

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

**No. 51/4/SP&PA-2011/ 497 - 507**

**Date: 23 May 2011**

**To**

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

**Sub: 32<sup>nd</sup> meeting** of the Standing Committee on Power System Planning of Southern Region  
**- Agenda for the meeting.**

**Sir,**

The **32<sup>nd</sup> meeting** of the Standing Committee on Power System Planning of Southern Region is scheduled to be held on 08<sup>th</sup> June 2011 (Wednesday) at New Delhi. Venue of the meeting would be conveyed separately.

Agenda for the meeting is enclosed. It is also available at CEA’s website( [www.cea.nic.in](http://www.cea.nic.in) ) .

Please make it convenient to attend the meeting.

Yours faithfully,

(Pardeep Jindal)  
Director (SP&PA)

(Telephone: 011 26198092, Fax No. 011 26102045)

Copy to : Sh. SK Soonee, CEO, POSOCO,  
B-9, Qutub Institutional Area,  
Katwaria Sarai, New Delhi-110016

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**Agenda Note for 32<sup>nd</sup> Meeting of  
Standing Committee on Power System Planning in Southern Region (SCPSPSR)**

Time: 10 30 AM    **Date: 08<sup>th</sup> June 2011 (Wednesday)**

Venue: New Delhi (exact venue would be informed separately)

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**1.0 Confirmation of the minutes of 31<sup>st</sup> meeting of the Standing Committee:**

- 1.1 Minutes of 31<sup>st</sup> meeting of the Standing Committee on Power System Planning of Southern Region, held on 16<sup>th</sup> November 2010 at New Delhi, were issued vide CEA's letter number 51/4/SP&PA-2010/ 1295 – 1305 dated 10 December, 2010.
- 1.2 KPTCL vide their letter no. CEE (P&C)/KCO-97199/37199/2011-12 dated 6 April 2011 had given their observations on the Madhugiri – Narendra – Kolhapur 765 kV D/c line and suggested that instead the 765kV (op 400kV) line may be routed as Madhugiri – BB Wadi - Kolhapur.
- 1.4 KPTCL's suggestion has been considered while planning transmission system for Kudgi TPS of NTPC. As such, the minutes as circulated may be confirmed.

**2.0 System studies for strengthening of Southern Region grid, transmission System for evacuation of power from Rayalseema St-IV (Andhra Pradesh), connectivity for Nirmal 400kV S/S of APTRANSCO, power evacuation from Yermarus TPS/Edlapur TPS (Karnataka) and new wind projects in Tamilnadu.**

- 2.1 During 31<sup>st</sup> meeting of the Standing Committee on Power System Planning of Southern Region held on 16<sup>th</sup> November 2010 at New Delhi, it was decided that joint system studies would be carried out by CEA, POWERGRID, APTRANSCO, KPTCL, KSEB, TNEB and POSOCO/SRLDC for following transmission system requirements:
  - i) Strengthening of Southern Region grid to address issue of congestion in the S1-S2 bid areas
  - ii) Transmission System for evacuation of power from Rayalseema St-IV (1x600 MW) of APGENCO in Andhra Pradesh
  - iii) Transmission System for evacuation of power from Yermarus TPS(2x800 MW)/Edlapur TPS(1x800 MW) of KPCL in Karnataka
  - iv) Transmission System for evacuation of power from new wind projects in Udumalpet, Theni and Tirunelveli areas of Tamilnadu
  - v) Connectivity for Nirmal 400kV S/S of APTRANSCO

2.2 Accordingly, system studies were carried out jointly with engineers from POWERGRID, KPTCL, KSEB, APTRANSCO, TNEB and SRLDC during 02-03 December 2010 at POWERGRID's Gurgaon office. The copy of Study Report is enclosed at **Annexure-I**.

2.3 Based on the studies, following system strengthening was proposed:

**i) Strengthening of Southern Region grid to address issue of congestion in the S1-S2 bid areas as a regional strengthening scheme**

- a. Vijayawada – Nellore (AP) 400 kV D/C line
- b. Nellore (AP) - Tiruvalem 400 kV D/C Quad
- c. Tiruvalam – Sholinganallur 400 kV D/C line
- d. LILO of existing Bangalore – Salem 400 kV S/C line at Hosur

Members may discuss and finalise

**ii) Transmission System for evacuation of power from Rayalseema St-IV (1x600 MW) of APGENCO in Andhra Pradesh**

Either

- a. Rayalseema(Muddanur) - Hindupur 400kV D/C line and a 400/220 kV S/S at Hindupur

or

- b. Rayalseema(Muddanur) - Chitoor 400kV D/C line

Members may discuss and finalise

**iii) Connectivity for Nirmal 400kV S/S of APTRANSCO**

- a. One of the circuit's of Ramagundam – Hyderabad 400kV lines may be LILOed at Nirmal. This LILO may be drawn from towers just outside the Ramagundam STPS switchyard to minimize the length of lines.
- b. Possibility of a spare bay/ space at NTPC's Ramagundam STPS switchyard may be re-explored to connect Nirmal with Ramagundam.

Members may discuss and finalise

**iv) Transmission System for evacuation of power from Yermarus TPS(2x800 MW)/Edlapur TPS(1x800 MW) of KPCL in Karnataka**

Transmission alternatives studied during the joint studies are given in the study report.

KPTCL has accepted following transmission system (load flow results are given Exhibit-Yermarus):

**Transmission system for Yermarus and Edlapur TPS:**

- a) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line
- b) The existing Raichur TPS – Davangere 400kV S/C line to be replaced with a new 400kV D/C line with QUAD conductors alongwith shifting of Raichur termination point to Yeramaras TPS switchyard.
- c) BTPS switchyard – Hiriryur (under construction) 400 kV D/c Twin line
- d) Yermarus TPS – Raichur (New) 400kV Quad D/C line
- e) BTPS – Madhugiri – 400 kV Quad D/c line
- f) Yeramaras – Basavanabagewadi (BB Wadi) 400 kV D/c Twin line
- g) Establishment of BB Wadi 400/220 kV substation.

Members may discuss and finalise.

**3.0 Strengthening of SR Grid to Facilitate Import of Power**

The transmission system of SR for past years has been planned basically considering SR as surplus in power due to overwhelming response from IPP projects for establishment of large sized coastal based generation projects. Further, this premise has been supported due to proposal for establishment of UMPP in AP and Tamil Nadu.

Now looking into the progress of the generation projects vis-à-vis the likely load projections considered in the above carried out joint studies there is likelihood that SR may need import of power from other regions. In this regard, it is prudent to mention that while planning the synchronous interconnection of SR with WR the basic premise has been export of power. This link is planned associated with Krishnapatnam UMPP in which 4000 MW power of the project is evacuated upto Raichur/Gooty from where the power is exported over Raichur-Sholapur 765 kV lines. In this arrangement if SR avails import of power over this line then it is seen that power is bottled up overloading the transmission lines beyond Gooty.

The studies have been carried out for import scenario for 2016-17 timeframe considering import of the order of 3500-4000 MW. For importing and absorbing this power further in SR, it is seen that Kurnool – Tiruvalam 765 kV D/C line presents the most optimal solution, in the base case this line carries about 2750 MW. Accordingly, following transmission system is proposed as system strengthening for SR to facilitate import of power.

**Proposed system**

1. Kurnool – Tiruvalam 765 kV D/c line
2. Provision of 2x1500 MVA, 765/400 transformers at Tiruvalam
3. LILO of Kolar – Sriperumbudur 400 kV S/c line at Tiruvalam.

POWERGRID to make presentation, members may discuss and finalize.

## 4.0 Transmission System for Evacuation of Wind Power from Tamil Nadu

- 4.1 The transmission system for wind generation projects in Tamil Nadu was first discussed and evolved in the 23<sup>rd</sup> Meeting of Standing Committee held on Jan 22, 2007. The evolved transmission system involved establishment of 400kV substation in the Tirunelveli area, where wind power concentration is there, and a 400 kV corridor up to Chennai. These transmission systems were to be built by TNEB. Detailed transmission system to be built by TNEB is given below:
- i) Tirunelveli (TNEB) (TN wind/Kanarapatty) 400/230 kV S/S, 3x315 MVA
  - ii) Tirunelveli (TNEB) - Tirunelveli (PG), 400 kV Quad D/C line.
  - iii) Five numbers of 230/33 kV wind energy substations at Marandai, Sayamalai, Vagaikulam, Kumarapuram, Sankaralingapuram and one 230/110 kV Samugarangapuram substation with associated 230 kV lines connecting with the Kanarapatty 400 kV S/S.
  - iv) Kanarapatty (TN Wind) - Kayathar 400 KV, 400 kV D/C line.
  - v) Kayathar - Karaikudi , 400 kV D/C Quad line
  - vi) Karaikudi - Pugalur 400 kV D/C Quad line
  - vii) Establishment of 400/230-110 kV S/S with 2x315 MVA 400/230 kV ICT, and 2x200 MVA 400/110 kV ICT at Kayathar.
  - viii) Pugalur – Sholinganallur (Ottiampakkam), 400 kV D/C Quad line.
- 4.2 The wind power in Tamil Nadu at the time of planning of above transmission system was about 2878 MW. At present wind power in Tamil Nadu has enhanced to about 5468 MW i.e. addition of about 2600 MW
- 4.3 It has been observed that TNEB have not completed the above transmission system even after 4 years it was planned. The status update for the planned transmission provided by TNEB in the 31st meeting of Standing Committee held on Nov'2010 is given at Annex-I. It is seen that some part of the above system is still under survey stage and for majority portion, the work is either not taken up or has been deferred.
- 4.4 This would not only block transmission of existing wind electricity but would also hamper the connectivity of additional wind capacity (proposed about 8000MW addition up to 2016-17).
- 4.5 During the joint study with CEA, KPTCL, KSEB, TNEB, SRLDC, POSOCO and APTRANSCO at POWERGRID's Gurgaon office on 02-03 December 2010, TNEB informed that existing wind generation capacity exists in Tamilnadu is of the order of 5500 MW (3500 MW in Tirunelveli/Kayathar area and 2000 MW in Udumalpet/Theni area). Addition wind generation capacity of about 3300 MW (Tirunelveli area – 2000 MW, Udumalpet area – 800 MW and Theni area 500 MW) was proposed to be added by end of 11th Plan. Further, during 12th Plan, more than 5000 MW may also be added in Tamilnadu.
- 4.6 In the 31st meeting of SCPSR, Chief Engineer, CEA had expressed that huge wind generation capacity addition, in Tamil Nadu or any other State for that matter, should be factored in transmission planning so that wind generation does not have to back down when local demand is not sufficient. The requisite inter-State transmission system should be put in place for absorbing surplus wind generation in the rest of the country. The requisite system strengthening for this purpose should be done as a matter of transmission planning philosophy without requiring any application for LTA. The intra- State transmission system up to the

ISTS points near boundary of the State or up to ISTS pooling point directly feeding to 765kV/ HVDC trunk transmission system should be developed by STU.

4.7 TNEB was suggested to work out wind power likely to be added in Tirunelveli, Kayathar, Theni and Udumalpet areas for the periods 2012-2015. TNEB would indicate quantum of power to be injected at these locations for three seasons of winter, monsoon and summer for period 2012-2015.

4.8 TNEB is required to present relevant analysis and studies.

**5.0 Status of Under Construction / Approved Schemes:**

5.1 Powergrid may inform the progress of the transmission works that are being implemented by them as part of regional schemes.

5.2 State Utilities may inform the progress on their transmission works that are necessary to match with the regional schemes by Power grid for effective utilization of the system:

i) APTRANSCO may inform status of the transmission system for Kothagudam TPS Stage-VI, Bhoopalapally Stage-I and Stage –II projects.

ii) KPTCL may inform status the Nagarjuna TPS(UPCL)-Hassan 400kV D/C line and transmission system for in the Yeramas and Edlapur generating station.

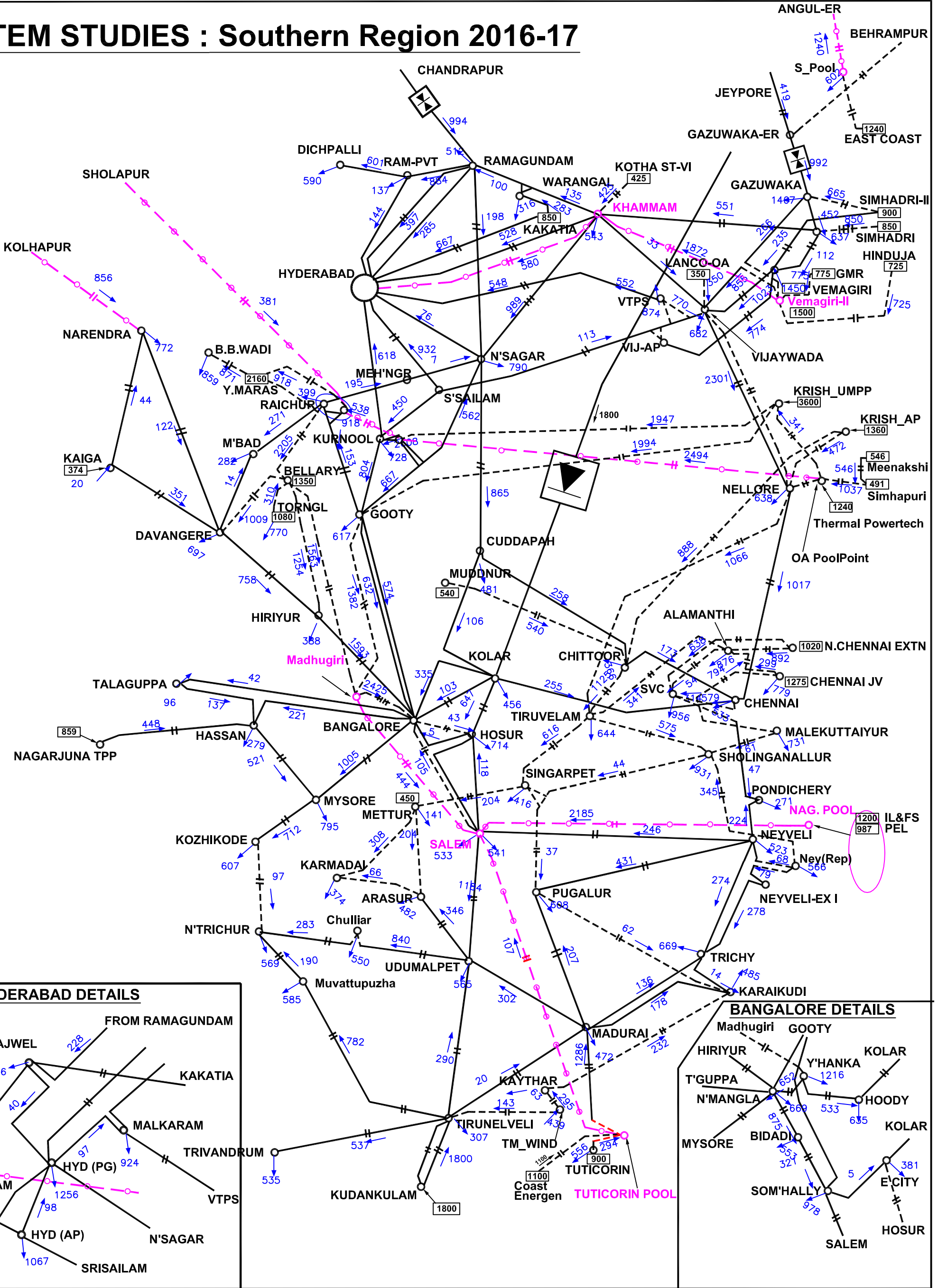
iii) TNEB may inform about status of transmission system for NCTPS Stage-II, Mettur TPS-III, Udangudi TPS and the transmission system for evacuation of wind power in Tirunelveli/Kayathar area i.e. Kanarpathy - Kayathar- Karaikudi -Pugalur- Singarapet - Sholinganallur 400kV system.

**6.0. The committee may take up the Agenda point regarding Connectivity and LTA applications circulated by PGCIL.**

**7.0 Any other issue with the permission of Chairman.**

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# SYSTEM STUDIES : Southern Region 2016-17



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

**No. 51/4/2010-SP&PA/156-162**

**Date: February 09, 2011**

To

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|------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| 1. The Executive Director (SEF, CE &IT),<br>Power Grid Corp. of India Ltd.<br>“Saudamini”, Plot No.2, Sector-29,<br>Gurgaon - 122 001, Haryana | 2. The Director (Transmission),<br>Transmission Corp. of Andhra Pradesh Ltd.,<br>Vidyut Soudha,<br>Hyderabad – 500 082.                        |
| 3. The Director (Transmission),<br>Karnataka State Power Transmission<br>Corp.Ltd.,<br>Cauvery Bhawan,<br>Bangalore - 560 009                  | 4. The Member (Transmission),<br>Kerala State Electricity Board,<br>Vidyuthi Bhawanam, Pattom, P.B. No.<br>1028, Thiruvananthapuram – 695 004. |
| 5. Member (Distribution),<br>Tamil Nadu electricity Board (TNEB),<br>6 <sup>th</sup> Floor, Eastern Wing, 800 Anna Salai,<br>Chennai – 600002. | 6. The General Manager,<br>Southern Regional Load Dispatch Centre,<br>29, Race Course Cross Road,<br>Bangalore 560 009                         |

**Sub: System studies for strengthening of Southern Region grid, transmission System for evacuation of power from Yermarus TPS/Edlapur TPS (Karnataka), Rayalseema St-IV (Andhra Pradesh) & new wind projects in Tamilnadu, and connectivity for Nirmal 400kV S/S of APTRANSCO**

Reference: 31<sup>st</sup> meeting of the Standing Committee on Power System Planning of Southern Region held on 16<sup>th</sup> November 2010 at New Delhi

Sir,

Based on the discussions during 31<sup>st</sup> meeting of the Standing Committee on Power System Planning of Southern Region, held on 16 November 2011 at New Delhi, system studies were carried out in POWERGRID’s Gurgaon office during 02-03 December 2010.

The studies were carried out for following transmission system requirements:

- i) Strengthening of Southern Region grid to address issue of congestion in the S1-S2 bid areas
- ii) Transmission System for evacuation of power from Rayalseema St-IV (1x600 MW) of APGENCO in Andhra Pradesh



- iii) Transmission System for evacuation of power from Yermarus TPS(2x800 MW)/Edlapur TPS(1x800 MW) of KPCL in Karnataka
- iv) Transmission System for evacuation of power from new wind projects in Udumalpet, Theni and Tirunelveli areas of Tamilnadu
- v) Connectivity for Nirmal 400kV S/S of APTRANSCO

These studies were carried out jointly with engineers from POWERGRID, KPTCL, KSEB, APTRANSCO, TNEB and SRLDC.

**A copy of study report is enclosed.**

(Pardeep Jindal)  
Director(SP&PA)

**Copy to:**

1. The Member Secretary,  
Southern Regional Power Committee,  
29, Race Course Cross Road,  
Bangalore 560 009

**Report on System studies for strengthening of Southern Region grid, transmission System for evacuation of power from Yermarus TPS/Edlapur TPS (Karnataka), Rayalseema St-IV (Andhra Pradesh) & new wind projects in Tamilnadu, and connectivity for Nirmal 400kV S/S of APTRANSCO**

**1.0 Background:**

1.1 During 31<sup>st</sup> meeting of the Standing Committee on Power System Planning of Southern Region held on 16<sup>th</sup> November 2010 at New Delhi, it was decided that joint system studies would be carried out by CEA, POWERGRID, APTRANSCO, KPTCL, KSEB, TNEB and POSOCO/SRLDC for following transmission system requirements:

- i) Strengthening of Southern Region grid to address issue of congestion in the S1-S2 bid areas
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- iv) Transmission System for evacuation of power from new wind projects in Udumalpet, Theni and Tirunelveli areas of Tamilnadu
- v) Connectivity for Nirmal 400kV S/S of APTRANSCO

1.2 Accordingly, system studies were carried out jointly with engineers from POWERGRID, KPTCL, KSEB, APTRANSCO, TNEB and SRLDC during 02-03 December 2010 at POWERGRID's Gurgaon office.

**List of participants is given at Annex-I.**

**2.0 Assumptions:**

Following assumptions in respect of time-frame of studies, demand projections and generation additions in Southern Region, were made for carrying out different studies

**2.1 Time-frame for studies:**

Studies were carried out for two time-frames –

- (1) Time-frame 2013-14 - i.e. the minimum time by which the planned system can get commissioned, and
- (2) Time-frame 2016-17 - to plan transmission system for Yermarus/Edlapur projects and also to assess the efficacy of planned system when new generation projects and their associated transmission systems shall be available.

## 2.2 Demand projections:

For the 2013-14 time frame, the load demand to be considered for this time was assessed. The constituents gave projected load which when compared with the present unrestricted peak demand shall require load growth of the order of 13-14% per year which are appearing to be some what un-realistic. Therefore, two base cases were established; Case-1 corresponding to the load projected by the different constituents and second Case-2 corresponding to load growth of 9% over and above the present unrestricted peak demand.

The peak load projections were considered in the two scenarios is as given below:

State	Peak Demand (MW) for 2013-14 time-frame	
	Demand Case-1 (Projected by Constituents)	Demand Case -2 (considering 9% load growth over and above unrestricted present peak demand
Andhra Pradesh	17000	15500
Karnataka	12000	11000
Kerala	4000	4100
Tamil Nadu	17000	15500
<b>Total Regional</b>	<b>50,000</b>	<b>46,100</b>

For 2016-17 time-frame, the demand projections as given in the 17<sup>th</sup> EPS were considered, which are given below:

State	Peak Demand (MW) for 2016-17 time-frame
Andhra Pradesh	21845
Karnataka	13092
Kerala	4574
Tamil Nadu	21976

## 2.3 Generation addition assumptions:

For 2013-14 time-frame:

Though by the 2013-14, time frame a number of new generating stations were scheduled to be commissioned, however, it was seen that few of them might get delayed and could cause stress to the system for import of power by Southern

region constituents. The projects which may get delayed and accordingly not considered in the studies are as given below:

1. Out of 7000 MW capacity addition indicated by IPPs in Vemagiri, only 1500 MW were considered for 2013-14 time-frame
2. In Krishnapatnam area, out of 5000 MW by IPPs, only 1000 MW dispatch has been considered, similarly for Krishnapatnam UPPP out of 6 units of 660 MW each only 3 units have been considered to be available for 2013-14.
3. In Tuticorin area, only Coastal Energen has been is taken and Ind-Barath (1320 MW) has not been considered.
4. Kaplakkam PFRB 500 MW may be delayed beyond 2013-14.
5. 300 MW at Neyveli-I consider to be retired.
6. Kudankulam U#1 and 2 are planned to come by 2011. Therefore for base case studies, these units were taken in the studies. However, a sensitivity case was been carried out with and without Kudankulam for 2013-14 scenario

For 2016-17 time-frame:

All the generation projects in Southern region, for which transmission system have been planned or LTA/LTOA have been granted, were considered. Though transmission system for Tamilnadu(Cheyyur) UMPP have been planned, this project may slip to 13<sup>th</sup> plan, and therefore, this project was not considered.

### **3.0 Strengthening of Southern Region grid to address issue of congestion in the S1-S2 bid areas:**

- 3.1 To address the issue of congestion in the S1-S2 bid area, it was decided that studies be planned for 2013-14 time frame as this is the minimum time by which the planned strengthening system can get commissioned. The efficacy of planned system was assessed for 2016-17 time-frame also.
- 3.2 Based on the studies, following system strengthening is proposed:
  1. Vijayawada – Nellore (AP) 400 kV D/C line
  2. Nellore (AP) - Tiruvalem 400 kV D/C Quad
  3. Tiruvalam – Sholinganallur 400 kV D/C line
  4. LILO of existing Bangalore – Salem 400 kV S/C line at Hosur

The above system was tested for following extreme conditions of – i) no Kudankulam generation, and ii) nil wind generation scenario. The system was also tested for both the demand projection scenarios. Efficacy of the planned system was also assessed for 2016-17 time frame.

3.3 Load flow results are given in following Exhibits:

<b>Sl. No.</b>	<b>Load Flow Case</b>	<b>Exhibit No.</b>
1.	Base case - Starting case	S1-S2/1
2.	Case 1 : Vijayawada-Nellore(PP)-Tiruvalam-Sholingallur Strengthening	S1-S2/2
3.	Case 2 : Vijayawada-Nellore(AP), Nellore(PP)-Tiruvalam-Sholingallur Strengthening	S1-S2/3
4.	Case 3 : Vijayawada- Nellore(AP)-Tiruvalam-Sholingallur Strengthening	S1-S2/4
5.	Case 3.1: Case 3 with Outage of Tiruvalam-Sholingallur 400kV D/c line	S1-S2/5
6.	Case 3.2: Case 3 without Kudankulam APP Generation	S1-S2/6
7.	Case 3.3: Case 3 without Wind Generation of Tamilnadu	S1-S2/7
8.	Case 3.4: Case 3 without Kudankulam APP Generation and Mysore-Kozhikode 400kV D/c line not available.	S1-S2/8
9.	Case 3.5: Case 3 with Vijayawada-Nellore-Chennai Strengthening and LILO of Salem - Somanahalli 400kV S/c line at Hosur – Final recommended case	S1-S2/9
10.	Case 3.6: Case 3.5 with “Demand Case-2” loads	S1-S2/10
11.	2016-17 Case	KTK/1

#### **4.0 Transmission System for evacuation of power from Rayalseema St-IV of APGENCO in Andhra Pradesh:**

4.1 APTRANSCO representative informed that the generation unit would be ready by 2013-14; accordingly, the studies were carried out for 2013-14 time frame.

4.2 Following six transmission alternatives were studied:

Sl. No	Load Flow Case	Exhibit No.
1.	Alt-1: Rayalseema(Muddanur) - Gooty 400kV D/C line	RTPP/1
2.	Alt-2: Rayalseema(Muddanur) - Hindupur 400kV D/C line and a 400/220 kV S/S at Hindupur	RTPP/2
3.	Alt-3: Rayalseema(Muddanur) - Chitoor 400kV D/C line	RTPP/3
4.	Alt-4: Rayalseema(Muddanur) – Gooty, Muddanur – Hindupur, and Gooty – Hindupur 400kV S/C lines, and a 400/220 kV S/S at Hindupur	RTPP/4
5.	Alt-5 : Rayalseema(Muddanur) – Gooty, and Gooty – Hindupur 400kV S/C lines, and a 400/220 kV S/S at Hindupur	RTPP/5
6.	Alt-6: Rayalseema(Muddanur) – Hindupur, and Hindupur - Gooty 400kV S/C lines, and a 400/220 kV S/S at Hindupur	RTPP/6

4.3 To start with alternatives 4,5 & 6 were studied to get an idea of how the power would flow from the Rayalseema TPS. It was observed that in all of these alternatives (no.4, 5 and 6), the flow of power was mainly towards Hindupur, which indicated need of establishing a 400/220kV S/S at Hindupur by APTRANSCO. Accordingly, Alt-1, 2 and 3 were finally agreed to be studied in detail.

4.4 In the Alternatives- 1, 2 and 3, the loading on 220 kV existing evacuation lines from Rayalseema/Muddanur were within the acceptable limits. In Alternative - 2 the flow on Rayalseema – Cuddapah 220 kV D/c line was about 260 MW per circuit, which is also within limits considering that this line is constructed with as twin MOOSE conductor and has thermal limit of about 400 MW per circuit.

In Alternative–1, it was seen that the State generation was directly injected into ISTS grid at Gooty without having any self-sufficient transmission system for evacuation and absorption of power within the State of Andhra Pradesh. It was also loading extra 40 to 100 MW on lines emanating from Gooty.

4.5 Further, the losses in Alternative – 1, 2 and 3 were also studied. Losses in the AP grid and Southern Region grid in these alternatives are given below:

Losses, MW	Alt - 1	Alt - 2	Alt - 3
SR Grid	1463	1435	1419
AP Grid	399	387	384

It is observed that SR losses under Alt-1 were 30-40 MW more than those in the other alternatives. And losses in the AP grid were 5-12 MW more as compared to those in other two alternatives.

4.6 Considering above observation, the joint study group Accordingly, joint study group recommends adoption of Alt –2 or Alt-3 by APTRANSCO for evacuation of power from APGENCO’s Rayalseema IV TPS (1x600 MW).

**5.0 Transmission System for evacuation of power from Yermarus TPS(2x800 MW)/Edlapur TPS(1x800 MW) of KPCL in Karnataka:**

5.1 KPTCL reprehensive informed that Yermarus TPS was scheduled for 2014-15 and Edlapur could come by 2016-17. Regarding, Kudgi generation of NTPC, the study group discussed that there was no progress on ground for this project and it may slip to 13<sup>th</sup> Plan, accordingly, transmission system for Yermarus/Edlapur may be planned without considering Kudgi. In future, when NTPC applies for LTA for this project, the transmission system requirements for evacuation of power from Kudgi could be planned. Also, as capacity of Kudgi project is 4000 MW, the transmission system for this project could be based on 765kV system. Thus, the Kudgi project was not considered for planning transmission system for Yermarus/Edlapur projects. The studies were carried out for 2016-17 time frame.

5.2 Following **six alternatives** were studied:

Sl. No.	Load Flow Case	Exhibit No.
1	<p><b><u>Alt -1: Base Case:</u></b>            (the transmission system proposed in agenda for 31<sup>st</sup> meeting of SCSPSR)</p> <ul style="list-style-type: none"> <li>i) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line</li> <li>ii) Yermarus TPS – Raichur New (PGCIL) 400 kV Quad D/C line</li> <li>iii) The planned LILO of RTPS-Gooty at Raichur New would be bypassed through a bypass arrangement so as to retain RTPS-Gooty direct connection</li> <li>iv) Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line</li> <li>v) Basavana Bagewadi – Narendra (PGCIL) 400kV D/C line</li> <li>vi) Basavana Bagewadi 400/220 kV 2x500 MVA Substation</li> </ul>	KTK/1

Sl. No.	Load Flow Case	Exhibit No.
2	<p><b><u>Alt -2:</u></b></p> <p>i) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line  ii) The existing Raichur TPS – Davangere 400kV S/C line to be replaced with a new 400kV D/C line with QUAD conductors  iii) Creation of Bellary Pooling Point by LILO of Raichur TPS – Davangere 400kV D/C Quad line and also LILO of Bellary TPS-Madhugere 400kV D/C line. Shifting connectivity of Torangallu TPS to Bellary Pooling Point  iv) Yermarus TPS – Bellary PP 400kV Quad D/C line  v) Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line</p>	KTK/2
3	<p><b><u>Alt -3 :</u></b></p> <p>Alt-2 above, but the Torangallu – Gooty 400kV D/c ‘Dedicated Transmission Line’ (as earlier approved), to be changed as Torangallu - Hiriyyur 400kV D/C line</p>	KTK/3
4	<p><b><u>Alt -4:</u></b></p> <p>i) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line  ii) Yermarus TPS – Madhugere 400kV Quad D/C line  iii) Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line  iv) Yermarus TPS – Raichur New 400kV Quad D/C line  v) The Raichur TPS – Munirabad 400kV connection to be changed as Yermarus - Munirabad  vi) Torangallu – Hiriyyur 400kV D/C instead of Torangallu - Gooty 400kV D/C line (the Dedicated Transmission Line as earlier approved)</p>	KTK/4
5	<p><b><u>Alt -5:</u></b></p> <p>Alt-4, above but without Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line</p>	KTK/5
6	<p><b><u>Alt -6:</u></b></p> <p>i) Edlapur TPS - Yermarus TPS S/S 400 kV D/C line  ii) Raichur TPS – Davangere 400kV Quad D/C line (additional link between RTPS and Davangere)  iii) Creation of Bellary Pooling Point, as extension of Bellary TPS switchyard, by LILO of Raichur TPS –</p>	KTK/6



Sl. No.	Load Flow Case	Exhibit No.
	Davangere 400kV D/C Quad line iv) Yermarus TPS – Bellary PP 400kV Quad D/C line v) Bellary PP – Madhugere 400kV Quad D/C line (2 <sup>nd</sup> D/C line) vi) Yermarus TPS – Basavana Bagewadi 400 kV Quad D/C line vii) Torangallu – Bellary PP 400kV D/C instead of Torangallu - Gooty 400kV D/C line (the Dedicated Transmission Line as earlier approved)	

5.3 KPTCL representative would discuss above alternatives within his organisation, to also assess their feasibilities, and inform CEA if any further changes/alternatives were to be studied.

**6.0 Transmission System for evacuation of power from new wind projects in Udumalpet, Theni and Tirunelveli areas of Tamilnadu:**

6.1 TNEB representatives informed that existing wind generation capacity exists in Tamilnadu is of the order of 5500 MW (3500 MW in Tirunelveli/Kayathar area and 2000 MW in Udumalpet/Theni area). Addition wind generation capacity of about 3300 MW (Tirunelveli area – 2000 MW, Udumalpet area – 800 MW and Theni area 500 MW) was proposed to be added by end of 11<sup>th</sup> Plan. Further, during 12<sup>th</sup> Plan, more than 5000 MW may also be added in Tamilnadu.

6.2 The study group discussed these aspects and suggested that TNEB may work out wind power that is likely to be added in Tirunelveli, Kayathar, Theni and Udumalpet areas for the periods 2012-2015. TNEB would indicate quantum of power to be injected at these locations for three seasons of winter, monsoon and summer for period 2012-2015. Based on this input, further studies would be carried out in light of the principle set up during 31<sup>st</sup> meeting of SCPSR. Which is - that wind generation does not have to back down when local demand is not sufficient, and that the requisite inter-State transmission system should be put in place for absorbing surplus wind generation in the rest of the country. The requisite system strengthening for this purpose should be done as a matter of transmission planning philosophy without requiring any application for LTA. The intra- State transmission system up to the ISTS points near boundary of the State or up to ISTS pooling point directly feeding to 765kV /HVDC trunk transmission system should be developed by STU.

## **7.0 Connectivity for Nirmal 400kV S/S of APTRANSCO:**

7.1 APTRANSCO had proposed to make LILO of one circuit of Ramagundam-Chandrapur 400kV D/C line at Nirmal(Adilabad district) to meet the growing load demand in that area. APTRANSCO representative informed that they were planning 2x315 MVA 400/220kV transformers at Nirmal.

7.2 In the 31<sup>st</sup> meeting of the SCPSPSR, it was discussed that LILO of Ramagundam-Chandrapur 400kV D/C line would adversely affect import/export capacity between SR and WR over this the SR-WR inter-regional link. The joint study group again discussed this issue and suggested following transmission alternatives for establishing connectivity to Nirmal 400kV S/S:

- One of the circuit's of Ramagundam – Hyderabad 400kV lines may be LILOed at Nirmal. This LILO may be drawn from towers just outside the Ramagundam STPS switchyard to minimize the length of lines.
- Possibility of a spare bay/ space at NTPC's Ramagundam STPS switchyard may be re-explored to connect Nirmal with Ramagundam.

7.3 APTRANSCO representative stated that they would examine feasibility of this arrangement and accordingly, the studies, if required, would be carried out.

## **8.0 Additional observation:**

During the studies following was observed, which required further examination and studies:

- There is a need to strengthen the Khammam- Nagarjuna Sagar 400kV link. For 2016-17 scenario the studies were carried out with additional 400kV D/C line between Khammam – Nagarjuna Sagar.
- Possibility of re-conductoring Nellore-SPBudur(Chennai) line with higher capacity conductors should be explored, so that the problem of increasing transmission capacity to feed Chennai area under the constraint of non-availability of additional bay at SPBudur could be solved.
- Tamilnadu may analyse their power supply position for 2013-2017 time frames, both with and without wind generation availabilities, to assess quantum of export/import into their State. It is particularly needed for Tamilnadu because of (i) intermittency of wind generation, and (ii) high percentage of wind projects (as compared to load or installed capacity with the State) in Tamilnadu.

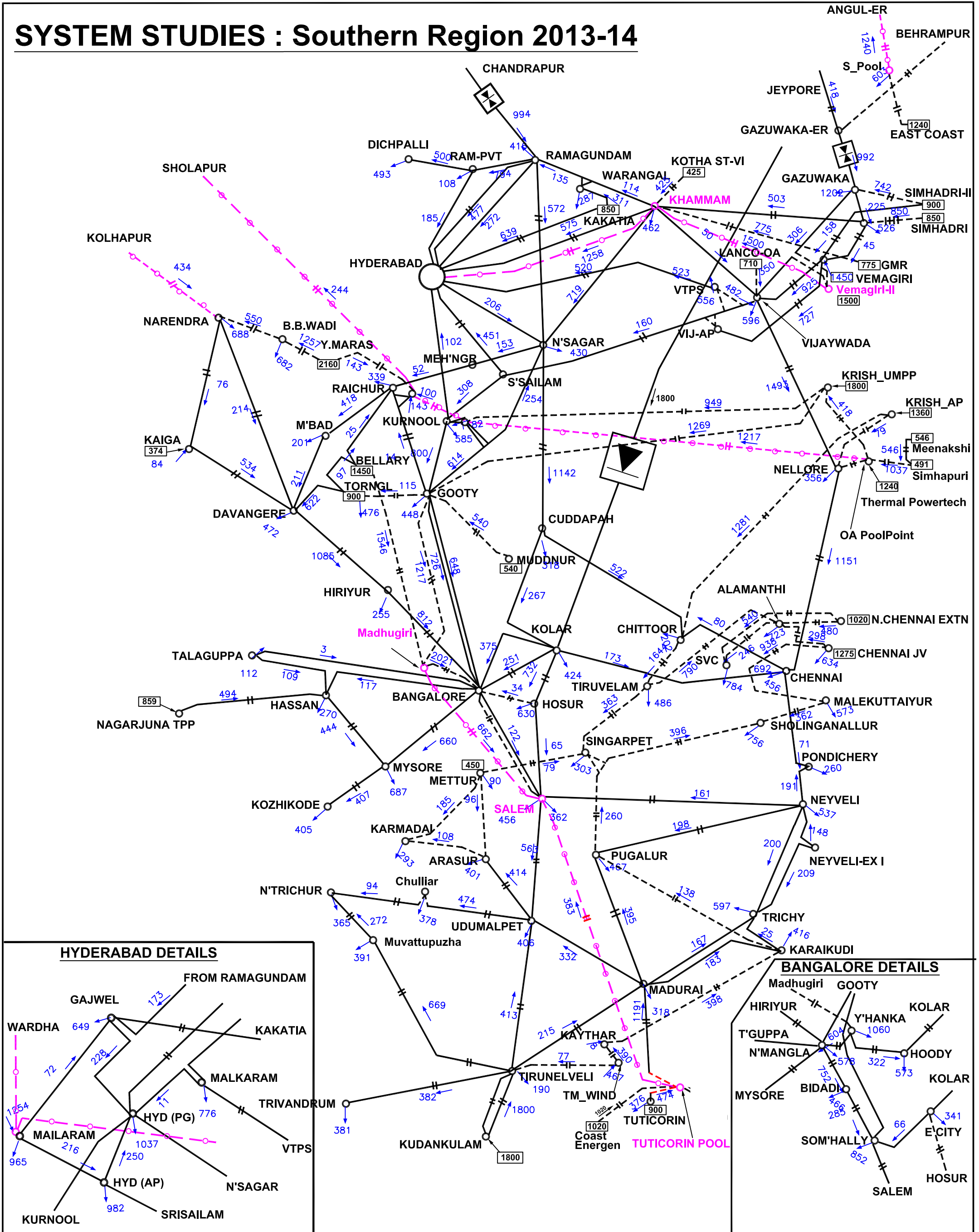
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**List of participants in the Joint Studies:**

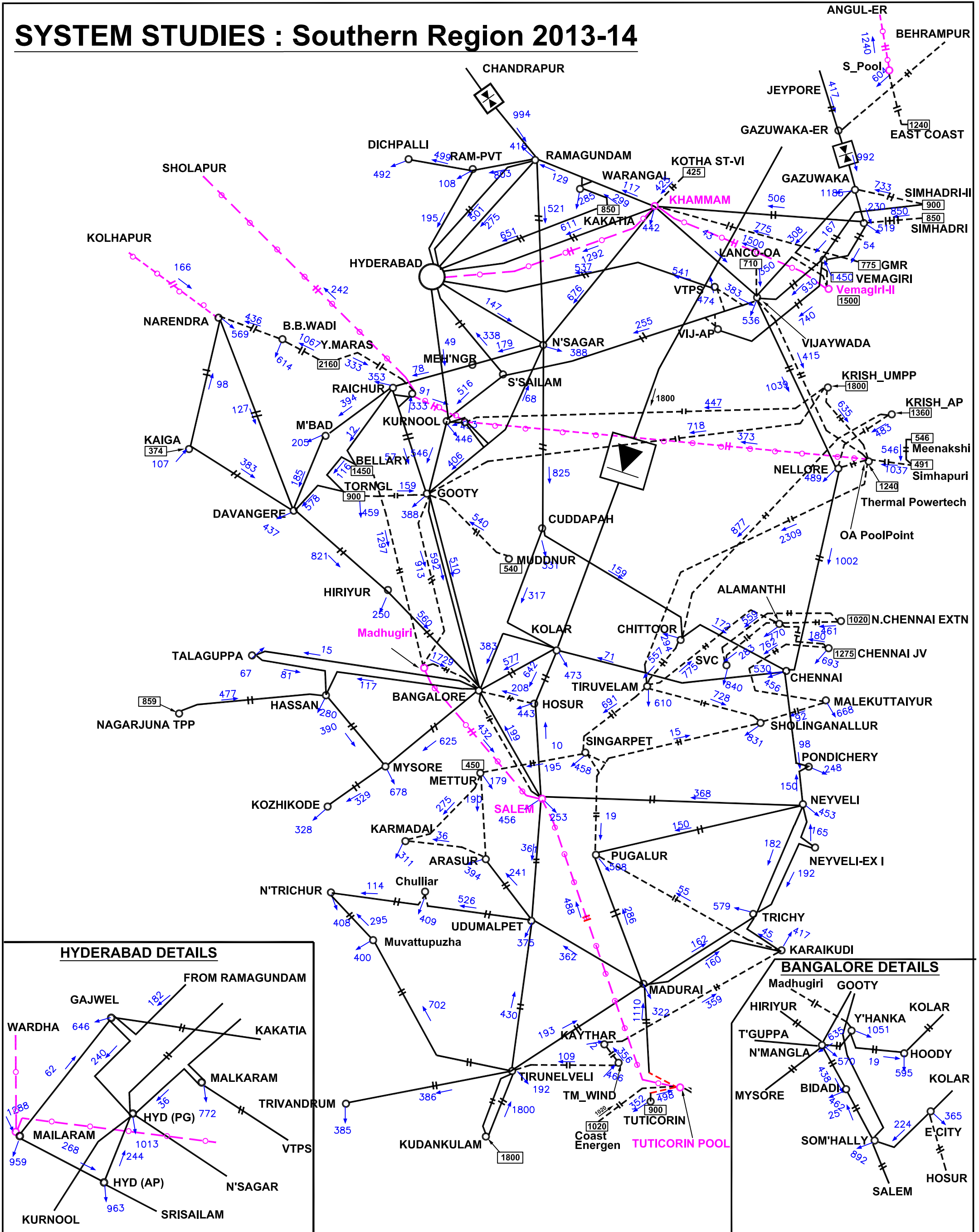
<b><u>Sl. No</u></b>	<b><u>Name of the Participant</u></b>	<b><u>Designation /Organisation</u></b>
1.	Pardeep Jindal	Director, CEA
2.	Dilip Rozekar	DGM, POWERGRID
3.	R. V M M Rao	CDE, POWERGRID
4.	Anil Kumar Meena	ACDE, POWERGRID
5.	S. P. Kumar	CM, POSOCO, SRLDC
6.	Madhukar	Engineer, POSOCO,SRLDC
7.	M. Balasubramanyam	DE/SS, APTRANSCO
8.	Paramesha.K.	AEE/PSS, KPTCL
9.	Biju S.S	AEE/SSG, KSEB
10.	S. Ravichandran	EE, TANGEDCO(TNEB)
11.	Arun Kumar Samuel	AEE/EMS, TANTRANSCO(TNEB)

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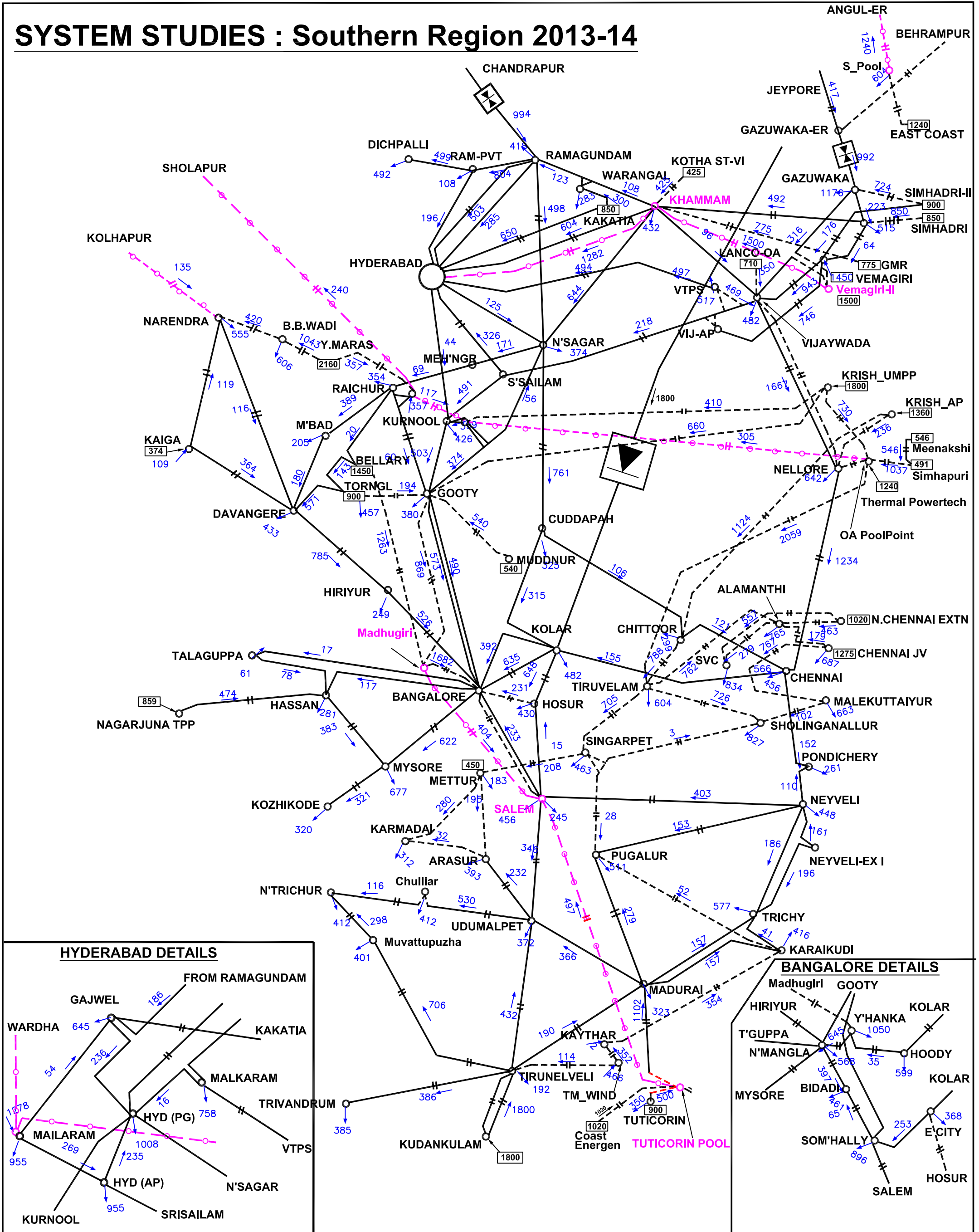
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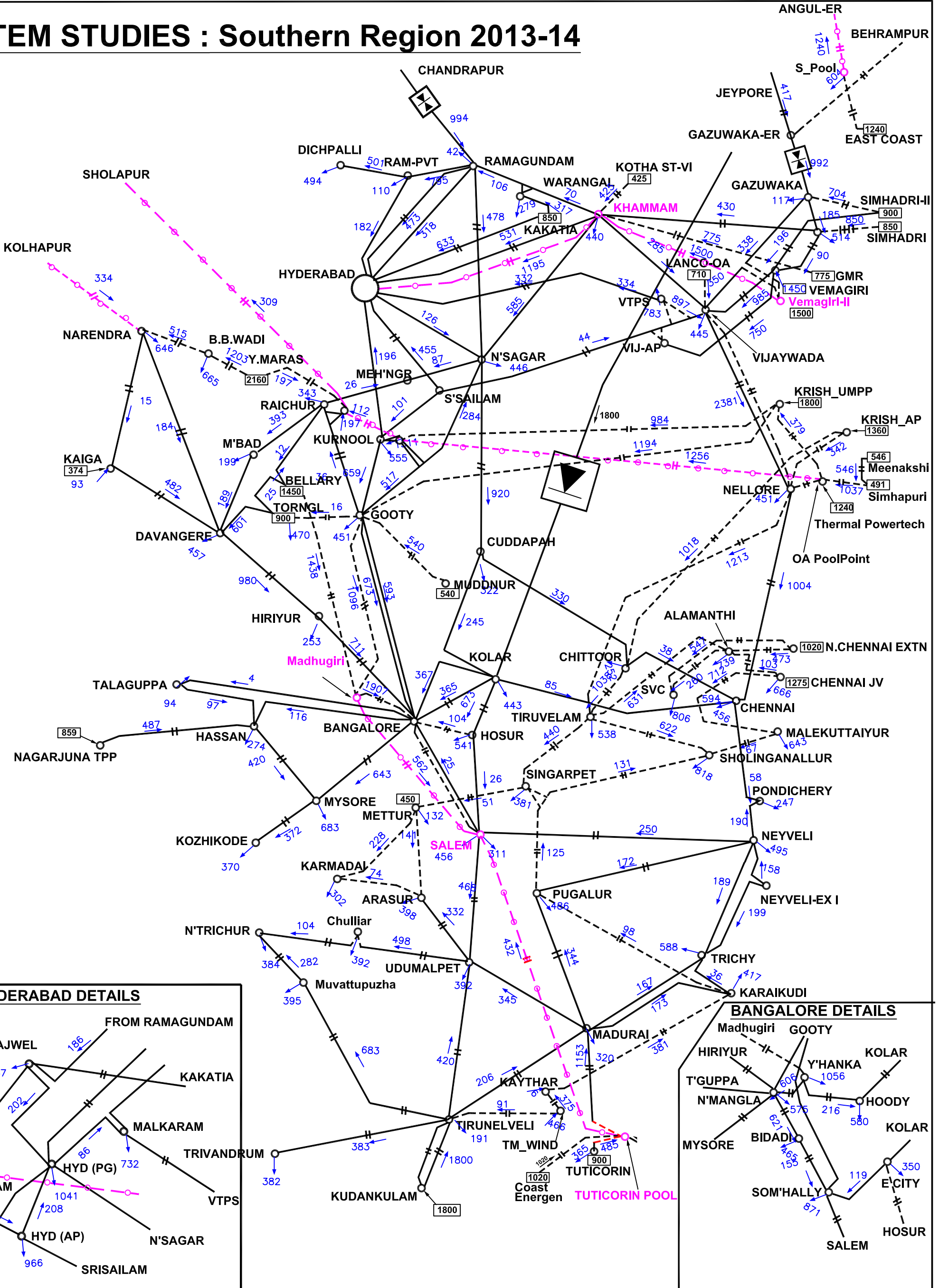
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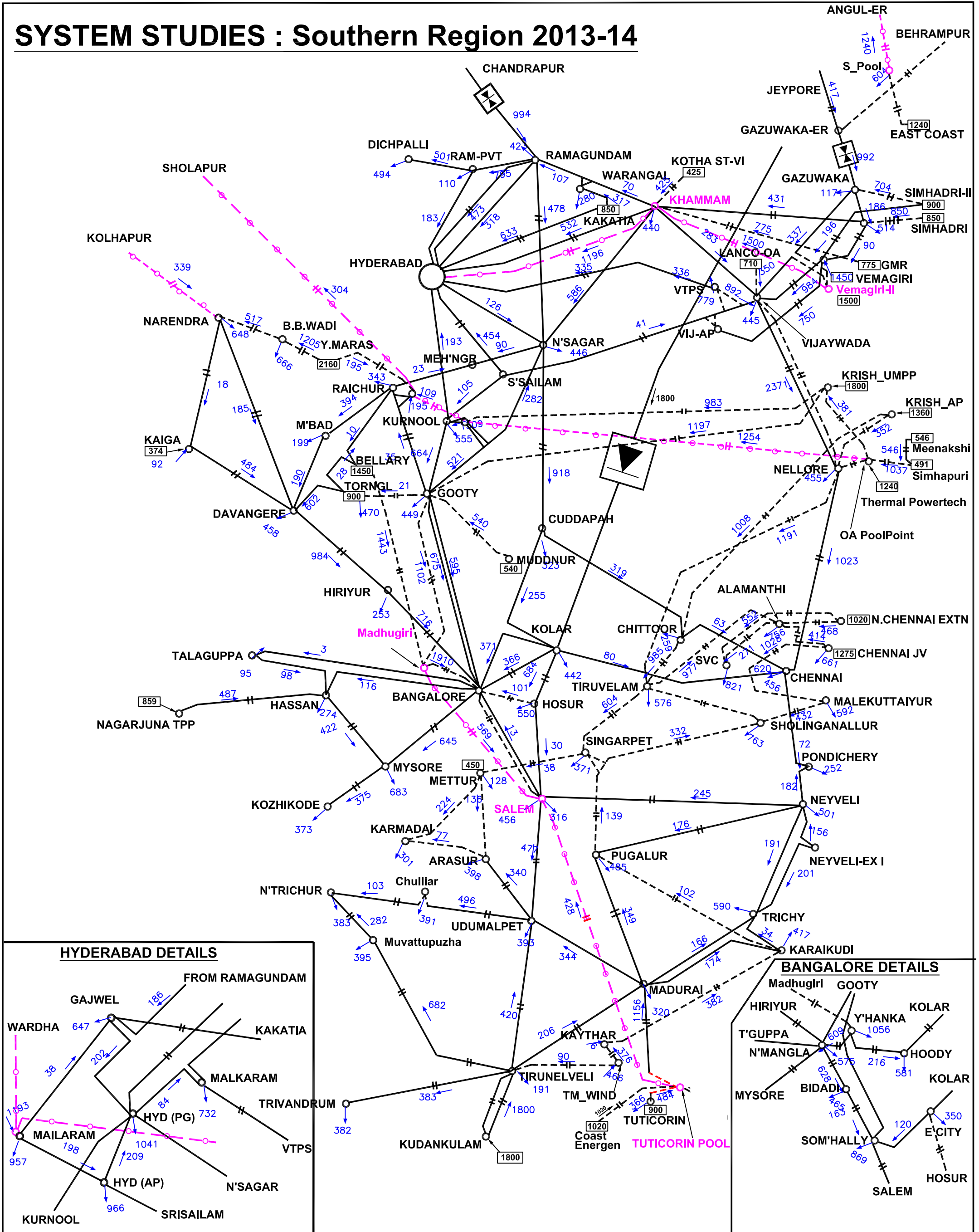
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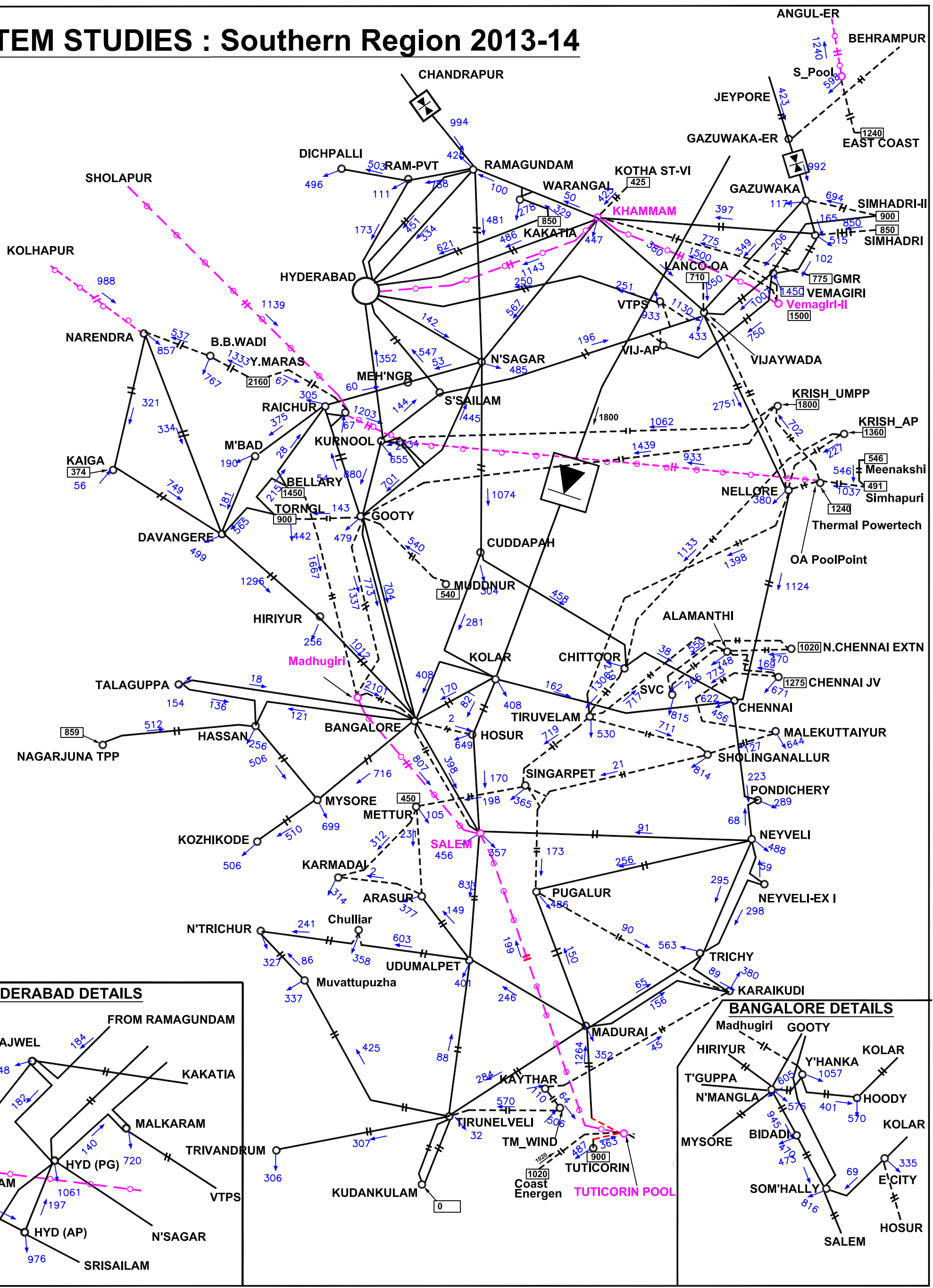


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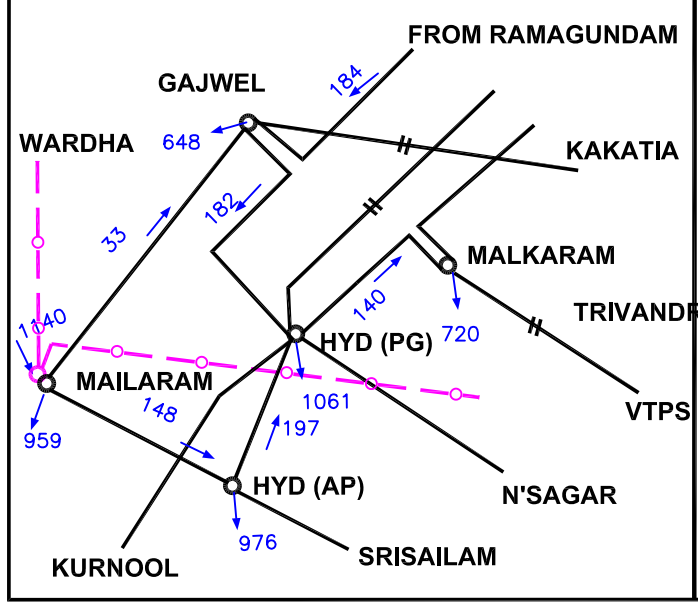




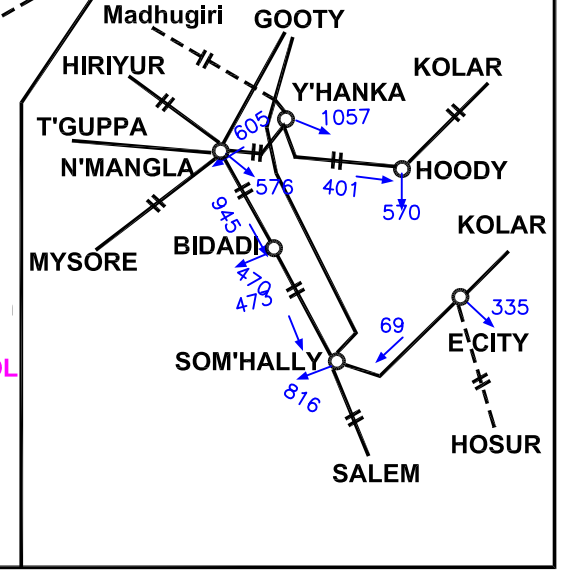
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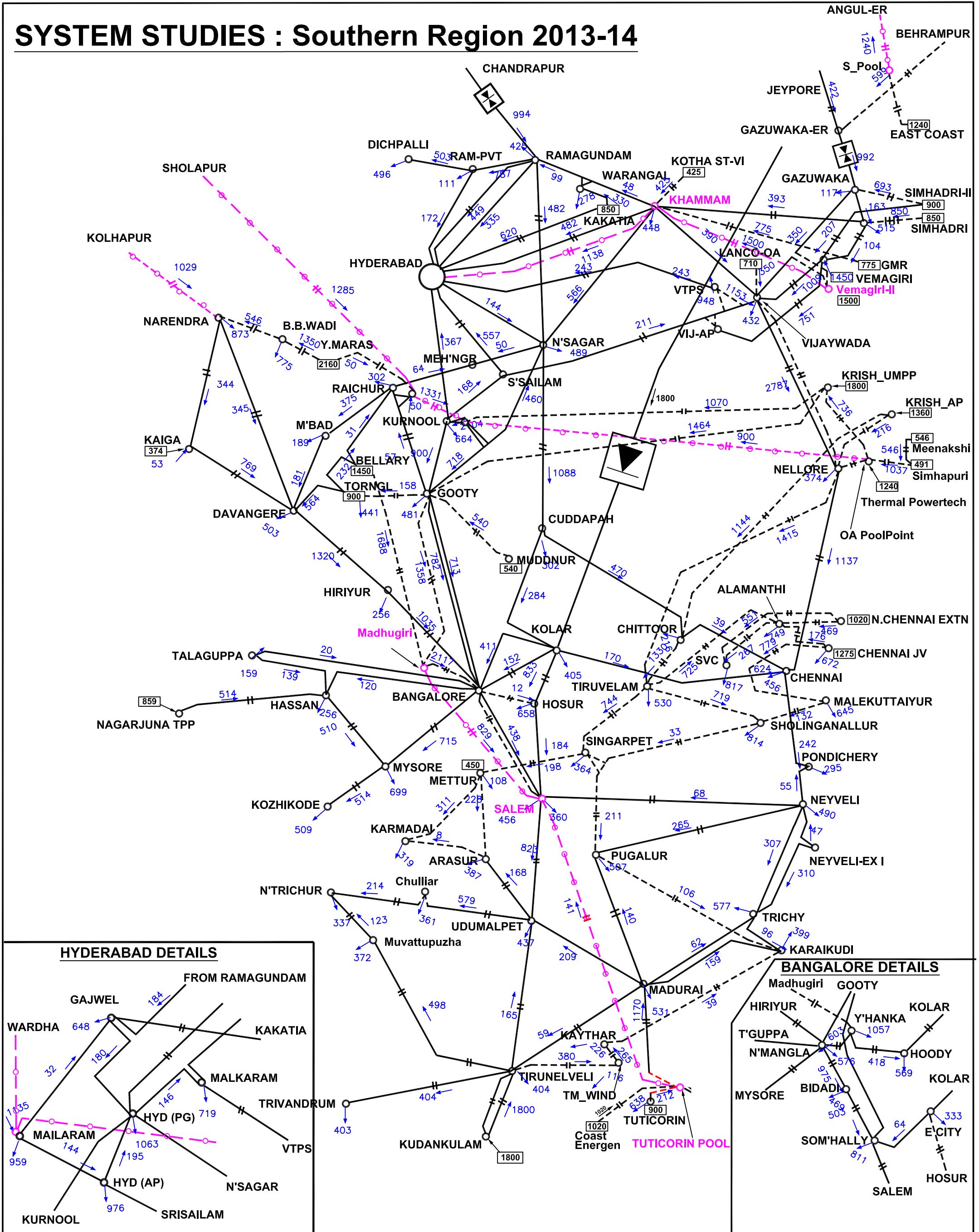
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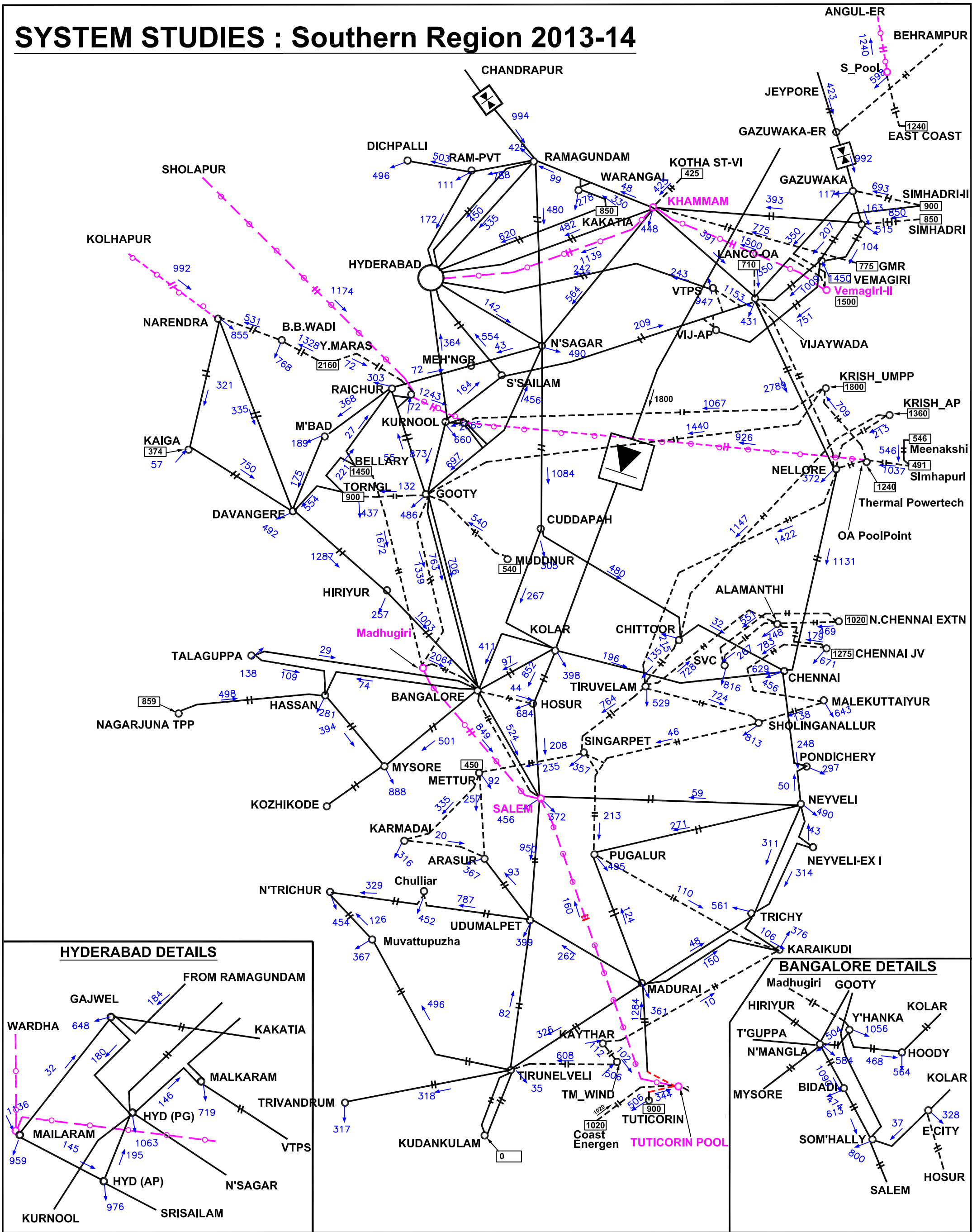
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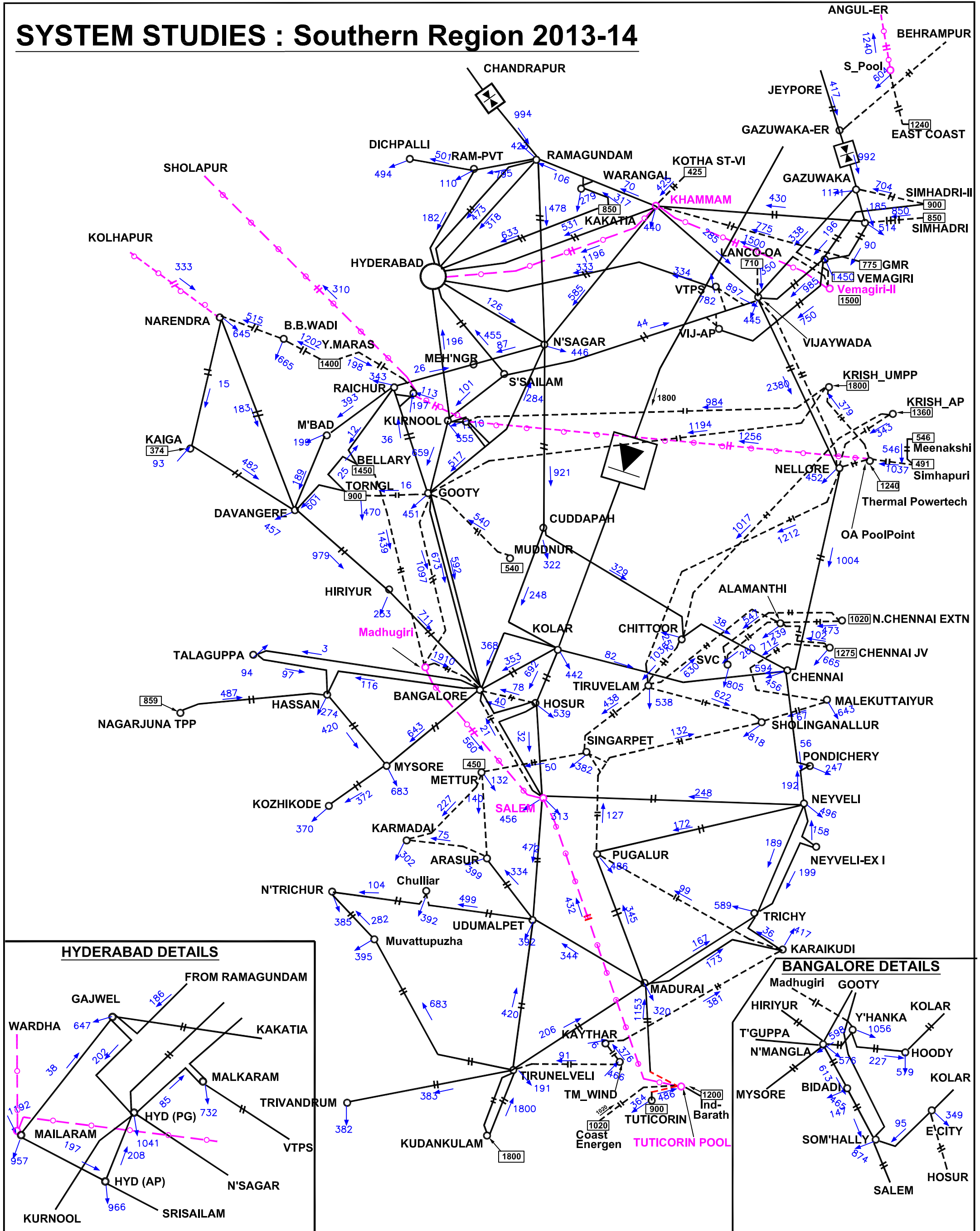
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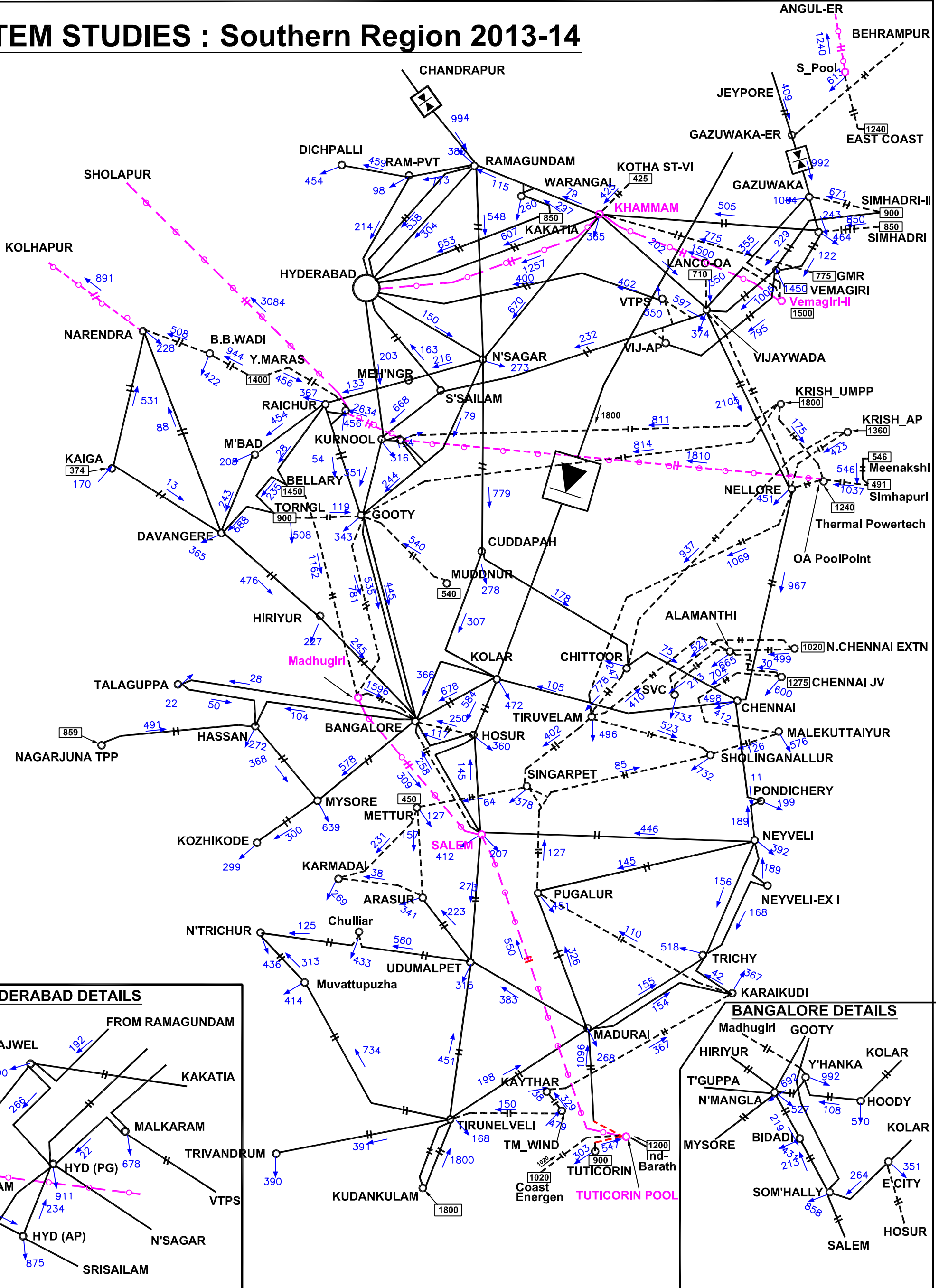
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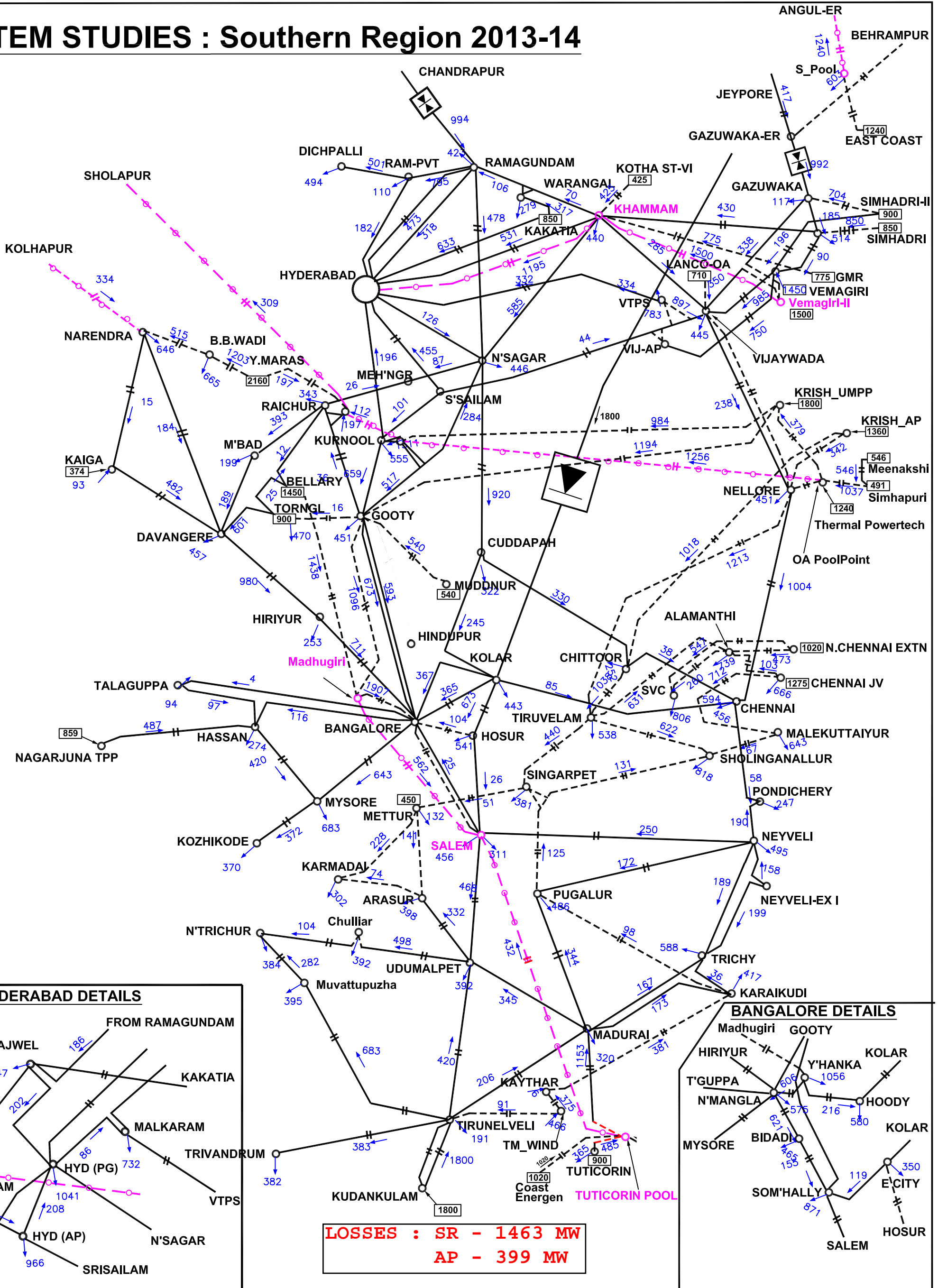
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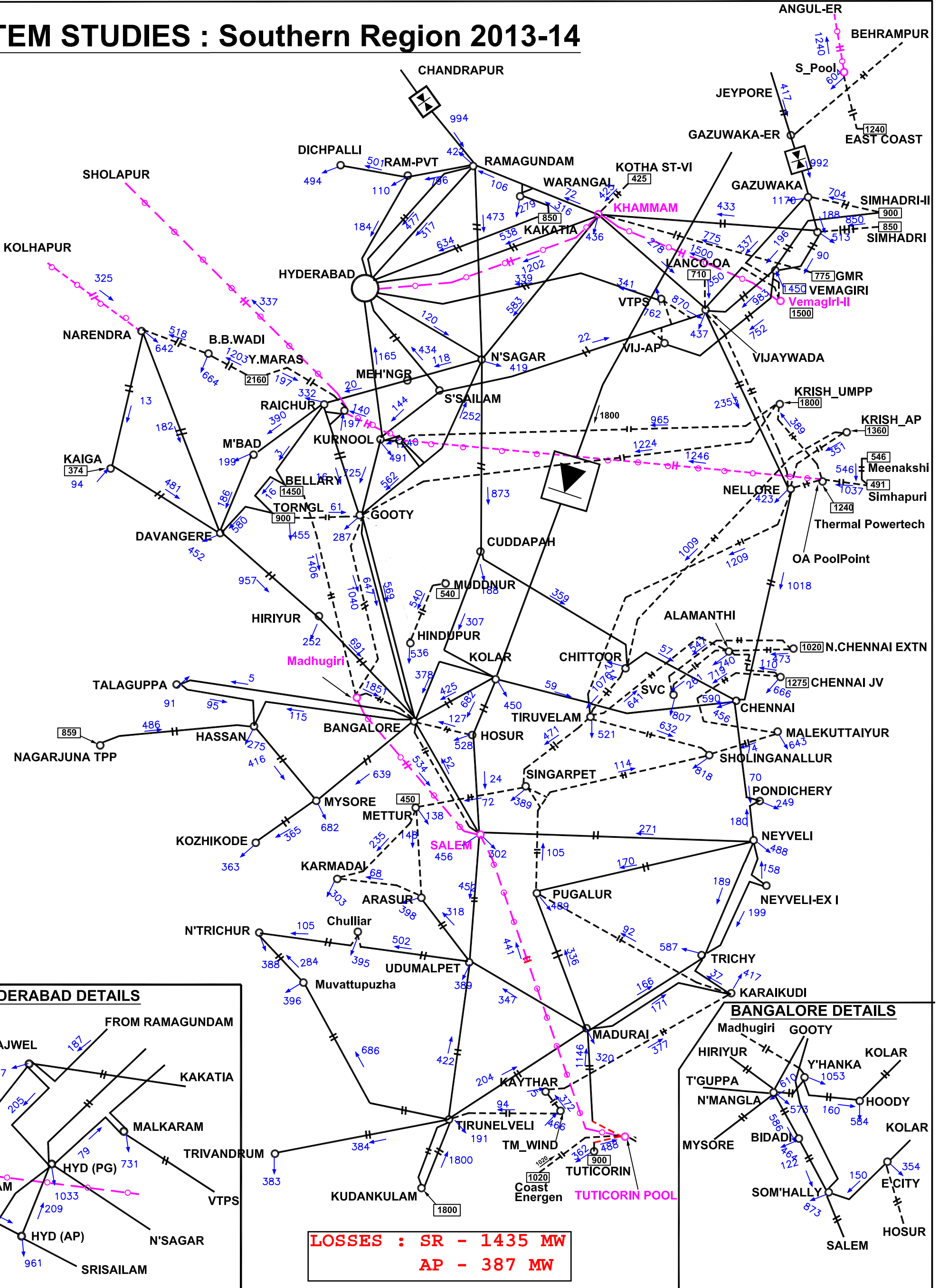
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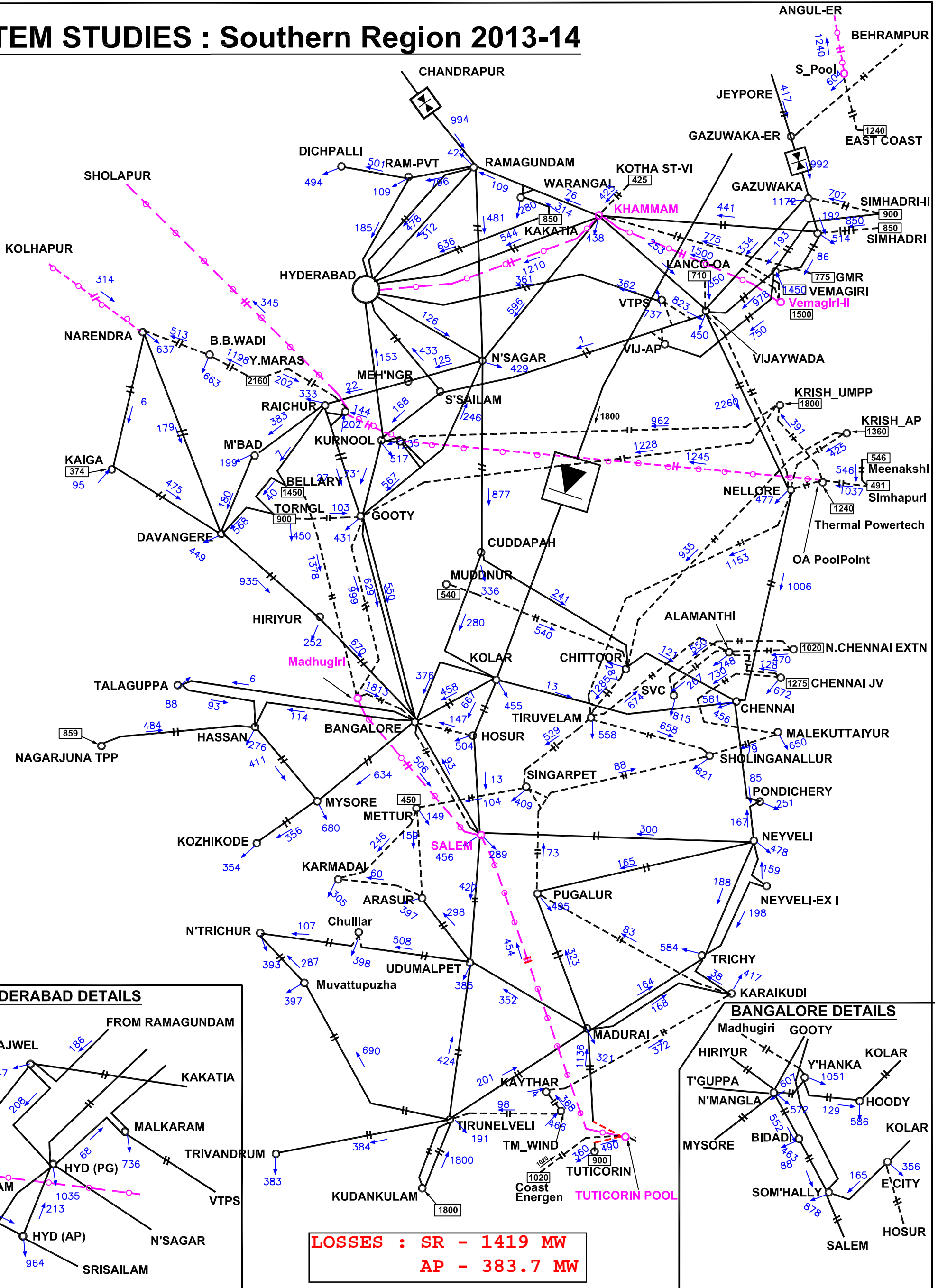
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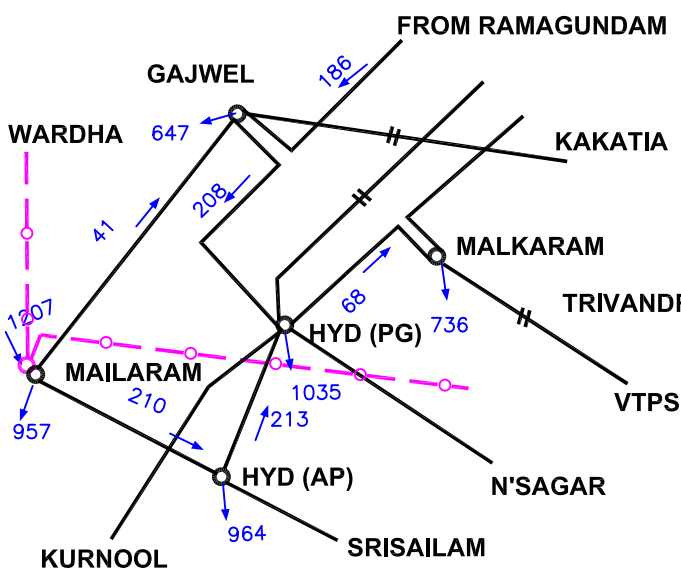
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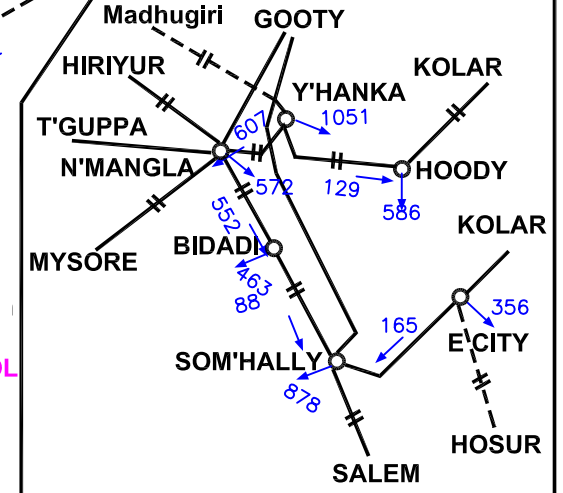
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### HYDERABAD DETAILS



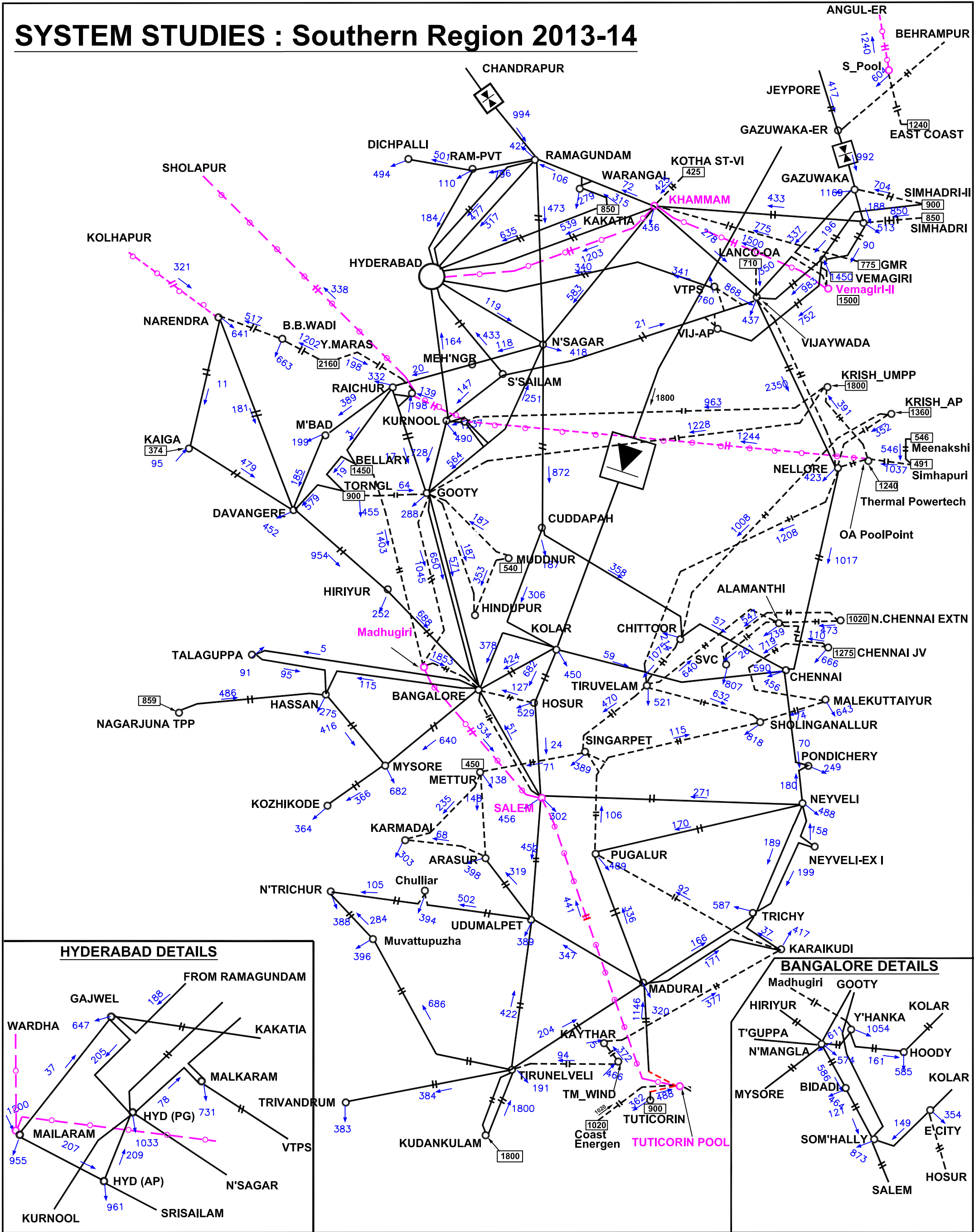
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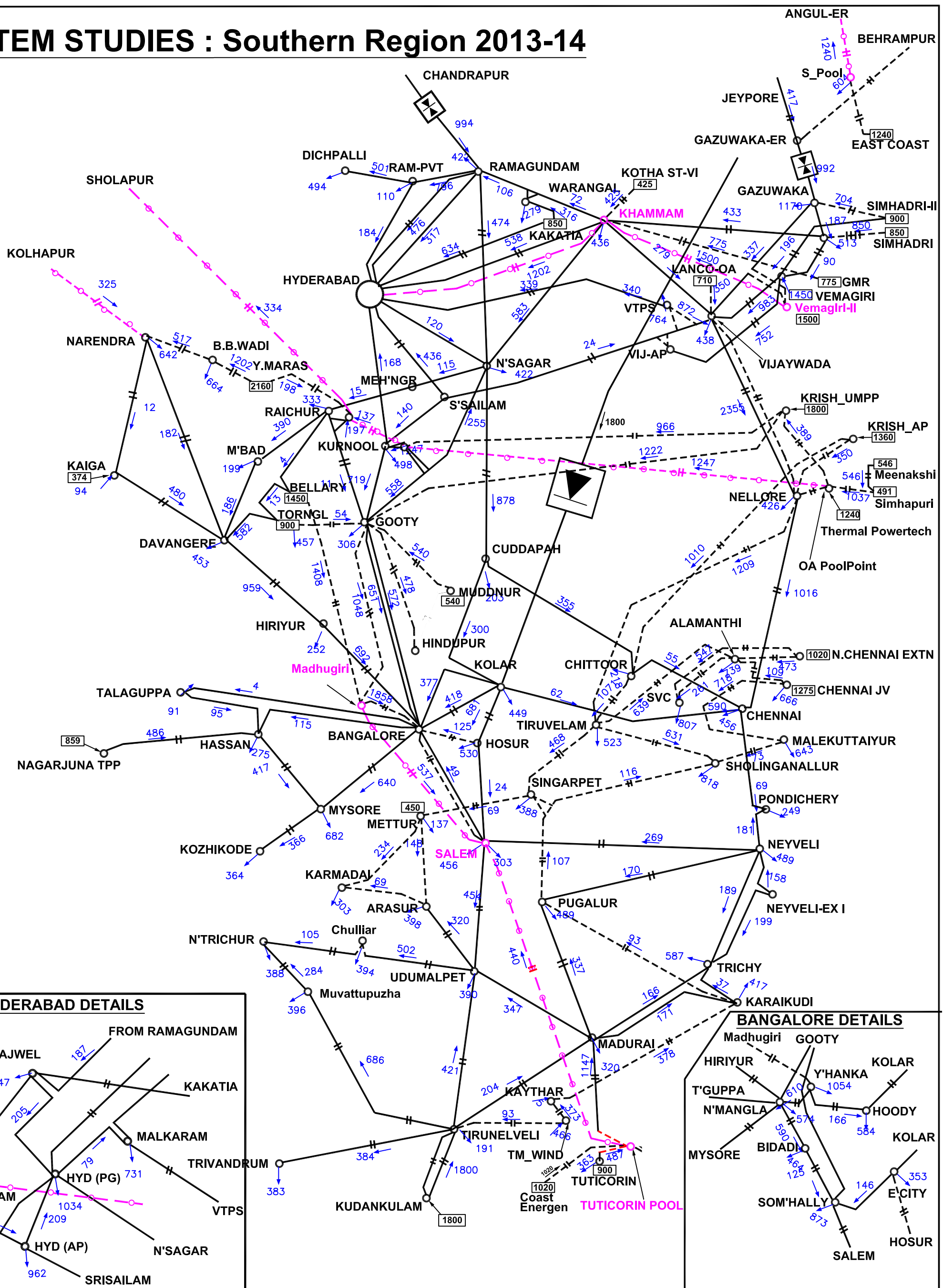
**LOSSES : SR - 1419 MW**  
**AP - 383.7 MW**



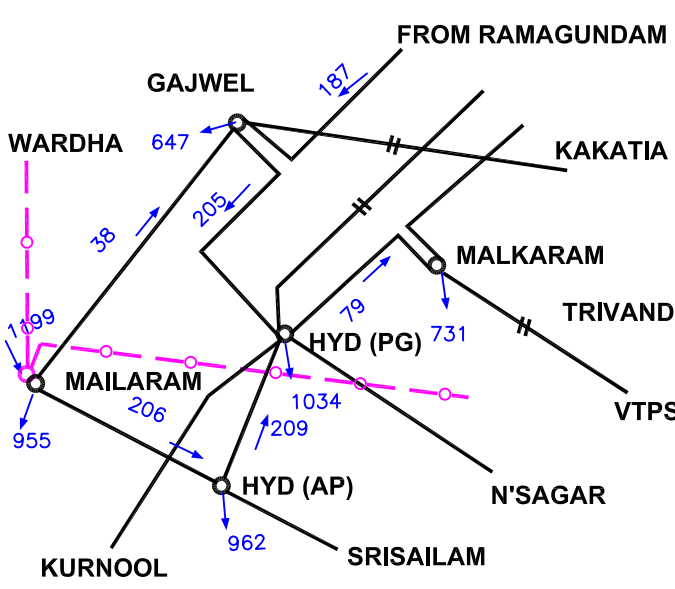
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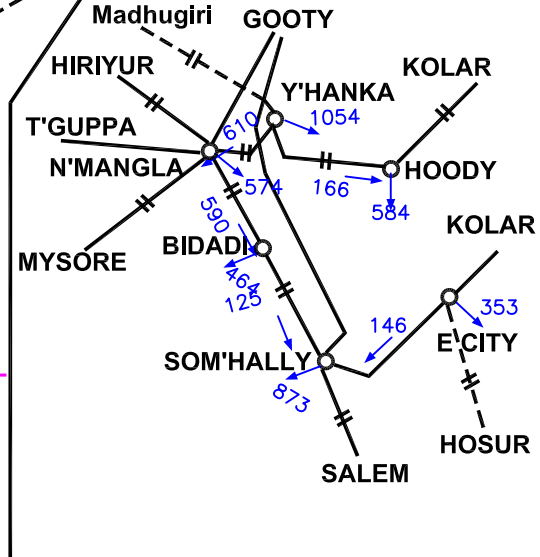
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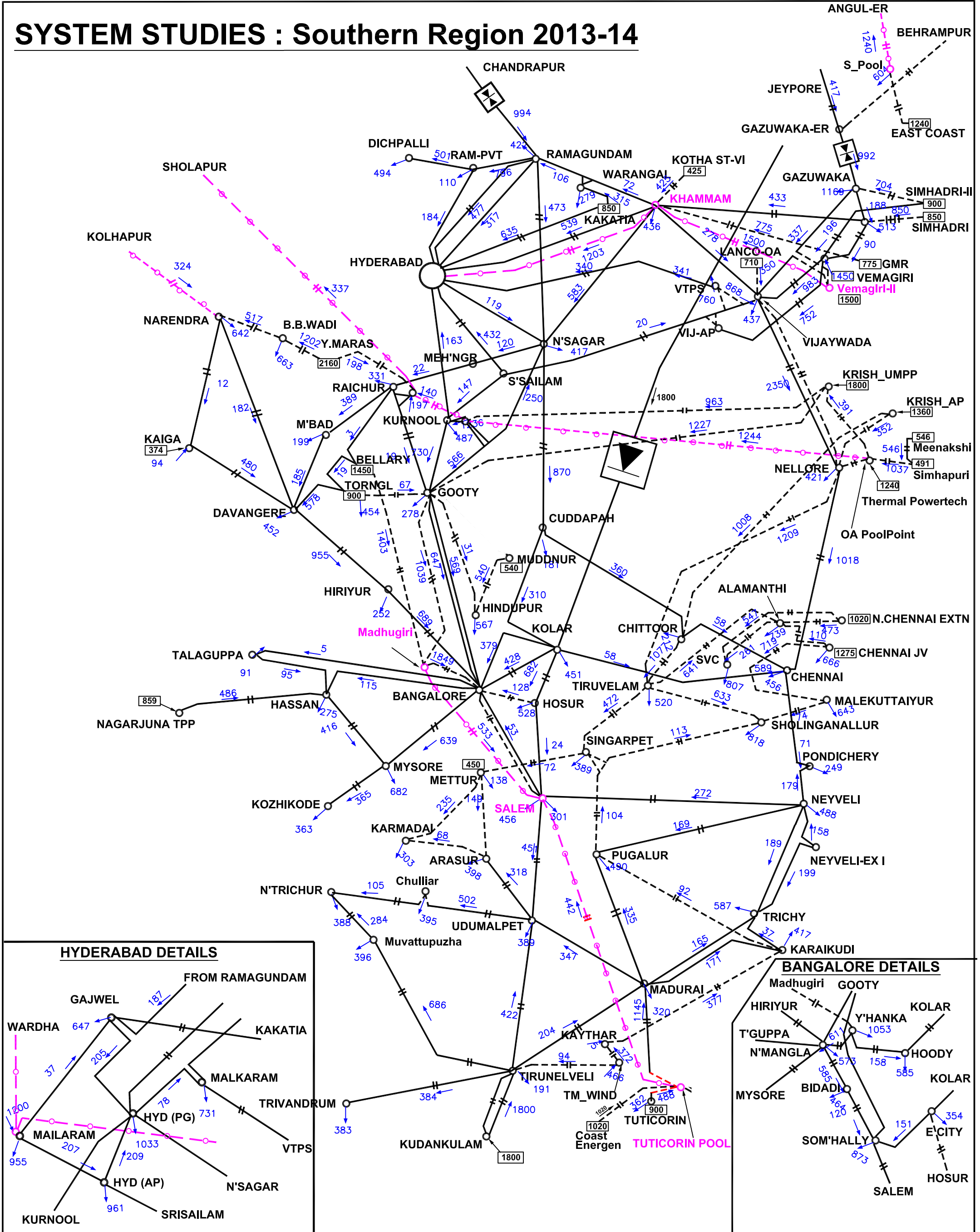
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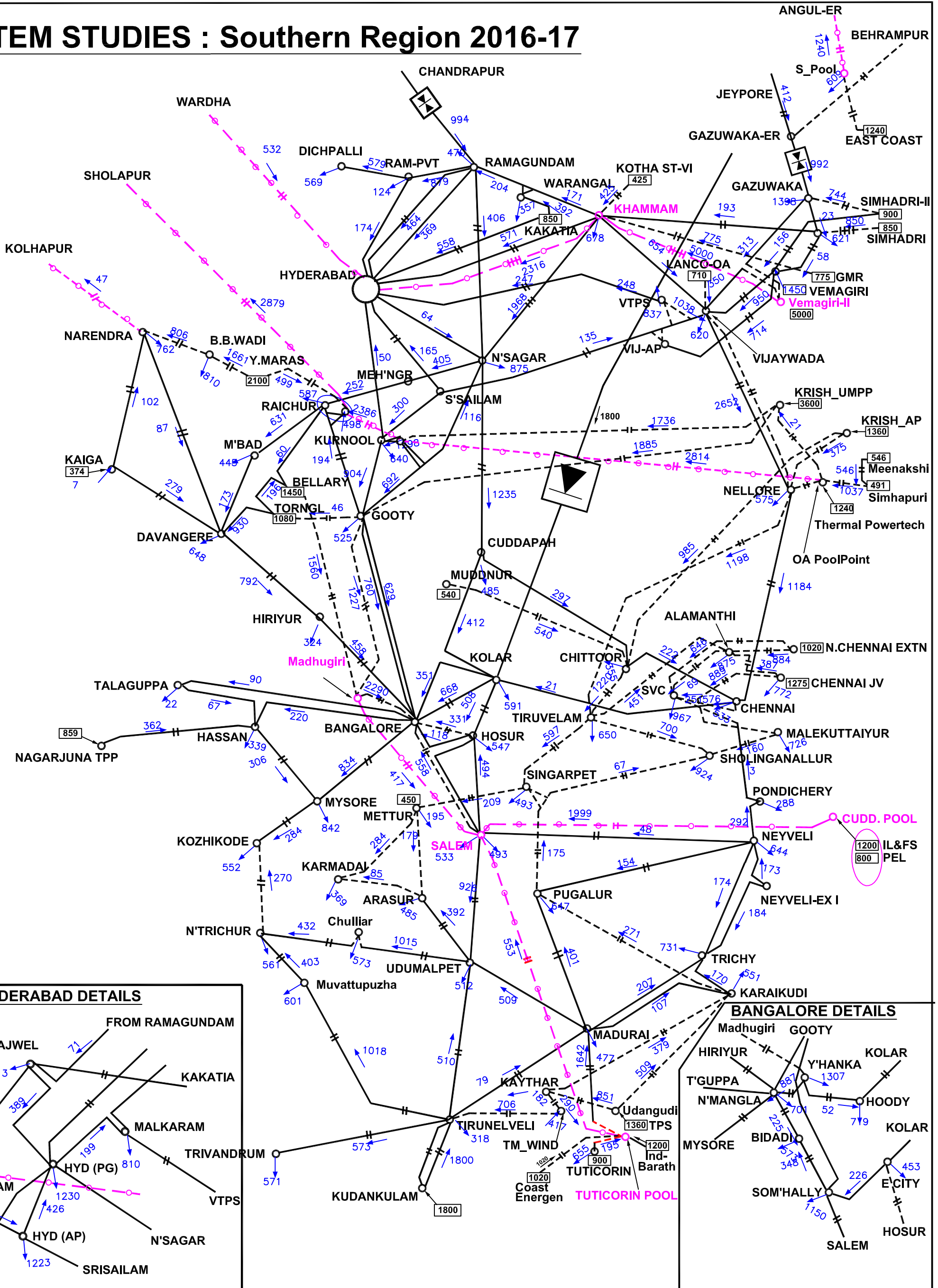
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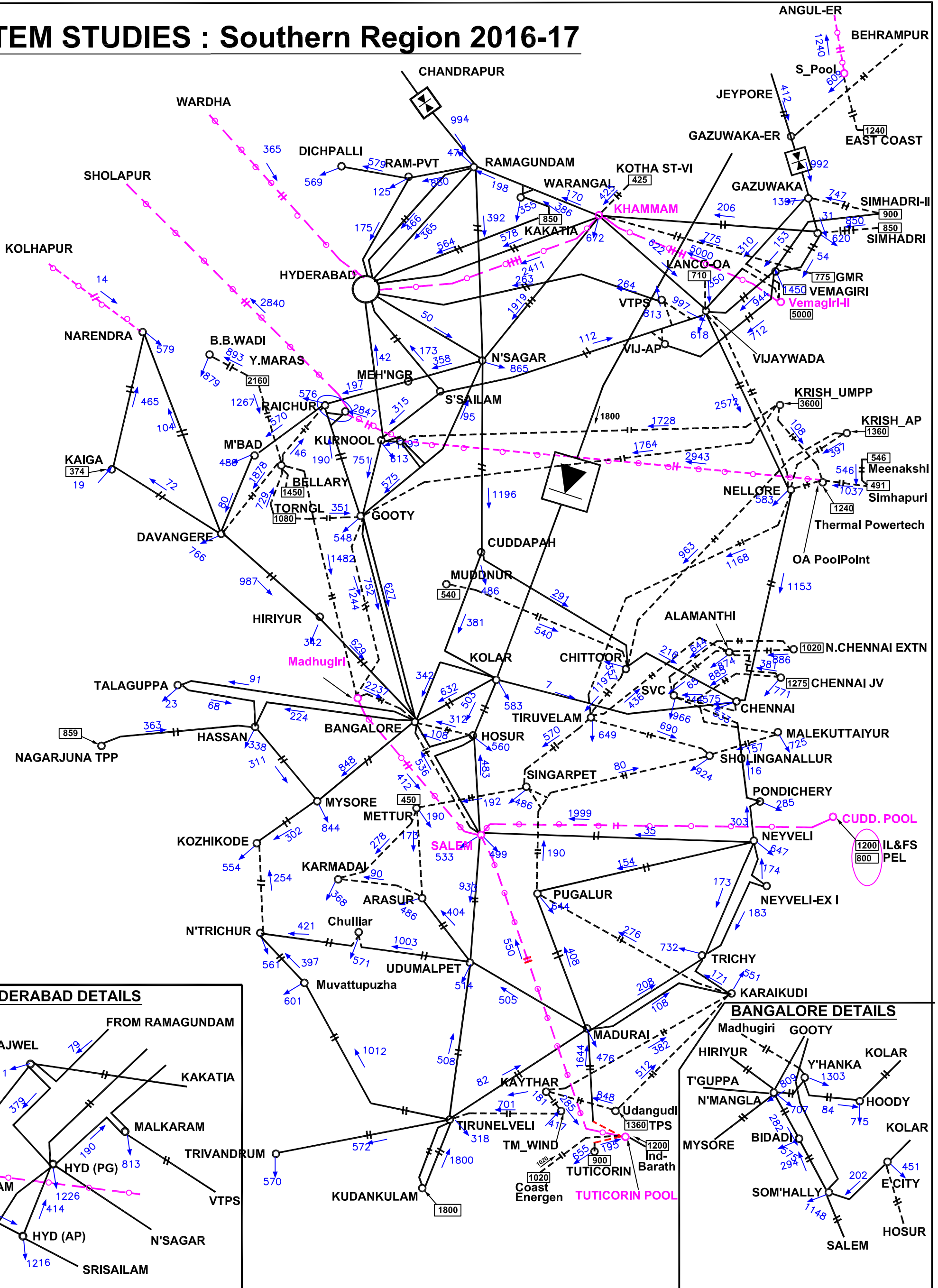
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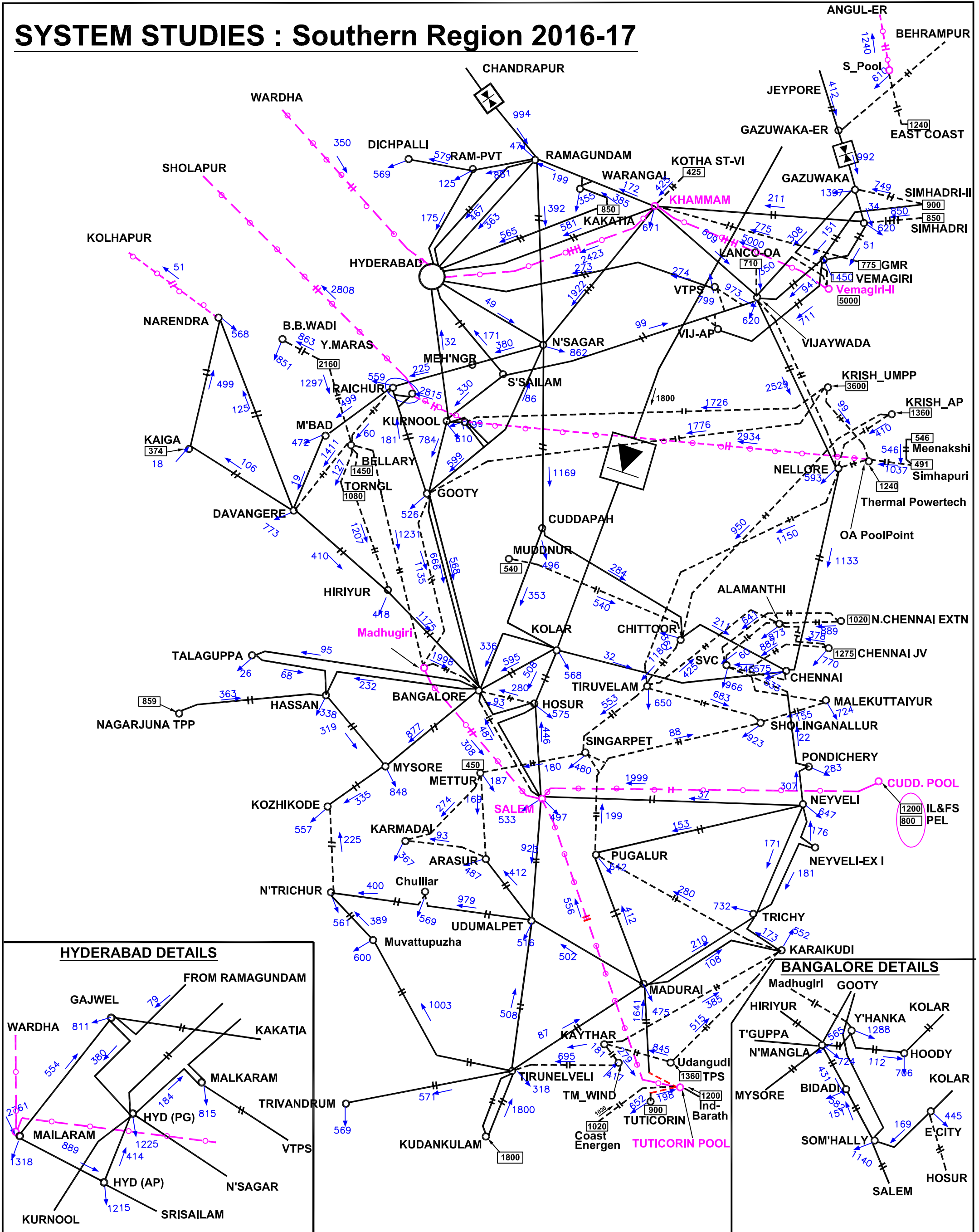
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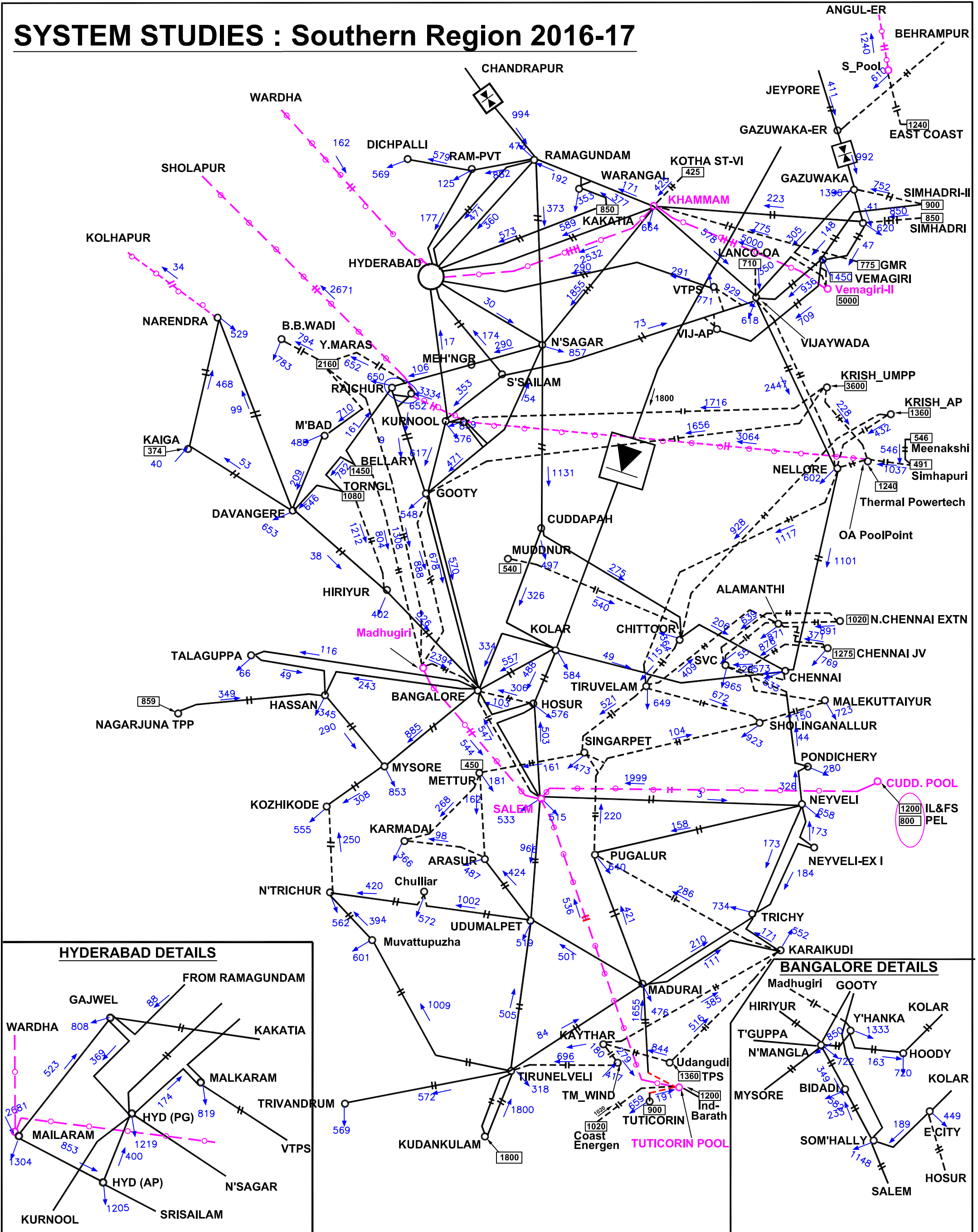
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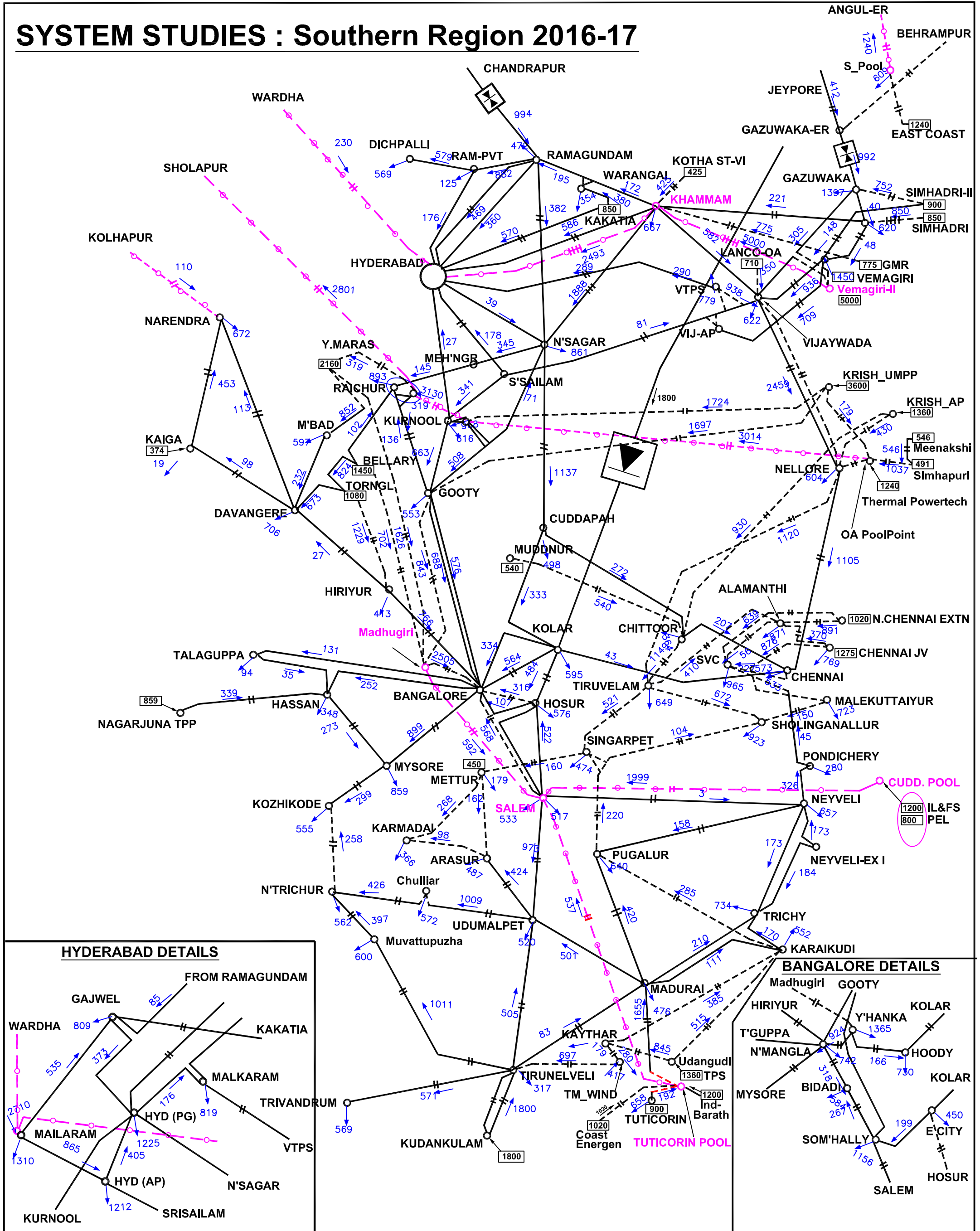
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# SYSTEM STUDIES : Southern Region 2016-17



# SYSTEM STUDIES : Southern Region 2016-17





# SYSTEM STUDIES : Southern Region 2016-17

