

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

No. 51/4/SP&PA-2013/962 - 973

Date: 08-July-2013

To

1. The Member Secretary, Southern Regional Power Committee, 29, Race Course Cross Road, Bangalore 560 009. FAX : 080-22259343	2. The Director (Projects), Power Grid Corp. of India Ltd. "Saudamini", Plot No.2, Sector-29, Gurgaon 122 001, Haryana. FAX : 95124-2571932
3. The Director (Transmission), Transmission Corp. of Andhra Pradesh Ltd., Vidyut Soudha, Hyderabad – 500 082. FAX : 040-66665137	4. The Director (Transmission), Karnataka State Power Transmission Corp.Ltd., Cauvery Bhawan, Bangalore 560 009. FAX : 080 -22228367
5. The Member (Transmission), Kerala State Electricity Board, Vidyuthi Bhawanam, Pattom, P.B. No. 1028, Thiruvananthapuram - 695 004. FAX : 0471-2444738	6. Member (Distribution), Tamil Nadu electricity Board (TNEB), 6 th Floor, Eastern Wing, 800 Anna Salai, Chennai - 600002. FAX : 044-28516362
7. The Director (Power), Corporate Office, Block – I, Neyveli Lignite Corp. Ltd., Neyveli , Tamil Nadu – 607 801. FAX : 04142-252650	8. The Superintending Engineer –I, First Floor, Electricity Department, Gingy Salai, Puducherry – 605 001. FAX : 0413-2334277/2331556
9. Director (Projects), National Thermal Power Corp. Ltd. (NTPC), NTPC Bhawan, Core-7, Scope Complex, Lodhi Road, New Delhi-110003. FAX-011-24360912	10. Director (Operations), NPCIL, 12 th Floor, Vikram Sarabhai Bhawan, Anushakti Nagar, Mumbai – 400 094. FAX : 022- 25991258

Sub: 36th meeting of the Standing Committee on Power System Planning of Southern Region
- Agenda for the meeting.

Sir,

The **36th meeting** of the Standing Committee on Power System Planning of Southern Region is proposed to be held by the end of July 2013. The agenda is available at CEA's website

(www.cea.nic.in).

Exact date and venue of the meeting would be conveyed separately.

Please make it convenient to attend the meeting.

Yours faithfully,



(K. K. Arya)

Chief Engineer(I/C) (SP&PA)

(Telephone: 011 26732305, Fax No. 011 26102045)

Copy to:

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**Agenda Note for 36th Meeting of
Standing Committee on Power System Planning in Southern Region (SCPSPSR)**

Date and Venue: (to be communicated shortly)

1.0 Confirmation of the minutes of 35th meeting of the Standing Committee

- 1.1 The Minutes of 35th meeting of the Standing Committee on Power System Planning of Southern Region were issued vide CEA's letter No. 51/4/SP&PA-2013/202-213 dated 19th Feb, 2013. In this regard, some observations were received from POWERGRID.
- 1.2 Based on these observations, a corrigendum to the minutes of the 35th meeting was issued vide CEA letter no. 51/4/SP&PA-2013/827-838 dated 12-6-2013, a copy of which is enclosed as **Annex-I**.
- 1.3 TANTRANSCO vide their letter no. CE/Plg&R.C/ SE/EE1/AEE1/F.35SCM/D.138/2013 dated 03-04-2013, has given their observations on – (i) discussion in 34th and 35th meeting regarding upgrading of Pugalur HVDC at 765kV, (ii) to check overloading of Tuticorin-Chekanurani and Tuticorin – Pugalur 400kV lines in case of connecting Pugalur HVDC, (iii) to add 'LILO of one of the NLC TS-II – NMTPS 230kV D/C lines at TANTRANSCO 230kV S/S at a later date. Regarding (i)- the 765kV at Pugalur was in agenda but was not agreed, (ii) - the studies carried out did not show overloading, (iii) – this LILO was also not agreed.
- 1.4 The minutes of the 35th meeting along with corrigendum, as circulated, may be confirmed.

2.0 Wardha – Hyderabad 765kV D/C line

- 2.1 During the 35th meeting of the Standing Committee POWERGRID raised the issue to anchor planned Hyderabad –Wardha 765kV D/C line at some intermediate station as the length of this line is becoming more than 500 km as per the preliminary survey. The increase in line length is due to line routing, to avoid Hyderabad City limits and Forest stretches. After discussions, it was decided that the location and connectivity at 400kV level of the intermediate station would be decided on the basis of joint studies/visit by CTU, APTRANSCO and CEA.
- 2.2 During the joint studies of a team comprising of officers from CTU, CEA and APTRANSCO it was found that Nizamabad could be the perspective location for the intermediate station. PGCIL SRTS-I and APTRANSCO has identified 3-4 locations

around Nizamabad area, and the proposed line lengths of the Wardha - Nizamabad and the Nizamabad - Hyderabad would be approximately 250km. Following connectivity for Nizamabad and 765kV Hyderabad S/S (Maheshwaram) was studied and finalized in joint studies with PGCIL, APTRANSCO, TNEB and KPTCL held in Hyderabad on 28-30 June 2013:

For Maheshwaram (Hyderabad) 765/400kV S/s:

1. Establishment of Maheshwaram(PG) 765/400kV substation with 2x1500 MVA transformers
2. LILO of Hyderabad – Kurnool 400kV S/c line at Maheshwaram(PG)
3. Maheshwaram(PG) – Mahboob Nagar 400kV D/c line
4. Establishment of Maheshwaram(AP) 400/220kV substation with 2x500 MVA transformers – by APTRANSCO
5. Maheshwaram (PG) – Maheshwaram (AP) by bus extension or by short 400kV D/c line – by APTRANSCO
6. Maheshwaram (AP) – Yeddumailaram (Shankarapalli) 400kV D/c line (to be established by re-alignment of the ‘LILO of Srisailam – Mamadipalli at Shankarapalli’ and re-instating the Srisailam – Mamadipalli 400kV D/c line) - by APTRANSCO

For Nizamabad 765/400kV S/s:

1. Establishment of Nizamabad 765/400kV substation with 2x1500 MVA transformers
2. Nizamabad – Dichpalli 400kV D/c line
3. Nizamabad – Yeddumailaram (Shankarapalli) 400kV D/c line
4. LILO of Nizamabad – Yeddumailaram (Shankarpalli) 400kV D/c line at Narsapur – by APTRANSCO

2.3 These proposals are included in the study report given at **Annex- II**. The above system is proposed to be built as system strengthening scheme along with the already approved Wardha – Hyderabad 765kV D/c link. Member may discuss and agree.

3.0 System strengthening scheme in WR for transfer of power to SR

3.1 POWERGRID vide their letter No.C/CTUIW/Solapur dated 25.04.13 and subsequent e-mail on 29th May 2013 regarding system strengthening scheme in WR for transfer of power to SR proposed to implement a Aurangabad - Sholapur 765 kV double circuit line to help transfer of power to Southern Region from Western Region.

3.2 After analyzing the studies furnished by the POWERGRID it was observed that the Sholapur-Pune 765 kV second circuit and Kohlapur-Padghe 765kV double circuit lines were planned in scenario of export of power from SR to WR though Raichur - Sholapur 765kV 2xS/c line and Narendra - Kolhapur 765kV(initially operated at

400kV) D/C line, however, the situation has reversed. Accordingly, CEA vide their letter 51/4/2013-SP&PA/52 dated 29-5-2013 has given the in-principle approval to the above proposal with following modifications in earlier planned system:

- (i) Aurangabad - Sholapur 765 kV double circuit line may be implemented by the POWERGRID as system strengthening scheme in lieu of the Sholapur - Pune 765 kV second circuit.
- (ii) LILO of one circuit of Aurangabad - Padghe 765 kV double circuit line at Pune 765 kV S/s, in lieu of the Kolhapur - Padghe with one circuit via Pune 765 kV line

3.3 The above proposed system is included in the study report given at **Annex- II**. The Members may discuss and agree.

4.0 Proposal of Electricity Department, Puducherry for erection of 230kV line to Karaikal

4.1 Electricity Department, Puducherry had proposed the erection of 230kV line to Karaikal by LILO of existing 230kV Neyveli- Bahour line to proposed 230kV S/s at Karaikal. This was also discussed in the 35th meeting of the Standing Committee and after discussion, it was decided to implement a direct 230kV D/c line from NLC TS-I switchyard or any other switchyard/substation in NLC complex to proposed Karaikal S/s as regional system strengthening scheme. For this, it was also decided that CTU would coordinate with Puducherry, TNEB and NLC to confirm the 230kVS/s, from where this line may be built.

4.2 Electricity Department, Puducherry vide their letter 15/ED/AEE-EHV/F.14/2013-14 dated 11-4-2013 has informed that during their visit to Neyveli it was found that there is no vacant 230kV bay available at NLC TS-II at present. The TS-I switchyard would be dismantled after 2015. Thus there is no scope of bays availability at TS-I also. PGCIL in their visit report has also said that no bay is available at present. However, in the time frame of establishment of new NNTPS, bays may be available at NNTPS and Neyveli TANTRANSCO 230kV new S/S. PGCIL has also carried out preliminary route survey and has indicated that implementation of this line is feasible. The construction of this line would involve crossing of Cauvery river, and a few railway lines, highways and 400kV lines. In view of this, they have proposed to again consider the original proposal i.e. LILO of existing 230kV Neyveli- Bahour line to proposed 230kV Auto S/s at Karaikal.

4.3 The studies with assumed load at Karaikal and Pudducherry are given at **Annex-III**. It is therefore proposed that the LILO of the 230kV Neyveli- Bahour line could be carried out in such a way that in future as per the bay availability at NLC the 230kV Karaikal S/S may directly be connected to NLC and 230kV Neyveli- Bahour line may be restored. Members may discuss and agree.

5.0 Associated transmission system for Kaiga APP St-III(U-5& 6)

- 5.1 The issue of power evacuation system from KAPP St -III (2x700 MW) was discussed in the 34th and 35th meeting of the Standing committee wherein, it was observed that due to involvement of the forest area it may would be difficult to get a new transmission corridor for building additional transmission lines. POWERGRID has confirmed that technically it would be feasible to re-conductor the existing lines i.e. Kaiga –Davangere(Guttur) and Kaiga - Narendra 400kV twin moose D/C line with HTLS conductor. Re-conductoring would take about 18-24 months per D/C line and shall required to be carried out serially one after the other to avoid complete shutdown of the existing Kaiga APP. Further, even with such arrangement, power from the existing KAPP generations (4x220 MW) shall have to evacuate with reduced reliability of the evacuation system. NPCIL was asked to confirm their acceptance for operation of existing Kaiga units at reduced reliability of evacuation system (which are also needed for cooling of the core) for the period of re-conductoring which may take 48 months or more in total and as such they would have to operate on reduced reliability.
- 5.2 NPCIL vide their letter no. NPCIL/Trans/2013/M/24 dated 20-3-2013 has stated that the matter is under discussion and has requested following inputs based on the system studies:
- (i) Studies indicating maximum loading of Kaiga- Narendra D/C line for 2014-16 conditions when Kaiga- Guttur D/C is taken up for re-conductoring
 - (ii) Studies considering outage of one of the two circuits in above case (i)
 - (iii) Studies indicating maximum loading of Kaiga- Guttur D/C line for 2016-18 conditions when Kaiga- Narendra D/C is taken up for reconductoring
 - (iv) Studies considering outage of one of the two circuits in above case (iii)
 - (v) Power flow on nearby 400/220kV ICTs and lines
- 5.3 NPCIL vide their above also mentioned letter also viewed that the re-conductoring process may cause the poison shut down of all the 4 units on loss of evacuation corridor, denial of reliable power to power deficit SR beneficiaries, failure of nuclear fuel due to stress arising out of such transients. So, NPCIL also proposed to consider laying of a new corridor for reliable and safer operation of Kaiga.
- 5.4 The study results, requested by NPCIL, are given at **Annex - IV**. Members may discuss.

6.0 Transmission system for 2x800 MW Krishnapatnam AP TPS

- 6.1 APTRANSCO vide their D.O letter dated 06-06-2013 informed that APGENCO's 2x800 MW Krishnapatnam power project units would be commissioned in Sept 2013 and Dec 2013 respectively. The dedicated system for the project i.e. Krishnapatnam AP- Nellore and Krishnapatnam AP- Chittoor 400kV quad lines would be ready by that time. APTRANSCO also stated that about part of the generation from this project would be coming to 400kV Chittoor S/S of AP and would flow towards Tamil Nadu on the Chittoor – Thiruvalem 400kV line which is under construction. They have requested that Tamil Nadu should complete the down stream 230kV system at Thiruvalem.
- 6.2 The matter was also discussed in 35th meeting of the Standing committee and TANTRANSCO told that they are in process of implementing the 400/220kV S/S at Thiruvalem and would expedite the work for Thiruvalem S/s and also complete the down stream 230kV system beyond Thiruvalem. APTRANSCO may give status of the generating station. TANTRANSCO and POWERGRID and may give the status of the Thiruvalem S/s and Chittoor – Thiruvalem 400kV line respectively. Members may discuss.

7.0 TANGEDCO's proposals

7.1 Transmission evacuation system for the proposed power plants at North Chennai, Ennore and Udangudi

7.1.1 TANGEDCO vide their letter no. CE/Plg&R.C/SE/SS/EE1/AEE1/F.Stg.Committee/D. 206/2013 dt. 28.05.13 has proposed a generation capacity addition programme of 3440 MW in Chennai area (ETPS Exp. 1x660MW, ETPS Replacement 1x660MW, NCTPS Stage–III 1x800MW, NCTPS Stage–IV 2x660MW, Udangudi 2x660MW and Udangudi Exp. 2x660MW). As ETPS Expansion (1x660MW) and NCTPS Stage –IV (2x660MW) are likely to be commissioned by the year 2016-2017, the transmission evacuation system is to be finalised at the earliest.

7.1.2 Preliminary discussion was held with TNEB and POWERGRID during joint planning meeting held in Hyderabad on 29-30 June 2013, and it was brought out that TNEB would plan a 765kV pooling station near Chennai/TV Malai and evacuate the power through 765kV lines towards Coimbatore area. The location and connectivity of pooling station and the Coimbatore station were to be planned by TNEB. The evacuation system for other generation projects could be taken up in next SCPSPSR meeting.

7.1.3 TANGEDCO/TANTRANSCO may present the studies. Members may discuss.

7.2 Transmission system for the proposed 3 nos. 400 KV Pooling stations for solar power evacuation

7.2.1 TNEB vide their letter .No.CE/Plg&R.C/SE/SS/EE1/AEE3/F.Solar/D. 235/2013 dt.14 .06.13 has proposed to establish 3 nos. 400kV pooling stations along with their transmission systems, which has been approved by TANGEDCO to accommodate 3000 MW of solar power into Tamil Nadu Grid by the year 2015 under “Tamil Nadu Solar Energy Policy 2012” the details of the proposed system is given as under:

a) Eppodumvendran 400/230-110 KV SS (3x 315+2x200 MVA)

- (i) 400 KV line from EppodumvendranS/S to proposed Sivaganga 400/230 kV S/s

230 KV Connectivity:

- (i) LILO of TTPS- TSIPCOT 230 KV line at Eppodumvendran 400kV S/s
(ii) LILO of Sterlite – Anupankulam 230kV line at Eppodumvendran 400kVS/s

b) Sivaganga 400/230-110 KV SS (3x 315+2x200 MVA)

- (i) 400 KV line from Sivaganga S/S to proposed Pudukottai 400/230 KV substation.
(ii) 400 KV line from Sivaganga S/S to Eppodumvendran 400/230 KV substation.

230 KV Connectivity:

- (iii) Erection of 230 KV DC line to proposed Kamuthi 230 KV SS.
(iv) Erection of 230 KV DC line to proposed Thiruvadanai 230 KV SS.
(v) Erection of 230 KV link to existing Alagarkoil 230 KV SS.

c)Pudukottai 400/230-110 KV SS (3x 315+2x200 MVA)

- (i) 400 KV line from Sivaganga S/S to proposed Pudukottai 400/230 KV substation.
(ii) 400 KV line from Pudukottai S/S to Ariyalur (PGCIL) 765/400 KV SS .

230 KV Connectivity:

- (iii) LILO of Alundur - Thanjavur 230 KV line at Pudukottai 400 KV SS
(iv) Erection of 230 KV link to existing Karambiyam 230 KV SS.

7.2.2 TNEB/TANTRANSCO may present the studies. Member may discuss.

8.0 Agenda requested by APTRANSCO vide letter no. CE/PS/SE(SP)/DE(SS)/F. Standing committee/D.No. 93/2013 dated 7-6-2013

8.1 Augmentation of transmission system for Talcher-II via Gazuwaka and Erection of 400/220kV Garividi SS in Vizianagaram District of Andhra Pradesh

APTRANSCO had proposed for the augmentation of transmission system between Gazuwaka -Vijaywada section for transfer of power from Talcher-II via Gazuwaka. The matter was also discussed in 34th meeting of the standing committee and it was decided that CEA/POWERGRID would carry out studies to plan a system for above requirement. APTRANSCO also proposed a 400/220 kV S/S at Garividi connecting with Kalpakka S/s through 400kV quad moose line and 220/132kV S/S at

Pydibhmavaram to reduce the overloading of 400/220kV ICTs at Kalpaka and Gazuwaka.

8.2 Power evacuation system from 1040 MW power plant of M/s Hinduja at Vishakapatnam

For evacuation of power from 1040 MW power plant of M/s Hinduja following is proposed by APTRANSCO:

- (i) 400kV twin moose D/c line from Kalpaka S/s to Hinduja (HNPCL) Switchyard.
- (ii) A new 400/220kV KVKota S/s with 2x315MVA capacity and 400kV twin moose D/c line from HNPCL switchyard to the proposed KVKota S/s.
- (iii) 400/220kV Suryapet S/s with 2x315MVA capacity and 400kV quad moose D/c line from proposed KVKota S/s to proposed Suryapet S/s.
- (iv) 400kV quad moose D/c line from proposed Suryapet S/s to 400/220kV Yeddumailaram(Shankarapally). (this line is to be made through Manikonda which can be made LILO upon realization of 400kV Manikonda S/s).
- (v) 400kV twin moose D/c line from proposed KVKota S/s to Vemagiri S/s.

8.3 Transmission requirement scheme of AP for 2013-14:

APTRANSCO has proposed to erect 4 number of 400kV S/Ss at Maheshwaram, Manikonda, Kalikiri and Podili along with 12 new 220/132kV S/S. The proposed 400kV works are as under:

- (i) 400/220kV Manikonda S/s (2x315MVA) with LILO of both circuits of proposed 400kV Suryapet - Yeddumailaram quad moose D/c line
- (ii) 400/220kV Maheshwaram S/s(APTRANSCO) (2x315MVA) with 400kV twin moose D/c line to 765/400kV Maheshwaram S/S(PGCIL)
- (iii) 400/220kV Podili S/s (3x315MVA) with 400kV twin moose D/c line to 400/220kV Narsaraopeta/Sattenpalli S/S(APTRANSCO)
- (iv) 400/220kV Kalikiri S/s (2x315MVA) with LILO of both circuits of 400kV RayalseemaTPP-IV - Chitoor D/C line.

8.4 The above proposals were discussed during the joint planning meeting held in Hyderabad on 29-30 June 2013. These proposals have been considered in the studies included in the study report given at **Annex- II.**

8.5 Member may discuss.

9.0 Transmission system for increasing import of power into Southern Region

- 9.1 A study report to plan transmission additions for increasing import of power into Southern Region is given at **Annex-II**. From the load flow study results, it was observed that with the following strengthening schemes the projected demand of about 57,200 MW in Southern region during 2016-17 time frame can be met with reliability & security of the grid.

System Strengthening – I

- (i) Raigarh – Pugalur New 4000 MW HVDC bipole
- (ii) Pugalur HVDC Station – Pugalur Existing 400kV (quad) D/c line
- (iii) Pugalur HVDC Station – Arasur 400kV (quad) D/c line
- (iv) Pugalur HVDC Station – Thiruvalam 400kV (quad) D/c line
- (v) Pugalur HVDC Station – Edayarpalayam – Udumalpet 400kV (quad) D/c line
- (vi) Establishment of 400/220kV substation with 2x500 MVA transformers at Edayarpalayam

System Strengthening – II

- (i) Vemagiri – Chilakaluripeta – Cuddapah – Salem 765kV D/c line
- (ii) Chilakaluripeta – Podli 400kV (quad) D/c line
- (iii) Cuddapah – Hindupur 400kV (quad) D/c line
- (iv) Cuddapa – Hoody 400kV (quad) D/c line
- (v) Establishment of 765/400kV substations at Chilakaluripeta and Cuddapah with 2x1500 MVA transformers each
- (vi) Establishment of 400/220kV substations at Podli 2x315 MVA transformers each

System Strengthening – III

- (i) Phase Shifting Transformer at Sholapur to control power flow on Sholapur – Raichur 765kV lines

System Strengthening in Western Region

- (i) Aurangabad – Sholapur 765kV D/c line

9.2 Members may discuss.

10.0 Transmission schemes in Southern Region for evacuation of power from Renewable Energy Sources in Southern Region

10.1 A number of transmission schemes for evacuation and integration of power from renewable energy sources are proposed to be implemented and posed or KfW funding under the India-Germany bilateral cooperation. These include 400kV, 220kV and 132kV state transmission systems in Tamil Nadu, Karnataka and Andhra Pradesh. Complete list of the state-wise transmission schemes are attached as per the Annex listed below:

- Tamil Nadu - Annex- V(a)
- Karnataka - Annex- V(b)
- Andhra Pradesh - Annex- V(c)

10.2 The 400kV works given in above listed Annexes have already been discussed and approved in previous meetings of the Standing Committee on Power System Planning of SR. The proposed 220/132kV works are furnished for discussion and approval as a part of coordinated planning process.

10.3 Members may discuss and agree.

11.0 Review of the evacuation scheme for Yeramarus (2x800 MW), Edlapur(1x800 MW) Thermal Power Generation

11.1 KPTCL vide their letter no CEE(P&C)/SEE(Plg)/EE(PSSS)/KCO-97/55319/2013-14 dated 18-06-2013 has requested to review the system in view of the studies carried out by them. Subsequently, joint studies have been carried out in Hyderabad on 29-30 June 2013 and following system was agreed to be taken up for discussion in the next meeting of standing committee:

11.2 The following transmission system already planned, must be implemented at the earliest :

1. Edlapur TPS - Yeramarus TPS S/S 400 kV D/C Twin moose line
2. The existing Raichur TPS – Davangere 400kV SC line to be converted to 400kV DC line with QUAD conductors along with shifting of Raichur termination point to Yeramaras TPS switchyard.
3. BTPS – Madhugiri (Tumkur) 400 kV Quad D/C line

11.3 In line with the provisions of the new transmission planning criteria the following transmission system was found essential for evacuation of power from Yeramarus, Edlapur & Bellary TPS:

1. Establishment of 400kV Switching Station near Chikkanayakanahalli (C.N.Halli) near LILO point of Hassan 400kV Substation on Talaguppa – Neelamangla 400kV S/c line

2. LILO of both circuits of Talguppa – Neelamangla 400kV D/c line at Chikkanayakanahalli
 3. Termination of the LILO towards Hassan at Chikkanayakanahalli thereby making Hassan – Chikkanayakanahalli 400kV D/c line
 4. BTPS – Chikkanayakanahalli 400kV Quad D/C line
 5. Chikkanayakanahalli – Mysore 400kV D/C line
- 11.4 The additional transmission system earlier planned for reliability i.e. YTPS – Raichur (New) 400kV Quad D/c line is proposed to be dropped due the increased fault level at the existing Raichur generation plant. Members may discuss and agree.

(The system study results for above proposal would be sent/uploaded shortly)

12.0 Response to POSOCO report on Operational Feedback on Transmission Constraints

- 12.1 POSOCO in its report on ‘Operational Feedback on Transmission Constraints - April 2013’ has listed a number of transmission lines and ICTs which are experiencing constraints due to overloading. The report is available on POSOCO website (posoco.in >document>operational-feedback).
- 12.2 The transmission schemes to overcome the constraints mentioned in the report have already been planned, approved in various meeting of the Standing Committee on Power System Planning of SR and many of these are under implementation .
- 12.3 POSOCO may present the critical lines/corridors which require:
- (i) the planned system to be implemented on priority.
 - (ii) additional system to be planned
- 12.4 Members may discuss.

13.0 Status of Under Construction / Approved Schemes

- 13.1 POWERGRID may inform the progress of the transmission works that are being implemented by them as part of regional schemes.
- 13.2 State utilities may also inform the progress on their 400kV transmission works and transmission systems that are necessary to match with the regional schemes by POWERGRID for effective utilization of the system.

14.0 LTA/ Connectivity Agenda for discussion

- 14.1 POWERGRID vide their letter no. C/ENG/SEF/S/00/CONN dated 13-05-2013 have circulated the agenda for LTA/connectivity (given at Annex-VI). POWERGRID to present, members may discuss.

No. 51/4/SP&PA-2013/ 827-838

Date: 12-06-2013

**Corrigendum to Minutes of 35th Meeting of
Standing Committee on Power System Planning in Southern Region (SCPSPSR)
held on 4th January 2013 at POWERGRID office, Gurgaon**

The Minutes of 35th meeting of the Standing Committee on Power System Planning of Southern Region were issued vide our letter No. 51/4/SP&PA-20113/202-213 dated 19th February 2013. Following corrigendum is issued based on the observations received from POWERGRID.

Corrigendum # 1

POWERGRID vide their letter NoC/CTU/S/SCM dated 5-3-2013 had given observation on item no.11.0 “Implementation of Common Transmission System Associated with IPPs in Vemagiri Area, Andhra Pradesh”. Based on the POWERGRID’s observations **following changes are made in the para 11.0** in the minutes of 35th meeting of the Standing Committee on Power System Planning of Southern Region:

11.0 Implementation of Common Transmission System Associated with IPPs in Vemagiri Area, Andhra Pradesh

11.2 (iv) Hyderabad 765/400kV S/S – Hyderabad ~~Khammam~~ (existing) 400 kV D/C (quad) line.

Corrigendum # 2

POWERGRID vide their letters No: C/CTU/S/SCM dated 30-05-2013 has requested to modify the para 22.0 (22.4) regarding SSSR-XII and SSSR-XIII schemes. **Accordingly, Para 22.4** of the minutes of the 35th meeting **is replaced** as given below:

22.4 After deliberations the following system was agreed:

- (i) **System Strengthening in Southern Region-XII**
 - a) Establishment of new 400/220 kV GIS substation at Yelahanka with 2x500 MVA transformers with 400kV portion as Gas Insulated Substation (GIS) and the 220kV portion as Air Insulated Substation (AIS)
 - b) LILO of one circuit on multi-circuit tower in Bengaluru area of Neelamangla – Hoody 400 kV D/C line at Yelahanka (instead of earlier envisaged LILO of

both circuits)

(ii) **System Strengthening in Southern Region-XIII**

- a) Establishment of new 400/220 kV substation at Madhugiri with 2x500 MVA transformers with provision of establishing a 765/400 kV Substation in future in the same switchyard
- b) Gooty – Madhugiri 400 kV D/C line
- c) Madhugiri- Yelahanka 400 kV Quad D/C line with a small portion to be strung on multi-circuit tower of the SSSR-XII Scheme with high ampacity conductor in Bengaluru area

Corrigendum # 3

POWERGRID vide their letters No: (1) C/CTU/S/SCM dated 5-3-2013 and (2) dated 30-05-2013 has requested to include the discussions regarding Replacement of Old transformers (7x167 MVA, 400/220 kV) with 2x500 MVA, 400/220 transformers at Somanhalli under para 25 of the minutes. Accordingly, **following para 25.0 is added** in the minutes of 35th meeting of the Standing Committee on Power System Planning of Southern Region:

25.0 Replacement of Old transformers (7x167 MVA, 400/220 kV) with 2x500 MVA, 400/220 kV at Somanhalli Substation of POWERGRID.

25.1 AGM (OS), POWERGRID stated that Bangalore is a major load center of SR and hence has a very significant importance with respect to security and reliability of entire SR grid. It is also one of the oldest 400/220 kV substation in the country. Presently, there are 2 nos. 500 MVA transformers of which ICT-I was commissioned in July, 1986 (i.e. age more than 27 years) and ICT-II was commissioned in February, 1990 (i.e. age more than 23 years). Looking into increasing loading pattern of transformers, augmentation through 1x500 MVA was approved in 18th SRPC meeting held on 23.12.2011. Review of loading pattern of ICTs during past one year has revealed that loading on each of the ICTs operating at this Substation had exceeded 400MW on number of occasions and touched 425 MW in August, 2012. Moreover, from last 2 years, there is increase in fault gases in some of the units. In view of such increased loading pattern and rise in fault gases and to meet any eventuality in the event of failure of anyone of the ICTs at the above sub-station, it is proposed for replacement of both the ICTs at Somanhalli by 2x500 MVA (3-phase unit) as failure of any one of the ICTs may lead to overloading of other ICT and might cause cascaded tripping of remaining ICT in service leading to complete outage. Further the dismantled ICT shall be utilized as Regional Spare after refurbishment.

25.2 Member (PS), CEA opined that healthiness of the transformers with regard to its suitability for refurbishment should be studied separately.

- 25.3 After discussions it was decided to replace the 7x167 MVA, 1000 MVA transformers with 2x500 MVA (3-phase unit) ICTs at Somanhalli substation of POWERGRID.

Corrigendum # 4

POWERGRID issued the minutes of 15th Meeting of Southern Region constituents **regarding LTA and Connectivity applications** in Southern Region vide their letter No. C/ENG/SEF/S/00/LTA dated 7 February 2013. Further, a corrigendum to above minutes was also issued vide their letter No. C/ENG/SEF/S/00/LTA dated 6 March 2013. Based on the **request from POWERGRID vide letter No. C/CTU/S/LTA dated 06 March 2013, the following Para 26.0 is added** to the Minutes of 35th meeting of the Standing Committee on Power System Planning of Southern Region:

26.0 Discussion on Connectivity and LTA applications for projects in Southern Region:

The issues related to provision of LTA and connectivity, based on the applications received by POWERGRID, were discussed in the 15th meeting of Southern Region Constituents held in this regard. Minutes and Corrigendum to the minutes of this discussion were issued by POWERGRID vide their letter No. /ENG/SEF/S/00/LTA dated 7 February 2013 and C/CTU/S/LTA dated 06 March 2013. The same is given at **Annex-II**, below:

Annex-II

Minutes of 15th Meeting of Southern Region constituents Regarding Long Term Access and Connectivity Applications in Southern Region held on 4th January, 2013 at Gurgaon.

List of Participants is enclosed at **Annexure-I**.

- 1.0 COO (CTU), POWERGRID welcomed the participants for the 15th Meeting of Southern Region (SR) constituents regarding Long Term Access and Connectivity applications of SR. In his opening remarks, he informed that as per the earlier circulated agenda, POWERGRID have received 5 nos. of new connectivity applications from Wind generation developers. He informed that there is no bay space in the existing POWERGRID substation in the area to accommodate these wind generators. Further these wind generators have not applied for LTA so there is no commitment under LTA for development of new transmission system. Therefore, these applications need to be discussed in details to work out their connectivity system. COO (CTU), POWERGRID requested CDE (CTU), POWERGRID to proceed with the agenda for the meeting.
- 2.0 **Confirmation of the minutes of 14th Meeting of Southern Region constituents**

regarding Long Term Access and Connectivity applications

2.1 POWERGRID stated that, there were no comments received on the minutes of the 14th Meeting of Southern Region constituents regarding Long Term Access and Connectivity applications issued vide letter dated 15.05.2012 and the minutes are confirmed. Copy of the minutes is available at POWERGRID website (www.powergridindia.com).

3.0 Common Transmission System Associated with IPP Projects in Srikakulam Area, Andhra Pradesh

3.1 POWERGRID informed that the transmission system for evacuation of power from IPP projects in Srikakulam area was earlier planned to be developed under 2 phases viz. the 765/400 kV Srikakulam Pooling Station along with Srikakulam – Angul 765 kV D/c line to be initially charged at 400 kV under the “Common Transmission System Associated with IPP projects in Srikakulam Area Part – A” and subsequently upgraded to 765 kV level in “Common Transmission System Associated with IPP projects in Srikakulam Area Part – C”.

During the 33rd Meeting of Standing Committee on Power System Planning in Southern Region held on 20th October 2011, Srikakulam Pooling Station – Vemagiri Pooling Station 765 kV D/c line was approved to facilitate import of power to Southern Region due to changed load generation scenario and this is being implemented through Tariff Based Competitive Bidding.

3.2 It was further stated that, in view of these developments it is prudent to establish Srikakulam pooling station at 765 kV level right from the beginning and accordingly also charge the Srikakulam – Angul 765 kV D/c line at its rated voltage of 765 kV from the beginning itself. This inter-alia would mean taking up Part – A and Part – C of the transmission system together with suitable deletion of elements meant for initial charging the system at 400 kV from the scope of Part – A of the system.

POWERGRID also informed that they are in the process of Land Acquisition for Srikakulam Pooling Station and it has been learnt from the site that locating suitable site avoiding physical factors like water bodies, wet land, small holding farmers, forest area, hillocks etc is extremely difficult. Further, there is lot of resistance from local people also. From about 20 nos. of sites surveyed, we have zeroed on one of the most suitable site but the same is not enough to accommodate normal 765/400 kV AIS substation. Considering all these factors he proposed that Srikakulam Pooling Station may be constructed with 400 kV portion as AIS and 765 kV portion as GIS.

3.3 POWERGRID further informed that in this regard, CEA vide its letter dated 21-05-2012 has already conveyed their in-principle clearance for constructing Srikakulam Part – A and Part – C together in the same time frame and Srikakulam Pooling Station with 400 kV portion as AIS and 765 kV portion as GIS subject to regularisation in the next Standing Committee Meeting.

3.4 After discussion it was agreed for constructing of Srikakulam Part – A and Part – C together in the same time frame and Srikakulam Pooling Station with 400 kV portion as AIS and 765 kV portion as GIS, with suitable deletion of elements meant for initial charging the system at 400 kV from the scope of Part – A.

4.0 Implementation of Common Transmission System Associated with IPPs in Vemagiri Area, Andhra Pradesh & Request of GMR Rajahmundry Energy Limited for connectivity through LILO of Vijayawada – Gazuwaka 400 kV S/c line as an interim arrangement till the commissioning of Vemagiri Pooling Station.

4.1 POWERGRID informed that the Common Transmission System Associated with the IPPs in Vemagiri area, Andhra Pradesh inter-alia comprised of two nos. of 765kV D/c line from Vemagiri to Hyderabad via Khammam. Looking into the uncertainty of the availability of Gas only one 765kV D/c line was under taken for implementation through Tariff Based Competitive Bidding route which was planned to be initially charged at 400kV level.

It was also informed that during the joint visit by CEA & POWERGRID, it was gathered that GMR project of 768 MW is already commissioned & Samalkot project of 2400 MW is partially commissioned and are waiting for gas allocation. Also Srikakulam – Vemagiri 765kV D/c line has been planned to facilitate import to Southern Region for meeting future load demand.

4.2 Considering all these factors POWERGRID have proposed to charge the Vemagiri – Khammam – Hyderabad 765kV D/c line at its rated voltage of 765kV right from the beginning, for which CEA vide its letter dated 17th September, 2012 had already conveyed its in-principle approval subject to regularisation in the next meeting of Standing Committee.

4.3 POWERGRID, further stated that the Common Transmission System inter-alia also comprised of Hyderabad – Wardha 765kV D/c, which upon the decision of Empowered Committee on Transmission, POWERGRID is implementing this line. It has been learnt from the site that as per the preliminary survey the line length of this line is becoming more than 500 kms. The increase in line length is due to line routing, to avoid Hyderabad City limits and Forest stretches.

In view of the above, POWERGRID proposed to establish a 765/400 kV substation at intermediate location enroute Hyderabad – Wardha 765 kV D/c line making Hyderabad – intermediate substation – Wardha 765 kV D/c line and the intermediate substation at 400kV level shall be connected to Southern Grid which shall be decided later based upon the Joint studies of APTRANSCO, POWERGRID & CEA.

4.4 After discussion following transmission system was agreed

- a) Vemagiri – Khammam – Hyderabad 765kV D/c line shall be charged at its rated voltage of 765kV level right from the beginning.
- b) Establish a 765/400kV substation at intermediate substation enroute Hyderabad – Wardha 765kV D/c line making Hyderabad – intermediate substation – Wardha 765 kV D/c line with suitable interconnection at 400kV level to southern regional grid.

It was further decided that the location of intermediate 765/400kV substation and its interconnection at 400kV level to SR grid shall be decided separately in association with APTRANSCO.

4.5 GMR Rajahmundry Energy Limited (GREL) informed that their 768 MW Gas based power plant is ready; however there is no generation due to un-availability of Gas. Further they have indicated that they are implementing the connectivity line 400 kV quad line from their power plant to 765/400 kV Vemagiri Pooling Station as per the revised intimation issued by POWERGRID. The Vemagiri Pooling station is targeted for commissioning by April, 2015 matching with commissioning of TBCB lines. Considering

the timeline of Vemagiri Pooling station, GREL have requested LILO of Gazuwaka-Vijayawada 400 kV S/c line at their power plant by joining their connectivity 400 kV line as an interim arrangement till the commissioning of Vemagiri Pooling station of POWERGRID.

- 4.6 POWERGRID representative stated that as per revised connectivity granted to GMR on their request, the connectivity line to be constructed by GMR is to terminate at Vemagiri pooling station. POWERGRID has completed all the preliminary activities for taking up construction of Vemagiri pooling station. As this is a GIS substation various issues of equipment compatibility are involved hence POWERGRID had been repeatedly requesting GMR and Samalkot for signing of agreement for implementation of bays at Vemagiri pooling station for termination of their dedicated line. However both the generation developers are not agreeing for the same and are delaying it. In view of this, it may be appreciated that if POWERGRID starts working on implementation of Vemagiri pooling station without waiting for signing of agreement for implementation bays for termination of dedicated line, and if none of the IPPs terminate their connectivity transmission line then not only Vemagiri pooling station shall remain unutilised but shall also lead to compatibility issue of GIS bays at a later date when these generation developers decide to terminate their transmission line.
- 4.7 Samalkot representative stated that uncertainty with respect to availability of gas is known yet they have made investment in the generation project and it is not that there is no gas, it is just time frame of its availability is uncertain. He explained that though there is no constraint on availability of funds for construction of bays but they are in tight situation as their lenders have put restriction in such an uncertain situation. He stressed that utility of Vemagiri substation is coupled with the availability of Vemagiri – Khammam – Hyderabad line, however, the order from CERC on the license application of POWERGRID is yet to come. This adds to the uncertainty with respect to availability of Vemagiri – Khammam – Hyderabad line also.
- 4.8 DGM (CTU) stated that taking into consideration that the generation project of GMR is already on the ground and that of Samalkot is partially completed, it would be required that Vemagiri Pooling station and the Vemagiri – Khammam – Hyderabad line are implemented as per schedule. He further mentioned as the generation developers are not facilitating implementation of Vemagiri pooling station which may lead to delay in Vemagiri Transmission system and under such situation if availability of gas is announced at a short notice the generation shall be bottled leading to disputes especially in the light of LTA already granted to both Samalkot and GMR.
- 4.9 Samalkot representative mentioned that the application for LTA has been made with tentative/target beneficiaries hence as per their understanding of present CERC regulations their LTA cannot get operationalised until the beneficiaries are tied up. Under such situation he questioned the relevance/validity of the BPTA signed with CTU. He further stated even question of levying transmission charges is very vital. He clarified that as the generation project is financed on its own merit, they shall not be in a position to pay transmission charges in case it does not operate due to non-availability of gas. Therefore, they are taking step by step decision as the question here it not only for transmission charges on account of bays for termination of dedicated line at Vemagiri pooling station but also that of entire Vemagiri transmission system corresponding to 2200 MW. He stated that in the background of uncertainty of availability of gas and time frame of commissioning of onward Vemagiri – Khammam – Hyderabad due to delay in disposal of license application by CERC they don't find any merit is agreeing to sign the agreement with POWERGRID for implementation of bays at Vemagiri pooling station. Regarding levy of transmission charges, CTU clarified that Samalkot Power is liable for payment of

charges in the event of commissioning of transmission system even when LTA cannot get operationalise due to beneficiary not tied up. In fact many generators are presently paying transmission charges in this category. Towards this, the representative of Samalkot had indicated that their understanding as indicated above (at the beginning of para) remains same.

4.10 Based on the discussions, the following issues emerged out:

- The uncertainty of gas still remains and the lenders have put restriction in financing even for the bays for termination of dedicated line at Vemagiri Pooling Station
- IPPs in Vemagiri area have reluctance in signing the agreement with POWERGRID for implementation of bays at Vemagiri Pooling Station
- Levy of transmission charges towards LTA which does not get operationalised in absence of firm beneficiaries
- Payment of transmission charges in the event of generation plant not operating due to non-availability of gas.
- IPPs are taking Step by Step approach to the transmission system in view of restrictions put by lenders.

4.11 Member (PS), CEA stated that views of Samalkot and GMR has been carefully considered but there is also a predicament with respect to implementation of Vemagiri pooling station and onward Vemagiri – Khammam - Hyderabad transmission line. It was decided that a separate meeting shall be convened in CEA for addressing this issue.

4.12 As regards the request of GMR for interim LILO the matter was deliberated and as the constituents were not in agreement the same was not agreed to.

5.0 **Request of Lanco Kondapalli Power Limited (LKPL) for reduction of Long-term Open Access granted from their Phase-II power plant from 250 MW to 75 MW**

5.1 POWERGRID informed that LANCO Kondapalli Power Limited (LKPL) was granted Long-term Open Access (LTOA) for a quantum of 350 MW in June, 2009 for a period of 25 years and the same was to become effective from date of commissioning of the generation project. The LTOA was granted for target beneficiaries in WR – 200 MW and NR – 150 MW.

Subsequently, in January, 2012 LKPL submitted request for reduction of LTOA quantum by 100 MW. The above proposal was discussed and approved in the 33rd meeting of Standing Committee on Power System Planning in SR and 19th meeting of SRPC.

5.2 Further vide letter ref. no. LKPL:PGCL:4489:2012 dated 14 August, 2012 and subsequent reminder dated 4 September, 2012, LKPL have requested for reduction of LTOA quantum from 250 MW to Zero MW.

➤ The major reasons mentioned by the LKPL for seeking reduction of LTOA quantum to Zero MW are as below:

- Non- availability of gas due to reduction of gas from KG D6 basin. CEA in its notification dated 20th March, 2012 have indicated that

quote

“further reduction in KG D6 production is expected to be about 15 MMSCMD in 2012-13, 3.42 MMSCMD in 2013-14 and has not given any projection for the

year 2014-15 and 2015-16. Considering the priority allocation from KG D6 field to fertilizer & CGD sector, the net availability of gas to power sector from KG D6 filed is expected to be nil.”

unquote.

- The entire power will be supplied to AP Discoms only, towards which LKPL has given undertaking that entire power to be generated on the available gas from its Phase-II will be supplied to AP only.
 - In the present scenario of dwindling gas supplies from KG D6 basin, LKPL may not get qualified to participate in the medium/long term power procurement bids called by State utilities because of non-availability of FSA which is a pre-requisite for any generator to participate in the Case-I bids. Hence they are bound to sell electricity in Andhra Pradesh only and that too through short term route only.
- 5.3 The issue was deliberated during the 20th meeting of SRPC held on 28 September, 2012 in Hyderabad and the decision is reproduced as below:
- “The Committee agreed with the recommendation of TCC that in view of the petition filed before Hon'ble CERC by POSOCO, status quo of present billing may be continued.”*
- 5.4 Subsequently LKPL vide their letter dated 29 November 2012 has requested for reduction of LTA from 250 MW to 75 MW and request for change in the target region from WR, NR to SR. Further vide above letter LKPL had indicated that reduction of LTA is sought due to the continuous reduction in the output of KG D-6 basin, Also vide above referred letter LKPL has indicated change in target region from WR & NR to SR because electricity supply to home state has been made a pre-condition for supply of gas.
- 5.5 LKPL representative said that though they have been granted LTOA for 350 MW, however in absence of PPA with beneficiaries their LTOA is not getting effected and they are not getting any benefit of LTOA regulations in priority, scheduling etc. for their generation. However in absence of PPA they are resorting to STOA for power transfer from their generation project. Further they are not getting full capacity gas and also have given undertaking to MOP for sale of power to Andhra Pradesh, therefore the LTOA may be reduced to 75 MW and target regions may be changed to Southern Region.
- 5.6 APTRANSCO representative stated that they are not agreeable to reduce the quantum from 250MW to 75 MW.
- 5.7 KPTCL was of the opinion that the quantum & target regions should remain unchanged.
- 5.8 SRPC was of the opinion that the direction from MOP in this regard may be followed for the gas based generation projects.
- 5.9 ED (SRLDC), POSOCO said that the target region should not be changed against another target region and therefore should remain unchanged.
- 5.10 Member (PS), CEA & POWERGRID stated that matter is to be discussed in further meetings with all the SR constituents.
- 6.0 **Long-term Access of Simhapuri & Meenakshi Energy Private Limited.**
- 6.1 POWERGRID informed that Long-term Access (LTA) was granted to Simhapuri Energy

Private Limited (SEPL) for a quantum of 546 MW from their generation capacity of 600 MW (4x150 MW) in Krishnapatnam Area, Andhra Pradesh. In this area, POWERGRID has also granted Long-term Access to Meenakshi Energy Private Limited (MEPL) for a quantum of 910 MW from their generation capacity of 1000 MW (2x150 + 2x350 MW).

- 6.2 The above LTA was subject to dedicated line from SEPL/MEPL to Nellore 400 kV D/c (quad) line and strengthening of transmission system. The dedicated line to Nellore was proposed while granting LTA, keeping view the generation schedule, availability of bays at Nellore & conservation of the Right-of-way for the corridor. The common transmission System for LTA is under implementation by POWERGRID and is expected to be commissioned by September, 2014. Under this system it was proposed to LILO both circuits of SEPL/MEPL-Nellore 400 kV D/c line at Nellore Pooling Station.
- 6.3 Both these generation projects SEPL & MEPL have commissioned their first unit and during the commissioning they faced difficulties in scheduling, dispatch, metering, energy accounting including UI etc. Therefore, MEPL has approached the Hon'ble CERC vide their petition no. 205/MP/2011 and while disposing the petition on 09.10.2012 the commission directed as below:

“The generating stations of the petitioner (MEPL) and Respondent No.5 (SEPL) shall be treated by SRLDC as separate and independent entities for the purpose of scheduling and dispatch, metering, energy accounting including UI computation by opening the inter-connection line between the generating stations and installing separate meters at the interconnection points at Nellore. We order accordingly.”

In view of the direction of CERC to open the interconnecting line between these generation projects, the generation projects are getting radially connecting to Nellore through 400 kV S/c (quad) line. This arrangement has lead to failing in N-1 reliability criteria for both the generation projects.

- 6.4 However for meeting N-1 criteria, additional 400 kV D/c line to Nellore Pooling Station is proposed from any one of the power plant. Upon commissioning of proposed line the existing dedicated MEPL/SEPL – Nellore 400kV D/c line may be re-routed for emanating from one power plant only.
- 6.5 The MEPL representative stated that they have gone to Appellate Tribunal for Electricity against the order of CERC and made presentation & proposed two options that committee may consider for the metering arrangement or the dedicated transmission line may be taken over by the POWERGRID.
- 6.6 POWERGRID informed that it can not take over a transmission line developed by a private party.
- 6.7 Member (PS), CEA stated that since the matter is pending before Appellate Tribunal & is sub-judice in nature and need no further deliberations.

7.0 Issue of Long Term Open Access Granted to Udupi Power Corporation Ltd.

- 7.1 CDE (CTU), POWERGRID informed that Udupi Power Corporation Limited (UPCL) was granted Long Term Open Access (LTOA) way back in June, 2007 under prevailing CERC Regulations, 2004. As per the intimation for grant of LTOA the applicant was granted LTOA at Hassan bus for 939 MW [Karnataka (845 MW) and Punjab (94 MW)]. In this regard, he explained that UPCL generation is an ISGS having allocation to more than one

State who have sought and granted LTOA to Inter-State Transmission System (ISTS).

- 7.2 The transmission system identified for grant of LTOA included NPCL switchyard – Hassan 400 kV quad D/c as dedicated line and Hassan – Mysore 400kV D/c line as system strengthening. However, subsequently, dedicated transmission line was constructed by KPTCL as State sector line. He further informed that the applicant despite repeated efforts have not signed requisite agreement for sharing of applicable transmission charges.
- 7.3 Director (KPTCL) expressed that they are not agreeable for seeking LTOA for their share of power from the UPCL generation project.
- 7.4 Member Secretary (SRPC) mentioned that this issue has been regularly appearing as agenda item in SRPC meetings with no resolution. He expressed that pending resolution of LTOA quantum of Karnataka, the LTOA to Punjab for 94 MW may be regularised as per their request.
- 7.5 After deliberations it was decided that in view of the request of Punjab their LTOA for 94 MW with Hassan substation as injection point may be regularised for which Punjab shall sign requisite agreement with POWERGRID for sharing of applicable ISTS transmission charges. Further regarding the LTOA quantum of Karnataka shall be discussed separately.

8.0 Connectivity applications of wind farm established by various IPP developers

- 8.1 POWERGRID proposed to consider grant of Connectivity to 4 nos. of applicants & 1 no. lead generator on behalf of 4 nos. wind generation developers who have applied for grant of Connectivity as per CERC (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State Transmission and related matters) Regulations, 2009 as per details given below in Table.

Application from IPP developers →

Sl. No	Applicant	Time frame	Location	IC (MW)	Connectivity Sought for (MW)
1.	Mytrah Energy (India) Limited	Mar, 2013	Tirunelveli Dist., Tamil Nadu	300	300
2.	R.S. India Global Energy Limited	Mar, 2014	Tirunelveli Dist., Tamil Nadu	270	270
3.	Suzlon Power Infrastructure Limited	Mar, 2014	Tirunelveli Dist., Tamil Nadu	1000	850
4.	Suzlon Power Infrastructure Limited	Dec, 2012	Coimbatore Dist., Tamil Nadu	200	180
5.	SISL Green Infra Limited **	Dec, 2012	Tirunelveli Dist., Tamil Nadu	48.5	48.5
6.	Samimeru Windfarms Private Limited **	Dec, 2012	Tirunelveli Dist., Tamil Nadu	48.5	48.5
7.	Samiran Udaipur Wind farms Ltd. **	Mar, 2013	Tirunelveli Dist., Tamil Nadu	48.5	48.5
8.	Shivam Filaments Private Limited **	Mar, 2013	Tirunelveli Dist., Tamil Nadu	48.5	48.5
	Total			1964	1594

** Note – M/s Samimeru Windfarms Pvt. Ltd. shall be the lead generator for connectivity

applications of wind generators mentioned in table at Sl. No. 5-8.

8.2 Member (PS), CEA stated that all these Connectivity applicants are wind generation developers and may not remain the owner of the generation plant, once Connectivity is granted. Therefore POWERGRID should seek necessary legal opinion whether these applicants are legal entities to apply for Connectivity as per the prevailing CERC regulations. It was decided that the matter regarding grant of connectivity to these applicants shall be considered after the legal opinion is available.

9.0 Long pending Connectivity applications due to non-satisfactory progress - discussed in earlier meetings.

9.1 POWERGRID stated that the grant of Connectivity and LTA as per the CERC regulation, 2009 is a time bound activity (connectivity to be granted in 60 days and LTA in 120/180 days). Further it is directed by Hon'ble CERC that the transmission system development should be phased to avoid creation of any redundant transmission capacity. In the past, to facilitate project development activities POWERGRID had granted connectivity/LTA even to projects who had not achieved important milestones but in such cases it is seen that such IPPs are repeatedly delaying the signing of BPTA and furnishing Bank Guarantee. Such delay in the BPTA/BG complicates the matter, especially in the scenario of implementation of transmission system through competitive bidding, where the selected bidder is not liable to delay/advance the commissioning schedule to match with the generation progress.

9.2 In this regard, at present there are number of Connectivity & LTA applications pending for about 1 to 2½ years. These applications had been taken up since last 3-4 meeting with not much progress observed in respect of project development. In view of the forgoing and to avoid unrealistic planning, POWERGRID proposed to close these applications and they may apply afresh whenever the projects have progressed in getting requisite clearances.

9.3 After discussion the committee agreed for Connectivity & LTA application as given in the following table:

Sl. No	Connectivity & LTA Applicant	Time frame	Connectivity / LTA Quantum	Decision of the Committee
1.	Sindya Power Gen. Company Pvt Ltd	Jun, 2014	Conn – 1320 MW LTA – 1060 MW	Extension of 6 months
2.	Empee Power & Infrastructure Pvt. Ltd.	Apr, 2013	Conn – 1241 MW LTA – 1241 MW	Close the applications as no representative was available to update the status.
3.	NPCIL - Kudankulam-II	2016	Conn – 2000 MW	Connectivity may be granted through Kudankulam-II – Tuticorin pooling station 400kV D/c (Quad) line and with suitable re-arrangements
4.	AES Naganadu Power Pvt. Ltd.	Dec, 2016	Conn – 1400 MW	Close the applications as no representative was present.
5.	Lanco Kondapalli Power Ltd. (Ph-III)	Dec, 2012	LTA – 550 MW	Extension of 6 months
LTA applications (LTA granted but yet to sign LTA agreement)				
6.	PPN Power	Dec,	LTA – 360 MW	Matter under CERC review.

Sl. No	Connectivity & LTA Applicant	Time frame	Connectivity / LTA Quantum	Decision of the Committee
	Generating Company Ltd.	2012		
7.	NSL Nagapatnam Power & Infratech Pvt. Ltd.	Oct, 2014	LTA – 1240 MW	Extension of 6 months
8.	Chettinad Power Corporation Pvt. Ltd.	Dec, 2013	LTA – 1110 MW	Extension of 6 months
9.	Hinduja National Power Corporation Ltd	Jan, 2013	LTA – 725 MW	Close the applications as no representative was available to update the status.

(Items added as per the Corrigendum to Minutes of 15th Meeting of Southern Region constituents regarding LTA and Connectivity applications in Southern Region)

10.0 Long-term Access Application of Jaiprakash Power Ventures Limited

10.1 DGM(CTU) stated that POWERGRID had received a application from IPP in Northern Region viz. Jaiprakash Power Ventures Limited (JPVL) and the details are as given below:

Power Plant	Installed Capacity (MW)	Quantum of LTA (MW)	Target Beneficiary
Karcham Wangtoo HEP (existing)	1000 (4x250)	704	NR-440 MW, WR-176 MW & SR-88 MW

Karcham Wangtoo HEP is located in the state of Himachal Pradesh with installed capacity of 1000 MW. The generating station and its immediate evacuation system is existing and is as give below:

- a. LILO of both circuits of Baspa – Nathpa Jhakri (triple snowbird) at Karcham Wangtoo HEP
- b. Karcham Wangtoo HEP – Abdullapur 400 kV D/c (quad) line.

Abdullapur 400/220 kV of POWERGRID is in the state of Haryana and this substation is integrated with Northern Region grid.

10.2 The matter of granting LTA was discussed in the LTA meeting of NR constituents alongwith 31st Meeting of Standing Committee on Power System Planning in NR on 2nd January 2013 wherein POWERGRID informed to JPVL that LTA of 88 MW to Southern Region would be feasible only from July 2014 onwards, as entire corridor to Southern Region is already booked and there are no margins available. It was also informed to JVPL that as there are no firm beneficiaries from this project, therefore there shall not be any scheduling of power from this generation project to SR and also rights on the corridor shall not be available. Subsequently, JPVL informed that till June 2014, LTA may be granted with Northern Region constituents as target beneficiaries and thereafter to Southern Region constituents from July 2014 onwards.

Accordingly it was decided to grant Long-term Access to JPVL for transfer of 88 MW power from Karcham Wangtoo HEP to target beneficiary as Southern Region constituents from July, 2014 to March, 2037.

List of participants of the 15th Meeting of Southern Region regarding Connectivity and LTA applications of SR held on 04.01.2013 at Gurgaon

Sl. No. Name and Organization Designation

Central Electricity Authority (CEA)

- | | | |
|----|----------------|------------------------|
| 1. | Ravinder | Member (Power Systems) |
| 2. | K K Arya | CE (CEA) |
| 3. | Pardeep Jindal | Director (SP&PA) |

Southern Region Power Committee (SRPC)

- | | | |
|----|----------|----------------------|
| 4. | S R Bhat | Member Secretary I/c |
|----|----------|----------------------|

Power Grid Corporation of India Limited (POWERGRID)

- | | | |
|-----|------------------------|-----------|
| 5. | Y K Sehgal | COO (CTU) |
| 6. | R K Chauhan | GM (CTU) |
| 7. | Dilip Rozekar | DGM(CTU) |
| 8. | R V Madan Mohan Rao | CDE (CTU) |
| 9. | Anil Kumar Meena | DCDE(CTU) |
| 10. | Amrendra Kishore Singh | DE(CTU) |
| 11. | Ankush Patel | EET(CTU) |

Power System Operation Corporation Limited (POSOCO)

- | | | |
|-----|--------------|----------------------|
| 12. | P R Raghuram | ED, SRLDC |
| 13. | N Nallarasam | DGM, NLDC |
| 14. | S P Kumar | Chief Manager, SRLDC |
| 15. | G Madhukar | Sr. Engineer, SRLDC |

NTPC Limited (NTPC)

- | | | |
|-----|---------------|-----|
| 16. | Dinkar Devate | GM |
| 17. | S S Mishra | AGM |

Nuclear Power Corporation of India Limited (NPCIL)

- | | | |
|-----|-----------|----|
| 18. | K P Singh | CE |
|-----|-----------|----|

Transmission Corp. of Andhra Pradesh Ltd. (APTRANSCO)

- | | | |
|-----|-------------------|-------------------|
| 19. | P Sri Rama Rao | Director |
| 20. | C V Subba Rao | SE (SP) |
| 21. | V V Ramana Murthy | DE/System Studies |

Karnataka Power Transmission Corporation Limited (KPTCL)

- | | | |
|-----|----------------|-------------------------|
| 22. | S Pratap Kumar | Director (Transmission) |
| 23. | D Chethan | EE (PSS) |
| 24. | A J Hosamani | CEE (P&C) |

Connectivity/LTA Applicants

- | | | | |
|-----|----------------------|---------------|---------------------------------------|
| 1. | Rakesh Gupta | COO | Lanco Kondapalli Power Ltd. |
| 2. | Bharat Saxena | Sr. VP (Op) | Lanco Kondapalli Power Ltd. |
| 3. | R. Parthasarathy | ED (Op) | Lanco Kondapalli Power Ltd. |
| 4. | A K Asthana | Adv.(RPTL) | Samalkot Power Ltd. |
| 5. | Madan Mohan | GM | Mytrah Energy India Ltd. |
| 6. | Kiran V | DGM | Mytrah Energy India Ltd. |
| 7. | Naresh Panchal | Head-PE | Suzlon Power India Pvt. Ltd. |
| 8. | NSM Rao | GM (Grid) | Suzlon Power India Pvt. Ltd. |
| 9. | K Balachandra | VP (Projects) | Sindya Power Generating Company Ltd. |
| 10. | V Chandramo Leeswanw | Director | Chettinad Power Corporation Pvt. Ltd. |
| 11. | N P Hanagodu | CEO | Meenakshi Energy Pvt. Ltd. |
| 12. | S N Sunkari | GM (Trans) | GMR Energy Limited |
| 13. | Rajnish Mahajan | AGM (Trans) | GMR Energy Limited |
| 14. | Rajpal Singh | GM (Elec) | National SEZ Infra Services Pvt. Ltd. |

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Studies for Import of power to SR during 2016-17 Time Frame

1.0 Back ground:

1.1 Till few years back, based on the proposed generation additions Southern region was projected to experience surplus situation and accordingly inter-regional links like Raichur-Sholapur 765 kV 2xS/c, Narendra – Kolhapur 765 kV D/c (Charged at 400 kV), Vemagiri – Khammam – Hyderabad – Wardha 765 kV transmission corridors were planned to enable export of power from SR. However, due to variety of reasons, a large number of generation projects could not took off ground. Further, to make the situation worse, even the generation projects that were under construction and planned for commissioning during 11th plan are getting inordinately delayed. The effect of these developments is that presently Southern Region is reeling under huge deficit of power to the extent of 6200 MW.

1.2 One of the high capacity transmission corridor planned for transfer of surplus power from Southern region to other regions included Vemagiri – Khammam – Hyderabad and Hyderabad – Wardha 765 kV D/c line. This corridor was primarily meant for evacuation and transfer from Gas based generation projects in Vemagiri area. However, due to uncertainty of availability of gas Hon'ble CERC, in its order, have observed that the requirement of transmission network needed for evacuation of power of the generating stations being or to be established in Vemagiri area are required to be reviewed in the light of present day developments. Commission vide its order dated 9th May, 2013 have directed CEA and CTU to examine the possibility of reconfiguring the required network in the Southern Region based on expected generation and the load and some elements of the transmission system may be combined with the other transmission systems being built / proposed to be built in the Region, if required.

1.3 Keeping above into view in the present report, comprehensive power import requirement has been worked out and based on these analyses transmission augmentation requirements to not only meet the present deficit but also to cater to the projected load growth has been evolved. While working out the transmission requirement as per direction of CERC the Vemagiri transmission system has also been reviewed and its suitability in the changed load generation scenario has been analyzed.

2.0 Power Supply Scenario

2.1 Power Scenario of Southern Region - Present

Present Power Load Generation Balance – as per SRLDC Report (April, 2013)

<i>State</i>	<i>Installed Capacity (MW)</i>	<i>Demand (MW)</i>	<i>Availability (MW)</i>	<i>Deficit (-) / Surplus (+)</i>
Andhra Pradesh	14196	13761	11630	-2131
Karnataka	12716	8985	8096	-889
Kerala	2821	3407	3237	-170
Tamil Nadu	15461	12665	10783	-1882
Pondicherry	32	320	318	-2
IPPs	816	0	0	
Central Sector	9310	0	0	
Regional	55352	38627	32428	-6199

*** Note – Installed Capacity includes 12,400 MW from Renewable energy.*

From the above it may be seen that against the peak demand of about 38,600 MW demand met is of the order of 32,400 MW leaving a gap of about 6,200 MW.

2.2 Power Scenario of Southern Region – End of 12th Plan (2016-17)

(i) Projected Demand

The demand projection as per the 18th EPS is as given below

State	Demand (MW)(as per 18th EPS)
Andhra Pradesh	22445
Karnataka	13010
Kerala	4669
Tamil Nadu + Pondicherry	21446
Regional	57221 (61570)

(ii) Projected Generation Addition

The projected generation additions in the Southern region during the 12th plan is given at **Annexure-I**, wherein it is seen that 22,380 MW Installed capacity is likely to be added with the dispatchable power of 19,544 MW. Under scenario that all the planned

generation projects are timely commissioned and dispatch power then the Southern Region shall be self reliant to a large extent without much inter-regional power transfer requirement. However, the past experience suggest that the uncertainty with respect to actual availability of power due to factors like delay/deferment in commissioning of generation projects, non-availability of fuel etc. poses unplanned inter-regional power transfer requirements. **Therefore, it is necessary that while assessing transmission augmentation pessimistic scenario with respect to power availability in SR should be considered.** Accordingly, a scenario incorporating pessimistic capacity additions has also been worked out. The import requirement in these scenarios is as given below

Sl. No.	Items	Optimistic generation additions (MW)	Pessimistic generation additions (MW)
1)	Existing Capacity	42952**	42952**
2)	Existing Availability	32428	32428
3)	Capacity addition from new generation projects	22380	17230
4)	Availability from new generation projects	19544	15760
5)	Total Availability	51972	48188
6)	Projected Demand (2016-17)	57221	57221
7)	Import (-) / Export (+)	(-) 5249	(-) 9033

** Note – Installed Capacity excluding 12,400 MW from Renewable energy.

(iii) **Projected Transmission Addition**

A number of transmission systems are presently under construction which shall add to transmission capability of the region. The transmission systems that are considered to be available by the end of 12th Plan period are given at Annexure – II.

3.0 **Load Flow Studies**

As mentioned above, if all the projected capacity addition materializes, the Southern region import requirement is about 5250 MW. However as the generation availability of subjected to number of uncertainties, past experience have revealed that the import requirement should not be worked only on the pessimistic scenario. Further, under the present market scenario the constituents should have opportunity of access cheaper

power availability elsewhere in other regions. Accordingly the transmission system requirements have been evolved on the pessimistic scenario of generation availability.

3.1 Case – 1: Import Capability with approved inter-regional links viz. Raichur – Sholapur, Narendra – Kolhapur and Wardha – Hyderabad 765 kV lines

Here it would be mentioned that Raichur – Sholapur and Narendra – Kolhapur lines are already under implementation. Further, Wardha – Hyderabad 765 kV D/c lines was approved in the 35th Standing Committee meeting subject to finalization of intermediate substation (to address long distance of the line) and terminal system at the Hyderabad end.

In this regard, though the Srikakulam – Vemagiri 765 kV D/c line is also approved however the same has been considered in the next set of studies as the dispersal arrangement beyond Vemagiri, as per CERC directions, are to be reviewed.

It is seen that with availability of above links only import of the order of 3500 MW is feasible beyond which limiting constraints hits.

The load generation considered for load flow studies in Base Case (for pessimistic scenario) is as below

State	Demand (MW) (as per 18 th EPS)	Demand MW) (considered)	Availability (MW)
Andhra Pradesh	22445	18790	10650
Karnataka	13010	10680	6030
Kerala	4669	3900	1650
Tamil Nadu + Pondicherry	21446	17630	6380
Central Sector			12050
IPPs			8590
Import			6800
Regional Losses		1150	0
Regional	57221 (61570)	52150	52150

The load flow study results with the above transmission & generation considered for the base case are placed at **Exhibit-I & Ia**.

Observations: From the study results it is observed that

- Import to the extent of about 3500-4000 MW only is feasible with the existing/planned inter-regional links between SR grid & NEW grid viz. Raichur – Sholapur 765kV 2xS/c line, Narendra – Kolhapur 765kV D/c line and Wardha – Hyderabad 765kV D/c line.
- The limiting constraint in further enhancing in Import is seen on Wardha – Hyderabad 765kV D/c line which under contingency carries about 2100 MW (Angular separation – 17 deg)
- The loadings, voltages & angular separation on some of the transmission lines in SR are as below

Transmission Line		Loading (MW)	Voltage (kV)		Angular separation (in deg)
			Sending end	Receiving end	
Wardha – Hyderabad 765kV D/c line	Base Case	1285	767	768	10°
	Contingency	2059	761	762	17°
Raichur – Sholapur 765kV 2xS/c line	Base Case	618	778	780	4°
	Contingency	1010	776	778	6°
Ballary – Madhugiri 400kV D/c line	Base Case	655	400	396	9°
	Contingency	917	400	395	13°
Hiryur – Neelmangla 400kV D/c line	Base Case	355	399	393	7°
	Contingency	458	401	393	9°
Kurnool – Thiruvallur 765kV D/c line	Base Case	473	782	765	4°
	Contingency	684	778	752	6°
Nellore – Thiruvallur 400kV D/c line	Base Case	426	402	400	8°
	Contingency	491	401	400	10°

- SR is still in deficit of about 5000 MW.
- Out of the projected demand of about 57,200 MW by 2016-17, only 52,200MW may be able to be met with the planned inter-regional links and therefore additional inter-regional links need to be planned for importing power from neighboring regions

3.2 Proposals for Augmentation of Inter-regional transmission capacity

To mitigate the deficit of balance 5000 MW, two proposals have been considered (i) Raigarh – Chennai 4000 MW HVDC bipole with associated 400kV transmission system and (ii) Srikakulam – Vemagiri 765kV D/c lines along with dispersal transmission system beyond Vemagiri. The load flow studies in this regard are as given below

3.2.1 Case – 2 : Case – 1 + Raigarh – Chennai 4000 MW HVDC bipole with associated 400kV transmission system:

A joint study was conducted by CEA and CTU with the TANTRANSCO, KPTCL and APTTRANSCO during 28th-30th July, 2013 at Hyderabad wherein after detailed deliberations specifically with respect to the generation and load development in Tamil Nadu & location of landing point for HVDC near Pugalur, following transmission system for dispersal of power beyond HVDC station has been finalized. Accordingly, the following new transmission system is considered in the studies

- (i) Raigarh – Pugalur New 4000 MW HVDC bipole
 - (ii) Pugalur HVDC Station – Pugalur Existing 400kV (quad) D/c line
 - (iii) Pugalur HVDC Station – Arasur 400kV (quad) D/c line
 - (iv) Pugalur HVDC Station – Thiruvalem 400kV (quad) D/c line
 - (v) Pugalur HVDC Station – Edayarpalayam – Udumalpet 400kV (quad) D/c line
 - (vi) Establishment of 400/220kV substation with 2x500 MVA transformers at Edayarpalayam
- The proposed 4000 MW HVDC bipole under normal conditions is proposed to be loaded upto 3000 MW only, so that under the contingency of one pole, the healthy pole can be loaded to 2200 MW (considering 10% over load capability per pole) thereby the impact on the AC network shall be limited to 800MW only.
 - Load flow study results are placed
 - **Exhibit-II** - Base Case
 - **Exhibit-IIa** - contingency – one pole block of Raigarh – Pugalur HVDC bipole

- **Exhibit-IIb** - contingency – outage of one circuit of Wardha-Hyderabad 765kV D/c line
- **Exhibit-IIc** - contingency – one pole block of Raigarh – Pugalur HVDC bipole + outage of one circuit of Wardha-Hyderabad 765kV D/c line

Observations: From the study results it is observed that

- The limiting constraint in enhancing in Import is seen on Wardha – Hyderabad 765kV D/c line which under contingency carries about 2100 MW (Angular separation – 17 deg)
- The loadings, voltages & angular separation on some of the transmission lines in SR are as below:

Transmission Line		Loading (MW)	Voltage (kV)		Angular separation (in deg)
			Sending end	Receiving end	
Wardha – Hyderabad 765kV D/c line	Base Case	1268	774	768	10°
	Contingency	2031	770	759	17°
Raichur – Sohlapur 765kV 2xS/c line	Base Case	555	778	775	3°
	Contingency	904	777	772	6°
Ballary – Madhugiri 400kV D/c line	Base Case	595	400	397	8°
	Contingency	829	400	396	11°
Hiryur – Neelmangla 400kV D/c line	Base Case	309	401	394	6°
	Contingency	399	401	393	8°
Kurnool – Thiruvalum 765kV D/c line	Base Case	395	774	760	3°
	Contingency	569	769	749	5°
Nellore – Thiruvalum 400kV D/c line	Base Case	386	401	398	8°
	Contingency	444	401	397	9°

- Out of the projected demand of about 57,200 MW by 2016-17, only 54,700MW may able to be meet with the addition of Raigarh – Chennai 4000 MW HVDC bipole

3.2.2 Case – 3 : Case-2 + import through Srikakulam – Vemagiri 765kV corridor:

As mentioned above, Srikakulam – Vemagiri 765 kV D/c line has been earlier approved as system strengthening to facilitate import of power from IPP generation projects in Orissa. The power available at Vemagiri has to be dispersed through adequate transmission corridor beyond Vemagiri. Towards this earlier Vemagiri – Khammam – Hyderabad 765kV & Hyderabad – Wardha 765 kV transmission corridors were planned. This corridor was primarily meant for evacuation of power from large scale gas based generating station in Vemagiri area of Andhra Pradesh. However looking into the uncertainty of availability of gas CERC had directed in its order dated 09.05.2013 on the Petition no. 127/2012 & 128/2012 to review the requirement of transmission network needed for evacuation of power of the generating stations being or to be established in Vemagiri area in the light of present day developments. Further CERC has also observed that there is also a need to examine the possibility of reconfiguring the required network in the Southern Region based on expected generation and the load and some elements of the transmission system may be combined with the other transmission systems being built / proposed to be built in the Region, if required.

Looking into the import requirements of Southern Region following two alternatives have been considered for dispersal of power beyond Vemagiri

Alternative-I

- Vemagiri – Khammam – Hyderabad 765kV D/c lines

Alternative-II

- Vemagiri – Chilakaluripeta – Cuddapah – Salem 765kV D/c line

The Load flow study results for the base case for both the alternatives are placed at **Exhibit-III & IV**, wherein it has been observed that due to the availability of power at Hyderabad through Wardha – Hyderabad 765 kV line the power does not have tendency to flow towards Hyderabad through Vemagiri – Khammam - Hyderabad 765 kV corridor. It has also been observed that the over all system losses in case of Alternative-II are about **120 MW** less than that under Alternative-I. Accordingly Alternative-II is preferred for dispersal of power beyond Vemagiri.

3.3 Proposals for Improving Loadability of Inter-regional links

3.3.1 Aurangabad – Sholapur 765 kV D/c line in lieu of earlier planned Sholapur – Pune 765 kV 2nd 765 kV S/c:

The under construction of Raichur – Sholapur 765 kV lines alongwith Sholapur –Pune 765 kV lines were planned as a part of Krishnapatnam UMPP. Similarly, Kolhapur – Padghe 765 kV D/c line were planned for onward dispersal of power through Narendra – Kolhapur 765 kV D/c (initially charged at 400 kV) line. The above system was mainly planned to cater to the export requirement from Southern region. However, as explained in the report the situation has been reversed and now in the foreseeable future Southern region shall be importing power. Therefore, it has been found that system augmentation/modification shall be necessary in the Western region to make power available at Sholapur for onward import by Southern region. Based on the transmission system planned in the Western region, it has been found that in place of Sholapur – Pune 765 kV S/c (2nd) circuit, Aurangabad – Sholapur 765 kV D/c shall facilitate transfer of power to Sholapur. Similarly, LILO of one circuit of Aurangabad - Padghe 765 kV double circuit line at Pune 765 kV S/s, in lieu of the Kolhapur - Padghe with one circuit via Pune 765 kV line has been proposed.

The above system was referred to CEA for their in-principle approval which was conveyed vide CEA letter reference no. 51/4/2013-SP&PA/52 dated 29-5-2013.

The study results incorporating above modifications are enclosed at **Exhibit - WR**, wherein it may be observed that Aurangabad - Sholapur 765 kV D/c line facilitates transfer of about **2335 MW** to Sholapur for onward transfer to Southern region through Sholapur – Raichur 765 kV lines.

3.3.2 Control of power transfer on Parallel inter-regional transmission corridors:

From **Exhibit-IV** referred above it is observed that the inter-regional lines specifically Wardha – Hyderabad & Sholapur – Raichur 765kV lines are not equitably loaded, thereby causing higher loading on Wardha – Hyderabad 765kV line and hence posing limiting constraint when sufficient capacity is available in the Raichur – Sholapur 765kV line. Therefore it is found prudent to equip controllability through Phase Shifting Transformer (PST). In this regard PST has been considered at Sholapur to control power flow on Sholapur – Raichur 765kV lines. The study results with PST on the above mentioned Alternative-II are placed at

- **Exhibit-V** - Base Case
- **Exhibit-Va** - contingency –outage of one circuit of Srikakulam Pool-Vemagiri 765kV D/c line
- **Exhibit-Vb** - contingency – outage of one circuit of Wardha-Hyderabad 765kV D/c line

- **Exhibit-Vc** - contingency – one pole block of Raigarh – Pugalur HVDC bipole
- **Exhibit-Vd** - contingency – one pole block of Raigarh – Pugalur HVDC bipole + outage of one circuit of Srikakulam Pool-Vemagiri 765kV D/c line
- **Exhibit-Ve** - contingency – one pole block of Raigarh – Pugalur HVDC bipole + outage of one circuit of Wardha-Hyderabad 765kV D/c line

Observations: From the study results it is observed that

- The limiting constraint in enhancing in Import is seen on Vemagiri – Srikakulam 765kV D/c line which under contingency carries about 2250 MW (Angular separation – 18 deg)
- The loadings, voltage drop & angular separation on some of the transmission lines in SR are as below

Transmission Line		Loading (MW)	Voltage (kV)		Angular separation (in deg)
			Sending end	Receiving end	
Wardha – Hyderabad 765kV D/c line	Base Case	929	776	772	7°
	Contingency	1480	773	763	12°
Raichur – Sholapur 765kV 2xS/c line	Base Case	1019	776	769	7°
	Contingency	1696	773	765	11°
Ballary – Madhugiri 400kV D/c line	Base Case	566	400	399	8°
	Contingency	786	400	398	11°
Hiryur – Neelmangla 400kV D/c line	Base Case	267	401	396	5°
	Contingency	343	401	395	6°
Kurnool – Thiruvalum 765kV D/c line	Base Case	449	768	757	4°
	Contingency	640	763	547	6°
Nellore – Thiruvalum 400kV D/c line	Base Case	386	401	400	8°
	Contingency	442	401	399	9°

Transmission Line		Loading (MW)	Voltage (kV)		Angular separation (in deg)
			Sending end	Receiving end	
Vemagiri – Srikakulam pool 765kV D/c line	Base Case	1358	768	769	12°
	Contingency	2255	762	752	19°
Vemagiri – Chilakaluripeta 765kV D/c line	Base Case	1214	769	768	8°
	Contingency	1969	764	761	13°
Chilakaluripeta – Cuddapah 765kV D/c line	Base Case	1016	768	768	7°
	Contingency	1599	763	763	12°
Cuddapah – Salem 765kV D/c line	Base Case	524	768	758	4°
	Contingency	801	764	750	7°

- With the above transmission system additions the import requirement of Southern Region as per the projected demand of about 57,200 MW by 2016-17 time frame shall be able to meet.

4.0 Conclusions

From the load flow studies it is observed that with the following strengthening schemes the projected demand of about 57,200 MW in Southern region during 2016-17 time frame can be met with reliability & security of the grid.

System Strengthening – I

- Raigarh – Pugalur New 4000 MW HVDC bipole
- Pugalur HVDC Station – Pugalur Existing 400kV (quad) D/c line
- Pugalur HVDC Station – Arasur 400kV (quad) D/c line
- Pugalur HVDC Station – Thiruvalem 400kV (quad) D/c line
- Pugalur HVDC Station – Edayarpalayam – Udumalpet 400kV (quad) D/c line
- Establishment of 400/220kV substation with 2x500 MVA transformers at Edayarpalayam

System Strengthening – II

- (i) Vemagiri – Chilakaluripeta – Cuddapah – Salem 765kV D/c line
- (ii) Chilakaluripeta – Podli 400kV (quad) D/c line
- (iii) Cuddapah – Hindupur 400kV (quad) D/c line
- (iv) Cuddapa – Hoody 400kV (quad) D/c line
- (v) Establishment of 765/400kV substations at Chilakaluripeta and Cuddapah with 2x1500 MVA transformers each
- (vi) Establishment of 400/220kV substations at Podli 2x315 MVA transformers each

System Strengthening – III

- (i) Phase Shifting Transformer at Sholapur to control power flow on Sholapur – Raichur 765kV lines

System Strengthening in Western Region

- (i) Aurangabad – Sholapur 765kV D/c line

Generation Additions during 12th Plan in Southern Region by 2016-17 Time Frame

Sl. No	Generation Project Name	Sector	Fuel Type	Optimistic Scenario		Pessimistic Scenario	
				Capacity (MW)	Despatch (MW)	Capacity (MW)	Despatch (MW)
<u>11th Plan Capacity addition program</u>							
1.	Coastal Energen IPP U 1,2	P	Coal	1200	1020	1200	1020
2.	Bellary TPS	S	Coal	1200	1020	1200	1020
3.	Bpoopalpally TPS U2	S	Coal	600	510	600	510
<u>12th Plan Capacity addition program</u>							
				0	0	0	0
4.	Kudankulam U 1,2	C	Nuclear	2000	1800	2000	1800
5.	PFBR(Kalpakkam)	C	Nuclear	500	425	500	425
6.	Vallur (Ennore) TPP U 2,3	C	Coal	1000	850	1000	850
7.	Tuticorin TPP JV U1,2	C	Coal	1000	850	1000	850
8.	Neyveli II TPP U2	C	Lignite	250	212	250	212
9.	Lower Jurala HEP	S	Hydro	240	120	0	0
10.	Pulichintala HEP	S	Hydro	120	60	0	0
11.	Nagarjuna Sagar TR HEP	S	Hydro	50	25	0	0
12.	Thottiar HEP	S	Hydro	40	20	0	0
13.	Pallivasal HEP	S	Hydro	60	30	0	0
14.	Krishnapattnam TPP U1,2	S	Coal	1600	1440	1600	1440
15.	Royal seema TPP U6	S	Coal	600	540	0	0
16.	Mettur TPP EXT U1	S	Coal	600	540	600	540
17.	North Chennai TPP Ext U1,2	S	Coal	1200	1020	1200	1020

18.	Meenakshi Energy IPP U-3,4	P	Coal	700	637	700	637
19.	Nagarjuna Construction Company Ltd Ph-I U-1,2	P	Coal	1320	1240	660	620
20.	Thermal Powertech IPP U 1,2	P	Coal	1320	1240	660	620
21.	East Coast Energy IPP U-1,2	P	Coal	1320	1240	660	620
22.	Simhapuri Energy IPP U 2	P	Coal	150	135	150	135
23.	Hinduja IPP,U1-2	P	Coal	1050	890	1050	890
24.	Ind Barath Power (Madras) IPP U1	P	Coal	660	620	0	0
<u>Other Capacity addition</u>				0	0	0	0
25.	IL&FS Tamil Nadu IPP	P	Coal	1200	1020	600	510
26.	Kudgi NTPC	C	Coal	2400	2040	2400	2040
	Total			22380	19544	17230	15759

Transmission Additions during 12th Plan in Southern Region by 2016-17 Time Frame

The new transmission schemes that are projected to be commissioned by 2016-17 timeframe are as given below

- a) Supplementary Transmission System associated with Vallur TPS
- Extending one 400 kV D/c line of original Vallur TPS transmission system from LILO point to Alamanthy by suitably utilizing the LILO of Nellore – Sriperumbudur 400 kV D/c line at Alamanthy.
 - Extending second 400 kV D/c of original Vallur TPS transmission system from LILO point to Malekottaiyur by suitably utilizing part of the LILO of Kolar-Sriperumbudur line at Melakottaiyur. Kolar – Sriperumbudur 400 kV shall be restored as direct lines.
 - Establishment of Tiruvelam 765/400kV switching station initially charged at 400kV
 - Tiruvalam (POWERGRID) - Chittoor 400kV D/C quad line
- b) System Strengthening in Southern Region – XIII
- Establishment of new 400/220 kV substation at Madhugiri with 2x500 MVA transformers with provision of establishing a 765/400kV substation in future in the same switchyard.
 - Gooty – Madhugiri 400kV D/c line
 - Madhugiri – Yelahanka 400 kV D/c quad line
- c) Transmission System associated with Krishnapatnam UMPP – PART – A, B & C1 & C2
- Nellore Pooling station – Gooty 400 kV D/c Quad
 - Establishment of new 765/400 kV substations at Raichur, Sholapur & Pune with 2x1500 MVA ICTs and 1x240 MVAR bus reactor each
 - LILO of existing Raichur – Gooty 400 kV Quad D/c line at Raichur (New) substation
 - Kurnool – Raichur 2nd 765 kV S/c line
 - Raichur – Sholapur 765 kV 2xS/c line (one circuit through TBCB route)
 - Sholapur – Pune 765 kV S/c line
 - Establishment of new 765/400 kV substation at Kurnool with 2x1500 MVA ICTs and 1x240 MVAR bus reactor
 - LILO of N'Sagar – Gooty 400 kV S/c line at Kurnool (New) substation
 - Kurnool (New) – Kurnool (APTRANSCO) 400 kV D/c quad line
 - LILO of Aurangabad – Pune 400 kV D/c at Pune (GIS)
 - LILO of Parli – Pune 400 kV D/c at Pune (GIS)
- d) Common Transmission System Associated with LTA Projects in Krishnapatnam Area
- Establishment of 765/400kV 2x1500MVA Pooling station at Nellore by LILO of Simhapuri – Nellore 400kV D/c line

- Nellore Pooling station – Kurnool 765 kV D/c line
 - Kurnool – Raichur 2nd 765 kV S/c line
- e) Common Transmission System Associated with LTA Projects in Tuticorin Area – Part-A & B
- Establishment of 400 kV Tuticorin pooling station (with a provision of 765/400 kV in future)
 - LILO of both circuits of Tuticorin JV – Madurai 400 kV D/c (quad) line at Tuticorin pooling station
 - Establishment of 765 kV Salem pooling station (initially charged at 400 kV)
 - Tuticorin Pooling station – Salem Pooling station 765 kV D/c line (initially charged at 400 kV)
 - Salem Pooling station - Salem 400 kV D/c (quad) line.
 - Salem Pooling station – Madhugiri Pooling station 765 kV S/c line (initially charged at 400 kV)
- f) System Strengthening in Southern Region – XIV
- Salem New – Somanahalli 400kV Quad D/c line
 - Augmentation of 1x315 MVA 400/220kV Transformer at Hosur
- g) Transmission System for Connectivity of Thermal Powertech Corporation India Ltd.
- TPCIL Switchyard – Nellore Pooling Station 400 kV D/c quad line
- h) System Strengthening in Southern Region – XVII
- Establishment of New 765kV substation each at Narendra (Kudgi)(GIS) and Kolhapur (initially charged at 400kV)
 - Narendra (Kudgi) (GIS) – Kolhapur (new) 765kV D/C line (initially charged at 400kV)
 - LILO of both circuits of Kolhapur – Mapusa 400 kV D/C line at Kolhapur (new)
 - Narendra (Kudgi) (GIS) - Narendra (existing) 400 kV D/c Quad line
- i) System Strengthening in Southern Region – XVIII
- Vijayawada – Nellore (AP) 400 kV D/C line
 - Nellore (AP) - Tiruvalem 400 kV D/C Quad line
 - Tiruvalam – Sholinganallur 400 kV D/C line
 - LILO of existing Bangalore – Salem 400 kV S/C line at Hosur
- j) System Strengthening in Southern Region – XIX
- Kurnool – Tiruvalam 765 kV D/c line
 - Provision of 2x1500 MVA, 765/400kV transformers at Tiruvalam

- LILO of Kolar – Sriperumbudur 400 kV S/c line at Tiruvalam
- k) Common Transmission System Associated with LTA Projects in Srikakulam Area – Part-A, B & C
- Establishment of 765/400kV pooling station at Srikakulam with 2x1500 MVA transformers
 - Srikakulam Pooling Station – Angul 765 kV D/c line
 - Provision of 1x1500 MVA, 765/400 kV transformer at Angul
 - Angul – Jharsuguda 765 kV 2nd D/c line (1st D/c line covered under Orissa IPPs)
 - Jharsuguda – Dharamjaigarh 765 kV 2nd D/c line (1st D/c line covered under Orissa IPPs)
- l) System Strengthening in Southern Region – XX
- Augmentation of 1x500 MVA 400/220kV Transformer with associated 400kV & 220kV bays at each substations of (1) Hyderabad (Ghanapur), (2) Warangal, (3) Khammam, (4) Vijayawada, (5) Gooty, (6) Cuddapah, (7) Malekuttaiyur, (8) Somanahalli, (9) Mysore, (10) Pugalur and (11) Trichy.
 - Replacement of 2x315 MVA 400/220kV transformers at Narendra with 2x500 MVA transformers and utilize the replaced 2x315 MVA transformers as regional spare, location to keep the spare shall be decided later.
 - Conversion of 50 MVAR line reactors at Madakathara end on both circuits of Ellapally (Palakkad) – Madakathara (North Trissur) 400kV D/c line into switchable reactors by providing necessary switching arrangement.
 - 2x125 MVAR Bus Reactor at Vijayawada 400kV substation.
- m) Common Transmission System Associated with ISGS Projects in Nagapattinam/Cuddalore Area of Tamil Nadu - Part-A & B
- New 765/400kV Pooling station at Nagapattinam (GIS) with sectionalisation arrangement to control short circuit MVA (initially charged at 400 kV)
 - LILO of Neyveli – Trichy 400kV S/c line at Nagapattinam Pooling Station for initial arrangement which later shall be bypassed
 - Nagapattinam Pooling Station – Salem 765 kV D/c (initially charged at 400 kV)
 - Salem – Madhugiri 765 kV S/c (initially charged at 400 kV)
- n) Transmission System associated with Kudgi TPS of NTPC
- Kudgi TPS – Narendra (Kudgi) 2x400 kV D/c line
 - Narendra (Kudgi) – Madhugiri 765 kV D/c line (initially charged at 400 kV)
 - Madhugiri – Bidadi 400 kV (Quad) D/c line
- o) System Strengthening for import of power from ER
- Srikakulam – Vemagiri 765 kV D/c line
 - Khammam – Nagarjuna Sagar 400 kV D/c line

Karaikal Studies

(The system study results for above proposal would be sent /uploaded shortly)

Kaiga studies under re-conductoring/outage scenario

Fig-1 : base case

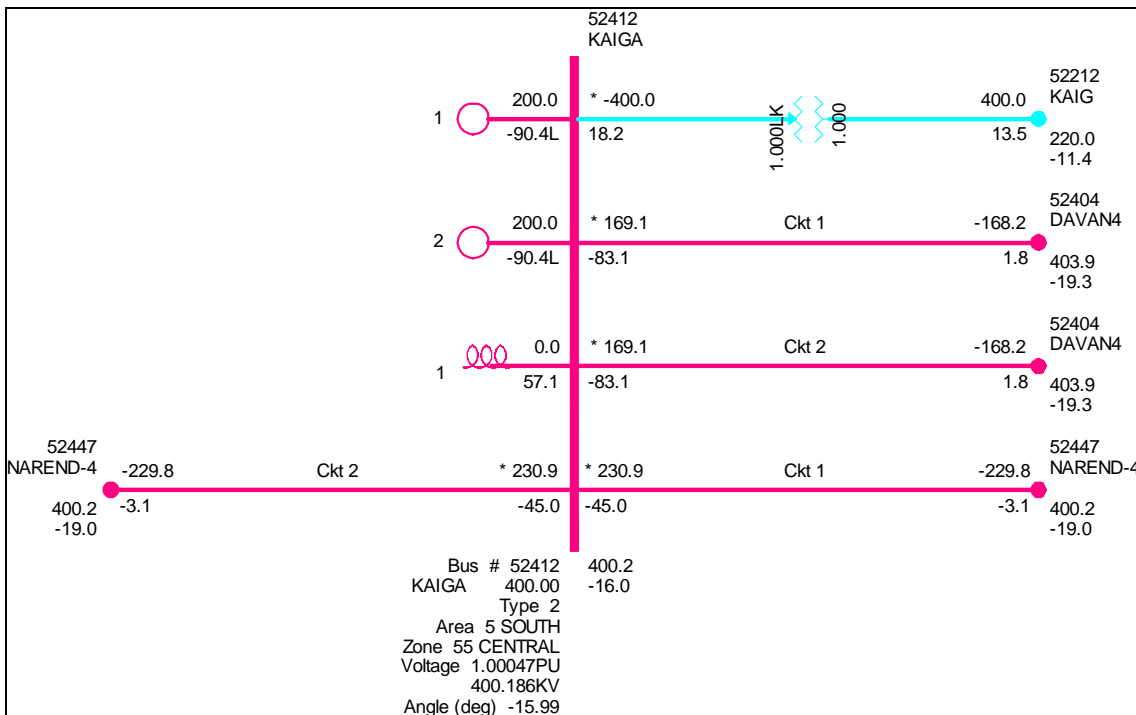


Fig-2 : Re-conductoring of Kaiga-Narendra lines and outage of S/C

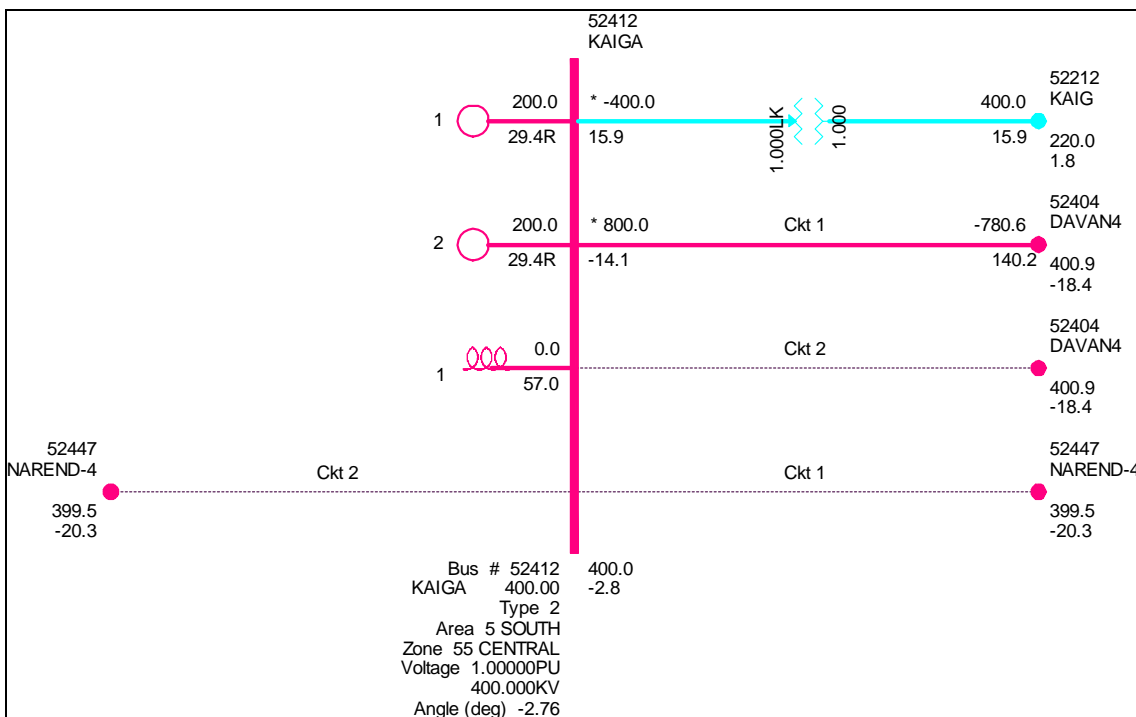
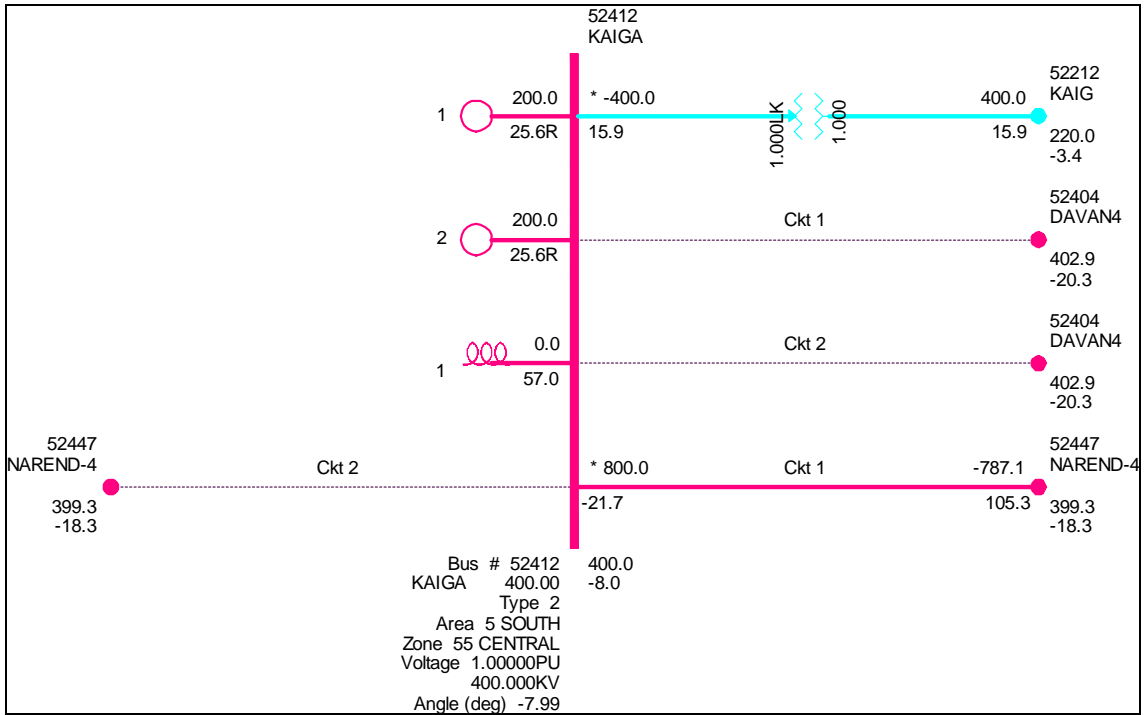


Fig-3 : Re-conductoring of Kaiga-Davangere lines and outage of S/C



TAMIL NADU**I.400 KV SUB STATIONS**

Sl. No	Name of 400kV S/s	Transformer Capacity/ Reactor Details	Description of Bays and other works
1	Thappugundu 400/110 KV in Theni area	1) 400/110kV, 200 MVA – 5 Nos 2) 400 KV 63 MVAR Reactor	1) 400kV Feeder Bays – 2 nos 2) 400kV Transformer Bays-4 nos 3) 400 KV Reactor bay – 1 No. 4) 110kV Feeder Bays- 8 nos 5) 110kV Transformer Bays-4 nos 6) Relay Panels, PLCC Equipments and SAS 7) Civil works in the sub station
2	Anaikadavu 400/230-110 KV in Udumalpet area	1) 400/230kV, 315 MVA – 2 Nos 2) 400/110kV, 200 MVA – 2 Nos	1) 400kV Feeder Bays – 4 nos 2) 400kV Transformer Bays-5 nos 3) 230kV Feeder Bays- 6 nos 4) 230kV Transformer Bays-3 nos 5) 110kV Feeder Bays- 4 nos 6) 110kV Transformer Bays-2 nos 7) Relay Panels, PLCC Equipments and SAS 8) Civil works in the sub station
3	Rasipalayam 400/230-110 in Udumalpet area	1) 400/230kV, 315 MVA – 2 Nos 2) 400/110kV, 200 MVA – 2 Nos 3) 400 KV 63 MVAR Reactor – 1 No.	1) 400kV Feeder Bays – 8 nos 2) 400kV Transformer Bays-5 nos 3) 400 KV reactor bay – 1 No. 3) 230kV Feeder Bays- 4 nos 4) 230kV Transformer Bays-2 nos 5) 110kV Feeder Bays- 5 nos 6) 110kV Transformer Bays-3 nos 7) Relay Panels, PLCC Equipments and SAS 8) Civil works in the sub station 9) 400 KV Bay provision at Salem (PGCIL) SS for Rasipalayam - Salem 400 KV DC line
4	Kanarpatty 400/230-110 KV in Tirunelveli area	1) 400/230kV, 315 MVA – 2 Nos 2) 400/110kV, 200 MVA – 2 Nos	1) 400kV Feeder Bays – 4 nos 2) 400kV Transformer Bays-4 nos 3) 230kV Feeder Bays- 5 nos 4) 230kV Transformer Bays-2 nos 5) 110kV Feeder Bays- 7 nos 6) 110kV Transformer Bays-2 nos 7) Relay Panels, PLCC Equipments and SAS 8) Civil works in the sub station
5	400kV Bay at Udumalpet for LILO of one circuit of Thappagundu- Anikadavu 400 KV DC Line		1) 400 KV Feeder bays – 2 Nos.

II.400 KV TRANSMISSION LINES:

Sl. No	Name of 400 KV Line	Approx. Route Length (km)
1	Thappagundu- Anaikadavu 400 KV Twin DC	179
2	Anaikadavu- Rasipalayam 400 KV Twin DC	43
3	Rasipalayam -Salem/Dharmapuri (PGCIL SS) 400 KV Quad DC as part of LILO of the Rasipalayam – Singarapet 400kV D/c line	171
4	Kanarpatti – Tirunelveli(PGCIL) 400 KV Quad DC	15
5	Kanarpatty – Kayathar 400 KV DC Twin line	12
6	LILO of one circuit of Thappagundu-Aniakadavu 400 KV DC Line at Udumalpet (PGCIL) 400 KV SS	25

KARNATAKA**Intra State Transmission System strengthening for RE projects:**

Sl. No	Name of the Project	Line Length (ckm)
1	Dhoni: Establishment 2x500MVA, 400/220kV Station along with associated Transmission lines as noted below; a) By LILO'ing the existing S/C 400 KV line running between 400 KV station at Davanagere and Guddadahally. b) By LILO'ing the existing 220KV D/C line running between 220 KV station at Gadag and Lingapur to the proposed 400/220 KV station at Dhoni.	a) 52 b) 6
2	Shivanasamudram: Establishment 2x100MVA, 220/66kV Station along with associated Transmission lines noted below: a) By LILO'ing the existing 220 KV D/C line running between 220 KV stations at T.K.Hally and Madhuvinahally. b) Conversion of existing 220 kV Hootagally – Vajamangala – T.K. Halli S/C line to D/C line with Drake conductor – (associated transmission system strengthening)	a) 4 b) 130
3	Hosadurga: Establishment 2x100MVA, 220/66kV Station along with associated Transmission lines noted below; a) By extending 220 KV D/C line from the existing 400/220 KV station at Hiriyyur.	84
4	Running of 220kV D/C line between 220 KV stations at Gadag and Bagalkote & LILO'ing of one of the existing 220kV D/C line running between 220 KV stations at Bidnal and Lingapur.	191.4
5	Conversion of existing 220kV SC line to 220kV DC line running between 220 KV stations at Guttur and Chitradurga.	170
6	Conversion of the existing 220kV SC line to 220kV DC line running between 220 KV stations at Chitradurga and Hiriyyur together with running of 2 nd 220 KV S/C line between 400/220 KV & 220/66 KV stationa at Hiriyyur.	120
7	LILO'ing of one of the circuit of the existing 220KV DC line running between 220 KV stations at Narendra and Haveri to 220 KV station at Bidnal.	24
8	Conversion of existing 66kV DC line equipped with 'Coyote ACSR' to 'Drake ACSR' between 66 KV station at Sakalespura and 220 KV station at Hassan .	72

ANDHRA PRADESH**A: 400kV Hindupur Substation:**

Sl. No.	Description of Line/ Substation	Length/ Capacity	Unit
1	400/220kV Substation at Hindupur - 3 Nos. 315 MVA PTRs	3x315	MVA
2	80 MVAR Bus Rector	1	No.
3	400kV DC Quad Moose Line from Hindupur SS to 400kV Uravakonda SS	130	km
4	220kV DC Moose Line from 400kV Hindupur SS to 220kV Penukonda SS	50	km
5	220/132 kV Substations at Penukonda	2x100	MVA
6	220kV DC Twin Moose line from 400kV Hindupur SS to 220kV Pampanur Tanda SS	90	km
7	220/132 kV Substation at Pampanur Tanda	2x100	MVA

B:400kV Jammalamadugu Substation:

Sl. No.	Description of Line/ Substation	Length/ Capacity	Unit
1	400/220/132kV Substation at Jammalamadugu	4x315 & 2X160	MVA
2	400kV Quad Bay Extensions at Kurnool 400kV Substation	2	Nos.
3	80 MVAR Bus Rector	1	No.
4	400kV DC Quad Moose Line from 400kV Jammalamadugu to 400kV Kurnool SS	125	km
5	400kV DC Quad Moose Line from 400kV Jammalamadugu to 400kV Uravakonda SS	110	km
6	220kV DC Moose line from 400kV Jammalamadugu SS to 220kV Tirumalaipally SS	17	km
7	220/132 kV Substation at Tirumalaipally	2x160	MVA
8	220kV DC Moose line from 400kV Jammalamadugu SS to 220kV Betamcherla	68	km
9	220/132/33 kV Substation at Betamcherla	2x100& 2x31.5	MVA
10	220kV DC Moose line from 400kV Jammalamadugu SS to 220kV Chakrayapet SS	70	km
11	220/132/33 kV Substation at Chakrayapet	2x100 & 2x31.5	MVA
12	220kV DC Moose line from 400kV Jammalamadugu SS to 220kV Porumamilla SS	75	km
13	220/132 kV Substation at Porumamilla	2x100	MVA

C:400kV Uravakonda Substation:

Sl. No.	Description of Line/ Substation	Length/ Capacity	Unit
1	400/220kV Substation at Uravakonda	4x315	MVA
2	400kV Quad Bay Extensions at Mahaboobnagar 400kV Substation	2	Nos.
3	80 MVAR Bus Rector	1	No.
4	400kV DC Quad Moose line from 400kV Uravakonda SS to 400kV Mahaboobnagar SS	190	km
5	220kV DC Twin Moose line from 400kV Uravakonda SS to 220kV Vajrarakur SS	13	km
6	220/132 kV Substation at Vajrarakur	1x100	MVA
7	220kV DC Twin Moose line from 400kV Uravakonda SS to 220kV Borampalli SS	68	km
8	220/132 kV Substation at Borrampalli	1x100	MVA

D: 220kV Interconnectivities:

Sl. No.	Description of Line/ Substation	Length/ Capacity	Unit
1	220kV DC Moose line from 400kV Hindupur SS to 220kV Hindupur Substation	20	km
2	220kV DC Moose line from 400kV Uravakonda SS to 220kV KalyanDurg SS	50	km
3	LILO of both the circuits of 220kV DC Moose line from 400kV Uravakonda SS to 220kV KalyanDurg SS at 220kV Borampalli SS	10	km
4	220kV DC Moose line from 400kV Jammalamadugu SS to 220kV Tadipatri SS	40	km
5	220kV Bay Extensions at 220kV Hindupur Substation	2	Nos.
6	220kV Bay Extensions at 220kV Kalyandurg Substation	2	Nos.
7	220kV Bay Extensions at 220kV Tadipatri Substation	2	Nos.

E: 132 kV Interconnectivities:

Sl. No.	Description of Line/ Substation	Length/ Capacity	Unit
1	132 kV DC line from 220/132 kV Penukonda SS to 132/33 kV Penukonda SS	10	km
2	132 kV DC line from 220/132 kV Jammalamadugu SS to 132/33 kV Jammalamadugu SS	12	km
3	132 kV DC line from 220/132kV Porumamilla SS to 132/33 kV Porumamilla SS	10	km
4	132 kV Bay Extensions at 132/33 kV Penukonda Substation	2	Nos.
5	132 kV Bay Extensions at 132/33 kV Jammalamadugu Substation	2	Nos.
6	132 kV Bay Extensions at 132/33 kV Porumamilla Substation	2	Nos.

Agenda Note for 16th Meeting of Southern Region constituents regarding Connectivity/LTA Applications of IPPs in SR

1.0 AGENDA FOR THE MEETING

1.1 To consider grant of Connectivity to 8 nos. of earlier discussed applications and 3 nos. of new applications who have applied for grant of Connectivity as per CERC (Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State Transmission and related matters) Regulations, 2009 as per details given below in Table. The terms and conditions applicable for connectivity applications are given at Annexure-I.

Application earlier discussed from IPP developers →

Sl. No	Applicant	Time frame	Location	IC (MW)	Connectivity Sought for (MW)
9.	Mytrah Energy (India) Limited	March, 2013	Tirunelveli Dist., Tamil Nadu	300	100
10.	SISL Green Infra Limited **	December, 2012	Tirunelveli Dist., Tamil Nadu	48.5	48.5
11.	Samimeru Windfarms Private Limited **	December, 2012	Tirunelveli Dist., Tamil Nadu	48.5	48.5
12.	Samiran Udaipur Wind farms Limited **	March, 2013	Tirunelveli Dist., Tamil Nadu	48.5	48.5
13.	Shivam Filaments Private Limited **	March, 2013	Tirunelveli Dist., Tamil Nadu	48.5	48.5
14.	R.S. India Global Energy Limited	March, 2014	Tirunelveli Dist., Tamil Nadu	270	270
15.	Suzlon Power Infrastructure Limited	March, 2014	Tirunelveli Dist., Tamil Nadu	1000	850
16.	Suzlon Power Infrastructure Limited	December, 2012	Coimbatore Dist., Tamil Nadu	200	180
	Total			1964	1594

** Note – M/s Samimeru Windfarms Pvt. Ltd. shall be the lead generator for connectivity applications of wind generators mentioned in table at Sl. No. 2 – 5.

New Applications from IPP developers →

Sl. No	Applicant	Time frame	Location	IC (MW)	Connectivity Sought for (MW)
17.	Vestas Wind Technology India Private Limited	September, 2014	Coimbatore and Tirupur Districts	150	150
18.	Suzlon Power Infrastructure Limited	March, 2014	Anantpur Dist., Andhra Pradesh	300	270
19.	IL&FS Tamil Nadu Power Company Ltd.	April, 2017	Cuddalore, Tamil Nadu	2640	2410
	Total			3090	2830

2.0 GRANT OF CONNECTIVITY

2.1 The connectivity application from wind developer from Sl. No. 1 to 8 were discussed in the 15th Meeting of Southern Region constituents regarding Long Term Access and Connectivity Applications in Southern Region wherein it was stated that all these Connectivity applicants are wind generation developers and may not remain the owner of the generation plant, once Connectivity is granted. Therefore POWERGRID should seek necessary legal opinion whether these applicants are legal entities to apply for Connectivity as per the prevailing CERC regulations.

2.2 As per the decision POWERGRID sought the legal opinion and the observations are a below

“It is a common practice of the Wind Developers transferring the generating stations to third parties after commissioning of the generating unit. There is nothing in law which prohibits them from effecting such transfer. Such transfers are done mostly of the shares of the generating company and not by sale of generating station as such.

In other words, a generating company is formed, the wind project is established in the generating station and thereafter the Promoters sell the shares to third parties. The connectivity under the Connectivity Regulations is given to a generating station and not necessarily to a company as a whole. In my opinion, there is no difficulty whatsoever in regard to the connectivity granted, if there is a change in the ownership of the shares or even when there is a change in the ownership of the generating station. While granting the approval for connectivity, Powergrid can specify that the connectivity is restricted to the generating station and will not be available for transfer to any other generating station or unit.

As regards the ownership change, Powergrid can provide in the approval that in case of change of ownership, the developer and the new owner shall file a declaration with Powergrid and the new owner shall be bound by all the terms and conditions of the approval granted for the connectivity.”

2.3 Therefore in view of the above it is proposed to grant connectivity to the applicants from wind developer. Further connectivity application at Sl. No. 9 & 10 are also the wind farms and are located in Coimbatore area, Tamil Nadu and another one is located in Anantpur area, Andhra Pradesh.

2.4 The proposed wind farms by Vestas Wind Technology & Suzlon Power are located near to the existing substations of POWERGRID.

2.5 It is to mention, as per Para 16.2 of the Manual on Planning Criteria of CEA, that the N-1 criteria may not be applied to the immediate connectivity of wind/solar farms with ISTS/Intra-State grid i.e the line connecting the farm to the grid and the step-up transformers at the grid station.

2.6 The Connectivity application by IL&FS Tamil Nadu is seeking connectivity for 2410 MW power plant, the expansion of their under construction power plant of 2x600 MW at Cuddalore, Tamil Nadu. In view of the above the Connectivity to the above applicants are proposed as below:

Proposed Transmission system for Connectivity

Sl. No	Applicant	Location	Connectivity Sought for (MW)	Connectivity System
1.	Mytrah Energy (India) Limited	Tirunelveli Dist., Tamil Nadu	100	Mytrah wind farms – Tirunelveli PS 230kV S/c line
2.	Samimeru Windfarms Private Limited **	Tirunelveli Dist., Tamil Nadu	48.5	Samimeru wind farms – Tirunelveli PS 230 kV D/c line
3.	SISL Green Infra Limited **	Tirunelveli Dist., Tamil Nadu	48.5	
4.	Samiran Udaipur Wind farms Limited **	Tirunelveli Dist., Tamil Nadu	48.5	
5.	Shivam Filaments Private Limited **	Tirunelveli Dist., Tamil Nadu	48.5	
6.	R.S. India Global Energy Limited	Tirunelveli Dist., Tamil Nadu	270	RS India wind farms – Tirunelveli PS 230kV D/c line
7.	Suzlon Power Infrastructure Limited	Tirunelveli Dist., Tamil Nadu	850	Suzlon wind farms – Tirunelveli PS 400kV D/c line
8.	Suzlon Power Infrastructure Limited	Coimbatore Dist., Tamil Nadu	180	Suzlon switchyard –Pugalur 230 kV D/c line
9.	Vestas Wind Technology India Private Limited	Coimbatore and Tirupur Districts	150	Vestas wind farms – Udumalpet 230kV D/c line
10.	Suzlon Power Infrastructure Limited	Anantpur Dist., Andhra Pradesh	270	Suzlon wind farms – Gooty 230kV D/c line
11.	IL&FS Tamil Nadu Power Company Limited	Cuddalore, Tamil Nadu	2410	Generation switchyard – Nagapattinam PS 2x400kV D/c quad line
	Total		4424	

*** Note – M/s Samimeru Windfarms Pvt. Ltd. shall be the lead generator for connectivity applications of wind generators mentioned in table at Sl. No. 2 – 5.*

Members may discuss the above proposals and decide.

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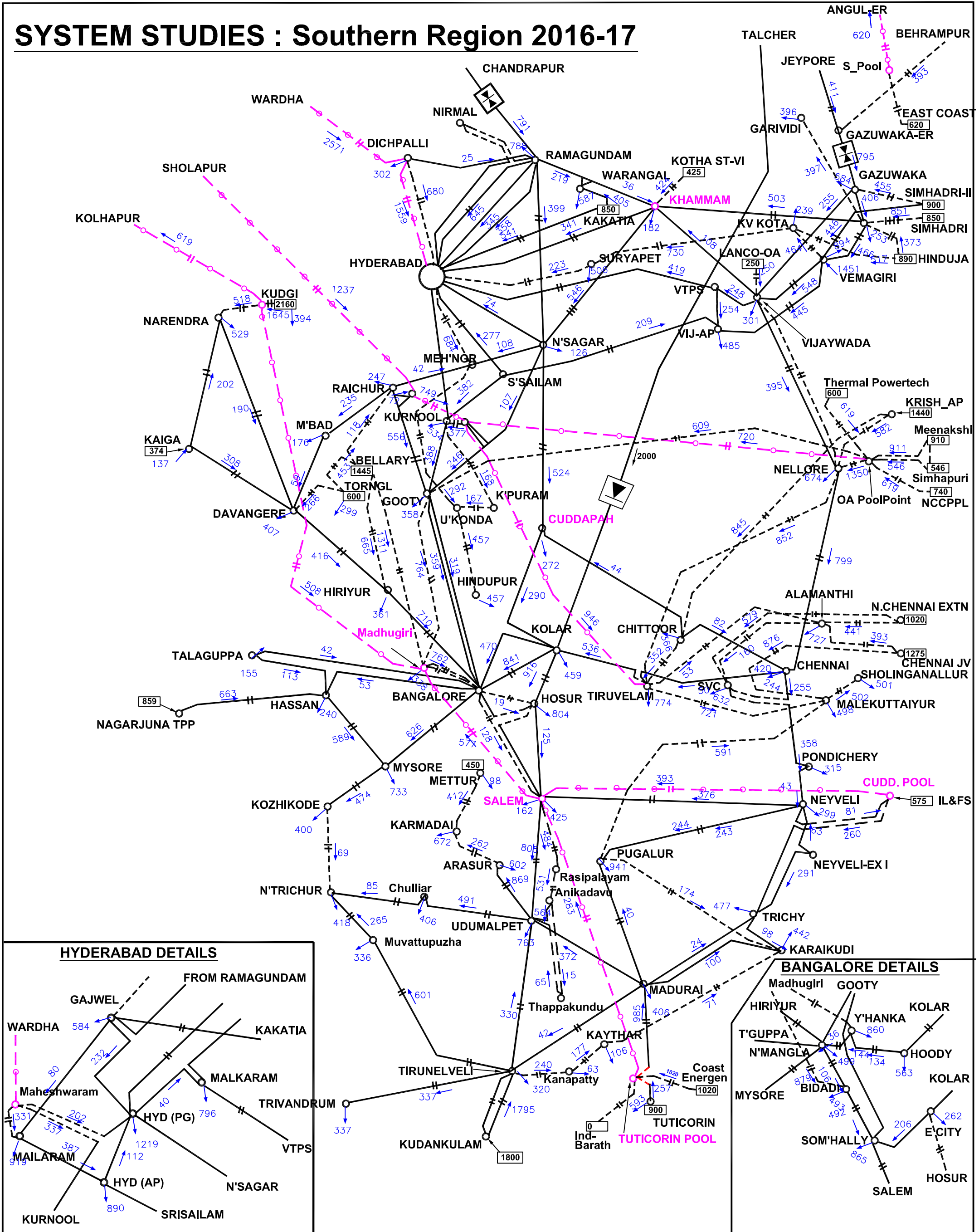
Annexure-I

TERMS AND CONDITIONS APPLICABLE FOR CONNECTIVITY APPLICATIONS

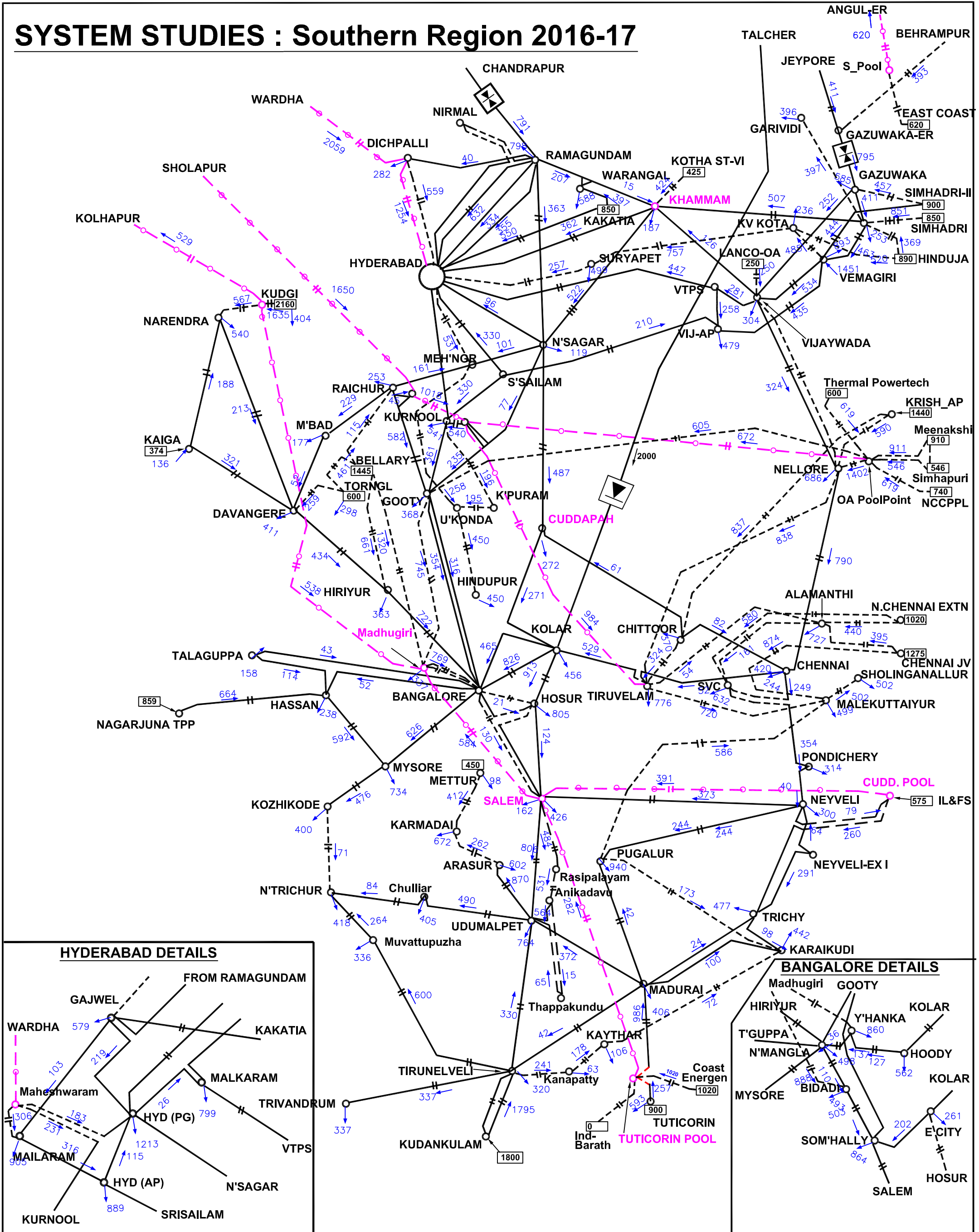
The following may be noted by all the applicants who have applied for Connectivity:

1. The grant of connectivity shall not entitle to interchange any power with the grid unless it obtains long-term access, medium term open access or short term open access. However, the IPPs shall be allowed to undertake interchange of power including drawl of power for commissioning activities and injection of infirm power in to the grid during full load testing before being put into commercial operation, even before availing any type of open access, after obtaining permission of the concerned regional load dispatch centre, which shall keep grid security in view while granting such permission.
2. Transmission system strengthening shall be identified to facilitate power transfer on long-term basis once above applicants apply for Long-term Access as per CERC Regulations, 2009.
3. All the applicants are required to inform/confirm following to facilitate connectivity:
 - i. Likely date of synchronization, likely quantum and period of injection of infirm power before being put into commercial operation to the SLDC and RLDC concerned at least one month in advance.
 - ii. As per the procedure for connectivity approved by CERC, the time frame for commissioning of dedicated transmission system from the signing of Transmission Agreement would be 9 months plus the time lines as specified by CERC in tariff regulations, 2009. If the time available is less than the above stipulated time frame then CTU shall approach CERC for appropriate direction in the matter.
 - iii. In case the dedicated transmission system upto point of connection is to be undertaken as a party of coordinated transmission plan, then it shall be implemented by Inter-State Transmission Licensee (including CTU) as per the decision of Empowered Committee on Transmission. In such cases, the applicants need to sign transmission agreement within one month of grant of connectivity, furnish requisite Bank Guarantee and fulfill other terms & conditions as stipulated in the CERC Regulations/Detailed Procedure, 2009 in this regard.
 - iv. The scope of works at generation switchyard like line terminal bays, bus/line reactors, associated bays etc. shall be under the scope of respective generation developer/applicant.
 - v. The applicants shall abide by all provisions of the Electricity Act, 2003, CERC(Grant of Connectivity, Long-term Access and Medium-term Open Access in inter-State transmission and related matters) Regulations, 2009, CEA (Technical Standards for connectivity to the Grid) and Indian Electricity Grid Code as amended from time to time.
 - vi. The applicant shall have to apply for “Connection Offer” to CTU at least more than 2 years prior to physical interconnection as well as have to sign “Connection Agreement” with CTU prior to physical interconnection as per CERC Regulations, 2009.

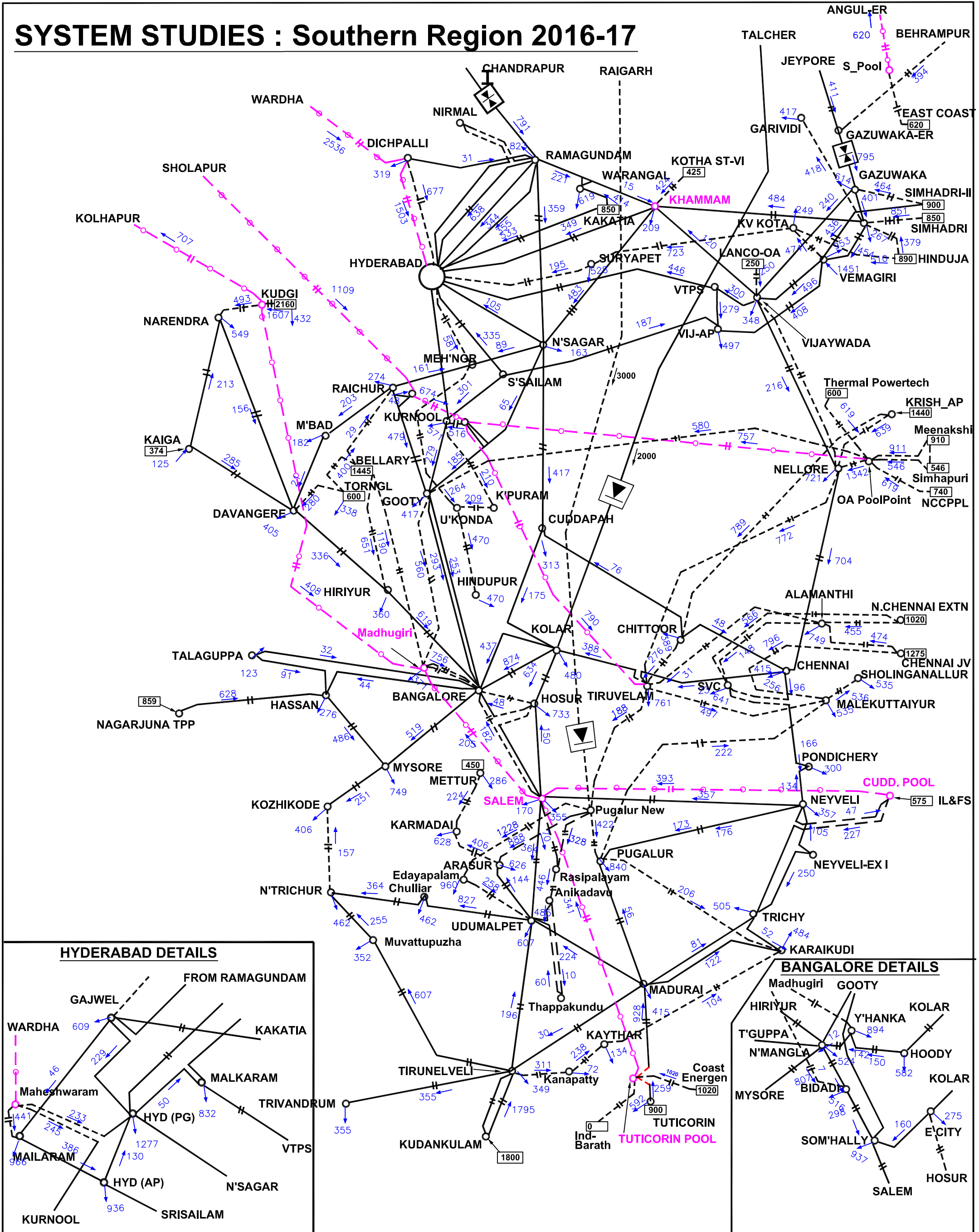
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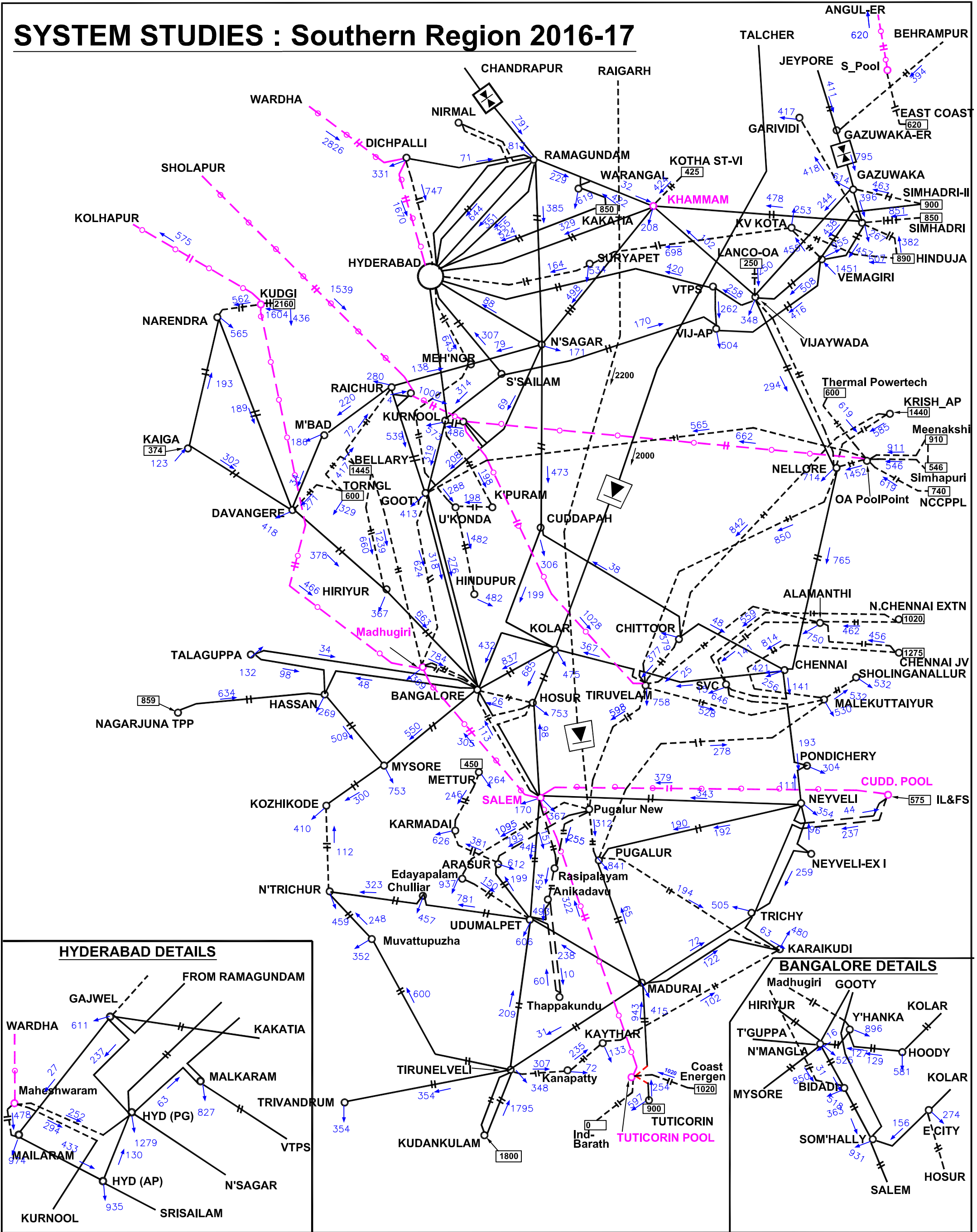
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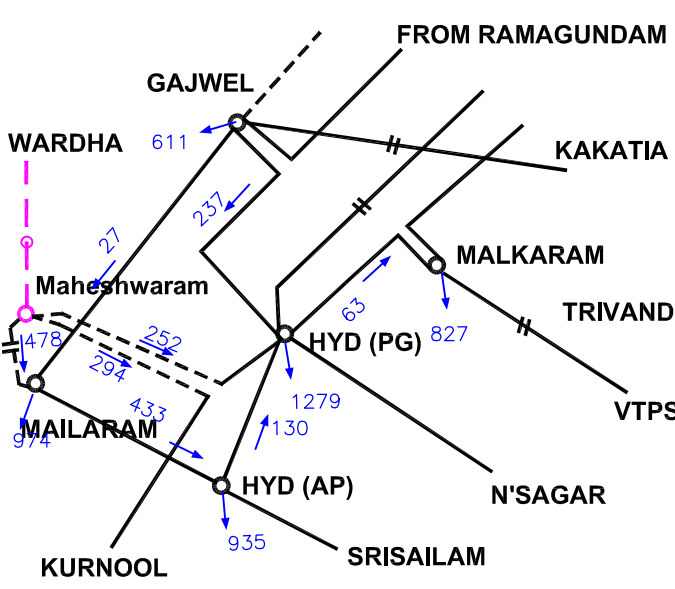
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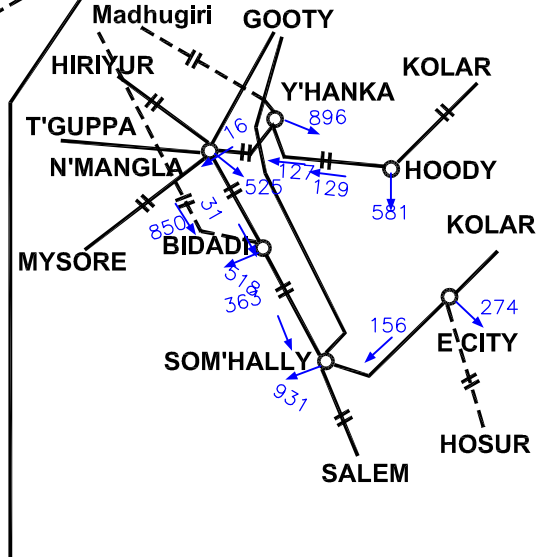
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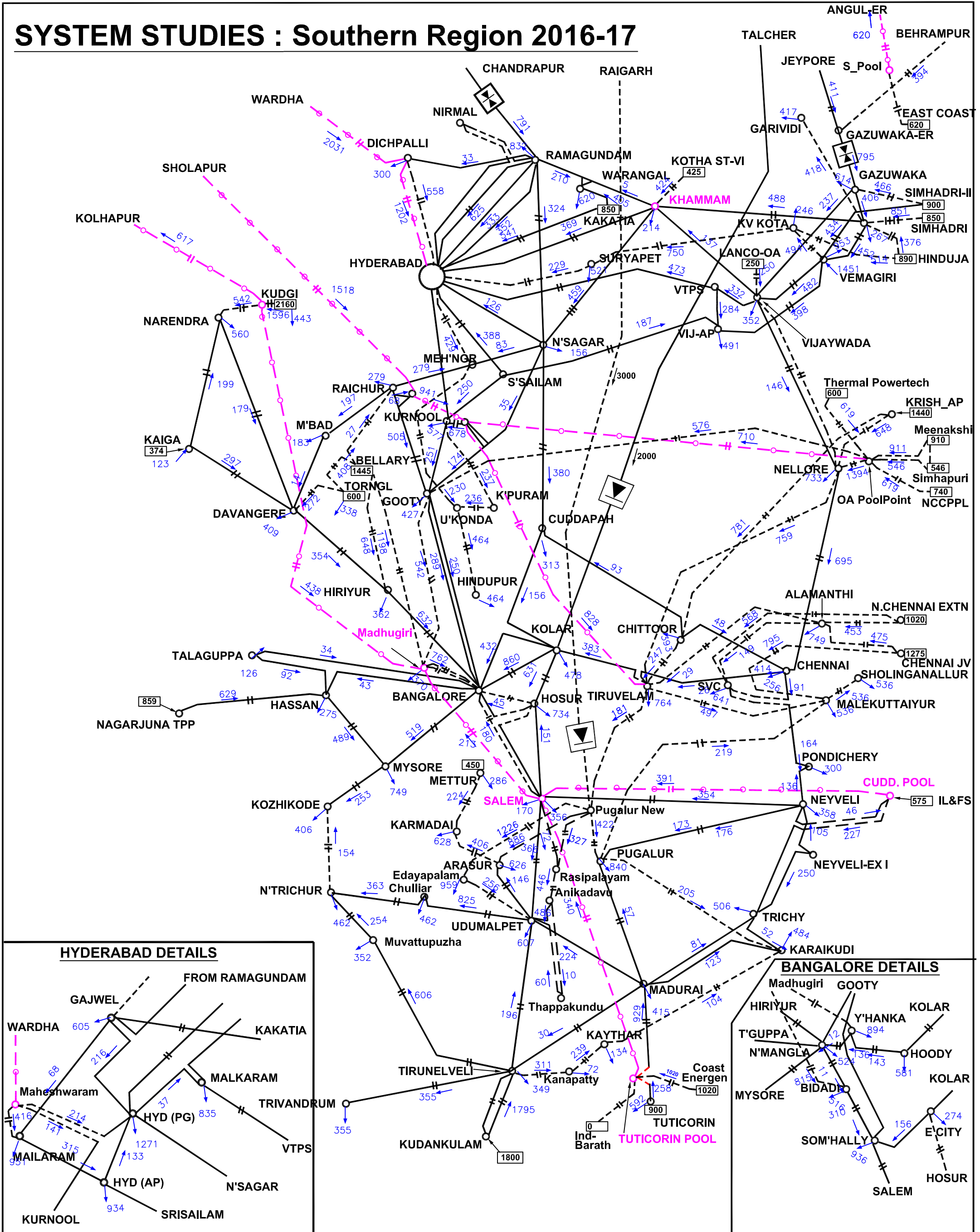
HYDERABAD DETAILS



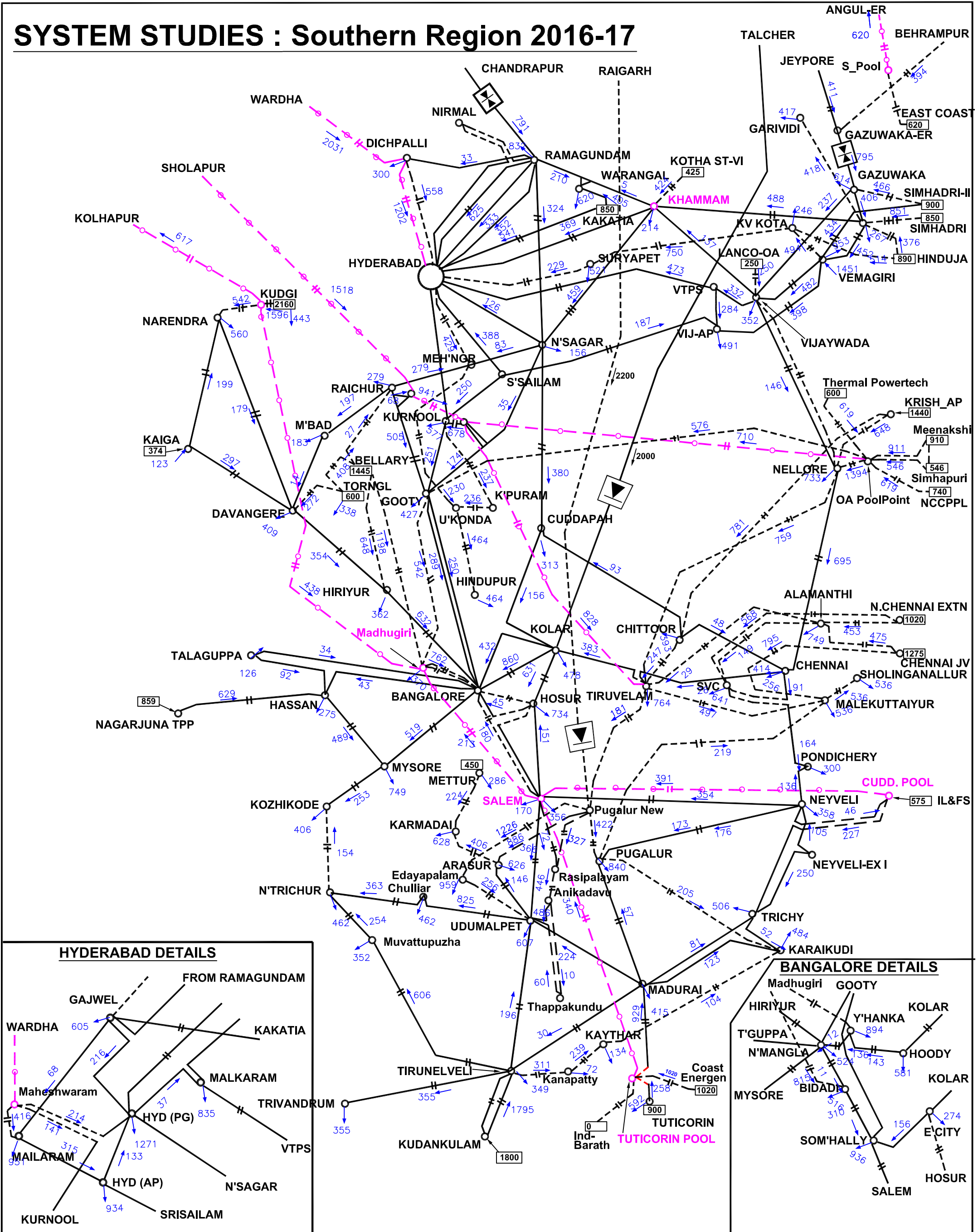
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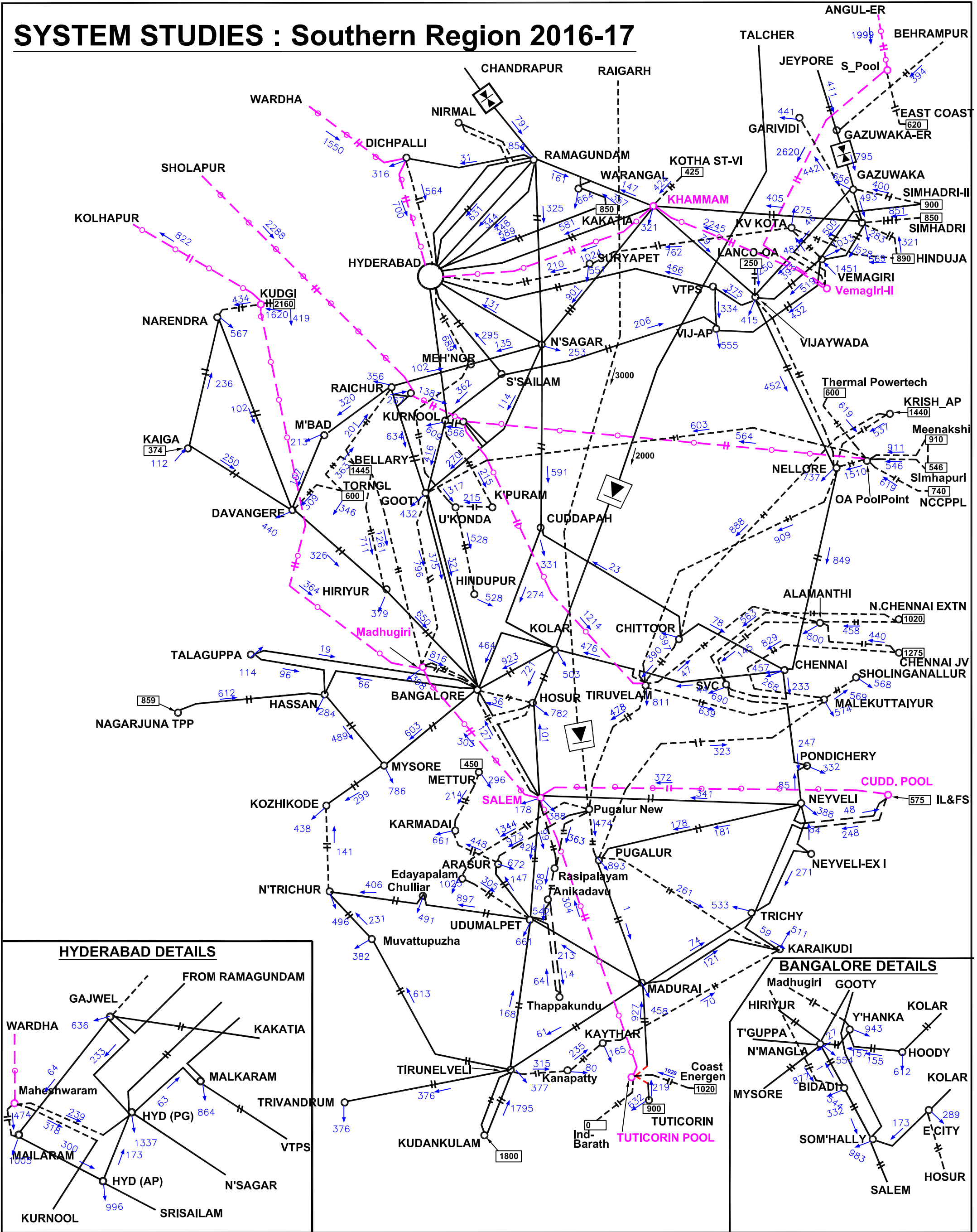
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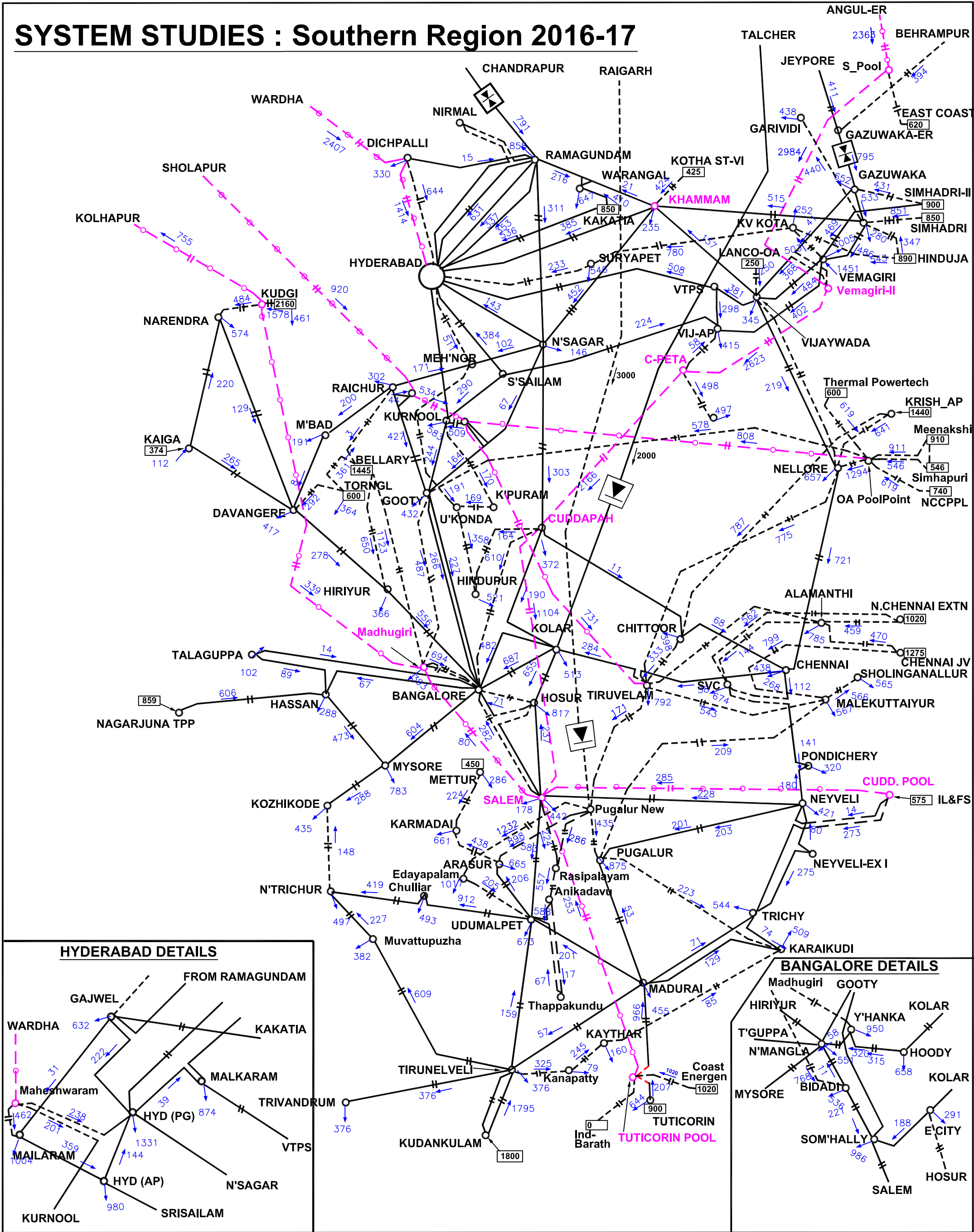
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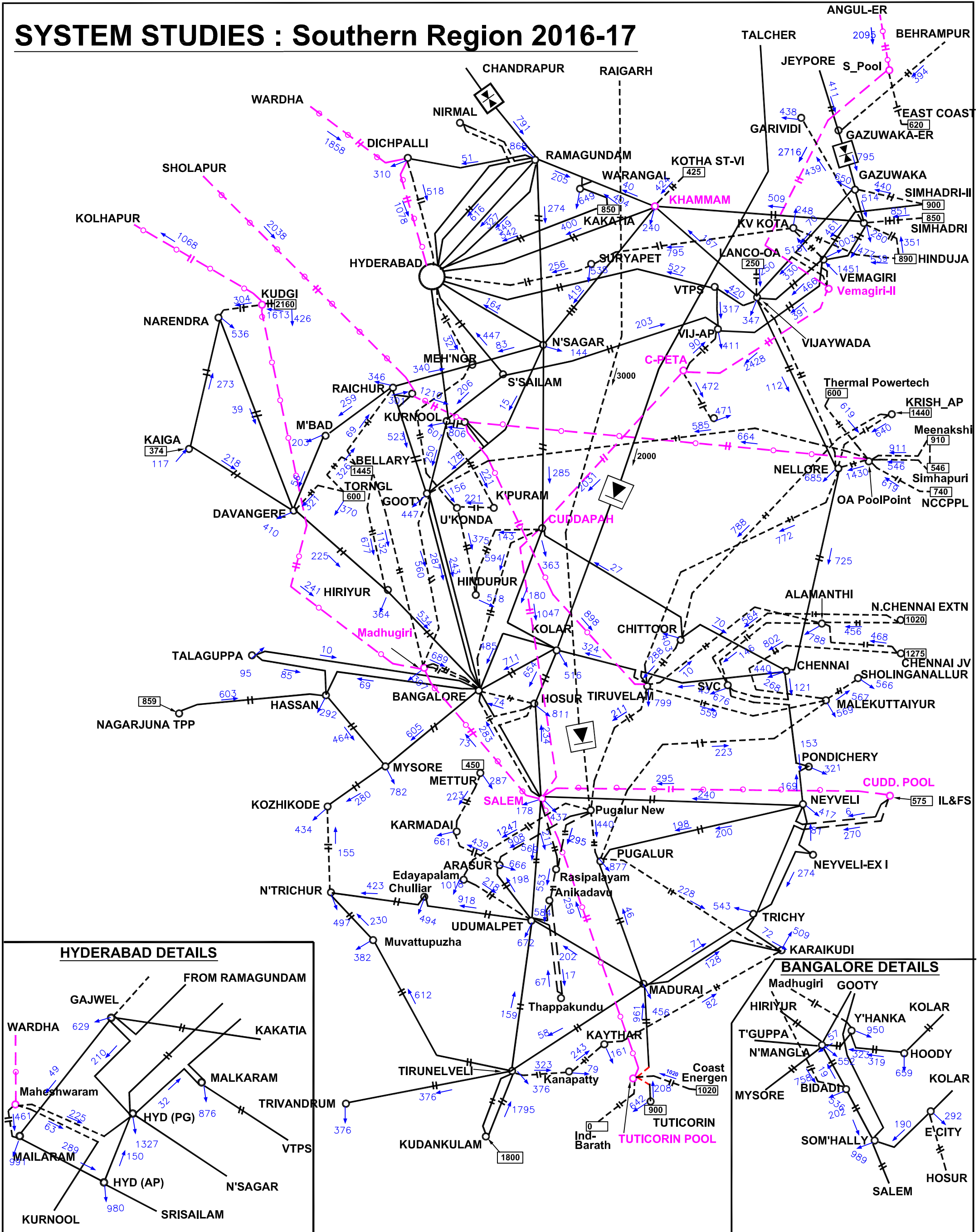
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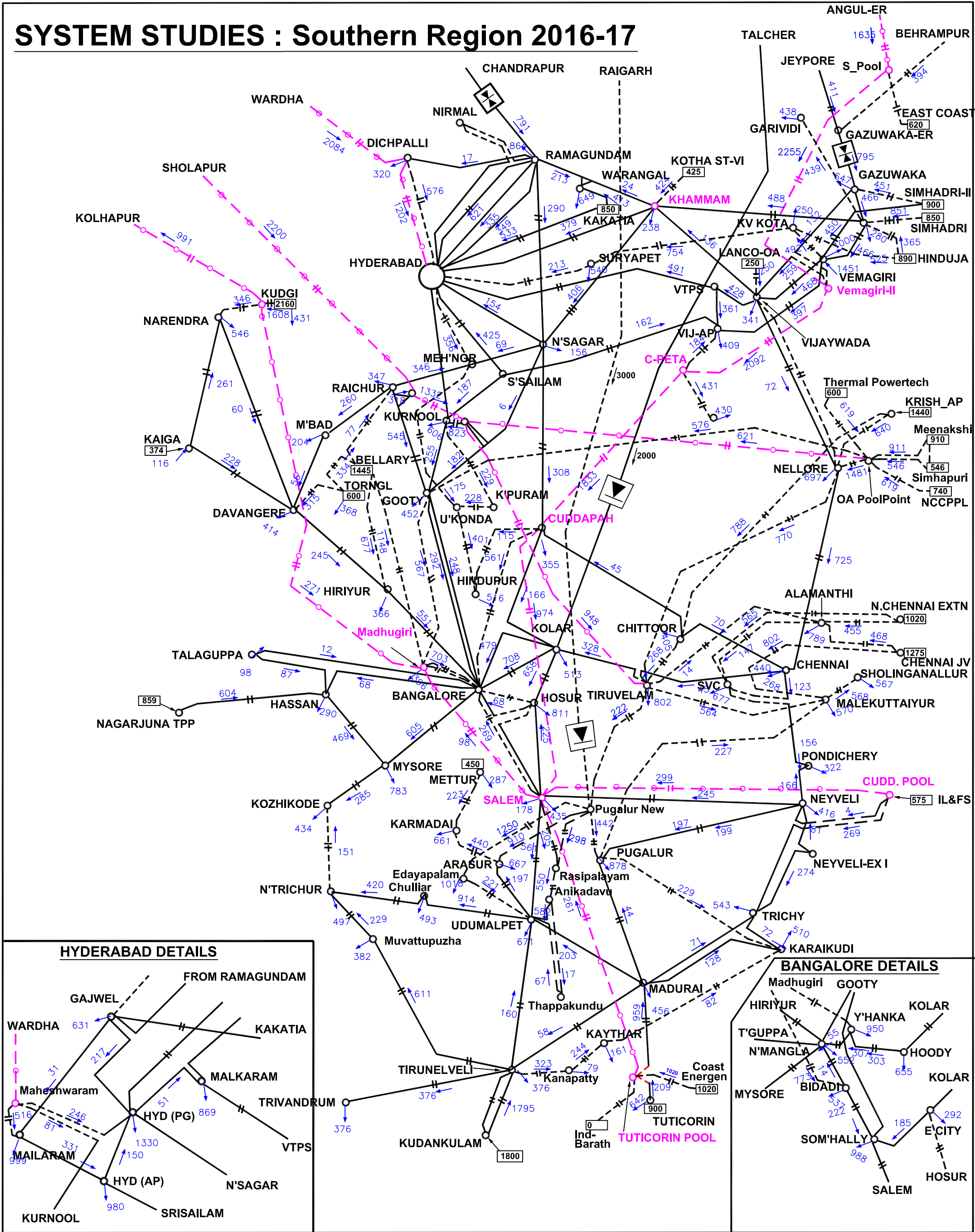
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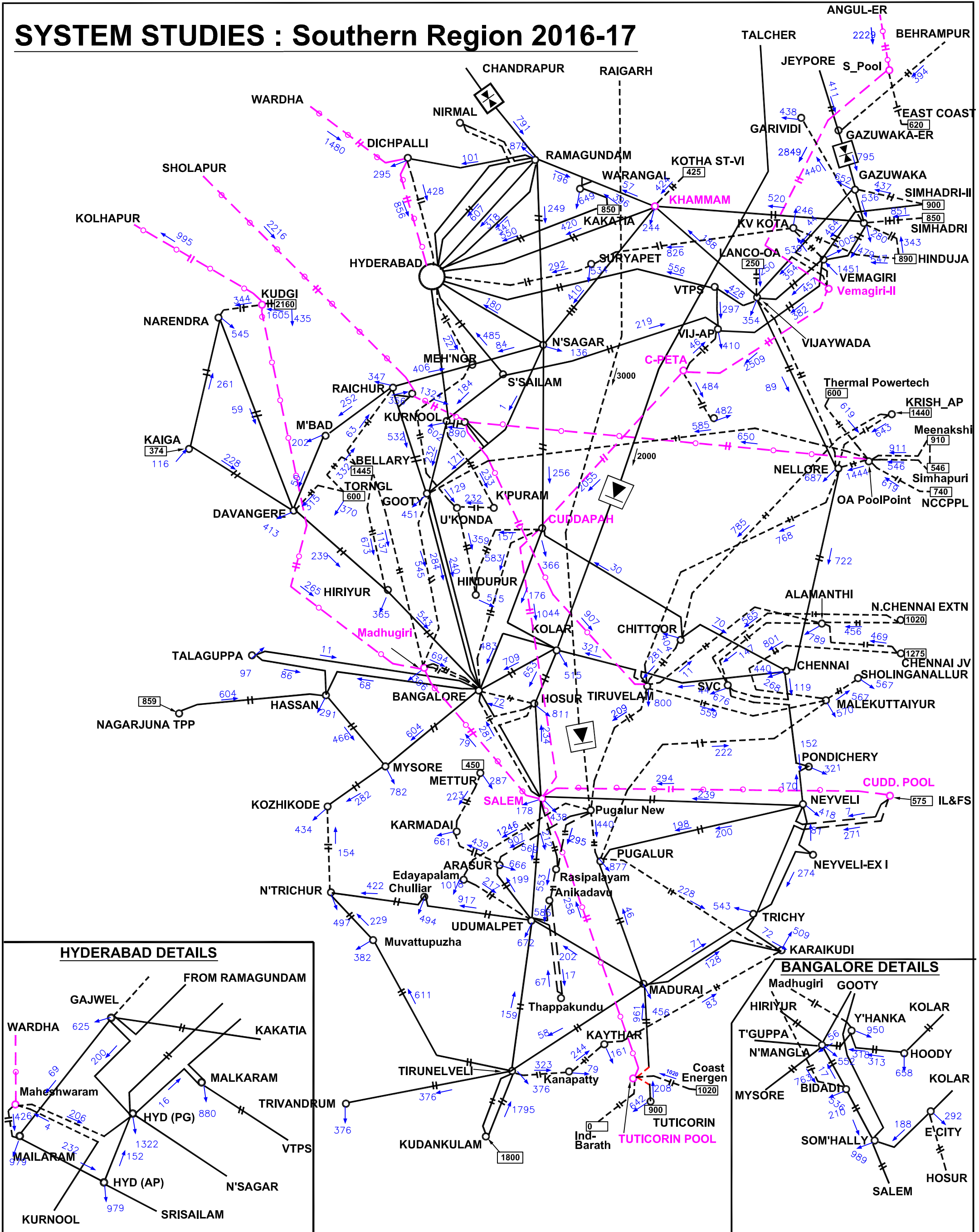
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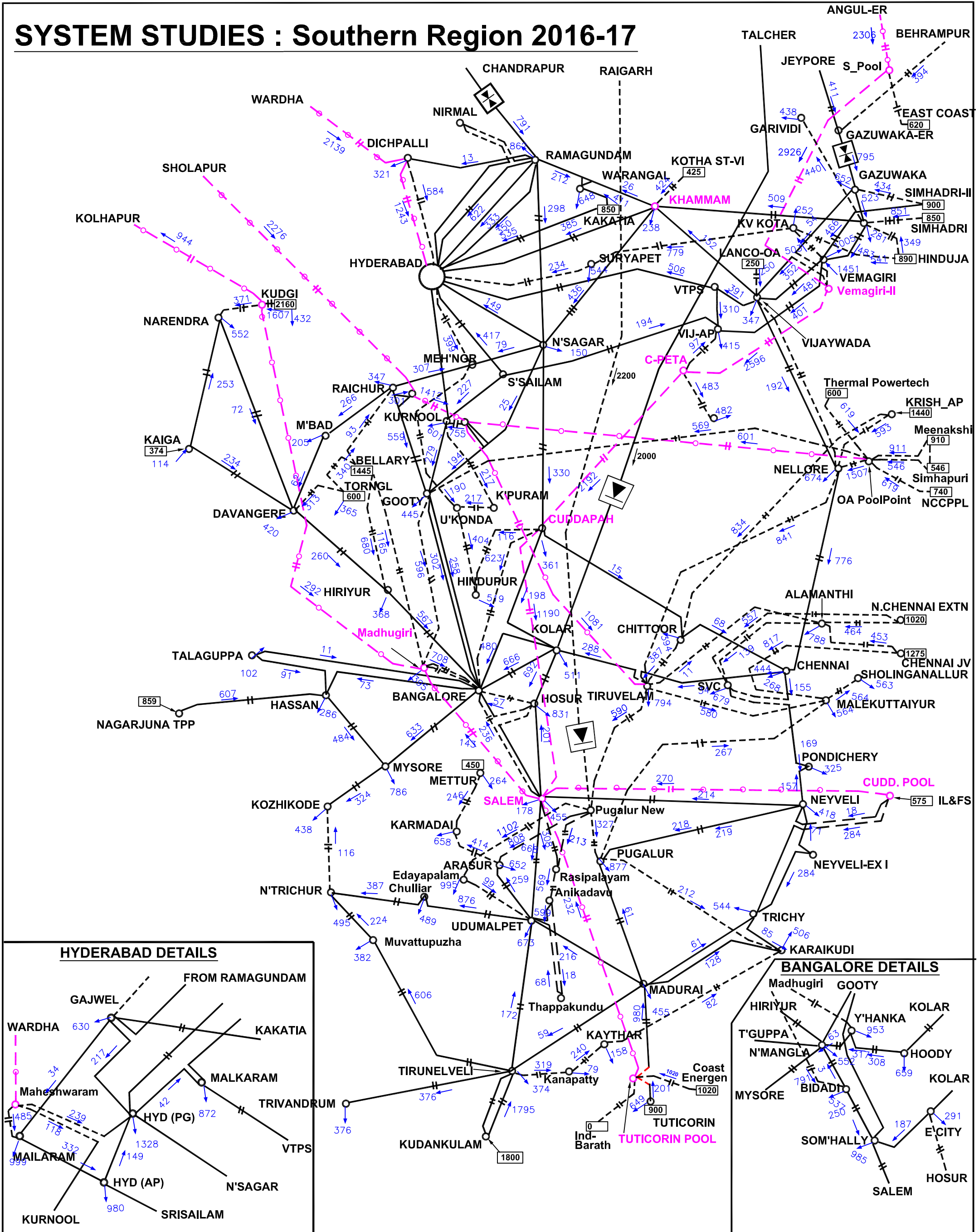
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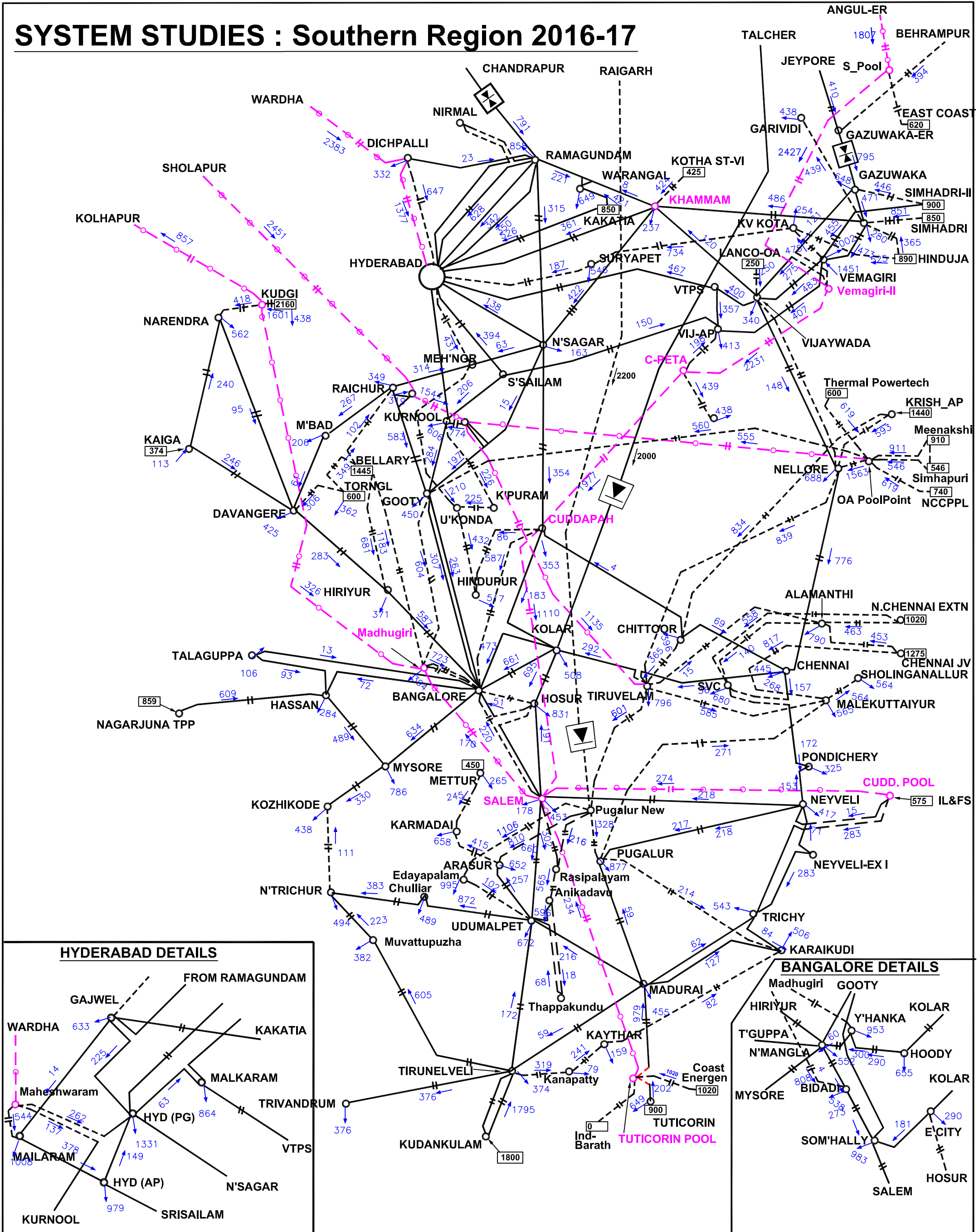
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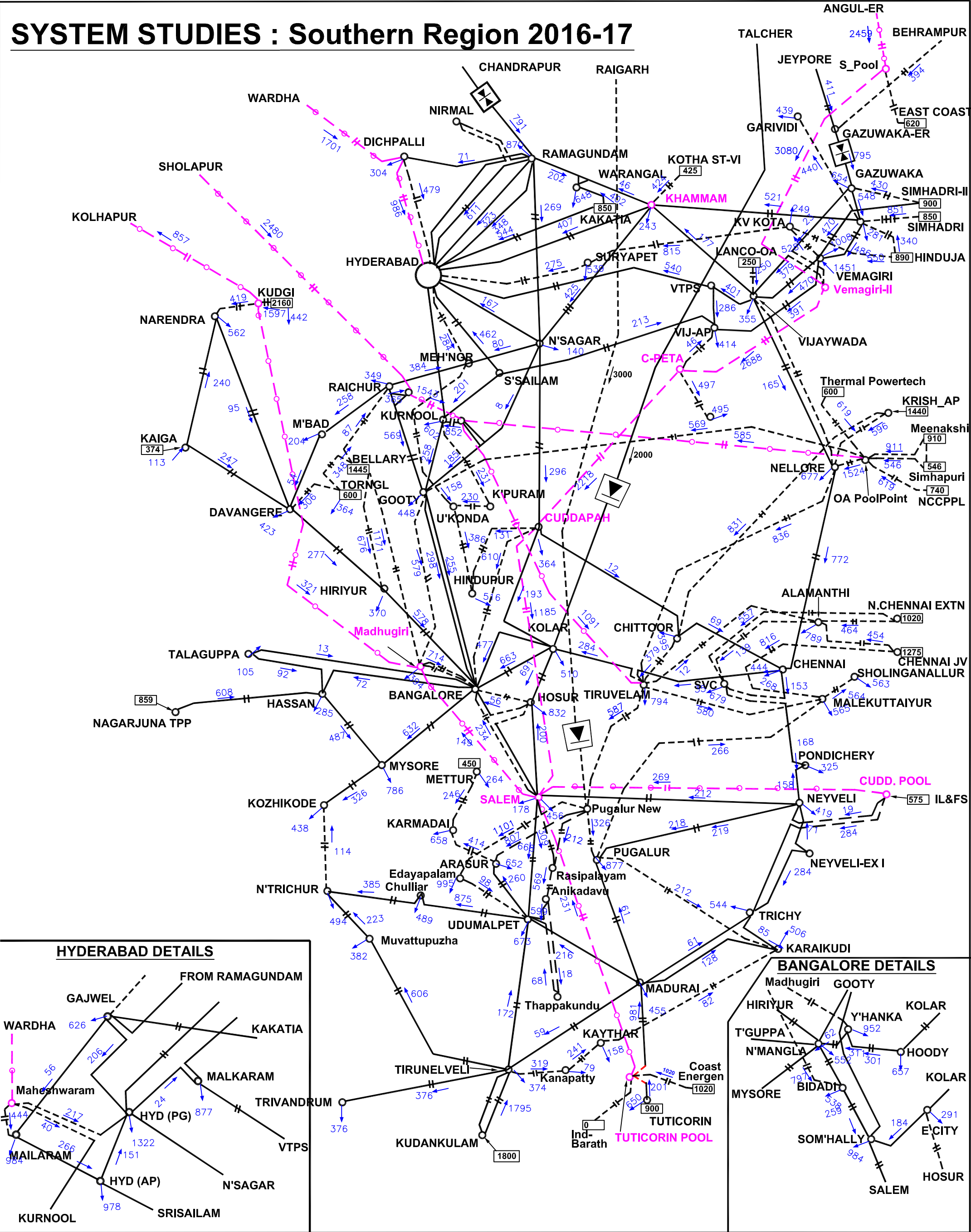
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SYSTEM STUDIES IN WESTERN REGION

