative from D&D and DNH also agreed to the proposed transmission network.
- 3.15 GM, NTPC stated that as an interim arrangement for connectivity a number of LILOs at 400 kV from lines emanating from Korba were proposed. This would increase the fault level and desired a study to ensure that fault levels at 400 kV Korba bus do not exceed the permissible limit. This was agreed and it was decided that POWERGRID would carry out a study to assess the fault levels.
- 3.16 After discussions the following network was agreed:

A. New IPP projects in Chattishgarh and the associated transmission system

➤ **Transmission System within WR associated with New IPP projects in Chattishgarh**

- (i) Raipur Pooling station- Wardha 765 kV 2x D/C (initially 1st D/c line to be operated at 400 kV)
- (ii) Wardha- Aurangabad(PG) 765 kV 2X D/C (initially 1st D/c line to be operated at 400 kV)
- (iii) Aurangabad- Padge(PG) 765 kV D/C
- (iv) Aurangabad- Dhule (New) (PG) 765 kV S/C (*Implementation by private sector through tariff based competitive bidding route*)
- (v) Dhule (New) – Vadodara (PG) 765 kV S/C (*Implementation by private sector through tariff based competitive bidding route*)
- (vi) Establishment of 765/400 kV 2x1500 MVA substations at Dhule (New) (*Implementation by private sector through tariff based competitive bidding route*)
- (vii) Dhule (New) – Dhule (MSETCL) 400 kV D/C (quad) (*Implementation by private sector through tariff based competitive bidding route*)
- (viii) Establishment of 765/400 kV 2x1500 MVA substations at Aurangabad and Padghe (GIS)
- (ix) Aurangabad(PG)-Khargar 400 kV D/C (quad)
- (x) Padghe(PG)- Padghe 400 kV D/C (Quad)
- (xi) Vadodra-Asoj (GETCO) 400 kV D/C (Quad)
- (xii) Dhule (New) – Nasik (MSETCL) 400 kV D/C (quad)
- (xiii) Dhule (New) – Malegaon (MSETCL) 400 kV D/C (quad)
- (xiv) ± 600 kV 4000 MW HVDC bipole between Raigarh pooling station (Kotra) – Dhule
- (xv) 4000 MW , 600 kV HVDC bipole terminal each at Raigarh pooling station (Kotra) and Dhule

➤ **Transmission System in NR associated with New IPP projects in Chattishgarh**

- (i) ± 800 kV 6000 MW HVDC bipole between Champa Pooling Station – Near Kurushetra (NR) in Harayana (initially to be operated at 3000 MW)
- (ii) 3000 MW , 800 kV HVDC bipole terminal each at Champa pooling station and near Kurushetra in Haryan with provision to upgrade the terminals to 6000 MW
- (iii) Kurushetra- Jallandhar 400 kV D/C (Quad) (one ckt via Nakodar S/S)
- (iv) LILO of Abdullapur- Sonapat 400 kV D/C (triple) at Kurushetra
- (v) Establishment of 400/220 kV , 2x500 MVA substation at Kurushetra

➤ **Pooling Stations along with their interconnections for New IPP projects in Chattishgarh**

- (i) Raigarh Pooling Station (Kotra)- Raipur Pooling station 765 kV D/C (initially to be operated at 400 kV)
- (ii) Raigarh Pooling Station (Kotra)- Champa Pooling station 765 kV S/C

- (iii) Champa Pooling station- Raipur Pooling station 765 kV D/C (initially to be operated at 400 kV
- (iv) Raigarh Pooling station (Kotra) - Raigarh Pooling station (Tamnar) 765 kV D/C (initially to be operated at 400 kV) for Jindal Power.
- (v) Champa Pooling station – Dharamjaygarh 765 kV S/C
- (vi) Establishment of 765/400 kV pooling stations at Raigarh (near Kotra), Raigarh (near Tamnar), Champa, and at Raipur (the pooling stations will be initially at 400 kV and later upgraded to 765/400 kV).
- (vii) Raigarh Pooling Station (Kotra) - Raigarh existing 400 kV D/C (to be kept open at a later date).
- (viii) Raipur Pooling Station – Raipur existing 400 kV D/C (to be kept open at a later date)

Note: At present only Jindal Power project is connected to Raigarh (Tanmar). Jindal Power is yet to get coal linkage. Therefore the implementation of Raigarh(Tanmar) pooling station should be linked with the progress of works at Jindal Power.

➤ **Dedicated transmission System up to pooling point under the scope of Project Developer for generation projects in Raigarh Complex**

RKM Powergen Ltd.(4x360MW)	(i) RKM Powergen – Raigarh Pooling Station(near Kotra) 400kV D/c(Quad)
Athena Chhattisgarh Power Ltd. (2x600MW)	(i) Athena Chhattisgarh – Raigarh Pooling Station(near Kotra) 400kV D/c(Quad)
Jindal Power Ltd.(4x600MW + 1x500MW)	(i) Jindal Power – Raigarh Pooling Station (near Tamnar) 400kV 2xD/c (Quad) along with 765/400kV 3x1500MVA transformers at Raigarh Pooling station (Tanmar)
SKS Ispat & Power Ltd.(4x300MW)	(i) SKS Ispat - Raigarh Pooling Station (near Kotra) 400kV D/c(Quad)
Korba(West) Power Ltd.(1x600MW)	(i) LILO of Athena Chhattisgarh – Raigarh Pooling Station 400kV D/c at Korba(W)
DB Power Ltd.(2x600MW)	(i) DB Power – Raigarh Pooling Station (near Kotra) 400kV D/c (Quad)

➤ **Dedicated transmission System up to pooling point under the scope of Project Developer for generation projects in Champa Complex**

Wardha Power Ltd.(6x600MW)	(i) Wardha Power – Champa Pooling Station 400kV 2xD/c (Quad) along with 765/400kV 3x1500MVA transformers at Champa Pooling Station.
Balco Ltd.(4x300MW)	(i) Balco – Champa Pooling Station 400kV D/c (Triple)
Vandana Vidyut Ltd. (2x135 + 1x270MW)	(i) Vandana Vidyut – Champa Pooling Station 400kV D/c
Lanco Amarkantak Power(2x660MW)	(i) Lanco - Champa Pooling Station 400kV D/c (Quad)
Chhattisgarh Steel & Power Ltd. (1x35+1x250MW)	(i) LILO of Vandana Vidyut – Champa Pooling Station 400kV D/c at CSPL

➤ **Interim arrangement for connectivity of projects coming prior to availability of transmission**

Balco Ltd.	(i) LILO of both circuits of Korba - Birsinghpur 400kV D/c at Balco
RKM Powergen Ltd.	(i) LILO of Rourkela- Raigarh 400kV D/c at RKM Powergen
Vandana Vidyut Ltd	(i) LILO of one ckt of Korba – Birsingpur 400kV D/c at Vandana Vidyut

The above interim arrangement is purely a temporary transmission arrangement to be carried out by the respective IPP and power transfer may takes place on short-term open access basis. The LILO shall be removed and the line shall be restored in its original configuration by the respective developer, after interconnection of the generation project at the identified Pooling Station.

B. Madhya Pradesh Generation Projects and Chattishgarh Generation Projects (pooled at Bilaspur Pooling Point)

➤ **System strengthening in WR associated with above generation projects**

- (i) Indore - Vadodara 765kV S/c
- (ii) Vadodara – Pirana 400kV D/c(Quad)
- (iii) Establishment of 765/400kV 2x1500MVA Vadodara substation

➤ **Dedicated transmission System up to pooling point under the scope of Project Developer**

Maruti Clean Coal & Power Ltd. (300 MW)	(i) Maruti – WR Pooling Station(Bilaspur) 400 kV D/c (ii) Two nos of 400kV bays at WR Pooling Station (Bilaspur)
Dheeru Powergen (450MW) and PTC India(600MW)	(i) Dheeru Power Gen – WR Pooling Station (Bilaspur) 400 kV D/c (high capacity) (ii) Two nos of 400kV bays each at WR Pooling Station (Bilaspur)
Jaiprakash Power Ventures Ltd. (1320MW)	(i) Jaiprakash – Satna 400kV D/c (high capacity) (ii) Two nos of 400kV bays at Satna(POWERGRID)
Aryan Coal Benefications Pvt. Ltd. (1200MW)	(i) Aryan Coal – Vindhyachal Pooling Station 400kV D/c (high capacity) (ii) Two nos of 400kV bays at Vindhyachal Pooling Station (iii) 1X 1500 MVA, 765/400 KV transformer at Vindhyachal Pooling Station (to be reviewed in light of 400 kV D/C interconnection between Vindhyachal pool and Sasan)

C. Orissa IPP Projects

➤ **System strengthening common for WR and NR associated with Orissa IPPs.**

- (i) Establishment of 765kV switching substation at Dharamjaygarh
- (ii) Establishment of 2x1500 MVA, 765/400kV Jabalpur Pooling Station
- (iii) Jharsuguda Pooling Station – Dharamjaygarh (WR) 765kV D/c
- (iv) LILO of Ranchi – Sipat (Bilaspur) PS 765kV S/c line at Dharamjaygarh
- (v) Dharamjaygarh – Jabalpur Pool 765kV D/c line
- (vi) Jabalpur Pooling station – Jabalpur 400 kV D/c (high capacity)
- (vii) Jabalpur Pooling station – Bina 765kV D/c line
- (viii) Bina – Gwalior 765kV S/c (3rd circuit)

➤ **System strengthening in WR associated with Orissa IPPs.**

- (i) Establishment of 2x1500MVA, 765/400kV Bhopal Pooling Station. (*Implementation by private sector through tariff based competitive bidding route*)
- (ii) Jabalpur Pooling station – Bhopal 765kV S/c (*Implementation by private sector through tariff based competitive bidding route*)

- (iii) Bhopal – Indore 765kV S/c (*Implementation by private sector through tariff based competitive bidding route*)
- (iv) Bhopal New substation – Bhopal (M.P.) 400kV D/c (high capacity) (*Implementation by private sector through tariff based competitive bidding route*)

➤ **System strengthening in NR associated with Orissa IPP.**

- (i) Gwalior - Jaipur 765kV S/c line
- (ii) Jaipur - Bhiwani 765kV S/c line

➤ **Pooling Stations along with their interconnections for IPPs in Orissa**

- (i) Establishment of 765/400kV Pooling Station at Jharsuguda
- (ii) Establishment of 765/400kV Pooling Station at Angul
- (iii) Angul Pooling Station – Jharsuguda Pooling Station 765kV 2xS/c
- (iv) LILO of Rourkela – Raigarh 400kV 1xD/c at Jharsuguda Pooling station
- (v) *LILO of Meramundali – Jeypore 400kV S/c line at Angul pooling station
- (vi) *LILO of one ckt of Talcher - Meramundali 400kV D/c line at Angul pooling station.

* Interim arrangement. LILO to be removed after establishment of 765 kV pooling station at Angul

➤ **Dedicated transmission System up to pooling point under the scope of Project Developer for Orissa IPPs**

Sterlite (2400 MW)	(i) Sterlite- Jharsuguda Pooling station 400 kV D/C line with associated bays
Ind- Barath(700 MW)	(i) Ind-Barath- Jharsuguda Pooling station 400 kV D/C line with associated bays
Jindal Thermal (1200 MW)	(i) Jindal Thermal- Angul Pooling station 400 kV D/C line with associated bays
Monnet (1050 MW)	(i) Monnet- Angul Pooling station 400 kV D/C line with associated bays
GMR (1050 MW)	(i) GMR- Angul Pooling station 400 kV D/C line with associated bays
Lanco Babandh (2640 MW)	(i) Lanco Babandh- Angul Pooling station 400 kV 2XD/C line with associated bays (ii) 3X1500 MVA, 765/400 kV transformers at Angul along with associated bays
Navbharat Phase-I (1050 MW)	(i) Navbharat - Angul Pooling station 400 kV D/C line with associated bays

D. Jharkhand and West Bengal IPP Projects

➤ **System strengthening, common for WR and NR associated with IPP Projects in Jharkhand and West Bengal Generation projects:**

- (i) Ranchi - Dharamjayagarh 765kV S/c
- (ii) Dharamjayagarh – Jabalpur 765kV D/c (2nd line) (*Implementation by private sector through tariff based competitive bidding route*)

3.16 Phasing of transmission works associated with new Chhattisgarh IPPs Projects

Stage – 1: 36 months from the date of signing of BPTA by the IPPs (Tentatively by Sept 2012)

- (i) Raigarh Pooling Station (Near Kotra) – Raigarh (existing) 400kV D/c (temporary arrangement)
- (ii) Raipur Pooling Station – Raipur (existing) 400kV D/c (temporary arrangement)
- (iii) Raigarh Pooling Station (Near Kotra) – Raipur Pooling Station 765kV D/c (initially to be operated at 400kV)
- (iv) Champa Pooling Station – Raipur Pooling Station 765kV D/c (initially to be operated at 400kV)
- (v) Raigarh Pooling station (near Kotra) – Raigarh pooling station (near Tamnar) 765kV D/c (initially to be operated at 400kV)
- (vi) Raipur Pooling Station – Wardha 765kV D/c (initially to be operated at 400kV).
- (vii) Wardha – Aurangabad (PG) 765kV D/c (initially to be operated at 400kV)
- (viii) Aurangabad (PG) – Khargar 400kV D/c (Quad)
- (ix) Establishment of 400kV Raigarh Pooling Station (near Kotra) [provision to upgrade at 765kV level]
- (x) Establishment of 400kV Raipur Pooling Station (provision to upgrade at 765kV level)
- (xi) Establishment of 400kV Champa Pooling Station (provision to upgrade at 765kV level)
- (xii) Establishment of 400kV Raigarh Pooling Station (near Tamnar) [provision to upgrade at 765kV level]

Stage – II: 42 months from the date of signing of BPTA by the IPPs (Tentatively by March 2013).

- (i) Raipur Pooling Station – Wardha 765kV D/c (2nd).
- (ii) Wardha – Aurangabad (PG) 765kV D/c (2nd).
- (iii) Padghe – Padghe (PG) 400kV D/c (Quad).
- (iv) Aurangabad (PG) – Padghe (PG) 765kV D/c.
- (v) Raigarh Pooling Station (near Kotra) – Champa Pooling Station 765kV S/c.
- (vi) Champa Pooling Station – Dharamjaygarh 765kV S/c.
- (vii) Upgradation of 400kV Raigarh Pooling station (near Kotra) to 765/400kV 4x1500MVA capacity, Raipur pooling station to 765/400kV 1x1500MVA capacity, Champa pooling station to 765/400kV 3x1500MVA capacity, Raigarh pooling station (near Tamnar) to 765/400kV 3x1500MVA capacity for charging of terminating 765kV lines at 765kV level
- (viii) Establishment of 765/400kV 2x1500MVA Aurangabad (PG) S/s for charging of 765kV lines at 765kV level.
- (ix) Establishment of 765/400kV 2x1500MVA Padghe (PG) S/s
- (x) Aurangabad- Dhule (New) (PG) 765 kV S/C (*Implementation by private sector through tariff based competitive bidding route*).
- (xi) Dhule (New) – Vadodara (PG) 765 kV S/C (*Implementation by private sector through tariff based competitive bidding route*)
- (xii) Vadodra-Asoj (GETCO) 400 kV D/C (Quad).
- (xiii) Establishment of 765/400 kV 2x1500 MVA substations at Dhule (New) (*Implementation by private sector through tariff based competitive bidding route*)
- (xiv) Dhule (New) – Dhule (MSETCL) 400 kV D/C (quad) (*Implementation by private sector through tariff based competitive bidding route*).

Stage – III: 52 months from the date of signing of BPTA by the IPPs (Tentatively by December 2013)

- (i) ±600kV, 4000MW HVDC bipole between Raigarh Pooling Station (Kotra) – Dhule
- (ii) Dhule (New) – Nasik (MSETCL) 400kV D/c (Quad)
- (iii) Dhule (New) – Malegaon (MSETCL) 400kV D/c(Quad)
- (iv) Establishment of 4000MW 600KV HVDC bipole terminal each at Raigarh Pooling station (near Kotra) and Dhule respectively.

Stage - IV: 55 months from the date of signing of BPTA by the IPPs (Tentatively by March 2014)

- (i) ±800kV, 6000MW HVDC bipole between Champa Pooling Station – around Kurukshetra in Haryana (NR) [initially to be operated for 3000MW).
- (ii) Establishment of 3000MW 800KV HVDC bipole terminal each at Champa Pooling station and Kurukshetra(NR) respectively (provision to upgrade the terminals at (6000 MW at a later date)
- (iii) Kurukshetra(NR) - Jalandhar 400kV D/c(Quad) one ckt. via 400/220kV Nakodar S/s.
- (iv) LILO of Abdullapur – Sonapat 400kV D/c (triple) at Kurukshetra.
- (v) Establishment of 400/220kV 2x500 MVA S/s at Kurukshetra

4.0 Transmission system associated with Mauda (2X500 MW) generation project of NTPC.

4.1 Director (SP&PA) stated that during the 28th SCM of WR held on 06.12.2008 the following transmission system was agreed for Mauda generation project:

- Mauda – Nagpur South (Butibori) 400kV D/C (Quad)
- Mauda – Khaperkheda (MSETCL) 400kV D/C (Quad)

In addition the following transmission elements were also agreed by the WR constituents as a part of System Strengthening in WR:

- Nagpur South (Butibori) – Wardha 400kV D/c (Quad)
- Establishment of 400/220kV 2x500MVA S/s at Nagpur South (Butibori) (with 220kV interconnectivity under preview of MSETCL)

4.2 POWERGRID informed that availability of land for new substation in Nagpur South near Butibori was difficult.

4.3 Member (PS) stated that the distance between Nagpur South and Wardha was short, it would be desirable that line from Mauda is directly taken to Wardha instead of via Nagpur South. The issue had also been discussed with MSETCL and they were also in agreement for terminating the line at Wardha instead of Butibori. The revised associated Transmission system for Mauda generation project was as under:

- Mauda – Wardha 400kV D/C (Quad)
- Mauda – Khaperkheda (MSETCL) 400kV D/C (Quad)
-

Members agreed to the above.

4.4 As a result, of above modification Nagpur South –Wardha 400kV D/c (Quad) line along with 400/220 kV S/s at Nagpur South agreed earlier during the 28th SCM as part of System Strengthening of WR was not required and stands deleted.

4.5 To a query from GETCO whether STU charges would be applicable it was clarified by Member (PS) that as the inter-state network planned was adequate for transfer of power to beneficiaries outside Maharashtra no STU charges would be applicable.

- 4.6 To a query from POWERGRID regarding availability of bays at Khaperkheda, MSETCL informed that space for only one bay was available at Khaperkheda. Member (PS), CEA stated that in that case MSETCL should procure additional land for providing one more bay at Khaperkheda. In case of difficulty the line would need to be terminated at some other nearby 400 kV substations.

5.0 Transmission System associated with Vindhyacha-IV (1000MW) and Rihand-III (1000MW) generation projects of NTPC

- 5.1 Member (PS), CEA stated that during the last special meeting of the SCM 765 kV interconnectivity between Vindhyachal pooling station and Sasan was agreed. With regard to the 400 kV interconnectivity it was decided that POWERGRID would carry out a study in association with NTPC. In case studies justified interconnection at both 400 kV & 765 kV level, it would be considered. POWERGRID had carried out the studies which indicated that with 765 kV and 400 kV interconnection there would be more flexibility in operation as well as utilization of the 765/400 kV transformation capacity. He further informed that both 765 kV and 400 kV interconnections between Sasan and Vindhyachal Pooling station had already been agreed by NR constituents. After discussion 400 kV interconnectivity between Vindhyachal Pooling Station and Sasan was agreed.

- 5.2 The revised transmission system associated with Vindhyachal- IV and Rihand-III was as under:

Part-I: Generation specific transmission system (to be implemented by POWERGRID)

- A : Rihand-III: For NR only
- Rihand-III – Vindhyachal Pooling Station 765kV 2xS/c (initially to be operated at 400kV)
- B : Vindhyachal-IV: For WR only
- Vindhyachal-IV – Vindhyachal Pooling Station 400kV D/c (Quad)

Part-II: Common System: For both WR and NR

- Vindhyachal Pooling Station – Satna 765kV 2xS/c (initially to be operated at 400kV)
- Satna – Gwalior 765kV 2xS/c
- Sasan – Vindhyachal Pooling Station 765kV S/c
- Sasan – Vindhyachal Pooling Station 400kV D/c
- Establishment of 765/400kV 2x1500MVA S/s at Vindhyachal Pooling Station

Note: In order to reduce the short circuit levels, under Sasan transmission it has been decided to delete the LILO of Vindhayachal STPP – Jabalpur 400 kV D/C at Sasan subsequent to development of 765 kV system from Sasan. One of the LILO line would be retained at Sasan with suitable switching arrangements at Sasan 400 kV switchyard to meet its starting power requirements in future. The LILO of the other ckt would be bypassed and the 400 kV bays at Sasan would be utilized for Vindhyachal Pool-Sasan 400 kV D/C line to be terminated at Sasan.

Part-III: NR Strengthening in Regional pool

- Gwalior – Jaipur 765/400 kV S/c.

- 5.3 Director (SP&PA) stated that phasing of transmission works associated with Vindhyachal-IV and Rihand-III was intimated and agreed during the Special meeting of SCM held on 18th April 2009. Under phasing of transmission works the Vindhyachal Pooling-Satna-Gwalior 765 kV line was initially to be is charged at 400 kV level and 765 kV operations was planned with commissioning of all the generators at Vindhyachal-IV, Rihand-III and Aryan Coal. POWERGRID had intimated that there was space constraints at existing Gwalior therefore it

would be difficult to accommodate both 765 kV and 400 kV bays. They had suggested the following revised phasing.

- With the initial 1st unit of Vindhyachal-IV (2x500MW) and Rihand-III (2x500MW) generation, Vindhyachal Pooling Station – Satna 765kV link is charged at 400kV level.
- With the coming up of 2nd unit of Vindhyachal-IV and Rihand-III Vindhyachal Pooling Station – Satna is charged at 765 kV along with suitable reactive compensation.

Members noted the above revised phasing of works.

6.0 Connectivity of proposed 400 kV substation of CSPTCL at Bilaspur with 765/400 kV Bilaspur Pooling Station (WR Pooling Station).

- 6.1 POWERGRID informed that CSPTCL has proposed establishment of 400kV substation at Bilaspur which would be upgraded to 765kV level in future. CSPTCL had requested POWERGRID for provision of 2 nos. 400kV bays and 2 nos. 765kV bays at 400/765kV Bilaspur Pooling Station for interconnection with the proposed 400kV CSPTCL S/s at Bilaspur.
- 6.2 CSTPL informed that as per the MOU with IPPs 35% of power was with the Govt of Chhattisgarh. For injecting this power in to the grid connectivity with Bilaspur pooling substation was required.
- 6.3 Member (PS), CEA stated that providing connectivity for drawal from the grid was not an issue but in this case CSTPL proposed to inject power at Bilaspur, with interconnections of a number of generation projects (3500MW capacity through LTOA) in addition to 2980MW from Sipat generation project for onward transfer of power, the short circuit level at 765kV Pooling Station at Bilaspur pooling station would further increase. The interconnection proposed by CSPTCL at 765/400kV WR Pooling Station (Bilaspur) may aggravate the situation and was not desirable. After discussions it was agreed that POWERGRID would further study to assess the implications of the proposed interconnectivity by CSTPL.

7.0 Connectivity of proposed 220 /132 kV at Raigarh and Kumhari of India Railway with existing Raigarh and Raipur substation of POWERGRID for wheeling of power from Nabinagar generation project in ER to their traction substations in Chhattisgarh.

- 7.1 POWERGRID informed that Railway Electrification, Bhubaneswar had proposed to wheel power from Railways 1000 MW generation project at Nabinagar in ER, being developed by Bharat Rail Bijli Co. Ltd. (BRBCL) to Chhattisgarh through ISTS network. Long term open access had been granted to Bharat Rail Bijli Co. Ltd. (Nabinagar generation project) for transfer of 990 MW. Target beneficiaries Indian Railways (ER: 355 MW, WR: 485 MW, NR: 50 MW) and BSEB (100 MW). The target drawal of 130 MW in Maharashtra, 95 MW in Chhattisgarh, 185 MW in Madhya Pradesh and 75 MW in Gujarat has been indicated by Indian Railways in WR. They had now indicated that the power supply would be availed at 220 kV level by constructing 220/132 kV substations one each at Raigarh and Raipur and connecting it to POWERGRID 220kV Raigarh and Kumhari(Raipur) S/s respectively. The proposal therefore involved provision of 2 no 220 kV line bays each at existing Raigarh and Kumhari (Raipur) substation of POWERGRID. The cost of the bays would be borne by Railways.
- 7.2 POWERGRID further informed that out of 95 MW drawal indicated in Chattishgarh, Railways had indicated that 70 MW would be used for Traction with 35 MW drawal required at Kumhari (Raipur) and 35 MW drawal required Raigarh.

7.3 Members were of the view that provisions of 4 no bays to Railways for drawal of 70 MW of power would result in sub-optimal utilization of the substation capacity. The issue was discussed and as a special case of Railways due to their requirement of reliability and redundancy this was agreed. However, this case cannot be taken as criteria for grant of line bays at ISTS substations in future.

8.0 Transmission System at 400kV and 765kV in Maharashtra: Proposal of STU for Evacuation of power from new generating stations (MSPGCL, MAHADISCOM and IPPs) and Intra state system strengthening.

8.1 Director (SP&PA) stated that MSETCL had suggested some modifications w.r.t to the Intra state Transmission scheme which was noted and concurred for the connectivity with Regional grids, by the WR constituents, in the 28th SCM. In the revised intra-state transmission proposed, MSETCL has included Bhiwandi (PG) – Phadge-II 400 kV D/c line which involved connectivity with the Regional grid. Also subsequent to issue of agenda some more modifications had been proposed. With the proposed modifications the modified Intra state transmission scheme would be as under:

- A) Intrastate system strengthening and common system for the comprehensive evacuation system :
- 1) 7 X 500 MVA, 765/400 kV S/s at Koradi-III.
 - 2) 7 X 500 MVA, 765/400 kV S/s at Akola-II.
 - 3) Akola-II – Akola-I 400kV quad D/C line.
 - 4) Koradi-III – Akola-II 765kV 2xS/C lines.
 - 5) Akola-II – Aurangabad (PG) 765kV 2xS/C lines.
 - 6) New 7X167 MVA, 400/220 kV substations at: Lonikand-II, Chakan, Hinjewadi, Kesurdi, Nasik, Nanded, Malharpet (Karad-II), Padghe-II.

The above 400kV substations would have the following transmission connectivity:

- (i) LILO of both ckts of Parli (PG) – Pune (PG) 400 kV D/c at Lonikand-II.
- (ii) LILO of one ckts of Lonikand-I – Pune (PG) 400 kV at Chakan.
- (iii) LILO of both ckts of Koyna – Jejuri/Lonikand-I 400 kV D/c at Kesurdi.
- (iv) Lonikand-II – Kesurdi 400 kV quad D/c line.
- (v) Kesurdi – Hinjewadi 400 kV quad D/c line.
- (vi) LILO of both ckts of Navsari – Bhiwandi 400 kV D/c at Nasik.
- (vii) LILO of Chandrapur-I – Parli 400kV S/C at Nanded
- (viii) LILO of both circuits of New Koyna – Karad-I 400kV D/C at Malharpet (Karad-II).
- (ix) LILO of both circuits of Tarapur – Padghe-I 400kV D/C at Padghe-II.
- (x) Chakan – Pune(PG) 400 kV S/C line.
- (xi) Karad-II (Malharpet) – Kesurdi 400 kV D/c line.
- (xii) Bhiwandi (PG) – Phadge-II 400 kV D/c line.
- (xiii) South Solapur (PG) – Solapur 400 kV D/c quad line.

B. Intrastate transmission system for generation specific evacuation up to grid points:

MSPGCL Generation

Bhusawal II	(i) Bhusawal-II – Bhusawal-I 400kV D/C line (ii) Bhusawal-II – Aurangabad-I 400kV D/C line (iii) 7X167 MVA, 400/220 kV S/s at Bhusawal-II
Khaperkheda	(i) Khaperkheda – Koradi-III 400kV quad D/C line (ii) LILO of Chandrapur – Koradi –I 400 kV S/C line at Khaperkheda (iii) 7X167 MVA, 400/220 kV S/s at Khaperkheda
Koradi-II	(i) Koradi-II – Koradi-III 400 kV quad D/C line (ii) 7X167 MVA, 400/220 kV S/s at Koradi-II
Chandrapur-II	(i) LILO of both circuits of Chandrapur - Parli 400kV D/C at Chandrapur-II (that is LILO of 2 circuits out of 3) (ii) Chandrapur-II – Warora – Wardha PG 400kV quad D/C with 7X167 MVA, 400/220 kV sub station at Warora (iii) 7X167 MVA, 400/220 kV S/s at Chandrapur-II

Mahadiscom

Dhopave	(i) Dhopave – Padghe-II 400kV quad D/C line (ii) LILO of both circuits of Jaigarh-New Koyna 400kV quad D/C at Dhopave
Dhule-II	(i) Dhule-II – Dhule-I 400kV quad D/C line (ii) 7X105 MVA, 400/220 kV S/s at Dhule-II.
Aurangabad-II	(i) LILO of both circuits of Aurangabad-I – Bhusawal-II 400kv D/C line at Aurangabad-II (ii) 7X105 MVA, 400/220 kV S/s at Aurangabad-II.

IPPs

M/s JSW Energy Ltd.	(i) Jaigarh – New Koyna 400kV quad D/C (ii) Jaigarh – Karad-I 400kV quad D/C
M/s Wardha Power Co.	(i) Wardha Plant – Warora 220 kV D/C line
Reliance Ind. Shirur	(i) Shirur –Lonikhand-II 400kV quad D/C line (ii) Shirur –Chakhan 400kV quad D/C line
Reliance Ind. Talegaon	(i) Talegaon – Hinjewadi 400kV quad D/C line (ii) Talegaon – Chakhan 400kV quad D/C line
India Bulls, Sinnar (Nasik)	(i) Sinnar – Nasik 400kV D/C (ii) Sinnar – Bableshwar 400kV quad D/C line
Sophia Power Co., Nandgaonpet	(i) Nandgaonpet –Akola-II 400kV D/C line (quad) (ii) LILO of Akola-I – Koradi-I 400 kV S/C line at Nandgaonpet
M/s Adani - Gondia	(i) Gondia – Koradi-II 400kV quad D/C line (ii) Gondia – Warora 400kV quad D/C

8.2 Members noted the revised intra-state transmission system. To a query from members, MAHATRANSCO informed that LILO of Koradi-1 - Satpura and Koradi-1 – Bhusawal at Koradi –II was removed due to high short circuit level at Koradi-II . Even after removal of LILO arrangement the short circuit level at Koradi-II was of the order of 40 kA.

8.3 Member (PS), CEA stated that the issue of short circuit level at Koradi-II needs to be addressed. Either the generation at Koradi-III should be stepped up to 765 kV or generator buses would need to be segregated for split bus operation. He requested MAHATRANSCO to sort out the issue with their consultant. Members took a note of the above.

9.0 MSETCL proposal of connectivity of 400 kV Sholapur with South Solapur (PG) under Central sector.

- 9.1 POWERGRID informed that MSETCL vide their letter dated 17.06.2009 had requested for consideration of South Solapur (PG) – Solapur 400 kV D/c quad line as a Regional line for providing connectivity to Maharashtra at South Solapur. He informed that connectivity to MAHATRANSCO was being provided through LILO of Karad (MSETCL) - Sholapur (MSETCL) 400 kV S/C at Sholapur (PG)
- 9.2 Member (PS), CEA stated) that in principle they had no problem to the proposal but in this case the LILO of Karad (MSETCL)- Sholapur (MSETCL) 400 kV S/C at Sholapur (PG) was under the purview of IPTC and would need to be deleted. The deletion in LILO would involve change in scope of the IPTC and this would need to be discussed with the IPTC.

After discussions it was decided that meeting would be convened by Member (PS), CEA with the IPTC to discuss and sort out the same.

10.0 Provision of 400/220 kV substation to Union territory of DNH (Dadar and Nagar Haveli) and Daman & Diu

- 10.1 Director (SP&PA) stated that in the 28th SCM, WR constituents had agreed for provision of 400/220 kV 2x315 MVA substation at a suitable location in DNH as a second 400 kV feed, to be established by LILO of Navsari-Mumbai new location 400 kV D/C line along with underlying network interconnectivity. It was also decided the location of the substation and interconnectivity would be evolved by POWERGRID and DNH in consultation with CEA. Regarding 400/220 kV substation in Daman & Diu it was decided that the same would be taken up in the next SCM. He informed that POWERGRID had now proposed 400/220 kV substation in Daman & Diu by LILO of Vapi-Navi Mumbai 400 kV D/c line. He requested POWERGRID to give details of the location identified for the 400/220 kV substation and the connectivity planned.

POWERGRID informed that they had finalized a location at Kala in DNH for the 400/220 kV substation. The connectivity with the underlying network was yet to be firmed. It was decided that DNH and POWERGRID would evolve connectivity in consultation with CEA.

- 10.2 POWERGRID intimated that the process of identification of suitable land in Dama & Diu was in progress. No Government land was available and they had written to the Daman & Diu authorities to make land available. D&D representative stated that they would intimate the location in about one month's time.

Members agreed to the proposed 400/220 kV 2x315 MVA GIS substations at suitable location in Daman & Diu by LILO of Vapi-Navi Mumbai line and it was decided that POWERGRID and Daman & Diu would work out the proposed the underlying network and intimate to CEA.

11.0 Evacuation of power from generation projects coming up in Sikkim and Bhutan

- 11.1 Director (SP&PA) stated that the list of generation projects in Sikkim and phasing of the comprehensive transmission system matching with generation schedule was informed during the 28th SCM meeting held on 06.12.2008. A review of the generation projects in Sikkim, Bhutan and NER along with comprehensive transmission system had been carried out and the latest schedule of generation projects envisaged to come by the year 2014 was as under:

- (a) NER : About 4000 MW (Lower Subansiri HEP: 2000MW, Kameng HEP: 600 MW, Bongaigaon TPS: 750 MW, Pallatana GBPP: 726 MW)

- (b) Sikkim : About 2400 MW (Chujachen: 99 MW, Teesta-III: 1200 MW, Jorethang: 96 MW, Tingting: 99 MW, Rongnichu: 96 MW, Bhasmey: 51 MW, Tashiding: 97 MW, Rangit-II*: 66 MW, Teesta-VI: 500 MW, Rangit-IV: 120 MW)
- (c) Bhutan : About 1200 MW (Punatsangchu-I HEP),

Other future projects in Bhutan like Mangdechu (670MW) and Punatsangchu-II (990 MW) are expected to be commissioned by 2016

- 11.2 In order to evacuate the power from the generation projects in NER, Sikkim and Bhutan, a comprehensive transmission scheme had been evolved which consisted of Bishwanath Chariyali(NER) - Agra(NR), +/-800kV, 6000MW HVDC bipole line with 3000MW HVDC converter stations at Bishwanath Charyiali and Agra proposed under "NER – NR/WR Interconnector-I" initially, which has already been concurred by the constituents of NR and WR.. Earlier it was proposed to evacuate power from Sikkim projects by pooling it at Kishanganj and onward transmission to Agra was to be through HVDC. However, now there was change in the proposal and Sikkim power was now proposed to be evacuated through AC network from Kishanganj onward. The location of the proposed HVDC terminal is proposed to be brought to Alipurduar nearer to Bhutan for evacuation of power from projects in Bhutan. The balance portion of the scheme now consists of 3000MW converter station each at Alipurduar and Agra along with loop-in & loop-out of 6000MW HVDC bipole line at Alipurduar.
- 11.3 Member (PS), CEA stated that the transmission system for evacuation of the above projects had been divided into three parts. The first part was for evacuation of power from the first two projects in Sikkim i.e. Chujachen (99 MW) and Teesta-III (1200 MW). The 2nd part would be for evacuation of the next 1100MW of power i.e. total 2400MW from Sikkim generation projects. The 3rd part would provide the corridor towards NR/WR with adequate reliability and security for the above generation projects in Sikkim as well as help in evacuation of power from Phunatsangchu-I generation project in Bhutan and also initial evacuation of future generation projects in Bhutan like Punatsangchu-II, Mangdechu etc.
- 11.4 Director (SP&PA) stated that instead of quad conductor indicated for Punatsangchu-I (generation project in Bhutan)-Alipurduar 400 kV D/C line covered Part-C, it would be a line with High Temperature Low Sag (HTLS) Conductor.

The details of the transmission system with this modification were as under:

(i) By 2011-12, for evacuation of 1300 MW from Sikkim

Part-A: Transmission System for development of pooling station at Kishanganj in Northern part of West Bengal/Bihar

- Establishment of new 2x315 MVA, 400/220kV sub-station at Kishanganj
- LILO of Siliguri (Existing) – Purnea 400kV D/c line(quad) at new pooling station Kishanganj
- LILO of Siliguri (Existing) – Purnea 400kV D/c line(on which reconductoring is being carried out) at Kishanganj with the higher capacity(HTLS) conductor
- LILO of Siliguri – Dalkhola 220kV D/c line at new pooling station at Kishanganj
- LILO of Gangtok-Melli 132kV S/c line upto Rangpo, where Chuzachen-Rangpo 132kV D/c would be connected so as to form Chuzachen-Gangtok and Chuzachen-Melli 132kV S/c lines.

(ii) By 2012-13, when additional 1100 MW materializes in Sikkim

Part-B: Transmission System for development of pooling substations within Sikkim and transfer of power to a new pooling station Kishanganj in northern Part of West Bengal/Bihar

- Establishment of 220/132kV, 3x100MVA Gas Insulated Substation at Rangpo
- Establishment of 10x167MVA, 1 phase, 400/220kV Gas Insulated substation at New Melli
- LILO of Teesta III – Kishanganj 400kV D/c line at New Melli
- Rangpo – New Melli 220kV D/c line (with twin Moose conductor)
- LILO of Gangtok-Rangit 132kV S/c line at Rangpo and termination of Gangtok-Rangpo and Melli – Rangpo 132kV lines (constructed under part-A through LILO of Gangtok-Melli 132kV S/c line upto Rangpo) at Rangpo
- LILO of Teesta V – Siliguri 400kV D/c line at New Melli
- Kishanganj – Patna 400kV D/c (quad) line

(iii) By 2014-15, when Punatsangchu-I (1200 MW) comes up in Bhutan

Part-C: Transmission System for development of pooling station in Northern part of West Bengal and transfer of power from Bhutan to NR/WR.

- New 400kV AC & HVDC sub-station with + 800kV, 3000MW converter module at new pooling station in Alipurduar
- Extension of + 800 kV HVDC station with 3000 MW inverter module at Agra
- LILO of Bishwanath Chariali – Agra HVDC line at new pooling station in Alipurduar for parallel operation of the HVDC station
- LILO of Bongaigaon – Siliguri 400kV D/c line at new pooling station in Alipurduar
- LILO of Tala-Siliguri 400kV D/c line at new pooling station in Alipurduar
- LILO of Birpara-Salakati 220 kV D/C line at New Pooling station in Alipurduar
- Punatsangchu-I (generation project in Bhutan)-Alipurduar 400 kV D/C with HTLS conductor (Indian portion)

11.5 Member (PS), CEA stated that the transmission charges for Part 'A' & 'B' of the above transmission scheme would be initially borne by the generation developers. The transmission charges for Part 'C' of the transmission scheme shall be borne by beneficiaries of Bhutan power. Northern Region Constituents had already agreed to share the transmission charges of Part-C of the scheme subject to the allocation of power from Bhutan projects to Northern Region. He opined that constituents of WR could also give a similar undertaking.

11.6 After discussions, Members agreed to share transmission charges for Part 'C' of the transmission scheme subject to the allocation of power to Western Region from Bhutan projects.

12.0 Open Access Applications pertaining to New Generation Projects in Southern Region with target beneficiaries in Western/Northern/Southern Region

12.1 POWERGRID informed that in the last special SCM held on 18.04.2009 Long Term Open access applications pertaining to New Generation Projects in Southern Region with target beneficiaries in Western/Northern/Southern Region was discussed. It was decided that the inter-state transmission system strengthening in WR and NR as well as inter-regional system strengthening between NR and WR shall be identified later on. He informed that open access applications received in Southern Region with target beneficiaries in WR/NR/SR was as under:

LTOA Applicant	LTOA	Allocation of Power		
	Applied	(MW)		
		SR	WR	NR
Krishnapatnam Area				
Simhapuri Energy Private Ltd.	491	311	135	
PTC India Ltd. (Meenakshi)	600	205	195	200
APPDCL	175			175
Krishnapatnam Power (Navayuga)	1860	360	600	900
Total	3126	876	930	1275
Tuticorin Area				
Coastal Energen Pvt. Ltd.	1100	820	280	
Ind-Barath Power (Madras) Ltd.	945	284	236	425
Total	2045	1104	516	425
Srikakkulam Area				
East-Coast Energy	2440	1940	500	
NCC Vamshadara	1320	500	500	320
Total	3760	2440	1000	320
Grand Total	8931	4420	2446	2020

12.2 POWERGRID informed that for transfer of power to WR and NR beneficiaries following transmission system strengthening within WR/NR and between WR and NR had been identified.

- (i) Sholapur – Pune 765 kV 2nd S/c.
- (ii) Jabalpur Pooling station – Orai 765 kV S/c line.
- (iii) Orai – Bulandshahar 765 kV S/c line.
- (iv) Bulandshahar – Sonipat 765 kV S/c line
- (v) Establishment of 765/400 kV 2X1000 MVA substation at Orai by LILO of one circuit of Satna – Gwalior 765 kV line
- (vi) Establishment of 765/400 kV 2X1500 MVA substation at Bulandshahar by LILO of Agra – Meerut 765 kV line.
- (vii) Establishment of 765/400 kV 2X1500 MVA substation station at Sonapat by LILO of Bhiwani – Meerut 765 kV line.

12.3 Member (PS), CEA informed that the above system strengthening scheme had been agreed in by the constituents of SR during the 29th SCM of SR. He also informed that the Sholapur – Pune 765 kV 2nd S/C line would be a common strengthening scheme for WR and NR for IPP projects in SR. Balance elements would be system strengthening in NR. He further stated that the transmission charges of the above system strengthening scheme shall be borne by the generation project developers till the finalization of their beneficiaries.

Members noted the above

13.0 Any other item

General Manager, NTPC informed that they were proposing to set up 2x660 MW units at Sholapur for which NIT was to be issued next month. He further stated that Sholapur would be regional project with beneficiaries, constituents of WR and requested for finalizing the step up voltage. Member (PS), CEA stated that in case there was no future expansion program the step up voltage could be 400 kV. However, in case NTPC proposed to add more units in future then step up voltage of 765 kV should be adopted.

14.0 Open Access Meeting

The Open Access meeting for IPP Generation Project in Western Region was held after the Standing Committee Meeting. Summary of the same is at Appendix-OA. The detailed minutes of the meeting would be issued by POWERGRID.

The meeting ended with a vote of thanks to the chair.

List of Participants during the 29th Meeting of Standing Committee of Power System Planning in WR held on 10.09.2009 at Ahmedabad

S.No.	Name (S/Sh)	Designation	Contact No	E-mail
CEA				
1	V.Ramakrishna	Member (PS)		
2	P.K.Pahwa	Director (SP &PA)		
3	A.K.Yadav	Dy. Director (SP&PA)	011-26732308	awd@rediffmail.com
GETCO				
4	S.Jagadeesan	Principal Secretary (Energy), Govt. of Gujarat & Chairman GETCO and WRPC	022-28221636	
5	S. K. Negi	MD	9879200622	md.getco@gebmil.com
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7	S.G.Prasad	EE (System)	9925208598	eesystem.getco@gebmil.com
8	P.J.Jani	E.E.(Com.), GUVNL	9879618754	
POWERGRID				
9	I.S.Jha	Director, POWERGRID		isjha@powergridindia.com
10	A.K.Dutta	ED, WR-II		
11	Y.K.Sehgal	ED(SEF&CE)		yksehal@powergridindia.com
12	M.G.Raoot	ED, WRLDC	0986945582	mraoot5@yahoo.co.in
13	A.K.Sinha	GM (Projects), WR-I	9422145369	ak_sinha@powergridindia.com
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15	Prashant Sharma	AGM (Comml.)	9910378002	prashant@powergridindia.com
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18	Subir Sen	DGM		subir@powergridindia.com
19	Manju Gupta	CDE		manju@powergridindia.com
20	K.K.Gupta	CM (Engg), WR-II		
WRPC				
21	Manjit Singh	Member Secretary	9819064946	hora2512@rediffmail.com
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	MSETCL			
23	G.S.Limaye	Dir (Operation)	9820552242	dirop@mahatransco.in
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CSPTCL				
26	Vijay Singh	Chief Engr. (Trans.)	9406249987	vijaysingh.cseb@gmail.com
27	Shiv Raj Singh	Advisor	9827216858	
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28	O.P.Jaiswal	CE (P.S.)	9425804949	ceps321@yahoo.com
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UT of DD & DNH				
30	B.N.Mehta	ACE (OIDC) SE (Power)	9825400184	bknmehta@yahoo.co.in
NTPC				
31	A.K.Gupta	GM (PE-Elect & C&I)	9868390251	akgupta@ntpceoc.co.in

1. New IPP projects in Chattishgarh

Connectivity/ LTOA agreed for the following 12 nos IPPs in Chhattisgarh. The details of the transmission system associated with new IPPs in Chhattisgarh consisting of Transmission System in Western Region, Northern Region, Pooling stations along with their interconnection, generation specific dedicated transmission lines and the interim arrangement of connectivity of projects is indicated under para 3.16- A of the minutes of 29th SCM in WR.

S n	Developer	Capacity (MW)	LTOA (MW)	Unitwise comm schedule	Target Allocation-Region (MW)			
					WR*	NR	SR	TOTAL
RAIGARH COMPLEX								
1	RKM Powergen Ltd.(4x360)	1440	1440	Mar'11,Jun'11,Sep'11, Dec'11	840	300	300	1440
2	Athena Chhattisgarh Power Ltd.(2x600)	1200	1200	Mar'12, Aug'12	823	377		1200
3	Jindal Power Ltd.(4x600)	2400	2400	Mar'12,Jul'12,Nov'12, Mar'13	1610	790		2400
4	Jindal Power Ltd.(1x500)	500	500	Existing	500			500
5	SKS Ispat & Power Ltd.(4x300)	1200	1200	Nov'11,Dec'11,Mar'12 ,Mar'12	800	400		1200
6	Korba West Power Co. Ltd.(1x600)	600	600	Jul'12	600			600
7	DB Power Ltd.(2x600)	1200	1200	Nov'11,Feb'12	818	382		1200
	sub-total	8540	8540		5991	2249	300	8540
JANJGIR-CHAMPA COMPLEX								
1	Wardha Power Co. Ltd (6x600)	3600	3600	Feb'12,Jun'12,Oct'12, Feb'13, Jun'13,Oct'13	3600			3600
2	BALCO(4x300)	1200	900	Jun'10, Sep'10, Dec'10, Mar'11	450	450		900
3	Vandana Vidyut Ltd.(2x135+1x270)	540	540	Apr'11,Dec'11,Mar'12	440	100		540
4	Lanco Amarkantak Power Pvt. Ltd.(2x660)	1320	1320	Mar'12,Jun'12	462	858		1320
5	Chhattisgarh Steel & Power Ltd.(1x35+1x250)	285	285	Existing, Dec'11	200	85		285
	sub-total	6945	6645		5152	1493	0	6645
	Total	15485	15185		11143	3742	300	15185

* WR allocation also include Chattisgarh share (3600 MW)

2. Moser Baer Power & Infrastructure Ltd

- Applicant : Moser Baer Power & Infrastructure Ltd
- Generation project : Moser Baer Power TPS– 2x600 MW (1200MW)
Village- Belia & Jethari, Dist – Anuppur (M.P)
Generation step-up voltage: 400kV
- Long-term open access sought : 1128 MW
- Target beneficiaries : M.P Govt. to buy as per MOU – 416MW
WR : 200 MW
NR : 350 MW
Others – 162 MW
- Commissioning Schedule : Unit-I : Dec 2012 , Unit-II : June 2013
- LTOA agreed : 1128 MW
- Dedicated Transmission system : ➤ Moser Baer TPS – Jabalpur Pooling Station 400kV D/c (Quad).

- 2 nos. 400kV line bays at Jabalpur Pooling station
- System Strengthening :
 - Jabalpur Pooling Station – Bina 765kV S/c along with associated bays at either end
 - Jabalpur Pooling Station – Damoh 400kV D/c (Quad) along with associated bays at either end.

3. Bina Power Supply Co. Ltd.

- Applicant : Bina Power Supply Co. Ltd.
- Generation project : Bina Power Supply TPS– 2x250 MW (500MW)
Village- Sirchopi, Tehsil – Bina, Dist- Sagar (M.P)
Generation step-up voltage: 400kV
- Long-term open access sought : 500 MW
- Target beneficiaries : Long term Sale:
M.P – 210 MW at MPSEB S/s Bina

Merchant Power – 290 MW
WR : 145 MW
NR : 145 MW
- Commissioning Schedule : Unit-I : Sept. 2011 , Unit-II : Dec 2011
- LTOA agreed : 500 MW
- Dedicated Transmission system : ➤ LILO of 400kV Bina(M.P) – Bina(PG) D/c line at Bina TPS

4. Indiabulls Power Ltd.

- Applicant : Indiabulls Power Ltd.
- Generation project : Amravati TPS – 2x660 MW (1320MW)
Nandgaon Pet, Dist – Amravati (Maharashtra)
Generation step-up voltage: 400kV
- Long-term open access sought : 1230 MW
- Target beneficiaries : Maharashtra – 930 MW
WR : 200 MW
NR : 100 MW
- Commissioning Schedule : Unit-I : Dec 2011 , Unit-II : March 2012
- LTOA agreed : 1230 MW
- Dedicated Transmission system : ➤ Nandgaonpeth (Indiabulls) – Akola II (MSETCL) 400kV D/c(Quad)
➤ LILO of Akola-I – Koradi I 400kV S/c at Nandgaonpeth (Indiabulls)
- System Strengthening : ➤ Aurangabad(PG) – Khargar 400kV D/c (Quad).

5. Pipavav Energy Pvt Ltd.

Applicant	:	Pipavav Energy Pvt Ltd.
Generation project	:	Pipavav Energy TPS – 2x600 MW (1200 MW) Pipavav port, Dist – Amreli (Gujarat) Generation step-up voltage: 400kV
Long-term open access sought	:	1110 MW
Target beneficiaries	:	Maharashtra : 930MW WR : 200 MW NR : 100 MW
Commissioning Schedule	:	Unit-I : March 2013 , Unit-II : June 2013
LTOA agreed	:	1110 MW
Dedicated Transmission system	:	➤ *Pipavav TPS – Pirana(PG) 400kV D/c ➤ *2 nos. 400kV line bays at Pirana(PG) to terminate above line
System Strengthening	:	➤ *Bhachau – Versana (GETCO) 400kV D/c.

* Tentative to be reviewed based on GETCO response. (GETCO to explore the possibility of connectivity at nearby S/s in Saurashtra Region)

It is noted that some of the LTOA applicants are applying for open access for full capacity and some for net injection. In line with discussion held during the 28th SCM, since the sharing of pooled regional charges was on basis of gross generation capacity, therefore the LTOA applicants would also share the transmission charges accordingly. Wherever, the applicants has applied for part capacity with balance to be supplied to STU system or own consumption LTOA would be for capacity applied for. However, such applicants would need to account for their full generation capacity with respect to LTOA (STU) + LTOA (CTU) + own consumption.